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An Ostrich or a Leopard – Communication Response Strategies to Post-Exposure of Negative Information about Health Hazards in Foods

by

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Abstract

  The effect of negative information on consumer product evaluations has been studied heavily in the context purchase intentions and other preference-related measures. In this study, we examine the context (negative health hazard information on meat commodities), direction (positive and negative), and intensity (low and high) of information on consumer choice processes. We draw from the literature on Bayesian updating, choice processes and heuristics, as well as cognitive and information processing to propose a set of hypotheses and empirically test them using survey data. Our results indicate that under low intensity, information consumers tend to employ a non-compensatory type choice process with the health aspects of the product being non-salient. In the case of high-intensity negative information, consumers employ a compensatory choice process and consider the health dimension of the product. These results are mainly attributed to variations in the allocation of consumer cognitive resources in the decision-making process as a result of the different types of information, changing it from peripheral to central, and affecting the decision strategy and choices. The results may provide insight into how to design better marketing and media strategies in response to unfavorable information about health hazards.

Key words: negative information, choice process, health hazards

Introduction

"Everything that generates pleasure is either immoral or unhealthy," "If it tastes good it is not good for you," "Eat to live or live to eat" are three examples of sayings that reflect the popular perception that pleasure and punishment go hand in hand when it comes to many food products. Some consumers prefer to reap the immediate reward of taste and pay the price later, in deteriorating health and appearance, while others adopt a more strategic approach aimed at building their health stock (Roininen, 2001). Day-to-day purchases are made without re-examining this painful tradeoff before buying or eating (Chapman, 2005). However, when buyers are exposed to new information about the effect of consumption on health, the status quo may change, and buyers are then forced to go through the difficult task of choosing between taste and health.

Tybout, Calder and Sternthal (1981) who were inspired by the "McDonald's and the red worms" scandal (see http://en.wikipedia.org/wiki/McDonald%27s_urban_legends for details), used information processing theory to explain consumer reaction to rumors and their denial. Previous studies that explored various aspects of negative information regarding health hazards on consumer behavior were primarily concerned with the effect of negative information on attitude and purchase intention (Viscusi and O'Connor, 1984; Zuckerman and Chiaken, 1998; Wansink, 2005). There is, however, a paucity of literature investigating how such negative information affects consumer choice process. Furthermore, most of the studies considered a single product in the evaluation process, while most real-life situations involve evaluation of various alternatives in a choice set.

In this study we aim at filling the void in the literature in this area by addressing

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these issues. We study how information on health hazards changes individual decision-processes in a choice context of multiple alternatives and the derived choice procedure. The effect of different constructs of information on choice process is tested by comparing the effects of positive, mild negative and aggressive negative media messages about health hazards on consumers' choice process. This study, therefore, provides insights into designing media response strategies to health crises.

Marketer responses to unfavorable publicity about health hazards in foods can follow one of two strategies: (a) ignore the health attribute and choose an emotional advertising strategy, which will be termed the ostrich strategy, or (b) attack the health issue head-on, in an attempt to sell the idea that the devil is not as frightening as he has been portrayed. This strategy will be termed the leopard strategy.

The research of Tybout, Calder and Sternthal (1981) indicates that individuals who had been exposed to information that undermined the purity of the food (the hamburger patties) formed strong beliefs. These strong and unfavorable beliefs (termed prior beliefs) caused new, contradictory information to be interpreted as unfavorable. Applying the results of their study, which analyzed the primacy effect generated by rumors, to a more general case implies that whenever there is a possible devaluation of the health attribute, the ostrich strategy should be adopted. Integrating this strategy with the failure-recovery literature (Smith, Bolton and Wagner, 1999) implies that the firm must take responsibility, apologize and then rebuild its image using the indirect approach, i.e., avoiding confrontation with the health issue.

Nevertheless, McDonald's, Jack in the Box and many other fast-food chains do not

follow these implied recommendations, choosing instead the direct leopard strategy as a response to negative information on health hazards attributed to the consumption of their foods.

In this study we chose to learn how different types of information affect consumer choice processes rather than the more common research approach that explores the effect of negative information on consumer attitudes, perceptions, evaluations and behavioral intentions. Specifically, we examine the changes in the saliency and structure of product dimensions in a choice process as a function of different information types: positive (i.e., improvement in health qualities), mild negative (i.e., decrease in health qualities), and aggressive negative (i.e., significant decrease in health qualities). We draw from the rich literature on information integration and updating, and choice processes to propose a set of hypotheses concerning involvement and choice processes. Manipulation of the intensity of the negative messages affected involvement and enabled us to test these hypotheses.

We also develop managerial implications that suggest guidelines for designing marketing and communication strategies when consumers are exposed to negative information about possible health hazards resulting from eating a particular food.

Our main findings indicate that consumers will adopt different choice processes given various types of information. Our hypotheses postulate that for repeat purchase commodities such as meat, consumers are very familiar with the product and will not engage in a high cognitive effort in the choice process. Consequently, they will employ a non-compensatory choice process with taste as the salient attribute. Our empirical study

supports this hypothesis. When exposed to low-intensity information (positive and negative), we postulate that consumers will not change their decision process, and it will still be a non-compensatory type with taste as the salient attribute. These set of hypotheses were partially supported. When consumers were exposed to the high-intensity negative information, they engaged in a high cognitive effort decision-making process and employed a non-compensatory process with the health dimension becoming salient.

