The effects of information about health hazards in food on consumers’ choice process

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\begin{abstract}
This study examines the effects of context (health hazard), direction (positive versus negative) and intensity of information about health hazards on consumers’ choice processes. We propose that choice of frequently purchased food commodities, \textit{ceteris paribus}, is based on a single dimension—taste. We develop a set of hypotheses regarding the type of choice process to be employed in various information types and empirically test them in a field experiment design. Our results indicate that a single-dimension choice process is employed under a nonsevere message and a multidimensional process under high-intensity negative information.
\end{abstract}

1. Introduction

The role of information about risk in decision making has been studied in the behavioral literature, predominantly in the context of individuals’ suboptimal choices. Deviations from normative decision outcomes are mainly attributed to the inherent biases in information processing, memorizing and decision making. A large body of research has been devoted to exploring biases in the integration of new information and the effect of these biases on choices.

Most of the studies in this general area are primarily concerned with examining the effects of various factors that can affect individuals’ judgments. These factors include, among others, availability of cognitive resources, time pressure, limited information, integration of new information, representativeness and affect. The effects of a single factor or the interactive effects of two (or more) factors on consumer judgment are generally examined in a controlled experimental design. Individual judgment tasks under such manipulations are characterized by a choice among lotteries (i.e., risky) or probability judgments of outcomes for which consumers, in general, have limited knowledge.

Testing for differences among individuals in this context is typically carried out by comparing attitude ratings, opinions or likelihood of choices under the different manipulations, with an emphasis on the overall utility or evaluations of products by individuals.

We offer a different approach for analyzing the role of various types of information on consumer choice by analyzing the consumer choice-decision process and not outcome judgments. Specifically, we are interested in the domain of choices with information on risk. Therefore, our approach differs from the mainstream of research in this area in three dimensions. First, we are interested in the process of decision making and in that context, we are aiming to gain additional insight into the effect of information about health risk on this process. Analyzing the saliency of the dimensions (i.e., product characteristics) of the choice process under different information types makes it possible to characterize different choice-process strategies. Furthermore, the emphasis on choice between alternatives enables us to capture the relative competitiveness intensity between products. To this end, a choice model is employed that provides us with diagnostic information about the choice processes and not just a comparison of attitude ratings or similar measures. Second, the research design is a field experiment that allows us to depict a more realistic range of responses from individuals. Third, we study choice of food commodities, a product category that is frequently purchased by consumers and about which they have a relatively high degree of knowledge. Their choice process under “regular” information, therefore, might be based on some “simple” decision rules which may be altered by new product information.

2. Conceptual framework

Previous studies that explored aspects of negative information about health hazards on consumer behavior were primarily
Concerned with the effect of negative information on attitude and purchase intention through food labeling (Viscusi and O’Connor, 1984; Zuckerman and Chaiken, 1998) and education and nutrition values (Wansink, 2005).

Choices can be conceptualized as the outcome of a process (decision making) of selecting the alternative that will yield the highest utility. Resources, therefore, are allocated to the decision task when a consumer thinks that this will lead to a better choice. In frequently purchased commodities such as food in general, and meat products in particular, consumers are generally familiar with the products’ characteristics and will, therefore, minimize the cognitive effort in product choice (Brock and Brannon, 1992).

Minimizing cognitive efforts induces the use of a mechanism that simplifies the choice process yet provides a good outcome. This is the basic concept behind Simon’s (1955) theory of bounded rationality that consumers can adopt an array of simplifying heuristics. Choices based on attribute comparisons are less cognitively demanding than product-based comparisons (Tversky, 1972). Choices based on noncompensatory decision rules are less resource demanding than compensatory choice processes (Bettman et al., 1998). The noncompensatory choice process assumes that there is no tradeoff between attributes. That is, high value in one attribute does not compensate for low value in another (Payne et al., 1992). In its essence, a noncompensatory process is a less intensive (shortcut) decision strategy, where a screening process of alternatives that is based on some heuristics (i.e., conjunctive, disjunctive, lexicographic) is used (Gilbride and Allenby, 2004). Formally, consumers employ a screening rule that screens out all the alternatives that do not meet a specific criterion. Let $x_{ij}$ denote the level of attribute $i$ $(i = 1 \ldots n)$ in alternative $j$, and $\gamma_i$ the threshold level set for attribute $i$. The disjunctive screening rule is defined by

$$\Pi_n( x_{jn} > \gamma_n ) = 1 \quad \text{and;}$$

$$I ( x_{jn} > \gamma_n ) = \begin{cases} 1 & \text{if } \Pi_n ( x_{jn} > \gamma_n ) \\ 0 & \text{otherwise} \end{cases}$$

