

A Study of Food Product Labelling for Products Aimed at Children

Havish Madhvapaty¹, Aparajita DasGupta²

*Assistant Professor – Marketing, Amity Global Business School, Amity University Sector 125 Noida
Uttar Pradesh 201303*

Research Scholar – Bhagwant University Ajmer, Rajasthan

Abstract: *Nutrition labels on food items play an important role owing to the nutrition information they provide. The objective of the paper is to assess, and to identify the need for alternative nutritional labels, such as Front of Pack labeling. The research was conducted through a questionnaire administered across 4 cities aimed at assessing the importance and influence that consumers pay to these labels have while purchasing food targeted at children. This also included the method of traffic light labeling to see what impact it has on customers. It is concluded that there is an urgent need to focus on food labels and look at Front of Pack Labeling in detail. The new methods like the traffic light labeling system received high scores on the survey results – but it was also seen that it needs to be fine-tuned since the Cronbach Alpha scores show a need to improve clarity among the intricacies of traffic light labelling. It should also be ensured though that there is no information overload. There needs to be transparency among food companies, consumers and regulators which empower consumers to make better, more well-informed purchases.*

Keywords: *food labeling, front of pack labeling, nutrition, health, pre-packaged foods, nutrition information panels*

I. Introduction

Getting consumers to eat healthy is no trivial task. One of the major instruments in trying to bring about healthier eating pattern has been nutrition labelling. Nutritional labelling is an attempt to provide consumers, at the point of purchase, with information about the nutritional content of individual food products, in order to enable consumers to choose nutritionally appropriate food (Grunert and Wills, 2007).

In many parts of the world, food companies, consumers and governments are re-examining the provision of nutrition information on food labels. It is important that the nutrition information provided be appropriate and understandable to the consumers and that it impact food-choice behavior (Wills *et al*, 2009). Food labelling represents a valuable tool to help consumers make informed decisions about their diet and life-style. Hence, food labels play an important role by disseminating important nutrition information to consumers. Initially food labelling was limited to food name, quantity, price and identity of the manufacturer. But recently, its important aim is to bridge the gap between the consumers and the original food ingredients. Thus detailed and well-informed nutrition labels have become an indispensable part of today's consumption scenario (Singla, 2010). The principle reason for nutrition labelling is that the consumers have a right to know what is in the purchased food, so that consumers can take better decisions for their own well-being and for their family also (Rotfeld and Taylor, 2009).

Diet related health problems have increased dramatically over the last few years. There is robust evidence that dietary factors are related to the development of chronic diseases such as heart disease, stroke, obesity and diabetes (Astrup, 2001). However, research on nutrition labelling formats is relatively scarce and virtually, there is no insight into how labelling information is used in a real world buying situation and how it will affect consumers' dietary patterns. Also that, the nutrition labelling in India is at evolutionary stage and data on "user friendliness" of these labels are scanty.

Indian Food Industry

Accounting for about 32 per cent of the country's total food market, the food processing industry is one of the largest industries in India and is ranked fifth in terms of production, consumption, export and expected growth. The total food production in India is likely to double in the next 10 years with the country's domestic food market estimated to reach US\$ 258 billion by 2015. The food processing industry forms an important segment of the Indian economy in terms of contribution to GDP, employment and investment, and is a major driver in the country's growth in the near future. This industry contributes as much as 9-10 per cent of GDP in agriculture and manufacturing sector, according to Mr. J.P.Meena, Additional Secretary, Ministry of Food Processing Industries (GOI). The Indian food industry stood around Rs 247,680 crore (US\$ 39.03 billion) in 2013 and is expected to grow at a rate of 11 per cent to touch Rs 408,040 crore (US\$ 64.31 billion) by 2018.

Indian agricultural and processed food exports during April-May 2014 stood at US\$ 3,813.63 million, according to data released by the Agricultural and Processed Food Products Export Development Authority (APEDA). The government through the Ministry of Food Processing Industries (MoFPI) is making all efforts to encourage investments in the sector. It has approved proposals for joint ventures (JVs), foreign collaboration; industrial licenses and 100 per cent export oriented units. According to the data provided by the Department of Industrial Policies and Promotion (DIPP), food processing sector in India has received around US\$ 6,076.58 million worth foreign investments in the period April 2000 - September 2014. Reports from the Organization for Economic Co-operation and Development (OECD) have revealed that the size of the middle class may increase from 1.8 billion to 3.2 billion by 2020 and 4.9 billion by 2030. Of which, 85 percent of this growth will come from Asia. About 80 percent of the growth in global spending from US\$21 trillion to US\$56 trillion by 2030 will be attributed to Asia. China and India are the main contributors to this phenomenon, while countries like Indonesia, Vietnam, Thailand and Malaysia play a significant role too.

Pre-packaged foods and food labels

“Pre-packaged” or “Pre-packed food” means food, which is placed in a package of any nature, in such a manner that the contents cannot be changed without tampering it and which is ready for sale to the consumer. Food Safety and Standards (Packaging and Labelling) Regulations, 2011, notified by Food Safety and Standards Authority of India (FSSAI).