Anecdotal Evidence

Over the past decade, McDonald's alone has been exposed to so much negative publicity about health hazards resulting from consumption of its food that it could publish a complete textbook on health-crisis management. Two of the most prominent cases have been the "Mad Cow" crisis and the "Super-Size Me" crisis. Both the Mad Cow case and the implied relationship between the food served at McDonald's branches and obesity are characterized by their permanent nature; however, they differ in who is to be blamed. In both cases, McDonald's targeted its campaign directly at the health attribute in question.

In the early '80s, researchers found that several deaths that had been caused by damage to the brain were associated with eating beef from cows that had been fed food containing animal residuals. European consumer reaction was harsh. The Bavarian Cooperative of Beef Growers (BCBG) in Germany reported a 20% decline in the demand for beef. Prior to their advertising campaign, McDonald's European center revenues declined by 10% (*The Wall Street Journal* 2003). In the UK, and even more dramatically in France, the panic was so severe that McDonald's had to take the beef hamburgers off its menu (*Advertising Age*, 1996).

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McDonald's outside the US and BCBG adopted the leopard advertising strategy and focused on measures aimed at guaranteeing a supply of meat free of Mad Cow disease. In Europe, the campaign message was "no offal, brain or spinal cords" (internal parts that are suspected to have the potency to infect the consumer; *The Wall Street Journal*, 2003). In Japan, the campaign promised that McDonald's products were made of beef imported from Australia, where no incidence of Mad Cow had been discovered (*The New York Times*, 2001).

The BCBG handled the Mad Cow BSE (Bovine Spongiform Encephalopathy) crisis by focusing on the high standards of beef grown in Bavaria, implying that it was BSE-safe, and spent about $2.4 million on TV advertisements to that effect. The campaign succeeded in reducing the decline in sales by 4.6%. The overall decline in sales, however, which was attributed to the exposure to BSE, was still estimated to be 15.3% in revenue (Herrmann et al., 2002).

In a different type of negative publicity, the Super-Size Me crisis, McDonald's new strategy has included promoting new items that may be perceived as healthier, thereby satisfying consumer desire to find healthier fast-food items, and preaching the adoption of a healthy lifestyle. As part of this campaign, McDonald's added new salads, low-fat sandwiches, and in a dramatic change, enabled consumers to replace the french fries in Happy Meals with bowls of fruit salad. Furthermore, McDonald's signed with Bob Green the personal trainer of Oprah Winfrey to promote her "Go Active" chicken meal which came with exercise tips (*The Economist, 2003*). Thus, in both crises, McDonald's and the BCBG chose the direct approach, focusing on the health attribute

and therefore challenging Tybout et al.'s (1981) implied strategy.

Theoretical Background

The "McDonald's and the red worms" anecdote implied that denial of rumors may strengthen unfavorable feelings instead of correcting them (Green, 1978, as quoted by Tybout et al., 1981). The latter authors showed that information about health hazards has such a strong impact that it overrides prior beliefs. The manipulated information generates a contingency effect, which causes information that denies prior information to strengthen the negative valuation of the product. In the "McDonald's and the red worms" incident, the recovery strategy was aimed at strengthening the association between McDonald's and high-level comfort food. This strategy, of speaking as little as possible about the impurity or health hazard and trying to minimize the damage by strengthening other benefits, indirectly suggests that consumers use a compensatory choice process.

The study conducted by Tybout et al. (1981) is clearly related to information integration and information updating frameworks since it analyzes judgments that are based on belief updating. New information and its direction (i.e., positive or negative) relative to previously held beliefs (i.e., confirming or contradicting) is heavily studied in the context of Bayesian framework (Plach, 1999).

The current paper studies the effect of different types of information on consumer choice processes and their belief updating. We add to Tybout et al. (1981) paper by providing insight about the possible changes in the choice process in light of consumer exposure to positive and negative information. Furthermore, we examine this exposure in

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the context of a competitive environment where consumers can choose from a set of alternative products.

In commodities that are frequently purchased, such as food in general, and meat products in particular, consumers are generally familiar with the products' characteristics and will minimize the cognitive effort in choosing a specific product (Brock and Brannon, 1992). Low cognitive efforts indicate that the choice of one product over the other has low importance for consumers, indicating that the products are hardly differentiated. This is the case with food commodities (Beharrell and Denison, 1991). An alternative explanation to the low cognitive effort in the choice process is the level of confidence consumers have in the choice in hand. The higher the confidence level, the lower the cognitive effort. Low cognitive efforts increase the likelihood that peripheral processing (Petty and Cacioppo, 1986), or the parallel concept of heuristic processing (Chaiken, Liberman and Eagly, 1989), will take place. The Elaboration Likelihood Model (ELM; Petty and Cacioppo, 1986) suggests that peripheral processing may result in biased interpretation. The Heuristic-Systematic Model (HSM; Chaiken et al. 1989) suggests that non-systematic processing and judgment according to impression which characterizes a decision of low importance will also result in a biased interpretation. This might explain why products that are supposed to be evaluated by quality cues, such as orange juice, are being judged by the brand and not nutritional values, which are accessible but require investment of cognitive efforts (Zeithaml, 1988).

