THE OHIO STATE UNIVERSITY

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# U.S. Consumer Perceptions of What Considerations Should Determine if Foods are Labeled 'Healthy'

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**Executive Summary**

One goal of the U.S. Food and Drug Administration's Foods and Veterinary Medicine Program's Strategic Plan for 2016-2025 is to foster an environment to promote healthy food choices. Claims appearing on food labels represent one aspect of this environment. The FDA has requested interested parties to provide information about consumer understanding of the term "healthy," an implied nutrient content claim of great interest among consumers and food manufacturers. The purpose of this study is to provide contemporary insights about U.S. consumer attitudes toward regulating the term 'healthy' on food labels and consumer opinions about what considerations should determine if foods are labeled 'healthy.' We analyze responses by 525 U.S. consumers to an October 2016 online survey whose responses are weighted by income, age and race to be representative of the contemporary U.S. population. We find 73% of respondents agree that the term 'healthy' should be regulated by the Federal Government. Respondents' most highly rated criteria for determining 'healthy' foods include whether foods are free of GMOs, contain no artificial ingredients, contain no trans-fat, are high in vitamins and low in saturated fats. No trans-fat was rated statistically more important than low in saturated fat, while low in saturated fat was rated as statistically more important than any of the following: low in all types of fat, low in sugar and low in sodium.

**Keywords:** food labels, nutrition claims, Food and Drug Administration, healthy, information policy, industry guidance, trans-fat, saturated fat

## 1. Introduction

One goal of the U.S. Food and Drug Administration's Foods and Veterinary Medicine Program's Strategic Plan for 2016-2025 is to foster an environment to promote healthy food choices. Claims appearing on food labels represent one aspect of this environment. The term 'healthy' is an implied nutrient content claim of particular interest among consumers and food manufacturers. The Code of Federal Regulations (21 CFR 101.65(d)) establishes parameters for the use of 'healthy' on food labels. To provide better guidance on the use of the term 'healthy,' the FDA has requested interested parties to provide comments and information about the use of this term, including any information about consumers' current understanding of this term. The FDA also received a citizen petition requesting an amendment to the regulation such that a 'healthy' claim need not be anchored to a single nutrient level in a food, but rather be tied to broader criteria.

The purpose of this study is to provide contemporary insights about U.S. consumer attitudes toward regulating the term 'healthy' on food labels and their opinions about what considerations should determine if foods are labeled 'healthy.' In the spirit of the citizen petition, the design of this study prompts consumers to indicate the appropriateness of different criteria for determining whether a food should be labeled healthy including both very specific nutrient criteria (e.g., low sugar) or broader criteria (e.g., no artificial ingredients, no GMO ingredients).

## 2. Materials and Methods

An online survey was administered in October 2016 to 525 adult participants recruited by Qualtrics LLC from the United States. The survey included questions about personal and household demographics, the questions analyzed in this research (see Section 4 of the survey in the Appendix) and questions about three other food labeling topics not analyzed here. While the respondents were recruited in a manner to improve national representativeness of the sample on key demographic characteristics, responses were weighted to adjust for differences between the sample and U.S. Census figures using a race by age by income weighting scheme to further enhance representativeness. Ethics approval was received from The Ohio State University Office of Responsible Research Practices' Institutional Review Board (#2016E0645).

Two questions asked of respondents will be analyzed here. First respondents were asked "Do you agree that the federal government should be allowed to regulate how food companies are able to use the term "healthy" on food packages?" The response options were strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, and strongly agree. Next respondents were asked "Rate the following based on importance of what the government should consider when determining how to determine if a food should be declared healthy:" Twelve criteria were listed (see Table 2) and the response options included disagree (coded = 1), somewhat disagree (=2), neither agree nor disagree (=3), somewhat agree (=4) and agree (=5).

Statistical analysis was conducted in Stata Version 14. All analyses use the constructed sample weights. Pairwise t-tests were used to determine if the average rating for each of the 12 criteria were different from one another.

