GENDER DIFFERENCES IN THE PROCESSING OF NUTRITION INFORMATION ON FOOD PRODUCTS

Journal of Academy of Business and Economics, forthcoming June 2010

Khaled S. Aboulnasr
Assistant Professor of Marketing
Lutgert College of Business
Florida Gulf Coast University
10501 FGCU Blvd., S.
Fort Myers, Florida 33965
(239) 590-7598
fax: (239) 590-7330
kaboulna@fgcu.edu
GENDER DIFFERENCES IN THE PROCESSING OF NUTRITION INFORMATION ON FOOD PRODUCTS

Khaled Aboulnasr, Florida Gulf Coast University, FL

ABSTRACT

In an effort to battle the spread of obesity and allow consumers to make more informed food choices, Food and Drug Administration (FDA) regulations require food manufacturers to present a standardized nutrition facts panel on food product packages. The purpose of this research is to investigate the role of gender in the processing of nutrition information on food packages. There is strong research evidence that indicates that males and females process information differently. Results of our experiment indicate that males are more likely to carefully examine and use the nutrition facts panel for evaluation purposes compared to females. It was also shown that males’ disease risk perceptions as a result of a food product consumption are more sensitive to the favorability of the information in the nutrition facts panel compared to females.

1. INTRODUCTION

According to the Center for Disease Control and Prevention (CDC), currently more than 33% of U.S. adults suffer from obesity (CDC 2009). Despite efforts from regulatory agencies such as the Food and Drug Administration (FDA) aimed at limiting obesity, it continues to spread at an alarming rate such that by 2015, more than 40% of American adults are expected to be obese (Wang and Beidoun 2007). In the battle against obesity, FDA rules based on the Nutrition and Labeling Act (NLEA) regulated the use of health claims and required food marketers to present a standardized nutrition facts panel on food products (Food and Drug Administration 1993). The goal of these regulations was to protect consumers against misleading health claims and provide them with objective nutrition information that would reduce confusion and lead to more healthful food choices.

The cornerstone of the FDA regulations is consumers’ utilization and elaboration of the nutrition information prior to making consumption decisions (Keller et al. 1997). Yet, prior research suggests that these regulations may not have translated into an improvement in consumers’ nutrition choices and food consumption habits (Burke, Milberg and Moe 1997). While Crosby and Taylor (1981) indicated that consumers may not have the ability to properly interpret nutrition label information or apply such information appropriately for consumption decisions, Fien, Derby and Levy (1992) suggested that because of individual differences, only few consumers are able to appropriately use nutrition label information for dietary planning.

An important question that has not been answered and one that the current research attempts to address is whether gender differences translate into significant dissimilarities in the way men and women process nutrition information on food packages and the way they use such information to make food product evaluations. Research evidence suggests that males and females differ in the strategies they employ to process information (Meyers-Levy and Maheswaran 1991). While these differences have been investigated in the context of consumption behavior and particularly from an advertising research perspective (Putrevu 2004; Prakash and Flores 1985), the literature on the processing and acquisition of information on food products has mostly overlooked the role of gender as an important predictor of consumers’ ability and motivation to process nutrition information at the point of purchase.

The objective of this research is twofold. First, we explore how gender influences the processing of nutrition information. Second, we measure the consequences of processing strategies employed by the
different genders in terms of consumers’ disease risk perceptions. We contend that the role of gender is of significant importance in the processing of nutrition information and has important behavioral and policy implications. If males and females process information differently, then it is important for food marketers and public policy makers to appreciate these differences in order to communicate more effectively with each of these segments. Understanding how males versus females process information on food packages and the type of information they are more likely to attend to before making a consumption decision is critical to the effectiveness of FDA regulations and food labeling intervention programs. Similarly, for food marketers, this understanding may have important segmentation implications. It may help shape the communication strategies employed for each segment.

The balance of this paper is organized as follows. In the next section, we present a conceptual framework and develop our hypotheses. Following this, we describe our research methods, including analysis, procedures and results of our experiment. Finally, we conclude the paper by identifying possible limitations, potential research avenues and discussing implications for scholarship and practice.

