CONSUMER DEMAND FOR REDUNDANT FOOD LABELS

by

Lacey Wilson

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STATEMENT OF COMMITTEE APPROVAL

Dr. Jayson Lusk, Chair
Department of Agricultural Economics

Dr. Holly Wang
Department of Agricultural Economics

Dr. Bhagyashree Katare
Department of Agricultural Economics

Approved by:
Dr. Nicole Olynk Widmar

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Previous studies, as well as market sales data, show some consumers are willing to pay a premium for redundant or superfluous food labels that carry no additional information for the informed consumer. Some advocacy groups have argued that the use of such redundant labels is misleading or unethical. To determine whether premiums for redundant labels stem from misunderstanding or other factors, this study seeks to determine whether greater knowledge of the claims - in the form of expertise in food production and scientific literacy - decreases willingness to pay for redundant labels. We also explore whether de-biasing information influences consumers' valuations of redundant labels. An online survey of 1,122 U.S. consumers elicits willingness-to-pay premiums for three redundantly labeled products: non-GMO sea salt, gluten-free orange juice, and no-hormone-added chicken breast. Respondents with farm experience report lower premiums for non-GMO salt and no-hormone-added chicken. Those with higher scientific literacy state lower premiums for gluten-free orange juice. However, provided information about the redundancy of the claims, less than half of respondents who were initially willing to pay extra for the label are convinced otherwise. Over 30% of respondents counter-intuitively increase their premiums, behavior that is associated with less *a priori* scientific knowledge. The likelihood of "overpricing" redundant labels is associated with willingness-to-pay premiums for organic food, suggesting at least some of the premium for organic is a result of misinformation.

INTRODUCTION

The gap between the average American consumer and the farmer who produces her food has grown. According to the Bureau of Labor Statistics, less than 2 percent of the United States population works in production agriculture, a 50 percent decline since 1980 (Daly 1981; U.S. BLS 2017). As Americans become more removed from the farm, urban and suburban individuals tend to be less knowledgeable about agriculture (Dale, Robinson, and Edwards 2017; Frick et al. 1995; Harmon and Maretzki 2006). However, growing consumer interest in food production methods and their impact on animal welfare, health and food safety, environmental sustainability, and social equity is evident in the proliferation of consumer products touting these qualities. For example, the number of new products bearing GMO-free or organic labels nearly tripled between 2009 and 2016 (USDA ERS 2019b).

However, some advocacy groups have criticized such labels, arguing they are misleading to consumers. For example, in 2018, a policy think tank filed a petition with the FDA to prohibit "non-GMO" labeling as "false and misleading" (Court 2018). FDA issued new non-binding guidelines in March 2019, emphasizing that food labeling related to bioengineering should be "truthful and not misleading" (U.S. Food and Drug Administration 2019). Such concerns extend beyond the representation of bioengineered foods as less safe or healthful than comparable products. The document states that food may be misbranded in context, if not in letter, listing the following example:

> A statement in food labeling that may be false or misleading could be the statement "None of the ingredients in this food is genetically engineered" on a food where some of the ingredients are incapable of being produced through genetic engineering (e.g., salt). (U.S. Food and Drug Administration 2019)

In fact, a salt manufacturer made headlines in 2015 by placing exactly such a label upon its packages (Brat 2015). Salt, of course, is a mineral with no genetic content. Similarly, a brand of tomato-based products faced criticism in 2016 after a commercial advertised its tomatoes as non-GMO when there were no genetically modified tomatoes on the market at that time (Senapathy 2016).

USDA has also addressed food packaging claims that, while true in fact, tend to cause consumer misunderstanding. Though the Food Safety and Inspection Service prohibits the practice of administering hormones to swine and poultry, it allows products derived from these animals to carry a "no hormones added" claim. However, a disclaimer clarifying that "Federal regulations prohibit the use of hormones" must also be printed on an item with such a label (USDA Food Safety and Inspection Service 2015).

Prior studies have found that some consumers are indeed willing to pay more for labels that provide redundant information (Bernard, Duke, and Albrecht 2019; Heng, Peterson, and Li 2016). If such spending is truly caused by confusion or lack of knowledge, consumers may be over-paying and suffer from a cost of ignorance which might be avoided with better information (Foster and Just 1989).

Existing studies on redundant information labels tend to focus on a single product or issue, such as the natural label. Prior works have found the effectiveness of better information to lower spending on such marketing claims to be varied. This study contributes to the literature by investigating three distinct products with labels referencing attributes spanning nutrition, biotechnology, and meat production practices. To determine whether premiums for redundant labels stem from misunderstanding or other factors, we determine the extent to which premiums

for such labels are affected by (i) expertise – i.e., farm experience, (ii) knowledge – i.e., score on a scientific literacy quiz, and (iii) de-biasing information. To the extent willingness-to-pay for redundant labels falls with any of these three factors, this provides evidence of such labels being misleading. We conduct a nationwide online survey of 1,122 U.S. consumers, eliciting willingness to pay premia (or discounts) for non-GMO sea salt, gluten-free orange juice, and no-hormone-added chicken. We also investigate willingness-to-pay premia for organic apples; although the organic label is not redundant, consumers often misunderstand its meaning (Campbell et al. 2014; Guilabert and Wood 2012; Hoefkins et al. 2009). By investigating the relationship between preferences for redundantly labeled products and organic products, we can indirectly identify the extent to which organic preferences result from inadequate knowledge about food and agricultural production.

As a preview of results, we find respondents with farm experience report lower premiums for non-GMO salt and no-hormone-added chicken. Those with higher scientific literacy state lower premiums for gluten-free orange juice. However, fewer than 50% of participants who initially stated positive premiums are convinced otherwise by the information in the study. Over 30% of respondents counter-intuitively increase their premiums post-information; this behavior is associated with lower scientific literacy scores.

The refusal of experts and those with greater scientific understanding to pay more for redundant labels suggests that consumers who do pay a premium do so in part because they are not fully informed of labels' true meaning. Respondents who lower their willingness to pay for the labels after learning more about them also demonstrate that some portion of their initial premium stemmed from misinformation. Interestingly, these misinformed respondents are more likely to

state a positive premium for an organic label, suggesting that at least part of the organic premium is due to a lack of understanding.

LITERATURE REVIEW

Existing literature demonstrates that food labels that provide no additional information can still draw higher prices from consumers. Bernard et al. (2019) found that willingness to pay for local watermelons increased with the addition of a label conveying repetitive origin information. Heng et al. (2016) found that consumers would pay more for eggs with the addition of superfluous labels; though organic certification stipulates that chickens live cage-free, respondents stated higher premiums for organic eggs that also carried a cage-free tag. Likewise, Lusk (2019) found willingness-to-pay premiums for cage-free eggs exceed those for organic, even though the latter includes the former and more.

How do we determine whether premiums for redundant labels stem from misunderstanding or other factors? Handel and Schwartzstein (2018) investigated cases where consumers appear not to use all available information to make decisions. They present a theoretical framework that distinguishes observed demand for the good from the demand that would exist, were consumers to fully utilize all information. The authors identify three common approaches to measuring the wedge between the two demand curves. Researchers may compare the demand of subject matter experts with that of non-experts, assuming experts make choices based upon the true value of the good. Similarly, researchers may measure participants' relevant knowledge in a survey and compare the demand of apparently informed and uninformed consumers. Finally, studies may attempt to de-bias study participants by providing information about the topic and comparing expressed demand with and without the information treatment. Prior work on consumer misunderstanding of food labels has utilized each of the former approaches; this thesis will add to the literature by including all three methods.

Using Expertise as a Proxy for Information

Bronnenberg et al. (2015) used Nielsen expenditure data to compare the spending of experts and non-experts on generic and branded goods that are physically homogenous, such as pain medication and pantry staples. Experts in medication, such as nurses and pharmacists, were far more likely than the general public to purchase generic headache remedies. As experts in food preparation, chefs were more likely to purchase store brand pantry staples than the general public. While these expert proxies strongly correlated with direct measures of knowledge about the products' attributes, this level of information was domain-specific; a consumer who was well-informed about the equivalency of generic and branded headache remedies was not significantly more likely to purchase generic pantry staples. The authors estimate that if average consumers were as informed as pharmacists, consumer surplus would increase by 4 percent in the $2.88 billion pain reliever industry. Though their estimate of consumer surplus increase in the food sector is economically smaller, the estimate includes only those information gains that would move consumers from branded products to physically identical generic products. If other attribute labels mislead uninformed consumers, the impact in the food sector could be even larger; for example, the organic food market alone reached $47.9 billion in 2018 (Organic Trade Association 2019).

Björkegren (2018) studied experts' purchases of "nostalgic" foods, defined as products that reject modern technology but are not proven to be safer, more healthful, or better for the environment. In contrast to Bronnenberg et al. (2015), the author finds that health experts and food production workers are no less likely than non-experts to demand non-GMO milk or eggs. Bjorken suggests a theory to explain demand for nostalgic products, wherein consumers are uncertain about the quality of goods produced with innovative methods. They therefore do not demand attributes like "local" or "non-GMO" per se, but instead view them as indirect signals of familiar quality. This

model implies that when the "hidden" aspects of quality are revealed, consumer willingness to pay for signaling attributes will decrease.

Directly Measuring Knowledge

Researchers have found some evidence that consumers with higher levels of relevant knowledge are less susceptible to deceptive advertising and food labeling claims. Schmuck, Matthes, and Naderer (2018) showed experimental participants advertisements for water in plastic bottles that featured a false claim to environmental friendliness. Those participants who scored higher on an environmental knowledge quiz were more likely to identify the false claim as greenwashing. Andrews, Burton, and Netemeyer (2000) evaluated perceptions of a factually true but potentially misleading nutrition label: a claim of reduced sodium on a soup product that remained high in absolute levels of sodium. Respondents who scored higher on a nutrition quiz were less likely to believe the soup was healthy and ranked it higher in sodium content and blood pressure impacts. The same authors also measured consumer attitudes about a candy bar that advertised "half the fat" or "half the calories" of the leading bar but was still high in fat and calories. They report an increasingly negative relationship between objective knowledge and purchase intentions (Andrews, Netemeyer, and Burton 2009).

Surveys have shown that U.S. consumers are generally uninformed about genetics and genetically modified food (McFadden and Lusk 2016; Onyango, Govindasamy, and Hallman 2006). Several studies have investigated the relationship between survey respondents' knowledge about and attitudes toward bioengineered foods, often distinguishing between participants' self-reported level of knowledge and measured knowledge of scientific facts. House et al. (2004) found that higher subjective knowledge was associated with increased willingness to accept GM foods, but

objective knowledge did not significantly predict willingness to accept. On the contrary, Fernbach et al. (2019) report that while respondents with higher objective knowledge of scientific facts were less opposed to GM foods, those with higher self-assessed knowledge were more opposed. McFadden (2016) found both actual and perceived knowledge increased the likelihood that respondents saw GM foods as safe. However, Rose et al. (2019) found neither factual knowledge nor perceived familiarity to be significant predictors of attitudes toward GM foods when controlling for demographics, values, and media attentiveness. Overall, evidence on the effects of knowledge on attitudes toward food technology is conflicting. This is perhaps due in part to differing methods of measuring knowledge across studies. Furthermore, a survey by McFadden and Lusk (2016) found that merely calling attention to subjects' lack of factual knowledge through the act of measuring objective knowledge can shift opposition levels. Finally, though many studies have documented U.S. consumers' lack of knowledge about bioengineered foods, we are not aware of any work that has included a non-GMO label on a food incapable of being genetically modified, such as salt.

De-Biasing Subjects by Providing Information

Labels describing food as "natural" have been criticized as misleading, in part because consumers tend to overestimate the attributes associated with them (Butler and Vossler 2018). The Food and Drug Administration does not define the word natural on non-meat products; however, the USDA regulates the claim for meat, and the definition (contrary to most consumer's suppositions) merely implies the product is minimally processed. Several studies have investigated the impact of outlining the legal requirements for natural labels on willingness to pay for products carrying them. Gifford and Bernard (2011) collected bids for natural and organic chicken breasts before and after presenting the USDA regulations for each. Nearly 50% of participants increased their premium for

organic over natural after learning the requirements; these individuals tended to have overestimated the definition of natural before receiving information. However, 30% lowered their premium. With these conflicting forces, mean bids across the sample were not substantially changed by the information. Syrengelas et al. (2018) randomly assigned participants either to a control group that received no information or to a treatment group that received the USDA definition of natural. Amongst respondents in the control group, those who indicated they were not familiar with the label's definition were more likely to state a positive premium for naturally labeled beef. The informed treatment group demonstrated no significant willingness to pay extra for the natural label. The findings in Syrengelas et al. (2018) thus suggest the natural claim, while federally regulated by the USDA, is in fact misleading for most consumers.

