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**The Effect of Labeling Information Framing on Genetically Modified Food Choices: A**

**Query Theory Account**

Taylor Pruitt

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### **Abstract**

The progression of policy that regulates genetically modified (GM) food in the US is a prime example of how the role of the government reformulates in relation to societal changes. Support for various labeling programs is formed around key themes which center on the benefits and costs associated with GM labels. The goal of this experiment was to explore the effect of information framing on GM food choices. This was accomplished by presenting information for or against GM labeling in terms of the benefits (positive framing) or costs (negative framing) to consumers. 1,410 consumers participated in an economic experiment where they were asked to make eight choices between otherwise identical hypothetical poultry products, where half of the consumers were presented with positive framing information and the other half with negative framing. This study also used Query Theory to examine social psychological differences between the two framing treatments. The results show that both positive and negative framing decreased utility for consumers. Age and gender were found to be significant factors in my models.

*Keywords:* genetically modified foods, consumer preferences, attribute framing, Query Theory

## **Introduction**

The progression of policy that regulates genetically modified (GM) food in the US is a prime example of how the role of the government reformulates in relation to societal changes. Consumer demand for non-GM foods is on the rise and the Federal government has responded to public demands for mandatory GM labeling by creating the first mandatory labeling program in the US. Support for GM labeling formed around key themes which center on the benefits and costs associated with GM labels. The literature on framing suggests that labels make a substantial difference in consumer decision making. How the GM attributes are represented in a choice situation can influence the choices made by individuals.

## **Literature Review**

GM foods are produced through the process of genetic engineering or biotechnology. The US Department of Agriculture (USDA) defines agricultural biotechnology as, “a range of tools, including traditional breeding techniques that alter living organisms, or parts of organisms, to make or modify products; improve plants or animals; or develop microorganisms for specific agricultural uses” (“Regulation of Biotech Plants”, 2013) . Biotechnology can benefit farmers, producers and consumers. Farmers benefit from the development of biotechnology in modern agriculture for many reasons such as crop resistance toward disease, drought and pests, higher crop yields and a decreased use of pesticides and chemicals. While some consumers are fearful and resistant toward new technology (Messer, Costanigro & Kaiser, 2017), biotechnology is providing advancements in which consumers benefit by the addition of desirable traits and elimination or decrease in undesirable traits in foods. The US government created laws to monitor and regulate practices, such as biotechnology, that may present hazards to human health, human safety and the environment, known as a risk-based approach (Pew, 2001). The FDA has

strict guidelines to ensure that all foods, regardless of production through conventional or biotechnological means, are safe for human consumption (“Regulation of Biotech Plants”, 2013).

There are three options for regulating GM foods in the market including banning GM foods, segregating GM foods through a mandatory labeling system or allowing GM foods to remain unsegregated through the use of a voluntary labeling system (Dannenberg, 2009). In this study, we will look more closely at the latter two options of mandatory and voluntary labeling systems. Historically in the US, GM foods have been labeled under a voluntary labeling program. Voluntary labeling is one solution to labeling because the only producers that have to pay for testing and labeling are those willing to pay for labeling. Voluntary labeling also creates segregation in the market and gives consumers more choice. This allows consumers the freedom to choose between GM or non-GM products (Dannenberg et al., 2010).

Under a mandatory labeling regime, food products containing GM ingredients (above a certain threshold for trace amounts) are required to provide such information on their food label (Byrne et al., 2014). A program of mandatory labeling would require monitoring and enforcement and would spread the burden of costs across all consumers. Such a labeling program could cause a large increase in the price of food due to the incurred costs of scientific testing and the creation of a new label (Dannenberg et al., 2010). This is in stark contrast to the voluntary program where the cost is absorbed by the consumer willingness to pay (WTP) for the product label. The Consumers Union estimates that the costs of mandatory GM labeling would be \$2.30 per capita annually (Consumers Union, 2014). In contrast, research by Lesser (2014) estimated that mandatory labeling would cost a family of four in NY state roughly \$500 per year in increased food costs (\$125 per capita). The American Farm Bureau argues that a patchwork of labeling laws across numerous states would be costly to farmers, processors, retailers and

consumers and could range from \$500 to \$1,500 per year per family (AFB, 2015). These estimates reflect the uncertainty on how much a mandatory food labeling system will impact the cost of food.

Opponents of mandatory GM labeling argue that it can result in a negative perception of GM foods by sending a signal to consumers that the foods produced with GM are unsafe for consumption (Costanigro & Lusk, 2014). The absence of GM products in markets in the EU where mandatory labeling is required could indicate that mandatory labeling does not offer consumers choice but rather restricts choice by effectively banning GM food products. However, mandatory labeling in Brazil and China has not resulted in such negative outcomes. Some of the major GM producers (Brazil and China) use mandatory labeling (Gruère & Rao, 2007). There are also concerns regarding the voluntary labeling of GM foods. There is some concern that in countries applying voluntary labeling this may result in inconsistent labeling and consumers being potentially misled (Viljoen, 2006).

Another important issue regarding mandatory GM labeling is consumer sovereignty. One of the key arguments in the current debate over GM foods is the “right to know” if food contains GM ingredients (Kemper et al., 2018). Food labeling for the consumers’ “right to know” has ties to the basic founding principles of democracy and encompasses issues such as the right to religious freedom, the right to information, the ethics of transparency and societal concerns (Klintman, 2002).

Acceptance of GM foods by consumers is important because acceptance, or lack thereof, can influence changes in labeling requirements, trade policies and welfare. A consumer’s trust in government, prior beliefs and how knowledgeable they feel are all factors that influence the acceptance and regulation of GM foods. Government policy indicates to consumers the safety or

quality of products and consumers with trust in government are consequently more likely to modify beliefs according to government action (Lusk & Rozan, 2008). Prior beliefs are largely related to acceptance of GM foods due to the linkages between prior beliefs and how that affects an individual's ability to process scientific information. Consumers are likely to be skeptical of or reject scientific information if that scientific information does not align with prior beliefs (McFadden & Lusk, 2015). Consumers are also likely to disregard information regarding a topic they feel they are educated on (Lusk & Rozan, 2008). When consumers feel educated on a topic, the scientific community faces challenges sharing legitimate information. Demographics also play a role in acceptance of GM foods. Lusk and Rozan, (2008) found that WTP was directly correlated with gender, age and conclusions on the safety and quality of GM foods. Despite the solid evidence and opinions of organizations such as the European Food and Safety Authority (EFSA) reporting that GM products are unlikely to cause harm to humans, animals or the environment, there continues to be resistance from advocates of mandatory GM labeling (Dannenberg et al., 2010).

Framing is important as it relates to GM labeling because of the profound effect framing has on consumer perception of products. Hardisty, Johnson and Weber (2010) explained that consumers are more likely to pay more for a product described as 75% lean than they are if the product is labeled 25% fat. When comparing these two, the product labeled 75% lean is highlighted as a positive attribute while 25% fat is labeled as a negative attribute or warning signal. The way that this information is presented will play against the beliefs consumers hold such as fat being an undesirable trait and will in turn affect the choices consumers make. In another study, chocolate bars labeled 20% fat became the factor that women identified with and listed as a reason behind choice (Hardisty et al., 2010). This listing of fat percentage on the



chocolate bars resonated more with women than men and shows that along with the framing effects, it is also important to consider which alternatives resonate more or less depending on different groups.