The greater the importance of the decision to the consumers, the higher the likelihood they will adopt a systematic choice process. Systematic choice process

requires high cognitive effort as it involves collecting and integrating of information on different attributes, which may differ in their quantities, valuating the importance of the different attributes, and adopting a choice rule. Multi-attribute choice processes based on the sum or weighted sum of attribute ratings are considered to yield a good prediction to the choice task (Lynch, 1985). Sum, weighted sum, or more complex rules that include threshold levels for some attributes require intensive investment of cognitive efforts. In low-involvement choice tasks, therefore, consumers will try to reduce the cognitive load by adopting a heuristic rule. Low-intensity processing, for example, will most likely be carried out according to a single and the most important attribute, e.g., a lexicographic process (see Bettman, Luce and Payne, 1998 for an extensive review). Based on the above discussion, we come up with our first hypothesis:

H1: With no new information, the choice of repeatedly purchased food commodities will be non-compensatory and nonselective, i.e., it will be based on comparing all products across one attribute.

The rational choice literature would suggest that health considerations will dominate taste attributes and thus, if a lexicographic-type choice model can characterize consumer behavior, the choice process will be based only the health aspect. Empirical evidence based on large surveys, however, has shown that consumers clearly prefer taste to health in the UK, US and Sweden. Only in Finland was health the most important attribute in such scenarios (see Roininen, 2001 for extensive review on these surveys). The exact explanation of the preference for taste over health is not the objective of our study. We choose, however, to quote Mary Ann Chapman who wrote in her article, "Bad

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Choices," that "Most of the bad choices we make in our lives involve an immediate reward…we often choose to live now even though we're likely to end up paying the price later" (Chapman, 2005). There are many other explanations for this phenomenon, such as the high cost of a healthy diet, cultural effects, social norms, and the fact that 1) changes in health conditions resulting from eating a certain food are less observable than taste, which has an immediate impact on pleasure, and 2) health is less accessible than taste. Nowlis and Simonson (1997), for example, suggested that attributes that are more accessible are given higher weights in consumer considerations. We therefore postulate that taste is more accessible than health, and propose the following hypothesis:

> **H2**: In choices of food commodities, if the decision rule is non-compensatory the choice between alternatives is based on the taste attribute

Chicken meat is perceived to be healthy and tasty. Only beef is perceived to be tastier, but it is also considered far less healthy (Heiman et al., 2001) Meat, in general, is a frequently purchased undifferentiated commodity and its actual purchases are made with low cognitive effort (Wansink, 2005; Brock and Brannon, 1992). Now suppose that the consumer receives or is exposed to, new information about possible health hazards associated with the consumption of a meat product that previously had been considered to be healthy. Integration of the new and unfavorable information and previous favorable beliefs is supposed to reduce the evaluation of the product. As Tybout et al. argue, "Because these thoughts are less positive than those that could have been retrieved in the absence of the rumor" (p. 74). The integration of information is supposed to follow the

Bayesian framework. The belief that individuals are updating their knowledge in a Bayesian manner is so heavily grounded in the literature, that in many cases any deviation from the Bayes rule is considered to be an inconsistency attributed to heuristic choice process (Hertwig and Todd, 2000). In addition to its theoretical validity, the Bayesian updating mechanism gained popularity due to its mathematical tractability (Erdem et al., 1999). The Bayesian framework has become a normative baseline to which other judgments are compared, and much of the research on judgment has focused on the deviations from this normative baseline. If individuals follow the Bayesian updating theorem, then given new information they are expected to change their evaluation, attitude and beliefs of a product according to the context of the information. Thus, it is assumed that individuals adjust their ratings on the health attribute, and their choices are supposed to change accordingly. The magnitude of the change depends on the relative strength of the prior beliefs and the new information (base and case, respectively).

However, metastudies on information and its utilization concluded unequivocally that consumers are miscalibrating information (Alba and Huchinson, 2000). Miscalibration is caused, among other reasons, by memory failures and misweighting of evidence that are attributed to base rate, incomplete generation and assessment of information (Alba and Huchinson, 2000). Miscalibration take the form of overweighting or underweighting the case (Ofir, 1988; Hertwig and Todd, 2000)

Biases in probability judgments take the form of either overweighting the base and underweighting the case or vice versa (i.e., overweighting the case and underweighting the base). Reasoning the phenomenon of overweighting priors, which

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was termed "conservatism", inspired many studies until the early 1970s when Kahneman and Tversky (1972) argued that individuals overweight new information. Such overweighting, termed "base rate neglect", became a popular research area in the 1970s and 1980s, and many such studies focused on exploring decision heuristics that cause probability judgment biases. Kahneman and Tversky (1972) explained that base rate neglect through an individual's perception that the new information more accurately represents the situation they are required to judge. They termed this bias of judgment as the representativeness heuristic. If, in contrast, the new information is perceived to be unreliable, the base is given a higher weight. Bar Hillel (1980) found that the weight of the base (e.g., average proportion) increases as its relevance increases (causality), and the weight of the case (new information) is lower if its relevance is perceived to be low. Lynch and Ofir (1989) showed that weights given by individuals to the case and the base are a function of the relative magnitude of the base and the case. That is, high probability of case causes the base to be overweighed and vice versa. Tolcott, Marvin and Lehner (1989) showed that individuals, generally weight the more recent information more heavily, but in ambiguous information situations, the first impression has a lasting effect.

Strong prior beliefs and moderately contradicting new information is the classical background for conservatism, i.e., ignoring the new information.

