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# Consumer Generalization of Nutrient Content Claims in Advertising

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Although considerable research exists on consumer processing of nutrition labeling and package claims, less is known about consumer interpretation of nutrient content claims in advertising. This is important because product advertising often provides a significant first step for consumers in learning new nutrition information. Yet, unlike package claims, Nutrition Facts Panels are often not available for consumers during the processing of such advertising claims. Therefore, the authors examine the following research questions: (1) Do consumers misinterpret (i.e., overgeneralize) common nutrient content claims in advertising? If so, under what conditions does this occur? and (2) Can various types of disclosure statements remedy this problem? To address these questions, the authors interview a total of 365 primary food shoppers in three geographically dispersed malls in the United States in a between-subjects experiment. Misleading generalizations, beyond those of control ad claims, are found for general and specific nutrient content claims. Ad disclosure type, ad claim type, and nutrition knowledge all separately influence nutrient content and disease risk measures. Evaluative disclosures reduce misleading generalizations to a greater extent than do absolute or relative disclosures. The authors offer implications for public policy and food marketers.

One of the most significant and controversial changes affecting consumers and food manufacturers is the Congressionally mandated Nutritional Labeling and Education Act (NLEA) (1990; deNitto 1991; Ingersoll 1991). The Food and Drug Administration's (FDA) regulations as a result of the NLEA have required nutritional labeling for most foods since May 1994 and specification of the approved use of nutrient content and health claims on all food packaging (*Federal Register* 1993). The regulations have provided the impetus for several recent studies that examine consumer acquisition, comprehension, and interpretation of nutrient content claims, health claims, and labeling on food packages (e.g., Ford et al. 1996; Levy, Derby, and Roe 1997; Moorman 1996). Although it has been estimated that the regulations will cost food manufacturers between $1.4 and $2.3 billion over the next 20 years, public health benefits (e.g., reductions in coronary heart disease, cancer, high blood pressure) are predicted to exceed the costs (*FDA Consumer* 1993, p. 6).

Although nutrition labeling and package claim research has progressed since the appearance of the new food-labeling rules, relatively little is known about how consumers will process nutrient content and health claims in advertising in this new environment. This is important because of the inherent differences between advertising and package information processing. For example, when consumers are exposed to nutrition claims on packages, Nutrition Facts Panel information is readily available to help in the interpretation and evaluation of the claim. Unfortunately, though advertising can be an important first step in the processing of marketing communications (Hoch and Ha 1986; Shimp 1997; Smith and Swinyard 1982), Facts Panel information is not readily available when consumers examine nutrition claims in advertising.

Therefore, our study focuses on the extent to which consumers generalize from recent nutrient content claims in advertising across different disclosures, ad claim types, and nutrition knowledge levels. We use theories from the memory and information processing literature (e.g., Alba and Hutchinson 1987; Collins and Loftus 1975; Lynch and Srull 1982) to develop and test our hypotheses. Also, as is found in research on misleading advertising (cf. Burke et al. 1988; Johar 1995; Olson and Dover 1978; Pechmann 1996; Russo, Metcalf, and Stephens 1981), we address whether consumers misinterpret common nutrition claims in advertising. This focus is consistent with the Federal Trade Commission's (FTC) attempt to provide uniformity between the FDA labeling rules and its case-by-case approach of regulating claims in food advertising (Federal Trade Commission 1994). In this context, FTC Commissioner Roscoe Starek recently called for extrinsic evidence about exactly how consumers interpret favorable nutrient claims, especially for foods that contain high levels of other negative nutrients (e.g., fat, saturated fat, cholesterol, sodium) that are not disclosed in an advertisement (Starek 1993).

An understanding of nutrition ad claim effects is also highly relevant to marketers of food products. As consumers have become more health and nutrition conscious, the promotion of nutrition and health benefits as a primary message appeal has become more common (The Food Marketing In-

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stitute/*Prevention Magazine* 1995). Moreover, food marketers have sought a greater understanding of how consumers process such claims in advertisements and what specific advertising copy might result in gross misinterpretations by consumers (Colford 1994; Petruccelli 1996).

Because of these needs, the purpose of our study is to address four primary research questions: (1) To what extent will consumers generalize from (and potentially misinterpret) positive nutrient content claims in advertising, given an omission of an important negative nutrient? (2) What effect will different disclosure types have on consumers' nutrition-related generalizations and evaluations? (3) How will different ad claim types (e.g., general versus specific claims) affect nutrition generalizations and evaluations? and (4) What is the role of prior nutrition knowledge in the generalization and evaluation process?

## Theoretical Background and Hypotheses

### Generalizability Effects

Although a healthy skepticism of advertising in general continues (cf. Calfee and Ringold 1994), consumer generalizations and inferences beyond the attribute information provided in advertisements are common (e.g., Russo, Metcalf, and Stephens 1981; Shimp 1983). Such generalizations may result in ad-based beliefs that are invalid, incorrect, or deceptive (Johar 1995; Pechmann 1996). According to the FTC Deception Policy Statement (1983, pp. 4, 15), "the Commission will find deception if there is a representation, omission, or practice that is likely to mislead the consumer acting reasonably in the circumstances" and "the representation, omission, or practice must be material." Such representations may be conveyed by express and *implied* advertising claims (cf. *Kraft Inc.* 1991). For implied claims, the FTC examines the overall net impression of the advertisement from the perspective of consumers acting reasonably under the circumstances (e.g., a consumer in the target market). Deceptive inferences can occur from the omission of information (e.g., high sodium levels) that is needed to prevent a favorable representation (e.g., express and implied heart-healthy claims) from being misleading (*Campbell Soup Co.* 1992; *International Harvester Co.* 1984).

Activation theory offers a conceptual framework for how ad-based generalizations might occur (Collins and Loftus 1975). For example, links between concepts (e.g., nutrients, diet–disease relationships) in a memory network are a function of the strength or importance of each link between such concepts. When a concept is primed (e.g., by a "no cholesterol" claim), activation is spread by an expanding set of links in the network (e.g., inferences that the advertised brand is "low-fat" or "healthy" or "will not lead to heart disease"). However, this activation process is attenuated the further it travels outward in the network. Thus, generalizations about overall healthiness and nondisclosed, but related, attributes should be more likely to occur than generalizations for more tangential and ambiguous associations between product use and a lower risk of certain diseases (e.g., low-fat products and a reduced risk of cancer). Furthermore, studies of information-based inferencing between attributes have shown that inferencing processes are strengthened when a plausible or intuitive relationship exists between the attributes (Broniarczyk and Alba 1994). With nutrient content claims, consumers long have confused cholesterol and fat claims and their relationships (Levy, Fein, and Stephenson 1993). Therefore, we predict that

$H_1$: Consumers viewing favorable nutrient content claims (e.g., "no cholesterol," "healthy") will have more favorable evaluations of nonfeatured nutrient content (e.g., levels of fat, overall nutrition content) and disease risk (e.g., the risk of cancer, heart disease) than will consumers exposed to control advertisements (e.g., "delicious taste") for the same product.

