The Heart and Stroke Foundation of Canada's Health Check Food Information Program

Modelling Program Effects on Consumer Behaviour and Dietary Practices

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ABSTRACT

Background: A conceptual model was proposed and tested in order to link attitudinal and awareness factors that might explain changes in food purchase behaviours and dietary patterns related to the Heart and Stroke Foundation of Canada's Health Check food information program.

Methods: Two hundred food shoppers completed a survey inquiring about demographics, diet-related health conditions, attitude toward healthy food purchases, use of food package information, and awareness, perceived value and reported use of the Health Check logo. Participants provided their receipt for groceries purchased and completed a dietary fat assessment. Path analysis was used to test the model.

Results: Shoppers purchasing a Health Check product had lower fat intakes than shoppers who did not (30.4% vs. 33.9% calories from fat; $p < 0.05$). There was strong association ($\beta = 0.81$; $p < 0.001$) between logo awareness and use, and the meaning consumers attributed to the logo moderated this relationship ($\beta = 0.53$; $p < 0.01$). Logo awareness was related to general use of food package information ($\beta = 0.14$; $p < 0.05$) and attitude toward healthy food purchases ($\beta = 0.15$; $p < 0.05$).

Interpretation: Persons successfully limiting their fat intake purchase Health Check products, suggesting the program has utility in this regard. Program promotional efforts should aim to increase understanding of the Health Check logo's meaning in helping to make healthier purchase decisions. Promotional efforts surrounding the introduction of new nutrition labels in Canada are also expected to have a positive effect on the program.

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

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Diet-related conditions such as cardiovascular disease, cancer, and diabetes represent billions of dollars in annual health care costs in Canada.¹ Dietary change, especially reduced intake of saturated and trans fat and increased intake of fibre, fruits, and vegetables, is an important part of a public health strategy to reduce the risk of these chronic diseases.² Food availability, including household food purchases made at supermarkets, plays a direct role in nutritional health.³ Food purchase choices are complex decisions influenced by a dynamic relationship between individual and environmental factors.¹

Point-of-purchase decision-making is a very important component of food purchase decisions; up to 80% of food purchase decisions are made at the supermarket.⁴ Since 1999, the Heart and Stroke Foundation of Canada has promoted an on-pack food information program called Health Check.⁵ The Health Check program is designed to help consumers make healthy food choices at the point of purchase. Consumers are guided towards nutrient-dense foods through an on-pack logo, an explanatory message, and a nutrition facts table on the packages of foods that have been analyzed and comply with specified nutrient criteria. The Health Check criteria are based on *Canada's Food Guide to Healthy Eating*⁶ and utilize Health Canada's approved nutrient content claims. The criteria relate to a wide variety of nutrients including fat (quantity and type), dietary fibre, carbohydrates, calcium, certain vitamins, and sodium.

To develop a sound basis for evaluating the impact of the Health Check program on food shoppers, we proposed a conceptual model relating factors to explain the process by which consumers become aware of and use the logo while shopping, and to link logo use to actual purchases and dietary practices. In creating the model, we drew upon theories from the fields of health education, health behaviour change, marketing, and consumer behaviour.

In the proposed model, the number of Health Check products purchased by shoppers was assumed to be the main outcome. However, potential health benefits of the program were also considered as long-term outcomes of interest. Since better food choices were expected to yield improved dietary practices at the individ-

ual level, it was hypothesized that Health Check purchases would be negatively associated with dietary fat intake. The most proximal determinant of Health Check purchases was proposed to be the degree to which shoppers reported using the logo while shopping. Logo use was expected to be positively associated with awareness of the logo, as well as other factors, particularly consumers' use of food package information to compare brands. Perceptions of the meaning consumers attributed to the Health Check logo were posited to moderate the relationship between awareness and logo use. That is, greater awareness would be associated with greater logo use only when shoppers perceived the logo to have value in helping them make better food choices. Awareness of the logo was hypothesized to be determined by consumers' general tendency to rely on food package information when making food purchase choices, as well as on attitude toward healthier food choices. It was recognized that various demographic and background factors (e.g., age, gender, education, diet-related health conditions) might influence relationships in the model.

