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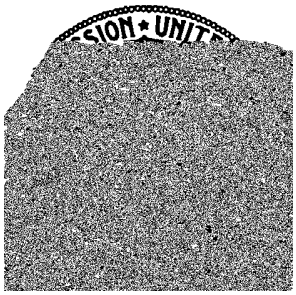

Consumer Perceptions of Heart-Health Claims for Cooking Oils and Vegetable Oil Spreads

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proven relationship between diets high in trans fat content and LDL ('bad') cholesterol levels..."[6] As explained below, however, FDA has not yet approved a health claim in labeling for this diet-disease relationship.

Given that heart disease is the leading cause of death in the United States, accounting for almost one-third of all deaths in 1997, the benefits of increasing consumer awareness of the risk of high saturated fat and trans fat intake are clearly substantial.[7] One important potential source for such information is health claims on package labels and in advertising for products that are lower in saturated fat or trans fat than competing products consumers might choose.

During the period 1982-1990, an increasing proportion of advertising by fats and oils producers contained claims concerning heart health. These claims were encouraged by the FTC's decision in 1982 to hold health claims to the same deception and substantiation standards that governed advertising for other goods and services.[8] By 1990, one-third of magazine advertisements for fats and oils made an explicit disease claim concerning the heart-health benefits of products lower in saturated fat, such as corn oil. An additional 12 percent of ads contained an indirect heart-health claim relating to the beneficial impact of the food on serum cholesterol levels.[9]

Figure 1 shows one such print advertisement for Puritan Oil. This ad, which ran in January 1991, provides detailed information on the saturated fat content of various fats and oils, and contains the following health claim:

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[6] "FDA Fact Sheet On Trans Fat Acids," July 9, 2003, available at http://www.fda.gov/oc/initiatives/transfat/q_a.html.

[7] "US Death Statistics for 1997," Center for Disease Control, available at http://www.disastercenter.com/cdc/.

[8] Under a longstanding liaison agreement between the agencies, FDA has primary jurisdiction over labeling claims for food products and dietary supplements, while the FTC has jurisdiction over advertising claims. Prior to 1982, the FTC was engaged in an ongoing rulemaking that proposed strict limits on all food health claims in adverstising, particularly for fats and oils. The rulemaking was terminated in December 1982. During the 1980s, FDA also adopted a more lenient enforcement posture toward food health claims in labeling. In particular, the agency failed to challenge a large-scale labeling and advertising campaign that Kellogg began in October 1984 for its high-fiber cereals. Kellogg claimed that diets high in fiber could reduce the risk of certain kinds of cancer. In 1987, FDA formally proposed a rule that would have based labeling regulation on an *ex post* deception standard.

[9] *See* Ippolito, P., and J. Pappalardo, "Advertising Nutrition & Health," Bureau of Economics Staff Report, Federal Trade Commission, September 2002: 151-153.

Figure 1
Pre-NLEA Heart-Health Advertisement

And it's smart to lower saturated fat in your diet every way you can. Diets high in saturated fat can raise blood cholesterol. And high levels of blood cholesterol raise the risk of heart disease.

Despite the greater latitude that advertisers of fats and oils have to make comparative health claims, a recent content analysis of print food advertising revealed that such claims virtually disappeared after the Statement was published and the FDA labeling rules took effect.[14] Further, use of nutrient content claims (such as "low in saturated fat"), which are allowed in labeling and advertising, also fell dramatically after 1994.[15]

It is not obvious why the FDA *labeling* rules would have such a dramatic impact on health claims in *advertising*, or why advertisers would not make greater use of nutrient content claims to highlight indirectly any heart-health advantage their products might enjoy. Perhaps advertisers interpreted the Statement=s ostensibly more lenient treatment of substitution claims very cautiously, and did not think nutrient content claims concerning saturated fat content would have sufficient impact without accompanying explicit health claims that helped consumers

> Scientific evidence suggests but does not prove that eating 1.5 ounces per day of most nuts [such as *name of specific nut*] as part of a diet low in saturated fat and cholesterol may reduce the risk of heart disease.

In November 2004, FDA approved the following qualified claim for foods that contain 6 grams or more of olive oil:[19]

> Limited and not conclusive scientific evidence suggests that eating about 2 tablespoons (23 grams) of olive oil daily may reduce the risk of coronary heart disease due to the monounsaturated fat in olive oil. To achieve this possible benefit, olive oil is to replace a similar amount of saturated fat and not increase the total number of calories you eat in a day. One serving of this product [*Name of food*] contains [*x*] grams of olive oil.

FDA approved a similarly worded qualified claim for canola oil in October 2006.[20] To date, however, a broad range of cooking oils and vegetable spreads that are high in polyunsaturated or monounsaturated fat still cannot make any health claims in labeling. Further, those products that have obtained approval to make *qualified* heart-health claims for a particular type of cooking cannot make any *unqualified* claims (such as those used in our research) that link heart health more generally to diets low in saturated fat.

Finally, irrespective of saturated fat content, no food that has been formulated to reduce or eliminate trans fatty acids can explain in labeling the heart-health benefits of restricting consumption of this type of fat, or use nutrient content descriptors (such as Alow@) to spotlight advantageously low levels of trans fat. FDA has concluded that it currently lacks a scientific basis for establishing a

Figure 2
Sunflower Fields Tombstone Control

Figure 3
Sunflower Fields Nutrient Content Simple

Figure 4
Sunflower Fields Nutrient Content Substitution

Figure 5
Sunflower Fields Health Claim Simple

Figure 6
Sunflower Fields Health Claim Substitution

For recipe ideas, visit us at www.sunflowerfields.com.

Figure 7
Sunflower Fields Health Claim Control

Figure 8
Sunflower Fields Calorie Disclosure

could not be sure that readers of these versions of the Sunrise Spread treatments would also fail to draw any distinctions, budgetary constraints dictated that we eliminate two of the treatments used in the Sunflower Fields testing. Accordingly, we only tested the Simple Language for the Sunrise Spread advertisements. In addition, the Health Claim Control treatment was also eliminated to free up a cell for testing an additional remedy disclosure. This left a total of five test cells for the Sunrise Spread product.

Figure 9 displays the Tombstone Control treatment. The only information presented concerns the product taste and possible uses. The Nutrient Content Simple ad is shown in Figure 10. The text states rather emphatically that Sunrise Spread contains no trans fatty acids, but does not link this fact to a heart-health benefit. The explicit heart-health claim, along with the nutrient content information, is contained in the Health Claim Simple ad, shown in Figure 11. The package shown in the ad sports a prominent heart symbol to further differentiate this treatment from the nutrient content version. The Calorie Disclosure is shown in Figure 12. It follows the same format as the corresponding Sunflower Fields ad, except that the number of calories in a tablespoon of Sunrise Spread is 90 rather than 120.

Finally, Figure 13 presents an alternative remedy treatment that discloses the total fat in one serving of Sunrise Spread instead of the number of calories. Earlier testing of the Sunflower Fields Calorie Disclosure indicated that many respondents did not consider 120 calories per serving as a negative product attribute. Although the heart-health concern posed by these products relates to their caloric density rather than their high total fat content, we wished to test whether respondents might regard the amount of fat in Sunrise Spread–10 grams per serving–as a greater cause for concern than the number of calories

B. Questionnaire Design

The questionnaires for Sunflower Fields and Sunrise Spread were very similar, although a question was added to the Sunrise Spread questionnaire in an attempt to focus respondents more directly on the issue of possible weight gain from liberal use of the product. In both cases, the questionnaire followed a classic funneling structure. Respondents initially were asked in completely open-ended fashion for their general take-away from the ad, and then were asked gradually more pointed questions that narrowed in on the key research issues. The main questionnaire for the Sunrise Spread ads is presented in Appendix A.

Respondents were allowed to see the relevant test ad twice. After the first viewing, the ad was removed from sight and the respondent was asked to identify the name of the advertised product. The respondent was then allowed to read the ad again, after which the ad was removed from sight for the remainder of the session. Interviews were terminated if a subject could not