### Ad Claim Type

Ad claim type (e.g., a general versus specific nutrient claim) is also important in the processing of nutrient content information. Although a variety of labels (e.g., general versus specific, subjective versus objective, evaluative versus factual, abstract versus concrete) has been used for roughly the same distinction (Shimp 1983), one common element of such distinctions is the extent to which the claim is verifiable (Darley and Smith 1993). For example, specific claims (e.g., "no cholesterol") are perceived as easier for consumers to verify than more general claims (e.g., "healthy") because they are not as susceptible to individual interpretation. As Darley and Smith (1993) note, the criterion of verifiability can be met, even though the consumer might not have the ability to verify the claims personally, as long as someone (e.g., FDA, FTC) perceives the claims as verifiable.

*Advertising research evidence.* In the study of factual versus evaluative ad content, one perspective is that evaluative claims (e.g., "Brand X is Better") are believable because of the multiple implications that often are drawn from such claims and tolerance of ad hyperbole (e.g., "puffery;" Shimp 1983). However, certain general and overused nutrition terms in advertisements, such as "oat bran" and "healthy," have drawn sharp criticism from both consumers and nutrition groups (Hurley and Schmidt 1992; Silverglade 1991). Such discounting by consumers can occur because of consumers' intuitive theories about the persuasive tactics used in advertising (Wright 1986).

*Economic and consumer behavior theory.* From economics of information theory (e.g., Ford, Smith, and Swasy 1990; Nelson 1974; Smith 1990), consumers tend to be more skeptical of experience-good (i.e., the product cannot be inspected prior to purchase) and subjective (e.g., "healthy") claims than they are of search-good and objective ("no cholesterol") claims. Similarly, Hoch and Ha (1986) find that when consumers are confronted with ambiguous evidence (e.g., a "healthy" claim), further information (e.g., advertising, experience) is needed to enhance perceptions of product quality. Therefore, we predict that

$H_2$: Consumers viewing the specific ad claim type (e.g. "no cholesterol") will have more favorable evaluations of nonfeatured nutrient content and disease risk than will consumers viewing the general ad claim type (e.g., "healthy").

### Ad Disclosure Information

*Disclosure processing effects.* The general purpose of footnoted disclosures in advertisements is to present information that will help prevent consumers from being misled or potentially deceived by other information included in (or omitted from) the advertisement (cf. Russo, Metcalf, and Stephens 1981; Wilkie 1985). However, the history of print ad disclosures in "curing" misleading advertising impressions is not good. For example, many deceptive advertising cases before the FTC, dating back to *Giant Food Inc.* (1962; see also *Kraft Inc.* 1991), show that small print disclosures often do not remedy misrepresentations found in advertising copy. However, if clearly and prominently displayed, there are three important reasons a footnoted disclosure might reduce the potentially misleading aspects of ad-based information. First, the disclosure provides relevant information that is directly accessible and encourages the retrieval of other information available in memory. Second, a footnoted disclosure is likely to be perceived as providing important, "diagnostic" information that should be included in ad-based beliefs (cf. Feldman and Lynch 1988). Third, disclosures that provide more detailed information broaden the cognitive frame of reference and lead to fewer inappropriate generalizations than those providing more restricted information. For example, for advertisements promoting a low nutrient level (e.g., "no cholesterol"), a limited disclaimer including only information on a related nutrient level (e.g., "contains 14 grams of total fat per serving") may not be as effective as disclaimers that provide a broader frame of reference (e.g., the per-serving level in the context of daily values or diet-related disease; *Federal Register* 1993).

*Types of disclosures.* In this study, we examine three specific footnoted nutrition disclosures and a control condition in which no disclosure is present. These disclosures are incremental in nature (i.e., they successively build on one another) and address issues similar to those found in the testing of different nutrition label formats (Levy, Fein, and Schucker 1996). The first disclosure is an *absolute disclosure* condition (see Table 1), which presents information on the absolute quantitative level of a nutrient when such a nutrient level is not mentioned in the advertisement's headline or copy (i.e., "contains 14 grams of total fat").[1] This disclosure type is consistent with current FDA packaging regulations. For example, when a favorable nutrition claim is made, omitted information about fat, saturated fat, cholesterol, or sodium must be disclosed if these nutrients occur at levels that increase the risk of diet-related disease (*Federal Register* 1993, p. 2411). This absolute condition is also in accord with the FTC's position on advocating qualifying information to prevent misleading inferences and beliefs about an advertised product (Federal Trade Commission 1994, p. 15).

The second type is a *relative disclosure*, which includes not only disclosure of the omitted nutrient level, but also information on the recommended daily value level and percentage of daily value of the nutrient contained in one serving of the product. This latter information is similar to that required on the Nutrition Facts Panel and, thus, provides more accessible information, which creates a broader, more accurate cognitive frame of reference. Consistent with

[1]The actual level of fat for the margarine brand used as the basis for the experimental advertisements in the study was 11 grams per serving. The 14 grams per-serving experimental level allowed for a "high fat" designation (>20% daily value) and was consistent with absolute levels for oils.

**TABLE 1**
**Disclosure Conditions and Study Design**

**A. Disclosure Conditions**

1. None (No-disclosure control condition)
2. Absolute: "Contains 14 grams of total fat per serving."
3. Relative

| | Amount of Total Fat | % of Recommended Daily Value |
|---|---|---|
| "Brand X" Spread | 14 grams | 22% |
| Recommended Daily Value | 65 grams | — |

4. Evaluative: "Contains 14 grams of total fat per serving, an amount determined by the Food and Drug Administration to be high. Eating a diet low in total fat may reduce the risk of some types of cancer."

**B. Study Design[a]**

| Ad Claim Type | Ad Disclosure Type: None (no-disclosure control) | Absolute | Relative | Evaluative |
|---|---|---|---|---|
| Control (no nutrient claim) | 1 | N/A | N/A | N/A |
| General nutrient claim | 2 | 3 | 4 | 5 |
| Specific nutrient claim | 6 | 7 | 8 | 9 |

[a]These cells represent a 3 (ad claim type) × 4 (ad disclosure type) unbalanced design, for which the control ad claim is not fully crossed with ad disclosure type. Cell 1 is used for comparisons with cells 2 and 6 for tests of $H_1$. Cells 2 and 6 are used for predictions in $H_2$. Predictions for $H_{3(a,b)}$ and $H_{4(a,b)}$ are tested using data from cells 2 through 9 and exclude responses from the nonnutrient control advertisement (cell 1).

a primary NLEA goal, this "accurate" cognitive frame should aid consumers in interpreting advertising copy information and forming nutrition beliefs (Burton, Biswas, and Netemeyer 1994; *Federal Register* 1993, pp. 2125–29; Rosch 1975).

The third disclosure is an *evaluative disclosure*, which specifies that the per-serving level of the disclosed nutrient is high according to FDA criteria. Previous research has found that consumers have difficulty using quantitative nutrition information in evaluating products (e.g., Jacoby, Chestnut, and Silberman 1977; Scammon 1977; Viswanathan 1994); this summary evaluation helps minimize such potential difficulty. Consistent with the model health statements in the food labeling regulations, this evaluative disclosure also offers information that links consumption levels of the nutrient to specific, health-related diseases (e.g., cancer). Linking the nutrient to a disease risk provides information that consumers should perceive as diagnostic, as well as a cue for retrieval of less accessible information in memory. Using this as a basis, we predict that

$H_{3a}$: Consumers viewing advertisements with disclosure statements will have less favorable evaluations of nonfeatured nutrition content and disease risk for an unhealthy product than will those viewing advertisements with no disclosure statements.