Wansink (2005) argued that since food choices are made with very little mental effort, individuals pay very little attention to food labeling, although it contains vital information. For most food products, prior perceptions are that they are healthy, and thus processing the disconfirming information found on warning labels, requires intense

cognitive efforts (Wansink, 2005). This implies that individuals would tend to search for confirming information about the food they consume on a regular basis and would try to avoid disconfirming information that is provided on the warning labels . An alternative explanation to the phenomenon of ignoring warning labels was proposed by Zuckerman and Chaiken (1998). According to Zuckerman and Chaiken (1998), individuals will only engage in a more resource-demanding choice process, systematic processing, if the availability and motivation conditions are met. Individuals ignore warning labels since they employ heuristic processing with respect to whether or not to read the warning labels. False interpretation of probabilities, overconfidence in self-performance and immunity caused individuals to ignore the warning labels.

Low cognitive effort, peripheral processing and a message that contradicts previously held beliefs may cause ambiguity. Ambiguity, in turn, encourages biased processing (Chaiken and Maheswaran, 1994). The conflict between previously held beliefs and new information may generate dissonance (Festinger, 1957). Feelings of dissonance can be reduced by decreasing the importance of the elements that might be causing this inconsistency. In the case of low-intensity information, an efficient way of doing this would be to ignore or reject the new information (Petty, Wegener and Fabrigar, 1997). This is consistent with the self-affirmation framework (Petty et al., 1997) and the defense motivation (Zuckerman and Chaiken, 1998)

The above discussion leads us to hypothesize that given the strong prior about healthiness of chicken meat commodity, mild intensity unfavorable new information will be heavily discounted, resulting in unchanged beliefs and purchase intention. Our goal is

to go beyond that point and show that the new information changes the choice process. When the case is meaningful and contradicts previous favorable beliefs, the individual will adopt a strategy that will minimize the conflict. In addition, if the first two hypotheses are not rejected and the message is of low intensity and is about health, which is not salient in the choice process, individuals, therefore, will not "waste" scarce cognitive resources to update their evaluation of the health attribute. Only when the new information is strong, reliable and unambiguous will individuals need to refer to health and to the new information.

Based on these arguments, we propose our third hypothesis as follows:

H3: Low-intensity messages, either positive or negative, about health hazards in low-involvement products will be ignored and will not change the choice mechanism such that it will still be of the low-cognitive type, i.e., lexicographic.

The combination of H2 and H3 leads to a situation where in meat commodities, a low-intensity message, either positive or negative, will be ignored as prior information about health attributes had been favorable, choice process will continue to be based on a single attribute that is taste. We therefore postulate that:

H4: In meat commodities, the choice of a product in light of a low-intensity message will be based on the taste aspects of the product.

When consumers are exposed to high-intensity information messages, they can no longer ignore them. In this event, consumers would abandon the heuristic they had

previously adopted to ignore the warning embedded in the message and engage in systematic processing (Chaiken, 1980). This is mainly due to the relationships between the prior and posterior beliefs. Since the prior was favorable and the posterior is very unfavorable, a conflict must be resolved. In a situation in which an individual needs to resolve a conflict between contradictory attribute information, and if the decision is not emotional, a more complex choice mechanism will be set into operation, increasing the tendency to use some sort of a weighted-sum (multi-attribute) decision procedure (Bettman, Luce and Payne, 1998). Negative feelings arise in choices that require a tradeoff between important attributes: health and taste-pleasure. Sacrificing pleasure to gain health or vice versa will increase the likelihood of employing a multi-attribute choice process (Luce et al., 1997). This notion is consistent with Coupey (1994), who argued that the process of decision-making may vary according to circumstances and new information (learning). Hypothesis (5) summarizes the above discussion:

H5: A high-intensity negative message will change involvement and increase the cognitive resources allocated to the choice of the product. Higher cognitive resources will, therefore, cause consumers to employ a compensatory choice process.

Since the new information is about health, it is only natural to assume that

H6: When a high-effort compensatory decision mechanism is employed, health will be a salient variable in the choice process.

Moving from a lexicographic to a compensatory choice process, which includes the health attribute, calls for updating the ranking given to health.

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Hypotheses (5) and (6) suggested that differences in the intensity of the negative message will affect the cognitive resources allocated to the information integration. Strong and favorable prior and contradicting moderate unfavorable information will result in a strategy where alternatives are compared attribute by attribute and the new information is ignored. Strong new unfavorable information will result in shift to a compensatory model and add the health attribute to the relevant set.

Research Design

The research design constructed for this study is a between-subject, one that allows for the detection of variation between the consumer evaluation of product characteristics as well as their purchasing behavior under different treatments. To capture the different effects of information on the two main issues of interest (i.e., perceptions and saliency), four different groups of respondents were used: one served as a control group and the other three received different treatments with respect to the type of information to which they were exposed. Each group received a questionnaire that began with the insertion of a short, fabricated article which was supposed to have been published in a major daily newspaper. The article contained information on the research and development of agricultural products, as well as biotechnological research and information on food. In this article, a report describing lab findings on poultry and ready-to-eat foods aimed at tracing residual vaccines and antibiotics was changed. For each of the three experimental groups, this part was changed according to the assigned manipulation. The fourth group received the same questionnaire, but the manipulated part

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dealing with poultry was omitted.

Three levels of information manipulation were designed. The first message was about residual vaccines and antibiotics found in chickens---hereafter termed chicken negative. The second version was aimed at providing information about health improvements in chickens---termed chicken positive, and the third version included information regarding health hazards associated with chicken consumption---termed chicken aggressively negative.