As indicated, while the USDA provides a broad definition of natural for labels on meat products, the FDA does not define the claim for foods under its regulation. Berry, Burton, and Howlett (2017) found that a natural label increased perceptions of healthfulness and purchase intentions, but exposure to a news article explaining that the claim is not defined by the FDA rendered the effects of the label insignificant. When similar information was instead presented in a brief disclosure on the product packaging, incorrect perceptions were only somewhat mitigated. McFadden and Huffman (2017) conducted an auction for conventional, organic, and natural apples, eggs, and broccoli. Respondents who received information from the perspective of the natural industry increased premiums for organic food, implying prior misunderstanding of the natural claim. Kuchler et al. (2018) report similar results from analysis of consumers' information searches. Rather than providing information in a lab or survey, the authors combine aggregate Google search data for natural and organic foods with sales data. They find that searches seeking information

about natural foods are associated with higher purchases of organic foods, a result consistent with confusion about natural labels.

Previous work has also found evidence that the provision of information changes willingness to pay for organic labels that may be misleading. Streletskaya, Liaukonyte, and Kaiser (2019) studied consumer understanding of the distinction between wines labeled "organic" or "made with organic grapes." Because many wine drinkers are not familiar with the non-grape inputs of conventional wine production, organic restrictions on inputs such as egg whites may not be obvious to the average consumer. The study revealed that outlining the more stringent requirements of the organic label raised premiums for organic wine over wine made with organic grapes.

Consumer misunderstanding about genetically modified agricultural products seems evident in a group of studies that change willingness to pay for GM products by providing information about them. Lusk et al. (2004) decreased the compensation required by participants to consume a cookie made with GM ingredients by presenting information about the environmental, health, and developing world benefits of genetically modified foods. Li, McCluskey, and Wahl (2004) reported a significant, positive impact of scientific information explaining the effective equivalence of conventional beef and that fed with GM corn on survey respondents' willingness to pay for GM-corn-fed beef. Rousu et al. (2005) investigated perceptions of a second-generation genetically modified product; i.e., a product genetically engineered for the purpose of benefitting the consumer. Information about the attributes of cigarettes genetically modified to reduce nicotine content counterbalanced the discounted willingness to pay otherwise associated with the presence of a GM label.

Despite evidence that the provision of information can de-bias study participants, another line of work indicates that the impact of objective information may be dependent upon recipients' prior perceptions. Costanigro et al. (2014) elicited willingness to pay for conventional, local, and organic apples before and after presenting limited scientific evidence of nutritional or environmental benefits to local and organic. Participants appeared to interpret the information subjectively. Those with higher initial premiums for the alternative apples seemed to view the information favorably, increasing WTP premiums for the alternative labels, while those with low initial valuations lowered their premiums in response to the information. McFadden and Lusk (2015) presented survey respondents with scientific information refuting the purported risks of genetically modified foods. While respondents who initially believed GM foods to be safe strengthened that belief, those who initially believed GM foods to be unsafe were more likely to report unchanged safety perceptions.

METHODS

An online survey was administered to a sample of the United States population. A total of 1,168 individuals completed the survey. Data were collected via the firm Dynata, which maintains a panel of individuals who have volunteered to take surveys in exchange for payment. The sample is generally representative of the U.S. population in terms of gender, ethnicity, age, and census region (see Table 1). Data were collected from June 17, 2019 to June 24, 2019.

Respondents were deemed inattentive and dropped from the sample if they met two or more of the following criteria: (i) spent less than 20% of the average time on the survey, (ii) spent less than 2.5 seconds on information pages, or (iii) failed a "trap question" that instructed the respondent to select a particular answer. Forty-six responses were dropped, with a final sample size of 1,122. This sample size provides a sampling error of less than +/-3% with 95% confidence for dichotomous questions.

Survey Format

The survey began by eliciting willingness to pay for four sets of paired products. Each set consisted of one generic, unlabeled item and an identical item with an attribute label. Each set was presented on its own page, and ordering of the two items on each page was randomized to control for ordering effects. We included three sets of products with redundant labels: sea salt with and without a Non-GMO Project label; 100% orange juice with and without a "gluten-free" label; and fresh chicken breast with and without a "no added hormones" label. Because sea salt contains no genes, it cannot be genetically modified; juice comprised completely of oranges is naturally free

Table 1: Explanatory Variables

Variable	Description	Mean	Std. Dev.	Census estimate
FarmWorker	1 = has been employed by a farm OR self or family has owned a farm	0.101	0.301	-
SciLit	number of science questions correct, out of 9	4.620	2.019	-
Liberal	1 = "Somewhat" or "Extremely" liberal	0.299	0.458	-
Conservative	1 = "Somewhat" or "Extremely" conservative	0.286	0.452	-
College	1 = attained 4 year degree or higher	0.428	0.495	0.309
Income	Low Income = < $40,000	0.370	0.483	0.338
	Middle Income = $40,000-$140,000	0.508	0.500	0.492
	High Income = > $140,000	0.122	0.327	0.170
Age	18-34	0.299	0.458	0.304
	35-54	0.328	0.470	0.339
	Over 54	0.373	0.484	0.358
HHsize	number of people living in household	2.428	1.193	2.630
Female	1 = female	0.523	0.500	0.508
Region	Northeast	0.191	0.394	0.172
	Midwest	0.232	0.422	0.210
	South	0.363	0.481	0.380
	West	0.214	0.410	0.238
SubjectiveKnowledge_salt	1 = "Somewhat" or "Strongly" agree w/ statement "I am knowledgeable about GMOs"	0.450	0.498	-
SubjectiveKnowledge_OJ	1 = "Somewhat" or "Strongly" agree w/ statement "I am knowledgeable about gluten"	0.426	0.495	-
SubjectiveKnowledge_chicken	1 = "Somewhat" or "Strongly" agree w/ statement "I am knowledgeable about poultry production"	0.399	0.490	-
ObjectiveKnowledge_salt	1 = answered “< 25% of sea salt contains GM ingredients”	0.363	0.481	-
ObjectiveKnowledge_OJ	1 = answered “< 25% of 100% OJ contains gluten”	0.376	0.485	-
ObjectiveKnowledge_chicken	1 = answered “< 25% of chicken administered growth hormones”	0.174	0.379	-

of a protein found in wheat; and USDA regulations prohibit the use of added hormones in poultry. As such, these labels are redundant and do not provide any additional information for the informed consumer.

We also elicited willingness to pay for apples with and without an organic label. While the organic stamp does convey additional information about the production process, it has been shown to be commonly misperceived by consumers (Campbell et al. 2014; Guilabert and Wood 2012; Hoefkens et al. 2009). Apples were presented first, on their own page, to prevent the redundant labels from producing a framing effect for the organic label.

Respondents completed a payment scale style WTP question for each food item. Beneath each item, respondents indicated the maximum amount they would spend using a click-and-drag scale. The maximum value possible on each scale was three times the typical retail price for non-branded similar products, observed via online retailers or reported by USDA ERS (Pay Less Super Markets n.d.; USDA ERS 2019a). Survey pretesting revealed that some participants struggled to achieve cent-level precision with the scale, so we also include a space to allow respondents to type a WTP answer. In the foregoing analysis, we also account for this lack of exact measurement by defining a "positive premium" as a price more than three cents above the price of the similar item.

Contingent valuation techniques are known to produce certain biases, including hypothetical bias (Arrow et al. 1993; Donaldson, Thomas, and Torgerson 1997; Kahneman, Ritov, and Schkade 1999). However, we are not particularly interested in the "total" WTP for each item, but rather the *difference* in WTP between the labeled and unlabeled items. We thus calculate a continuous premium variable by subtracting willingness to pay for the unlabeled item from that of the labeled item. Hypothetical bias thus might be netted out by focusing on the difference in stated willingness-

to-pay for two items (Lusk and Schroeder 2004). Social desirability bias is another common concern in WTP questions; however, in this case any respondent who perceives it is socially desirable to pay more for the labelled good is still demonstrating that she has been misled.

Occupational Expertise

We identify "farm workers" for the purpose of the study through a series of questions about involvement in agriculture. Participants who indicate they have worked in production agriculture then choose from a list of experiences. We classify respondents with farm experience as those who selected one or more of the following: 1) employed by a farm that produced crops, primarily for sale, 2) employed by a farm or ranch that raised livestock, primarily for sale, or 3) affirmatively responding to the statement that "I have (or my immediate family has) owned a farm or ranch." 10.07% of our final sample met these criteria.

We checked the robustness of our classification with two alternative definitions of farm experience. The first expands the scope of past and present agricultural experience to include 1) employed by a farm that produced crops, primarily for sale, 2) employed by a farm or ranch that raised livestock, primarily for sale, 3) employed in buying or processing of grain, 4) employed in buying or processing of livestock, 5) employed in agricultural science/research, or 6) affirmative responses to the statement "I have (or my immediate family has) owned a farm or ranch." 12.48% of the final sample fell into the expanded definition. The second alternative classification includes only those respondents who had worked in a management role on a farm or ranch and encompassed 7.13% of the sample. [1]

[1] For our preferred model specification, expanding the definition of "farm worker" changes coefficient estimates in equations for salt and chicken premiums by no more than one cent. Narrowing the definition increases the magnitude of the farm worker variable for salt and chicken equations. For each of the alternative definitions, *FarmWorker* remains statistically insignificant in the orange juice and apple equations.

Some non-agricultural professions may also indicate familiarity with food production processes and attributes, such as dieticians and nutritionists, cooks and chefs, and food scientists. Regardless of experience in production agriculture, all respondents to the survey selected their current occupation from a drop down list of the Current Population Survey's occupational classifications (U.S. Bureau of Labor Statistics 2016).

Scientific Literacy

A consumer's understanding of the issues behind food labels such as "non-GMO" may be influenced not only by agricultural or food-specific knowledge, but also general scientific literacy. To provide a measure of scientific understanding, participants answered a series of questions from Kahan's Ordinary Scientific Intelligence (OSI) scale (Kahan 2017). Six of these questions come from the NSF Indicators battery (National Science Board 2014). These six items are true or false and reference basic scientific facts. Examples include "All radioactivity is man-made" and "Antibiotics kill viruses as well as bacteria". The OSI also contains three cognitive reflection questions derived from Frederick (2005), which feature an answer option that intuitively seems correct but should be recognized as false after some consideration. Scientific literacy scores are calculated as the number of the nine OSI questions correctly answered.

Subjective and Objective Knowledge

Consumers who are confused by redundant labels must make purchasing decisions under some level of uncertainty. Bayesian theory postulates that when an individual receives new information, an updated belief is formed by a weighted combination of prior beliefs and new information. We thus expect that respondents' prior beliefs about the ingredients and production processes referenced will influence responses to the facts presented in the survey.

Before participants view information, self-assessed and factual knowledge about each redundant label are elicited through a set of two questions. Subjective knowledge is measured on a 5-point Likert scale, with responses ranging from "strongly agree" to "strongly disagree" with the following statement: "I am knowledgeable about <<GMOs; gluten; the way poultry is produced in the United States>>". A *SubjectiveKnowledge* indicator equals one if the individual expressed agreement for the issue in question. For each product, we then asked respondents to select the percentage of items sold that possess the attribute negatively referenced on the label. For example, one such question asks the percentage of broiler chickens sold in the United States that are given artificial growth hormones. Respondents choose either 0-25%, 26-50%, 51-75%, or 76-100%. An *ObjectiveKnowledge* indicator equals one if the individual correctly answered 0-25%.