$H_{3b}$: Consumers viewing evaluative disclosure statements will have less favorable evaluations of nonfeatured nutrition content and disease risk for an unhealthy product than will those viewing absolute or relative disclosure statements.

### Nutritional Knowledge

Previous research suggests that, despite interest in nutrition information, consumers often lack the ability to use this information effectively (Daly 1976; Jacoby, Chestnut, and Silberman 1977; Moorman 1990). In fact, general consumer knowledge about negative nutrients, such as dietary fat and cholesterol, has been characterized recently as "poor" (Chase 1995; Levy, Fein, and Stephenson 1993). According to activation theory, nutrition knowledge levels might play an important role in how consumers process nutrition information in advertisements. For example, Brucks, Mitchell, and Staelin (1984, p. 19) find that more knowledgeable subjects use other criteria (e.g., experiences) rather than promoted nutrients in evaluating the nutritiousness of advertised brands. Also, prior knowledge might help consumers avoid accepting erroneous implications from product advertising (Shimp 1983).

More detailed information presented in a footnote to an advertisement requires consumers to expend greater effort to obtain and use the disclosed information. Because more knowledgeable consumers are capable and willing to process more information, detailed nutrition disclosures (e.g., relative and evaluative) are likely to be processed, comprehended, and used effectively by consumers with higher nutrition knowledge (Alba and Hutchinson 1987, p. 419). Conversely, those with lesser knowledge might not be able or willing to process or integrate fully such footnoted information in evaluations (Alba and Hutchinson 1987; Collins and Loftus 1975).[2] Therefore, we expect that

$H_{4a}$: Consumers with greater nutrition knowledge will have less favorable evaluations of the nonspecified nutrient content and disease risk for an unhealthy product than will those with less nutrition knowledge.

$H_{4b}$: The effect of disclosure information on nutrient content and disease risk evaluation is moderated by nutrition knowledge. Disclosures containing more information (i.e., relative and evaluative) will lead to less favorable evaluations of nonfeatured nutrient content and disease risk for an unhealthy product by consumers higher in nutrition knowledge than by those lower in knowledge.

## Methodology

### Pretests

Prior to the main study, three pretests were conducted. The purpose of the first pretest was to develop an objective measure of nutritional knowledge (the Nutrition Information Questionnaire; see the Appendix). This involved subjecting a pool of 64 items, drawn from previous nutrition research, to a series of tests using two expert judges (with doctorates in nutrition research) and then using samples of 19 graduate students in nutrition and 40 nonstudent adults. Through discriminant analysis, the resulting 12-item scale was shown to significantly separate the expert from the nonexpert samples and provided an overall coefficient alpha of .71. After we added three items specifically related to our study, 68 MBA and undergraduate students evaluated the final 15-item instrument. The coefficient alpha was .69, with a mean score of 6.66 correct (standard deviation [SD] = 2.93).

The objective of our second pretest was to evaluate the perceived nutritiousness of various product categories. Trained interviewers collected data from 54 primary food shoppers in the Midwest. Margarine was selected as the target product for the main study because of (1) its significant standardized score on a seven-point nutritiousness scale considerably below the overall mean for ten product categories and (2) recent public policy interest in the category (cf. *Conopco Inc.* 1997).

The purpose of our third pretest was to assess the ad claim and disclosure manipulations for the main study. The effects of ad disclosure and ad claim types on manipulation checks of ad claim specificity and evaluation of the disclosed nutrients were examined. Perceived information quality of the disclosures also was addressed. Results from a sample of 200 primary food shoppers from three regions of the United States indicated that the ad claim manipulation operated as intended, with the specific advertising copy perceived as significantly more specific, clear, and detailed

[2]A reviewer noted that more knowledgeable consumers might be more likely to benefit from simple, less informative (i.e., absolute) disclosures because of their ability to link such disclosures to other nutrition information in their memory. As is discussed in the text, however, our a priori prediction was that more knowledgeable consumers would be more likely than those with less knowledge to obtain, comprehend, and use information in more detailed disclosures, as we predict in $H_{4b}$.

than the general advertising copy. Also, because of the significant differences across the three disclosure conditions (i.e., absolute, relative, and evaluative; see Table 1) on information quality and disclosed fat content, all three disclosure levels were retained for use in the main study.

### Main Study

*Sample characteristics.* The sample for the main study consisted of 365 consumers who were primary food shoppers for their households and at least 18 years of age. The consumers were recruited and interviewed in three geographically dispersed mall locations across the United States (Boston, n = 124; Chicago, n = 122; Los Angeles, n = 119). Four age quotas were used to match U.S. Bureau of the Census (1994) projections for those 18 years of age or older. The resulting age quotas and sample percentages are as follows: 18–29 years, 26.3%; 30–40 years, 24.9%; 41–56 years, 25.2%; 57 years or older, 23.6%. After screening for the primary food shopper, 67.7% of the sample were women.

*Study design and independent variables.* A 3 (ad claim type) × 4 (disclosure type) between-subjects, unbalanced design was employed (see Table 1). Ad claim and disclosure type were manipulated experimentally within the margarine ad stimuli, and all the ad versions were displayed in full color. Consumer nutrition knowledge was measured as an independent variable for use in the analyses. Therefore, ad claim type, disclosure type, and nutrition knowledge represented the three independent variables in the study.

The ad claim type manipulation made use of either a general ("Here's a [margarine] that's Healthy for You") or a specific ("No Cholesterol–Zero") nutrition treatment headline. A nonnutrient control advertisement ("It's Delicious Eating"), described subsequently, served as a third treatment level for comparison with the general and specific ad claim types. The disclosure type manipulation consisted of the no-disclosure control and absolute, relative, and evaluative treatment levels, as are presented in Table 1. High and low nutrition knowledge levels were based on a median split of correct responses (at approximately six) from the summation of the 15-item Nutrition Information Questionnaire (see the Appendix).

*Control advertisements.* Research in deceptive advertising has used several types of control advertisements to account for preexisting beliefs and other noise factors inherent in advertising copy tests (cf. Andrews and Maronick 1995; Burke et al. 1988; Maronick 1991; Olson and Dover 1978; Russo, Metcalf, and Stephens 1981). For example, possibilities include (1) a purged or "tombstone" advertisement that is identical to the test advertisement but has the potentially misleading claim removed, (2) a different advertisement for the same brand that does not contain the claim in question, (3) a nonexposure control in which respondents are not shown an advertisement but are measured on the claim attribute in question, and (4) a "corrected ad" control in which the misleading statement is corrected through use of revised advertising copy or disclosures.