The first version reported that only small traces of hormones and antibiotics had been found in a few chickens. It was made to sound like a sporadic finding that did not reflect information regarding most chickens. The second version, dealing with improvements in chicken quality, was manipulated by inserting a report saying that chicken growers could now comply with any health criteria imposed by the European market. This was claimed to be due to new breeding technology which eliminated the need to give antibiotics to chickens during their last month of rearing. The message was framed as a loss reduction rather than a profit enlargement. This was done to increase the ambiguity of the message and to increase the likelihood that the message would not be perceived as negative. The third group received a report in which the main findings indicated that antibiotics had been found in about 60% of the sampled chickens (aggressive negative). Furthermore, the article stated that the administered antibiotics were permitted by the strict European common market criteria, provided the chickens had not been treated in the last month of rearing.

We used the fourth group (control) to test hypotheses 2 and 3. The first (positive)

and second (low negative intensity) were used to test hypotheses 3 and 4. The third group (aggressive negative) was used to test hypotheses 5 and 6.

The second part of the questionnaire included questions about various alternative substitute products. These included, in addition to chicken, turkey and beef meat, their ready-to-eat counterparts. Respondents were asked to rate products on the following characteristics, which were found to be the most salient in Just et al. (2000): taste, health, ease of preparation, price, potential for producing a diverse menu, fat content, and time needed to prepare the food. Attitudes with respect to taste and health were collected using two bipolar-scale questions: one with a positive statement and the second with a negative one (note that Cacioppo and Berntson, 1994, recommend not using a bipolar scale in situations in which it is suspected that good and bad are not opposite). Fat content was separated from the health attribute as it has been found that certain segments of the population perceive fat in meat as a sign of quality and do not attribute it to health (Just et al., 2000).

Interviews were held in the meat departments of big chain supermarkets: four identical supermarkets were chosen, and each interviewer received a package containing a random assortment of interviews. All participants received valuable compensation (e.g., a pair of imported socks), and the response rate was close to 100%. Overall, 290 participants were interviewed for this research.

Data Analysis

First, we tested whether new information affects perceptions of the attributes of the relevant product, i.e., chicken. We conducted multiple ANOVA tests to detect differences in attribute ratings in the different groups due to the different types of information to which they were exposed.

Next, we tested our hypotheses about the effect of the new information on the choice process. We tested our hypotheses using a two-stage type of analysis: the first stage consisted of dimensionality reduction of the data and identification of underlying factors. Since there are 10 product characteristics, with several of them representing similar constructs (e.g., easy to prepare and fast-cooking represents different stages in meat preparation, but may also be perceived as one "time resource" dimension), these dimensions must first be identified. The second stage of the analysis was aimed at estimating the probability of choice from the set of alternative substitute products, given the manipulation on information. Since we were interested in obtaining diagnostic information on the decision process by determining the salient variables (i.e., product characteristics or dimensions) involved given different types of information, we employed a probabilistic choice model to analyze respondents' perceptions.

Results

We start our analysis by detecting whether our manipulation had an affect on respondents perceptions about the product attributes. We conducted 10 different ANOVA tests (one for each product attribute) between the three types of information. The results of these analyses are presented in Table 1.

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[Insert Table -1 about here]

It was expected that there would be no differences between the attribute ratings given by the different groups on all but the negative effect on health. As our manipulations focused on the health attribute, we did not expect to find significant differences on all other attributes. The results presented in Table 1 show that, indeed, the only significant difference (marginal) in attribute rating appeared in the negative health (i.e., unhealthy) aspect of the product. The differences in the expected direction are such that the positive information manipulation resulted in a less unhealthy perception of the product, whereas negative information resulted in a larger value of this attribute (i.e., more unhealthy). This result, therefore, lends face validity as to our research methodology and implementation.

In the next part of the analysis, we estimated the effects of intensity and direction of health-hazard information on consumer product evaluations through a choice model formulation.

Factor Analysis

For each of the four groups, we conducted a factor analysis and retained factors having an eigenvalue greater than 1. In all of our factor analyses, we obtained a solution of three factors. However, the three factors have different interpretations. Table 2 presents the interpretation of the three factors and the percent of variance explained.

[Insert Table 2 about here]

Our research hypotheses focused on the choice strategy that uses post-exposure to

different types of information and the derived weights given to each of the three factors. To test these hypotheses, we employed a probabilistic choice model to explore the salience of these dimensions on consumer preferences for purchasing various meat products. We studied six different meat-product alternatives that were found to be close substitutes by consumers: chicken, beef, turkey, ready-to-eat (RTE) chicken, RTE beef, and RTE turkey. In the following section, we present the results of this analysis.

Choice Model

Following the identification of the underlying dimensions involved in purchasing such products, we applied the multinomial logit choice model (MNL) with the factor scores from the previous stage (see, for example, Gensch and Ghose, 1992 for an application of this method).

The MNL model is a simultaneous compensatory attribute choice model that incorporates the concepts of thresholds, diminishing returns to scale and saturation levels (McFadden, 1974).