2. CONCEPTUAL FRAMEWORK AND HYPOTHESES

Nutrition Information

The way consumers use nutrition information on food products has been studied extensively since the implementation of FDA regulations stemming from NLEA of 1990/1994 (Ford et al. 1996; Roe, Levy and Derby 1999; Keller et al. 1997; Kozup, Creyer and Burton 2003). The main purpose of these regulations was to allow the consumer to make more informed decisions and to encourage more healthful food consumption practices. There were two particularly notable outcomes of these regulations. The first was mandating that all packaged food products disclose objective nutrition information in an unambiguous way, which is referred to as the nutrition facts panel (Keller et al. 1997; Howlett, Burton and Kozup 2008). The second visible outcome of the FDA regulations was limiting the use of health claims on packaged food products to ones that meet certain scientific standards and nutritional criteria such that these claims will not prohibit consumers from objectively interpreting the nutrition facts panel (Roe, Levy and Derby 1999).

The nutrition facts panel includes detailed unambiguous information on a food product’s nutrition content in addition to percentages of the daily recommended value for the intake of various nutrients. By providing standardized nutrient content information on food packages, the FDA hoped to reduce consumer confusion and present consumers with impartial information that would lead to more healthful food choices (Burton, Garretson and Velliquette 1999). Hence, consumers’ careful processing of the nutrition facts panel prior to purchase represents an important prerequisite for achieving the goals of these labeling regulations (Burton, Garretson and Velliquette 1999). Prior consumer research addressing NLEA and FDA regulations has mainly examined consumers’ ability and motivation to utilize and comprehend information in the nutrition facts panel (Moorman 1990; Kozup, Creyer and Burton 2003). It was suggested that more motivated consumers, expend the time and effort to elaborate on the nutrition facts panel prior to making product evaluations (Keller et al. 1997). Similarly, prior knowledge was found to impact consumers’ ability to acquire and utilize nutrition information (Moorman 1990). Other research studies have also investigated how the different characteristics of the nutrition panel such as its format and content affect the use of nutrition information (Ford et al. 1996).

In summary, most prior studies suggest that the success of nutrition labeling regulations depends to a great extent on the way consumers process and acquire nutrition information on food packages (Keller et al. 1997) and the attention they allocate to the different types of information on the package particularly the nutrition label prior to product purchase (Ford et al. 1996). It is within this context that we build on prior research to explore the overlooked role of gender differences in the processing of nutrition information on food products.
Gender effects

Marketers have successfully used gender as an effective segmentation criterion for a variety of products and services (Putrevu 2001). Such segmentation is consistent with research on gender effects in consumer behavior that has demonstrated gender differences in advertising response, attitude formation, product purchase intentions, evaluative judgment, consumption patterns and information processing (Meyers-Levy 1988; Meyers-Levy and Sternthal 1991; Prakash 1992; Darley and Smith 1995; Putrevu 2004). These variations have been attributed to physiological, biological and sociological causes. For example, sexual hormones (Darley and Smith 1995) as well as the use of the right versus the left hemisphere of the brain between men and women were argued to contribute to such differences (Meyers-Levy 1994). Alternatively, from a sociological perspective, differences in social roles, responsibilities and expectations in addition to differences in social pressures between the genders were thought to lead to variations in information processing and judgment (Darley and Smith 1995).

While there has been concurrence in the literature that gender affects information processing, there have been inconsistent explanations as to how males and females process information. The selectivity hypothesis describes males as heuristic and selective processors of information who make use of the most salient cues of a message. On the other hand, females are described by the selectivity model as comprehensive information processors who elaborate on all available cues in a message (Wolin 2003). In line with the selectivity explanation, Meyers-Levy (1994) suggested that males use the right-hemisphere of the brain relying on global categories and cues to process information while females were suggested to use the left-hemisphere which involved a more detailed processing.

Despite its common use in prior research, support for the selectivity hypothesis has been mixed and insubstantial. For example, Darley and Smith (1995) report that the selectivity hypothesis was not very valuable in predicting male information processing patterns. They recommended more research on the predictions of the selectivity hypothesis. An alternative view that describes differences in information processing between males and females is found in the area of cognitive psychology. This view suggests that males engage in item specific processing of information giving more attention to individual attributes while females process information in a manner that is relational, stressing similarities amongst the different pieces of a message (Putrevu 2001). Other studies that investigated gender differences in information processing described males as more analytical and diagnostic information processors as compared to females who were portrayed as more spontaneous and subjective (Broverman et al. 1968). This depiction is also consistent with males being more objective and analytical and women as more categorical and subjective.