## 3. Results

The characteristics of the sample and the most recent U.S. Census figures are displayed in Table 1. Despite the use of weights, the sample underrepresents those in the highest income group and over-represents the lowest income group. Some misalignment between sample and Census also occurs with respect education, which was not a weighting factor. Specifically, the sample underrepresents those with a high school degree or less.

Figure 1 displays the responses to the question "Do you agree that the federal government should be allowed to regulate how food companies are able to use the term "healthy" on food packages?" Fewer than 13% of respondents expressed disagreement, while 72.8% expressed agreement, including 41.8% who responded 'strongly agree.' Analyses were also conducted that explored whether the response to this question differed by demographic characteristics including

income, race, age, education, gender, and presence of children in household. Regression analysis reveals that the only statistically significant difference in agreement across different demographic groups occurs with respect to income where the lowest income group expresses significantly less agreement than those in higher income categories. No significant differences (at the 5% level) emerge with respect to race, age, education, gender or presence of children in the household.

Table 2 displays respondents' average rating of the twelve potential criterion for determining 'healthy.' The criteria posed to respondents were chosen from a broad array of possible items related to dietary concerns previously considered in FDA discussions (e.g., low fat, low saturated fat, no trans-fat, low sodium), dietary concerns posed in the popular media (e.g., no artificial ingredients, high protein, high vitamins, low sugar, low calorie, high antioxidants) and two addition items associated in the popular press with broader consumer concerns with food (e.g., non GMO, high animal welfare standards).

The criteria focused on non GMO and no artificial ingredients received the highest average ratings, i.e., respondents had the strongest agreement that these should be used to help determine if a food should be labeled healthy. While non GMO had a slightly higher average rating than no artificial ingredients, the difference was not statistically significant at the 5% level (in the table, criteria that share a common letter in the third column are not statistically different from one another at the 5% level). The next most highly rated criteria included no trans-fat, high in vitamins, low saturated fat, and high in protein. This is followed by low sugar, low sodium, low fat, high animal welfare standards and high in antioxidants. The item featuring the lowest average agreement was low calorie.

FDA and other organizations have worked to help consumers distinguish between types of dietary fat sources. The perception of this sample of U.S. consumers suggests that there is a ranking across fat types with trans-fat being the most critical, followed by saturated fat and then all fat. The differences in average ratings across fat types are significantly different at the 5% level.

## 4. Discussion

When rating potential criteria for allowing foods to display the term 'healthy' on the label, consumers expressed the strongest agreement with one criteria not previously considered by FDA in the realm of implied nutrient content claims (non GMO) and one broad criteria often invoked when discussing the meaning of the labeling term 'natural' (no artificial ingredients). Fat content, which has been of interest to both consumers and regulators, appear in three criteria posed to consumers: no trans-fat, low in saturated fat, and low in fat. A clear (statistically significant) ranking arises among consumers with the greatest agreement that no trans-fat is most relevant for determining if a food is healthy, then low saturated fat and followed by low fat. Low sugar, which has been featured in recent popular press discussions of nutrition, received ratings lower than non-GMO, no artificial ingredients and no trans-fat; similar to high in vitamins, low in saturated fat, high in protein and low in sodium; and higher than low fat, high animal welfare standards, high in antioxidants and low in calories.

120 **Table 1.** Sample Characteristics (n=525).

| Characteristic | Sample%[1] | Census % |
|---|---|---|
| Age | | |
| *18-24* | 13.8 | 13.1 |
| *25-44* | 33.8 | 35.8 |
| *45-64* | 37.0 | 34.2 |
| *65+* | 15.4 | 16.9 |
| Income | | |
| *< $25,000* | 34.4 | 22.1 |
| *$25,000 - $49,999* | 23.7 | 23.0 |
| *$50,000+* | 41.84 | 54.9 |
| Race | | |
| *White* | 77.2 | 72.4 |
| *Black* | 11.4 | 12.6 |
| *Other or Multiple* | 11.4 | 15.0 |
| Education | | |
| *High School or Less* | 33.2 | 40.5 |
| *Some College/Assoc. Deg.* | 32.5 | 29.3 |
| *College or More* | 34.3 | 30.6 |
| Male | 48.8 | 49.2 |
| Household Size | 2.71 | 2.65 |

121 [1] Percentages after results are weighted by race, income and age.