Hardisty et al. (2010) demonstrated the usefulness of Query Theory in the exploration of attribute framing. Query Theory, a “memory-based model of constructive preferences,” can help better understand why consumers make the choices they do (Weber & Johnson, 2011). There are four key principles of Query Theory (Johnson et al., 2007; Weber & Johnson, 2011). First, Query Theory assumes that people break down valuation questions into a series of queries of past experiences for evidence supporting one choice option or another. Second, these queries are carried out sequentially. Third, the order of queries is important because the first query produces richer representations of thoughts and is more heavily weighted than subsequent queries. Fourth, different response modes produce different query orders; hence, the order of options considered is important as it influences the balance of evidence. Query Theory suggests that framing determines the order in which alternatives are considered and, therefore, influences the final decision or choice made by the consumer (Weber & Johnson, 2011). Based on these four key principles, it is important for my research to analyze the sequence of queries that consumers go through while making a decision in order to determine the effect of framing choices.

The goal of this study is to better understand the effect of framing on GM food choices. A choice experiment was conducted where subjects were presented with information for or against GM labeling in terms of the benefits (positive framing) or costs (negative framing) or no information (control). To accomplish my goal, I carry out two specific objectives. First, I compare the choices made by subjects in two framing treatments. Second, subjects were asked to list their thoughts while making decisions in our experiment, and I used Query Theory to

examine these data for any differences among the two framing treatments and the control in terms of 1) the content of aspects listed and 2) the order in which aspects are listed.

## **Materials and Methods**

### **Experimental Design and Data**

The product used in the hypothetical choice experiment was boneless skinless chicken breast. Survey data were collected using a national online survey in 2015 using Sawtooth Software. There were 1,410 respondents to the survey in our two framing experimental treatments and respondents were provided by Survey Sampling International. Subjects participated in a consumer survey and choice experiment. The sample was balanced by the four main U.S. Census regions and by sociodemographic questions. The survey consisted questions regarding risk, food labeling and policy preferences as well as demographic questions. The choice experiment required each subject to complete eight choice tasks that included two experimentally designed options and a “none” option. The choice options were varied by the following attributes and levels: 1) price, which had four levels; 2) GM content of the products, which had three different levels (Non-GMO Project Verified, this product is composed of genetically engineered ingredients, and no information); 3) carbon footprint (four levels); and 4) local production (two levels) (Table 1). A sequential design and D-efficient criterion was used to determine the allotment of attribute levels to products (Bliemer & Rose, 2010). The final design had 32 choice tasks, arranged into four blocks of eight tasks. Respondents were randomly assigned to blocks. Figure 1 offers an example choice task from our experiment. Note: all figures and tables located in the appendix on pages 30-39.

## Experimental Treatments

In order to test the effects of framing on choice and aspects (thoughts) subjects were randomly assigned to one of three treatments: two experimental treatments (positive and negative framing) and one control (no framing). Subjects in all treatments were first presented with information regarding the current (in 2015) voluntary approach to labeling GM foods. Next, subjects in the two experimental treatments received varying information before beginning the choice experiment. In the positive framing treatment, subjects were presented with a statement that emphasizes the theme of the right-to-know and focuses on the positive benefits to consumers associated with mandatory GM labeling. Positive framing statement: *“Supporters of mandatory labeling argue that consumers should have the “right-to-know” what food products contain genetically modified ingredients giving consumers greater choice in the marketplace.”* In the negative framing treatment, the information presented to subjects focused on the negative themes commonly associated with GM labeling, increasing food costs and less choice in the marketplace: *“Opponents of mandatory labeling argue that consumers would see an increase in the cost of food and have fewer choices in the marketplace.”* Subjects in the control were presented with no framing information.

## Research Questions

The general hypothesis of this study is that the stated preferences of consumers can be influenced by the type of framing information presented to consumers. If the influence is strong enough, then framing should have a significant effect on utility in our models. It is expected that if framing effects preferences and choice that the aspects (thoughts) listed by subjects in the experiment should also be affected by framing. Specifically, it is expected that positive framing, when subjects are presented with information emphasizing the positive benefits associated with

GM labeling, will lead to higher utility when subjects make choices in the choice experiment. It is also expected that these subjects list more positive aspects when compared to the control and negative framing treatments. In contrast, it is expected that negative framing, when subjects are presented with information emphasizing the negative benefits associated with GM labeling, will lead to lower utility when subjects make choices in the choice experiment. It is expected that the subjects list more negative aspects when compared to the control and positive framing treatments. Finally, it is expected that a difference in the order of thoughts (SMRD) will exist with subjects exposed to positive framing listing positive aspects first more frequently than those exposed to negative framing, who are expected to be listing negative aspects first. The next two sections describe the Econometric and Query Methods used to test the hypotheses.

### **Econometric Methods**

Respondents' preferences will be analyzed using a discrete choice framework consistent with random utility theory (McFadden, 1974) and Lancaster consumer theory (Lancaster, 1966). A Random Parameters Logit (RPL) model with correlated errors and error components will be used to estimate preferences and WTP. The results of three RPL models are presented in the results sections. The determination of the final models presented was based on a comparison of model fit estimates across all prospective models with the baseline model in terms of significant improvements to model fit estimates. The final three models were selected based on having the best model fit in terms of Log Likelihood (LL) and Akaike information criterion (AIC). Model 1, the RPL baseline model, is specified as:

$$U_{ijt} = \text{NONE} + \beta_1 \text{PRICE}_{ijt} + \beta_2 \text{NG}_{ijt} + \beta_3 \text{GM}_{ijt} + \beta_4 \text{LO}_{ijt} + \beta_5 \text{MD}_{ijt} + \beta_6 \text{HI}_{ijt} + \beta_7 \text{LC}_{ijt} + \eta_{ijt} + \varepsilon_{ijt} \quad (1)$$

where  $i$  refers to the subject,  $j$  refers to three options in each choice set, and  $t$  refers to the number of choice situations. NONE is a dummy coded, alternate specific constant taking the value 1 for

the no-buy option and 0 otherwise. *PRICE* is a continuous variable represented by four price levels (\$2.99, \$6.99, \$10.99, \$14.99). The non-price attributes Non-GMO (NG), Contains GM Ingredients (GM), Low Carbon Footprint (LO), Medium Carbon Footprint (MD), High Carbon Footprint (HI), and Local Production (LC) are dummy coded variables taking the value 1 if the product carries the corresponding label and taking the value of 0 if there is an absence of a label. Finally,  $\eta_{ijt}$  is an error component that is normally distributed, while  $\varepsilon_{ijt}$  is an unobserved random term that is distributed following an extreme value type-I (Gumbel) distribution independent and identically distributed (iid) over alternatives.