Poole (1977) reported that males conceptualized items in terms of their physical attributes and objective states while females used more intuitive and subjective concepts and engaged in more associative interpretations when processing information (Putrevu 2001). In further support to the idea that males and females respond differently to objective versus subjective information, Darley and Smith (1995) suggested that males attend and respond more favorably to objective advertising claims while women will have a more favorable response to subjective claims. They tied claim objectivity to the degree it included factual information that “can be measured by a standard scale not subject to individual interpretation”. On the other hand, subjective information was described as affective information about a product’s intangible features (Darley and Smith 1995).

In the context of a food product, while other elements on a food package may represent a source of information such as a product’s brand name or a health claim, the nutrition facts panel includes all the factual information representing the product’s diagnostic attributes that can be measured and is not subject to individual interpretation and hence is considered an objective source of information. In light of the preceding theoretical arguments, we make the following hypotheses:

**H1**: As compared to females, males will report a greater influence of the nutrition facts panel in their evaluation of the food package.

One of the goals of NLEA was to provide consumers with nutrition information in the form of the nutrition facts panel that would allow them to make more informed and healthful food choices. Hence, the
presentation of such objective information was also intended to enable consumers to make reasoned judgments as to the connection between the nutrition content of the product and the risk of developing certain diseases such as high blood pressure, diabetes and cancer (Garretson and Burton 2000). From an information processing perspective, in order for a consumer to form accurate disease risk perceptions related to the consumption of a food product, he or she needs to have carefully examined the diagnostic information presented in the nutrition facts panel. Based on our prediction that males are more likely to carefully examine and use for judgment the nutrition facts panel compared to females, then we should also expect that the connection between the favorability of the nutrition label and disease risk perceptions to be stronger for males than for females. Hence, we suggest the following hypotheses:

H2: The Valence of the nutrition label influences consumers’ disease risk perceptions such that a food product with a favorable nutrition label will lead to lower disease risk perceptions.

H3: Gender moderates the effect of the valence of the nutrition label on the product’s disease risk perceptions such that: a) food packages that have a favorable nutrition label will lead to lower disease risk perceptions for males compared to females and, b) food packages that have an unfavorable nutrition label will lead to higher disease risk perceptions for males compared to females.

3. EXPERIMENT

Design and Stimuli

The aim of this study was to understand the effect of gender differences on the use of the nutrition facts panel in product evaluation and disease risk perceptions. This study was a 2 x 2 between subjects design using gender (males vs. females) and nutrition label (favorable vs. unfavorable). A packaged frozen food product (a microwaveable frozen lasagna dinner) was the focus of the study. Packaged frozen dinners were used in prior studies and they tend to exhibit considerable differences in nutrition content (Ford et al. 1996; Burton, Garretson and Velliquette 1999). A mock of the front and back panels of a lasagna frozen food package were created to assimilate an actual package. The front panel contained a picture of the product, the fictitious brand name “Red Ribbon” and the claim “Now healthier than ever”. The back panel contained the detailed nutrition information in a nutrition facts panel.

Participants and Procedure

Eighty-six undergraduate business students at a southeastern public university participated in the study in return for extra course credit. The average age of the participants was 22 years old (Age range 19-32). All study participants were exposed to the front and back panels of the mock frozen food package. Participants then responded to rating scales pertaining to the dependent variables. They were then debriefed and thanked for their participation.

Forty-one males and forty-five females participated in the study. Nutrition label favorability was manipulated by changing the nutrient levels in each version. Similar manipulation was used in prior studies The amount of calories, fat, saturated fat, sodium, carbohydrate and sugar levels were lower in the favorable nutrition label compared to the unfavorable nutrition label. Furthermore, the favorable nutrition label contained higher levels of dietary fiber and vitamin C compared to the unfavorable nutrition label.

