

SENSORY SUGGESTIVENESS AND LABELING: DO SOY LABELS BIAS TASTE?¹

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ABSTRACT

Can labels suggestively influence sensory perceptions and taste? Using a "Phantom Ingredient" taste test, we show that the presence or absence of a labeled ingredient (soy) and the presence or absence of a health claim negatively bias taste perceptions toward a food erroneously thought to contain soy. We found a label highlighting soy content made health claims believable but negatively influenced perceptions of taste for certain segments of consumers. Our results and discussion provide better direction for researchers who work with ingredient labeling as well as for those who work with soybean products.

INTRODUCTION

To what extent do labels suggestively influence our taste of a product? While this general issue of taste suggestibility is not often academically studied, it has a rich anecdotal history. Commissioned studies during World War II examined the feasibility of serving organ meats, such as brains, kidneys, tongue, and liver, as potential replacements for traditional cuts of meat which were in short supply. While the taste of these organ meats was generally acceptable when the type of meat was undisclosed, once disclosed, the meats became repulsive to many segments of consumers (Wansink 2002).

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This issue of taste suggestiveness and labeling is still important today (Caswell and Majduszka 1996). Consider soy. While soy-based foods receive endorsements as a healthy food choice, American consumers tend to dislike the taste of soybeans (Wansink and Chan 2001). As with organ meats in the 1940s, the suggestion that a food contains soy may be so powerful that some people convince themselves they do not like the taste. Part of this may be due to perceptions toward soy. Yet another part may be due to people believing healthy foods are not likely to taste good. Given there are also expectations of how "healthy foods" should taste, we may also think that foods with health claims lead people to perceive sensory differences in foods that are not objectively different.

While there is much research as to how labels influence usage, little has focused on how labeling influences perceptions of taste (Szykman *et al.* 1997). In extending past research (Wansink *et al.* 2000), the purpose of this article is (1) to discover how suggestive labeling influences consumers' taste perceptions, and (2) to discover what groups are influenced most by suggestive labeling. To examine these questions, we construct a "Phantom" ingredient study where we present consumers with a energy bar that is labeled as containing "10 grams of protein" versus "10 grams of soy protein" and which either contains a health claim on its label or does not contain one.

Our prediction is that soy labeling can negatively influence the taste and texture perceptions of various consumer segments, and that it does so independently of what might be expected simply because of a health-related inference. Specifically, we believe soy labeling will negatively influence the taste and texture perceptions of taste-conscious segments of consumers differently than health-conscious segments. Our results and discussion will provide better direction for researchers who work with ingredient labeling as well as for those interested in the suggestability of labeling.

BACKGROUND

Consumers in blind taste tests evaluate products solely based on their preferences and on intrinsic cues, such as taste, texture, or aroma (recall the 1974 Pepsi Challenge). Yet, this changes once a product is labeled. According to Allison and Uhl (1964), consumers have a limited ability to pick their preferred brand of beer given no extrinsic brand cues. Indeed, it has long been accepted that consumers in low involvement situations tend to use extrinsic cues rather than intrinsic attributes of the product to make product choices (Jacoby *et al.* 1977).

A series of studies conducted in a cafeteria investigated whether changing the description of menu items altered people's taste ratings and sales of six different foods (Wansink *et al.* 2001, 2002). The study involved using plain versus descriptive labels (seafood filet versus succulent Italian seafood filet). When a food was labeled with a descriptive label, its sales increased by an average of 27%. What was more intriguing, however, was that immediately following their meal, restaurant-goers rated these descriptively-labeled foods as more flavorful, more tasty, more caloric, and more satisfying than those who instead had eaten less descriptively-labeled counterparts. People want to taste what they expect they will taste.

We might also believe the same would be true with ingredients. If a person believes a particular ingredient, such as soy, tastes bad, the mere suggestion that a food has such an ingredient might effectively "poison" one's perceived taste of the food. This would be true even if the food contained no soy. What is not known is how ingredient information influences the sensory aspects of food that is also explicitly labeled as healthy. A food that might be perceived as healthy might also be perceived as being less flavorful or tasty.