We applied two different types of controls in our study. The first, a control advertisement, used a nonnutrition headline (i.e., "It's Delicious Eating") and content that allowed assessment of the incremental impact of the specific and general nutrient claims on nutrition and disease risk beliefs to test $H_1$. This nonnutrient control advertisement used the different ad control format (#2 previous), in which an advertisement for the same brand, which does not contain the potentially misleading (nutrient) information, is used. If the nutrient claims contribute to misleading ad beliefs, the next question is whether certain disclosures help remedy this problem. The no-disclosure (control) condition (i.e., with only nutrient claims) serves as a tombstone control to study the incremental impact of each disclosure type, as is predicted in $H_3$. Alternatively, the advertisements with disclosures may be viewed as corrected advertisements (versus the no-disclosure control), in accounting for preexisting, erroneous beliefs (cf. "exploitive misleadingness;" Russo, Metcalf, and Stephens 1981, p.125).

*Dependent measures.* Following a series of screening questions, the questionnaire proceeded from general, open-ended questions on ad meaning to more directed questions on nutrient content and disease risk to attitudinal measures. The dependent measures of interest here include (1) nutrient content and disease-related measures and (2) general attitudinal measures.

Four key nutrient content and disease-related measures assessed whether the advertised margarine brand was perceived as (1) low/high in fat content and (2) healthy/unhealthy for you and whether the respondent agreed/disagreed that regularly using the advertised brand would contribute to the risk of developing (3) coronary heart disease and (4) some types of cancer. All four items were measured on seven-point scales. For example, respondents were asked, "Based on the (margarine) advertisement that you just read, do you consider the advertised (margarine brand) to be ...," with endpoints of "low in fat" (1) and "high in fat" (7). The two diet–disease links are based on the model health statement (*Federal Register*, 1993, p. 2801) and recent medical findings on total fat intake in diets (Chase 1995). For example, for coronary heart disease, the item read, "Regularly using the advertised (margarine brand) may contribute to the risk of developing coronary heart disease," with endpoints of "strongly disagree" (1) and "strongly agree" (7).

The attitudinal measures included items assessing claim believability, attitude toward the ad (Aad), brand attitudes, and purchase intentions. All measures were multi-item scales, except for purchase intentions. Coefficient alphas for the summated scales ranged from .89 to .96. Finally, two seven-point, Likert-type items were summed (correlation = .63) to measure respondents' motivation to process nutrition information for use as a potential covariate (Moorman 1990, p. 367). The second covariate, brand familiarity, was measured on a seven-point scale, with endpoints of "not very familiar" and "very familiar."

*Procedure.* Generally accepted procedures for advertising copy testing were followed in our study (cf. Andrews and Maronick 1995; Maronick 1991). Mall shoppers first were screened for food shopping status and age and invited to an interview facility in the mall, where they were as-

signed randomly to one of the ad conditions shown in Table 1. The study began with each respondent viewing the target advertisement, which was embedded in two (nonchanging) clutter advertisements in a booklet. When a respondent was finished, the booklet was removed and two general, short-term product and brand recall questions for the target advertisement were asked. If answered successfully, the respondent was asked an open-ended, cognitive response question.[3] Following this, the respondent was shown the target advertisement a second time, and then, the nutrient content, disease risk, attitudinal, and covariate measures were asked. Respondents finally completed demographic questions and the 15-item Nutrition Information Questionnaire.

## Results

### *Generalization Effects for Ad Claim Type*

In $H_1$, we predict that consumers viewing favorable nutrient content claims will have more favorable evaluations of nonfeatured nutrient content and disease risk than will those exposed to control ad claims. A set of ANOVAs was performed on the ad claim cells that did not contain disclosure information (i.e., cells 1, 2, and 6 in Table 1) to assess consumer generalizations on nonfeatured, nutrient-related attributes beyond the "delicious eating" control advertisement. One-tail t-tests are reported (in accordance with hypothesized predictions), and a Bonferroni adjustment is used when multiple contrasts are performed (Winer, Brown, and Michels 1991, p. 160).

An ANOVA across the three levels of ad claim type (i.e., specific, general, and control ad claims) indicates significant differences for fat content ($F(2,118) = 4.42$, $p < .02$) and healthiness ($F(2,118) = 6.04$, $p < .01$). Results are nonsignificant for heart disease ($F(2,118) = .23$, ns) and cancer ($F(2,118) = .50$, ns). As we show in Table 2, and in support of $H_1$, follow-up Bonferroni contrasts indicate that consumers who viewed a favorable nutrient content claim (i.e., "no cholesterol" or "healthy") had significantly more favorable evaluations of fat content ($t = 2.91$, $p < .01$) and healthiness ($t = 3.12$, $p < .01$) than did those exposed to the control advertisement ("delicious eating"). Also, separate Bonferroni tests for both the specific ("no cholesterol") and the general ("healthy") ad claim indicate that consumers had significantly more favorable evaluations of fat content (specific: $t = 2.58$, $p < .05$; general: $t = 2.25$, $p < .05$) and healthiness (specific: $t = 3.00$, $p < .01$; general: $t = 2.69$, $p < .01$)

[3]Cognitive response and probe data were collected. The results are consistent with the findings from the nutrition generalization data in the text.

**TABLE 2**
**Generalizability Effects for Ad Claim Types on Nutrient Content and Disease Risk Measures**

$H_1$: Pooled Ad Claims (with no disclosure) Versus Control Advertisement

| | Dependent Measures: Means and (SD)[b] | | | |
|---|---|---|---|---|
| **Comparison:** | **Fat Content** | **Healthy** | **Cancer** | **Heart** |
| Control advertisement ("taste") | 3.05<br>(1.96) | 2.85<br>(1.94) | 2.48<br>(1.80) | 2.75<br>(1.82) |
| Pooled ad claims[c]<br>("no cholesterol," "healthy") | 2.10[a]<br>(1.55) | 1.78[a]<br>(1.40) | 2.15<br>(1.64) | 2.53<br>(2.07) |

$H_2$: Specific Ad Claim (with no disclosure) Versus General Ad Claim (with no disclosure)

| | Dependent Measures: Means and (SD)[b] | | | |
|---|---|---|---|---|
| **Comparison:** | **Fat Content** | **Healthy** | **Cancer** | **Heart** |
| Specific advertisement ("no cholesterol") | 1.98<br>(1.76) | 1.73<br>(1.36) | 2.13<br>(1.45) | 2.45<br>(2.00) |
| General advertisement ("healthy") | 2.22<br>(1.31) | 1.83<br>(1.45) | 2.17<br>(1.82) | 2.61<br>(2.16) |

[a]Indicates significant (one-tail, $p < .05$) follow-up comparisons of the cell means for the pooled ad claims compared with the control advertisement. A Bonferroni adjustment is made, given the nonorthogonality of comparisons for the predictions in $H_1$ and $H_2$ (Winer, Brown, and Michels 1991, p. 160).

[b]*Fat content* is a seven-point scale ranging from 1 ("low in fat") to 7 ("high in fat") for the advertised margarine brand. *Healthy* is a seven-point scale ranging from 1 ("healthy for you") to 7 ("unhealthy for you") for the advertised margarine brand. Agreement with the link between regularly using the advertised margarine brand and the risk of *cancer*, and separately for coronary *heart disease*, are both scored from 1 ("strongly disagree") to 7 ("strongly agree").