Dependent variables

All dependent measures were assessed on a seven-point scale. On all scales, higher values indicated a more positive response. Mean scores were used in the case of multi-item measures. Influence of the nutrition label: The extent to which the nutrition label influenced the evaluation of the product was measured using a two-item 7-point rating scale. Respondents were asked to rate the degree to which the nutrition label information influenced their product evaluation; the first item was anchored by ‘did not
influence my evaluation at all” and “Influenced my evaluation a lot” and the second item was anchored by “Was not important at all in my evaluation” and “Was very important in my evaluation” (Cronbach’s alpha =.91). Disease risk perception: Respondents’ rated their perceptions of disease risk as a result of product consumption using a three-item seven-point rating scale anchored by “strongly disagree” and “strongly agree”. Respondents were asked whether they thought consuming the product would increase the risk of developing heart disease, high blood pressure and of having a stroke (Cronbach’s alpha = .94)

Control variables

Following prior research on the effects of gender as well as research on nutrition labels, we controlled for subject’s prior nutrition knowledge and motivation to process information identified in prior research as possible influencers of the extent of use of the nutrition label in evaluation. Prior knowledge was measured using an eight-item subset of the nutrition knowledge questionnaire used by Andrews, Netemeyer and Burton (1998). A median split (median = 4.0) was used to classify respondents into high and low nutrition knowledge based on their answers to the knowledge questionnaire. Motivation to process nutrition information was measured using three seven-point scale items (Cronbach’s alpha =.93). These motivation items have been utilized in prior research (Keller et al. 1997). Additionally, we also controlled for respondent’s age.

Results

Manipulation check: The favorability of the nutrition label manipulation was checked by comparing respondents’ attitudes toward the nutritive value of the product between the favorable and unfavorable nutrition label conditions, measured using a two seven-point items; “I think the nutrition level of this product is: with endpoints poor / good” and “Based on the information provided, what is your overall attitude towards the nutrition content of this product? with endpoints unfavorable / favorable). Respondents in the favorable nutrition label condition gave the product a more favorable nutritiousness rating than did respondents in the unfavorable label condition (4.19 vs. 2.73) (t (84) = 5.42, p < .001).

Multivariate results: MANOVA results revealed a significant main effect of gender (Wilk’s lambda = 0.91, F = 3.92, p < 0.05) on the dependent variables. The favorability of the nutrition label had a significant effect on the dependent measures (Wilk’s lambda = 0.88, F = 5.19, p < 0.01). A marginally significant interaction effect was observed between gender and nutrition label favorability (Wilk’s lambda = 0.94, F = 2.37, p < 0.1). Follow up univariate results are described below.

Use of the nutrition label: In support of H1, ANOVA analysis revealed a significant main effect for gender, (F (1, 82) = 6.32, p<.05). Males reported greater usage and importance of the nutrition label in overall product evaluation compared to females (6.11 vs. 5.37).

Disease risk perceptions: In support of H2, results revealed a significant main effect of the favorability of the nutrition label on disease risk perceptions (F (1, 82) = 10.29, p < .01). The favorable nutrition label lead to lower disease risk perceptions compared to the unfavorable nutrition label condition (4.07 vs. 5.10). In support of H3a and H3b, a significant interaction effect was observed between gender and favorability of the nutrition label on disease risk perceptions (F (1, 82) = 4.13, p < .05). In the favorable nutrition label condition, males reported lower disease risk perceptions (M = 3.93) compared to females (M = 4.21). In the unfavorable nutrition label condition, males reported higher disease risk perceptions (M = 5.61) compared to females (M = 4.58).

