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An Investigation of Factors Influencing Consumer Responses To Health-Related Food Product Claims

Cover Page Footnote

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Abstract - The purpose of this study was to investigate the ability of general versus specific health-benefit claims in increasing consumer purchase intentions for a widely consumed vegetable, fresh mushrooms. The results indicate that specific claims work better with well-known versus lesser-known nutrients. Also, consumers' knowledge about a nutrient increases the effectiveness of nutrient-based health claims. Limitations of the study are the use of a sample drawn from an Internet panel and the lack of visual stimuli in the survey.

Keywords - Health-based claims, Health and nutrition advertising, Perceptions, Persuasion

Relevance to Marketing Educators, Researchers and/or Practitioners - Results of this research suggest that to be effective health benefits placed on packages should be clearly specified to consumers, should be applicable to most consumers, and do not need to emphasize a specific nutrient. A possible longer-term strategy would be to develop promotions to educate consumers on the benefits of specific nutrients. This would be particularly applicable to foods that have a strong differential advantage with respect to a specific nutrient that is not already well-known.

Introduction

This research is directed at understanding the linkages between health and/or nutrition claims on packaging on the effectiveness of changing the stated behavior of category consumers. While numerous studies have examined the effect of nutrition or health claims on packaging, the relationships have not previously been explored. The data was collected under the direction of one of the co-authors using an on-line commercial panel of 1,165 consumers. Details of the sample are described in the Data section of the article.

Research Objective

Researchers have been for years trying to identify the best way to deliver a health message that will have a positive impact on likelihood to buy. This research contributes to the body of knowledge by showing conditions where health and nutrition claims may be more effective. The paper investigates the relative effectiveness of different types of health claims for food products. The measure of effectiveness used is the extent to which there is a change in the respondent's desire to buy. The authors first compare health claims that offer specific health benefits with those highlighting the presence of a specific nutrient. They then examine whether common or well-known nutrients are more effective than those of uncommon nutrients, and whether specific claims are more effective than general claims. Finally, they investigate whether claims that apply to all adults are more effective than those that apply to specific demographic segments.

Health and Nutrition Advertising

Marketing expenditures on advertising *are* based on the logic that if consumers know and understand the relationship between the nutrient and disease prevention, they will be more likely to purchase the product. Products with claims are valued more than those without claims (Teratanavat et al., 2004). Consumers view health-food product advertising as ethical (Chandra et al., 2005) and have indicated they will probably purchase health food products that are frequently advertised. "According to a 2004 Food Marketing Institute survey, more purchasing decisions are being made on the basis of health-related benefits. Forty-two percent of respondents said they had purchased foods claiming to reduce their risk of developing heart disease, and 26 percent said that they had purchased foods claiming to reduce the risk of cancer" (Huth and Miller, 2006, pp. 54). Health claims may dramatically increase sales: chocolate's positive effects on cardiovascular disease and diabetes increased sales by 49 percent in three years (Tufts University Health & Nutrition Letter, 2007). Conversely, when health claims are refuted, sales may decline precipitously, for example, St. John's Wort as a depression treatment went from \$400 to \$59 million in four years (Saldanha, 2007). Many claims continue in the literature long after being scientifically

disproven, such as heart benefits gained from Vitamin E and the cancer-fighting ability of Beta Carotene (Arnst, 2007).

Health-Based Claims

A "health claim" by definition has two essential components: (1) a substance (whether a food, food component, or dietary ingredient) and (2) a disease or health-related condition. A statement lacking either one of these components does not meet the regulatory definition of a health claim. Unlike health claims, dietary guidance statements and structure/function claims are not subject to FDA review and authorization.¹

Nutrient-content claims describe the level of a nutrient or dietary substance in the product, using terms such as free, high, and low, or they compare the level of a nutrient in a food to that of another food, using terms such as more, reduced, and lite. Most nutrient-content claim regulations apply only to those nutrients or dietary substances that have an established daily value: [A Food Labeling Guide - VII. Nutrition Labeling](#).