[c]Follow-up Bonferroni comparisons were made between the specific ("no cholesterol") and the control advertisement and between the general ("healthy") and the control advertisement. Consumers exposed to the specific advertisement had significantly more favorable evaluations of fat content ($p < .05$) and healthiness ($p < .01$) than did those exposed to the control advertisement. Similarly, consumers exposed to the general advertisement had significantly more favorable evaluations of fat content ($p < .05$) and healthiness ($p < .01$) than did those exposed to the control advertisement.

than did those exposed to the control advertisement. Therefore, consumers exposed to either the "no cholesterol" specific ad claim or the "healthy" general ad claim (mistakenly) perceived the advertised margarine brand as significantly lower in fat and significantly more healthy than those exposed to the "delicious eating" control advertisement. However, the generalizations did not extend to specific disease risk measures (e.g., cancer, heart disease). These findings offer partial support for $H_1$.

In $H_2$, we posit that consumers viewing specific ad claims ("no cholesterol") will have more favorable evaluations of nonfeatured nutrient content and disease risk than will those viewing general ad claims ("healthy"). Follow-up Bonferroni contrasts were performed for the significant fat content and healthiness measures from the preceding ANOVAs. The results indicate that, though the means were in the predicted direction (see Table 2), significant differences did not occur between the specific and general ad claim conditions for fat content ($t = .71$, ns) or healthiness ($t = .33$, ns). Thus, the predictions in $H_2$ are not supported.

### Effects for Disclosure Type

*Tests of hypotheses.* Some evidence from tests of $H_1$ indicates that consumers generalized from (and misinterpreted) the positive nutrient content claims in the advertisements; $H_{3a}$ and $H_{3b}$ assess whether certain disclosure types can help remedy this problem. Analyses were conducted using data from cells 2 through 9 in Table 1 and excluding responses from the nonnutrition control advertisement (cell 1). Separate disclosure levels in Table 1 are combined as follows: no-disclosure control (cells 2 and 6), absolute disclosure (cells 3 and 7), relative disclosure (cells 4 and 8), and evaluative disclosure (cells 5 and 9). First, an ANOVA was performed to examine the effects of disclosure type, ad claim type (only specific and general ad claims), and nutrition knowledge on the nutrient content and disease-risk dependent variables. All two- and three-way interactions were nonsignificant. The disclosure type main effect indicated significant differences for fat content ($F(3,309) = 13.07$, $p < .01$), healthiness ($F(3,309) = 9.01$, $p < .01$), heart disease ($F(3,309) = 6.64$, $p < .01$), and cancer ($F(3,309) = 7.53$, $p < .01$). (We discuss main effects for nutrition knowledge subsequently.)[4]

In $H_{3a}$, we predict that consumers viewing advertisements with disclosures will have less favorable evaluations of nonfeatured nutrient content and disease risk for an unhealthy product than will those viewing advertisements without disclosures. Means and standard deviations for these predictions appear in Table 3. In support of $H_{3a}$, Bonferroni contrasts between a combination of the three disclosure types (i.e., absolute, relative, and evaluative) versus the no-disclosure control condition were significant for all dependent measures: fat content ($t = 6.39$, $p < .01$), healthiness ($t = 4.91$, $p < .01$), heart disease ($t = 1.97$, $p < .05$), and cancer ($t = 2.54$, $p < .05$). In summary, consumers viewing advertisements with a disclosure statement had significantly less favorable evaluations of all four dependent measures than did those viewing advertisements without a disclosure. Also, as is indicated in Table 3, separate tests (after Bonferroni adjustment) reveal significant differences from the no-disclosure control for the absolute (fat content: $t = 3.54$, $p < .01$; healthiness: $t = 3.06$, $p < .05$), the relative (fat content: $t = 3.41$, $p < .01$; healthiness: $t = 2.81$, $p < .05$), and the evaluative (fat content: $t = 6.11$, $p < .01$; healthiness: $t = 5.21$, $p < .01$; cancer: $t = 3.99$, $p < .01$; heart disease: $t = 3.48$, $p < .01$) disclosures.

In $H_{3b}$, we predict that consumers viewing advertisements with evaluative disclosures will have less favorable evaluations of nonfeatured nutrient content and disease risk for an unhealthy product than will those viewing advertisements with absolute or relative disclosures. Means and standard deviations for these predictions appear in Table 3. Consistent with the predictions in $H_{3b}$, Bonferroni contrasts showed that the evaluative disclosure led to significantly less favorable evaluations of fat content ($t = 2.63$, $p < .01$), healthiness ($t = 2.80$, $p < .01$), heart disease ($t = 3.48$, $p < .01$), and cancer ($t = 3.46$, $p < .01$) than a combination of the absolute and relative disclosure types. Also, no significant differences were found between the absolute and relative disclosure types.

*Disclosure comparisons with one another.* Although not hypothesized, further comparison of the disclosure means in Table 3 provides greater insight into differences between the three disclosures. For example, significant Bonferroni cell comparisons indicate that the evaluative disclosure led to significantly less favorable perceptions of heart disease ($t = 4.06$, $p < .01$) and cancer ($t = 3.88$, $p < .01$) than did the absolute disclosure. Interestingly, the relative ad disclosure (often used in food labeling and advertising) did not lead to significantly less favorable perceptions for the measures than the absolute disclosure. Also, the relative disclosure was significantly less effective ($t = 3.14$, $p < .01$) than was the evaluative disclosure in changing perceptions of fat content.

*Comparisons with the nonnutrient claim control advertisement.* Although not predicted, each of the six disclosure cells (i.e., absolute, relative, and evaluative for both general and specific ad claims; cells 3, 4, 5, 7, 8, and 9 in Table 1) also was compared with the nonnutrient claim control advertisement (cell 1 in Table 1). These comparisons provide helpful information regarding the relative impact of the disclosures versus prior consumer beliefs (from the control) with respect to the nonfeatured nutrient content and disease risk measures. All six Bonferroni comparisons between the disclosure cells and the control advertisement cell were nonsignificant, except for the evaluative disclosure in conjunction with the general ad claim (cell 5). Specifically, evaluations of fat content ($t = 2.78$, $p < .05$) and heart disease ($t = 3.20$, $p < .05$) were significantly more unfavorable than those of the control advertisement.

[4]As was suggested by a reviewer, an ANOVA that excluded nutrition knowledge was performed to examine the robustness of the disclosure type effects. This exclusion did not alter the significant main effect for disclosure type or any of the follow-up contrasts for the predictions in $H_{3a}$ and $H_{3b}$.