However, Food labelling on a pre-packaged food is a tool to promote and protect public health by providing accurate nutritional information which enable consumers to make informed dietary choices. It is also an instrument of marketing and product promotion used by food companies.

Indian food labelling regulations

The Food Safety and Standards Authority of India has been established under the Food Safety and Standards Act, 2006 as a statutory body for laying down the science based standards for articles of food and for regulating manufacturing, processing, storage, distribution, sale and import of food so as to ensure and safe and wholesome food for human consumption.

In order to safe guard the interest of the consumer, The Food Safety and Standards (Packaging and Labelling) Regulations, 2011, provides that every packaged food article has to be labelled and it shall provide the following information:

- The name of food,
- List of Ingredients,
- Nutritional information,
- Declaration regarding vegetarian or non-vegetarian,
- Declaration regarding food additives,
- Name and complete address of the manufacturer or packer,
- Net quantity,
- Code No. /Lot No./ Batch No.,
- Date of manufacture or packing,
- Best before and Use by date,
- Country of origin for imported food, and
- Instructions for use

In addition to the above information the manufacturer or the packer has to also ensure that the label complies with the general requirements of labelling prescribed under the regulations i.e. the label should not become separated from the container, contents on the label shall be correct, clear and readily legible and shall be in English or Hindi language, etc.

Indian food labelling regulations on the imported foods (A new amendment, 2011)

On October 13, 2011, the Food Safety and Standards Authority of India (FSSAI) published “ad hoc guidelines related to imported food clearance process by FSSAI’s Authorized Officers.” According to the guideline absences of the vegetarian/non-vegetarian logo, and name and address of importer, are considered “rectifiable labelling deficiencies” which may be dealt with via sticker labels in the customs bonded warehouse at the port. However, absence of name and address of manufacturer, list of ingredients, production date, best-before or expiry date; batch or code or lot number; net weight or volume; or nutritional information, when required, is not rectifiable with sticker labels. Furthermore, on December 21, 2011, the FSSAI issued a corrigendum on Food Safety and Standards (packaging and labelling) Regulations, 2011. According to this corrigendum, wholesale packages are no longer exempted from labelling requirements. This interpretation has

been made using sources deemed authoritative and reliable, but no warranty, express or implied, is made as to its accuracy (Office Agricultural Affairs of the USDA, 2011).

Objectives

The objectives of the papers are:

1. To discuss the current volume of work in the area of nutrition label use.
2. To analyse consumer views on labelling for products aimed at children.

II. Methodology

The research was primary in nature aimed at consumer behavior and awareness level.

For the same the following methodology was employed:

Sampling type:	Stratified sampling
Sample Geography:	4 cities – NCR, Hyderabad, Mumbai, and Chennai
Sample Size:	100 respondents each; Mothers with at least 1 kid going to school
Respondent Segment Classification:	SEC A1, A2
Respondent Income group:	Rs. 40,000 p.m. – Rs. 1, 20,000 p.m.
Mode of survey:	Online + CATI
Tools used:	SPSS 20.0; MS Excel 2013

III. Discussion

Globally, diet-related health problems have increased dramatically over the last few years. Consequently, nutritional labelling has emerged as an important aspect of the food purchasing decision both for the scientific and the non-scientific literature. Most empirical applications with respect to label use have been based on Stigler's (1961) approach (cost-benefit), although others have attempted to develop and provide theoretical frameworks (Drichoutiset *al.*, 2006; Sexton, 1979; Zarkin and Anderson, 1992)

Nutritional labelling

The way nutrition labels are formatted influences how effectively they can be used, interpreted and compared by consumers. Regulations are important because they dictate which nutrients are listed and the way that they are expressed quantitatively, along with other aspects of label design. The Codex has encouraged consistency between trading partners, but different countries have developed a diverse array of approaches to these requirements.

The Codex General Standard for the Labelling of Pre-Packaged Foods was adopted in 1969: the first international standard to be approved by the newly formed Codex Alimentarius Commission (CAC, 1969). However, the main shift is from a strict 'prevention of fraud' scenario (1960s) to a scenario of providing consumer information (1990s) and, finally, to a scenario of delivering health policy through labelling.

Codex Alimentarius Commission has published guidelines on Nutrition labelling, CAC/GL 2-1985 (Rev. 1-1993); guidelines for use of Nutrition claims, CAC/GL 23-1997 and guidelines on claim CC/GL 1-1979 (Rev. 1-1991), which are all followed by FSSAI in an un-deviated state. Under NLEA, some foods are exempt from nutrition labelling. These include:

- Foods served for immediate consumption as in cafeterias, airplanes, food service vendors and vending machines.
- Ready-to-eat food that is not for immediate consumption but is primarily prepared onsite – e.g. bakery, candy store items.
- Foods shipped in bulk, as long as it is not for sale in that form to consumers.
- Medical foods such as those used to address the needs of patients with certain diseases.
- Plain coffee and tea, some spices, and other foods that contain no significant amounts of any nutrients.