Unlike health-based claims, nutrient-content information indicates only that the food product contains the nutrient, which may have no health association. Health claims positively affect purchase intentions and product attitudes (Kozup et al., 2003) and provide independent effects on consumer beliefs beyond those in nutrition facts panels on food packages (Ford et al., 1996). Combining the two increases consumers' nutritional knowledge and reduces misperceptions (Mazis and Raymond, 1997). For claims alone, front-panel and more comprehensive back-side claims (including nutritional facts panels) improve processing ease and claim believability (Wansink, 2003; Wansink, Sonka, and Hasler, 2004).

Theoretically, health-based claims placed on the package's front panel may serve as heuristics (Kemp et al., 2007). These heuristics minimize cognitive effort and can be viewed in light of the heuristic-systematic model (Chaiken, 1980). When these heuristics are nebulous, for example, carb smart, the Elaboration Likelihood Model (Petty and Cacioppo, 1986) can explain these differences. Kemp et al. (2007) found support for this when respondents low in motivation were exposed to low-carb claims and their purchase intentions increased in comparison to high-motivation respondents.

While studies have found that both health-benefit and nutrient-content claims can be effective, the relative importance of each type of claim is not well established. Some studies found that nutritional information is more important. Thus, Derby and Levy (2001) found that consumers tend to rely more on the nutritional panel than on health-benefit claims. In addition, Kozup et al. (2003) found that, although health-based claims can favorably affect product attitudes and purchase intentions, stronger effects were found through nutrition facts panels

¹ These two paragraphs are taken directly from the <http://www.fda.gov/Food/IngredientsPackagingLabeling/LabelingNutrition/ucm111447.htm>

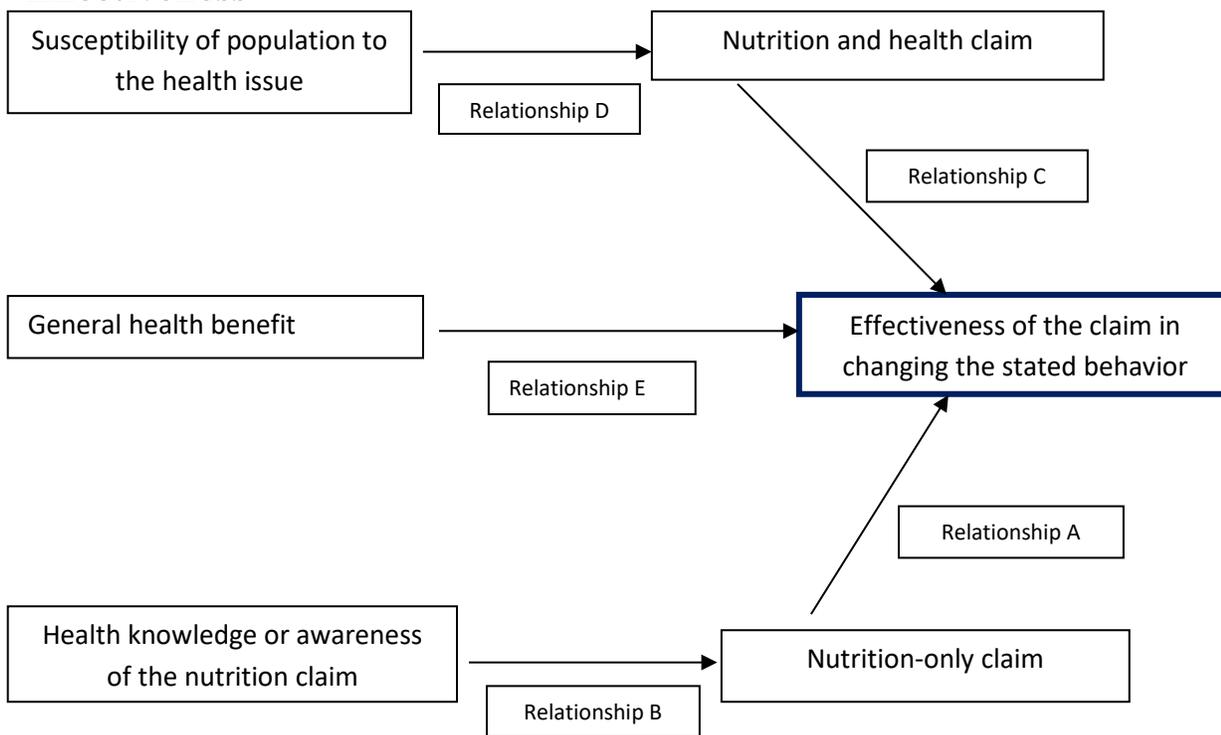
and several studies found that a claim's effect is removed when nutritional facts panels are available (Ford et al., 1996; Garretson and Burton, 2000; Keller et al., 1997; Mitra et al., 1999). Moreover, Ford et al. (1996) concluded that, while health claims and nutritional facts have independent effects on consumer beliefs, overall nutritional beliefs are not affected by claims when nutritional facts are available (Keller et al., 1997). However, Mitra et al. (1999) found that health claims explicitly linking diseases and nutrients are more effective than nutritional information alone. Therefore, further research is needed to address this issue.