(see Gilbride and Allenby (2004)). Choices that are based on comparing alternatives on a single attribute are a private case of disjunctive screening rules if all the alternatives pass the thresholds levels on all attributes. Employing a single attribute choice rule, which is not compensatory by definition, is consistent with utility maximization notion, if the perceived differences between the alternatives on the other attributes is small, the importance of the other attributes is small, or both (see Kohli and Jedidi, 2007 for formulation of these conditions for the lexicographic rule). In the case of a noncompensatory choice strategy that is based on a single attribute, the probability that product $k$ will be chosen is given by

$$\Pr(k) = \int_{-\infty}^{\infty} \left[ f(x_{jk} + \varepsilon_k) \right] \prod_{j \neq k} f(x_{ij} + \varepsilon_j) \prod_{j \neq k} d\varepsilon_j$$

where $J$ is the number of alternatives considered. The compensatory choice process requires more cognitive effort as it is composed of several inter-related aspects: collecting and integrating information on multiple product attributes across all alternative products being considered, weighing the different attributes according to their subjective contribution to utility, computing the utility for each alternative, and choosing the alternative that yields the highest utility. In low-involvement choice tasks such as frequently purchased, undifferentiated commodities (e.g., meat products), purchases are made with low cognitive effort (Wansink, 2005; Brock and Brannon, 1992). Compensatory processes, therefore, are less likely to occur and consumers will try to reduce the cognitive load by adopting a noncompensatory heuristic rule (see Bettman et al., 1998, for an extensive review).

An important issue to consider is the number of attributes used in the choice process. We analogously draw from studies on products’ choice set (e.g., Roberts and Lattin, 1991; Hauser and Wenerfelt, 1990) and suggest that an attribute will be employed in the choice process if its inclusion adds to utility more than the cost of collecting additional information (on the attribute) and processing it.

Bryant (2007) argued that in most low-involvement decision-making processes, the choice between alternatives is based on the attribute that guarantees the greatest distinctive criterion between the alternatives. It is logical to expect that a choice process based on a single attribute will minimize the cognitive resources and, therefore, will be employed in a purchase decision of frequently purchased products without new information.

Taste is a more observable attribute than health in such product categories and, therefore, can provide a greater distinctive value in evaluating alternative products. Shepherd and Stockley (1985) and Shepherd and Towler (1992) argue that consumers’ experience with (and valuation of) food products is shaped by sensory attributes and in particular taste. In that context, Koivistoini and Sjöden (1997) argue that taste is a good explanatory variable for food choices. ‘‘Some researchers suggest that taste, in particular, is the only criterion used when deciding whether to purchase a...‘"
particular food” (Holm and Kildevang, 1996; Moskovitch et al., 2005 p. 9). Based on the above we postulated that

H1: With no new information, the choice of repeatedly purchased food commodities will be based solely on the taste attribute.

Now suppose that consumers are exposed to new information about possible health hazards associated with the consumption of a meat product that was previously considered to be healthy. Integration of new and unfavorable information with previous favorable beliefs about a product is supposed to reduce product evaluation. The reduction in evaluation will occur even if the new information is perceived to be inaccurate or unreliable, since individuals cannot completely ignore it. As Tybout et al. (1981) argue, “these thoughts are less positive than those that could have been retrieved in the absence of the rumor” (p. 74).

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). A cognitive dissonance explanation would argue that 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 et al., 1997). This is also consistent with the self-affirmation framework (Petty et al., 1997) and defense motivation (Zuckerman and Chaiken, 1998).