The purpose of this study was to test the proposed model in a sample of food shoppers.

METHODS

Design and participants

A cross-sectional survey of 200 food shoppers was conducted at a supermarket in Ottawa in July 2002. A trained interviewer visited the supermarket and set up a table outside the checkout area. The interviewer approached customers at random and asked them to participate in a survey regarding their food purchases. Shoppers were eligible to participate if they were at least 18 years old, had purchased at least 15 items during their supermarket visit, and were willing to provide the sales receipt for their food purchases.

Procedures

Volunteer participants completed a 23-item interviewer-administered survey. The survey contained questions about demographic characteristics (age, gender, education), the presence of diet-related health conditions (self or family member), attitude toward healthy food purchases, use

TABLE I
Characteristics of Survey Respondents

Variable	
Age, years (SD)	44.3 (11.0)
Gender	
Male	23%
Female	77%
Education	
High school or less	22%
Some post-secondary or more	78%
Presence of high blood cholesterol (self or household member)	
Yes	19%
No	81%
Purchased Health Check product on day surveyed	
Yes	25%
No	75%

SD = standard deviation

of food package information, awareness and reported use of the Health Check logo, and perceived meaning of the logo. Upon completion of the survey, the interviewer obtained the participant's receipt for groceries they purchased to identify Health Check product purchases. The participant was provided with a food frequency questionnaire to be completed at home and mailed back to the investigators.

Measures

Survey questions were largely derived from previously conducted consumer surveys of awareness of and attitudes toward food information programs in Canada⁷ and Australia.⁸ Question wording and response options are summarized in Table II. Questions to assess use of food package information were developed based on items previously used in a survey of label use and beliefs about diet-disease relationships among university students.⁹ These questions have demonstrated satisfactory test-retest reliability (Spearman's rho=0.79) and construct validity.

To determine the number of Health Check products purchased, two independent reviewers examined grocery store receipts. Health Check purchases were identified and summed for each participant. There was 100% agreement between reviewers for Health Check purchases.

The Block 98 Food Frequency Questionnaire (FFQ) was used to assess dietary fat intake. The 109-item Block questionnaire has been validated using multiple four-day diet records, and correlations between the questionnaire and diet records for fat intake average 0.66.¹⁰ The test-retest reliability of the questionnaire is 0.82.¹¹

Data analysis

Data were analyzed using the EQS 5.7 for Windows statistical program. Descriptive statistics were calculated to summarize participant characteristics. Path analysis based on multiple regressions was used to test the proposed model. The EQS program permits analysis of models with categorical as well as continuous variables. Each path was tested using forward hierarchical regression, where the dependent variable was regressed on the set of variables proposed to precede it in a particular sequence. For each regression, background variables (i.e., relevant demographic and diet-related health conditions) were entered first, followed by the predictor variables in the particular path. In testing the moderating effect of perceived meaning of the logo on the relationship between awareness and reported use of the logo, background variables were entered first, then logo awareness and meaning were entered, followed by their interaction term.

RESULTS

Characteristics of participants

Participants were predominantly female with some post-secondary education and an average age of 44.3 years (Table I). One quarter of respondents had purchased a Health Check product on the day they were surveyed. For respondents purchasing a Health Check product, the mean number of Health Check products purchased was 1.6±0.5. The most frequently purchased Health Check items were breakfast cereal, lean ground beef, and omega-3 eggs. Participants returned a total of 72/200 food frequency questionnaires (36%) during the follow-up period.