The effectiveness of nutritional information may be weakened by consumers' lack of knowledge about nutrients and difficulty in processing nutritional information. Chase (1995) found that general knowledge of nutrition is often poor, and Moorman (1990) found that consumers often do not know how to use nutritional information effectively.

Conceptual Model

Based on the previous research, it is hypothesized that the effectiveness of a health claim for food is influenced by both nutrition claims alone and nutrition claims with a corresponding health outcome. However, it also appears that the "pure" nutrition claim only has an impact if the health outcome related to that nutrient is well-known. Additionally, the more the health outcome is related to the general population the more effective the claim will be. This is shown schematically in Figure 1.

Figure 1: Relationship of Nutrient Information to Change in Claim Effectiveness



Relationship B suggests that the more knowledge or awareness the general population has for a health issue the more likely the nutrition claim only will affect behavior. For example, the concept of heart disease and fat intake is well known. Foods often advertise or promote low in fat without any mention of heart disease. In the case of specific nutrients, a “pure” nutrition claim such as potassium might be more effective than selenium because many people know of the health benefit association with potassium (blood pressure), and blood pressure issues are a concern to most of the population. On the other hand, a selenium claim alone may be less effective because much of the population do not know the health benefit.

Relationship A hypothesizes that a nutrition-only claim can be effective alone but only if relationship B is positive. Relationship E hypothesizes the more generalized a health claim the more likely it will have an effect on behavior. For example, helps "lose weight" is a very general claim, but can have an impact on obesity (and the maladies that come with it), diabetes, vanity, etc.

Relationship D suggests that the more the health benefit is likely to affect only a portion of the population, the less likely the claim will be effective. In the aforementioned example, everyone is potentially a subject and, therefore, more likely to be aware of the impact of fat in food. In other cases, for example, lactose, the black population is more prone to lactose intolerance, and, therefore, lactose-free claims may be ineffective in changing the behavior of non-blacks. There are always exceptions. Celiac disease affects as few as 2 percent of the population, but many non-celiacs are buying food that is "gluten free." Relationship C suggests that unless both the health condition and the nutrient are advertised or promoted the claim will be less effective.

Missing from this model is feedback loops that clearly exist. For example, the more a nutrition and health claim is advertised the more likely the awareness level will increase. However, a time series data and model would be necessary to demonstrate and test this effect.