Importantly, it has been shown that on-package health claims and nutrition information have independent effects. For example, packages with health claims were perceived as significantly more "heart healthy" than packages without health claims regardless of the nutrition information provided or the format used (Ford 1994). Indeed, some nutrition labeling can affect consumers' perceptions of product quality and preference (Asam and Bucklin 1973), we expect that soy labeling may influence consumers' preferences for and perceptions of a product in the same way it unfairly influences taste expectations.

DATA AND METHOD

Participants and Design

To better examine how labeling influences product taste perceptions, we designed a 2 × 2 between-subjects experiment where a soy label ("Contains 10 grams of soy protein" versus "Contains 10 grams of protein") was evaluated with a health claim ("May help reduce the risk of heart disease" versus no health claim). Of 155 participants who participated in the experiment 45% were meal-planners and local adults in the central Illinois area (ages 22 to 45) who received \$6 donation for their participation, and 55% were undergraduate students at the University of Illinois (ages 17 to 21) who received course credit in exchange for their participation. By utilizing two different populations, the objective was to obtain a large cross-section of participants who were familiar with the product category. There were not predicted differences between the two populations,

and none were found. The average age of these participants was 31.2 years old and 64.3% were female.

Procedure and Treatments

We manipulated four different front-label conditions (soy label versus no soy label; health claim versus no health claim) on a brand name nutrition bar which contained no soy ingredients. During the experiment, we began by asking the participants to answer a questionnaire about their general food preferences (9-point scales). After completing the food preference questions, each group of the participants was randomly given a nutrition bar that was contained within one of the four different front package labels. They were then asked open-ended questions regarding whether they would either purchase or not purchase the product (Wansink *et al.* 1994). The participants were then asked to taste the product. Following this, they were asked to fill out the remainder of the survey, which had statements related to taste perceptions (1=strongly disagree; 9 = strongly agree) and purchase intentions.

Data Analysis

Of the 155 participants who began the study, 142 completed the study and were included in the statistical analysis. A chi-squared test was used to examine the content analyses of the participants' product and taste perceptions. Their cognitive responses were coded by two independent coders who were blind to the experimental conditions. Disagreements between the two coders were resolved through discussion (inter-coder agreement rate = 85%). The participants' prior perceptions were grouped into four different categories: taste perceptions (taste-, texture-, and flavor-related), health or energy claim perceptions (beliefs or disbeliefs about the health or energy claims), nutrients perceptions (e.g., protein-, calories-, and fat-related), and ingredients perceptions.

Next, ANOVAs were used to examine whether soy labeling and health claims influenced taste perceptions and product evaluations. Analyses were conducted with two segments of consumers, one which was primarily a taste-conscious segment and one which was primarily a health-conscious segment.¹ Thirty-nine of the 142 respondents were not classified as either a taste-conscious or a health-conscious segment. We evaluated buying intentions of different

¹A mean split method was used to discriminate a taste-conscious segment from a health-conscious segment. Means were calculated from multiplicative terms of the importance of taste (I_{taste})/health (I_{health}) and the behavioral intention of sacrificing health for taste (B_{health}) / taste for health (B_{taste}). For example, the taste conscious segment represents a group of the participants who were selected if $I_{taste} * B_{health}$ is greater than the average and $I_{health} * B_{taste}$ is smaller than the average.

consumer segments in each of four experiment conditions to examine whether soy labeling has more of an influence on taste-conscious consumers or health-conscious consumers.

RESULTS

How Do Suggestive Labels Bias Product and Taste Perceptions?

