Consumer Perceptions of Front-of-package Labelling Systems and Healthiness of Foods

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ABSTRACT

OBJECTIVE: The purpose of this study was to assess the impact of four different front-of-package (FOP) labelling systems on consumer perception and purchasing intent of food, and whether these systems help consumers select a balanced pattern of eating.

METHODS: The four FOP labelling systems studied included two nutrient-specific systems – the Traffic Light (TL) and the Guideline Daily Amount (GDA) – and two summary indicator systems – NuVal® and My-5®. Phase 1 was a small study with 36 participants to determine consumer understanding of the four FOP labelling systems and to inform the development of the questions for Phase 2, which consisted of a survey of 2,200 adults obtained through an online panel.

RESULTS: Although the TL and GDA were rated similar to the Nutrition Facts table in terms of attributes, these FOP systems were considered more visually appealing. Consumers indicated that the numeric summary indicator systems did not provide sufficient information. Approximately half of the respondents indicated that the FOP systems would help them make healthier choices. However, due to the limitations of each, consumers often misinterpreted a food's healthiness compared to their baseline perceptions. Similarly, consumers' intent to purchase based on the FOP system did not show a consistent pattern.

CONCLUSION: Although well received by consumers, FOP labelling systems can lead to confusion depending on perceived understanding of the system used. The nutrient-specific systems tend to be preferred by most consumers; however, the overall impact on selecting healthier eating patterns has yet to be demonstrated.

KEY WORDS: Front-of-package labelling systems; consumer perceptions; intent to purchase

La traduction du résumé se trouve à la fin de l'article.

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Chronic diseases in Canada continue to be a major cause of mortality and morbidity. More than a third of Canadian adults are overweight and almost a quarter are obese.¹ Excess weight along with hypertension and metabolic syndrome can lead to chronic diseases as well as increased risk of mortality.² These conditions are altered by a number of modifiable risk factors, including food choices.³ As a result, governments, health agencies and industries are looking at ways to help consumers make better food choices, including identifying healthier options through information on product labels. Nutrition labelling is an important policy tool that provides consumers with information that can assist them in making healthy food choices. Components of nutrition labelling include the Nutrition Facts table (NFT), the list of ingredients, nutrient content claims and health claims.⁴ In addition, Health Canada has developed tools to help consumers use the NFT and determine whether a food has a little or a lot of a particular nutrient.⁵ Other labelling initiatives include front-of-package (FOP) symbols and point of purchase (POP) information. The intent of FOP labelling or similar initiatives is to convey a product's attributes at a glance so that consumers are able to make healthier food choices.⁶ Currently, a myriad of FOP systems exist in the marketplace.

In recent years, several stakeholders – food manufacturers, retailers, governments and non-government agencies – have developed FOP systems. However, the number of published studies on the impact of these FOP systems is limited.

The purpose of this study was twofold: to assess the impact of four different FOP labelling systems on consumer perception and

purchasing intent of food; and to determine whether these systems help consumers select foods that could potentially lead to a more balanced eating pattern. The four FOP labelling systems are the Traffic Light System,⁷ the NuVal® System,⁸ the My-5® System⁹ and the Guideline Daily Amount System.¹⁰

METHODS

The study consisted of both qualitative (Phase 1) and quantitative (Phase 2) research. Phase 1 involved two moderated online bulletin boards – one group of 20 Nutrition Facts Table (NFT) users and another group of 16 non-users. Participants were recruited through TNS Canada's* online panel. Each group participated in their own individual bulletin board. Participants were asked to login at least twice a day between May 4 and 6, 2011 to respond to a series of open-ended questions; responses could be in either English or

* TNS Canada is one of Canada's largest marketing and social research firms.

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French. The goal of Phase 1 was to determine consumer understanding of the four FOP labelling systems and to use this information to form questions for the quantitative survey. Along with consultation with government experts, Phase I also helped to validate the proposed food categories and associated food choices.