Hypotheses

Four hypotheses have been developed. The first three are based on previous research findings. The fourth hypothesis derives from the fact that these health claims will be placed on the packages of fresh mushrooms and so the claim cannot be tailored to specific segments in the way that advertisements can be when placed in selected media.²

Hypothesis 1 (**H:01**): There are no significant differences in the effectiveness of claims where the health benefit is clearly specified, for example, benefits the immune system

² Selenium was used in this research as it is present in high levels in mushrooms; it is not well known so we can expect variation in the results, and there are substantial relationships established between selenium and a variety of health conditions.

and those that depend on nutritional information alone, for example, a good source of selenium. See relationships A and C in Figure 1.

Hypothesis 2 (**H:02**): Claims based on nutritional information alone will be more effective where the health benefit of the nutrient is well-known, for example, potassium versus selenium. See relationship B in Figure 1.

Hypothesis 3 (**H:03**): A claim will be more effective when it is specific rather than general, for example, a good source of potassium versus healthy food. See relationship E in Figure 1.

Hypothesis 4 (**H:04**): A claim will be more effective if the health benefit is relevant to a large portion of the population, for example, digestive system versus prostate. See relationship D in Figure 1.

Data and Method

Respondents were surveyed on their responses to different health-related claims that might be placed on packages of mushrooms. There are a variety of reasons why mushrooms were used in this study. The authors wanted to use a product that had not been in the national attention for its identification with any particular nutrition or health claim. Regardless of messages supplied the problem is that well-known products may have predetermined outcomes due to media attention. However, mushrooms have the advantage that there are some known nutritional claims that can be made, and that we can expect to see variability of awareness in the population. Mushrooms also have the advantage of having a reasonably low purchase frequency. It was felt that to show some potential movement in terms of likelihood to buy, the chosen product should not have extremely high purchase frequency to begin with. In 2015, only about half of U.S. households purchased mushrooms (Mushroom Council, 2015). The authors do not contend that mushrooms were the only product that could be used, but it was a product that provided the researchers of all the needed characteristics for this study.

It is important in a study of this type to include only users of the product category even if they are only light users. At least in the food product category, users represent the pertinent target market. Data were drawn from an Internet panel maintained by Markettools, Inc. All panelists were screened for the following conditions:

1. Panelist had consumed fresh mushrooms in the past 12 months;
2. Panelist had to be the primary food shopper; and
3. Panelist had to be between the ages of 18 and 65.

The total sample size is 1,165. There was no attempt to have a U.S. representative sample but rather to have a representative sample of the three conditions described

above. This sample was compared to past Mushroom Council research using the exact three sample conditions. This sample is very similar to these other studies.

Because of the large number of statements involved (35), and to reduce respondent burden respondents were divided into groups, with each being exposed to a different subset of the statements. The first split was based on respondents' answer to a question about knowledge of the nutrient selenium. There were four possible responses:

1. Have not heard of it;
2. Have heard of it but do not know what it does for you;
3. Have heard of it and have a good idea of what it does or why it is important; and
4. Have heard of it and know what it does and/or why it is important.

All respondents who gave answers three or four in the categories shown above were exposed to claims regarding selenium. The sample size is 616. The remaining respondents were randomly assigned to four groups. This research examines two groups. First the group that was exposed to the statements regarding selenium, and second, the group that was exposed to claims regarding mineral and vitamin content and one general statement that fresh mushrooms are a healthy food. The sample size is 274. The other three groups were not included for this study because statements did not include nutrient information.

Measure of Effectiveness

For the measure of effectiveness respondents were presented with a list of health-related claims that would be placed on mushroom packages and asked "Please indicate to what extent the statement you just read changed how likely you would be to buy mushrooms within the next month." There were five possible responses coded as follows:

1. Greatly increased my desire to buy;
2. Somewhat increased my desire to buy;
3. Did not affect my desire to buy;
4. Somewhat decreased my desire to buy; and
5. Greatly decreased my desire to buy.