For Model 2, additional factors were included. First, I included a variable to test for any framing effects associated with positive and negative framing. Second, I included demographic variables of age and gender. Model 2 is specified as:

$$U_{ijt} = \text{NONE} + \beta_1 \text{PRICE}_{ijt} + \beta_2 \text{NG}_{ijt} + \beta_3 \text{GM}_{ijt} + \beta_4 \text{LO}_{ijt} + \beta_5 \text{MD}_{ijt} + \beta_6 \text{HI}_{ijt} \\ + \beta_7 \text{LC}_{ijt} + \beta_8 \text{PFRAME}_{ijt} + \beta_9 \text{NFRAME}_{ijt} + \beta_{10} \text{AGE}_{ijt} + \beta_{11} \text{GENDER}_{ijt} + \eta_{ijt} + \varepsilon_{ijt} \quad (2)$$

where the additional variables PFRAME and NFRAME are dummy coded variable where 1 indicates that positive (negative) framing was used and 0 indicates no framing (control). AGE is a categorical variable with six age categories (see Table 2) and GENDER is a dummy coded variable where 0 indicates male and 1 indicates female.

Model 3 also included interaction terms to examine any framing interaction with preferences for the non-GMO and GM attribute levels and with our demographic factors of age and gender. Model 3 is specified as:

$$U_{ijt} = \text{NONE} + \beta_1 \text{PRICE}_{ijt} + \beta_2 \text{NG}_{ijt} + \beta_3 \text{GM}_{ijt} + \beta_4 \text{LO}_{ijt} + \beta_5 \text{MD}_{ijt} + \beta_6 \text{HI}_{ijt} \\ + \beta_7 \text{LC}_{ijt} + \beta_8 \text{PFRAME}_{ijt} + \beta_9 \text{NFRAME}_{ijt} + \beta_{10} \text{AGE}_{ijt} + \beta_{11} \text{GENDER}_{ijt} + \beta_{12} \text{PFNG}_{ijt} \\ + \beta_{13} \text{NFNG}_{ijt} + \beta_{14} \text{PFGM}_{ijt} + \beta_{15} \text{NFGM}_{ijt} + \beta_{16} \text{PFxAGE}_{ijt} + \beta_{17} \text{NFxAGE}_{ijt} + \\ \beta_{18} \text{PFxGEN}_{ijt} + \beta_{19} \text{NFxGEN}_{ijt} + \eta_{ijt} + \varepsilon_{ijt} \quad (3)$$

where the terms PFxNG, NFxNG, PFxGM, NFxGM, are product interaction terms between positive framing (PF) or negative framing (NF) terms and the non-GMO (NG) and GM attribute levels. The terms PFxAGE and NFxAGE are product interaction terms between the positive and negative framing terms and factor age, and PFxGEN and NFxGEN are product interaction terms between the framing terms and the factor gender.

### Query Methods

Following Johnson et al. (2007) and the extension suggested by Kemper et al. (2019), my study used a verbal report method called “aspect listing” to obtain information on the thoughts considered during each choice task. Subjects were asked specifically to tell what they were thinking as they made each decision. Subjects were asked to list their reasons one at a time and to consider both positive and negative reasons. The aspects listed by subjects are an approximation of the thoughts that actually occurred while decisions were made. Subjects aspects were then categorized (coded) manually. Following Kemper et al. (2019) data were first coded by the attributes mentioned by respondents (price, gm content, carbon footprint, location, or other). The next step was to classify all aspects listed into one of three categories: 1) value-decreasing, 2) value-increasing, or 3) value-neutral, since the valence (the intrinsic attractiveness or averseness) of aspects listed in Query Theory is significant. Once the aspects were coded, the content of aspects (number of value-decreasing and -increasing thoughts) and the order of aspects (negative or positive thoughts first) can be compared across treatments to examine potential framing effects. The Standardized Median Rank Difference of aspect types (SMRD) (Johnson *et al.* 2007) is used to compare the order of aspects across treatments and is defined as:

$$2(MR_i - MR_d)/n \quad (2)$$

where  $MR_d$  is the median rank of value-decreasing aspects in a participant's sequence;  $MR_i$  is the median rank of value-increasing aspects in a participant's sequence; and  $n$  is the total number of aspects in a participant's sequence. SMRD can take on values from -1 (all value-decreasing thoughts before value-increasing) to 1 (all value-increasing thoughts before value-increasing).

## Results

The sample included 1,410 subjects in three treatments. The sample was balanced by sociodemographic characteristics and across the four main US Census regions. Sample characteristics are reported in Table 2. In the following sections, I first present the results of the econometric models. Next, I present the results of our Query Theory analyses. Finally, I conclude with a discussion of the results and how they relate to the main research questions.

### Econometric Results

Three models were constructed to analyze the effects of framing on consumer preferences. Model 1 is a baseline random parameters logit model that includes only the choice variables in the choice experiment. Although CO2 and local are included in the models and reported in Table 3, because of the focus of this project, the focus will be on the attributes of Price, Non-GMO and GM in the results. Model 2 is a continuation of the baseline random parameters logit model with the addition of positive and negative framing and the demographic factors of age and gender. Model 3 includes the interaction terms where I interacted the framing variables with the GM content attributes and the framing variables with age and gender. The decision to present these three models was based on the model fit estimates associated with each model (log-likelihood and AIC) which helps to determine best model fit. As additional variables were added into the models, a decrease in log-likelihood indicated better model fit. Model 3 was

chosen as the optimal model because it had the best model fit statistics. The results for each model can be found in Table 3.

### **Model 1.**

As shown in Table 3, Model 1 coefficients indicate that consumers view price as one of the most significant attributes ( $\mu=-0.88$ ;  $p\text{-value} < 0.01$ ) and experience a decrease in utility when prices increase. Consumers experienced a large increase in utility when the Non-GM label was on the package ( $\mu=2.01$ ;  $p\text{-value} < 0.01$ ). Consumers experienced decreased utility when GM content was labeled ( $\mu=-0.52$ ;  $p\text{-value} < 0.01$ ). The coefficients for carbon footprint indicate that this variable does not have a strong impact upon consumer preference. Consumers experience an increase in utility when the indicator for local was present ( $\mu=0.54$ ;  $p\text{-value} < 0.01$ ). In conclusion, Model 1 results aligned with my expectations and confirm that consumers, in general, prefer lower prices, preferred the Non-GM label over no label, and respondents did not like knowing when there were GM ingredients in their food. Log-likelihood for this model was -8426.6 and the AIC was 1.497.

### **Model 2.**

According to Table 3, Model 2 coefficients once again reveal that consumers experience decreased utility from price increases ( $\mu=-0.86$ ;  $p\text{-value} < 0.01$ ), increased utility from the Non-GM label ( $\mu=1.99$ ;  $p\text{-value} < 0.01$ ), and decreased utility from the GM ingredient label ( $\mu=-0.51$ ;  $p\text{-value} < 0.01$ ). Model 2 coefficients indicate that consumers experienced a decrease in utility with positive framing (PFRAME) ( $\mu=-0.48$ ;  $p\text{-value} < 0.01$ ) and an increase in utility with negative framing or NFRAME ( $\mu=0.32$ ;  $p\text{-value} < 0.10$ ). As for age, the negative and significant coefficient ( $\mu=-0.27$ ;  $p\text{-value} < 0.01$ ) indicates that older consumers are experiencing less utility associated with the labels in the experiment. This could indicate that older consumers are less



concerned with GM labeling in general and will most likely continue to buy the same products they have always bought regardless of labels. The results of Model 2 also reveal that gender is also a significant factor in determining utility associated with consuming our experimental product. Female consumers experienced less utility than males in our experiment ( $\mu=-0.95$ ;  $p$ -value  $< 0.01$ ). This finding is in line with the findings of (Hardisty et al., 2010) that labels resonate more with women than men and that women identify with undesirable food characteristics, such as GM indicators, then list those as the reasoning behind purchases. While it may seem that many consumers prefer Non-GM over GM, the reasons for buying Non-GM may be strictly to avoid GM rather than consumers preferring Non-GM. The log-likelihood increased by the addition of the aforementioned variables and was -8407.8 and the AIC was 1.495 for Model 2.