Nutrition Information Panels: Under the labels - Nutrition Facts panel, manufacturers are required to provide information on certain nutrients. The mandatory (in italics) and voluntary components and the order in which they must appear are:

- Total calories
- Calories from fat
- Calories from saturated fat
- Total fat
- Saturated fat
- Polyunsaturated fat
- Monounsaturated fat

- Cholesterol
- Sodium
- Potassium
- Total carbohydrates
- Dietary fibre
- Soluble fibre
- Insoluble fibre
- Sugars
- Sugar alcohol
- Protein
- Vitamin A
- Percent of vitamin A percent as beta-carotene
- Vitamin C
- Iron
- Other essential vitamins and minerals

If a claim is made about any of the optional components, or if a food is fortified or enriched with any of them, nutrition information for these components becomes mandatory. The required nutrients were selected because they address today's health concerns. The order in which they must appear reflects the priority of current dietary recommendations.

Confusing NIPs and a shift to front of pack nutritional labelling

With the huge number of packaged food and beverages available in markets, it is becoming increasingly difficult to make healthy food choices. Mandatory labelling requirements as ingredients lists and nutrition information panels (NIPs), together with the proliferation of different labelling schemes, such as nutrition claims (e.g. "99% fat free"), labels showing percentage contribution to daily intakes, and endorsement programs, compete for consumers' attention and valuable label space. This can make the task of identifying healthy foods confusing. Meanwhile, the need to select healthier foods is more important than ever, as Indians are getting fatter, and are at increased risk of developing heart disease, diabetes and some forms of cancer.

Currently in India, nutrition information in the form of a NIP is mandatory on food packages. While NIPs are an important tool for providing consumers with in-depth information on a product's nutritional composition, research has shown that some consumers find this information confusing and difficult to interpret. An easier to understand system for labelling foods is therefore needed to support the NIP. One such alternative labelling system, which has been gathering support internationally, is the placement of nutrition information on the front of food packages, where it is immediately visible to consumers. This type of nutrition labelling is referred to as front-of-pack food labelling. There are essentially two main front-of-pack food labelling systems that have been developed internationally and proposed for use. These include the:

i. **Traffic Light system;** where total fat, saturated fat, sugar and sodium are ranked and color coded as either high (red), medium (amber) or low (green), based on nutrient cut-points.

ii. **Percentage Daily Intake (%DI) system;** which shows the contribution of energy, protein, total fat, saturated fat, total carbohydrate, sugar, fiber and sodium provided by a serve of a food as a percentage of daily requirements for each nutrient, based on the estimated nutrient requirements of a reference adult (a 70kg adult male).

Previous consumer research conducted in the United Kingdom found that consumers' ability to correctly use and interpret front-of-pack food labelling information to identify healthy food products was significantly better for Traffic Light labelling system compared with other front of-pack labelling systems. As nutrition labelling requirements for food products sold in India differ from those in the UK, it was important to determine how Indian consumers use and interpret various front-of-pack labelling systems to inform future decisions about the use of front of-pack labelling in the Indian market.

Determinants of Nutritional Label Use

There is considerable empirical research on the determinants of nutritional label use. These studies primarily deal with identifying the profile of consumers who use nutritional food labels using Stigler's (1961) cost-benefit approach, i.e., consumers will search for nutrition-related information as long as the costs (mainly viewed as time spent reading labels) do not outweigh the benefits (healthful food choices). Many of these studies have focused on exploring the determinants of nutritional labels in general, while only a few made a

distinction between ingredient lists and nutrition panels (Bender and Derby, 1992), or explored the use of specific nutrient information (Nayga et al., 2005; Nayga, 1996). One study has assessed the determinants of perceptions and/or beliefs of label usage (Nayga, 1999).

Following Nayga et al., (2005) and Nayga (1999), development of a conceptual framework by grouping the factors affecting the use of on-pack nutrition information into the following categories can be done:

- a. Individual characteristics;
- b. Situational, Attitudinal, and Behavioral;
- c. Product class involvement;
- d. Knowledge;
- e. Motivational factors; and
- f. Other factors

Mandatory vs. Voluntary Labeling

Mandatory labelling is called to fill the void of information provision mainly by correcting asymmetric information or by correcting externality problems. When the food consumption choices of consumers affect the welfare of others, and these welfare effects are not priced, then consumers may consume more or less than is socially opt-mal. The producers, manufacturers, and retailers of Energy-Dense, Nutrient-Poor foods (EDNP) (Kant, 2000) are just as socially powerful as the tobacco industry (Lambert, Dibsdall, and Frewer, 2002) and their lobbying capability is substantial (Padberg, 1999). Others have argued that if the government has the choice of banning a risky product or activity, and providing information about the risks involved, it should choose the informational provision (Magat and Viscusi, 1992). Either way, prescriptions such as “more information is always better” may not characterize an optimal policy solution for nutrition labelling (Teisl, Bockstael, and Levy, 1997). Additional information need not result in better purchasing decisions by consumers, but it could result in worse decisions (Sexton, 1979, 2001).