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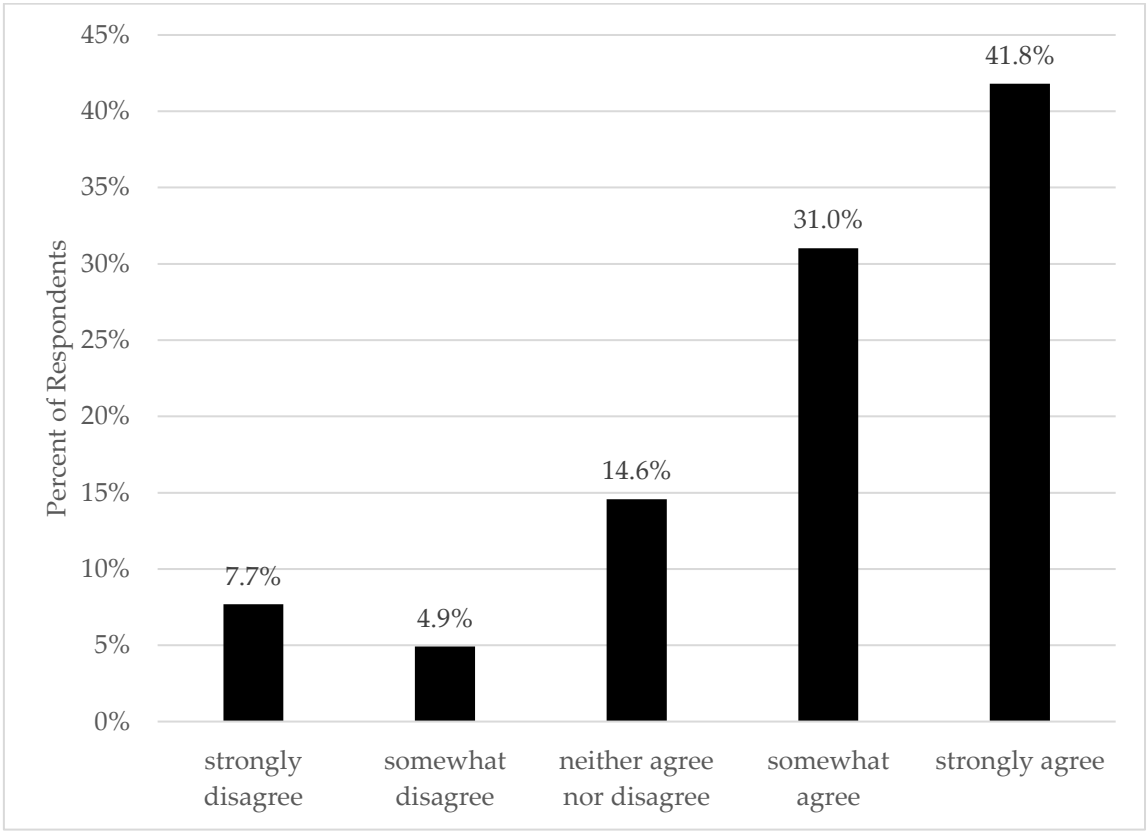


**Figure 1.** Response to "*Do you agree that the federal government should be allowed to regulate how food companies are able to use the term "healthy" on food packages?"* (N = 525)

129 **Table 2.** Sample Rating of Criteria for 'Healthy' (n=525).