### **Model 3.**

Results of Model 3, found in Table 3, again reveal that consumers experience decreased utility from price increases ( $\mu=-0.87$ ;  $p$ -value  $< 0.01$ ), increased utility from the Non-GMO label ( $\mu=2.22$ ;  $p$ -value  $< 0.01$ ) and decreased utility from GM indicators ( $\mu=-0.43$ ;  $p$ -value  $< 0.01$ ). Results also indicate that consumers experienced a decrease in utility when exposed to positive framing or PFRAME ( $\mu=-4.23$ ;  $p$ -value  $< 0.01$ ). This was a somewhat surprising result as I had expected positive framing to result in an increase in utility. I also observed a decrease in utility with negative framing or NFRAME ( $\mu=-1.28$ ;  $p$ -value  $> 0.10$ ); however, this result is not significant in Model 3. These results are interesting because both positive and negative framing decreased utility for consumers. As for age, older consumers again experienced less utility ( $\mu=-0.28$ ;  $p$ -value  $< 0.01$ ). The model reveals that female consumers experienced a large decrease in utility compared to males ( $\mu=-2.39$ ;  $p$ -value  $< 0.01$ ).

The interaction terms included in Model 3 also offer some interesting results (Table 3). The interaction between positive framing and non-GM labeling (PFxNG) ( $\mu=-0.34$ ;  $p\text{-value} > 0.10$ ) and the interaction between positive framing and GM (PFxGM) ( $\mu=-0.17$ ;  $p\text{-value} > 0.10$ ) were both found to be insignificant. However, the interaction between negative framing and non-GM labeling (NFxNG) was found to be significant ( $\mu=-0.49$ ;  $p\text{-value} < 0.05$ ) while the interaction between negative framing and GM labeling (NFxGM) was not significant ( $\mu=-0.13$ ;  $p\text{-value} > 0.10$ ).

Finally, the framing treatment variable was interacted with age and gender. The interaction between positive framing and age (PFxAGE) was not found to be significant ( $\mu=0.10$ ;  $p\text{-value} > 0.10$ ). The interaction between negative framing and age (NFxAGE) indicates a weakly significant and negative associate between age and negative framing ( $\mu=-0.31$ ;  $p\text{-value} < 0.05$ ). This coefficient could be interpreted to indicate that younger consumers are more responsive to negative framing than older consumers. The interaction between positive framing and gender (PFxGEND) was found to be significant ( $\mu=2.28$ ;  $p\text{-value} < 0.01$ ). I believe this result indicates that female respondents who were exposed to positive framing also experienced increased utility. Finally, the interaction between negative framing and gender (NFxGEND) indicates that this interaction was positive and significant ( $\mu=1.56$ ;  $p\text{-value} < 0.01$ ).

The results from Model 3 indicate that when framing is viewed on its own (without interactions) that whether positive or negative, framing appears to have a negative effect on consumer utility. However, interpreting the interaction term results indicates that positive and negative framing resonates differently with consumers depending on age and gender. In this case, framing had a larger impact on younger and female consumers. Another interesting result is that positive framing alone was significant, but with the addition of interaction terms of positive

framing with Non-GM, GM and age, there was no significance. While negative framing alone was insignificant, the interactions of negative framing with age and gender became significant. This model was chosen as the optimal model with a log-likelihood of -8354.4 and AIC of 1.488.

### **Query Results**

Query theory was used in this experiment to determine if information framing changes the content of thoughts and if framing changes the order of consumer's thoughts. In Figure 2, the average aspects listed per respondent for the positive framing treatment was 5.87 value-increasing thoughts and 7.63 value-decreasing thoughts. Similarly, in the negative framing treatment, subjects listed 5.29 value-increasing thoughts and 7.53 value-decreasing thoughts. When comparing positive and negative framing treatments, there was no significant difference between the treatments. However, when compared to the control treatment, there were significant differences. In the control, subjects listed on average 6.05 value-increasing thoughts and 6.65 value-decreasing thoughts. These results indicate that framing (whether positive or negative) generated on average about one more negative thought per subject compared to the experimental control group. Based on the ANOVA results I can conclude that there was a significant treatment effect and framing did influence the content of thoughts in the experiment.

Figure 3 presents the results of my analysis on the order of thoughts. The results indicate that subjects exposed to positive framing have lower SMRD scores (-0.07) compared to the control (-0.0166). Subjects exposed to negative framing also have lower SMRD scores (-0.043) compared to the control; however, these differences are not substantial enough to be significant. Therefore, based on the ANOVA results I cannot conclude that framing (positive or negative) significantly changed the order of thoughts in the experiment.

My Query results are interesting but do not align with my hypotheses. I expected that subjects exposed to positive framing would list more positive thoughts and more positive thoughts first and that subjects exposed to negative framing would list more negative thoughts and negative thoughts first. I found that subjects, whether exposed to positive or negative framing, listed more negative thoughts and negative thoughts first. This is an interesting finding and could mean that when consumers are presented with any information on GM foods, whether positive or negative, tend to have negative attitudes.

### **Conclusion**

In conclusion, framing did have an effect on consumer choice, but not as expected. I predicted that positive framing would ultimately lead to an increase in utility and negative framing would lead to a decrease in utility. Positive framing alone had a very significant negative impact upon utility then the interactions of positive framing with the non-GM and GM labels both resulted in slightly negative utility but with no significance. The results with interactions of positive framing and age were not significant but finally the interaction between positive framing and gender increased utility and was largely significant. As for negative framing, in Model 2 negative framing resulted in a slightly significant increase in utility while in Model 3, negative framing decreased consumer utility but was not significant. The interaction between negative framing and GM labels was slightly negative and not significant while the interaction between negative framing and Non-GM labeling decreased utility and was significant. This result was expected as I believed that negative framing would decrease consumer utility. The interaction between negative framing and age resulted in decreased utility and was significant. The interaction between negative framing and gender increased utility and was also significant. When looking at the interactions between framing and age and the interactions between framing

and gender, negative framing seemed to resonate more with females and younger consumers. This finding supports the results of Lusk and Rozan (2008) that specific demographics such as age and gender are largely responsible for the acceptance or rejection of GM foods. Negative framing appeared to cause more of an effect on consumer choice than positive framing, but ultimately, both negative and positive framing overall seemed to decrease utility for consumers. This result might reaffirm that consumers are so resistant toward biotechnology that presenting any information on GM foods, whether positive or negative, appears to confuse consumers and in turn, these consumers do not wish to purchase foods that are addressing a topic the consumer is unsure of.

While positive framing had a stronger effect on consumer utility, both positive and negative framing reduced individuals' utility in the choice experiment. Compared to the control, both framing treatments listed more value-decreasing aspects and fewer value-increasing aspects. SMRD values were found to be lower in both framing treatments; however, differences were not found to be significant. These results could be explained by consumers' lack of knowledge on GM foods and because consumers are fearful of the genetic engineering of our food, it is not surprising that consumers are listing more negative thoughts on a topic that there is so much controversy over. These results might indicate the same thing found in the framing results that consumers are still so resistant toward biotechnology and GM production that they are going to reject any information on the subject. This might indicate that consumer rejection of GM foods will lead to a mandatory labeling system and ultimately might also result in the loss of GM foods in the U.S. food market.