Let U_{ij} be the utility of alternative product j for customer i, and m the number of alternative products. The utility function can be separated into a deterministic component V_{ij} (measured in terms of perceived value associated with the characteristics of the products), and an unobserved random component, ε_{ij}, which is assumed to be drawn from independent and identically distributed such that

$$U_{ij} = V_{ij} + \varepsilon_{ij} \tag{1}$$

The distribution of ε_{ij} is assumed to be exponential (Gumbel type II extreme value) and

thus the probability that alternative product j will be chosen by customer i is represented

by:

$$P_{ij} = \frac{\exp^{(U_{ij})}}{\sum_{j=1}^{j=m} \exp^{(U_{ij})}} \tag{2}$$

Utility Specifications

The deterministic component of the utility function is a product of the weighted

sum of the three factors identified in Table 2 and the product-specific component, i.e.,

$$
\begin{aligned}
V_{ij} = {}&\alpha_1 F1_{ij} + \alpha_2 F2_{ij} + \alpha_3 F3_{ij} + \alpha_4 PRODUCT - SPECIFIC_A + \\
&+ \alpha_5 PRODUCT - SPECIFIC_B + \alpha_6 PRODUCT - SPECIFIC_C + \\
&+ \alpha_7 PRODUCT - SPECIFIC_D + \alpha_8 PRODUCT - SPECIFIC_E
\end{aligned} \tag{3}
$$

where Fk_{ij} is respondent i's perceptions of Factor k (through factor scores) of product

alternative j, $k = 1...3$.

$PRODUCT - SPECIFIC_J$ - product alternative j's idiosyncratic effects, for $j =$

A,B,C,D,E,F.[1]

$\alpha_1, \alpha_2 \alpha_3, \alpha_4, \alpha_5, \alpha_6 \alpha_7, \alpha_8$ - parameters to estimate.

The chosen strategy is identified through the significance given to each of the three

factors, i.e., $\alpha_1, \alpha_2 \alpha_3$. If only one of the α 's is significant, then among other things, we

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[1] It is possible that certain product-specific variables, or other variables that are shared by all alternatives, which were not explicitly accounted for in this study, will add to the predictive power of the model. These product-specific variables capture the idiosyncratic effects of the product (see, for example, Guadagni and Littlle 1983). To avoid singularity, only j-1 variables are included in the model.

get an indication that a non-compensatory strategy has been adopted, and if more than one is, a weighted sum (compensatory) strategy has been used.

We used four measurements of goodness-of-fit to help evaluate which model best represents the data. The log-likelihood value, the Bayes information criterion (BIC, see Schwarz, 1978), the Akaike information criterion (AIC, see Akaike, 1973), and the consistent Akaike information criterion (CAIC, see Bozdogan 1987), comprise the four measurements. Results are presented in Table 3.

[Insert Table 3 about here]

The results in Table 3 enable us to test our set of hypotheses. It can be seen that the control group employed a non-compensatory choice strategy. Respondents in this group chose their products using a lexicographic-type decision rule, where only one dimension is relevant (i.e., significant). This gives support to our first hypothesis, H1. As for our second hypothesis, H2, it can be seen that relevant dimension in this non-compensatory choice process is the taste-value dimension. This result, therefore, supports our second hypothesis, H2.

Next, we examine hypotheses 3 and 4 that relate to the effect of positive information on the choice process. The results in Table 3 indicate partial support for these hypotheses. Specifically, it can be seen that positive information did not result in a change in the choice process and it is still of a lexicographic type. Thus, we find support for our third hypothesis, H3. The taste dimension is the one that is salient in the choice process and, thus, supports our fourth hypothesis, H4. In sum, for the positive information message, there is no real difference as compared with the control group just

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as hypothesized in these hypotheses. As for the low-intensity negative information, we get partial support for these hypotheses. We find that the taste dimension is still salient in the choice process, but the convenience of preparation becomes salient as well. Thus, we get partial support of hypotheses 3 and 4. It should be noted here that the health dimension is still not salient in this case, as postulated in our hypotheses development. These results give indication that our conceptual development is valid. One possible explanation for the lack of full support for these hypotheses in the case of low-intensity negative information as compared to positive information is that these messages were not exactly equal in strength and that the negative was somewhat stronger than the positive in absolute terms. Another possible explanation is the asymmetry in consumer evaluation of positive and negative deviations from common reference points (Kahneman and Tversky, 1979). This idea can be explored further in future research.

A strong unfavorable message caused individuals to base their choice on all three factors. As a result, the choice process was compensatory in nature, and the health aspects of the product became salient. That is, we get support for hypotheses 5 and 6.

In general, the product-specific dummy variables are in the right order of the aggregated market shares, thereby lending face validity to our empirical findings.

In sum, our results suggest that meat products are characterized by low involvement and low cognitive effort by consumers as reflected by their lexicographic choice approach that is based on taste. As new information presented to consumers in such cases, a low-intensity message about a health hazard does not affect the choice process in the case of positive information and is comparable to the one in the control

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group (i.e., a lexicographic-type choice process on the taste aspects). In the case of low-intensity negative information, while consumers continue to ignore the health aspects of the product, they engage in a choice process that is somewhat more complex when convenience of preparation becomes a factor. When the health message is framed as being of high negative intensity, individuals use a compensatory choice model. In this case consumers can no longer ignore the health hazard information, and it becomes salient in the choice process. When the message is strong enough, the individual will use all three attributes, which requires high cognitive effort.