The benefits arising from mandatory labelling can be product reformulation, product innovation, and changed consumer behavior. Mandatory labelling could improve food products if producers reformulate their products to avoid having to make unfavorable disclosures (Aldrich, 1999), thus moving the benefits from label users to consumers who do not use labels for their purchasing decision (Caswell and Padberg, 1992). However, studies have shown that “producers behave strategically in such situations—for example, by reducing the price of less healthful foods, adding to the uncertainty about the eventual effect of reformulation on consumer diets (Variyam, 2005). The largest benefit can accrue if consumers who are overweight and who have poor diets, change their behavior and start choosing foods based on nutritional information. However, in order to be successful, nutrition programs, besides making more nutritional information available, may also need to instruct the consumer on how to use the information (Cole, Balasubramanian, and Castellano, 1992).

As Golan et al. (2000) noted, mandatory labelling can be an appropriate policy tool when consumer preferences differ, information is clear and concise, information on product use enhances safety, costs and benefits of consumption are borne by the consumer, and when no political consensus on regulation exists.

Does Nutritional Label Use Affect Purchasing Behavior?

Derby and Levy (2001) reported that, in the 1990 Diet and Health Survey, one-third of consumers said they had changed their decision to buy a product because of the information on the nutrition label. The same authors report that in another survey in 1995, almost 48% of consumers reported that they changed their purchasing behavior due to nutritional labels. Furthermore, they cite a 1996 survey where one-third of those interviewed said that they stopped buying a product that they had regularly purchased and used because they read the nutrition label, and one in four started to buy or use a product not used before based on the nutrition label, with fat being the main information that influenced their decision.

In accordance with the previously reported results, Hawkes (2004), and Shine, O’Reilly, and O’Sullivan (1997b) found that nutrient information does affect food choice. The most common reason cited for use of this information was the avoidance of negative nutrients (Shine, O’Reilly, and O’Sullivan, 1997b). Furthermore, Baltas (2001a) found that nutritional information affected brand choice. In other studies, results suggest that labelling of food products, with respect to their nutritional characteristics along with an information campaign to educate consumers, can significantly affect consumer behaviour (Teisl and Levy, 1997). Kreuter et al. (1997) conducted a survey in a clinical setting and results revealed that patients eating diets lower in fat were much more likely than patients whose diets were higher in fat, to report that nutritional labels influenced their food purchasing decisions.

Can Use of Nutritional Information Lead to Dietary Changes?

Variyam, Blaylock, and Smallwood (1995; 1997) assessed the effect of information (as expressed by knowledge) on dietary intake. This study found that general knowledge reduced the intake of total fat, saturated

fat, and cholesterol. Brown and Schrader (1990) found that increased information about cholesterol decreased egg consumption per capita. Similarly, Yen, Jensen, and Wang (1996) found that nutritional information changed demand for fats and oils. Chern, Loehman, and Yen (1995) found that cholesterol information reduced consumption of butter and lard.

Survey results are more specific when it comes to the use of nutritional information. In general, label use has been found to affect diet (Hawkes, 2004), and increased use of food labels has been associated with healthier patterns of dietary behavior as well as food choice motivations (Coulson, 2000). Other studies associated label use with diets high in vitamin C and low in cholesterol (Guthrie et al., 1995) and with a lower percentage of calories from fat (Lin and Lee, 2003). In addition, disclosure of cereal brands' sugar content ("negative" information) caused consumers to switch to low-sugar cereals (Russo et al., 1986), while Variyam, Blaylock, and Smallwood (1996) confirmed the influence of nutritional information on fiber intake.

Furthermore, consumers' label use was found to increase the average Healthy Eating Index (HEI) by a range between 3.5 and 6.1 points, with higher improvements in diet quality detected when health claim information was used (Kim, Nayga, and Capps, 2001a). Variyam (2004) found that the Nutrition Facts panel that was mandated by the NLEA, increased the fiber, iron, and protein intakes of consumers who used labels compared with non-users. Neuhouser and Patterson (1999) found that label use was associated with lower fat intake, explaining 6% of the variance in fat intake. Kim and Capps (2000) found that label users generally had healthier diets than non-users, i.e., lower percentage of calories from fat and saturated fat, lower cholesterol and sodium intake, and higher fiber intake.

Analysis

Table 1 shows the respondent break up of women taken from the 4 cities.

Table 1: Respondent Break - Up

AREA	RESPONDENT AGE			TOTAL
	25 - 30	30 - 45	45 Above	
	F	F	F	
NCR	37	34	29	100
Mumbai	44	31	25	100
Chennai	37	35	28	100
Bangalore	40	30	30	100

Table 2 shows the respondent thoughts on various parameters. This shows that the respondents have typically given low scores regarding transparency of food companies as far as labels are concerned. Also a high proportion of women feel that misinformation and gimmicks are both high.

Table 2: Respondent feedback on various parameters

	Very High	High	Can't Say	Low	Very Low
Ease of understanding of Labels	12	19	10	45	14
Clarity of information presented	13	24	13	34	16
Misinformation Provided	34	19	21	16	10
Unwanted tactics / gimmicks used at children	51	23	16	8	2

When shown the following Image 1, the respondents overwhelmingly gave high scores to the ease of readability, with 92% (92) of the total 100 respondents stating they would strongly encourage this on the front of the pack.