Some weaknesses of this study might have been the lack of more extreme positive and negative framing. It might be best to provoke consumers in order to reveal the true factors that

consumers ultimately based their purchasing decisions upon. In the future, it would be interesting to present more extreme framing then to study the interactions of framing with even more factors to identify the most important factors to consumers when they buy food. The limitation of this study is that in studying the factors and interactions chosen, there are limitless factors and interactions that could be considered. In the future, better methods of identifying the factors that affect consumers the most need to be developed. The results I found were confusing and made it difficult to draw any profound conclusions. I believe that lack of a better information extraction method is the reason that I did not find more interesting results. It is not easy to identify the factors driving consumer choice seeing as psychology is so complex and consumers do not always understand the actual reasoning behind their own decision making. This makes it very difficult for researchers because now we must figure out a way to extract the legitimate reasons behind choice from the consumers. The task of creating better methods of extracting information is left to the scientific community. This is such an important task because researchers must identify methods of extracting all information from consumers on why they make the decisions they do, whether it be conscious or subconscious reasonings, in order to obtain accurate research. After this happens, we in the scientific community may then be able to understand what is going on in the consumer's mind and determine what key factors are driving consumer choice. Once these methods are found, I predict that it will be much easier to obtain the results that reveal how framing effects consumer choice in connection with GM food package labeling.

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## Tables

Table 1.

### *Choice Experiment Attributes, Coding, Levels and Descriptions*

<b>Attributes</b>	<b>Levels/Descriptions</b>	<b>Coding</b>
<i>Local (2)</i>	No information	0
	Local production	1
	None	0
<i>Carbon Footprint (4)</i>	No information	0, 0, 0
	79 oz CO <sub>2</sub> e/lb (low)	1, 0, 0
	90 oz CO <sub>2</sub> e/lb (medium)	0, 1, 0
	112 oz CO <sub>2</sub> e/lb (high)	0, 0, 1
	None	0, 0, 0
<i>GM Content (3)</i>	No information	0, 0
	Non-GM verified	1, 0
	Contains GM	0, 1
	None	0, 0
<i>Price (4)</i>	\$2.99	\$2.99
	\$6.99	\$6.99
	\$10.99	\$10.99
	\$14.99	\$14.99
	None	None

Note: <sup>1</sup> None option is an alternate specific constant rather than an attribute level  
 Table derived from data collected by Kemper (2016)

**Table 2.***Sample Characteristics, Counts and Percentages*

Characteristic	Overall		Experimental Treatments					
			Control		Positive Framing		Negative Framing	
Gender	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Male	482	34.2%	167	34.9%	164	35.3%	151	32.3%
Female	928	65.8%	311	65.1%	301	64.7%	316	67.7%
Age group	Count	Percent	Count	Percent	Count	Percent	Count	Percent
18–24 years	110	7.8%	40	8.4%	44	9.5%	26	5.6%
25–34 years	302	21.4%	108	22.6%	93	20.0%	101	21.6%
35–44 years	238	16.9%	83	17.4%	77	16.6%	78	16.7%
45–54 years	249	17.7%	79	16.5%	76	16.3%	94	20.1%
55–64 years	277	19.6%	91	19.0%	98	21.1%	88	18.8%
65 years or older	234	16.6%	77	16.1%	77	16.6%	80	17.1%
Education Level	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Some Grade School	27	1.9%	8	1.7%	5	1.1%	14	3.0%
Some High School	456	32.3%	154	32.2%	146	31.4%	156	33.4%
High School Diploma	299	21.2%	100	20.9%	104	22.4%	95	20.3%
Associates Degree (2-year degree)	414	29.4%	144	30.1%	138	29.7%	132	28.3%
Bachelors Degree (4-year degree)	168	11.9%	60	12.6%	51	11.0%	57	12.2%
Masters Degree	46	3.3%	12	2.5%	21	4.5%	13	2.8%
Doctoral Degree	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Income	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Under \$20,000	173	12.3%	63	13.2%	49	10.5%	61	13.1%
20,000-39,999	316	22.4%	96	20.1%	119	25.6%	101	21.6%
40,000-59,999	291	20.6%	107	22.4%	82	17.6%	102	21.8%
60,000-79,999	229	16.2%	69	14.4%	78	16.8%	82	17.6%
80,000-99,999	162	11.5%	57	11.9%	62	13.3%	43	9.2%
100,000-119,999	88	6.2%	29	6.1%	26	5.6%	33	7.1%
120,000-139,999	48	3.4%	18	3.8%	18	3.9%	12	2.6%
140,000-159,999	45	3.2%	19	4.0%	12	2.6%	14	3.0%
160,000 and above	58	4.1%	20	4.2%	19	4.1%	19	4.1%

Note: The sample size used is made up of the primary household grocery shoppers for individual households

Table derived from data collected by Kemper (2016)

**Table 2.***Sample Characteristics, Counts and Percentages continued*

Characteristic	Overall		Experimental Treatments					
			Control		Positive Framing		Negative Framing	
Region	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Northeast	348	24.7%	116	24.3%	114	24.5%	118	25.3%
Midwest	350	24.8%	116	24.3%	123	26.5%	111	23.8%
South	365	25.9%	126	26.4%	116	24.9%	123	26.3%
West	347	24.6%	120	25.1%	112	24.1%	115	24.6%
Race	Count	Percent	Count	Percent	Count	Percent	Count	Percent
American Indian or Alaska Native	8	0.6%	6	1.3%	2	0.4%	0	0.0%
Asian	15	1.1%	6	1.3%	5	1.1%	4	0.9%
Black or African American	65	4.6%	25	5.2%	20	4.3%	20	4.3%
Native Hawaiian or Other Pacific Islander	109	7.7%	39	8.2%	36	7.7%	34	7.3%
White	8	0.6%	3	0.6%	3	0.6%	2	0.4%
Mixed	1179	83.6%	389	81.4%	391	84.1%	399	85.4%
no response	26	1.8%	10	2.1%	8	1.7%	8	1.7%
Hispanic	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Hispanic or Latino	114	8.1%	47	9.8%	33	7.1%	34	7.3%
Not Hispanic or Latino	1296	91.9%	431	90.2%	432	92.9%	433	92.7%

Note: The sample size used is made up of the primary household grocery shoppers for individual households  
Table derived from data collected by Kemper (2016)