| Criteria | Average[1] | Significant Differences[2] |
|---|---|---|
| Non GMO | 4.02 | A |
| No Artificial Ingredients | 3.98 | A |
| No Trans-fat | 3.88 | B |
| High Vitamins | 3.82 | B C |
| Low Saturated Fat | 3.81 | C |
| High in Protein | 3.77 | C D |
| Low Sugar | 3.76 | C D E |
| Low Sodium | 3.73 | D E F |
| Low Fat | 3.66 | E F G |
| High Animal Welfare Standards | 3.65 | F G |
| High in Antioxidants | 3.64 | G |
| Low Calorie | 3.53 | H |

130 Question: "Rate the following based on importance of what the government should consider when
131 determining how to determine if a food should be declared healthy."
132 [1] Ratings scale: 5 = agree, 4 = agree somewhat, 3 = neither agree or disagree, 2 = disagree somewhat, 1 =
133 disagree. [2] Criteria that share a common letter have ratings that are not statistically different from one another
134 at the 5% level.

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138 **Conflicts of Interest:** The authors declare no conflict of interest. The funding sponsors had no role in the design
139 of the study; in the collection, analyses, or interpretation of data; or in the writing of the manuscript.
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# Appendix: Survey

**Consumer Perceptions of Food Labeling Policies**

We would now like to ask some questions about you and about the food you buy, prepare and eat in your home in order to inform ongoing food policy discussions taking place in the United States. These questions are being asked by Professor Brian Roe of Ohio State University and will take about 10 minutes to answer. Your participation is voluntary and you may skip any questions for any reason. This study does not require the study coordinator to access any of your personal information. You will not be asked to provide any personal or sensitive information. Information provided to this study does not have the potential to damage your financial standing, employability or reputation, or place you at risk of criminal or civil liability. Efforts will be made to keep your study-related information confidential. If you have questions about the questions in this part of the study you may contact Brian Roe at 614-688-5777. For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.

Are you willing to answer these questions?
Yes [links to questions]
No [ends survey]

Are you the primary food purchaser and preparer in your household?
- ❍ No (1)
- ❍ Yes (2)

Answer If Are you the primary food purchaser and preparer in your household? No Is Selected

How much food purchasing and preparation do you do?
- ❍ None (1)
- ❍ occasionally (2)
- ❍ Nearly half (3)

What is your age?
- ❍ 18-24 (1)
- ❍ 25-44 (2)
- ❍ 45-64 (3)
- ❍ 65+ (4)

Are you male or female?

- ❍ Male (1)
- ❍ Female (2)

Including yourself, how many people are there living in your household?

- ❍ One (1)
- ❍ Two (2)
- ❍ Three (3)
- ❍ Four (4)
- ❍ Five (5)
- ❍ Six (6)
- ❍ Seven (7)
- ❍ Eight or more (8)

In your household, how many children are under the age of 6?

In your household, how many children are between 6-11?

In your household, how many children are between 12-17?

What is the last grade of school you completed?

- ❍ Less than a high school graduate (1)
- ❍ High School graduate (2)
- ❍ Some college (3)
- ❍ Graduated college (4)
- ❍ graduate school or more (5)
- ❍ technical school/other (6)

Is your total annual household income from all sources and before taxes ....?

- ❍ Under $15,000 (1)
- ❍ 15,000 to $24,999 (2)
- ❍ $25,000 to $34,999 (3)
- ❍ $35,000 to $49,999 (4)
- ❍ $50,000 to $74,999 (5)
- ❍ $75,000 to $99,999 (6)
- ❍ Over $99,999 (7)

What is your race?

- ❍ White Non-Hispanic (1)
- ❍ Black Non-Hispanic (2)
- ❍ White Hispanic (3)
- ❍ Black Hispanic (4)
- ❍ Unspecified Hispanic (5)
- ❍ Asian/Chinese/Japanese (6)
- ❍ Native American/American Indian/Alaska Native (7)
- ❍ Native Hawaiian or other Pacific Islander (8)
- ❍ Other race (9)
- ❍ multiple racial identifications (10)

**Section 2**

On a scale from 1-5, how concerned are you about the way foods are produced and processed in the United States?