Figure 9
Sunrise Spread Tombstone

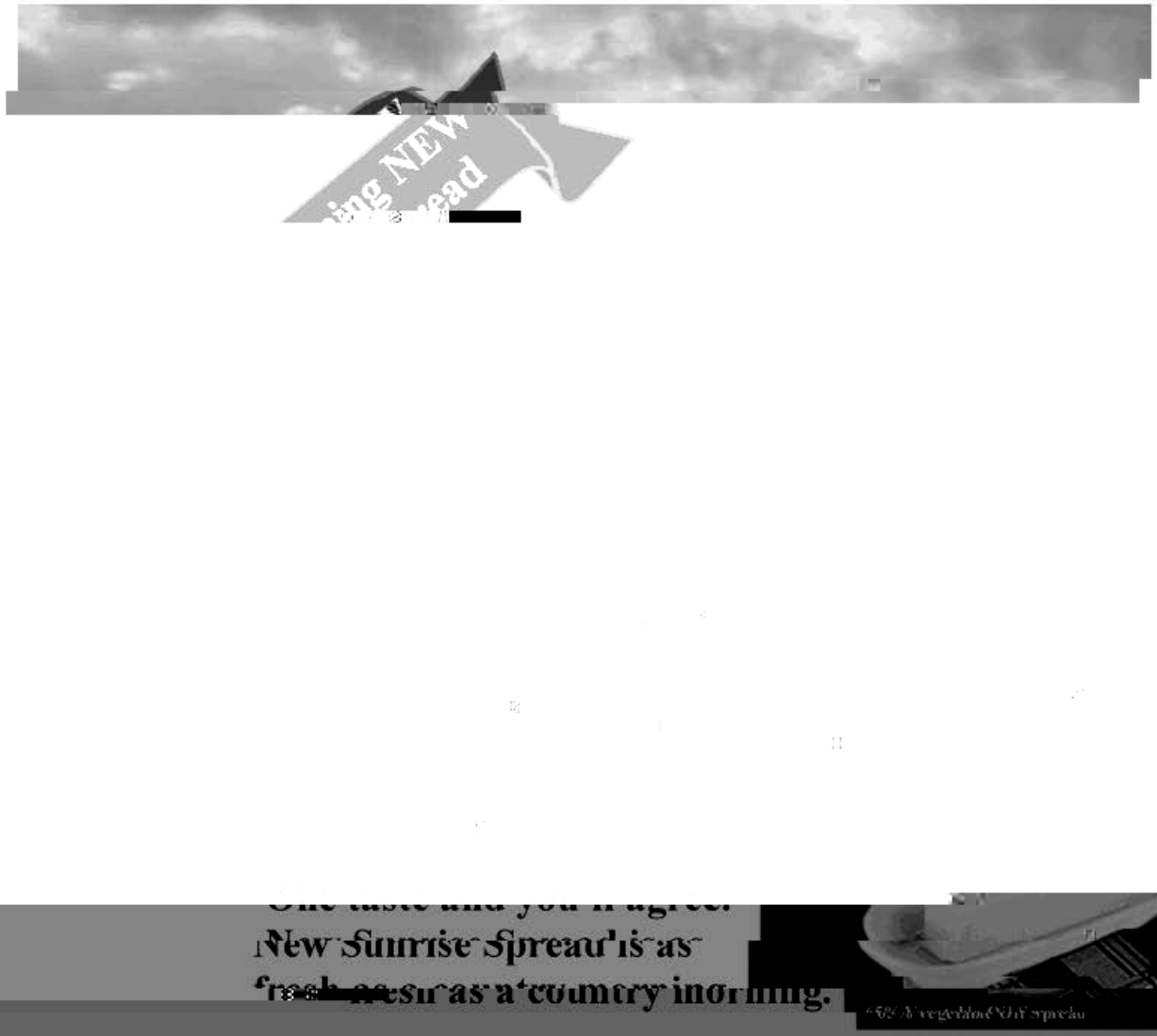

Figure 10
Sunrise Spread Nutrient Content Simple

Figure 11
Sunrise Spread Health Claim Simple

Figure 12
Sunrise Spread Calorie Disclosure

Figure 13
Sunrise Spread Total Fat Disclosure

Next, respondents were asked to use the same scale to indicate the heart-health impact of substituting the oil (spread) for butter in cooking. Respondents who understood that butter is substantially higher in saturated fat and cholesterol than the advertised product would be expected to rate this dietary substitution as healthier than simply adding the oil or spread to the diet.

In a variation on this theme, respondents were next given three possible menu choices: (1) a filet of fish that had been baked with only lemon juice for liquid and seasoning; (2) a fish filet pan-fried in Sunflower Fields or Sunrise Spread, with lemon juice for seasoning; and (3) a fish filet pan-fried in butter or traditional stick margarine, again with only lemon juice as seasoning. Respondents were then asked which of the three choices would be best for the heart, and then which of the remaining two alternatives would be better for the heart. Again, the key to arranging the choices in the correct order (with the relatively low-calorie baking method first, and the butter-fried option last) would be understanding that the oil and spread products are calorically dense despite their otherwise positive fat profile.

Following analysis of the results from the series of Sunflower Fields ads, a question was added to the Sunrise Spread questionnaire to deal more explicitly with the effect regular use of the product might have on weight gain *per se*, rather than the more indirect impact the product might have on heart health. Respondents were asked to use a seven-point scale to rate how good regular use of the product would be for losing weight. The choices ranged from Aextremely bad for losing weight@ to Aextremely good for losing weight.@

The questioning then shifted to a direct focus on the caloric content of the advertised products. Respondents were first asked to compare the number of calories in one tablespoon of Sunflower Fields or Sunrise Spread with the number in one tablespoon of butter. A five-point scale was provided, with values ranging from Amuch higher in calories than butter@ to Amuch lower in calories than butter.@ For Sunflower Fields, the correct answer was Asomewhat higher in calories than butter,@ since cooking oils are entirely fat and contain 120 calories per 14-gram serving (one tablespoon), while butter and stick margarine have about 11 grams of fat per serving, which corresponds to100 calories. For Sunrise Spread, which contains 90 calories per serving, the correct answer could be either Aabout equal in calories to butter@ or Asomewhat lower in calories than butter.

Finally, respondents were asked directly to estimate the absolute number of calories in a serving of Sunflower Fields or Sunrise Spread. Five ranges were provided: more than 200, 151-200, 101-150, 51-100, and 0-50. The remainder of the questionnaire included a standard purchase interest question and demographic questions concerning education and income level. Respondents were also asked whether or not they had been on a diet to lose weight at any time during the last year.

IV. Results

below the mid-point rating of 4.0 (“neither bad nor good for the heart.). The Tombstone Control results would reveal respondents= prior beliefs concerning ordinary cooking oil and vegetable spreads that did not promote favorable levels of saturated fat or trans fatty acids. Irrespective of the absolute level of the score for the Tombstone Control, we would expect the average rating to increase in the nutrient content and health claim test conditions. Respondents seeing the nutrient and/or health claims might conclude with justification that adding the advertised oil or spread to the diet would be health*ier* for the heart than adding an ordinary oil or spread that contained more saturated fat or trans fats. Thus, by itself, this increase would not necessarily indicate that the claims had misled consumers concerning the nutrient profile or other heart-health properties of the advertised products.

Any such increase in average ratings would be more problematic, however, if the initial score for the Tombstone Control were below the midpoint, but then increased to above the midpoint in any of the nutrient content or health claim test cells. This increase would then indicate that the nutrient or health information had misled consumers into thinking that the advertised products had properties that contributed to hearth health simply by their presence in the diet.

Figure 14 shows the mean responses for the various Sunflower Fields ads. Table 2 summarizes the statistical significance levels for the key differences in means between treatments. The average scores for all of the treatments are above the midpoint, and generally are above, or close to, ASomewhat good for the heart.” The underlying reasons for this perception of the product cannot be isolated at this point. Perhaps respondents did not understand the precise meaning of the phrase Aadding to the diet,@ and were still thinking of the cooking oil as a substitute for other fats and oils. Alternatively, many respondents may have viewed Sunflower Fields as low or moderately low in total fat and calories. As will be discussed below, results from subsequent questions help to resolve this issue.

The lowest score–4.63–was recorded by the tombstone control ad, which establishes the baseline beliefs that respondents brought with them to the test. The mean score of 5.06 for the Nutrient Content Simple ad is significantly higher than the Tombstone control score (P=.025), indicating that the information on saturated fat content did have a positive impact on respondents= evaluation of the heart benefit of adding the cooking oil to the diet. Although the rating for the Nutrient Content Substitution ad is slightly below the Nutrient Content Simple ad, the difference is not significant. This suggests that placing the ad claim in the context of a dietary substitution does not alert consumers to a possible downside from simply adding the product to the diet.

The mean ratings for the three ads with explicit heart-health claims are very similar, ranging from 5.21 to 5.30, and are statistically indistinguishable. As a group, the health claim treatments score higher than the nutrient content claims, and are significantly higher than the Tombstone Control ratings. With the exception of the Health Claim Control ad, however, there

Figure 14
Sunflower Fields
Heart-Health Effect of Adding to Diet

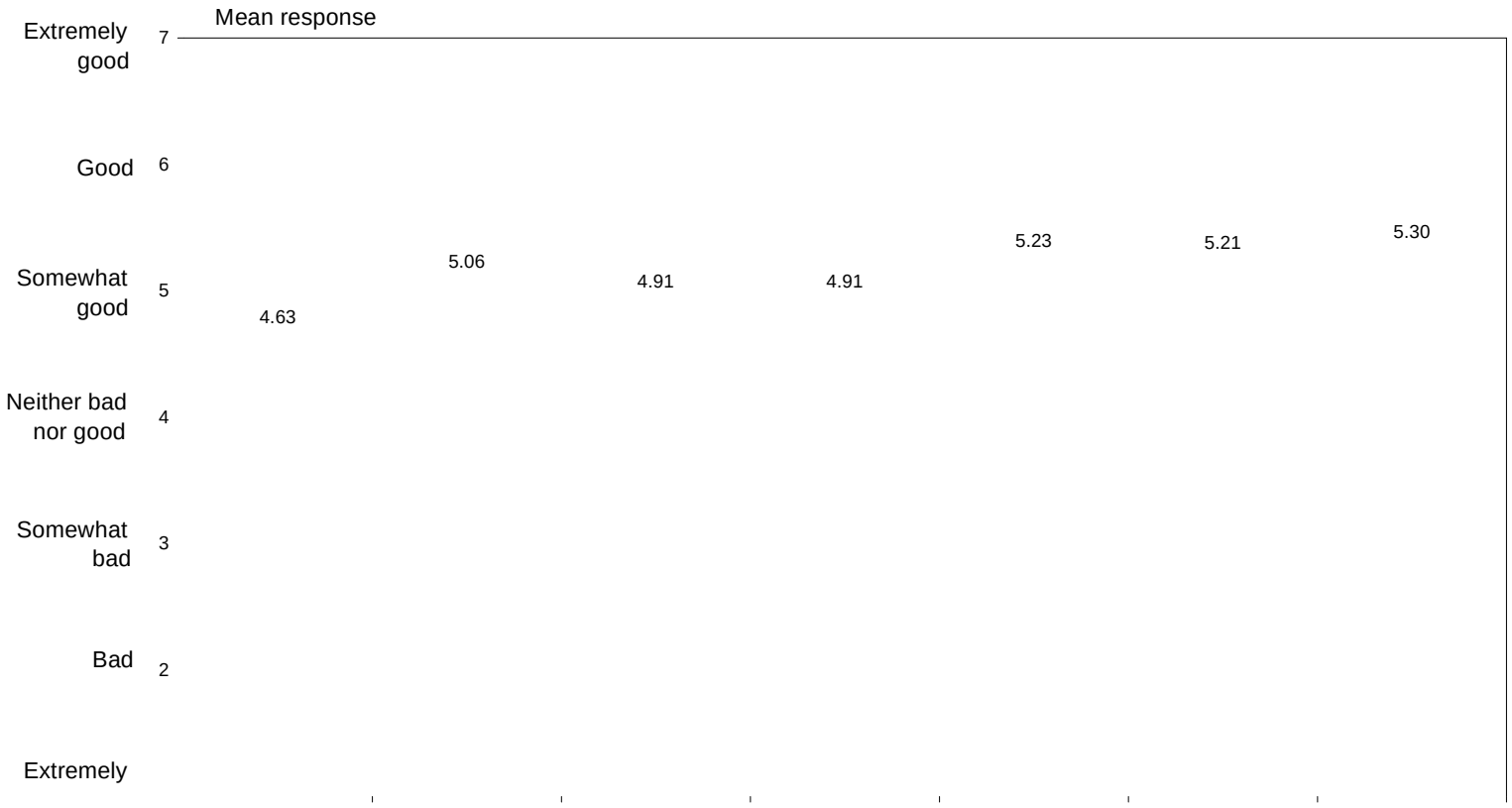

Table 2 Mean Consumer Response for Heart Benefits of Adding Sunflower Fields Oil to Diet[1]