The health claim was considered to be very effective if the respondent said it "greatly increased my desire to buy," and effective if the response was that it "somewhat increased my desire to buy." Thus, a lower mean score indicates more effectiveness. The Friedman Repeated Measures Nonparametric ANOVA method was used to test for significance of differences between the score ranks (Hollander and Wolfe, 1999). This test is robust to non-normal data and correlated observations. In this study, the results of the Friedman test for each of the variable sets indicated that there were differences between at least two of the benefit statements. Therefore, a test

for homogeneous variable subsets was used to examine differences between the statements.

Results

H:01

Table 1 shows the results for the sample exposed to the selenium statements. The order of the claims was rotated in the survey to eliminate order bias. In Table 1, health claims are ranked from most effective to least effective. Statements within each subset are not significantly different at the .05 level. The three most effective claims all give a specific health benefit, that is, “needed for the proper functioning of the immune system,” “regulates the body’s use of energy,” and “may help maintain a healthy digestive system.” These three claims are significantly more effective than the two statements giving nutritional information alone. These results do not support H:01, that is, “There are no significant differences in the effectiveness of claims where the health benefit is clearly specified and those that depend on nutritional information alone.” We find that a claim is more effective where the health benefit is clearly specified, rather than depending on nutritional information alone.

Table 1: Change in Likelihood of Buying Fresh Mushrooms in Response to Claims Based on Health Benefits versus Nutritional Information Alone

	Subset*	
	1	2
HB. Mushrooms are a good source of selenium. Selenium, an essential trace mineral, is needed for the proper functioning of the immune system.	2.17 2.17	
HB. Selenium, an essential trace element, is essential for the production of active thyroid hormone, which regulates the body’s use of energy.	2.23	
HB. Mushrooms are a good source of selenium, which may help maintain a healthy digestive system, including the esophagus, stomach and colon.	2.23	
NI. Fresh mushrooms provide 100% of the RDA** of selenium.		2.41
NI. Fresh mushrooms are an excellent source of selenium.		2.49

HB = Claims based on health benefits. NI = Claims based on nutritional information alone. Each cell shows the mean value where: 1. Greatly increased my desire to buy; 2. Somewhat increased my desire to buy; 3. Did not affect my desire to buy; 4. Somewhat decreased my desire to buy; and 5. Greatly decreased my desire to buy.

*Statements within each subset are not significantly different from each other at the .05 level.

** RDA - Recommended Daily Allowance

N = 616

The 616 respondents who were exposed to the selenium claims were comprised of two groups: 277 respondents who indicated that they had heard of selenium and knew what it does and/or why it is important, and 339 who indicated that they had heard of it, but only had a good idea of what it does or why it is important. The results of an analysis of the 277 respondents with the superior knowledge of selenium are shown in Table 2. Statements within each subset and where subsets overlap are not significantly different from each other at the .05 level. These results show a different

pattern than for the whole 616 sample. Thus, these respondents are just as likely to have responded favorably to the statement “Fresh mushrooms provide 100% of the RDA of selenium” as they are to the statements about thyroid/energy and digestive system. However, they are still less likely to respond favorably to this statement than to the statement about the immune system. Thus, the findings for those who know about selenium do not consistently reject (H:01). It appears that H:01 is rejected partly because of respondents’ weak knowledge of the nutrient selenium.

Table 2: Change in Likelihood of Buying Fresh Mushrooms in Response to Claims. Respondents Who Have Heard of Selenium and Know What it Does and/or Why It Is Important

	Subset*		
	1	2	3
Mushrooms are a good source of selenium. Selenium, an essential trace mineral, is needed for the proper functioning of the immune system.	2.12		
Selenium, an essential trace element, is essential for the production of active thyroid hormone, which regulates the body’s use of energy.	2.16	2.16	
Mushrooms are a good source of selenium, which may help maintain a healthy digestive system, including the esophagus, stomach, and colon.	2.21	2.21	2.21
Fresh mushrooms provide 100% of the RDA of selenium.		2.32	2.32
Fresh mushrooms are an excellent source of selenium.			2.37

Each cell shows the mean value where: 1. Greatly increased my desire to buy; 2. Somewhat increased my desire to buy; 3. Did not affect my desire to buy; 4. Somewhat decreased my desire to buy; and 5. Greatly decreased my desire to buy.