Not Concerned at All Somewhat Concerned Very Concerned

1 2 3 4 5

_____ Level of Concern

On a scale from 1-5, how concerned are you about the way foods are produced and processed in other countries?

Not Concerned at All Somewhat Concerned Very Concerned

1 2 3 4 5

_____ Level of concern

Please list specific concerns with food production and processing in the United States?

_____

Please rank in order of importance factors you look at in purchasing food

_____ Nutritional Facts Panel (1)

_____ Date labels (use by, best by, ect.) (2)

_____ Ingredient information (GMO, organic, ect.) (3)

_____ Sustainability information (fairtrade, rainforest alliance, ect) (4)

**Section 3**

Do you have a smartphone with access to wireless internet or a cellular network?

❍ Yes (1)

❍ No (2)

In thinking about the store where you most frequently purchase groceries, do you have access to the wireless internet or cellular network while in the store?

❍ Yes (1)

❍ No (2)

❍ Don't know (3)

Do you have access to make phone calls, from a personal device or store landline phone, while at the grocery store?

❍ Yes (1)

❍ No (2)

Have you noticed electronic and digital link scanners in your grocery store (such as one seen in this picture below)?

❍ Yes (1)

❍ No (2)

Answer If Have you noticed electronic and digital link scanners in your grocery store (such as one seen in... Yes Is Selected

If you have scanned a QR Code, was it for a food product?

- ❍ Yes (1)
- ❍ No (2)
- ❍ Not sure/ Can't remember (3)

Answer If Have you noticed electronic and digital link scanners in your grocery store (such as one seen in... No Is Selected

If you haven't scanned a QR Code, why not? (select all that apply)

- ❍ Wrong type of phone (1)
- ❍ Don't know how to do it (2)
- ❍ Find it inconvenient (3)
- ❍ Not sure what scanning it does (4)

Are you interested in knowing if your food contains Genetically Modified Ingredients (GMOs)?

- ❍ Yes (1)
- ❍ No (2)

Answer If Are you interested in knowing if your food contains Genetically Modified Ingredients (GMOs)? Yes Is Selected

If yes, would you say you are somewhat interested or very interested in if your food contains Genetically Modified Ingredients (GMOs)?

- ❍ Somewhat interested (1)
- ❍ Very interested (2)

When it comes to Genetically Modified Ingredients (GMOs), how important are the following publicized concerns to you? (1 = not important, 2 = somewhat important, 3 = moderately important, 4 = very important, 5 = extremely important)

_____ a. Unknown or unanticipated allergens introduced (1)
_____ b. Unknown or unanticipated toxins produced (2)
_____ c. Unknown long term health effects (3)
_____ d. Increased risk of antibiotic resistance (4)
_____ e. Control of agriculture by biotechnology companies (5)
_____ f. Unknown long term environmental effects (6)
_____ g. Genetic contamination of the environment (7)
_____ h. Increased use of pesticides (8)
_____ i. Increased use of herbicides (9)
_____ j. Spread of pest resistance to undesirable weeds (10)
_____ k. Spread of disease resistance to weeds (11)
_____ l. Spread of herbicide tolerance to weeds (12)
_____ m. Ethical issues with genetic modification of nature (13)
_____ n. risks to species diversity (14)
_____ o. Damage to topsoil (15)
_____ p. Risks to wildlife & insects (16)
_____ q. Other – specify and rate: (17)

How likely is it that you would scan QR codes with your smarthphone to determine if ingredients were genetically modified?

- ❍ Extremely unlikely (1)
- ❍ Somewhat unlikely (2)
- ❍ Neither likely nor unlikely (3)
- ❍ Somewhat likely (4)
- ❍ Extremely likely (5)

How likely is it that you would scan product QR codes with an in-store scanner to determine if ingredients were genetically modified?