De-Biasing Information

Following the willingness to pay and knowledge measurement sections, we present information about the redundancy of the salt, orange juice, and chicken labels and collect new willingness to pay measures. Similar to the "natural" label experiment in Syrengelas et al. (2018), we expect that providing information about the label will decrease premiums because uninformed consumers overestimate the benefits associated with the label. Images and brief text segments are taken from the GMO Answers Initiative, the Celiac Foundation, and the USDA Food and Safety Inspection Service websites (see Figure 1). After viewing information for each product, participants view the same sliding scale question from the first section. The individual's earlier response is shown below the product; they could choose to confirm or change their initial WTP.

Political Beliefs

Respondents' political affiliations may be tied to food values and beliefs, which in turn influence willingness to pay for certain attributes (Lusk 2012; Lusk and Briggeman 2009). Conservative or liberal ideologies are measured when respondents identify as "somewhat conservative (liberal)", "extremely conservative (liberal)", "moderate", or "don't know".

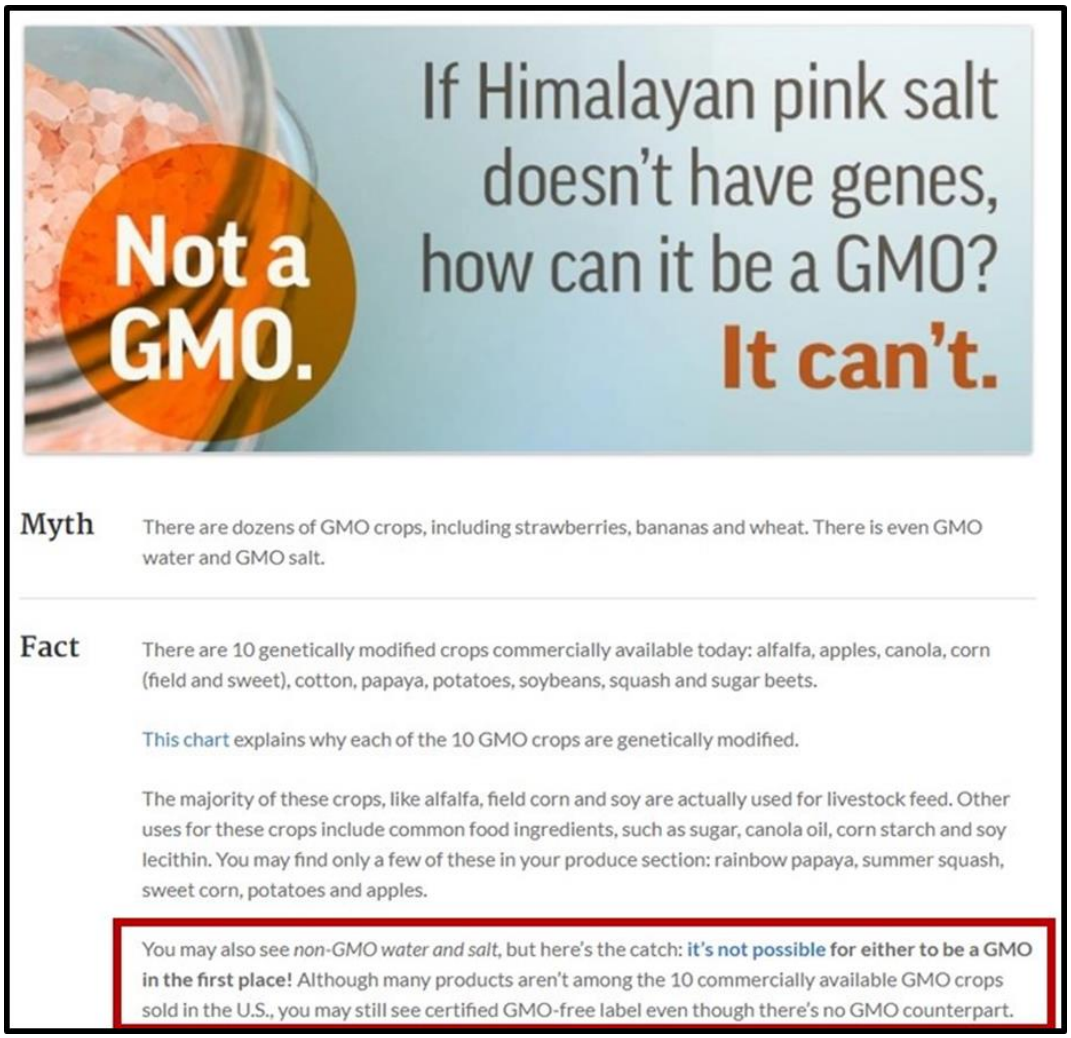


Figure 1: De-Biasing Information

Figure 1 continued

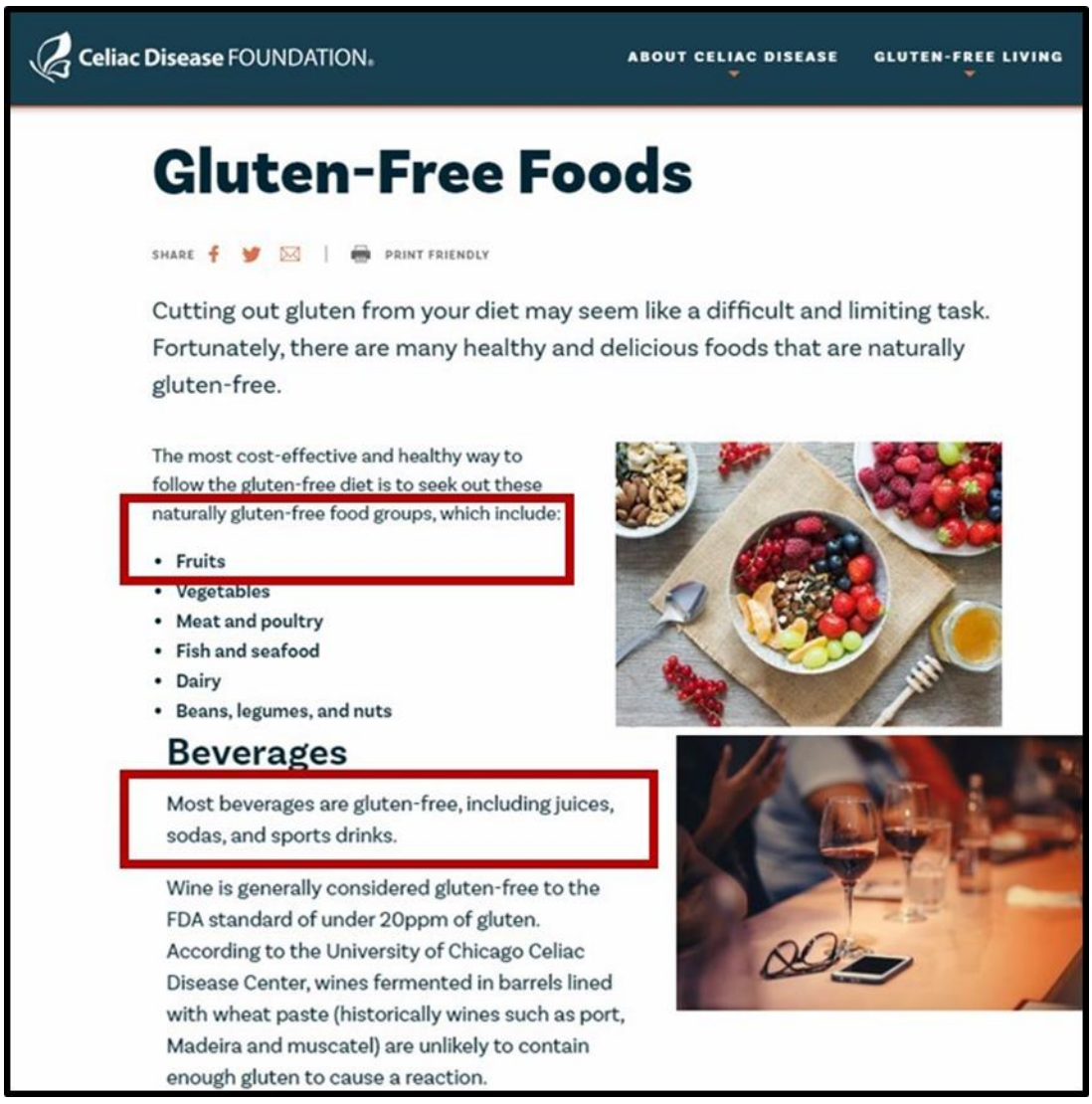
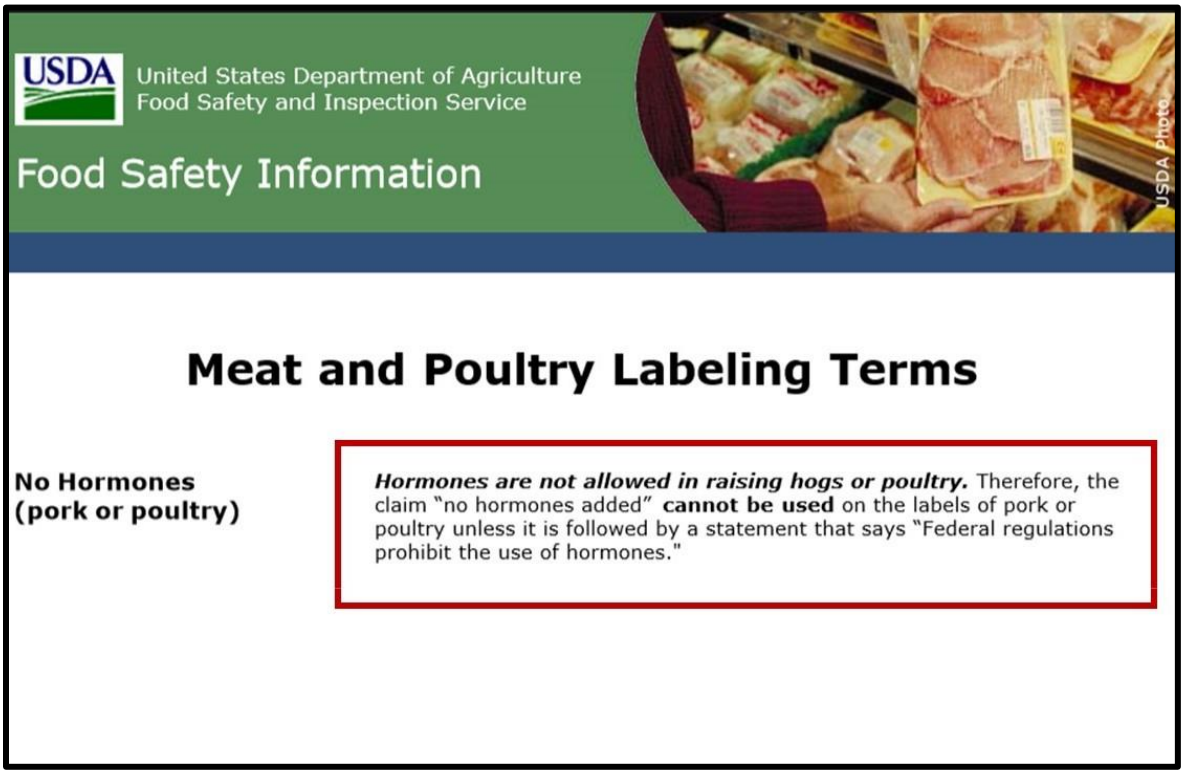


Figure 1 continued



Statistical Analysis

Our first target of analysis is characterizing consumers who are misled by redundant labels. The following OLS model regresses the characteristics of individual i (i = 1, …, 1122) on their calculated premiums for product $j \in$ {*apple, salt, orange juice, chicken*}. We estimate an OLS model:

$$Premium_{ij} = \beta_0 + \beta_1 FarmWorker_i + \beta_2 SciLit_i + \beta X_i + \varepsilon_{ij} ,$$

where *FarmWorker* equals one if a respondent is classified as having farm experience, *SciLit* denotes the number of OSI questions correctly answered, X_{ij} is an index of other demographic variables including education, income, gender, political affiliation, age, region, and household size, and ε_{ij} is a random error term. This equation is first estimated by stacking data across the three

product sets with redundant labels, adding indicator variables for the relevant products. Apple premiums are excluded from this initial analysis because this label, while potentially prompting misleading beliefs, is not redundant. We then estimate separate equations for each product, including apples, to investigate variation in effects across different attribute labels.