Conclusions

This study argues that exposure to new information about possible health hazards in frequently purchased food commodities, such as meat, changes the choice process. In the base situation, i.e., before consumers are exposed to new information, consumers minimize their cognitive load by employing a non-systematic choice process that is based on one attribute—taste. Negative information creates a gap between the strong prior beliefs about the healthiness of the meat and the new information that create doubts about this belief. As a result, it generates motivation which is a precondition for systematic processing (Chaiken, 1980). High-intensity negative information causes consumers to change their choice strategy and adopt a systematic-central process which includes all the relevant choice attributes: taste, value, health and convenience (ease of cooking). Weak information regardless of its direction, i.e., positive or negative, was supposed to be ignored due to the positive strong priors. We were partially successful in this set of

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hypotheses when the case of positive information was fully supported, and we show partial support in the case of weak unfavorable information. Exposure to weak intensity unfavorable was supposed to be ignored and thus maintain the choice process that is peripheral–heuristic. Our study showed that after exposure to weak negative information consumers employed a semi-systematic choice process that included two out of the three factors - taste and convenience, but continued to ignore the health attribute. In addition to the possible reason for this result (i.e., differential effect of positive and negative information from a reference point) presented in the previous section, we propose another explanation. The cognitive effort needed to trade off between two desired goals - taste and health - is not justified by the weak unfavorable information. Consumers might employ a two-step process in such a case: in the first step they become alerted and thus are motivated to use the highly demanding resource process. In the second step of selecting the relevant attributes, however, they ignore the health attribute that does not seem very threatening and compensate with convenience. This conjuncture can be explored in a future study.

Exposure to weak positive information about health improvement did not change the choice process. Ignoring the unfavorable information is realized in maintaining the heuristic choice process that is based on taste. Updating the health attribute is not meaningful as the health dimension of the product is not salient in this process.

Rational decision-making is based on the rigidity of the process, i.e., the choice should not depend on the process. Our findings imply that the process is information dependent. Furthermore, although health is too important to be ignored, in this study it

was not part of the choice variable with low information or without new information. Our study suggests that consumers maximize benefit from taste subject to their perception of all other relevant attributes being above some threshold level. Without information, or when information is not highly alerting consumers who are accustomed to eat chicken do not question its healthiness. When this perception is harmed, re-evaluation is required and a full compensatory model occurs.

We now go back to the ostrich and the leopard strategies presented at the introduction of this paper. These strategies can be employed by marketers utilizing the theory and findings presented here.

According to our findings, the first step in analyzing the optimal response to new health hazard information about a product is to distinguish between positive and negative types of information. In the case of positive new information, marketers should design a communication strategy that highlights the taste aspects of the product. Such a strategy will increase the choice probability of the product. This is mainly due to the non-compensatory type choice process.

In case of unfavorable information about a health hazard, marketers should first verify the intensity of the message. If the failure is extensively covered by the media, repetition of the message will fuel the intensity of the negative information regardless of consumer beliefs about its truthfulness, as in Tybout, Calder and Sternthal (1981). If the negative publicity is a one time-type event, a survey is needed to address the crucial issue of message intensity. That is, how do consumers perceive the intensity of the negative information? Questions about purchase intentions are not insightful in this case, as the

main type of behavior would be based on the choice strategy employed by consumers which is dependent on the intensity of the message. The perception of the intensity of the negative information leads to adoption of one of the two previously mentioned strategies: the leopard that fits a high-intensity negative message, or any message about product/brand that had unfavorable priors, or the ostrich strategy that seems to be the most promising one in the face of exposure to low-intensity information.

Rumors about the safety of food sold by a strong brand such as a one-time unfavorable publication about health issues in a frequently purchased food commodity or competitor's attack on the health attribute of a rival's product are conditions that lead to adoption of the ostrich strategy. This conclusion is in keeping with the findings of Sengupta and Johar, 2002 about confirming versus contradicting information.

Denying the rumor, rushing to adopt a new quality control plan, and trying to prove that the details in the published article are false are all ingredients that serve to intensify negative information and may force the consumer to use a compensatory choice process, which will worsen the marketer's (and the consumer's) situation. Thus, adopting the leopard strategy in the case of rumors is a mistake, as suggested by Tybout et al. (1981).

In general, the best course of action for marketers in light of negative information would be to provide information about other product attributes or to intensify the taste attribute which is always the most prominent attribute in such products. Let us consider the response of McDonald's to the direct attack of Philip Sokolof (Adams and Jennings, 1993) a heart attack victim who crusaded against fast food chains and processed food

manufacturers such as Nabisco and Kellogg's, accusing them of producing high-fat and high-cholesterol foods. Philip Sokolof ran a series of advertisements entitled "Poisoning America". In response, McDonald's spokesman adopted the leopard strategy and accused Sokolof in publishing inaccurate facts. The impact of the attack and the inappropriate response of McDonald's - which should have used the ostrich strategy - are, obviously, difficult to be assessed. It should be noted, however, that McDonald's announced that they would start cooking with vegetable oil instead of the tropical and animal fat oils that were used until that time (Adams and Jennings, 1993). The strategy of KFC and Jack in the Box, companies avoided the controversy about the connection between fast food and obesity and instead advertised the tastiness of their food and restructured their menu with new items. This strategy seems to be more appropriate than other alternatives (McArthur, 2001). In contrast, when negative information is strong, adopting the ostrich strategy will not result in a desired change, since consumers need to incorporate the health attribute in their choice mechanism. The best move in this case is to design a communication strategy that will highlight the healthiness of the new menu/food along the taste aspects and convenience of the food. The leopard strategy used by McDonald's after the Super Size Me scenario seems to be the choice of the best strategy that could be adopted in that case.