*Statements within each subset and where subsets overlap are not significantly different from each other at the .05 level.

N = 277

H:02.

This is confirmed by the finding that respondents who know what selenium does and/or why it is important are significantly more likely to have responded favorably to the two statements providing nutritional information alone than those who only “have a good idea of what it does or why it is important.” Thus, the means for those who know what selenium does and/or why it is important are 2.32 and 2.37 for the statements “Fresh mushrooms provide 100% of the RDA of selenium” and “Fresh mushrooms are an excellent source of selenium” respectively, compared to 2.47 and 2.60 for those who only have a good idea of what it does or why it is important. These results support (H:02), that is, “Claims based on nutritional information alone will be more effective where the health benefit of the nutrient is well-known.”

Table 3 shows the results for the group of respondents who were exposed to claims including selenium and other nutrients. Results show that the most effective claims involving nutrients specify potassium, and the least effective specify selenium. This finding corresponds to the respondent’s knowledge of the benefits of the two nutrients. Because of the way the groups were selected, the health benefits of potassium are far

better known by these respondents than those of selenium, as shown in Table 4. One-hundred percent of respondent either have not heard of selenium or have heard of it, but do not know what it does for you. The same number for potassium is less than 18 percent, and over 80 percent have heard of it and either have a good idea what it does or why it is important.

Table 3: Change in Likelihood of Buying Fresh Mushrooms in Response to Claims: Potassium and Selenium

	Subset*		
	1	2	3
Fresh mushrooms have as much potassium as a medium banana.	2.29		
Fresh mushrooms are a good source of potassium.	2.40		
Fresh mushrooms are a good source of selenium.			2.86

Each cell shows the mean value where: 1. Greatly increased my desire to buy; 2. Somewhat increased my desire to buy; 3. Did not affect my desire to buy; 4. Somewhat decreased my desire to buy; and 5. Greatly decreased my desire to buy.

*Statements within each subset are not significantly different from each other at the .05 level.
N = 274

Table 4: Respondents’ Knowledge of Potassium and Selenium

	Potassium	Selenium
Have not heard of it.	1.1%	43.3%
Have heard of it but do not know what it does for you.	16.8%	57.7%
Have heard of it and have a good idea of what it does or why.	42.7%	0.0%
Have heard of it and know what it does and/or why it is important.	39.4%	0.0%

N = 274

These results support (H:02), that is, “Claims based on nutritional information alone will be more effective where the health benefit of the nutrient is well-known.” Also, respondents had the option of adding comments to explain their responses. Of those who gave negative responses to a claim, unfamiliarity was given as the reason by no respondents for potassium and 66.7 percent for selenium.

H:03

As shown in Table 5 claims included statements about selenium and other nutrients and a general claim “Fresh mushrooms are a healthy food.” This data allows us to compare the effectiveness of specific claims with the more general claim. Results indicate that the most effective claims involving nutrients specify potassium, and these have the lowest means. However, the very general claim, that is, “Fresh

mushrooms are a healthy food,” is not less effective than the claim “Fresh mushrooms are a good source of potassium” and is more effective than the selenium claim. Hence, the results do not support (H:03), that is, “A claim will be more effective when it is specific rather than general.”