Phase 2 was a large-scale online survey of Canadians, 18 years and older, who have primary or shared household responsibility for grocery shopping. The sample frame of 2,200 individuals was obtained through TNS's online panel. The panel is national in scope, representing the Canadian population by age, region, household income and education. Participation is voluntary and full consent is obtained according to industry standards for market research and to Canada's Privacy Act. The sample excluded individuals if they or a family member worked for a market research firm, in marketing or public relations, in advertising, for a food manufacturer or wholesaler, a grocery store or other food retailer.

The questionnaire consisted of 29 questions; mostly closed ended or based on a 5-point Likert scale. Standard attributes used in market research on product labelling were used in the survey. The surveys were conducted in English and French and took place August 16-21, 2011. The results were weighted by age, region and gender according to Statistics Canada 2006 Census data.¹¹

The questionnaire assessed participants' baseline perceptions of the healthiness of 28 foods in 6 categories: breakfast foods, beverages, snacks, fruits and vegetables, meat and fish, and prepared meals. After being exposed to one of the four labelling systems, participants were asked to re-evaluate the foods to determine their perceptions of the healthiness of the same foods.

The four FOP labelling systems included:

1. Traffic Light (TL) Labelling System, a nutrient-specific system, which identified total fat, saturated fat, sugar and salt and assigned one of three colours, green, yellow or red, to each nutrient depending on its level. Green indicated the food is low in that nutrient, yellow indicated medium and red indicated high levels of that nutrient. In addition to the colour, the amount in grams per serving was listed.
2. Guideline Daily Amount (GDA) System, the second nutrient-specific system, displayed the amount of calories plus total fat, sodium and sugar in the food. Furthermore, up to two additional nutrients such as fibre, calcium, magnesium, potassium, vitamin A, vitamin C or vitamin D were listed.
3. NuVal® (summary indicator system) was based on an algorithm which converts nutritional information into a score between 1 and 100. A higher score indicated a healthier food.
4. My-5® was based on the Nutrient Rich Foods (NRF) index which gave a score between 1 and 5. This summary indicator system gave a higher score to foods that contain nutrients such as protein, fibre, iron, vitamins and calcium and a lower score to foods that have higher levels of saturated fat, added sugars and sodium.

Various FOP systems have been introduced in Canada and the United States by non-profit organizations (e.g., Health Check by Heart and Stroke Foundation of Canada) or food industry/retailers (e.g., modified GDA or Guiding Stars). The TL system is dominant in the United Kingdom and the GDA is dominant in Europe.¹² Both TL and GDA were introduced in 2006.

The two summary indicator systems, NuVal® and My-5®, were developed by nutrition researchers using both positive nutrients (those we need more of, such as calcium) and negative nutrients

Table 1. Sample Characteristics of Respondents in Phase 2 (n=2200)

	Percentage*
Sex	
Males	35
Females	65
Age (years)	
18-24	11
25-34	17
35-44	17
45-54	20
55-64	16
≥65	18
Income	
<\$20,000	9
\$20,000-34,999	15
\$35,000-49,999	16
\$50,000-69,999	18
\$70,000-99,999	19
≥\$100,000	14
Region†	
British Columbia	21
Prairies	15
Ontario	30
Quebec	23
Atlantic Canada	11
Education	
Below high school	4
High school graduate	28
College graduate	27
University graduate or above	33
Apprenticeship/technical	6

* Percentage of males and females is unweighted data. All other data are weighted.

† No panellists reside in the Territories.

(those we need less of, such as fat). NuVal® has recently been introduced in the United States¹³ but the My-5® was not yet on the market at the time of this study. According to a literature review, this is the first study to assess consumer perceptions of these FOP systems.

Statistical differences between groups of individuals, perceived healthiness of a product due to the front-of-package system displayed, or the percentage difference among categories were determined based on Student's t-test with 95% significance levels using SPSS.

RESULTS

Results presented are primarily from Phase 2. Participant comments from Phase 1 suggest some key differences between Nutrition Facts table users and non-users. Users were more likely than non-users to say they follow a healthy diet. Users referred to the NFT when selecting foods for the first time or when purchasing foods they perceived as less healthy, specifically calories, sugar, salt, fibre or iron content. Non-users, although open to the idea of a FOP system to identify healthier foods, did not expect their purchasing behaviour to change as they tend to make purchase decisions based on taste and preference rather than nutritional content, regardless of the presentation of nutrition information on the label.