The product perceptions each participant had prior to actual consumption were coded and categorized into taste-related, health-related, nutrient-related, and ingredient-related perceptions. For each of the four conditions, Table 1 shows positive and negative comments people had toward the nutrition bar prior to tasting it. Our results indicate that labeling influences the participants' perceptions of the product with regard to the favorable aspects of health and energy claim related perceptions ($\chi^2 = 3.61$; $P < 0.10$) and the unfavorable aspects of ingredient-related perceptions ($\chi^2 = 2.95$; $P < 0.10$). While the latter implied that soy labels, on balance, negatively influence product perceptions, we also discovered some positive findings concerning soy labels. For example, our results indicate that on average the participants tend to view the health and energy aspects of the nutrition bar with less skepticism when soy was mentioned on the front label [soy-health (19%) versus no soy-health (46%); soy-no health (4%) versus no soy-no health (31%)]. In other words, a soy label may help make health claims on the package more believable.

Who Is Most Influenced by Suggestive Labels?

Following their consumption of the product, consumers rated their taste of it. Because the participants' actual consumption experience could overshadow the effects of labeling (Jacoby *et al.* 1971), we decided to divide the overall sample into two separate samples of taste-conscious and health-conscious consumer segments in order to examine some possible differences in their patterns of responses.

When looking at the taste-conscious consumers, Table 2 indicates that a product with a soy label on it was thought to be less tasty ($F_{\text{soy}} = 3.55$; $P < 0.10$), to taste worse than expected ($F_{\text{soy}} = 5.85$; $P < 0.05$), and to have a worse appearance ($F_{\text{soy}} = 3.53$; $P < 0.10$) than the same product that did not have a soy label on it. In addition, those eating products with a soy label claimed they felt less healthy when eating it ($F_{\text{soy}} = 7.13$; $P < 0.05$), and they were less likely to purchase it ($F_{\text{soy}} = 4.70$; $P < 0.05$). These results suggest that the taste-conscious consumer segment is very sensitive to the soy labeling when it comes to nutrition bar consumption.

In contrast, soy labeling did not have any effects on the taste-related perceptions of the health-conscious consumer segment. Table 3 shows that the

TABLE 1.
HOW DO SUGGESTIVE LABELS INFLUENCE PRODUCT PERCEPTIONS?

Valence of Comments ¹	Open-ended Cognitive Responses (Total = 142 Respondents)	Suggestive (Soy) Label				No (Soy) Label		Chi-sq.
		Health Claim	No Health Claim	Health Claim	No Health Claim			
Unfavorable	Taste, Texture, and Flavor (n = 39)	21%	26%	28%	26%	.24		
Comments	Health and Energy (n = 26)	19%	4%	46%	31%	1.11		
	Protein, Calories, and Fat Contents (n = 14)	43%	21%	21%	14%	.06		
	Soy as an Ingredient (n = 19)	42%	37%	21%	0%	2.95*		
Favorable	Taste, Texture, and Flavor (n = 3)	33%	33%	0%	33%	.75		
Comments	Health and Energy (n = 15)	20%	33%	40%	7%	3.61*		
	Protein, Calories, and Fat Contents (n = 13)	23%	8%	39%	31%	.44		
	Soy as an Ingredient (n = 0)	--	--	--	--	--	--	

The participants' product perceptions were first categorized into favorable and unfavorable comments and then were categorized into the four basic product attribute-related perceptions.

* $P < 0.10$.

TABLE 2.
SUGGESTIVE (SOY) LABELS BIAS TASTE-CONSCIOUS CONSUMERS

Taste Perceptions/ Product Ratings	Suggestive (Soy) Label		No (Soy) Label		F-values		
	Health Claim (n = 15)	No Health Claim (n = 15)	Health Claim (n = 15)	No Health Claim (n = 15)	Suggestive (Soy) Label	Health Claim	Label × Claim
I like the taste	2.6	2.3	2.9	4.0	3.55*	.71	1.86
I like the texture and consistency	2.1	1.9	2.0	3.1	1.71	1.33	2.13
It tastes better than expected	3.2	2.4	3.6	4.8	5.85**	.14	2.96
I like the appearance	2.8	3.0	4.1	3.6	3.53*	.07	.45
I feel good (healthy) when I eat it	2.4	2.1	4.1	3.5	7.13**	.66	1.2
I am likely to purchase this	1.9	2.1	2.7	3.3	4.71*	.59	1.2