Ad Treatment	Mean Response	Significant compared to Tombstone Control[2]	Significant compared to Simple Nutrient Content Claim

are no significant differences between any of the health claim ads and nutrient content treatments.[24]

Taken together, these results suggest that heart-health claims and nutrient content claims related to saturated fat and trans fat communicate roughly the same health message to consumers, with perhaps a slight edge apparent for the direct heart-health claims. There is no evidence that the effects of nutrient content and explicit health claims are additive, and certainly the two claims do not interact synergistically to produce an effect that is greater than the sum of the parts. The results also suggest that respondents interpret the "Simple" and "Substitution" language in similar fashion.

Finally, adding a calorie disclosure to the Nutrient Content Simple ad has no impact on the mean healthiness rating. The Calorie Disclosure ad and the Nutrient Content Simple ad record identical scores of 4.91. We cannot determine from these results alone, however, whether respondents did not view 120 calories per serving as a cause for concern, did not make the link between possible weight gain and heart health, or possibly did not even notice the disclosure.

Figure 15 reports the results for the five Sunrise Spread treatments. As a group, the scores are slightly lower than the Sunflower Fields ratings, which suggests that respondents viewed the spread as a less heart-healthy product than the cooking oil. Still, the lowest rating, 4.26 for the Tombstone Control, is above the midpoint rating of "neither bad nor good for the heart." From there, the score increases significantly to 4.99 for the Nutrient Content Simple ad (P=.001). The Health Claim Simple treatment records a mean rating that is insignificantly above the Nutrient Content Simple score (P=.31), but significantly above the Tombstone Control (P<.001).

Again, disclosing calorie information has no significant impact. There is virtually no difference between the healthiness rating for the Nutrient Content Simple ad (4.99) and the Calorie Disclosure ad (5.03). Although disclosing total fat rather than calories at least moves the mean score in the intended downward direction, from 4.99 to 4.79, this difference is not significant.

These results generally confirm the conclusions drawn from the Sunflower Fields testing. Again, the evidence shows that adding explicit information on heart health to a nutrient content claim has only a modest and insignificant positive impact on perceptions of heart-healthiness. Adding a calorie disclosure (or, for this product, a total fat disclosure) to the nutrient content claim also fails to change heart-health perceptions significantly. Finally, as explained earlier, we cannot conclude from any of these results that the nutrient content or health claims were deceptive, since respondents brought with them a prior belief that products such as those advertised were healthy for the heart when added to the diet.

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[24]The Health Claim Control score is significantly higher than the Nutrient Content Substitution ad score (P=.02).

Figure 15
Sunrise Spread
Heart-Health Effect of Adding to Diet

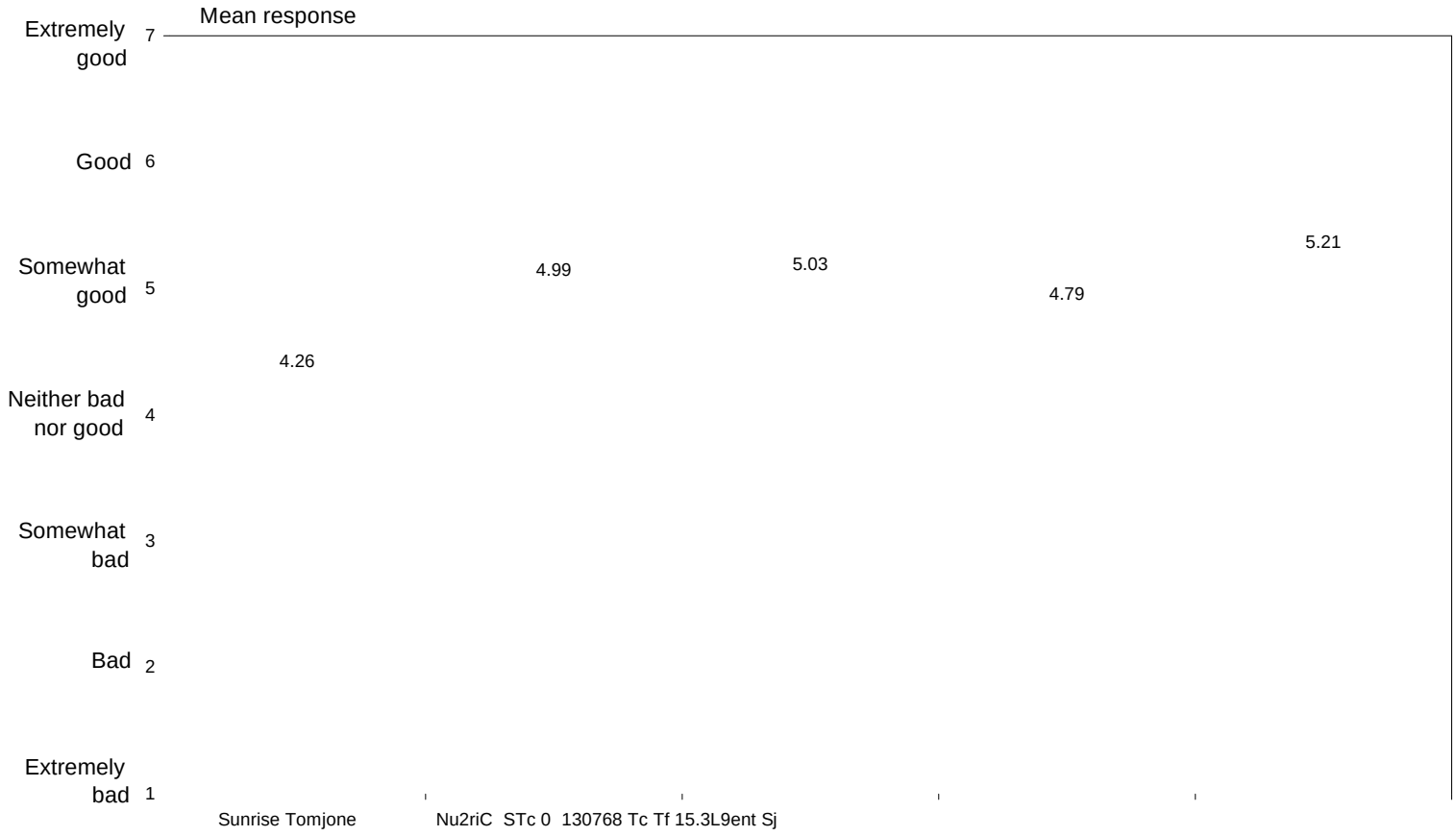

Table 3 Mean Consumer Response for Heart Benefits of Adding Sunrise Spread to Diet[1]

Ad Treatment	Mean Response	Significant compared to Tombstone Control[2]	Significant compared to Simple Nutrient Content Claim[2]
Tombstone Control	4.26	---	
Nutrient Content Claim: Simple	4.99	**	---
Nutrient Content Claim: Calorie Disclosure	5.03	**	No
Nutrient Content Claim: Fat Disclosure	4.79	**	No
Health Claim: Simple	5.21	**	No

Notes. [1] Consumers were asked "Suppose you added Sunrise Spread to your regular diet without making any other changes in what you eat. For example, suppose that in the past you didn't use any spread or butter on your toast or sandwiches, but now you stat using Sunrise Spread on them. Do you think that adding Sunrise Spread to your diet would be extremely bad for the heart, ..., extremely good for the heart?" Consumers were shown a card with seven choices with endpoints. See question 7 of questionnaire in Appendix A.
[2] Dashes indicate the comparison ad for the test. ** indicates significance at the 5 percent level in a simple difference-in-means t-test. *No* indicates that a test was conducted and was not significant at either the 5 percent or 10 percent level.

2. Heart Healthiness of Substituting Tested Product for Butter or Margarine

The next question shifted the research focus to dietary substitution and asked respondents to use the same seven-point rating scale to rate the heart healthiness of using Sunflower Fields oil (Sunrise Spread) instead of butter in cooking. Since these products would in fact be better for the heart if used as replacements for worse products, rather than as dietary additions, the mean heart-healthiness scores should rise above those for the previous question if respondents are even partially aware of the nutrition issues involved. The results are reported in Figures 16 and 17.

As shown in Figure 16, which also reports the results for the prior dietary addition question from Figure 14, the new responses for Sunflower Fields are indeed uniformly higher by an amount that ranges from about .30 to .60 points. The mean response for all the dietary substitution treatments is 5.58 vs 5.05 for the "simple" treatments. This difference is highly significant (P<.001). The pattern of scores across test cells is very similar in the two graphs, with the Tombstone Control rating below that of the other test cells, and generally by a statistically significant amount.[25] As a group, the scores for three health claim ads are above the nutrient content scores, and one of these differences is statistically significant. The rating for the Health Claim Substitution treatment is significantly higher than the mean for the Nutrient Content Substitution Simple ad (P=.009).

Figure 17 illustrates that similar results hold for the Sunrise Spread dietary substitution treatments. We observe the same fairly uniform upward shift in the substitution ratings, with the overall mean increasing .27 points to 5.13 (P<.001). The Tombstone Control mean score is significantly lower than the scores for the other ads. The mean score for the one ad that includes a health claim is above the score for the corresponding nutrient content ad, although the difference is not significant. The Fat Disclosure (but not the Calorie Disclosure) appears to have had the desired effect. The mean score for the Fat Disclosure ad is significantly below the score for the Nutrient Content rating using a one-tail test (P=.052).