Two thousand two hundred (2,200) individuals participated in Phase 2, the online quantitative survey (Table 1). Respondents were well represented by age, income, region and education.

Attitudes and perceptions of food and nutrition

Nine out of ten respondents claimed to consider nutritional information when selecting foods. The nutrients of most concern include salt, sugar, fat, calories and fibre. The majority reported that they look at the Nutrition Facts table (71%) and/or the list of ingre-

Table 2. Perceived Attributes of Nutrition Facts Table and Four Front-of-package Labelling Systems

System Attribute	Nutrition Facts Table (n=2200)	Guideline Daily Amount (n=536)	Traffic Light (n=558)	NuVal® (n=575)	My-5® (n=531)

Ease of understanding	62*	67	69	60	71
Level of detail	56	55	55	38*	42*
Ease of finding info	68	67	70	51*	59*
Trustworthy	58*	59	52	50	52
Visually appealing	54*	67	72	54*	66

* Indicates significantly different from other labelling systems at $p < 0.05$ within the attribute.

dients (69%) while only about one third reported using health claims. Females, respondents with an annual household income over \$70,000, and those with a higher education (university or college degree) were more likely to look for information about nutrition and to look at the NFT. One in ten (10%) “rarely” or never read or looked at the NFT.

Evaluation of front-of-package systems

TL and GDA systems were rated similar to the NFT in terms of attributes, except for visual appeal, for which they are rated higher (Table 2). Consumers indicated that both NuVal® and My-5® systems do not provide sufficient level of detail or ease of finding information compared to the nutrient-specific systems.

About one quarter (27%) of respondents strongly agreed that they would use these FOP systems but not in lieu of the Nutrition Facts table. Women and those who indicated that they look for information on healthy eating would be more likely to use the FOP systems regularly compared to men or those who indicated that they do not look for information. Approximately half of the respondents (between 47% and 55%) felt that the FOP systems would help them make healthier choices and between 39% and 49% indicated that the FOP systems changed their perception of a healthy diet. This response was primarily because the systems provided an easy reference about the healthiness of the food and were simple to understand. The NuVal® system was the least liked, with 19% indicating that they disliked the tool very much. Respondents indicated that all four systems did not provide enough information, and this was especially so with the two summary indicator systems.

Impact on perceptions of the healthiness of foods

The four front-of-package labelling systems had varying impacts on the perceptions of healthiness of foods, often in opposite directions (Figure 1). Most foods within the breakfast group were viewed as less healthy, with the exception of white bread and Corn Flakes®. The NuVal® system resulted in respondents viewing milk and orange juice as less healthy and diet soda and fruit punch as more healthy. Mild cheddar cheese was considered to be much less healthy by all systems except the GDA. The TL system also reduced the perceived healthiness of cheddar cheese and almonds while improving the perceived healthiness of sugar-free Jello®. For meat and fish, the response was mixed; NuVal® resulted in lower perceptions of healthiness while My-5® resulted in higher perceptions of healthiness for the same products, even though both systems are based on both positive and negative nutrients to provide single values.

Overall, the GDA system was least likely to elicit a change in the perception of healthiness compared to baseline, while the NuVal® system was the most likely.

Intent to purchase

The intent to purchase more, less or the same varied depending on which labelling system was used and which food, sometimes in opposite directions. In terms of net impact for intent to purchase, three of the four tools led participants to indicate that they would buy more whole grain bread, All-Bran® cereal and muesli cereal. Other than whole grain bread, the TL system resulted in a negative net impact on purchases for all breakfast items.

Similarly, the TL system resulted in a net impact to purchase less of all four beverages (2% milk, unsweetened orange juice, diet soda, fruit punch). All four systems resulted in about one quarter (22-32%) of the individuals indicating that they would purchase less diet soda; however, about one quarter (23%) looking at the NuVal® score indicated they would purchase more diet soda.