Image 1: Front of Pack label example shown to respondents

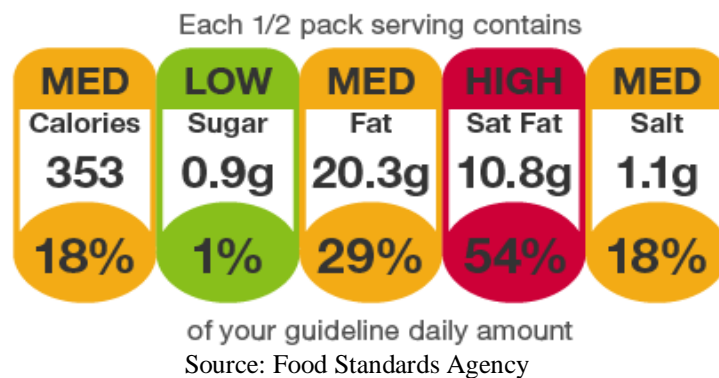


Table 3 and Table 4 show the Cronbach Alpha scores to check for consistency of responses. The values being greater than 0.70 show that there was consistency in responses, but we would have expected a higher score. This shows that even though the respondents strongly favor front of pack labelling and more transparency from food companies and regulators, the thoughts are not very articulate.

Table 3: Cronbach Alpha Questions: Consistency of Responses

Variables	Questions
Food Labeling	Clarity of information provided
	Visibility of label
	Relevant information highlighted
Influence of Food purchasing	Label information strongly influence food purchase
	Serving Size information is important
	Labels are seen while purchasing new brands

Table 4: Cronbach Alpha Scores

Variables	Cronbach Alpha Score
Food Labeling	0.71
Influence of Food purchasing	0.74

IV. SuggestionsAnd Future Implications

1. Approaches like front of pack labelling indeed are given positive scores by the respondents – showing that improvements in labelling will go a long way.
2. There is a lot of influence that packaging and labelling has on the purchase intent.
3. Despite extensive literature in the area of nutrition labelling and also in food product marketing and advertising for children, there is a dearth of specific research into how nutritional labelling specifically influences purchase of food products aimed at children.
4. There needs to be a concerted endeavour to ensure that consumers are informed about what the labelling stand for and how it is read. Here food companies and regulators both have a part to play.
5. Heavy- handed regulation and nutrition education programs could increase the current consumer backlash against diet and nutrition messages. Highly involved consumers may actively ignore nutrition information to avoid the negative emotions that may arise if the food is less nutritious than they had thought.
6. A win-win situation for both food companies and consumers would be if food companies help consumers better control their consumption and promote favourable attitudes towards the brand and company; since overconsumption can lead to weight gain, rapid satiation and delayed purchasing – which would harm the food companies. This holds even more importance in case of children since it is a sensitive target group.
7. Future research opportunities are to understand the purchases children make when not monitored by parents e.g. in school.

References

- [1]. Abbott, R. (1997). Food and nutrition information: a study of sources, uses, and understanding. *British Food Journal*, 99(2), 43-49.
- [2]. Aldrich, L. (1999). Consumer use of information: Implications for food policy. Food and Rural Economics Division, Economic Research Service, U.S. Department of Agriculture. *Agricultural Handbook No. 715*.
- [3]. Andrews, J. C., Netemeyer, R., and Burton, S. (1998). Consumer generalization of nutrient content claims in advertising. *Journal of Marketing*, 62(October), 62-75.
- [4]. Balasubramanian, S. K., and Cole, C. A. (2002). Consumers' search and use of nutrition information: The challenge and promise of the Nutrition Labeling and Education Act. *Journal of Marketing*, 66(July), 112-127.
- [5]. Baltas, G. (2001b). Nutrition labelling: issues and policies. *European Journal of Marketing*, 35(5/6), 708-721.
- [6]. Beatty, S. E., and Smith, S. M. (1987). External search effort: An investigation across several product categories. *Journal of Consumer Research*, 14(1), 83-95.
- [7]. Burton, S., and Andrews, J. C. (1996). Age, product nutrition, and label format effects on consumer perceptions and product evaluations. *The Journal of Consumer Affairs*, 30(1), 68-89.
- [8]. Burton, S., and Biswas, A. (1993). Preliminary assessment of changes in labels required by the Nutrition Labeling and Education Act of 1990. *The Journal of Consumer Affairs*, 27(1), 127-144.
- [9]. Byrd-Bredbenner, C., Wong, A., and Cottee, P. (2000). Consumer understanding of US and EU nutrition labels. *British Food Journal*, 102(8), 615-629.
- [10]. Caswell, J. A. (1992). Current information levels on food labels. *American Journal of Agricultural Economics*, 74(5), 1196-1201.
- [11]. Caswell, J. A., and Mojdzuska, E. M. (1996). Using informational labeling to influence the market for quality in food products. *American Journal of Agricultural Economics*, 78(5), 1248-1253.
- [12]. Coestier, B., Gozlan, E., and Marette, S. (2005). On food companies liability for obesity. *American Journal of Agricultural Economics*, 87(1), 1-14.
- [13]. Cole, C. A., and Balasubramanian, S. K. (1993). Age differences in consumers' search for information: Public policy implications. *The Journal of consumer Research*, 20(1), 157-169.
- [14]. Cole, C. A., Balasubramanian, S. K., and Castellano, N. M. (1992). Individual differences in consumers' willingness to use nutritional information. In J. F. Sherry, Jr. and B. Sternthal (Eds.), in *Advances in Consumer Research* (Vol. 19, pp. 489-490). Provo, USA: Association for Consumer Research.