- ❍ Extremely unlikely (1)
- ❍ Somewhat unlikely (2)
- ❍ Neither likely nor unlikely (3)
- ❍ Somewhat likely (4)
- ❍ Extremely likely (5)

**Section 4**

Do you agree that the federal government should be allowed to regulate how food companies are able to use the term "healthy" on food packages?

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

Rate the following based on importance of what the government should consider when determining how to determine if a food should be declared healthy (1=disagree, 2 = somewhat agree, 3 = neither agree nor disagree, 4 = somewhat agree, 5 = agree):

_____ a. low sugar (1)
_____ b. low fat (2)
_____ c. low saturated fat (3)
_____ d. no trans-fat (4)
_____ e. non GMO (5)
_____ f. high animal welfare standards (6)
_____ g. low calorie (7)
_____ h. high vitamins (8)
_____ i. low sodium (9)
_____ j. high in protein (10)
_____ k. no artificial ingredients (11)
_____ l. high in antioxidants (12)
_____ m. other (please list) (13)

**Section 5**

Do you agree that the federal government should be allowed to regulate how food companies are able to use the term "natural" on food packages?

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

Do you agree that a food labeled "natural" should provide nutritional or health benefits?

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

How important are the following when considering if a food is "natural"? (1 = not at all important, 2 = slightly important, 3 = moderately important, 4 = very important, 5 = extremely important)

_____ a. The food contains no artificial/synthetic ingredients (1)

_____ b. The food contains no artificial/synthetic colors (2)

_____ Please select slightly important (3)

If 'Please select slightly important...' is Not Equal to 2, Then Skip To End of Block

How important are the following food processing techniques when considering if a food is "natural"? (1 = not at all important, 2 = slightly important, 3 = moderately important, 4 = very important, 5 = extremely important)

_____ a. No Fortification (adding vitamins or minerals) (1)

_____ b. No Pasteurization (2)

_____ c. No artificial/synthetic additives (3)

_____ d. No artificial/synthetic flavorings (4)

_____ e. no irradition (5)

How important are the following farming practices when considering if a food is "natural"? (1 = not at all important, 2 = slightly important, 3 = moderately important, 4 = very important, 5 = extremely important)

_____ a. no pesticide usage (1)
_____ b. no herbicide usage (2)
_____ c. Organic production methods (3)
_____ d. No Biotech seeds (4)
_____ e. Free-range animal husbandry practices (5)
_____ f.Cage-free animal husbandry practices (6)
_____ g. No antibiotics (7)

**Section 6**

When you see dates printed on foods, how strongly do you agree with the following statements (strongly disagree = 1, somewhat disagree = 2, neither agree nor disagree = 3, somewhat agree = 4, strongly agree = 5)

_____ The food becomes unsafe to eat after the label date has passed. (1)
_____ The food quality decreases after the label date has passed. (2)
_____ The importance of the label date for food safety depends on the type of food. (3)

How likely are you to throw out the following food if it is past the date printed on the package? (1 = very unlikely, 2 = somewhat unlikely, 3 = neither likely nor unlikely, 4 = somewhat likely, 5 = very likely):

_____ a. Milk (1)
_____ b. Cheese (2)
_____ c. Yogurt (3)
_____ d. Packaged Fresh Vegetables (4)
_____ e. Packaged Fresh Fruits (5)
_____ f. Fresh meats (6)
_____ g. Packaged Deli Meats (7)
_____ h. Eggs (8)
_____ i. Fresh Fish (9)
_____ j. Cereals (10)
_____ k. Condiments (11)

Please indicate the information the following food date phrases would appear to be suggesting to you (1 = food safety, 2 = food quality, 3 = depends on type of food)

_____ Best if Used By (1)

_____ Expires On (2)

_____ Best Before (3)

_____ Use By (4)