**Table 3.***Random Parameters Logit (RPL) Model Results for Three Models*

Variables	Coefficient	MNL			Model 1 RPL Baseline			Model 2 RPL + Framing + Factors			Model 3 RPL + Framing + Factors + Interactions		
		Estimate	S.E.		Estimate	S.E.		Estimate	S.E.		Estimate	S.E.	
<i>Price</i>	$\mu$	0.25 ***	0.01		-0.88 ***	0.02		-0.86 ***	0.02		-0.87 ***	0.02	
	$\sigma$	-	-		0.76 ***	0.03		0.69 ***	0.02		0.73 ***	0.03	
<i>NON-GM (NG)</i>	$\mu$	1.18 ***	0.04		2.01 ***	0.10		1.99 ***	0.10		2.22 ***	0.16	
	$\sigma$	-	-		2.36 ***	0.08		2.46 ***	0.09		2.55 ***	0.10	
<i>GM (GM)</i>	$\mu$	-0.27 ***	0.03		-0.52 ***	0.06		-0.51 ***	0.06		-0.43 ***	0.09	
	$\sigma$	-	-		0.90 ***	0.07		0.98 ***	0.08		0.88 ***	0.09	
<i>LOWCO2 (LO)</i>	$\mu$	0.19 ***	0.04		0.41 ***	0.06		0.42 ***	0.06		0.41 ***	0.07	
	$\sigma$	-	-		0.02	0.16		0.01	0.15		0.07	0.15	
<i>MEDIUMCO2 (MD)</i>	$\mu$	0.09 **	0.04		0.13 **	0.07		0.12 *	0.07		0.13 *	0.07	
	$\sigma$	-	-		0.11	0.15		0.04	0.14		0.05	0.15	
<i>HIGHCO2 (HI)</i>	$\mu$	0.11 ***	0.04		0.18 ***	0.06		0.18 ***	0.06		0.19 ***	0.06	
	$\sigma$	-	-		0.07	0.13		0.13	0.12		0.04	0.11	
<i>LOCAL (LC)</i>	$\mu$	0.31 ***	0.03		0.54 ***	0.04		0.56 ***	0.04		0.54 ***	0.04	
	$\sigma$	-	-		0.10	0.08		0.05	0.09		0.31 ***	0.08	
<i>PFRAME</i>	$\mu$	-	-		-	-		-0.48 ***	0.18		-4.23 ***	0.93	
	$\sigma$	-	-		-	-		0.48 ***	0.18		0.19	0.19	
<i>NFRAME</i>	$\mu$	-	-		-	-		0.32 *	0.19		-1.28	0.92	
	$\sigma$	-	-		-	-		0.51 ***	0.20		0.42 **	0.16	
<i>AGE</i>	$\mu$	-	-		-	-		-0.27 ***	0.05		-0.28 ***	0.09	
	$\sigma$	-	-		-	-		0.30 ***	0.02		0.14 ***	0.02	
<i>GENDER</i>	$\mu$	-	-		-	-		-0.95 ***	0.16		-2.39 ***	0.30	
	$\sigma$	-	-		-	-		1.22 ***	0.06		1.48 ***	0.07	

Note: \*\*\*, \*\*, \* Significance at 1%, 5%, 10% level

Table created by Taylor Pruitt

**Table 3.***Random Parameters Logit (RPL) Model Results for Three Models continued*

MNL				Model 1 RPL Baseline		Model 2 RPL + Framing + Factors		Model 3 RPL + Framing + Factors + Interactions				
Variables	Coefficient	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.			
<i>PF x NG</i>	$\mu$	-	-	-	-	-	-	-0.34	0.21			
	$\sigma$	-	-	-	-	-	-	1.04	***	0.23		
<i>PF x GM</i>	$\mu$	-	-	-	-	-	-	-0.17	0.14			
	$\sigma$	-	-	-	-	-	-	0.38	*	0.21		
<i>NF x NG</i>	$\mu$	-	-	-	-	-	-	-0.49	**	0.21		
	$\sigma$	-	-	-	-	-	-	0.77	***	0.23		
<i>NF x GM</i>	$\mu$	-	-	-	-	-	-	-0.13	0.13			
	$\sigma$	-	-	-	-	-	-	0.39	**	0.20		
<i>PF x AGE</i>	$\mu$	-	-	-	-	-	-	0.10	0.13			
	$\sigma$	-	-	-	-	-	-	0.08	**	0.03		
<i>PF x GEND</i>	$\mu$	-	-	-	-	-	-	2.28	***	0.41		
	$\sigma$	-	-	-	-	-	-	0.21	0.13			
<i>NF x AGE</i>	$\mu$	-	-	-	-	-	-	-0.31	**	0.12		
	$\sigma$	-	-	-	-	-	-	0.01	0.04			
<i>NF x GEND</i>	$\mu$	-	-	-	-	-	-	1.56	***	0.40		
	$\sigma$	-	-	-	-	-	-	0.11	0.11			
<i>No-buy (NONE)</i>	$\mu$			-4.21	***	0.12	-6.93	***	0.41	-9.56	***	0.72
<i>Error Component</i>	$\sigma$	-	-	3.35	***	0.11	1.99	***	0.11	2.33	***	0.11
Respondents			1,410		1,410		1,410		1,410			
Log likelihood			-10900.8		-8426.6		-8407.8		-8354.4			
AIC/N			1.934		1.497		1.495		1.488			

Note: \*\*\*, \*\*, \* Significance at 1%, 5%, 10% level

Table created by Taylor Pruitt

**Table 4.***Willingness to Pay for Non-GMO (Voluntary) and GM (Mandatory) Labels on Chicken Products*

	Non-GMO	GM
MNL	-	-
Model 1	2.28	-0.59
Model 2	2.31	-0.59
Model 3	2.55	-0.49

Note: these are dollar values in price for pound premiums for boneless skinless chicken breast


Table created by Taylor Pruitt

## Figures


If these were your only options, which would you choose?  
Choose by clicking one of the buttons below:

(1 of 8)


All Natural Boneless  
Skinless Chicken Breast  
Product 1



All Natural Boneless  
Skinless Chicken Breast  
Product 2



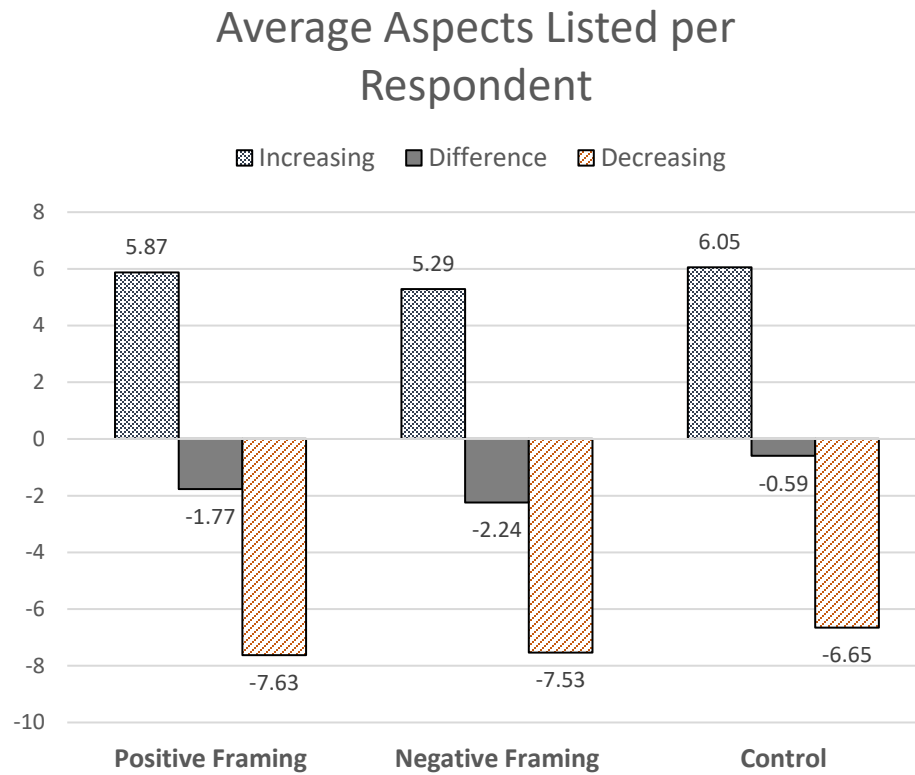
None

Price	\$2.99 per lb	\$10.99 per lb	
GM Content	No information	Chicken Raised and Fed a Diet in Compliance With the Non-GMO Project Standard for Avoidance of Genetically Engineered Ingredients 	I would choose neither of these.
Carbon Footprint	112 oz CO2e/lb (high)	79 oz CO2e/lb (low)	
Production State	Birds raised and food grown in your state	No information	
	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