Overall, the results for the dietary addition and substitution questions indicate that, when asked directly, respondents on average understand that the tested products are healthier for the heart when substituted for a less healthy alternative than when added to the diet. The high mean scores for the dietary addition question suggest, however, that respondents nonetheless underestimate or do not understand the adverse impact that additional consumption of these products could have on weight gain and heart health.

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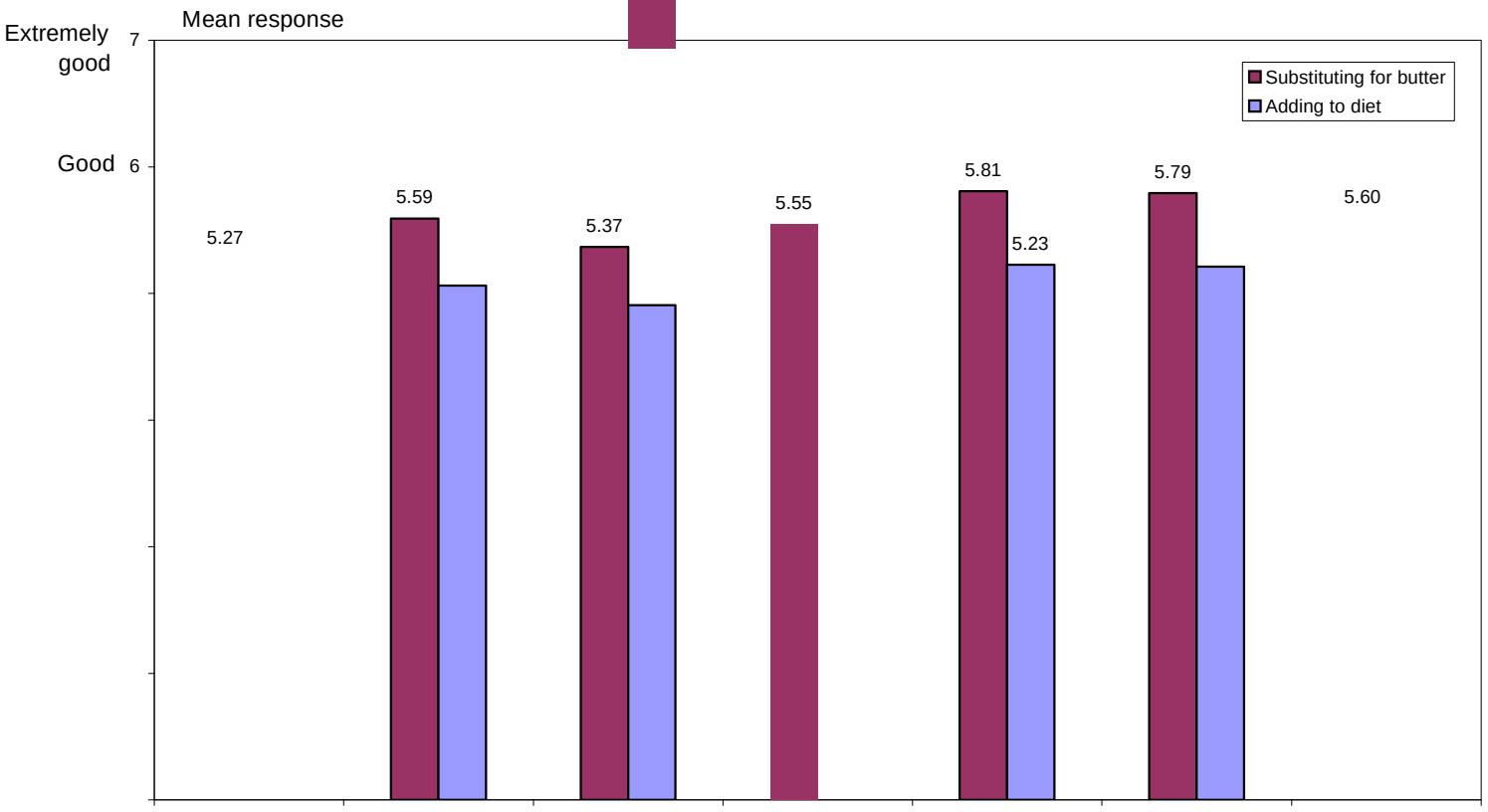
[25] Only the Nutrient Content Substitution claim fails statistical significance using a one-tail test.

gure 16
Su ower Fields
Heart-Health Eff of Substituting for Butter



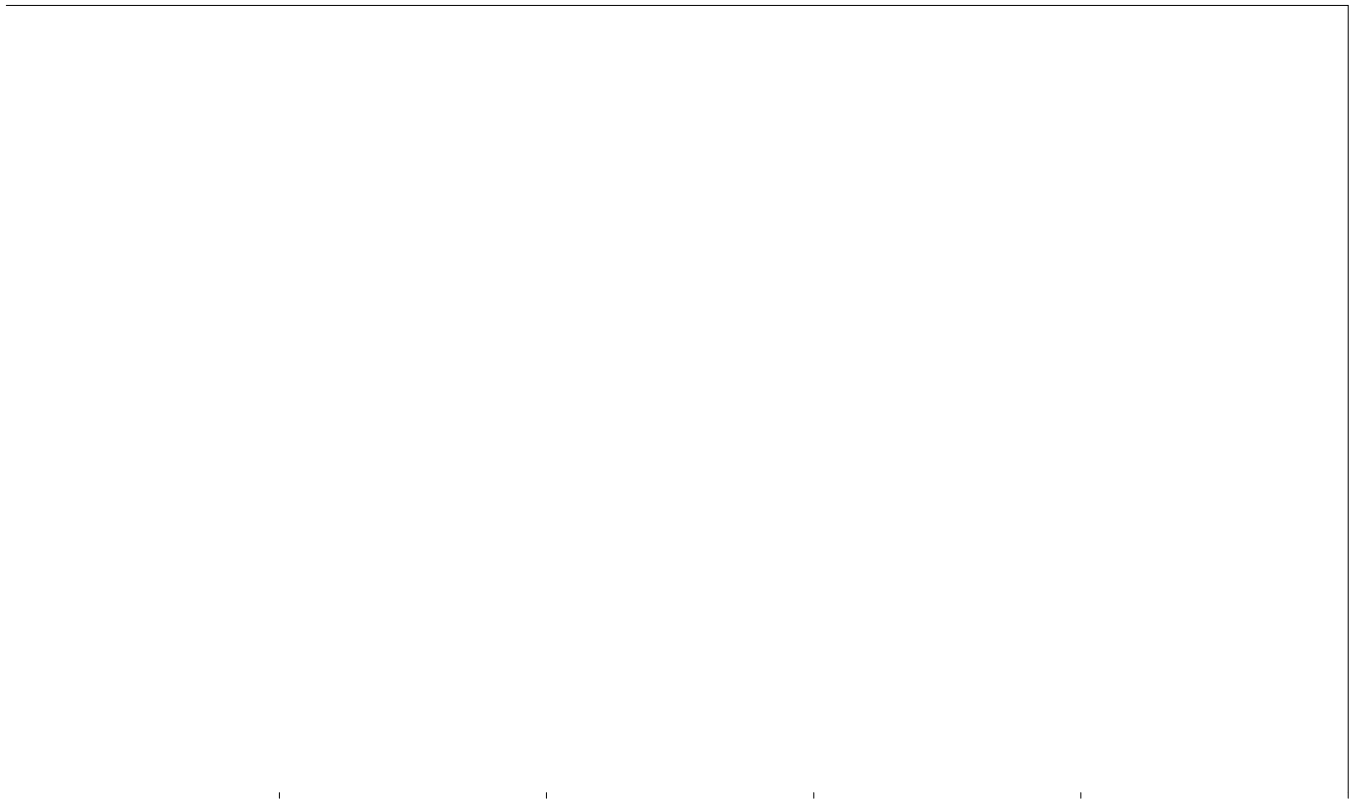
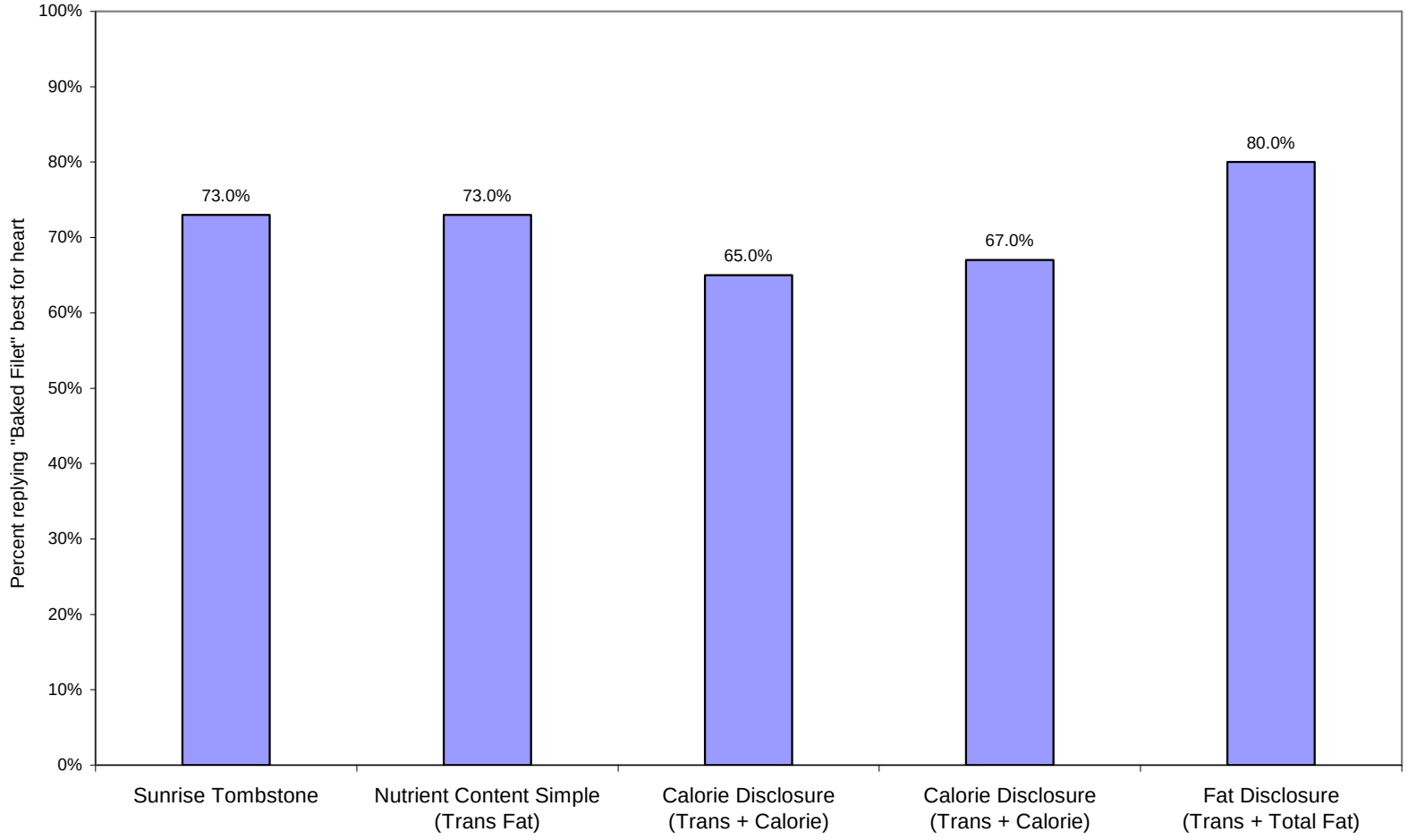