- [15]. Coulson, N. S. (2000). An application of the stages of change model to consumer use of food labels. *British Food Journal*, 102(9), 661-668.
- [16]. Cowburn, G., and Stockley, L. (2003). A systematic review of the research on consumer understanding of nutrition labelling. Brussels: European Heart Network.
- [17]. Co-operative Wholesale Society Ltd., UK. (2002). Lie of the label II: Why dishonest labelling is past its sell-by date: Co-operative Wholesale Society Ltd., UK.
- [18]. Crespi, J. M., and Marette, S. (2003). Some economic implications of public labeling. *Journal of Food Distribution Research*, 34(3), 83-94.
- [19]. Crutchfield, S., Kuchler, F., and Variyam, J. N. (2001). The economic benefits of nutrition labeling: A case study for fresh meat and poultry products. *Journal of Consumer Policy*, 24, 185-207.
- [20]. Darby, M. R., and Karni, E. (1973). Free competition and the optimal amount of fraud. *Journal of Law and Economics*, 16(1), 67-88.
- [21]. Derby, B. M., and Fein, S. B. (1994). Meeting the NLEA Challenge: A Consumer Research Perspective. In R. Shapiro (Ed.), *Nutrition Labeling Handbook* (pp. 315-353). New York: Marcel Dekker.
- [22]. Drichoutis, A. C., Lazaridis, P., and Nayga, R. M., Jr. (2006). The economics of nutrition information search: Agricultural University of Athens.
- [23]. Drichoutis, A. C., Lazaridis, P., and Nayga, R. M., Jr. (2007). An assessment of product class involvement in food purchasing behaviour. *European Journal of Marketing*, 40(forthcoming).
- [24]. Eves, A., Gibson, S., Kilcast, D., and Rose, D. (1994). Influence of nutrition information on the attitudes and knowledge of dieters. *Nutrition & Food Science*, 5(September/October), 17-21.
- [25]. European Advisory Services. (2004). The introduction of mandatory labelling in the European Union. Brussels: European Advisory Services.
- [26]. Feick, L. F., Herrmann, R. O., and Warland, R. H. (1986). Search for nutrition information: A probity analysis of the use of different information sources. *The Journal of Consumer Affairs*, 20(2), 173-192.
- [27]. Finke, M. S. (2000). Did the Nutrition Labeling and Education Act affect food choice in the United States?, *The American Consumer and the Changing Structure of the Food System Conference*. Arlington, VA: Economic Research Service USDA.
- [28]. Ford, G. T., Hastak, M., Mitra, A., and Ringold, D. J. (1996). Can consumers interpret nutrition information in the presence of a health claim? A laboratory investigation. *Journal of Public Policy & Marketing*, 15(1), 16-27.
- [29]. Garretson, J. A., and Burton, S. (2000). Effects of nutrition facts panel values, nutrition claims, and health claims on consumer attitudes, perceptions of disease-related risks, and trust. *Journal of Public Policy & Marketing*, 19(2), 213-227.
- [30]. Geiger, C. J., Wyse, B. W., Parent, C. R., and Hansen, R. G. (1991). Nutrition labels in bar graph format deemed most suitable for consumer purchase decisions using adaptive conjoint analysis. *Journal of the American Dietetic Association*, 91(7), 800-807.
- [31]. Golan, E., Kuchler, F., Mitchell, L., Greene, C., and Jessup, A. (2000). Economics of food labelling. USDA Re-search Service, Agricultural Economic Report No. 793.
- [32]. Guthrie, J. F., Derby, B. M., and Levy, A. S. (1999). What people know and do not know about nutrition. In E. Frazao (Ed.), *America's eating habits: Changes and consequences* (pp. 243-280): US Department of Agriculture, Economic Research Service, Agricultural Information Bulletin No. (AIB750).