The only snack product with a net positive impact on purchase was unsalted raw almonds. All tools except the GDA resulted in a negative impact on purchase of mild cheddar cheese.

All tools had a positive impact on the intent to purchase Atlantic salmon and skinless chicken breast. All tools except NuVal® had a positive impact on the intent to purchase pork tenderloin, and only one, My-5®, was positive for sirloin steak.

Overall, participants were more likely to indicate their intention to buy less of the suggested products based on NuVal® or TL and to buy more of the listed products based on My-5® and GDA.

DISCUSSION

The proliferation of different front-of-package systems and the difficulty of conducting field experiments have limited the number of studies measuring actual purchase behaviour. Non-field studies have examined consumer preferences for various FOP systems/symbols, their ability to identify the healthier option, and their willingness to pay for reductions in specific nutrients indicated by a FOP system.¹⁴ The TL system and the GDA system or modified versions of these systems have been the focus of a number of studies.

As in the Feunekes et al. study,¹⁵ the Traffic Light system in our study was rated highly with respect to ease of understanding and appealing format. In the Feunekes study, the Health Protection Factor, a summary indicator with a single value, was considered least credible, similar to findings for both NuVal® and My-5® in this study.¹⁵

Inconsistency with perception of healthiness of products was evident as some systems resulted in people perceiving a product to be healthier while other systems rated it as less healthy compared to their baseline perceptions. For example, NuVal® lowered the perceived healthfulness for pork tenderloin, sirloin steak, sugar-free Jello® and fruit cocktail, while perceived healthfulness of pork tenderloin and sirloin steak was increased with My-5® and sugar-free Jello® and fruit cocktail cup was increased with TL. A recent review indicated that people were able to more easily select a healthier product if the FOP system is nutrient-specific rather than a summary symbol.¹⁶

Although Hersey and colleagues also noted that text plus colour was more effective than text alone when identifying healthfulness of a food,¹⁶ our study indicated that the Traffic Light system tended to decrease the perceived healthiness of foods that are part of the four food groups in Eating Well with Canada's Food Guide – large egg, All-Bran® cereal, raw almonds, mild cheddar cheese and salmon – while increasing the perceived healthiness of foods that are not part of the four food groups, such as sugar-free Jello®, fruit punch and diet soda. This is an indication of the difficulty in using these systems which are dependent on different nutrients to calculate the value and/or symbol, and how the systems can influence peoples' perceptions in very different, even conflicting, ways. Furthermore, the differences in perceived healthiness of the same product can lead to more confusion among consumers.

After viewing one of the four FOP systems, consumers' intent to buy did not show a consistent or interpretable pattern, which was similar to observations in another study.¹⁴ The discrepancy between perceived healthiness of a food and intent to purchase that food was also evident. For example, although consumers perceive the healthiness of salmon to be lower with the TL system, these same individuals indicated their intent to purchase more. Other elements rather than the FOP systems may be influencing their behaviours. Consumers may be more influenced by recommendations to increase consumption of fatty fish rather than any FOP system. Recommendations also target whole foods or patterns such as those evident in Canada's Food Guide;¹⁷ whereas these FOP systems are limited to specific nutrients.

Even the same individual can bring a multitude of reasons and motivations to a task that most likely varies each time food shopping is undertaken. Many reasons direct food choices and they vary by product and situation. In two separate studies, Grunert et al. found that taste and family preference were the key factors for the majority of purchase choices.^{18,19} Socio-demographic variables and health-related variables are also strong motivating factors for reading label information.²⁰ Food selection is also impacted by socio-demographic variables, as low-income consumers are more price-sensitive than high-income consumers.²¹

The limitations of this study are similar to those of other non-field experiments. The study sample was a convenience sample of adults from an online panel. Although the recruitment weighting made the sample representative of the Canadian population, it did not include those who do not have computer access or who live in the Territories. With the limited data available in this field of research, there is no validated list of categories, food, or attributes that could be used in this survey. Hence, the results may be limited to the chosen foods and FOP systems and may not be generalizable. In addition, the study examined intended behaviours, not