Figure 19
Sunrise Spread
Which Cooking Method Best for Heart?



significant differences between the scores of any of the ads that did not disclose total fat content. Although the Fat Disclosure score of 80 percent was not significantly higher than the Nutrient Content or Tombstone Control ratings, it was the highest recorded and was significantly higher than the score of 67 percent for the Calorie Disclosure ad (P=.04). This suggests that respondents were more concerned by the amount of total fat in Sunrise Spread (10 grams per serving) than by the caloric content *per se* (90 per serving).

In sum, these results suggest that most respondents understand that the advertised products do not possess pharmaceutical-like powers that offset any undesirable effects attributable to their fat content. The large majority of respondents view avoiding an oil or spread altogether as more heart healthy than using the advertised products in cooking. The results do not reveal, however, any specific information about respondents' understanding of the fat and calorie profiles of the tested products, or the implications of this fat and calorie content for weight gain. These issues are explored below.

4. Effect of Regular Use of Sunrise Spread on Weight Loss

As discussed, our initial analysis of the Sunflower Fields results suggested that consumers may have interpreted the opening questions on heart health very narrowly and were not prompted to consider any indirect effects regular use of the product might have on heart health through the mechanism of weight gain. The Sunrise Spread respondents were therefore asked the following question that focused directly on the issue of weight:

> Suppose someone you know has been using Sunrise Spread, and now decides to go on a diet to lose weight. Also suppose this person continues to use Sunrise Spread on a regular basis. Do you think that using Sunrise Spread on a regular basis would be: extremely bad for losing weight, bad for losing weight, somewhat bad for losing weight, neither good nor bad for losing weight, somewhat good for losing weight, good for losing weight, or extremely good for losing weight.

This question provides the first clear test of whether the nutrient content and health claim information lowers respondents' perceptions of the calorie or fat content of Sunrise Spread. The appropriateness of using this product as part of a diet to lose weight depends strictly on its calorie content, which in turn is related to total fat contentBnot the composition of that fat If consumers understand this, the average responses for the treatment groups should not be significantly higher than the mean response for the Tombstone Control ad. If, however, respondents form a more favorable opinion of Sunrise Spread as a diet aid after seeing the Nutrient Content ad or Health Claim ad, this evidence would indicate that the positive messages about trans fatty acid content or heart health were causing some consumers to infer incorrectly that the product was lower in calories and better suited for a weight loss program than ordinary spreads.

Figure 20 and Table 4 report the results for the diet question. All of the mean ratings, including the Calorie Disclosure and Fat Disclosure, are above the midpoint rating of 4.0 ("Neither good nor bad" for losing weight), which indicates that respondents on average overestimated the appropriateness of using the spread in a weight program. The Nutrient Content rating of 4.90 is significantly above the Tombstone Control rating of 4.04 ($P<.001$), which

Table 4 Mean Consumer Response for Effect of Regular Use of Sunrise Spread on Weight Loss[1]

Ad Treatment	Mean Response	Significant compared to Tombstone Control[2]	Significant compared to Simple Nutrient Content Claim[2]
Tombstone Control	4.04	---	
Nutrient Content Claim: Simple	4.90	**	---
Nutrient Content Claim: Calorie Disclosure	5.18	**	No
Nutrient Content Claim: Fat Disclosure	4.49	**	**
Health Claim: Simple	4.95	**	No

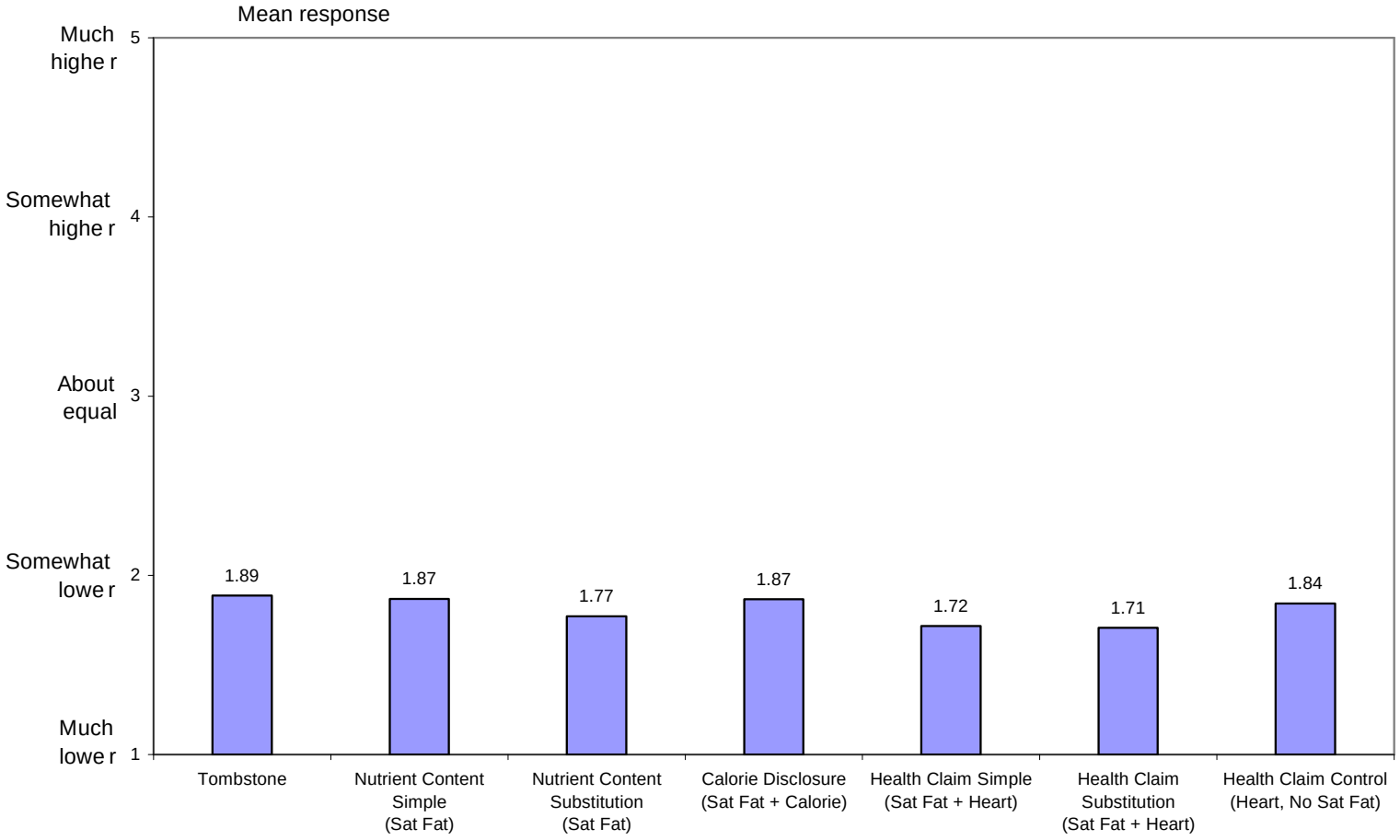
Notes. [1] Consumers were asked "Suppose someone you know has been using Sunrise Spread, and now decides to go on a diet to lose weight. Also suppose this person continues to use Sunrise Spread on a regular basis. Do you think that using Sunrise Spread on a regular basis would be: extremely bad for losing weight...extremely good for losing weight? Consumers were shown a card with seven choices with endpoints. See question 9 of questionnaire in Appendix

[2] Dashes indicate the comparison ad for the test. ** indicates significance at the 5 percent level in a simple difference-in-means t-test. *No* indicates that a test was conducted and was not significant.

whether the nutrient content and health claims lowered the average ratings relative to the ratings for the Tombstone Control, and if so, (3) whether a calorie disclosure or total fat disclosure would counteract this halo effect.

Figure 21 presents the mean ratings for the seven Sunflower Fields treatment groups. There are no statistically significant differences among test groups, indicating that the various claims and the disclosure of calories-per-serving had no overall impact on respondents' impressions of the relative caloric content of cooking oil and butter. The absolute level of all the scores, however, indicates clearly that respondents on average underestimated the number of

Figure 21
Sunflower Fields
Calories Compared to Butter*



* No significant differences between treatment cell means.