- [33]. Guthrie, J. F., Fox, J. J., Cleveland, L. E., and Welsh, S. (1995). Who uses nutritional labeling, and what effects does label use have on diet quality? *Journal of Nutrition Education*, 27(4), 163-172.
- [34]. Hawkes, C. (2004). Nutrition labels and health claims: the global regulatory environment. World Health Organization, Geneva.
- [35]. Heimbach, J. T., and Stokes, R. C. (1982). Nutrition labeling and public health: survey of American Institute of Nutrition members, food industry, and consumers. *The American Journal of Clinical Nutrition*, 36(October), 700-708.
- [36]. Higginson, C. S., Rayner, M. F., Draper, S. W., and Kirk, T. R. (2002). The nutrition label - which information is looked at? *Nutrition and Food Science*, 32(3), 92-99.
- [37]. Ippolito, P. M., and Mathios, A. D. (1990). Information, advertising and health choices: A study of the cereal market. *The RAND Journal of Economics*, 21(3), 459-480.
- [38]. Ippolito, P. M., and Mathios, A. D. (1991). Health claims in food marketing: Evidence on knowledge and behavior in the cereal market. *Journal of Public Policy & Marketing*, 10(1), 15-32.
- [39]. Kant, A. K. (2000). Consumption of energy-dense, nutrient-poor foods by adult Americans: nutritional and health implications. The third National Health and Nutrition Examination Survey, 1988-1994. *American Journal of Clinical Nutrition*, 72, 929-936.
- [40]. Katona, G. C., and Mueller, E. (1955). A study of purchase decisions. In L. H. Clark (Ed.), *Consumer behavior: The dynamics of consumer reactions* (pp. 30-87). New York: New York University Press.
- [41]. Keller, S. B., Landry, M., Olson, J., Velliquette, A. M., Burton, S., and Andrews, J. C. (1997). The effects of nutrition package claims, nutrition facts panels, and motivation to process nutrition information on consumer product evaluations. *Journal of Public Policy & Marketing*, 16(2), 256-269.
- [42]. Kim, S.-Y., Nayga, R. M., Jr., and Capps, O., Jr. (2000). The effect of food label use on nutrient intakes: An endogenous switching regression analysis. *Journal of Agricultural and Resource Economics*, 25(1), 215-231.
- [43]. Kim, S.-Y., Nayga, R. M., Jr., and Capps, O., Jr. (2001a). Food label use, self-selectivity, and diet quality. *The Journal of Consumer Affairs*, 35(2), 346-363.
- [44]. Kreuter, M. W., Brennan, L. K., Shriff, D. P., and Lukwago, S. N. (1997). Do nutrition label readers eat healthier diets? Behavioural correlates of adults' use of food labels. *American Journal of Preventive Medicine*, 13, 277-283.
- [45]. Leung, P., and Miklius, W. (1997). Demand for nutrition vs. demand for tastes. *Applied Economics Letters*, 4, 291-295.
- [46]. Levy, A. S., and Fein, S. B. (1998). Consumers' ability to perform tasks using nutrition labels. *Journal of Nutrition Education*, 30(4), 210-217.
- [47]. Levy, A. S., Fein, S. B., and Schucker, R. E. (1996). Performance characteristics of seven nutrition label formats. *Journal of Public Policy & Marketing*, 15(1), 1-15.
- [48]. Lin, C.-T. J., and Lee, J.-Y. (2003). Dietary fat intake and search for fat information on food labels: New evidence. *Consumer Interests Annual*, 49.
- [49]. Loureiro, M. L., Gracia, A., and Nayga, R. M., Jr. (2006). Do consumers value nutritional labels? European Re-view of Agricultural Economics, 33(2), 249-268.
- [50]. Magat, W. A., and Viscusi, W. K. (1992). Informational approaches to regulation. Cambridge MA: MIT Press.
- [51]. Mazis, M. B. (1980). An overview of product labeling and health risks. In L. A. Morris, M. B. Mazis, and I. Barofsky (Eds.), *Product labeling and health risks*. New York: Cold Spring Harbor Laboratory.