**TABLE 3**
**Generalizability Effects for Ad Disclosures on Nutrient Content and Disease Risk Measures**

$H_{3a}$: Pooled Ad Disclosures Versus No-Disclosure Control

| | Dependent Measures: Means and (SD) | | | |
|---|---|---|---|---|
| **Overall Comparison:** | **Fat Content** | **Healthy** | **Cancer** | **Heart** |
| No-disclosure control (ad claims only) | 2.10 (1.55) | 1.78 (1.40) | 2.15 (1.64) | 2.53 (2.07) |
| Pooled ad disclosures (absolute, relative, evaluative) | 3.54[a] (2.29) | 2.74[a] (1.88) | 2.71[a] (1.96) | 3.06[a] (2.11) |
| Individual Disclosures Versus Control: | | | | |
| Absolute: | 3.49[a] (2.30) | 2.52[a] (1.71) | 2.20 (1.60) | 2.45 (1.68) |
| Relative: | 3.01[a] (1.84) | 2.49[a] (1.79) | 2.59 (1.93) | 3.03 (2.20) |
| Evaluative: | 4.11[a] (2.54) | 3.21[a] (2.05) | 3.34[a] (2.15) | 3.71[a] (2.24) |

$H_{3b}$: Evaluative Disclosure Versus Absolute and Relative Disclosures

| | Dependent Measures: Means and (SD) | | | |
|---|---|---|---|---|
| **Comparison:** | **Fat Content** | **Healthy** | **Cancer** | **Heart** |
| Absolute and relative disclosures | 3.25 (2.09) | 2.51 (1.74) | 2.39 (1.77) | 2.74 (1.97) |
| Evaluative disclosure | 4.11[b] (2.54) | 3.21[b] (2.05) | 3.34[b] (2.15) | 3.71[b] (2.24) |

[a]Indicates significant (one-tail, $p < .05$) follow-up comparisons of disclosure cell means with the no-disclosure control. Bonferroni adjustments are made, given the nonorthogonality of comparisons for the predictions in $H_{3a}$ (Winer, Brown, and Michels 1991, p. 160).
[b]Indicates significant (one-tail, $p < .05$) follow-up comparisons of the evaluative disclosure with the combined absolute/relative disclosure. A Bonferroni adjustment is made, given the nonorthogonality of comparisons for the predictions in $H_{3b}$ (Winer, Brown, and Michels 1991, p. 160). No significant differences were found between the absolute and relative disclosures.

### *Nutrition Knowledge Effects*

In $H_{4a}$, we predict that consumers with higher levels of nutrition knowledge will have less favorable evaluations of nonfeatured nutrient and disease risk for an unhealthy product than will those with lower levels of nutrition knowledge. The ANOVA for the nutrition knowledge effects in $H_{4a}$ and $H_{4b}$ included cells 2 through 9 from Table 1 and excluded the control ad cell (cell 1). In partial support of $H_{4a}$, nutrition knowledge had a significant impact on the fat content variable ($F(1,309) = 4.50$, $p < .05$) but did not affect the healthiness ($F(1,309) = 1.65$, ns), heart disease ($F(1,309) = 1.96$, ns), or cancer ($F(1,309) = 3.84$, ns) measures. As we show in Table 4, consumers with high nutrition knowledge perceived the advertised brand as significantly higher in fat than did consumers with low nutrition knowledge ($t = 2.20$, $p < .05$). In the case of the absolute disclosure, high-knowledge consumers were able to use this information better in perceiving the advertised margarine as significantly lower in fat (high = 3.93; low = 2.97; $t = 1.91$; $p < .06$) and more likely to increase the risk of cancer (high = 2.52; low = 1.82; $t = 2.04$; $p < .05$) than low-knowledge consumers. However, support was not found for $H_{4b}$, in that overall disclosure effects were not moderated by nutrition knowledge (all $p >$ .05, ns). Rather, the disclosures had a significant effect regardless of knowledge level.[5]

## Other Results

*Covariance analysis.* Tests prior to ANCOVA indicated that familiarity was not significantly correlated with any of the four dependent variables and, therefore, would not affect

[5]As was recommended by a reviewer, knowledge was included as a covariate, and $H_1$–$H_{3b}$ were reexamined. The knowledge covariate did not affect tests of ad claim and disclosure type. Also, we conducted regression analyses using independent variables of knowledge (as a continuous variable), disclosure and ad claim type (as dummy variables), and interaction terms. Across the dependent variables, multicollinearity effects were evident (large standard errors and coefficient sign reversals). Thus, the ANOVA-based framework is preferred and used for the analyses. Also, as was suggested, we ran ANOVAs for claim type (three levels) and knowledge as independent variables. The two-way interactions were not significant for any of the dependent variables. However, claim type was significant for fat content and health ($p < .05$) but not for heart disease and cancer.

**TABLE 4**
**Generalizability Effects for Nutrition Knowledge on Nutrient Content and Disease Risk Measures**

$H_{4a}$: High Versus Low Nutrition Knowledge

| | Means and (SD) | | | |
|---|---|---|---|---|
| **Comparison:** | **Fat Content** | **Healthy** | **Cancer** | **Heart** |
| Low nutrition knowledge (LK) | 2.93[a] (2.02) | 2.39 (1.77) | 2.38 (1.64) | 2.78 (2.01) |
| High nutrition knowledge (HK) | 3.41[b] (2.32) | 2.69 (1.88) | 2.74 (1.94) | 3.04 (2.15) |

$H_{4b}$: Nutrition Knowledge by Ad Disclosure Levels[c]

| | Means and (SD) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Fat Content** | | **Healthy** | | **Cancer** | | **Heart** | |
| Disclosure Level: | LK | HK | LK | HK | LK | HK | LK | HK |
| None | 2.13 (1.49) | 2.06 (1.64) | 1.74 (1.34) | 1.83 (1.49) | 2.11 (1.52) | 2.20 (1.80) | 2.50 (1.98) | 2.57 (2.21) |
| Absolute | 2.97[a] (2.12) | 3.93[b] (2.38) | 2.21 (1.55) | 2.80 (1.81) | 1.82[a] (1.37) | 2.52[b] (1.72) | 2.24 (1.48) | 2.64 (1.83) |
| Relative | 2.74 (1.71) | 3.27 (1.94) | 2.31 (1.69) | 2.66 (1.88) | 2.31 (1.92) | 2.85 (1.92) | 2.85 (2.16) | 3.20 (2.25) |
| Evaluative | 3.84 (2.37) | 4.43 (2.73) | 3.20 (2.06) | 3.22 (2.06) | 3.20 (2.18) | 3.51 (2.13) | 3.47 (2.27) | 4.00 (2.20) |

[a, b]Indicates significant (one-tail, $p < .05$) follow-up comparisons of cell means between high- and low-nutrition knowledge consumers.
[c]The nutrition knowledge x disclosure interaction for the lower panel was nonsignificant. Main effects were found for disclosure type for all measures ($p < .05$) and for nutrition knowledge in the case of fat content ($p < .05$). Significant effects (one-tail, $p < .05$) between high- and low-nutrition knowledge consumers were found for those exposed to the absolute disclosure condition. Effects between high and low nutrition knowledge were not significant for all other disclosure levels and measures.

tests of the independent variables (Hair et al. 1995; Winer, Brown, and Michels 1991). In contrast, motivation to process was significantly correlated with fat content ($r = .12$, $p < .05$) and cancer ($r = .11$, $p < .05$). However, when motivation to process was included as a covariate in tests of $H_1$–$H_{4b}$, there was no effect on the previously reported tests for fat content. (Because initial analyses indicated an interaction between motivation and disclosure type for cancer, motivation was not included in the analysis for cancer.)

*Attitudinal effects.* We examined the effects of ad type, disclosure type, and nutrition knowledge on claim believability, Aad, brand attitude, and purchase intention. ANOVA results show that disclosure type had a significant effect ($p < .05$) on all four dependent measures. The evaluative disclosure resulted in lower claim believability, less favorable ad and brand attitudes, and lower purchase intentions versus the no-disclosure control. ANOVA tests for ad claim type were significant ($p < .01$) for claim believability, Aad, and brand attitude. The specific ad claim led to greater claim believability and more favorable ad and brand attitudes than did the general claim.