Figure 22
Sunrise Spread
Calories Compared to Butter

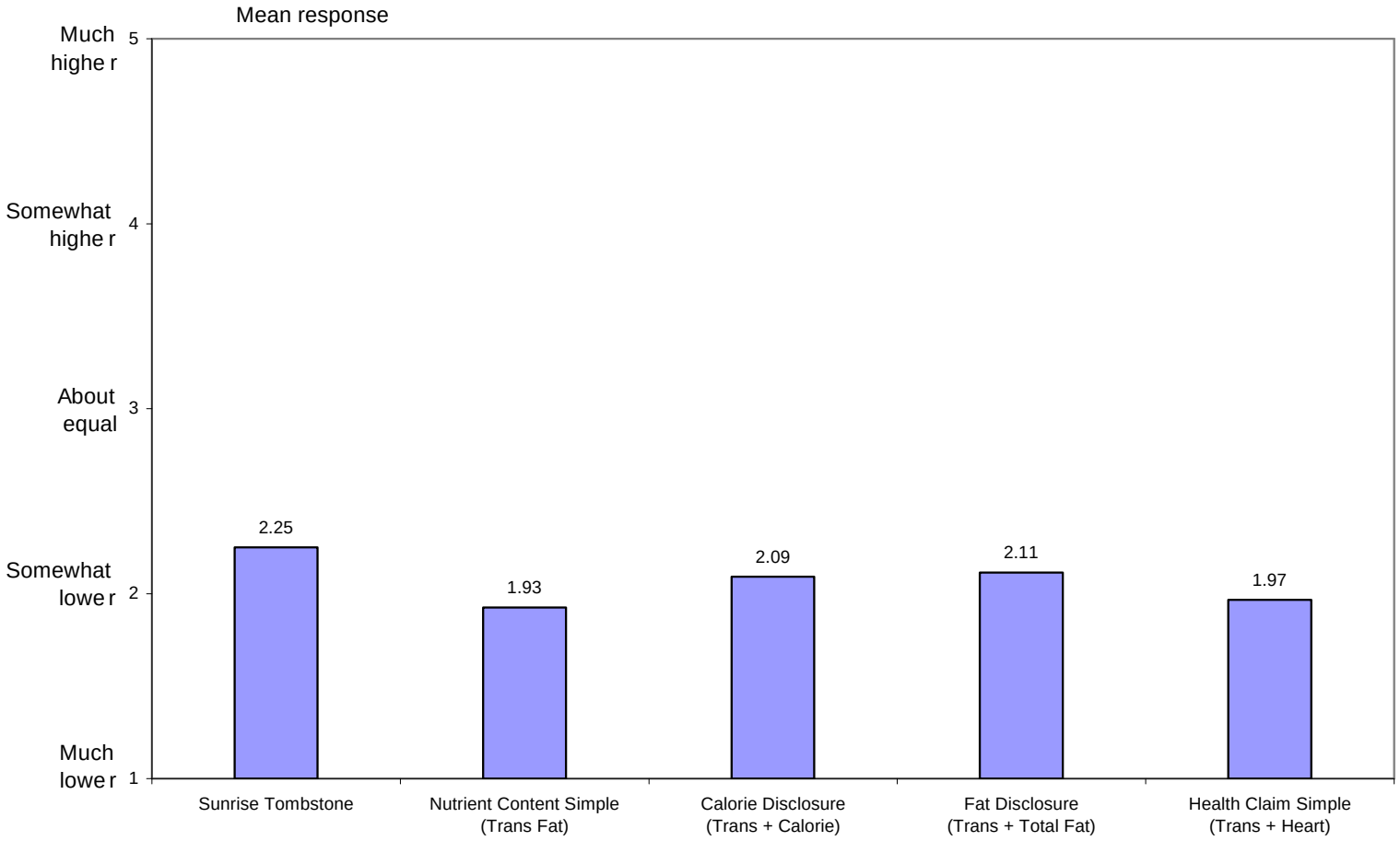


Table 5 Mean Consumer Response for Calories in Sunrise Spread Compared to Butter[1]

Ad Treatment	Mean Response	Significant compared to Tombstone Control[2]	

The proportion of respondents that gave the least correct answer of Amuch lower in calories than butter@ was lower for the Sunrise Spread ads than for the Sunflower Field ads. The Sunrise Spread proportions ranged from 22 percent for the Tombstone Control to 39 percent for the Nutrient Content ad.[28]

In comparison to the Sunflower Fields ratings, these results indicate that consumers have a better understanding of the number of calories in Sunrise Spread relative to butter, although the evidence indicates a halo effect from the no-trans-fatty-acids claim. This effect can be offset by disclosing either the quantity of calories or total fat per serving in the ad.

6. Absolute Number of Calories

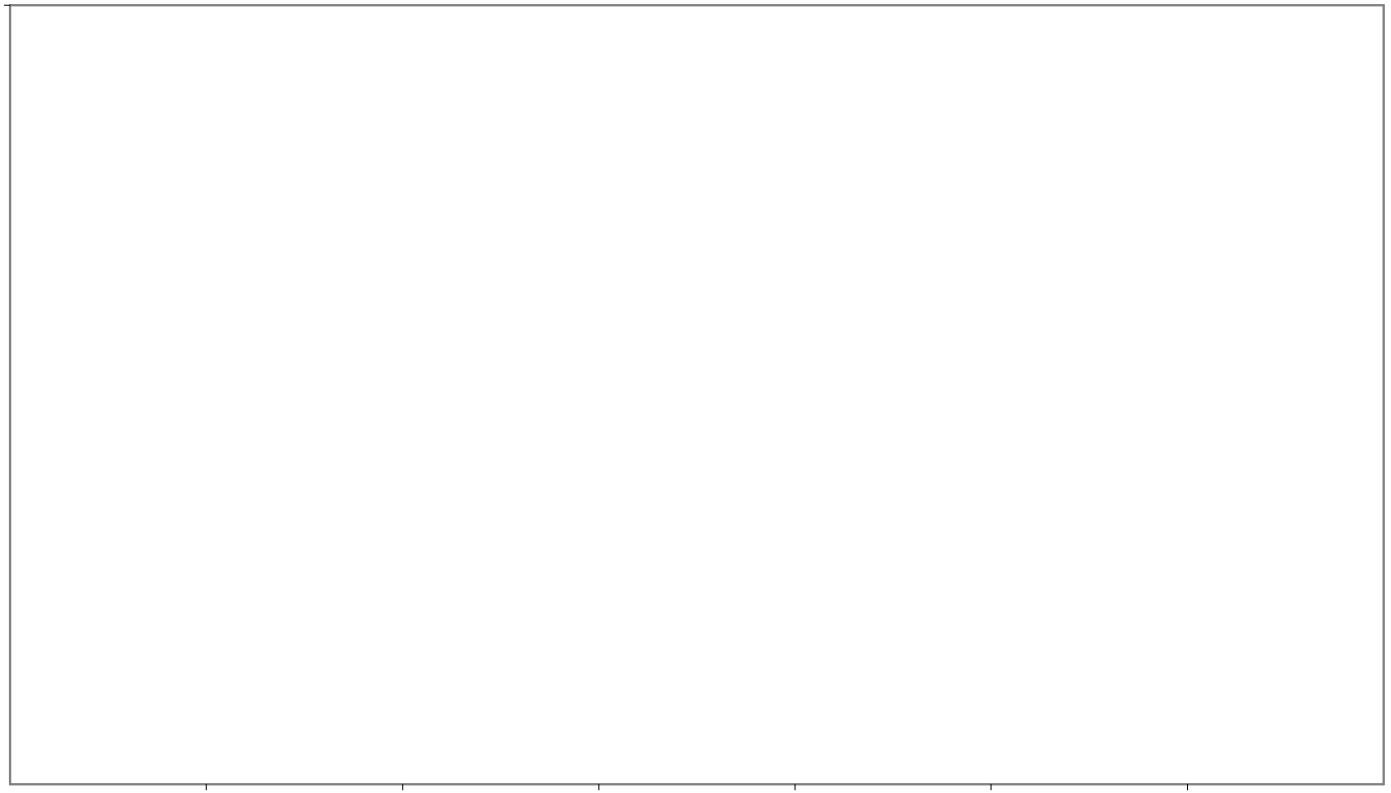


Table 6 Mean Consumer Response for Number of Calories in One Tablespoon of Sunflower Fields Oil[1]

Ad Treatment	Mean Response	Significant compared to Tombstone Control[2]	Significant compared to Simple Nutrient Content Claim[2]
Tombstone Control			

of these respondents selected the correct category. The comparable figures for the other test conditions range from five to 15 percent, which indicates that on net approximately two-fifths of the respondents noticed and recalled the calorie information in the ad.

In sum, the results from this question provide further evidence that consumers underestimate the calorie density of cooking oil. The results also suggest that disclosing calories-per-serving can provide a partial remedy for any enhancement of this misunderstanding caused by the saturated fat nutrient content claim.[30] The lack of a clear halo effect in the various health claim and nutrient content claim treatments, however, indicates that there may not be any

Figure 24
Sunrise Spread
Number of Calories per Tablespoon

Table 7 Mean Consumer Response for Number of Calories in One Tablespoon of Sunrise Spread[1]

Ad Treatment	Mean Response	Significant compared to Tombstone Control[2]	Significant compared to Simple Nutrient Content Claim[2]
Tombstone Control	2.15	---	
Nutrient Content Claim: Simple	2.06	No	---
Nutrient Content Claim: Calorie Disclosure	1.91	*	No
Nutrient Content Claim: Fat Disclosure	1.89	*	No
Health Claim: Simple	2.03	No	No

Notes. [1] Consumers were asked "Based on what the ad says or suggests, or anything else you may know or believe, about how many calories are on one tablespoon of Sunrise Spread?" Consumers were shown a card with five choices with endpoints. See question 7 of questionnaire in Appendix A.
[2] Dashes indicate the comparison ad for the test. * indicates significance at the 10 percent level in a simple difference-in-means t-test. *No* indicates that a test was conducted and was not significant.