The literature suggests alternative explanations for why individuals deviate from the Bayesian rule in their judgments of risk or probability and information integration (e.g., Hertwig and Todd, 2000). These explanations include overweighting of new information when it is perceived to more accurately represent the situation consumers need to judge (e.g., Kahneman and Tversky, 1972), underweighting new information, amplifying priors, sticky priors (e.g., Bar-Hillel, 1980), overconfidence and biases (e.g., Alba and Hutchinson, 2000). Most of the work done in this area has focused on examining the effect of manipulated stimuli (i.e., new information and priors) on a specific outcome (i.e., choice of lotteries, rating of alternatives). Other studies have also included mediating variables to explain individuals’ judgments. However, a scarcity of research exists into the consumers’ “black box” that contains the decision process itself. This study aims at uncovering the effect of information about health hazards in food on choice processes. Identifying decision rules (e.g., compensatory) might facilitate better judgment of partial effects of information integration and the conditions leading to biased integration.

The basic premise in this study is that information intensity (severity) will determine the choice strategy used by consumers. When the new information about health is perceived to be mild (nonacute), and it concerns an attribute that was not salient in the initial choice process, individuals will not “waste” scarce cognitive resources to change their decision process.

Individuals will use a more demanding choice strategy when they have sufficient motivation, ability and opportunity to do so. Motivation may be increased when the new information is very damaging (Zuckerman and Chaiken, 1998). Fig. 1 illustrates the effects of information with various severities, valence, and strength of prior beliefs on the choice process.

Based on the above discussion, we propose Hypothesis (2) that deals with the effect of nonacute information on the choice process. H2: Low-intensity messages, either positive or negative, about health hazards in low-involvement food products will not affect choice. Thus, choice will still be based solely on the taste attribute of the product.

When consumers are exposed to a high-intensity information message, which is threatening and can therefore not be discounted, they will abandon the heuristic decision-making strategy and engage in systematic processing (Chaiken, 1980). Since the prior was favorable and the posterior very unfavorable, a potential conflict may be created, increasing the likelihood of employing a more complex decision process. Engaging in a complex decision-making process will increase the likelihood of using some sort of weighted-sum (multi-attribute) decision process (Bettman et al., 1998). Negative feelings arise in choice situations that require individuals to engage in a tradeoff between important attributes, such as health and taste in the case of food products. Sacrificing the utility derived from taste (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). The next hypothesis summarizes the above discussion:

H3: A high-intensity, negative message will increase consumers involvement, leading them to increase the cognitive resources allocated to the choice procedure. This will result in employing a multi-attribute decision in which health will be a salient variable.

Hypotheses (2) and (3) suggest that more alarming (intense negative) information on the health hazards of food commodities will increase the cognitive resources allocated to the choice process, while information that is not severe will not change the decision-making process.

The purpose of this study is not to gain a better understanding of the effect of information intensity on consumers’ perceptions of attributes, or on the potential changes in market shares. We, therefore, do not construct formal hypotheses concerning the relationships or effects of different information types on such aspects, but rather develop hypotheses about the choice process itself. Naturally changes in the choice process will result in changes in shares of the commodities or perceptual discrimination between attributes, but this is a matter for future research.

3. Research design

A between-subject design was used in a field experiment that allowed detection of variations in consumer decision making in food commodities as a function of different types of information on health risks that differ in their severity and valence (positive versus negative). There were four different groups of respondents: a control group and three manipulation groups. Information on health hazards resulting from the consumption of chicken were manipulated in terms of their severity and valence. The first manipulated group was exposed to positive information (reduction of health hazards); the second group was exposed to mild negative information, and the third group received aggressive negative (severe) information. Interviews were held in the meat departments of similar stores of a large supermarket chain. A photocopy of an article with an unrelated story about a large dairy producer that intends to launch a new line of ready-to-eat ethnic salads was given to the interviewees. At the top of the page with the unrelated story, we inserted a manipulated short article...
about health hazards resulting from the consumption of chicken. It included a report describing lab findings on poultry and ready-to-eat foods aimed at tracing residual vaccines and antibiotics. For each of the three experimental groups, this part was changed according to the assigned manipulation as follows:

The first version dealt with improvements in chicken quality and was manipulated through inclusion of a report claiming that chicken growers could now comply with any health criteria imposed by the European Common 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 reduction in losses 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 second 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 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 antibiotics in question were only permitted by the strict European Common Market criteria if the chickens were not treated in the last month of rearing. We chose to depart from the research design of Johnson and Slovic (1995) and not to present a specific risk measure (probability of death or illness) or a range of probabilities, which would increase uncertainty. This is mainly due to the findings of Ofir (1988) and Lynch and Ofir (1989) that perceptions of probabilities are sensitive to the relative weight of the base and the case. Additionally, consumers are exposed in real life to a similar form of information, thus our design enhances the external validity of the findings. The control group received the same questionnaire, but the manipulated part dealing with poultry was omitted. Each interviewer received a package containing a random assortment (i.e., manipulation) of information.

In the field experiment, respondents were asked to express their opinion on the new product line that was not related to our study. Immediately afterwards, they were asked to participate in a study on meat-purchasing behavior and in return, they would receive a pair of quality Italian pantyhose worth about $25. The interviewer read the questions and recorded the answers. The interview took about 20 min. A total of 330 participants were interviewed for this study, 80 in each of the manipulated groups and 90 in the control group. Consumers were asked to rate six meat commodities: chicken, turkey, beef, and ready-to-eat chicken, turkey and beef, on 10 attributes using a five-item Likert-type scale. The ready-to-eat products were used to capture the possible substitution effect resulting from the negative information about the meat. The following product attributes were rated: taste, health (positive direction), ease of preparation, price fairness (positive direction), diverse ways of cooking, unhealthiness (negative direction), low fat content, ease of preparation, taste (negative direction), and low cost. Evaluations 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.\textsuperscript{8} 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. These 10 product attribute ratings on all six product alternatives were used to explain consumer choice of the six meat products. Respondents were then asked to indicate how much of each of the six meat commodities they would choose in their next 10 shopping trips (i.e., dependent measure).

4. Empirical analysis

As our interest is in identifying the choice process given different information types, we employed a two-stage type of analysis for that purpose: the first stage consisted of dimensionality reduction of the data using a principle components-based factor analysis, identification of underlying factors, and using the new dimensions as an input for the next step of the analysis. The analysis yielded a three-factor solution as presented in Table 1 (detailed results are reported in Appendix).

As can be seen from Table 1, the dimensions have similar meanings, but vary in terms of explained variance. This indicates that the different types of information affected the structure of consumer perceptions.

Recall that our study focuses on the effect of valence and severity of information on decision making and not on building a set of assumptions about the evaluation of product attributes (e.g., health) in light of such information. We did, however, use the health-related factor values to examine how health perceptions varied across the four different groups by factor analyzing the perceptions of chicken (manipulated product) across all groups. In the case of negative information about health hazards, one would expect a monotonic relationship, i.e., the greater the severity of the message, the higher the rating of the nonhealthy attribute. However, following Tybou et al. (1981), a positive message may reduce health perception (i.e., a higher rating on the nonhealthy attribute). Message severity may increase the perception of risk, but from a certain point a stronger (negative) message may be discounted (Lynch and Offir, 1989), resulting in a counter-effect leading to a U-shaped relationship. Such U-shaped patterns have been found in studies exploring the relationship between fear and willingness to adopt protective behavior (e.g., McGuire, 1968).

We employed a quadric form of a polynomial contrast test as this allows the detection of relationships among the group means (instead of a simple main effect test as in ANOVA) and a verification of these differences. The mean values of the health dimension for the control, positive, mild negative, and aggressive negative groups were 0.3544, 0.0057, −0.2852, and −0.1237, respectively, and the contrast test was significant at the 0.05 level. A contrast test for differences between the control group and the average of all manipulated groups was significant at the 0.001 level. Similar results were obtained for the differences between the control group and positive information (0.05) and the control and the negative groups (0.001). From various angles (i.e., Table 1, contrast tests, and pre-testing), we get an indication that variation in the type of information affected respondents’ health evaluation and, therefore, provided face validity to this relationship.