To test the robustness of this model, we also explore two alternative specifications. Defining a positive premium as a WTP difference greater than three cents, we estimate a logit model with a 0/1 dependent variable denoting non-positive and positive premiums. Because median premiums are quite different from mean premium estimates, we also estimate quantile regressions on median premiums. The results of these robustness tests are presented in Appendix A.[2]

Next, we estimate a similar equation to discover how individuals' characteristics, expertise, knowledge, and prior beliefs affect their responses to information. We study the change in premium for the labeled products after information as follows:

$$Premium2_{ij} - Premium1_{ij} = \beta_0 + \beta_1 farmWorker_{ij} + \beta_2 SciLit_{ij} + \beta_3 SubjectiveKnowledge_{ij} + \beta_4 ObjectiveKnowledge_{ij} + \beta X_{ij} + \varepsilon_{ij},$$

where *Premium2* represents the premium stated after viewing information and *Premium1* that stated at the beginning of the survey. *SubjectiveKnowledge* and *ObjectiveKnowledge* represent the self-assessed and actual knowledge for each product attribute measured before the presentation of information.

[2] The alternate specifications support our OLS findings in that our main variables of interest, farmWorker and SciLit, demonstrate significant effects in the hypothesized negative direction for multiple products.

Based on the findings of Gifford and Bernard (2011) and McFadden and Lusk (2015), we suspect that these characteristics may not have linear effects on reactions to information. Their results suggest that it may be appropriate to differentiate between categories of responses that reflect beliefs updated to converge to, diverge from, or disregard new information. We follow Gifford and Bernard (2011) in estimating logistic regressions to determine the effect of individuals' characteristics on the likelihood of decreasing, increasing, or maintaining premiums.

Organic Apple Premiums

Though we do not present information about the organic label, we investigate the relationship of respondents who are misled by redundant food labels with organic premiums. Respondents who decrease premiums for redundant labels after viewing new information behave consistently with having been initially misled. We create a decrease index, which counts the number of products for which an individual decreased premiums. Because prior works have found several common consumer misperceptions of organic, we suspect this measure of susceptibility to misleading food marketing claims may be positively correlated with premiums for organic. This index is thus added to the explanatory variables for a regression explaining apple premiums.

RESULTS

Data/Descriptive Statistics

Respondents

According to the Census Bureau's 2017 American Community Survey, the U.S. population is 50.8% female, 30.9% have attained a bachelor's degree or higher, and the median income is $60,336 (U. S. Census Bureau n.d.). Our final sample was 52.32% female, 42.83% have a bachelor's degree, and the median income is in the $40,000 - $59,999 range. Its composition is therefore similar to that of the population, although more highly educated. Descriptive statistics for these and all other explanatory variables are presented in Table 1.

113 respondents, or 10.07% of our sample, were classified as having farm experience.[3] This percentage is much higher than the previously cited 2% of the US population working in production agriculture. However, note that our farm worker variable does not denote current employment in agriculture, but rather experience from having worked on a farm during one's lifetime. 1.52% of the sample indicated they are *currently* employed in the agricultural sector, a figure more closely aligned with the Bureau of Labor Statistics' estimate.

Analysis of other occupations with high levels of food knowledge was restricted by small numbers of respondents. The sample contained only four physicians, nine nurses, zero dieticians or nutritionists, three chefs, fifteen cooks, and three food scientists.

[3] The expanded definition encompasses 140 respondents, while the narrower definition includes 80 respondents.

Knowledge

The mean scientific literacy score was 4.62 questions correct out of nine, with a median score of four. 44.92%, 42.51%, and 39.84% of respondents claimed to be knowledgeable about GMOs, gluten, and poultry production, respectively. However, only 36.27% of respondents correctly answered that 0-25% of sea salt sold in the United States contains genetically modified ingredients; 37.61% correctly answered that 0-25% of 100% orange juice contains gluten; and only 17.38% correctly identified the same statistic for broiler chickens given artificial hormones. After viewing information about the USDA's regulations of hormones in poultry, the percentage of respondents correctly answering the factual chicken question nearly tripled, to 49.29%. This large change provides support for the hypothesis of a knowledge deficit in public understanding of food production.

Premiums

Mean and median WTP premiums are reported in Table 2. Initially, the mean premium is positive for all products except orange juice, and 40 – 58 % of respondents report positive premiums. For all products, the median premium is closer to zero than is the mean. The largest premium, both in absolute dollars and as a percentage of willingness to pay, is for chicken, at $0.31, or 20.13%. This

Table 2: Mean and Median Premiums

	Before Information				After Information			
	mean	std. dev.	median	% positive	mean	std. dev.	median	% positive
Apple	$0.19	$1.06	$0.12	57.93%	-	-	-	-
Salt	$0.08	$0.50	$0.02	46.88%	$0.07	$0.48	$0.00	38.68%
OJ	-$0.04	$0.95	$0.00	40.91%	$0.04	$0.85	$0.00	37.61%
Chicken	$0.31	$1.29	$0.13	58.02%	$0.34	$1.27	$0.09	54.99%

aligns with studies that find premiums for alternative agricultural attributes are higher for fresh products than processed and for animal products than fruits or grains (Carlson and Jaenicke 2016; Gifford and Bernard 2008; Lusk et al. 2015). Additionally, the redundancy of the no hormones claim is perhaps the least obvious of the three to non-farmers, because it stems not from the make-up of the good, but from regulatory restrictions.

Figure 2 shows the distribution of initial premiums for those with and without farm experience. Without controlling for any other factors, it is clear that the farm experienced are more likely to be willing to pay *less* for the label, i.e., have a "negative premium".

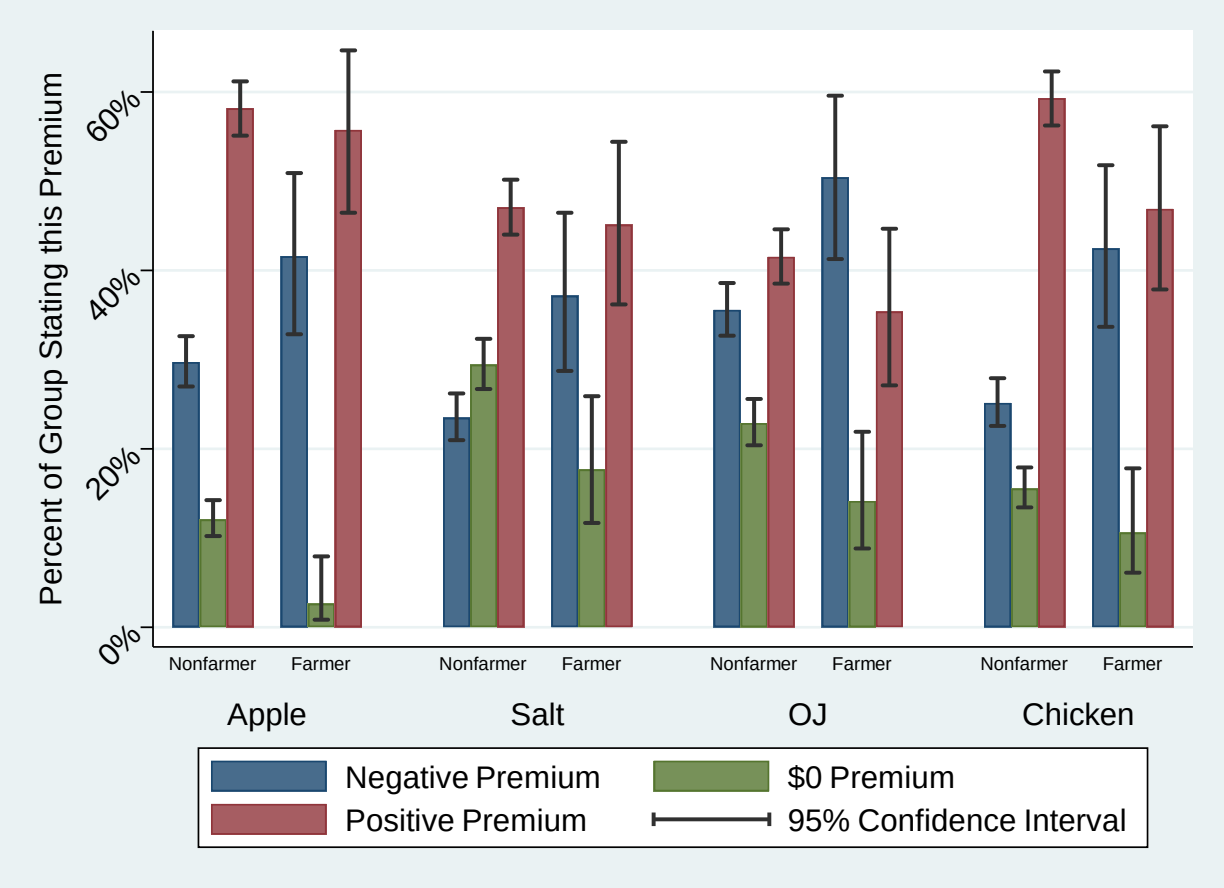


Figure 2: Distribution of Premiums for Respondents with and without Farm Experience

Figure 3 reports mean scientific literacy scores for respondents with a "negative," $0, or positive original premium. Science scores are nearly equivalent across the distribution of premiums for organic apples. For all other products, those who state they are willing to pay no more and no less for the labelled item score the highest on OSI questions.

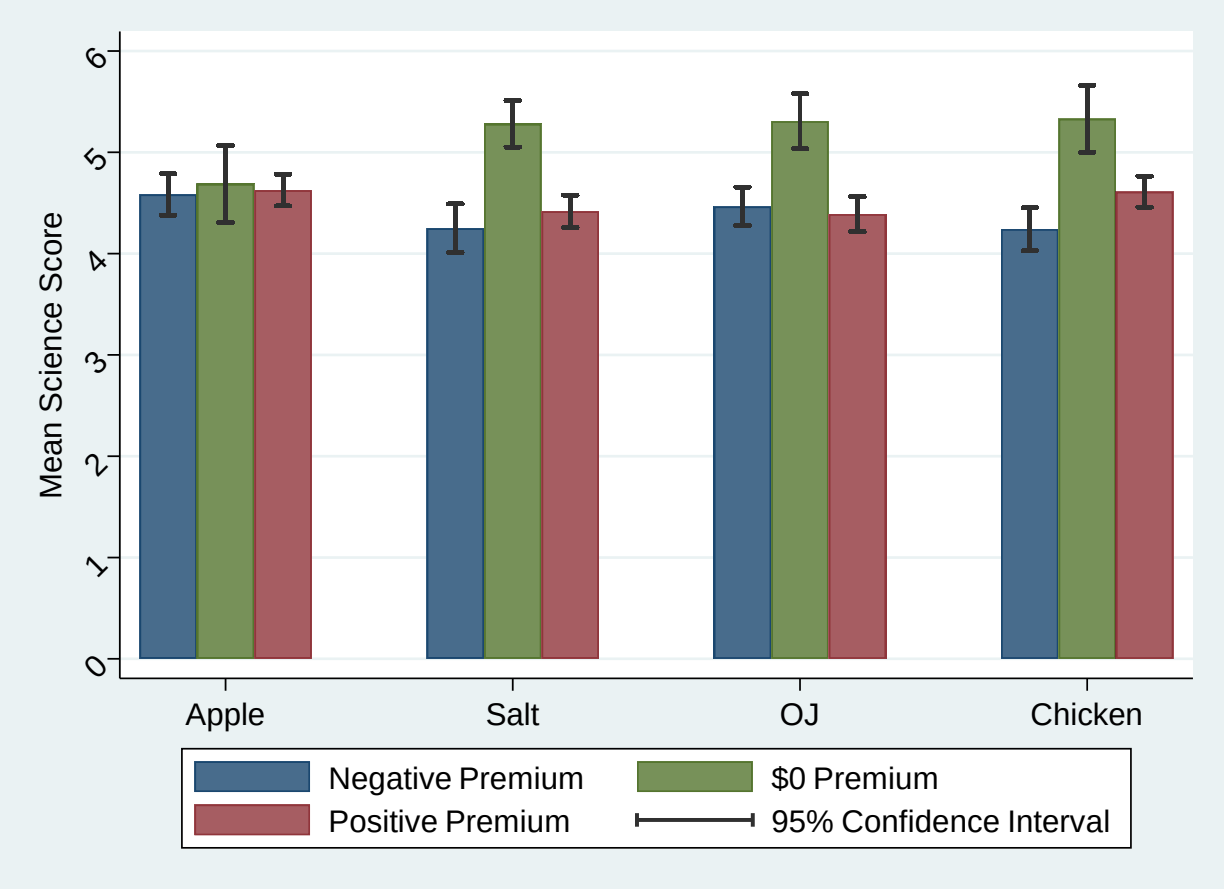


Figure 3: Scientific Literacy Scores by Type of Premium

After respondents view information, median premiums for salt and chicken fall, while that of orange juice remains zero. However, mean orange juice and chicken premiums rise after information, and that of salt falls by only one cent. Less than 50% of participants who were initially willing to pay extra for the label on any given product report a non-positive premium for that product after viewing the information. Across the whole sample, 38.50%, 39.84%, and 42.69%

decrease premiums for salt, orange juice, and chicken, respectively. More than 30% of respondents actually increase premiums for any given product. A smaller portion, 13-27%, of subjects maintain their initial premium within the 3 cent zone we use to account for the sensitivity of our sliding scale measurement tool.