Control ad (which provided no specific information about the product) were as high as those for the treatment groups, we could conclude that consumers were not very interested in the nutrient content and health claim information that was provided.

The specific question asked was:

Figure 26
Sunrise Spread
Purchase interest

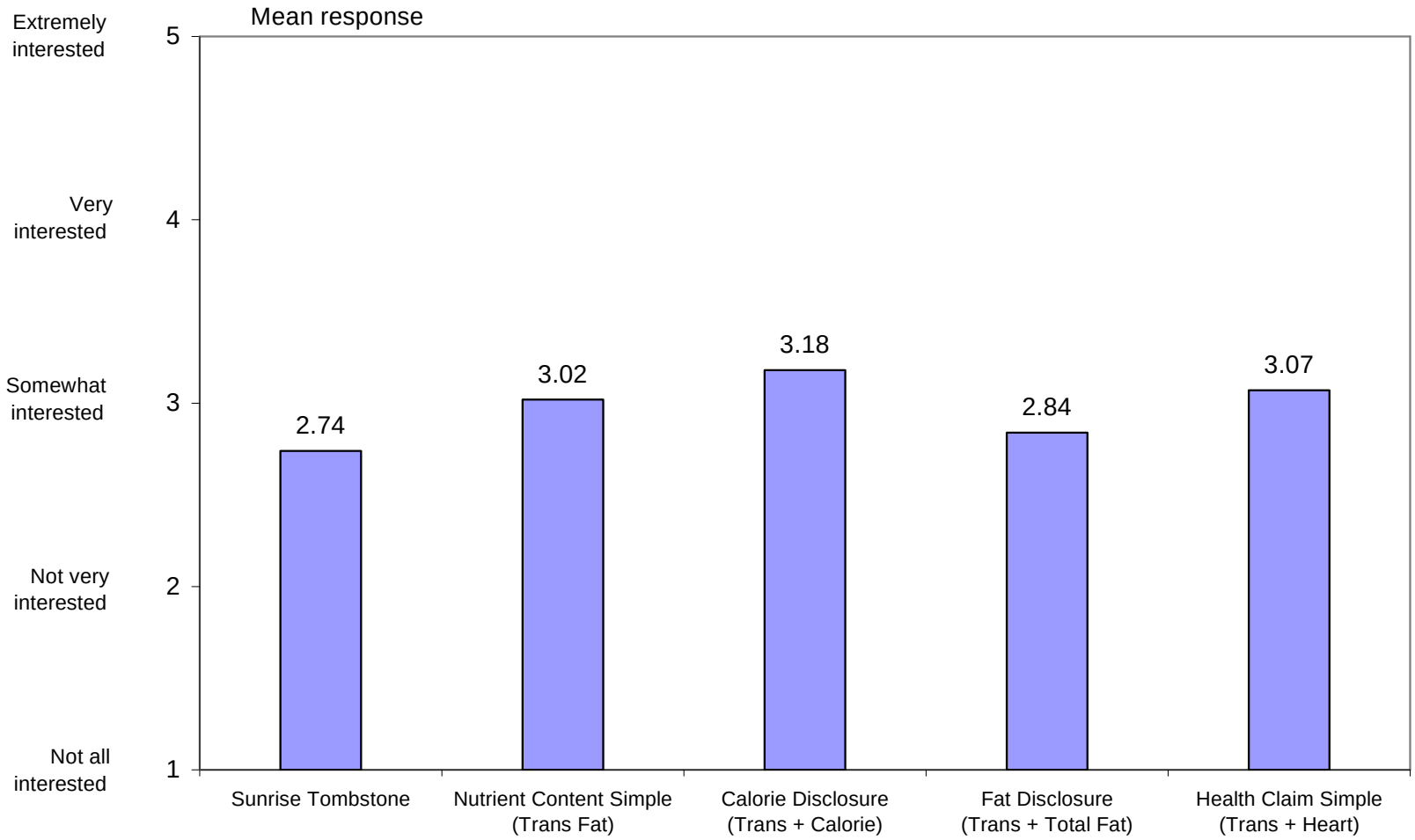


Table 8 Mean Consumer Response for Sunrise Spread Purchase Interest[1]

Ad Treatment	Mean Response	Significant compared to Tombstone Control[2]	Significant compared to Simple Nutrient Content Claim[2]
Tombstone Control	2.74	---	
Nutrient Content Claim: Simple	3.02	**	---
Nutrient Content Claim: Calorie Disclosure	3.18	**	No
Nutrient Content Claim: Fat Disclosure	2.84	No	No
Health Claim: Simple	3.07	**	No

Notes. [1] Consumer were asked "How interested would you be in buying Sunrise Spread? Consumers were shown a

8. Personal Characteristics

Our inquiry concluded with questions concerning the personal characteristics of respondents, including their education and income level, and whether or not they had been on a diet to lose weight during the last year. Data on respondent age and gender were obtained during the initial screening interviews. There were five categories for the age, income, and education variables, represented in each case by four dummy variables (with the lowest category omitted).

All else equal, we would expect more educated and higher income respondents to be better informed about nutrition issues in general, and perhaps also about the specific nutrient profile of the tested products. We would also expect respondents who had tried to lose weight recently to be more interested in and knowledgeable about the calorie and fat content of food products. The independent influence of age is more difficult to predict *a priori*. Older respondents might be more concerned about health issues and have gained more knowledge about nutrition through greater experience, but might also exhibit some reduced cognitive function.

The research used probit analysis to determine whether consumers with certain

variable, which assumed the value of one for all of the Sunrise Spread treatments, to determine whether there were any systematic differences between the two test products in the impact of the demographic variables.[34]

Full results for the five probit equations are shown in Appendix B. These results show no significant relationship between the question responses and the variable that measured whether or not a respondent had been on a diet to lose weight during the past year. In contrast, respondents with the highest income level (greater than $75,000 per year) consistently gave fewer wrong answers.[35]

Only two of the education dummy variables were even marginally significant. Specifically, the coefficient for the college graduate dummy was negative (indicating a greater propensity to choose correct answers) and significant at the .10 level in two of the regressions.

The coefficients for age were consistently positive and frequently significant.[36] This indicates that older respondents were more prone to choose incorrect answers. Gender proved significant in only one of the regressions. Males were more likely than females to select an inappropriate method for cooking the fish filet. Finally, the dummy variable for Sunrise Spread was always negative and highly significant in four of the five regressions, which indicates that these respondents were less likely to choose incorrect answers than were respondents assigned to a Sunflower Fields advertisement.

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[34] The product dummy was also interacted with the multi-value categorical variables for income, education, and age. No significant interactions were found.

[35] The highest income level was significant at the .05 level in three of the five probit equations, and at the .10 level in one equation.

[36] All of the age dummy coefficients were significant at the .05 level in two of the regressions. The dummy for the highest age category (50+) was significant in one regression, and the dummy for the second-highest age category (40-49) was significant in an additional regression.

V. Conclusions

Our research also provides insight concerning the effectiveness of several approaches to improving consumer understanding of the caloric density of the tested products and the manner in which the products should be used to achieve a heart benefit. One clear result is that respondents did not interpret "substitution" and "simple" advertising claims differently for these products. For either a nutrient content or a health claim, framing the ad copy to suggest that consumers try the product *instead of* a less healthy fat or oil did not inform consumers that the advertised product can pose a heart-health risk if added to an existing diet. It should be noted, however, that respondents did distinguish between a dietary addition and a dietary substitution when asked directly about this issue. Respondents in all of the test conditions perceived the products as healthier for the heart when substituted for butter rather than when simply added to the diet.

The results also reveal that disclosing the number of calories per tablespoon of either the cooking oil or spread does not alter the perceived heart healthiness of the advertised product. Although, for Sunflower Fields, the disclosure helped respondents provide more accurate answers to the question that asked directly about the number of calories per serving, the responses to other questions indicate that respondents did not understand the practical significance of the calorie information.

The calorie disclosure also performed poorly in the Sunrise Spread treatments. Indeed, disclosing calories at times shifted perceptions in the wrong direction, improving respondents' opinion of the vegetable spread as a diet aid, and also increasing purchase interest. Consumers clearly do not regard 90-120 calories as a negative product attribute, even when the relevant serving size is only one tablespoon.

Firm conclusions on the efficacy of disclosing total fat per serving are difficult given that this remedy was not tested for any of the Sunflower Fields treatments. The fat disclosure performed unevenly in the Sunrise Spread questioning, and never had more than a modest impact on the results.

From a public policy standpoint, our results emphasize the need for increased consumer education concerning the high caloric density of products in the fats and oils food group, and the implications of this fact for daily dietary decisions and heart health. In particular, consumers need to understand that, on a per-tablespoon basis, cooking oils contain as many or more calories than any other food, including butter. Nutrient content and health claims in labeling and advertising can complement these educational efforts by identifying the specific types and brands of foods that have the healthiest fat profiles and that can contribute most to heart health as a dietary selection within the fats and oils food category.

The poor performance of the calorie disclosure in our tests indicates that public education must not be limited to informing consumers about the absolute number of calories in these products. Consumers must understand more generally that the regular addition of any food product with 90-120 calories per serving can contribute significantly to weight gain and associated health problems unless compensating adjustments are made elsewhere in the diet.

Appendix A
Sunrise Spread Main Questionnaire

ESCORT RESPONDENT INTO INTERVIEWING ROOM. SEAT RESPONDENT AT TABLE. IF RESPONDENT INDICATED EARLIER THAT S/HE WEARS GLASSES FOR READING, BE SURE THAT S/HE IS WEARING THEM.

Hello, my name is_____from Cunningham Research. As mentioned earlier, we are conducting a study today about advertising. I am going to show you an advertisement. Please read it carefully and let me know when you are finished.

GIVE RESPONDENT AD. WHEN RESPONDENT INDICATES THAT S/HE IS FINISHED LOOKING, TAKE BACK AD AND REMOVE FROM VIEW.