- [52]. Mazis, M. B., and Raymond, M. A. (1997). Consumer perceptions of health claims in advertisements and on food labels. *The Journal of Consumer Affairs*, 31(1), 10-26.
- [53]. Mojduszka, E. M. (2001). Integration of a product choice model and a latent variable model of nutrition information, AAEA conference. Chicago, Illinois.
- [54]. Moorman, C. (1998). Market level effects of information: Competitive responses and consumer dynamics. *Journal of Marketing Research*, 35(February), 82-98.
- [55]. Moorman, C., and Matulich, E. (1993). A model of consumers' preventive health behaviours: the role of health motivation and health ability. *Journal of Consumer Research*, 20(September), 208-228.
- [56]. Nayga, R. M., Jr. (1996). Determinants of consumers' use of nutritional information on food packages. *Journal of Agricultural and Applied Economics*, 28(2), 303-312.
- [57]. Nayga, R. M., Jr. (1999). Towards an understanding of consumers' perceptions of food labels. *International Food and Agribusiness Management Review*, 2(1), 29-45.
- [58]. Nayga, R. M., Jr. (2000). Nutrition knowledge, gender, and food label use. *The Journal of Consumer Affairs*, 34(1), 97-112.
- [59]. Nayga, R. M., Jr., Lipinski, D., and Savur, N. (1998). Consumers' use of nutritional labels while food shopping and at home. *The Journal of Consumer Affairs*, 32(1), 106-120.
- [60]. O'Rourke, A., Stanley, J. C., Ravnskov, U., and Marshall, T. (2000). VAT and fat. *British Medical Journal*, 320(7247), 1469-1476.
- [61]. Park, W. C., Iyer, E. S., and Smith, D. C. (1989). The effects of situational factors on in-store grocery shopping behavior: The role of store environment and time available for shopping. *The Journal of consumer Research*, 15(4), 422-433.
- [62]. Prathiraja, P. H. K., and Ariyawardana, A. (2003). Impact of nutritional labeling on consumer buying behavior. *Sri Lankan Journal of Agricultural Economics*, 5(1), 35-46.
- [63]. Roe, B., Levy, A. S., and Derby, B. M. (1999). The impact of health claims on consumer search and product evaluation outcomes: Results from FDA experimental data. *Journal of Public Policy & Marketing*, 18(1), 89-105.
- [64]. Rose, D. (1994). Attitudes and behaviors related to weight status. *Food Review*, 17, 30-35.
- [65]. Russo, J. E., Staelin, R., Nolan, C. A., Rusell, G. J., and Metcalf, B. L. (1986). Nutrition information in the supermarket. *Journal of Consumer Research*, 13(1), 48-70.
- [66]. Schenker, S. (2000). VAT on fatty foods. *Nutrition Bulletin*, 25, 101-102.
- [67]. Schultz, T. W. (1975). The value of the ability to deal with disequilibria. *Journal of Economic Literature*, 13(3), 827-846.
- [68]. Schupp, A., Gillespie, J., and Reed, D. (1998). Consumer awareness and use of nutrition labels on packaged fresh meats: A pilot study. *Journal of Food Distribution Research*, 29(2), 24-30.
- [69]. Seiders, K., and Petty, R. D. (2004). Obesity and the role of food marketing: A policy analysis of issues and remedies. *Journal of Public Policy & Marketing*, 23(2), 153-169.
- [70]. Sexton, R. J. (1979). A theory on information and its application to the effect of labeling on food products. Staff paper P79-35, Department of Agricultural and Applied Economics, University of Minnesota, October.
- [71]. Shine, A., O'Reilly, S., and O'Sullivan, K. (1997a). Consumer attitudes to nutrition labelling. *British Food Journal*, 99(8), 283-289.
- [72]. Silberberg, E., and Suen, W. (2001). *The structure of economics, A mathematical approach* (3rd ed.). New York: McGraw-Hill.
- [73]. Smith, T. G. (2004). The McDonald's equilibrium, Advertising, empty calories, and the endogenous determination of dietary preferences. *Social Choice and Welfare*, 23, 383-413.
- [74]. Stigler, G. J. (1961). The economics of information. *The Journal of Political Economy*, 69(3), 213-225.
- [75]. Stubenitsky, K., Aaron, J. I., Catt, S. L., and Mela, D. J. (2000). The influence of recipe modification and nutritional information on restaurant food acceptance and macronutrient intakes *Public Health Nutrition*, 3(2), 201-209.
- [76]. Szykman, L. R., Bloom, P. N., and Levy, A. S. (1997). A proposed model of the use of package claims and nutrition labels. *Journal of Public Policy and Marketing*, 16(2), 228-241.
- [77]. Teisl, M. F., Bockstael, N. E., and Levy, A. S. (1997). Preferences for food labels: A discrete choice approach. In J. A. Caswell and R. W. Cotterill (Eds.), *Strategy and policy in the food system: Emerging issues* (pp. 171-194). Washington, D.C.
- [78]. Teisl, M. F., and Levy, A. S. (1997). Does nutrition labeling lead to healthier eating? *Journal of Food Distribution Research*, 28(3), 18-27.
- [79]. Variyam, J. N. (2004). Evaluating the effect of nutrition labels: a quasi-experimental approach, *Creating and Using Evidence in Public Policy Analysis and Management*. Atlanta, GA, USA: Twenty-Sixth Annual AP-PAM Research Conference.
- [80]. Variyam, J. N. (2005). Nutrition labeling in the Food-Away-From-Home sector: An economic assessment: United States Department of Agriculture, Economic Research Service Report No 4.
- [81]. Variyam, J. N., Blaylock, J., and Smallwood, D. (1995). Modelling nutrient intake: The role of dietary information. Economic Research Service, US Department of Agriculture, TB-1842.
- [82]. Variyam, J. N., Blaylock, J., and Smallwood, D. (1996). A probity latent variable model of nutrition information and dietary fibre intake. *American Journal of Agricultural Economics*, 78, 628-639.
- [83]. Variyam, J. N., Blaylock, J., and Smallwood, D. (1997). Diet-health information and nutrition: The intake of dietary fats and cholesterol. Economic Research Service, US Department of Agriculture, TB-1855.
- [84]. Wang, G., Fletcher, S. M., and Carley, D. H. (1995). Consumer utilization of food labeling as a source of nutrition information. *The Journal of Consumer Affairs*, 29(2), 368-380.
- [85]. Wansink, B. (2003). How do front and back package labels influence beliefs about health claims. *The Journal of Consumer Affairs*, 37(2), 305-316.
- [86]. Yen, S. T., Jensen, H. H., and Wang, O. (1996). Cholesterol information and egg consumption in the US: a non-normal and heteroskedastic double-hurdle model. *European Review of Agricultural Economics*, 23(3), 343-356.
- [87]. Zarkin, G. A., and Anderson, D. W. (1992). Consumer and producer responses to nutrition label changes. *American Journal of Agricultural Economics*, 74(5), 1202-1207.