Figure 1. Percentage of respondents indicating perceived healthiness of food item

BREAKFAST FOODS

BEVERAGES

SNACK FOODS

MEAT & FISH

* Percentage of respondents selecting 4 or 5 on a Likert scale with 5 being "very healthy".
Circled values are significantly different from baseline perceptions at $p < 0.05$.

actual shopping behaviour. Point-of-purchase decisions are inherently complex and variable. Conceivably, a real shopping expedition can have multiple distractions and is filled with conflicting food choice reasons (taste, health conditions or price). Furthermore, time constraints can limit label use and family preferences can supersede the healthier choice.

Two recent reviews on FOP systems have identified the limited evidence of labelling and information approaches such as FOP systems succeeding in changing consumer behaviour. Both the Institute of Medicine (IOM) and the American Heart Association have identified the lack of evidence in addressing the public health benefits of FOP systems.^{14,22}

In conclusion, although FOP systems and symbols are well received by consumers, the algorithm or method of determining the values/colours/etc. can influence consumer perception on product healthfulness, sometimes in conflicting directions. The abundance of systems can lead to confusion as individuals choose to purchase more or less depending on their perceived understanding of the FOP system used. The nutrient-specific systems tend to be preferred by most consumers as the summary values seem to be lacking in detail, albeit simpler to understand. Although FOP systems can be helpful in selecting between two products from a similar category, overall impact on selecting healthier eating patterns has yet to be demonstrated. In addition, no FOP system will work if other factors such as taste, price, personal health or family preference are stronger motivators in consumer food choice. More research is needed to identify which, if any, FOP system and/or symbol has an impact on actual shopping behaviours, whether different FOP systems work better among different SES levels, or whether the use of these systems has any impact on product formulation by the food industry.

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RÉSUMÉ

OBJECTIF : Évaluer l'impact de quatre systèmes d'étiquetage de face sur les perceptions des consommateurs et sur leurs intentions d'acheter des aliments, et voir si ces systèmes aident les consommateurs à équilibrer leur alimentation.

MÉTHODE : Les quatre systèmes d'étiquetage de face à l'étude incluaient deux systèmes portant spécifiquement sur les substances nutritives – celui des « feux de circulation » (FC) et celui des Repères nutritionnels journaliers (RNJ) – et deux systèmes d'indicateurs sommaires – NuVal® et My-5®. Au cours de la phase 1, nous avons mené une petite étude avec 36 participants pour déterminer la compréhension des quatre systèmes par les consommateurs et pour éclairer l'élaboration de questions en vue de la phase 2, laquelle a consisté en un sondage auprès de 2 200 adultes dans le cadre d'un panel en ligne.

RÉSULTATS : Bien que les attributs des systèmes FC et RNJ aient reçu des évaluations semblables à ceux du tableau « Valeur nutritive », ces systèmes d'étiquetage de face ont été jugés plus attrayants visuellement. Les consommateurs ont indiqué que les systèmes d'indicateurs sommaires numériques ne leur fournissaient pas assez d'information. Environ la moitié des répondants ont indiqué que les systèmes d'étiquetage de face les aideraient à faire des choix plus sains. Cependant, en raison des contraintes de chaque système, les consommateurs ont souvent mal interprété la qualité sanitaire d'un aliment comparativement à leurs perceptions de référence. De même, les intentions d'achat des consommateurs fondées sur les systèmes d'étiquetage de face n'ont pas affiché une structure cohérente.

CONCLUSION : Malgré le fait qu'ils sont bien accueillis par les consommateurs, les systèmes d'étiquetage de face peuvent prêter à confusion selon la compréhension perçue du système utilisé. La plupart des consommateurs ont tendance à préférer les systèmes portant spécifiquement sur les substances nutritives, mais l'impact global de ces systèmes sur la sélection de modes de consommation plus sains reste à prouver.

MOTS CLÉS : systèmes d'étiquetage de face; perceptions du consommateur; intention d'acheter