Regression Analysis

Pooled

We stack data across all three products, include dummy variables for salt and chicken, and use orange juice as the reference product. OLS regression of individuals' premiums on respective characteristics reveals farm experience as the only statistically significant characteristic variable; having worked on a farm is associated with a 16 cent lower premium for a redundant label. On average, non-GMO salt and no-hormone-added chicken have 12 cent and 35 cent higher premiums, respectively, than does gluten-free orange juice. To check the robustness of this analysis, we also estimate clustered standard errors and a random effects model. Results for each are reported in Table 3; the findings remain unchanged.

By Product

We expect that the effect of individual characteristics on premiums may differ between the attribute labels in the survey, so we estimated separate regressions for each item. Results are presented in Table 4. Farm experience is associated with lower premiums for all four products, but the effect is not statistically different from zero in the case of gluten-free orange juice. While livestock raising practices and use of GM technology are activities that happen on the farm, gluten content is perhaps more in the realm of nutritionists than farmers. However, the effect of a higher scientific literacy score is consistently significant only for the gluten-free label; an additional

correct OSI question is associated with a 3 cent lower premium. The significance of a similar effect for non-GMO salt weakens when controlling for other demographic variables.

Table 3: Pooled OLS Results

	OLS	RE	Clustered SE's
FarmWorker	**-0.155*** **	**-0.155*** **	**-0.155** **
	(0.059)	(0.059)	(0.068)
SciLit	-0.011	-0.011	-0.011
	(0.009)	(0.009)	(0.009)
Liberal	0.018	0.018	0.018
	(0.041)	(0.041)	(0.042)
Conservative	-0.026	-0.026	-0.026
	(0.042)	(0.042)	(0.041)
College	0.047	0.047	0.047
	(0.039)	(0.039)	(0.040)
Income			
Middle Income	-0.047	-0.047	-0.047
	(0.039)	(0.040)	(0.041)
High Income	-0.084	-0.084	-0.084
	(0.062)	(0.062)	(0.066)
Age			
35-54	0.013	0.013	0.013
	(0.045)	(0.045)	(0.048)
Over 54	-0.023	-0.023	-0.023
	(0.046)	(0.047)	(0.052)
HHsize	0.004	0.004	0.004
	(0.015)	(0.015)	(0.015)
Female	-0.007	-0.007	-0.007
	(0.036)	(0.036)	(0.038)
Region			
Midwest	-0.049	-0.049	-0.049
	(0.052)	(0.052)	(0.055)
South	0.000	0.000	0.000
	(0.048)	(0.048)	(0.053)
West	-0.053	-0.053	-0.053
	(0.053)	(0.053)	(0.055)
Salt	**0.123*** **	**0.123*** **	**0.123*** **
	(0.041)	(0.041)	(0.031)
Chicken	**0.347*** **	**0.347*** **	**0.347*** **
	(0.041)	(0.041)	(0.050)
constant	0.062	0.062	0.062
	(0.085)	(0.086)	(0.087)
R squared	0.026		0.026
Adj. R squared	0.021		0.021

Note: * significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level.

Table 4: Product-Specific OLS Results

Dependent Variable: Premium for Non-GMO Sea Salt	1	2	3	4
FarmWorker	**-0.088***	**-0.098****	**-0.107****	**-0.118****
	(0.049)	(0.050)	(0.050)	(0.052)
SciLit		-0.011	**-0.015****	-0.010
		(0.007)	(0.008)	(0.008)
Liberal			0.028	0.027
			(0.036)	(0.036)
Conservative			0.003	0.016
			(0.036)	(0.037)
College			**0.056***	**0.064***
			(0.031)	(0.034)
Income				
Middle Income				-0.001
				(0.035)
High Income				-0.019
				(0.055)
Age				
35-54				-0.027
				(0.040)
Over 54				-0.066
				(0.041)
HHsize				-0.002
				(0.013)
Female				0.029
				(0.032)
Region				
Midwest				**-0.089***
				(0.046)
South				0.018
				(0.042)
West				-0.066
				(0.047)
constant	0.089***	0.141***	0.129***	0.153**
	(0.016)	(0.038)	(0.040)	(0.073)
R squared	0.003	0.005	0.008	0.02
Adj. R squared	0.002	0.003	0.004	0.008

Dependent Variable: Premium for Gluten-Free Orange Juice	1	2	3	4
FarmWorker	-0.069	-0.088	-0.090	-0.102
	(0.094)	(0.095)	(0.096)	(0.100)
SciLit		-0.022	**-0.030****	**-0.034****
		(0.014)	(0.015)	(0.015)
Liberal			-0.014	-0.006
			(0.069)	(0.070)
Conservative			-0.014	-0.017
			(0.070)	(0.072)
College			**0.117***	**0.141****
			(0.060)	(0.066)
Income				
Middle Income				**-0.135****
				(0.067)
High Income				-0.080
				(0.105)
Age				
35-54				0.014
				(0.076)
Over 54				0.022
				(0.079)
HHsize				0.003
				(0.025)
Female				**-0.112***
				(0.062)
Region				
Midwest				0.112
				(0.088)
South				0.051
				(0.081)
West				0.098
				(0.090)
constant	-0.035	0.069	0.064	0.122
	(0.030)	(0.073)	(0.077)	(0.140)
R squared	0	0.003	0.006	0.014
Adj. R squared	0	0.001	0.002	0.002

Table 4 continued

	Dependent Variable: Premium for No-Added-Hormones Chicken				Dependent Variable: Premium for Organic Apples			
	1	2	3	4	1	2	3	4
FarmWorker	**-0.239***	**-0.243***	**-0.254***	**-0.244***	-0.155	-0.171	**-0.203***	-0.181
	(0.128)	(0.129)	(0.131)	(0.135)	(0.106)	(0.106)	(0.108)	(0.112)
SciLit		-0.004	0.004	0.010		-0.019	-0.023	-0.027
		(0.019)	(0.020)	(0.021)		(0.016)	(0.017)	(0.017)
Liberal			0.032	0.035			0.113	0.111
			(0.094)	(0.094)			(0.078)	(0.078)
Conservative			-0.092	-0.076			-0.036	-0.056
			(0.094)	(0.097)			(0.078)	(0.080)
College			-0.093	-0.063			0.038	0.026
			(0.081)	(0.089)			(0.067)	(0.074)
Income								
Middle Income				-0.005				-0.012
				(0.091)				(0.075)
High Income				-0.152				0.024
				(0.143)				(0.118)
Age								
35-54				0.051				0.051
				(0.103)				(0.085)
Over 54				-0.024				0.093
				(0.107)				(0.088)
HHsize				0.011				-0.016
				(0.034)				(0.029)
Female				0.062				-0.022
				(0.084)				(0.069)
Region								
Midwest				-0.171				-0.017
				(0.120)				(0.099)
South				-0.069				0.014
				(0.110)				(0.091)
West				-0.191				0.040
				(0.122)				(0.101)
constant	0.329***	0.348***	0.370***	0.381**	0.209***	0.299***	0.280***	0.299**
	(0.041)	(0.099)	(0.105)	(0.189)	(0.033)	(0.082)	(0.086)	(0.157)
R squared	0.003	0.003	0.006	0.011	0.002	0.003	0.007	0.009
Adj. R squared	0.002	0.001	0.001	-0.001	0.001	0.001	0.002	-0.004

Interestingly, the effect of a college degree is positive and significant for salt and orange juice, raising premiums by 6 to 14 cents. This result is likely influenced by the presence of the scientific literacy control, which already captures the skill of scientific understanding that may be gained in college. This effect therefore captures other characteristics of those who attended college, including social groups. Kim et al. (2018) found that the more highly educated were more susceptible to social pressure increasing organic premiums; status effects could be one explanation for higher premiums among those with a degree. Midwesterners are willing to pay less, on average, for a non-GMO label on salt, while females are willing to pay less for a gluten-free orange juice label. The effect of income is generally insignificant.

Effect of Information

OLS

Determinants of the change in premiums after information are reported in Table 5. Respondents with higher science scores decrease their premiums more after learning about the labels' redundancy, though the effect is only statistically significant in the case of no-hormone-added chicken. Those with a college degree decrease their premiums for salt eight cents more than those without. Females also lower salt premiums by eight cents more than do males. Those with farm experience and those in the middle age category are more likely to increase premiums for salt, while those of middle income increase orange juice premiums more than lower income respondents.

Table 5: Reactions to Information, OLS Regression

Dependent Variable : Premium2 – Premium1

	Salt	OJ	Chicken
FarmWorker	**0.119***	0.161	0.176
	(0.067)	(0.124)	(0.189)
SciLit	-0.017	-0.015	**-0.049***
	(0.010)	(0.019)	(0.029)
SubjectiveKnowledge	-0.034	0.038	0.126
	(0.040)	(0.075)	(0.118)
ObjectiveKnowledge	-0.003	-0.080	-0.014
	(0.041)	(0.075)	(0.141)
Liberal	0.024	0.027	-0.049
	(0.047)	(0.086)	(0.131)
Conservative	-0.017	0.037	-0.050
	(0.048)	(0.088)	(0.134)
College	**-0.080***	-0.068	0.137
	(0.044)	(0.081)	(0.123)
Income			
Middle Income	0.029	**0.143***	-0.096
	(0.045)	(0.082)	(0.125)
High Income	0.037	0.109	0.052
	(0.070)	(0.129)	(0.197)
Age			
35-54	**0.114****	0.101	0.019
	(0.051)	(0.094)	(0.144)
Over 54	0.076	-0.075	-0.004
	(0.054)	(0.099)	(0.149)
HHsize	0.006	0.005	-0.014
	(0.017)	(0.031)	(0.047)
Female	**-0.083****	0.041	-0.144
	(0.041)	(0.076)	(0.115)
Region			
Midwest	0.072	-0.109	0.262
	(0.059)	(0.108)	(0.164)
South	0.016	0.010	0.129
	(0.054)	(0.099)	(0.151)
West	0.012	-0.127	0.161
	(0.060)	(0.111)	(0.168)
constant	0.019	0.086	0.175
	(0.096)	(0.176)	(0.270)
R squared	0.019	0.016	0.012
Adj. R squared	0.005	0.002	-0.002

Table 6: Reactions to Information, Logistic Regressions

Dependent variable : 0/1 indicator for having decreased, maintained, or increased premium