Overall the results provide support for H1, H2, H3a and H3b. Multivariate and Univariate results are presented in table 1. The cell means for all the dependent variables are presented in table 2.
### TABLE 1

**MULTIVARIATE AND UNIVARIATE RESULTS**

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Wilks’ λ</th>
<th>F Value</th>
<th>Nutrition label use</th>
<th>Disease Risk Perceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>0.91</td>
<td>3.92**</td>
<td>6.32**</td>
<td></td>
</tr>
<tr>
<td>Nutrition label favorability</td>
<td>0.88</td>
<td>5.19***</td>
<td></td>
<td>10.29***</td>
</tr>
<tr>
<td><strong>Interaction Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender x Nutrition label favorability</td>
<td>0.94</td>
<td>2.37*</td>
<td>4.13**</td>
<td></td>
</tr>
</tbody>
</table>

*p<0.1  **p<.05  ***p<.01

### TABLE 2

**CELL MEANS**

<table>
<thead>
<tr>
<th></th>
<th>Nutrition label use</th>
<th>Disease risk perceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main effects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>6.11</td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>5.37</td>
<td></td>
</tr>
<tr>
<td>Favorable nutrition label</td>
<td></td>
<td>4.07</td>
</tr>
<tr>
<td>Unfavorable nutrition label</td>
<td></td>
<td>5.10</td>
</tr>
<tr>
<td><strong>Interaction effects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Favorable nutrition label</td>
<td></td>
<td>3.93</td>
</tr>
<tr>
<td>Males</td>
<td></td>
<td>4.21</td>
</tr>
<tr>
<td>Females</td>
<td>5.61</td>
<td></td>
</tr>
<tr>
<td>Unfavorable nutrition label</td>
<td></td>
<td>4.58</td>
</tr>
</tbody>
</table>

Measures are based on seven-point scales

### 4. DISCUSSION AND IMPLICATIONS

Taken together, results from our study provide support to the argument that gender has a significant effect on the processing of nutrition information on food packages. It was shown that gender influences the degree to which males versus females utilize information from the nutrition facts panel in rendering product judgment. Males were shown to more carefully examine the objective nutrition information presented in the nutrition facts panel compared to females. These results contradict the predictions of the selectivity explanation and support the alternative view that males process information more objectively and analytically compared to females. While we also expected the favorability of the nutrition information
to influence the perceptions of disease likelihood as a result of product consumption, results supported the contention that gender moderates this relationship. It was shown that males’ disease risk perceptions were more sensitive to the valence of the nutrition label as compared to females. This result provides further support to our argument that compared to females; males more carefully examined and utilized the information in the nutrition facts panel.

If findings from this research extend to a realistic consumption setting, they may have important implications to public policy makers. The goal of NLEA regulations was to provide consumers with more objective information in order to help them make more informed consumption choices. One way to do this was through the provision of the nutrition facts panel on food packages. Results from this study show that males and females use the nutrition label at varying degrees. This practice was further reflected in males' disease risk perceptions being more responsive to changes in the favorability of the nutrition content of the product compared to females. This greater responsiveness reflects a more careful examination of the product’s nutrition label by males as opposed to females. These results were shown to hold despite controlling for other variables such as subjects’ age, prior nutrition knowledge and motivation to process information. Hence, these findings suggest that public policy should be directed at encouraging women to more carefully utilize nutrition labels for food product evaluation and judgment. Educational programs may be designed to create greater awareness amongst women about the importance of the nutrition label and the link between specific nutrients and disease risk.

While we have highlighted the role of gender in the utilization of nutrition information on food packages, we acknowledge several study limitations that may restrict the generalizability of our results. First, the study was conducted in a contrived setting and not in a grocery store at which food consumption decisions are typically made, furthermore the focus of the study was a mock package and not an actual food package. Hence, respondents were not exposed to other store environment variables that may otherwise be present at the point of purchase. Second, only one food product category was used in this experiment. Different food product categories are perceived differently by consumers in terms of health and nutrition. Hence repeating this study using a different food product such as a box of cereal may prove beneficial. Furthermore, we have only examined the idea that males are more objective and analytical processors compared to females. Future research may investigate whether females are more subjective information processors. This can be done by examining whether females use categorical cues on a food package such as health and promotional claims or brand names more often for product evaluation compared to males. In addition, this study only focused on how gender moderates the relationship between the valence of the nutrition label and disease risk perceptions. Studies are needed that examine how gender interacts with information on a food package to affect product attitudes and willingness to purchase.

5. REFERENCES


**Dr. Khaled Aboulnasr** earned his Ph.D. at the University of Houston in 2004. Currently he is an Assistant Professor of Marketing at Florida Gulf Coast University. His research interests are in the areas of innovation, consumers’ response to new products and international marketing.