Note. Taste perceptions and product ratings were measured on a 9-point scale (1 = strongly disagree; 9 = strongly agree). ** $P < 0.05$. * $P < 0.10$.

health-conscious consumer segment was not influenced by such claims but did believe that those candy bars labeled with health claims tasted better than they had expected ($F_{\text{health}} = 5.07$; $P < 0.05$). These results confirm that the taste-conscious consumer segment is more sensitive to soy labeling than the health-conscious segment. It also shows that although health claims can also negatively influence taste perceptions, they do so in a manner independent of how soy influences taste.

TABLE 3.
SUGGESTIVE SOY LABELS DO NOT BIAS HEALTH-CONSCIOUS CONSUMERS

Taste Perceptions/ Product Ratings	Suggestive (Soy) Label		No (Soy) Label		F-values		
	Health Claim (n = 12)	No Health Claim (n = 11)	Health Claim (n = 10)	No Health Claim (n = 10)	Suggestive (Soy) Label	Health Claim	Label × Claim
I like the taste	4.1	4.0	3.9	2.9	.62	.44	.31
I like the texture and consistency	3.3	4.0	3.5	2.2	1.05	.13	1.85
It tastes better than expected	4.9	3.5	4.8	2.6	.35	5.07**	.20
I like the appearance	3.5	4.8	3.2	4.1	.52	2.47	.08
I feel good (healthy) when I eat it	4.1	4.5	4.1	2.9	.90	.26	.94
I am likely to purchase this	3.1	3.4	3.9	2.8	.02	.24	.68

Note. Taste perceptions and product ratings were measured on a 9-point scale (1 = strongly disagree; 9 = strongly agree). ** $P < 0.05$.

DISCUSSION AND IMPLICATIONS

To examine how package labeling influences preference and taste, as well as to discover who is most influenced by labels, we conducted a “Phantom Ingredient” product taste test by varying front label conditions on a soy-free product. This study enabled us to complement previous nutrition labeling research since we used two different statements, a soy label and a health claim, simultaneously on the front label. The results generally support our expectation on the relationship between labeling and preference, perception, and taste.

In general, a soy label negatively influences the product preferences, perceptions, and taste of consumers, especially taste-conscious consumer segments. However, before we can draw specific conclusions from this study, we need to note how the limitations of the research design and method constrain the generalizability of the findings. Because the key manipulations (soy label and health claim) were operationalized in a laboratory environment, we did not monitor how these labels are processed and how they influence consumption in a market context. Also, because the participants of this study are mainly from one geographic region, we cannot generalize our findings throughout the general U.S. population. We can confidently conclude, however, that labeling can influence our senses.

When blind taste tests raise the salience of ingredients or attributes, they can artificially inflate or deflate sensory ratings or evaluations. In the context of soy, the power of suggestibility can be expanded to other ingredients or processes, such as those involving GMO or biotechnology. We developed the “Phantom Ingredient” blind test procedure, in order to elicit evaluation and taste perceptions of a product without increasing the salience of an ingredient. This procedure helps measure the more pure effects that labeling has on consumer perceptions, even after the actual consumption experience occurred.

There are two important insights this article presents about how the presence of a soy label influences the product preference, perception, and taste of different segments of consumers. First, while soy labels generated some negative preferences and perceptions, they helped decrease consumers’ skepticism toward health or energy-related perceptions. Therefore, using both soy labels and health claims together may neutralize negative preferences and perceptions that might result from using either alone. Second, all consumers are not equally influenced by suggestive labeling. It may be that some segments are more suggestible than others. Nevertheless, what we generally find is that a large percentage of consumers taste what they want to taste.

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