Salt

	decrease	no change	increase
FarmWorker	0.157	-0.384	0.093
	(0.219)	(0.279)	(0.220)
SciLit	0.031	**0.168*** **	**-0.178*** **
	(0.034)	(0.039)	(0.036)
SubjectiveKnowledge	-0.097	0.095	-0.006
	(0.132)	(0.146)	(0.136)
ObjectiveKnowledge	0.007	**0.256***	**-0.253***
	(0.135)	(0.146)	(0.141)
College	**0.318** **	**-0.363** **	-0.031
	(0.144)	(0.162)	(0.149)
Conservative	0.224	-0.126	-0.114
	(0.157)	(0.174)	(0.163)
Liberal	-0.039	0.029	0.022
	(0.155)	(0.172)	(0.158)
Female	**0.687*** **	**-0.333** **	**-0.432*** **
	(0.136)	(0.149)	(0.138)
Income			
Middle Income	0.001	0.088	-0.084
	(0.145)	(0.164)	(0.149)
High Income	-0.163	0.241	-0.069
	(0.231)	(0.251)	(0.236)
Age			
35-54	-0.186	0.257	0.028
	(0.166)	(0.199)	(0.168)
Over 54	**-0.430** **	**0.712*** **	-0.160
	(0.169)	(0.194)	(0.174)
constant	-0.911***	-2.013***	0.608
	(0.238)	(0.275)	(0.242)
Correctly classified	.629	.727	.670
Log likelihood	-729.841	-618.452	-698.821

OJ

	decrease	no change	increase
FarmWorker	0.091	-0.189	0.004
	(0.218)	(0.303)	(0.217)
SciLit	**0.064***	**0.159*** **	**-0.172*** **
	(0.034)	(0.043)	(0.035)
SubjectiveKnowledge	-0.072	0.163	-0.052
	(0.132)	(0.165)	(0.133)
ObjectiveKnowledge	**-0.239***	**0.643*** **	-0.202
	(0.134)	(0.163)	(0.134)
College	-0.034	0.257	-0.139
	(0.142)	(0.177)	(0.144)
Conservative	-0.228	0.302	0.033
	(0.157)	(0.192)	(0.156)
Liberal	0.061	0.011	-0.056
	(0.150)	(0.195)	(0.153)
Female	**0.237***	-0.049	-0.219
	(0.132)	(0.168)	(0.134)
Income			
Middle Income	-0.097	-0.078	0.157
	(0.142)	(0.186)	(0.145)
High Income	**-0.381***	0.185	0.226
	(0.231)	(0.270)	(0.228)
Age			
35-54	-0.087	0.094	0.032
	(0.165)	(0.220)	(0.163)
Over 54	0.145	0.150	-0.248
	(0.166)	(0.217)	(0.168)
constant	-0.597**	-2.799***	0.657***
	(0.233)	(0.313)	(0.236)
Correctly classified	.607	.862	.576
Log likelihood	-744.663	-521.134	-735.379

Table 6 continued

Chicken

	decrease	no change	increase
FarmWorker	-0.153	-0.202	0.209
	(0.219)	(0.363)	(0.215)
SciLit	0.038	**0.146*** **	**-0.111*** **
	(0.033)	(0.048)	(0.034)
SubjectiveKnowledge	-0.133	-0.165	0.205
	(0.135)	(0.197)	(0.135)
ObjectiveKnowledge	-0.255	**0.393***	0.038
	(0.164)	(0.214)	(0.163)
College	0.049	0.040	-0.074
	(0.140)	(0.203)	(0.142)
Conservative	-0.190	-0.194	**0.289***
	(0.154)	(0.219)	(0.154)
Liberal	-0.030	-0.133	0.094
	(0.149)	(0.217)	(0.151)
Female	0.105	-0.034	-0.091
	(0.131)	(0.189)	(0.132)
Income			
Middle Income	0.201	0.005	-0.209
	(0.142)	(0.209)	(0.142)
High Income	-0.008	0.186	-0.105
	(0.225)	(0.309)	(0.225)
Age			
35-54	-0.092	0.096	0.062
	(0.163)	(0.254)	(0.163)
Over 54	-0.040	0.390	-0.149
	(0.164)	(0.243)	(0.165)
constant	-0.431*	-2.667***	0.257
	(0.237)	(0.356)	(0.237)
Correctly classified	.590	.862	.576
Log likelihood	-759.628	-437.018	-752.226

Logistic Regression

Further insights to the drivers of premium changes are presented in Table 6. When we separately analyze the likelihood of increasing, decreasing, or maintaining the initial premium, we find scientific literary to be a consistent predictor of reactions to information. For all three products, those with higher science scores are significantly more likely to maintain their premiums and significantly less likely to increase premiums. In the case of orange juice, those with higher scientific literacy are more likely to decrease premiums. Similarly, factual knowledge is associated with unchanged premiums across all products. In no case did perceived knowledge have a significant impact on reactions to information. Possession of a college degree increased propensity to decrease salt premiums, and females were more likely to decrease salt and orange juice premiums. Older respondents tended not to change their premiums for salt.

Misled Consumers and Organic Premiums

When we add the index of premium decreases to the analysis of organic apple premiums, farm experience is no longer a significant predictor. Table 7 lists regression results. Under OLS analysis, the impact of the decrease index is not significantly different from zero. However, both logistic and quantile regression robustness checks point to a positive, significant relationship between the number of products about which a respondent was misinformed and organic premiums.

Table 7: Apple Premiums and Reactions to Information

	OLS	Logit	Quantile
Decrease	0.044	**0.140****	**0.058****
	(0.034)	(0.066)	(0.024)
FarmWorker	-0.181	-0.092	-0.013
	(0.112)	(0.213)	(0.079)
SciLit	-0.028	-0.032	-0.007
	(0.017)	(0.033)	(0.012)
Liberal	0.112	0.244	0.044
	(0.078)	(0.151)	(0.055)
Conservative	-0.055	-0.015	-0.021
	(0.080)	(0.153)	(0.057)
College	0.023	0.101	0.021
	(0.074)	(0.141)	(0.052)
Income			
Middle Income	-0.012	0.174	0.040
	(0.075)	(0.143)	(0.053)
High Income	0.030	0.291	0.062
	(0.118)	(0.228)	(0.083)
Age			
35-54	0.054	0.220	0.059
	(0.085)	(0.163)	(0.060)
Over 54	0.095	0.254	0.033
	(0.088)	(0.169)	(0.062)
HHsize	-0.017	0.005	-0.008
	(0.029)	(0.055)	(0.020)
Female	-0.032	0.021	0.003
	(0.070)	(0.133)	(0.049)
Region			
Midwest	-0.014	-0.204	-0.022
	(0.099)	(0.189)	(0.070)
South	0.017	-0.001	0.052
	(0.091)	(0.174)	(0.064)
West	0.043	0.142	0.015
	(0.101)	(0.196)	(0.071)
constant	0.256	-0.096	0.023
	(0.160)	(0.306)	(0.113)
R squared	0.010		
Pseudo R squared		0.013	0.007

DISCUSSION AND CONCLUSIONS

Retailers continue to expand their selection of organic, non-GMO, natural, and other alternative foods (Bhattacharyya 2019; Thomasson and Naidu 2019). As marketers target consumers seeking these attributes, it is likely that such claims will continue to appear in contexts in which they do not provide any new information for knowledgeable consumers. Though the FDA has addressed the relevance of labels that are misleading in context, its new guidelines are non-binding. It is thus important to understand how consumers value these labels; if grocery shoppers are misled by them, they may spend extra money without receiving extra value. This study investigates three redundant labels, all of which are currently present in the marketplace. We conduct a nationwide, online survey of 1,122 United States adults, including an elicitation of willingness to pay for salt with and without a non-GMO label, orange juice with and without a gluten-free label, and chicken breast with and without a no-hormone-added label. We find that 40 - 58% of respondents are willing to pay premiums for products carrying the redundant labels. This is true even in the presence of a clarifying statement on the product package, indicating the ineffectiveness of a small print disclaimer to correct misperceptions in the presence of a misleading marketing claim. In fact, no-hormone-added chicken breast carrying a federally mandated disclaimer had the highest average premium, as a percentage of willingness to pay, among all the products studied.

We find some support for the hypothesis that these premiums stem from misunderstanding. Respondents with farm experience are willing to pay less than those without farm experience for redundant labels that directly reference farm production practices, i.e., “non-GMO” on salt and “no-hormone-added” on chicken. Like in Bronnenberg et al. (2015), expertise is domain-specific; there is no significant effect of farm experience on premiums for the nutrition-referencing label on

orange juice. However, those with higher scores on a quiz of general scientific literacy tend to report lower premiums for gluten-free orange juice. Because two of our measures of informed consumers, expertise and scientific comprehension, are associated with a reluctance to pay more for redundant labels, we conclude that, in general, misinformation contributes to the willingness to pay a premium. It is surprising that scientific literacy is not a significant predictor of premiums for no-hormone-added chicken, given the statement on the package declaring the label's superfluity. Disclaimers seem to be ineffective at preventing misperceptions even among consumers well versed in understanding scientific facts.

The survey reveals heterogeneous responses to text excerpts explaining the labels' redundancy. We find that 39- 43% of respondents lower their premiums after viewing information, which is behavior consistent with having been initially misled. A smaller percentage, 14- 27%, did not change their premiums beyond our measurement tool's sensitivity buffer of 3 cents. These respondents may have discredited the information for a variety of reasons: distrust in the sources used in the survey, failure to read the information in the interest of time, or misinterpretation of its message. Furthermore, the findings of Bernard, Duke, and Albrecht (2019) and Kim, Lusk, and Brorsen (2018) suggest that consumers view food attribute labels as signals of benefits beyond the scope of the claim made. These benefits may include characteristics of the product itself, such as safety, or outcomes of purchase, such as social status. Such perceptions would limit the effectiveness of information about the claim itself to decrease premiums. On the other hand, participants who maintain their initial premiums may have simply already been aware of the facts presented. Indeed, greater objective knowledge about the label increased the likelihood that a respondent did not change her premium. 75% of those who did not change premiums for salt had initially stated a $0 premium; likewise, 69% for orange juice and 57% for chicken.

It is less clear why over 30% of respondents increase premiums after viewing information. These results align with those of Gifford and Bernard (2011), who found that 30% of respondents altered premiums for organic over natural chicken in the opposite of the expected direction when presented with information. In a similar vein, McFadden and Lusk (2015) found that 12% of participants formed a posterior belief contrary to the scientific information provided about the safety of GM foods. That study reported that information-processing problems, selective scrutiny, and several other cognitive biases influenced this failure to align beliefs with new information. Furthermore, it is possible that respondents reacted negatively to information that implied their prior beliefs were incorrect, and that their behavior was reactionary. Our study has limited explanatory power for why participants may have increased premiums; future work on redundant labels may benefit from measuring respondents' prior beliefs about the labels and perceptions of the presented information in more detail.

Respondents who lowered their premiums are likely to have held inflated beliefs about the benefits of the labeled products and corrected them in light of new information. We constructed an index of respondents' subjective tendency to be misled by labels, adding the number of products for which an individual decreased her premium after accurate information. Higher susceptibility to misleading claims increased the likelihood that a consumer was willing to pay a premium for organic food. This suggests that organic premiums are, at least partially, inflated by misinformation.

Redundant labels encourage overspending by uninformed consumers, and the provision of corrective information is often not enough to eliminate the willingness to pay more for products with these claims. Finding ways to provide consumers with food attributes they desire while avoiding misperceptions is a key challenge for regulators and the food sector.