← →

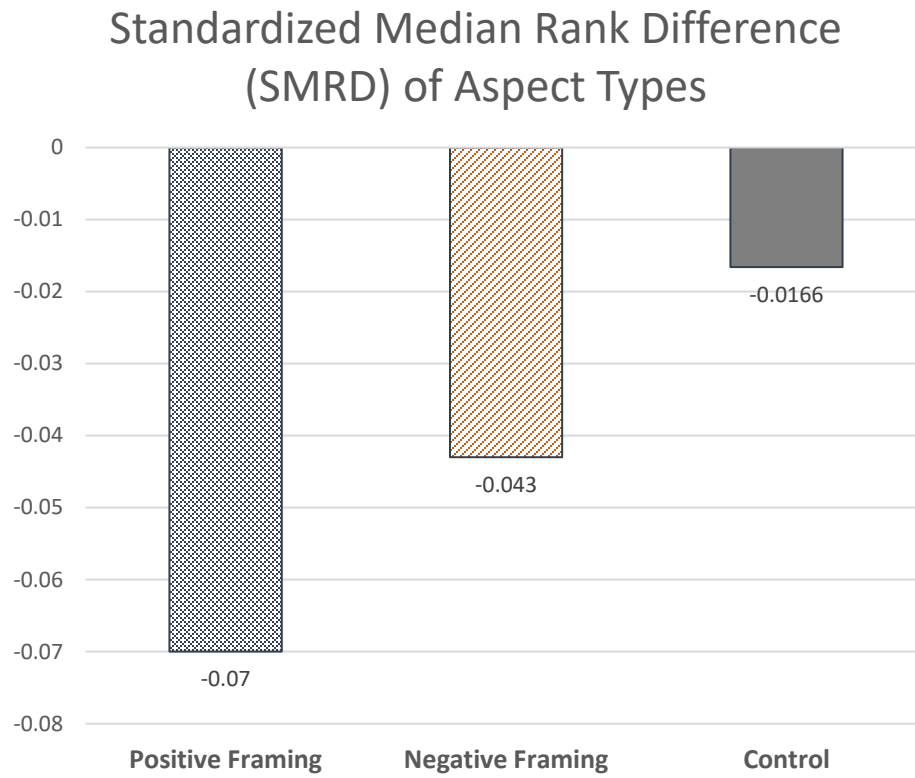
0%100%

*Figure 1.* Example Choice Task. Reprinted from "Query Theory Applications: Choice Experiments under Oath, Attendance to Attributes, and Genetically Modified Food Labeling Policy," by N. P. Kemper, 2016, Doctoral Dissertation, University of Arkansas. Reprinted with permission.



*Figure 2.* Average Aspects Listed per Respondent. Figure created by Taylor Pruitt.  
Note: ANOVA results indicate there was a significant treatment effect.





*Figure 3.* Standardized Median Rank Difference (SMRD) of Aspect Types. Figure created by Taylor Pruitt.  
Note: ANOVA results indicate there was not a significant treatment effect.

## Appendix

### Survey Instrument

#### IMPLIED CONSENT INFORMATION

[Participants will be given this information as well as a link to the survey.]

Dear Consumer,

This research is being conducted by researchers at the University of Arkansas. The purpose of this survey is to better understand how you make decisions on purchasing food products and what types of food labels you prefer. There are no anticipated risks to participating. The survey should take 20 minutes to complete. Your participation is completely voluntary. Your responses will be recorded anonymously and no identifying personal information will be collected on the survey. Responses will be aggregated for presentation.

The survey has three parts. The first part is a choice experiment where you will be asked to make choices between different sets of products. The second part is a series of questions to help us better understand your purchasing decisions in the choice experiment and your preferences for different approaches to labeling food. The third part is a short series of demographic questions. You are free to refuse to participate in the research and to stop completing the survey at any time.

If you have any questions about this survey itself, please contact Nathan Kemper by email or phone at [nkemper@uark.edu](mailto:nkemper@uark.edu) or 479-575-2697. You may also contact the University of Arkansas Research Compliance office listed below if you have questions about your rights as a participant, or to discuss any concerns about, or problems with the research: Iroshi (Ro) Windwalker, CIP, IRB/RSC Coordinator Research Compliance, 109 MLKG Building, Fayetteville, AR 72701, Ph. 479.575.2208, Fax 479.575.6527

Sincerely,

Nathan Kemper

IRB #15-10-192  
Approved: 10/19/2015  
Expires: 10/18/2016

## Part 1. Choice Experiment

*[Participants will first be presented with a set of instructions that are common across all surveys]*

### Instructions:

The United States does not follow a mandatory approach to the labeling of genetically modified food. Therefore, food producers are not required to label the genetically modified content of their food. As a result, under our current voluntary system the foods that typically carry a label are those carrying a non-genetically modified label. In the choice experiment portion of this survey, you will be asked to choose between food products that may or may not carry label statements regarding the genetically modified content of the food. Please consider all information provided for each product before making each purchase decision. Thank you.

### Label Terms Defined:

*Genetically Modified Organism (GMO):* in this survey, genetic modification (GM) refers to the production of heritable improvements in organisms for specific uses via genetic engineering (GE) and a genetically modified organism (GMO) is a plant produced through GM. The GM information on the labels in this survey refer only to the ingredients in the diet fed to the chickens.

*The Non-GMO Project:* a non-profit organization committed to preserving and building the non-GMO food supply, educating consumers, and providing verified non-GMO choices. Poultry carrying a Non-GMO Project Verified label indicates the bird was raised on a diet containing non-GMO feed.

*Carbon Footprint:* the total amount of Greenhouse Gas Emissions associated with a product, along its supply chain, including emissions from consumption, end-of-life recovery and disposal. Expressed in ounces (oz) of carbon dioxide equivalent (CO<sub>2</sub>e) per pound (lb) of meat.

*Production State:* the production location refers to BOTH the production of the feed AND the location of where the birds were raised.

### Screening Questions

1. In my household...
  - ☐ I am solely responsible for making all grocery purchasing decisions *[proceed]*
  - ☐ I have shared responsibility for making grocery purchasing decisions *[proceed]*
  - ☐ I do not have any responsibility for making grocery purchasing decisions *[discontinue]*
2. How many times have you purchased *chicken breast meat* in the past 12 months?
  - ☐ 0 *[discontinue]*      ☐ 1-6 *[proceed]*
  - ☐ 7-12 *[proceed]*      ☐ 13 or more *[proceed]*

## Part 2. Survey

## 1. Perceived Consequentiality

1. To what extent do you believe that answers from this survey will be taken into consideration by decision makers such as producers, manufacturers, retailers, and/or policy makers?