Occasionally marketers announce they have improved the quality control of their products and that they are safer than before (i.e., health improvements). Although surprising, the study found that in cases where a real change in quality has been achieved, marketers would be better off not advertising it. This is not to say that such advertising would cause harm but, based on our analysis, it would be a waste of valuable resources as

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consumers will discount the new positive information and continue to employ a non-compensatory choice process with taste as the relevant attribute. As a result, marketers would not gain an increase in consumer choice probability for their product and, as a result, would not reap the expected increase in market share.

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Table 1: ANOVA results of attribute perception of chicken meat with different

information

Product Attribute	Type	of	Information	Significance level
	Improvement	Negative	Aggressive negative	
Taste	4.31	4.23	4.18	0.707
Health (positive)	3.94	3.90	3.89	0.960
Ease of preparation	4.54	4.65	4.43	0.299
Fair price (positive)	4.13	3.94	3.86	0.272
Diverse ways of cooking	4.68	4.71	4.68	0.901
Health (negative): unhealthy	2.94	3.40	3.25	0.091
Low in fat	3.84	3.56	3.78	0.318
Fast preparation	4.48	4.43	4.38	0.811
Taste (negative)	3.94	3.83	3.66	0.435

Table 2: Factor analysis results[2]

Factor	Control	Chicken improvement	Chicken negative	Chicken negative aggressive
F1	Health	Taste-Value	Taste-Value	Health-Value
F2	Taste-Value	Convenience	Convenience	Taste
F3	Convenience	Health	Health	Convenience
% of variance explained	66.96%	58.54%	60.96%	61.62%

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[2] The loading matrix analyses for the four different treatments are presented in Tables C1, C2, C3 and C4.

Table 3: MNL coefficients

Attribute	Control Coefficient	Health improvement Coefficient	Negative Coefficient	Aggressive Negative Coefficient
Health	0.4131	02833	0.1134	0.3547**
Taste-Value	0.7509*	0.6507*	0.5164*	0.8013*
Convenience	-0.0203	0.2496	0.4336*	0.4019**
PS1	0.3035	1.4328	1.8643	1.4172
PS2	0.1288	0.8777	1.5376	0.8743
PS3	-0.2127	0.7076	1.2411	0.8909
PS4	-0.1069	0.3301	0.0725	0.3825
PS5	0.2701	-1.4402	-0.5430	-0.6218
Log likelihood	-76.857	107.2997	-104.3170	-99.5477
N	50	80	80	79
BIC	185.011	249.656	243.690	234.051
AIC	174.715	235.599	229.634	220.095
CAIC	188.099	252.274	246.308	236.682

*Significant at < 0.05, ** significant at < 0.088.

Appendix C1: Rotated Component Matrix – Base

Attributes	Factors and percent of explained variance		
	1	2	3
Taste	0.008	0.885	-0.001
Healthy	0.748	0.278	-0.108
Easy to prepare	-0.005	0.003	0.926
Value for money	0.536	0.630	0.002
Diverse ways of cooking	0.445	0.399	-0.488
Good to eat frequently	-0.661	-0.176	0.134
Not fatty	0.816	0.137	-0.001
Quick cooking	0.004	-0.008	0.914
No artificial flavor	0.296	0.766	-0.131
Inexpensive	0.628	0.009	0.007
% of variance explained	38.50%	18.31%	10.15%
Cumulative variance explained	38.50%	56.81%	66.96%

Appendix C2: Rotated Component Matrix – Version 2

Attributes	Factors and percent of explained variance		
	1	2	3
Taste	0.619	0.192	0.182
Healthy	0.447	0.164	0.652
Easy to prepare	0.009	0.866	0.006
Value for money	0.741	0.226	0.009
Diverse ways of cooking	0.670	-0.302	0.001
Good to eat frequently	0.009	0.006	-0.822
Not fatty	0.388	0.007	0.597
Quick cooking	0.117	0.868	0.002
No artificial flavor	0.473	0.005	0.331
Inexpensive	0.710	0.139	0.109
% of variance explained	32.35%	15.42%	10.77%
Cumulative variance explained	32.35%	47.77%	58.54%

Appendix C3: Rotated Component Matrix – Version 3

Attributes	Factors and percent of explained variance		
	1	2	3
Taste	0.698	0.007	0.003
Healthy	0.506	0.004	0.609
Easy to prepare	0.008	0.890	-0.003
Value for money	0.676	0.232	0.224
Diverse ways of cooking	0.565	-0.270	0.261
Good to eat frequently	0.006	0.104	-0.786
Not fatty	0.314	0.214	0.652
Quick cooking	-0.007	0.918	0.008
No artificial flavor	0.741	-0.151	0.001
Inexpensive	0.645	0.247	0.161
% of variance explained	31.89%	18.30%	10.50%
Cumulative variance explained	31.89%	50.19%	60.69%

Appendix C4: Rotated Component Matrix – Version 4

Attributes	Factors and percent of explained variance		
	1	2	3
Taste	0.161	0.675	0.179
Healthy	0.709	0.306	0.163
Easy to prepare	0.005	0.110	0.905
Value for money	0.557	0.451	0.211
Diverse ways of cooking	0.134	0.742	-0.152
Good to eat frequently	-0.769	0.229	0.108
Not fatty	0.601	0.425	0.139
Quick cooking	0.107	0.002	0.914
No artificial flavor	0.131	0.704	0.128
Inexpensive	0.584	0.321	0.005
% of variance explained	34.58%	15.85%	11.19%
Cumulative variance explained	34.58%	50.43%	61.62%

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