APPENDIX A. ALTERNATIVE SPECIFICATIONS FOR ANAYLZING INITIAL PREMIUMS

Table A.1: Logits
Dependent variable: 0 for Non-positive Premium, 1 for Positive Premium

	Salt	OJ	Chicken	Apple
FarmWorker	-0.299	**-0.374***	**-0.480****	-0.089
	(0.215)	(0.220)	(0.212)	(0.213)
SciLit	**-0.065****	**-0.098*****	0.001	-0.027
	(0.033)	(0.034)	(0.033)	(0.033)
Liberal	0.098	0.094	0.082	0.242
	(0.150)	(0.150)	(0.150)	(0.150)
Conservative	0.192	0.000	-0.027	-0.021
	(0.154)	(0.155)	(0.154)	(0.153)
College	0.217	0.173	0.213	0.111
	(0.141)	(0.142)	(0.142)	(0.141)
Income				
Middle Income	-0.101	-0.219	-0.218	0.175
	(0.144)	(0.144)	(0.144)	(0.143)
High Income	-0.140	-0.328	-0.295	0.270
	(0.227)	(0.229)	(0.226)	(0.228)
Age				
35-54	-0.193	-0.106	0.129	0.210
	(0.163)	(0.164)	(0.164)	(0.163)
Over 54	**-0.654*****	-0.038	0.010	0.247
	(0.170)	(0.169)	(0.169)	(0.169)
HHsize	0.000	-0.002	0.079	0.009
	(0.055)	(0.055)	(0.055)	(0.054)
Female	**0.365*****	0.073	**0.242***	0.053
	(0.133)	(0.133)	(0.132)	(0.132)
Region				
Midwest	0.044	0.113	0.015	-0.213
	(0.189)	(0.192)	(0.189)	(0.188)
South	0.042	0.146	0.077	-0.010
	(0.173)	(0.176)	(0.174)	(0.174)
West	-0.281	0.242	-0.097	0.131
	(0.195)	(0.195)	(0.193)	(0.195)
Correctly classified	0.431	0.408	0.421	0.422
Log likelihood	-754.087	-749.124	-754.003	-756.067

Table A.2: Quantile Regressions
Dependent Variable: Median Premium

	Salt	**OJ**	**Chicken**	**Apple**
FarmWorker	-0.032	**-0.040***	**-0.156***	-0.069
	(0.028)	(0.022)	(0.088)	(0.080)
SciLit	-0.005	0.000	-0.003	-0.006
	(0.004)	(0.003)	(0.014)	(0.012)
Liberal	-0.003	0.000	0.019	0.042
	(0.019)	(0.015)	(0.061)	(0.056)
Conservative	0.005	0.000	0.002	-0.007
	(0.020)	(0.016)	(0.063)	(0.058)
College	0.010	0.000	0.051	0.039
	(0.018)	(0.014)	(0.058)	(0.053)
Income				
Middle Income	-0.003	-0.010	-0.057	0.033
	(0.019)	(0.015)	(0.059)	(0.054)
High Income	0.004	-0.010	-0.039	0.069
	(0.029)	(0.023)	(0.093)	(0.085)
Age				
35-54	-0.033	0.000	0.004	0.048
	(0.021)	(0.017)	(0.067)	(0.061)
Over 54	**-0.056****	0.000	-0.072	0.005
	(0.022)	(0.017)	(0.069)	(0.063)
HHsize	-0.001	0.000	0.024	-0.004
	(0.007)	(0.006)	(0.022)	(0.020)
Female	0.020	0.000	**0.111****	0.023
	(0.017)	(0.014)	(0.054)	(0.050)
Region				
Midwest	-0.007	0.000	-0.045	-0.029
	(0.025)	(0.019)	(0.078)	(0.071)
South	0.004	0.000	0.047	0.061
	(0.023)	(0.018)	(0.071)	(0.065)
West	-0.016	0.000	-0.010	-0.003
	(0.025)	(0.020)	(0.079)	(0.072)
constant	0.084**	0.010	0.098	0.069
	(0.039)	(0.031)	(0.123)	(0.112)
Pseudo R squared	0.009	0.000	0.010	0.005

APPENDIX B. SURVEY

Survey Flow

EmbeddedData
psid = ${e://Field/psid}
EmbeddedData
pid = ${e://Field/pid}

Standard: Introduction (2 Questions)

BlockRandomizer: 1 - Evenly Present Elements

Standard: Organic 1 (3 Questions)
Standard: Organic 2 (3 Questions)

Standard: OJ (2 Questions)
Standard: Salt (2 Questions)
Standard: Chicken (3 Questions)
Standard: Chicken Follow-up (3 Questions)
Standard: Food Knowledge (8 Questions)
Standard: Information (14 Questions)
Standard: Scientific Intelligence (11 Questions)
Block: Farmer Designation (7 Questions)
Standard: Demographics (14 Questions)

Page Break

Start of Block: Introduction

Q1 Thank you for participating in this study. The following contains information about this study and your rights as a research participant.
Investigators: Lacey Wilson, Graduate Research Assistant and Jayson Lusk, Ph.D.

Purpose: This is a web-based survey research study designed to study consumer preferences for various food labels. Procedures: Proceeding with the web-based survey will imply your consent to participate in this study. There are about 25 questions asking about your preferences for and familiarity with typical grocery products. We also ask some basic demographic questions. The survey will take about 15 minutes to complete.

Risks of Participation: The risks associated with this study are minimal. The risks are not greater than those ordinarily encountered in daily life. Moreover, you may stop the survey at any time.

Benefits: This research will assist researchers and industry participants better understand how consumers interact with and understand food labels. Confidentiality: The researchers will not have access to your name. At no point will a data file be constructed in which your name is linked with your responses. The data will be stored by the investigator in her office with no intention to destroy the data. The data will only be released in summaries in which no individual's answers can be identified. The project's research records may be reviewed by departments at Purdue University responsible for regulatory and research oversight.

Contacts: If you have any questions or concerns about this project, please contact Lacey Wilson, (765) 494-4191, wils1013@purdue.edu. If you have questions about your rights while taking part in the study or have concerns about the treatment of research participants, please call the Human Research Protection Program at (765) 494-5942, email (irb@purdue.edu) or write to: Human Research Protection Program - Purdue University; Ernest C. Young Hall, Room 1032; 155 S. Grant St., West Lafayette, IN 47907-2114.
Participant Rights: Your participation in this study is voluntary. You may choose not to participate or, if you agree to participate, you can withdraw your participation at any time without penalty or loss of benefits to which you are otherwise entitled. Consent: I have read and fully understand the consent form. I understand that my participation is voluntary. By clicking below, I am indicating that I freely and voluntarily and agree to participate in this study and I also acknowledge that I am at least 18 years of age.

It is recommended that you print a copy of this consent page for your records before you begin.

Page Break

Q2 To what extent do you agree or disagree with the following statement:

I can easily understand the labels on food products.

- ○ Strongly agree (1)
- ○ Somewhat agree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat disagree (4)
- ○ Strongly disagree (5)

End of Block: Introduction

Start of Block: Organic 1

Q3 For the next few questions, imagine you are shopping for groceries for your household. Please indicate the highest price that you would be willing and able to pay for each product.

Make sure that the amount you enter is no higher than what you would actually be willing to spend in the grocery store.

Q4

What is the highest price (per pound) you would pay for this product?

click the 0 to type

Dollars per pound ($ / lb)

0 0.6 1.2 1.8 2.4 3 3.6 4.2 4.8 5.4 6

0

Q5

What is the highest price (per pound) you would pay for this product?

click the 0 to type

Dollars per pound ($ / lb)

0 0.6 1.2 1.8 2.4 3 3.6 4.2 4.8 5.4 6

0

End of Block: Organic 1

Start of Block: Organic 2

Q6 For the following questions, imagine you are shopping for groceries for your household. Please indicate the highest price that you would be willing and able to pay for each product.
Make sure that the amount you enter is no higher than what you would actually be willing to spend in the grocery store.

Q7

What is the highest price (per pound) you would pay for this product?

click the 0 to type

Dollars per pound ($ / lb)

0 0.6 1.2 1.8 2.4 3 3.6 4.2 4.8 5.4 6

0

Page Break

Q8

What is the highest price (per pound) you would pay for this product?

click the 0 to type

Dollars per pound ($ / lb)

0 0.6 1.2 1.8 2.4 3 3.6 4.2 4.8 5.4 6

0

End of Block: Organic 2

Start of Block: OJ

Q9

What is the highest price you would pay for this product?

Dollars ($)

0 0.6 1.2 1.8 2.4 3 3.6 4.2 4.8 5.4 6

0

Q10

What is the highest price you would pay for this product?

Dollars ($)

0 0.6 1.2 1.8 2.4 3 3.6 4.2 4.8 5.4 6

0

End of Block: OJ

Start of Block: Salt

Q11

What is the highest price you would pay for this product?

Dollars ($)

0 0.3 0.6 0.9 1.2 1.5 1.8 2.1 2.4 2.7 3

0

Q12

What is the highest price you would pay for this product?

Dollars ($)

0 0.3 0.6 0.9 1.2 1.5 1.8 2.1 2.4 2.7 3

0

End of Block: Salt

Start of Block: Chicken

Q13 What percentage of broiler chickens (*chickens raised for meat*) in the United States are given artificial growth hormones?

- 0-25% (1)
- 26-50% (2)
- 51-75% (3)
- 76-100% (4)

Page Break

Q14

What is the highest price you would pay for this product?

Dollars ($)

0 0.9 1.8 2.7 3.6 4.5 5.4 6.3 7.2 8.1 9

0

Q15

What is the highest price you would pay for this product?

Dollars ($)

0 0.9 1.8 2.7 3.6 4.5 5.4 6.3 7.2 8.1 9

0

End of Block: Chicken

Start of Block: Chicken Follow-up

Q16 What percentage of broiler chickens (*chickens raised for meat*) in the United States are given artificial growth hormones?

- 0-25% (1)
- 26-50% (2)
- 51-75% (3)
- 76-100% (4)

Page Break

Q17 Which of the following disclaimers appeared on the chicken breasts on the previous page?

- *PRODUCT CONTAINS ADDED HORMONES. (1)
- *FEDERAL REGULATIONS PROHIBIT THE USE OF ADDED HORMONES IN CHICKEN. (2)
- *CHICKEN RAISED IN A CAGE SYSTEM. (3)
- *CHICKEN PROCESSED IN A FACILITY THAT ALSO PROCESSES CHICKENS RAISED WITH HORMONES. (4)

Page Break

Q18

Have you ever seen the following disclaimer on fresh chicken in the grocery store?

*FEDERAL REGULATIONS PROHIBIT THE USE OF ADDED HORMONES IN CHICKEN.

- ○ Yes (1)
- ○ No (2)
- ○ Don't remember (3)

End of Block: Chicken Follow-up

Start of Block: Food Knowledge

Q19 To what extent do you agree or disagree with the following statement:

"I am knowledgeable about the way poultry is produced in the United States."

- ○ Strongly agree (5)
- ○ Somewhat agree (4)
- ○ Neither agree nor disagree (3)
- ○ Somewhat disagree (2)
- ○ Strongly disagree (1)

Q20 Are you a vegetarian or vegan?

- Yes (1)
- No (0)

Q21 How often have you purchased fresh chicken breasts in the past year?

- Every week (1)
- A few times a month (2)
- Once a month (3)
- A few times a year (4)
- Never (5)

Q22 Do you believe the government should require all foods that contain DNA to be labeled?

- Yes (1)
- No (2)

Q23 To what extent do you agree or disagree with the following statement:

"I am knowledgeable about GMOs."

- ○ Strongly agree (5)
- ○ Somewhat agree (4)
- ○ Neither agree nor disagree (3)
- ○ Somewhat disagree (2)
- ○ Strongly disagree (1)

Q24 What percentage of sea salt sold in the United States contains genetically modified ingredients?

- ○ 0-25% (1)
- ○ 26-50% (2)
- ○ 51-75% (3)
- ○ 76-100% (4)

Q25 To what extent do you agree or disagree with the following statement:

"I am knowledgeable about gluten."

- Strongly agree (1)
- Somewhat agree (2)
- Neither agree nor disagree (3)
- Somewhat disagree (4)
- Strongly disagree (5)

Q26 What percentage of 100% orange juice sold in the United States contains gluten?

- 0-25% (1)
- 26-50% (2)
- 51-75% (3)
- 76-100% (4)

End of Block: Food Knowledge

Start of Block: Information

Q27

You will now see some additional information about the products from the previous questions.

Please consider this information before revisiting how much you would pay for each item.

Page Break

Q29 The following is taken from a glossary of meat labeling terms from the USDA Food and Safety Inspection Service.

Meat and Poultry Labeling Terms

No Hormones (pork or poultry)

Hormones are not allowed in raising hogs or poultry. Therefore, the claim "no hormones added" **cannot be used** on the labels of pork or poultry unless it is followed by a statement that says "Federal regulations prohibit the use of hormones."

Page Break

Q30 What percentage of broiler chickens (*chickens raised for meat*) in the United States are given artificial growth hormones?

- 0-25% (1)
- 26-50% (2)
- 51-75% (3)
- 76-100% (4)

Page Break

Q31

What is the highest price you would pay for this product?