Table 5: Change in Likelihood of Buying Fresh Mushrooms in Response to Specific versus General Claims

	Subset*			
	1	2	3	4
Fresh mushrooms have as much potassium as a medium banana.	2.29			
Fresh mushrooms are a good source of potassium.	2.40	2.40		
Fresh mushrooms are a healthy food.		2.55	2.55	
Fresh mushrooms are a good source of selenium.				2.86

Each cell shows the mean value where: 1. Greatly increased my desire to buy; 2. Somewhat increased my desire to buy; 3. Did not affect my desire to buy; 4. Somewhat decreased my desire to buy; and 5. Greatly decreased my desire to buy.

*Statements within each subset and where subsets overlap are not significantly different from each other at the .05 level.

N = 274

H:04

The results, shown in Table 6 show that the three most effective claims are applicable to both genders and all age groups. The next most effective are the claims that selenium helps maintain breast health and may help maintain a healthy prostate gland. The least effective claim is “necessary for a healthy reproductive system in men and women.” Only those aged under 35 years had more positive responses than for the other health claims, that is, a mean of 2.36. The mean response for those aged 45 and older is 2.60. Therefore, our results support (H:04), that is, “A claim will be more effective if the health benefit is relevant to a large portion of the population.”

Table 6: Change in Likelihood of Buying Fresh Mushrooms in Response to Health Claims with Wide Applicability versus Limited Applicability

	Subset		
	1	2	3
Mushrooms are a good source of selenium. Selenium, an essential trace mineral, is needed for the proper functioning of the immune system.	2.17		
Selenium, an essential trace element, is essential for the production of active thyroid hormone, which regulates the body's use of energy.	2.23		
Mushrooms are a good source of selenium, which may help maintain a healthy digestive system, including the esophagus, stomach, and colon.	2.23		
A good source of selenium, which may help maintain breast health.		2.35	
Mushrooms are a good source of selenium, which may help maintain a healthy prostate gland.		2.47	2.47
Mushrooms are a good source of selenium. Selenium, an essential trace element, is necessary for a healthy reproductive system in men and women.			2.52

Each cell shows the mean value where: 1. Greatly increased my desire to buy; 2. Somewhat increased my desire to buy; 3. Did not affect my desire to buy; 4. Somewhat decreased my desire to buy; and 5. Greatly decreased my desire to buy.

Homogeneous subsets are based on asymptotic significances. The significance level is .05.

*Statements within each subset and where subsets overlap are not significantly different from each other at the .05 level.

N = 616

Implications for Research and Practice

As mentioned in the introduction, previous studies have found that both health claims and nutritional facts positively affect consumer attitudes, purchase intentions, and purchase behavior. Our results are consistent with these findings, as the mean values for all statements fall between 2 “somewhat increased my desire to buy” and 3 “did not affect my desire to buy.” The focus of this study, however, is on which types of statements are most effective.

As the results of prior research indicate that general knowledge of nutrition is often poor (Chase, 1995), and that consumers often do not know how to use nutritional information effectively (Moorman, 1990), we investigated whether our findings regarding the relative efficacy of health benefit claims versus nutritional facts may be due to consumers’ lack of knowledge about nutrients and difficulty in processing nutritional information. Our findings suggest that this is, to some extent, the case. In addition, for the other set of statements that include several nutrients (Table 3), the response to the statement regarding potassium (a well-known nutrient) is far more positive than that to the statement regarding selenium (a little-known nutrient)

The present study also investigated the relative efficacy of specific versus general claims. Andrews et al. (1998) found that specific claims are easier to verify and more easily understood by consumers than general claims. The findings of the present study do not show that a specific claim is more effective than a general claim. The results do show that specific claims mentioning a well-known nutrient such as

potassium are more effective than the statement mentioning the lesser-known selenium.

Results of this research suggest that to be effective health benefits placed on packages should be clearly specified to consumers, should apply to most consumers, and do not need to emphasize a specific nutrient. A possible longer-term strategy would be to develop promotions to educate consumers on the benefits of specific nutrients. This would be particularly applicable to foods that have a strong differential advantage with respect to a specific nutrient that is not already well-known.

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