1. What was the name of the product that was advertised?

1 SUNRISE SPREAD, SUNRISE, SUN, SUNRISE MARGARINE
3 OTHER
9 DON'T KNOW, DON'T REMEMBER OR NOT SURE

Since people often read ads more than once, I would like you to look at the ad again. When you are done, I will take back the ad and then ask you some questions. There are no right or wrong answers to these questions. If you don't know an answer, that's o.k., just say "I don't know."

GIVE RESPONDENT AD. WHEN RESPONDENT INDICATES THAT S/HE IS FINISHED LOOKING, TAKE BACK AD AND REMOVE FROM VIEW.

2. Although you may have told me this before, what was the name of the product that was advertised?

1 SUNRISE SPREAD, SUNRISE, SUN, SUNRISE MARGARINE **CONTINUE)**
3 OTHER **(TERMINATE)**
9 DON'T KNOW, DON'T REMEMBER OR NOT SURE **(TERMINATE)**

3. What were the main ideas that the ad communicated to you? (RECORD VERBATIM. PROBE UNTIL UNPRODUCTIVE WITH: Anything else?)

4a. Did the ad say or suggest anything about the amount of trans fatty acids in Sunrise Spread?

1 YES **(Go to Q4b)**
2 NO **(Go to Q5)**
9 DON'T KNOW, NOT SURE OR DON'T REMEMBER **(Go to Q5)**

4b. What did the ad say or suggest about the amount of trans fatty acids in Sunrise Spread? (RECORD VERBATIM. PROBE UNTIL UNPRODUCTIVE WITH: Anything else?)

5. Did the ad say or suggest anything to you about the amount of calcium in Sunrise Spread?

1 YES
2 NO
9 DON'T KNOW, NOT SURE OR DON'T REMEMBER

6a. Did the ad say or suggest anything to you about whether Sunrise Spread is healthy for your heart?

1 YES (**GO TO Q6b)**
2 NO **(GO TO Q7)**
9 DON'T KNOW, NOT SURE OR DON'T REMEMBER **(GO TO Q7)**

6b. What did the ad say or suggest about Sunrise Spread lns fatty acids in Su3YSs rt? RECORD VERBATIM. P

7. So far I have been asking you to answer questions based just on what the ad said or suggested. Now I would like you to answer the following questions based on what the ad said or suggested, or on anything else you may know or believe.

7a. Please answer the next question using this card. **(HAND RESPONDENT CARD A)** Suppose you added Sunrise Spread to your regular diet without making any other changes in what you eat. For example, suppose that in the past you didn't use any spread or butter on your toast or sandwiches, but now you start using Sunrise Spread on them. Do you think that adding Sunrise Spread to your diet would be

1 Extremely bad for the heart
2 Bad for the heart
3 Somewhat bad for the heart
4 Neither bad nor good for the heart
5 Somewhat good for the heart
6 Good for the heart
7 Extremely good for the heart

(Note to programmer: answers are presented in this order for version 1, and presented in reverse order in version 2)

RECORD LETTER SELECTED_____ **(GO TO Q7b)**
9 DON'T KNOW, NOT SURE OR DON'T REMEMBER **(GO TO Q8a)**

7b You said **(READ RESPONSE TO 7a).** Why did you say that?

RECORD VERBATIM. PROBE UNTIL UNPRODUCTIVE WITH: Anything else?)

8a Now I am going to ask a question that I want you to answer using this card. **(HAND RESPONDENT CARD B)** Suppose you were to use Sunrise Spread instead of butter in cooking and on sandwiches. Do you think that using Sunrise Spread instead of butter would be

1 Extremely bad for the heart
2 Bad for the heart
3 Somewhat bad for the heart
4 Neither bad nor good for the heart
5 Somewhat good for the heart
6 Good for the heart
7 Extremely good for the heart

(Note to programmer: answers are presented in this order for version 1, and presented in reverse order in version 2)

RECORD LETTER SELECTED_____ **(GO TO Q8b)**
9 DON'T KNOW, NOT SURE OR DON'T REMEMBER **(GO TO Q9)**

8b You said **(READ RESPONSE TO 8a).** Why did you say that?

RECORD VERBATIM. PROBE UNTIL UNPRODUCTIVE WITH: Anything else?)

9a I would like you to use this card to answer the next question. (**HAND RESPONDENT CARD C)** Suppose someone you know has been using Sunrise Spread, and now decides to go on a diet to lose weight. Also suppose this person continues to use Sunrise Spread on a regular basis. Do you think that using Sunrise Spread on a regular basis would be:

1 Extremely bad for losing weight
2 Bad for losing weight
3 Somewhat bad for losing weight
4 Neither good nor bad for losing weight
5 Somewhat good for losing weight
6 Good for losing weight.
7 Extremely good for losing weight

((Note to programmer: answers are presented in this order for version 1, and presented in reverse order in version 2)

9b You said **(READ RESPONSE TO 9a).** Why did you say that?

RECORD VERBATIM. PROBE UNTIL UNPRODUCTIVE WITH: Anything else?)

10 I would like you to answer the next question using this card.
(**HAND RESPONDENT CARD D)**
Suppose you are planning a meal and have three choices. Choice K is to bake a filet of fish with only lemon juice for liquid and seasoning. Choice L is to pan fry the fish with Sunrise Spread, and use only lemon juice as seasoning. Choice M is to pan fry the fish with butter, and use only lemon juice as seasoning.

(Note to programmer: the relevant sentence in version 2 would say: Choice K is to pan fry a filet of fish with butter, and use only lemon juice as seasoning. Choice L is to pan fry the fish with Sunrise Spread, and use only lemon juice as seasoning. Choice M is to bake the fish with only lemon juice for liquid and seasoning.)

10a Which method of cooking the fish do you think would be best for your heart? Would you say

K. Bake a filet of fish with only lemon juice
L. Pan fry the fish with Sunrise Spread & use only lemon juice as seasoning
M. Pan fry the fish with butter, and use only lemon juice as Seasoning

(Note to programmer: present answers in the order asked in the question above for Version 2)

(IF RESPONDENT GIVES MORE THAN ONE CHOICE, RECORD ALL NUMBERS GIVEN.)

RECORD NUMBER OR NUMBERS SELECTED_____
9 DON'T KNOW, NOT SURE OR DON'T REMEMBER

10b You said **(READ RESPONSE TO 10a).** Why did you say that?

RECORD VERBATIM. PROBE UNTIL UNPRODUCTIVE WITH: Anything else?)

10c Which of the remaining choices do you think would be better for your heart? (IF RESPONDENT GIVES MORE THAN ONE CHOICE, RECORD ALL NUMBERS GIVEN.)

RECORD NUMBER OR NUMBERS SELECTED_____
9 DON'T KNOW, NOT SURE OR DON'T REMEMBER

10d You said **(READ RESPONSE TO 10c).** Why did you say that?

RECORD VERBATIM. PROBE UNTIL UNPRODUCTIVE WITH: Anything else?)

11 I would like you to use this card to answer the next question. (**HAND RESPONDENT**

RECORD LETTER SELECTED_____
9 DON=T KNOW

13. How interested would you be in buying the product?
(READ CHOICES AND CIRCLE ONE ANSWER)

1 Not at all interested
2 Not very interested
3 Somewhat interested
4 Very interested
5 Extremely interested

14. Have you been on a diet to lose weight at any time during the last year?

1 YES
2 NO
9 DON'T KNOW

(HAND RESPONDENT CARD G)
15. Which of the following describes your education?

1 Some High School or less
2 High School Graduate
3 Some College or Technical School
4 College Graduate
5 Post Graduate
9 Ren3* (9 Ren3* (9 Ren3* 002)Tj /TT0 1 Tf 0.0009 TcBDC 0.0003 Tc 10.0011 Tc 0.0011 Tw -2.75 -2.

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and will not be used to sell you anything.

RESPONDENT CERTIFICATION

I certify that I was shown a print ad, asked some questions about it, and paid $5.00 for my participation.

_____

Appendix B

Relationship Between Probability of Selecting Incorrect Response and Demographic Characteristics, Probit Coefficients (Conditional Mean Imputation Estimators)

	Adding to Diet (1)	Good for Losing Weight (2)	Cooking Method (3)	Calories Relative to Butter (4)	Number of Calories (5)
Income (Relative to Less Than $25,000)					
$25,000 - $49,999	-0.1507 (0.1244)	0.0170 (0.2077)	-0.1246 (0.1205)	-0.0350 (0.1220)	-0.1894 (0.1270)
$50,000 - $74,999	-0.2064 (0.1347)	-0.0325 (0.2320)	-0.1830 (0.1327)	-0.1376 (0.1334)	-0.2686 ** (0.1382)
$75,000 or above	-0.3597 ** (0.1504)	-0.1947 (0.2707)	-0.3799 ** (0.1553)	-0.2821 * (0.1529)	-0.4865 ** (0.1598)
Education (Relative to Some High School or Less)					
High School Graduate	0.0988 (0.2143)	0.0664 (0.3614)	0.2728 (0.2102)	0.2078 (0.2210)	-0.0559 (0.2256)
Some College or Technical School	0.0111 (0.2111)	-0.1272 (0.3575)	0.0425 (0.2086)	0.2732 (0.2199)	0.1470 (0.2233)
College Graduate	-0.1610 (0.2183)	-0.6364 * (0.3695)	-0.3935 * (0.2200)	0.0353 (0.2284)	-0.0559 (0.2322)
Post Graduate	-0.0021 (0.2440)	-0.1915 (0.4251)	-0.3864 (0.2515)	0.0173 (0.2565)	0.1678 (0.2603)
Age (Relative to 21 - 39)					
30 - 39	0.1543 (0.1124)	-0.0404 (0.1993)	0.1114 (0.1177)	0.1820 ** (0.1168)	0.3055 ** (0.1203)
40 - 49	0.3019 ** (0.1127)	0.2540 (0.2029)	0.3538 ** (0.1163)	0.3270 ** (0.1208)	0.3270 ** (0.1208)
Over 50	0.3058 ** (0.1142)	0.2366 (0.2061)	0.1041 (0.1192)	0.4455 ** (0.1181)	0.4460 ** (0.1234)

	Adding to Diet (1)	**Good for Losing Weight** (2)	**Cooking Method** (3)	**Calories**	