The second stage of the analysis aimed at estimating the probability of choice from the set of alternative substitute products, given the manipulation of information using a choice model (i.e., multinomial Logit). Under this framework, we are interested in obtaining diagnostic information about the choice process. As such, if only one factor (taste) out of the three is significant without additional information, Hypothesis (1) is supported. Hypothesis (2) is supported if exposure to mild-negative or positive information did not affect choice process, i.e., the only significant factor will still be the taste aspects of the product. Hypothesis (3) suggests that at least two factors should be salient in the choice process in light of the exposure to negative information. Namely, the health and taste aspects of the product should be significant.

4.1. Choice model

Following the identification of the underlying dimensions involved in purchasing such products, we applied the multinomial Logit (MNL) choice model with the factor scores from the previous stage (see 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, \( \epsilon_{ij} \), which is assumed to be drawn from an independent and identical distribution such that:

\[
U_{ij} = V_{ij} + \epsilon_{ij}.
\]

The distribution of \( \epsilon_{ij} \) is assumed to be exponential (Gumbel type II extreme value) and thus the probability that alternative product \( j \) out of \( m \) alternatives will be chosen by customer \( i \) is represented by:

\[
P_j = \frac{\exp(V_{ij})}{\sum_{j=1}^{m} \exp(V_{ij})}.
\]

4.2. Utility specification

The deterministic component of the utility function is a product of the weighted sum of the three factors identified in Table 1 and the product-specific component, i.e.,

\[
V_{ij} = \alpha_1 F_{ij} + \alpha_2 F_2 \epsilon_{ij} + \alpha_3 F_3 \epsilon_{ij} + \alpha_4 P_{S\epsilon} + \alpha_5 P_{S\epsilon} + \alpha_6 P_{S\epsilon} + \alpha_7 P_{S\epsilon} + \alpha_8 P_{S\epsilon}.
\]

where \( F_{ij} \)-Respondent "i"’s perceptions of factor (product dimension) \( k \) through factor scores, of product alternative \( j \), for \( k = 1, 2, 3 \) (health, taste-value, and convenience).

\( P_{S\epsilon} \)-Product alternative \( j \)’s idiosyncratic effects, for \( j = 1, 2, 3, 4, 5, 6 \).

\( \alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6, \alpha_7, \alpha_8 \)-Parameters to estimate such that \( \alpha_1, \alpha_2, \alpha_3 \), and \( \alpha_4 \) are the dimension coefficients, and \( \alpha_5, \alpha_6, \alpha_7, \alpha_8 \) are the product-specific variables’ coefficients.

The chosen strategy is identified through the significance assigned to each of the three factors, i.e., \( \alpha_1, \alpha_2, \alpha_3 \). If only one of the three factor \( \alpha \)’s is significant, then among other things, we get an indication that a noncompensatory strategy has been adopted, and if more than one is significant, a weighted sum (compensatory) strategy has been used.

\textsuperscript{8} Cacioppo and Berntson (1994) recommend using a bipolar scale in situations in which it is suspected that good and bad are not opposite.

\textsuperscript{9} Certain product-specific variables, or other variables shared by all alternatives and which were not explicitly accounted for in this study, may add to the predictive power of the model. These product-specific variables capture the idiosyncratic effects of the product (see, for example Guadagni and Little, 1983). To avoid singularity, only \( j - 1 \) variables are included in the model.
4.3. Results

The results of the empirical analysis are presented in Table 2 and enable us to test our set of hypotheses.

It can be seen that the control group employed a noncompensatory choice strategy. Respondents in this group chose their products using a noncompensatory, lexicographic-type decision rule, where only one dimension is relevant (i.e., significant). Further, it can be seen that the relevant dimension in this noncompensatory choice process is the taste-value dimension. Thus, we get supports for our first hypothesis, H1.

Next, we examine Hypothesis 2, which relates to the effect of new, mild-intensity (nonsevere) information (positive or negative) on the choice process. The results in Table 2 indicate partial support for this hypothesis. Specifically, it can be seen that the new 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 the first part of our second hypothesis, H2. In the case of low-intensity negative information, we find partial support for Hypothesis (2). We find that the taste dimension is still salient in the choice process, and that the convenience of preparation becomes salient as well. The health dimension is still not salient in this case. These results indicate that our conceptual development is still valid. One possible explanation for the lack of full support for this hypothesis 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 information was perceived to be somewhat stronger than the positive one 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 bears exploring 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 find support for Hypothesis (3).