Not taken into account (1)      (2)      (3)      (4)      (5) Definitely taken into account

2. To what extent do you believe that answers from this survey will be taken into consideration by decision makers who bring food products to market?

Not taken into account (1)      (2)      (3)      (4)      (5) Definitely taken into account

3. To what extent do you believe that answers from this survey will be taken into consideration by decision makers in a way that can change the price of food (thus impacting your budget)?

Not taken into account (1)      (2)      (3)      (4)      (5) Definitely taken into account

## 2. Risk Preferences

4. How do you see yourself: are you generally a person who is willing to take risks or do you try to avoid taking risks? Please select a number on the scale, where the value 0 means: 'not at all willing to take risks' and the value 10 means: 'very willing to take risks'.

Not at all willing  
to take risks

Very willing to  
take risks

[illegible]

5. People can behave differently while engaged in different activities. How would you rate your willingness to take risks while engaged in the following activities? Please select a number on the scale, where the value 0 means: 'not at all willing to take risks' and the value 10 means: 'very willing to take risks'.

Not at all willing  
to take risks

Very willing  
to take risks

[illegible]

### 3. Preferences for GM Labeling Programs

The United States uses a voluntary approach to the labeling of genetically modified food. Foods that are labeled under the current voluntary approach are products displaying a non-genetically modified statement and/or label certified by a third-party agent. Some argue that the United States Department of Agriculture should play a more active role in the voluntary approach by setting national standards for the certification of genetically modified (non-bioengineered) food.

6. Do you agree or disagree that the current voluntary approach with third-party certification should be left as is and NOT be changed?
- \_\_\_\_\_ Strongly Disagree (1)  
\_\_\_\_\_ Disagree (2)  
\_\_\_\_\_ Neither Agree nor Disagree (3)  
\_\_\_\_\_ Agree (4)  
\_\_\_\_\_ Strongly Agree (5)
7. Do you agree or disagree that the USDA should become more involved in the voluntary approach by developing a national certification program?
- \_\_\_\_\_ Strongly Disagree (1)  
\_\_\_\_\_ Disagree (2)  
\_\_\_\_\_ Neither Agree nor Disagree (3)  
\_\_\_\_\_ Agree (4)  
\_\_\_\_\_ Strongly Agree (5)

**Some citizens in the United States argue that the federal government should adopt a mandatory labeling approach that requires labels on any food containing genetically modified ingredients.**

8. Do you agree or disagree that the federal government should require mandatory labeling?
- \_\_\_\_\_ Strongly Disagree (1)  
\_\_\_\_\_ Disagree (2)  
\_\_\_\_\_ Neither Agree nor Disagree (3)  
\_\_\_\_\_ Agree (4)  
\_\_\_\_\_ Strongly Agree (5)
9. Do you agree or disagree that taxpayers should pay for the cost of a federal mandatory labeling program?
- \_\_\_\_\_ Strongly Disagree (1)  
\_\_\_\_\_ Disagree (2)  
\_\_\_\_\_ Neither Agree nor Disagree (3)  
\_\_\_\_\_ Agree (4)  
\_\_\_\_\_ Strongly Agree (5)

10. How would you rate your trust in the different sources of label certification for food products?

	Very Untrustworthy (1)	Untrustworthy (2)	Neutral (3)	Trustworthy (4)	Very Trustworthy (5)
Private Company					
Independent Third Party (non-governmental)					
Government – Local or State					
Government – National					

#### 4. Food Label Information

11. Beyond looking at the brand name, how often do you read food labels?

- ☐ Never (1)  
☐ Rarely (2)  
☐ Sometimes (3)  
☐ Frequently (4)  
☐ Always (5)

12. As far as you know, have you ever eaten any food containing genetically modified ingredients?

- ☐ Yes  
☐ No  
☐ I am not sure

13. Do you agree or disagree that labelling the genetically modified ingredients in food should be required?

- ☐ Yes  
☐ No

14. If genetically modified ingredients were required to be labeled, where do you feel is the best place to display these ingredients on a food product label?

- ☐ On the back of the package in the list of ingredients (1)  
☐ On the back of the package separate from the ingredients (2)  
☐ On the front of the package (3)  
☐ On the front of package prominently displayed as a warning (4)

15. Different institutions publish research or report information on the advantages and disadvantages of genetically modified food. How trustworthy are each of the following sources?

	Very Untrustworthy (1)	Untrustworthy (2)	Neutral (3)	Trustworthy (4)	Very Trustworthy (5)
Government					
Private Sector					
University					
Nonprofit Consumer Advocacy Group					
Food Manufacturer					
Media					

## 5. Cultural and Political Views

**People in our society often disagree about how far to let individuals go in making decisions for themselves. How strongly do you agree or disagree with the following two statements?**

16. Sometimes government needs to make laws that keep people from hurting themselves.

☐ Strongly Disagree (1)  
☐ Disagree (2)  
☐ Neither Agree nor Disagree (3)  
☐ Agree (4)  
☐ Strongly Agree (5)

17. The government should stop telling people how to live their lives.

☐ Strongly Disagree (1)  
☐ Disagree (2)  
☐ Neither Agree nor Disagree (3)  
☐ Agree (4)  
☐ Strongly Agree (5)

**People in our society often disagree about issues of equality and discrimination. How strongly do you agree or disagree with the following two statements?**

18. We have gone too far in pushing equal rights in this country.

☐ Strongly Disagree (1)  
☐ Disagree (2)  
☐ Neither Agree nor Disagree (3)  
☐ Agree (4)  
☐ Strongly Agree (5)

19. Our society would be better off if the distribution of wealth was more equal.

- ☐ Strongly Disagree (1)
- ☐ Disagree (2)
- ☐ Neither Agree nor Disagree (3)
- ☐ Agree (4)
- ☐ Strongly Agree (5)

20. How would you describe your political views on social issues?

- ☐ Very liberal
- ☐ Liberal
- ☐ Moderate
- ☐ Conservative
- ☐ Very Conservative
- ☐ none of these

21. How would you describe your political views on fiscal issues?

- ☐ Very liberal
- ☐ Liberal
- ☐ Moderate
- ☐ Conservative
- ☐ Very Conservative
- ☐ none of these

## 6. Demographic Information

22. In what state do you currently live?

state [*drop down list*]

23. How would you describe your home environment?

- ☐ Rural
- ☐ Suburban
- ☐ Urban

24. What is your age?

[census age categories]

25. What is your gender?

☐ Male ☐ Female

26. Do you live alone or with others?

☐ Live alone ☐ Live with others

[*Skip Logic: if live alone, skip next question*]



27. How many people in your household are in the following age categories?

- Adults and children age 15 and older
- Children age 7 to 14 years old
- Children 6 years old and younger

28. What is your highest level of education? (check one):

- Some High School
- High School Diploma
- Associate's Degree (2-year degree)
- Bachelor's Degree (4-year degree)
- Master's Degree
- Doctoral Degree

29. What is your race? [census race/ethnicity]

30. What is your total net (after tax) household income?  
[census income categories]

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