In a previous question, you stated you would pay $${q://QID116/TotalSum}.

Dollars ($)

0 0.9 1.8 2.7 3.6 4.5 5.4 6.3 7.2 8.1 9

0

Q32

What is the highest price you would pay for this product?

In a previous question, you stated you would pay $${q://QID117/TotalSum}.

Dollars ($)

0 0.9 1.8 2.7 3.6 4.5 5.4 6.3 7.2 8.1 9

0

Page Break

Q33 The following comes from the Celiac Disease Foundation.

Celiac Disease FOUNDATION.

ABOUT CELIAC DISEASE GLUTEN-FREE LIVING

Gluten-Free Foods

SHARE | PRINT FRIENDLY

Cutting out gluten from your diet may seem like a difficult and limiting task. Fortunately, there are many healthy and delicious foods that are naturally gluten-free.

The most cost-effective and healthy way to follow the gluten-free diet is to seek out these naturally gluten-free food groups, which include:

- Fruits
- Vegetables
- Meat and poultry
- Fish and seafood
- Dairy
- Beans, legumes, and nuts

Beverages

Most beverages are gluten-free, including juices, sodas, and sports drinks.

Page Break

Q35

What is the highest price you would pay for this product?

In a previous question, you stated you would pay $${q://QID119/TotalSum}.

Dollars ($)

0 0.6 1.2 1.8 2.4 3 3.6 4.2 4.8 5.4 6

0

Q36

What is the highest price you would pay for this product?

In a previous question, you stated you would pay $${q://QID129/TotalSum}.

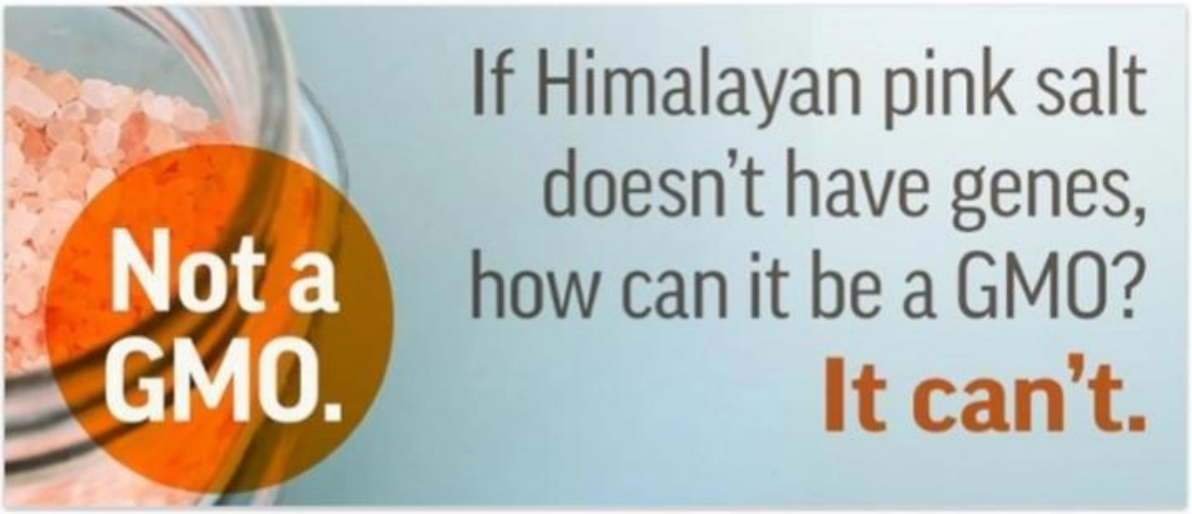
Dollars ($)

0 0.6 1.2 1.8 2.4 3 3.6 4.2 4.8 5.4 6

0

Page Break

Q38 The following comes from the GMO Answers Initiative.



Myth There are dozens of GMO crops, including strawberries, bananas and wheat. There is even GMO water and GMO salt.

Fact There are 10 genetically modified crops commercially available today: alfalfa, apples, canola, corn (field and sweet), cotton, papaya, potatoes, soybeans, squash and sugar beets.

This chart explains why each of the 10 GMO crops are genetically modified.

The majority of these crops, like alfalfa, field corn and soy are actually used for livestock feed. Other uses for these crops include common food ingredients, such as sugar, canola oil, corn starch and soy lecithin. You may find only a few of these in your produce section: rainbow papaya, summer squash, sweet corn, potatoes and apples.

You may also see *non-GMO water and salt*, but here's the catch: **it's not possible for either to be a GMO in the first place!** Although many products aren't among the 10 commercially available GMO crops sold in the U.S., you may still see certified GMO-free label even though there's no GMO counterpart.

Page Break

Q39

What is the highest price you would pay for this product?

In a previous question, you stated you would pay $${q://QID121/TotalSum}.

Dollars ($)

0 0.3 0.6 0.9 1.2 1.5 1.8 2.1 2.4 2.7 3

0

Q40

What is the highest price you would pay for this product?

In a previous question, you stated you would pay $${q://QID120/TotalSum}.

Dollars ($)

0 0.3 0.6 0.9 1.2 1.5 1.8 2.1 2.4 2.7 3

0

Page Break

End of Block: Information

Start of Block: Scientific Intelligence

Q41 You will now be asked a few questions about scientific facts. Please answer to the best of your ability.

Q42 All radioactivity is man-made.

- True (1)
- False (2)

Q43 Lasers work by focusing sound waves.

- True (1)
- False (2)

Q44 Electrons are smaller than atoms.

- True (1)
- False (2)

Q45 Antibiotics kill viruses as well as bacteria.

- ○ True (1)
- ○ False (2)

Q46 For this question, please select true.

- ○ True (1)
- ○ False (2)

Q47 If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets?

- ○ 1 minute (1)
- ○ 5 minutes (2)
- ○ 100 minutes (3)
- ○ 500 minutes (4)

Q48 A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost?

- ○ $0.05 (1)
- ○ $0.10 (2)
- ○ $1.00 (3)

Q49 In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long does it take for the patch to cover half the lake?

- ○ 1 day (1)
- ○ 24 days (2)
- ○ 47 days (3)

Q50 Does the Earth go around the Sun, or does the Sun go around the Earth?

- ○ Earth goes around the Sun (1)
- ○ Sun goes around the Earth (2)

Display This Question:

If Does the Earth go around the Sun, or does the Sun go around the Earth? = Earth goes around the Sun

Q51 How long does it take for the Earth to go around the Sun?

- ○ 1 day (1)
- ○ 1 month (2)
- ○ 1 year (3)

End of Block: Scientific Intelligence

Start of Block: Farmer Designation

Q52 The final section asks questions about you.

Q53 What is your current occupation?

Select the category that best fits, then select your occupation below.

Category (1)

Occupation (2)

▼Management occupations (1) ... Transportation and material moving occupations ~ Material moving workers, all other (557)

Q54 Have you ever worked in production agriculture?

- ○ Yes (1)
- ○ No (0)

Display This Question:

If Have you ever worked in production agriculture? = Yes

Q55 In which of the following capacities have you worked in agriculture?

Check all that apply.

- ☐ Employed by a farm that produced crops, primarily for sale (1)
- ☐ Employed by a farm or ranch that raised livestock, primarily for sale (2)
- ☐ Employed in buying or processing of grain (3)
- ☐ Employed in buying or processing of livestock (4)
- ☐ Employed in agricultural science/research (5)
- ☐ Tended a backyard or neighborhood garden or chicken coop (6)
- ☐ I have (or my immediate family has) owned a farm or ranch (7)
- ☐ Other (please specify) (8) _____

Display This Question:

If In which of the following capacities have you worked in agriculture?Check all that apply. = Employed by a farm that produced crops, primarily for sale

Or In which of the following capacities have you worked in agriculture?Check all that apply. = I have (or my immediate family has) owned a farm or ranch

Q56 With which crops have you worked?

Check all that apply.

- ☐ Corn (1)
- ☐ Wheat (2)
- ☐ Soybeans (3)
- ☐ Fruit/Vegetables (4)
- ☐ Cotton (5)
- ☐ Other (6) _____
- ☐ None (7)

Display This Question:

If In which of the following capacities have you worked in agriculture?Check all that apply. = Employed by a farm or ranch that raised livestock, primarily for sale

Or In which of the following capacities have you worked in agriculture?Check all that apply. = I have (or my immediate family has) owned a farm or ranch

Q57 With which specie(s) of livestock have you worked?

Check all that apply.

- ☐ Pork (1)
- ☐ Dairy Cattle (2)
- ☐ Beef Cattle (3)
- ☐ Poultry (4)
- ☐ Other (please specify) (5) _____
- ☐ None (6)

Display This Question:

If In which of the following capacities have you worked in agriculture?Check all that apply. = Employed by a farm that produced crops, primarily for sale

Or In which of the following capacities have you worked in agriculture?Check all that apply. = Employed by a farm or ranch that raised livestock, primarily for sale

Or In which of the following capacities have you worked in agriculture?Check all that apply. = I have (or my immediate family has) owned a farm or ranch

Q58 Have you ever worked in a management role on a farm or ranch?

For example, a manager may decide what or when to plant.

A non-management employee may be paid an hourly wage.

- ○ Yes (1)
- ○ No (0)

Page Break

End of Block: Farmer Designation

Start of Block: Demographics

Q59 What is your gender?

- Male (1)
- Female (2)

Q60 What is your current age?

- 18 - 24 years old (1)
- 25 - 34 years old (2)
- 35 - 44 years old (3)
- 45 - 54 years old (4)
- 55 - 64 years old (5)
- 65 - 74 years old (6)
- 74 years or older (7)

Q61 What is your current marital status?

- Single, Never Married (1)
- Married (2)
- Separated (3)
- Divorced (4)
- Widowed (5)

Q62 What percentage of the grocery shopping do you do for your household?

- All the grocery shopping (1)
- More than half of the grocery shopping (2)
- About half of the grocery shopping (3)
- Less than half of the grocery shopping (4)
- None of the grocery shopping (5)

Q63 How many people (including yourself) live in your household?

- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 or more (5)

Q64 Are there children under the age of 12 living in your household?

- Yes (1)
- No (0)

Q65 Are you currently on food stamps?

- Yes (1)
- No (0)

Q66 What is your zip code?

_____

Q67 In what US state do you live?

▼Alabama (1) ... Wyoming (51)

Q68 What is the highest level of education you have completed?

- Less than High School (1)
- High School/GED (2)
- Some College (3)
- 2-Year College Degree (Associates) (4)
- 4-Year College Degree (BA, BS) (5)
- Master's Degree (6)
- Professional Degree (Ph.D., J.D., M.D., etc.) (7)

Q69 What is your approximate annual household income before taxes?

- Less than $20,000 (1)
- $20,000 - $39,999 (2)
- $40,000 - $59,999 (3)
- $60,000 - $79,999 (4)
- $80,000 - $99,999 (5)
- $100,000 - $119,999 (6)
- $120,000 - $139,999 (7)
- $140,000 - $159,999 (8)
- $160,000 or greater (9)

Q70 Are you of Hispanic, Latino, or Spanish origin?

- No, not of Hispanic, Latino, or Spanish origin (1)
- Yes, Mexican, Mexican Am., Chicano (2)
- Yes, Puerto Rican (3)
- Yes, Cuban (4)
- Yes, another Hispanic, Latino, or Spanish origin (5)

Q71 What is your race?

- ☐ White (1)
- ☐ Black or African American (2)
- ☐ American Indian or Alaskan Native (3)
- ☐ Asian Indian (4)
- ☐ Chinese (5)
- ☐ Filipino (6)
- ☐ Japanese (7)
- ☐ Korean (8)
- ☐ Vietnamese (9)
- ☐ Native Hawaiian (10)
- ☐ Guamanian or Chamorro (11)
- ☐ Samoan (12)
- ☐ Other Pacific Islander (13)
- ☐ Other (14) _____

Q72 Politically, would you consider yourself liberal or conservative?

- ○ Extremely liberal (1)
- ○ Somewhat liberal (2)
- ○ Moderate (3)
- ○ Somewhat conservative (4)
- ○ Extremely conservative (5)
- ○ Don't know (6)

End of Block: Demographics

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