# Conclusions and Implications

## *Study Conclusions*

The purpose of our study is to (1) provide a better understanding of how consumers might misinterpret (i.e., overgeneralize) common nutrient content claims in advertising and (2) examine the influence of a variety of ad disclosures, ad claim types, and nutrition knowledge on such nutrition generalizations and ad beliefs. Our research relies on tenets of several theoretical frameworks (e.g., activation theory, Collins and Loftus 1975; information availability and accessibility, Lynch and Srull 1982) to help develop and test study hypotheses.

In support of $H_1$, consumers did overgeneralize from specific ("no cholesterol") and general ("healthy") nutrient content claims for margarine, in comparison with the nonnutrient control advertisement. However, these generalizations were limited to nonfeatured nutrient content (e.g., fat content and overall healthiness) and did not extend to evaluations of specific disease risks (e.g., cancer and heart disease). These results are consistent with the tenets of

spreading activation theory (Collins and Loftus 1975), in that consumers are more likely to access other, related nutrient concepts first when they are exposed to the favorable nutrient content claims, rather than more peripheral, and less accessible, disease-related concepts.

We do not find support for ad claim type effects predicted in $H_2$. Although the means are in the predicted direction (see Table 2), the specific ad claim did not lead to significantly more favorable evaluations of nonfeatured nutrient content and disease risk than the general ad claim. An inspection of the cell means in Table 2 indicates that a floor effect may have been operating. For example, whereas the fat content measure ranged from 1 ("low in fat") to 7 ("high in fat," which the margarine would be at 14 grams of fat per serving), the specific and general ad claim means were only 1.98 and 2.22, respectively. The realistic context of both the specific and general nutrient content claims in the advertisements may have contributed to the strong misperceptions for both claims. Alternatively, and based on Shimp's (1983) work, multiple interpretations of the general ad claim in the context of the margarine advertisement may have contributed to the favorable evaluations of nonfeatured nutrient content and disease risk levels.

Our study offers evidence for the effectiveness of different disclosure types in conveying important information about omitted nutrient levels. In support of $H_{3a}$, the disclosures were effective (versus the no-disclosure control) in reducing favorable (and misleading) nutrient content generalizations (e.g., "low-fat," "healthy"). Moreover, the disclosures led to significantly less favorable evaluations of disease risk (i.e., regular product use being more likely to contribute to the risk of cancer and heart disease) than the no-disclosure control. This effect is driven primarily by the evaluative disclosure, the only disclosure to specifically mention disease risk. Also, in support of $H_{3b}$, the evaluative disclosure was more effective than the absolute and relative disclosures in reducing favorable generalizations for both nutrient content and disease-related measures.

In this sense, disclosures can serve entirely different purposes in the evaluation of omitted nutrient levels. For example, though our third pretest showed that the relative disclosure was perceived by consumers as being strong in information quality and accessibility (through its boxed format and recommended daily values), it nonetheless did not convey the relatively high levels of fat as effectively as the evaluative disclosure. Also, as is found in previous research (Burton, Biswas, and Netemeyer 1994; Levy, Fein, and Stephenson 1993; Viswanathan 1994), consumers have difficulty interpreting absolute nutrient levels that are displayed numerically in disclosures. As Jacoby, Chestnut, and Silberman (1977) argue, there is a marked difference between information provision and information use by the consumer. In the evaluative disclosure, though evaluative information and disease relationships are helpful in conveying the nutrient levels of the omitted attributes, the perceived levels for dependent variables remain relatively favorable (i.e., almost all are below the scale midpoint of 4, except for fat content; see Table 3), which indicates that some nutritional education also might be helpful. Even with initial public service announcements by the FDA encouraging consumers to use the Nutrition Facts label (Burros 1994), and package and pamphlet information from food manufacturers, additional efforts on behalf of federal agencies, food manufacturers, and educational institutions may be needed to enhance consumer understanding and use of nutrient information and claims. Recent FTC consent agreements in misleading advertising cases have specified triggered disclosures of fat content when cholesterol claims are made, including both absolute and some evaluative disclosure information (e.g., absolute levels of fat grams *and* either the percentage of calories from fat or a statement that it is not a low-fat food; see *Conopco Inc.* 1997).

We find mixed effects for consumer nutrition knowledge. Although nutrition knowledge has a significant impact on the fat content variable (offering partial support of $H_{4a}$), effects of disclosure information are not moderated by nutrition knowledge ($H_{4b}$ is not supported). Yet, significant differences occur between nutrition knowledge levels in the case of the absolute disclosure for fat content and cancer, which indicates that high-knowledge consumers are able to interpret the absolute information somewhat better than are low-knowledge consumers. However, across all disclosure levels, the disclosures have significant effects, regardless of knowledge levels.

### *Implications for Public Policy*

As we predict in $H_1$, some misleading generalizations about nondisclosed nutrients and overall healthiness are found in this study. The FTC has advocated providing adequate disclosures to correct such misperceptions (Federal Trade Commission 1994, p. 16; Starek 1993). Our research suggests that when disclosures are displayed clearly and prominently, they can be important tools in qualifying misleading impressions from nutrient content claims. This is especially true in the case of the evaluative disclosure, in which the omitted nutrient's absolute per-serving level, its evaluative classification by the FDA (e.g., "high"), and the linkage between a low consumption of the nutrient and disease reduction benefits (e.g., low-fat diet–cancer reduction) are all disclosed. Conveying the specific nutrient–disease reduction relationship is consistent with aspects of the FDA's model health statements (cf. *Federal Register* 1993, p. 2677), represents a potentially important "cue to action" in health belief models (Janz and Becker 1984), and is likely to aid in consumer awareness of such nutrient–disease reduction relationships. However, trade-offs inherent in the evaluative disclosure affecting the information flow to consumers should be considered (cf. Mazis et al. 1981; Russo and Leclerc 1991). For example, the use of corrective disclosures is often difficult in practice because of the possibility of affecting other, nonmisleading consumer beliefs and becoming punitive in nature (Wilkie, McNeil, and Mazis 1984).

Although the nutrition claims resulted in misleading generalizations about the fat level and overall healthiness, misleading generalizations about increased risk of cancer and heart disease did not occur. We believe these latter generalizations were not evident because of low overall con-

sumer knowledge and/or low accessibility of information in memory that pertains to such nutrient–disease risk relationships. However, as is suggested by the pattern of means in Table 3, the evaluative disclosure helps inform consumers of these relationships and, subsequently, affects the dependent measures of cancer and heart disease. Therefore, advertisements using nutrient claims such as "no cholesterol" (when the product is high in fat) may be "exploitively misleading" because they capitalize on consumers' lack of knowledge about such nutrient–disease relationships (cf. Russo, Metcalf, and Stephens 1981, p. 125). An alternative view is that the evaluative disclosure is "correcting" heart and cancer beliefs that are not influenced directly by the advertisements themselves, and therefore, the advertiser should not be held responsible for informing the public about such nutrition knowledge issues. However, we believe that, given evidence of misleading fat content and healthiness beliefs, requiring triggered disclosures on important nutrient–disease relationships could help promote more informed consumer choices and, thus, increase consumer welfare. This view is consistent with the FDA's model health statement information (*Federal Register* 1993, p. 2801; Levy, Derby, and Roe 1997).