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.

Our results suggest that the purchasing decision of frequently purchased meat products is characterized by low involvement and low cognitive effort-type choice processes. With low cognitive effort and in the absence of information, consumers make their choice based on one attribute—taste. As new information is presented to the consumers, the following occurs: a positive low-intensity message about a health hazard does not affect the choice process; it continues to be based on the taste attribute. In the case of low-intensity negative information, consumers change their decision process and utilize a more complex and resource-demanding process. However, they continue to ignore the health aspects of the product. The finding that taste and convenience are salient in the choice process, and health is still not significant, might indicate that consumers hesitate to face two conflicting goals, health and taste. The exclusion of the health dimension and the inclusion of the convenience dimension in the decision process might reflect consumers’ problem-solving strategy, i.e. resorting to a nonthreatening dimension to avoid conflict. When the health message is framed as being of high negative intensity, individuals use a compensatory choice model. In this case, consumers decided that they could 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, requiring high cognitive effort.

5. Conclusions

Our study focused on the effect of new information about health hazards on the decision-making process of purchasing food products. Unlike previous studies that explored the effect of information on attitude or share of consumption, our study is aimed at exploring the effect of information on the choice process. We argue that the decision-making process depends on the perception of the health risk. Before receiving new information on health, the choice of frequently purchased meats is based on a single attribute, taste. New information that contradicts previously held beliefs on the healthiness of a certain food increases uncertainty in the optimality of the choice process that is based on taste alone, without taking the health attribute into account. Our study implies that decision making on purchases of frequently purchased food is information-dependent, and the difference in strategies (i.e., single versus multi–attribute choice) is based on the severity of the message. High-intensity negative information creates a gap between the strong prior beliefs about the healthiness of the meat and the new information that creates doubts about this belief. Such information causes consumers to base their choice process on all the relevant choice attributes: taste,
value, health and convenience (ease of cooking). Nonsevere (mild) negative information causes consumers to base their choice on two of the three factors—taste and convenience. We found that positive information (i.e., a message of improvement) did not affect the choice process relative to the control group.

Future research might be conducted to examine whether similarities exist between positive information and rumor denial, as happens in many cases in the food industry. Additional studies might investigate other types of manipulation to examine their effects on the choice process (e.g., consumers’ health concerns, optimism, mood, uncertainty).

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Table A.1
Rotated component matrix—control.

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<th>Factors and percent of explained variance</th>
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<td>Diverse ways of cooking</td>
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<td>Quick cooking</td>
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<td>No artificial flavor</td>
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<td>Inexpensive</td>
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Table A.2
Rotated component matrix—positive information.

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Table A.3
Rotated component matrix—mild negative information.

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<td>No artificial flavor</td>
<td>0.741</td>
</tr>
<tr>
<td>Inexpensive</td>
<td>0.645</td>
</tr>
</tbody>
</table>

Table A.4
Rotated component matrix—aggressive negative information.

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Factors and percent of explained variance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Taste</td>
<td>0.161</td>
</tr>
<tr>
<td>Healthiness</td>
<td>0.709</td>
</tr>
<tr>
<td>Easy to prepare</td>
<td>0.005</td>
</tr>
<tr>
<td>Value for money</td>
<td>0.557</td>
</tr>
<tr>
<td>Diverse ways of cooking</td>
<td>0.134</td>
</tr>
<tr>
<td>Good to eat frequently</td>
<td>−0.769</td>
</tr>
<tr>
<td>Not fatty</td>
<td>0.601</td>
</tr>
<tr>
<td>Quick cooking</td>
<td>0.107</td>
</tr>
<tr>
<td>No artificial flavor</td>
<td>0.131</td>
</tr>
<tr>
<td>Inexpensive</td>
<td>0.584</td>
</tr>
</tbody>
</table>

Appendix. Factor analysis result


References

Hertwig, R., Todd, P.M., 2000. Biases to the left, fallacies to the right, stuck in the middle with null hypothesis significance testing. Psychology 11 (28), Social Bias (20) (http://psycprints.ecs.soton.ac.uk/archive/00000028/).