Our findings (in Pretest 3 and Table 3) also imply that the continued use of elements contained in the relative disclosure (i.e., per-serving levels disclosed with recommended maximum daily values; see also *Campbell Soup Co.* 1992) to correct for potentially misleading omissions might be reconsidered. The reasoning is that absolute (high) nutrient levels (e.g., "14 grams of total fat") can be perceived by consumers as "not that bad" when framed in conjunction with the overall recommended daily values (e.g., "65 grams of total fat"). Also, as our results show, the absolute disclosure (e.g., 14 grams of fat per serving) might not be as effective for those with lower levels of nutrition knowledge. Recently, the FTC has advocated the use of more "evaluative" triggered disclosures in consent agreements (e.g., "this is not a low-fat food;" *Conopco Inc.* 1997).

### *Limitations and Further Research*

Although we obtained a geographically diverse sample of primary food shoppers, consistent with the U.S. population, and used realistic stimuli and experienced interviewers, the generalizability of the results may be restricted by factors common to ad copy tests. For example, the ad and disclosure stimuli appeared in print format, and effects might not extend to other media choices (e.g., television, the Internet). Specific copy headlines, disclosures, and product classes were used, and changes in the specific levels of the independent variables might yield different conclusions. For example, for margarine, our disclosures had an effect, regardless of ad type and nutrition knowledge. Thus, in the case of foods perceived as less nutritious (e.g., margarine), consumers might readily understand and accept the nutritional shortcomings conveyed to them. This might not occur with nutritional deficits for foods perceived as relatively nutritious, for which disclosure effects might depend on other factors, such as nutritional knowledge and/or motivation to process nutrition information.

Future work on ability to process factors other than nutrition knowledge (e.g., comprehensibility, repetition, wearout) is warranted (cf. Petty and Cacioppo 1986). For example, research on enhancing consumer ability to process and understand quantitative nutrient information might help reduce the need for evaluative-type disclosures. In addition, other consumer classification variables and contexts (e.g., buying for others in the household, product usage rates, dining away from home, frequency of reading nutrition information) might affect consumer scrutiny and the effects associated with nutrition ad claims and disclosures. Also, the relationships among the nutrition knowledge measure, awareness of diet–disease relationships, and other nutrient belief and attitudinal variables across demographic segments could be examined. No doubt, other disclosure formats and content, as well as alternative nutrient content claims (e.g., relative claims) and visual depictions, could contribute to our understanding of how consumers process nutrition ad claims and disclosures. Finally, given the importance of the FTC's Enforcement Policy Statement on Food Advertising (1994), a similar investigation of generalizations for implied health claims, other related nutrient content descriptors (e.g., fat/calorie claims), and dietary supplement claims could serve to enhance our knowledge in this field.

## APPENDIX[1]
## Nutrition Information Questionnaire

1. Saturated fats are usually found in: **% Correct**
   1 Vegetables and vegetable oils
   **2 Animal products like meat and dairy** 80.7%
   3 Grain products such as bread and cereal
   4 None of the above
   5 Don't know

2. Which kind of fat is more likely to be a liquid rather than a solid?
   1 Saturated fats
   **2 Polyunsaturated fats** 42.0%
   3 They are equally likely to be liquids
   4 None of the above
   5 Don't know

3. Which kind of fat is more likely to raise people's blood cholesterol level?
   **1 Saturated fats** 68.8%
   2 Polyunsaturated fats
   3 Both of them
   4 None of the above
   5 Don't know

4. Which kind of fat is higher in calories?
   1 Saturated fats
   2 Polyunsaturated fats
   **3 They are both the same** 27.6%
   4 None of the above
   5 Don't know

| | % Correct |
|---|---|
| 5. If you eat 2000 calories a day, your daily *saturated fat* intake should be less than how many grams? | |
| 1 **20** | 23.4% |
| 2 25 | |
| 3 30 | |
| 4 35 | |
| 5 Don't know | |
| 6. Nutrition guidelines suggest that no more than _____ percent of the calories consumed in a day should come from *fat.* | |
| 1 10% | |
| 2 20% | |
| 3 **30%** | 23.1% |
| 4 40% | |
| 5 Don't know | |
| 7. Risk of high blood pressure is most likely to be reduced by eating a diet with: | |
| 1 Less sugar | |
| 2 More iron | |
| 3 More fiber | |
| 4 **Less salt** | 81.8% |
| 5 Don't know | |
| 8. A gram of fat provides about _____ as many calories as a gram of protein. | |
| 1 One-half | |
| 2 **Twice** | 24.4% |
| 3 Four times | |
| 4 Six times | |
| 5 Don't know | |
| 9. Vegetables, fruits, and grain products provide: | |
| 1 Complex carbohydrates | |
| 2 Dietary fiber | |
| 3 **Both complex carbohydrates and dietary fiber** | 64.8% |
| 4 Neither complex carbohydrates or dietary fiber | |
| 5 Don't know | |
| 10. Which food group provides protein, B vitamins, iron, and zinc? | |
| 1 **Meat, poultry and fish** | 53.2% |
| 2 Milk and dairy products | |
| 3 Fruits | |
| 4 Grain products such as bread, cereal, and rice | |
| 5 Don't know | |
| 11. Nutrition guidelines suggest that no more than _____ percent of the calories consumed in a day should come from *saturated fat.* | |
| 1 1% | |
| 2 **10%** | 33.8% |
| 3 20% | |
| 4 30% | |
| 5 Don't know | |
| 12. Is cholesterol found in: | |
| 1 Vegetables and vegetable oils | |
| 2 **Animal products like meat and dairy** | 43.4% |
| 3 All foods containing fat or oil | |
| 4 None of the above | |
| 5 Don't know | |
| 13. If you eat 2000 calories a day, your daily *sodium* intake should be less than how many milligrams? | |
| 1 500 | |
| 2 **2400** | 21.3% |
| 3 4300 | |
| 4 6000 | |
| 5 Don't know | |
| 14. Normal blood pressure in adults is systolic less than and diastolic less than . | |
| 1 **140 mm Hg, 85 mm Hg** | 58.4% |
| 2 180 mm Hg, 95 mm Hg | |
| 3 105 mm Hg, 95 mm Hg | |
| 4 200 mm Hg, 110 mm Hg | |
| 5 Don't know | |
| 15. Based on a 2000 calorie diet, per serving sodium levels are considered *high* when they exceed . | |
| 1 140 mg | |
| 2 **480 mg** | 18.9% |
| 3 620 mg | |
| 4 2400 mg | |
| 5 Don't know | |

[1]The correct response for each question is marked in bold. Original items were drawn from previous nutrition research (Burton, Biswas, and Netemeyer 1994; Levy, Fein, and Stephenson 1993; Moorman 1990), nutrition organizations (Center for Science in the Public Interest; American Heart Association), and industry (ConAgra) materials.

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