TABLE II
Consumer Attitudes Regarding Use of Food Package Information

Construct	Question and Response Options	Response Frequency (%)
Attitude toward healthier food purchases	To what extent do you agree with the statement: 'I have been trying to buy healthier food products?' Strongly agree Somewhat agree Somewhat disagree Strongly disagree	51 43 4 2
Use of food package information	When you shop for food products, how often do you look at the food information provided on packaging before deciding whether to buy a particular food product? Always Often Sometimes Rarely Never	21 41 22 11 5
Use of food package information to compare brands	When you look at the information provided on food packaging and labels, how often do you use this information to compare different brands? Always Often Sometimes Rarely Never	20 34 25 13 8
Awareness of Health Check logo	Can you recall having seen the following logo recently? (Respondent shown Health Check™ logo) Yes No	56 44
Meaning attributed to Health Check logo	If you had two similar types of food to choose from of similar price, one carrying the Health Check™ logo and the other without it, what would this mean to you? That the product with the logo was ... Definitely a better choice Probably a better choice Possibly a better choice Probably no real difference	32 48 16 4
General tendency to look for Health Check logo when grocery shopping	How often while shopping, do you look for this logo to help you select foods? Regularly Occasionally Rarely Never	4 19 11 66
Reported use of Health Check logo on day surveyed	Did you use the logo to help you decide on food purchases today? Yes No	6 94

Participants returning FFQs were older than those not returning FFQs (46.7 yrs vs. 43.0 yrs; $p=0.02$) and more likely to be female (86.1% vs. 73.4%; $P=0.04$). FFQ returners also purchased more Health Check products on average than non-returners (0.56 items vs. 0.30 items; $p=0.03$).

Test of proposed model

The influence of different background factors (i.e., age, gender, education, diet-related health conditions) on the relationships proposed in the model was assessed using multiple regression analysis. Background variables were selected on the basis of the significance of their relationship (at $p<0.10$) to at least one of the model constructs. Age and the presence of high blood

cholesterol were found to be relevant and were controlled for in each regression path depicted in the model. Response frequencies for questions measuring key constructs are summarized in Table II.

The model describing the results of the path analysis is shown in Figure 1. All paths were found to be statistically significant, as was the amount of variance explained for each dependent variable by its proposed predictor variables. Therefore, our original model did not require any revision. Awareness of the Health Check logo was predicted by general use of food package information and a positive attitude toward making healthier food choices. Awareness of the Health Check logo and use of food package information to compare brands predicted consumers' gen-

eral tendency to look for the Health Check logo when grocery shopping. The meaning consumers attributed to the logo was found to be a strong moderator of the relationship between awareness and reported use of the logo. That is, consumers who were aware of the logo were more likely to report using the logo if they believed that products bearing the logo were better food choices than similar products without the logo. By including the impact of consumers' perceived meaning of the logo in the model, the relationship between logo awareness and logo use when shopping was significantly strengthened ($\beta=0.81$ vs. $\beta=0.49$). The general tendency to look for the Health Check logo was significantly associated with use of the logo on the day the consumer was surveyed, and the latter, in turn, predicted the actual number of Health Check products purchased on that day. The number of Health Check products purchased was negatively associated with dietary fat intake, however this analysis was based on a reduced sample size (i.e., participants who returned the FFQ; $n=72$).

DISCUSSION

Food information programs like Health Check exist in several countries worldwide.¹² While there is evidence that consumer awareness of these programs is high (generally >70% in countries where they exist), there is little information about relationships among program awareness, food purchase behaviour and individual dietary practices. This report is, to the best of our knowledge, the first to examine pathways linking attitude toward healthy food purchases, use of food package information, awareness and reported use of the Health Check logo, actual purchases of logo-bearing products, and dietary fat intake.

There are three key findings in this study. These findings were statistically significant after controlling for relevant background variables. First, there was a significant negative association between purchase of Health Check products and fat intake. Shoppers who purchased a Health Check product had a lower fat diet compared to individuals who had not (30.4% vs. 33.9% calories from fat; $p<0.05$). We interpret this finding as evidence that persons who wish to reduce fat intake are using the

Figure 1. Model of Health Check Logo use and its relation to dietary fat intake

Note: Age and reported awareness of high blood cholesterol were controlled for on each regression; reported R^2 values represent amount of variance explained solely by predictors depicted in model. All parameters in model are standardized.
^a Beta coefficient depicts the strength of this relationship when the impact of consumers' perceived meaning of the Health Check logo was included in the model; without the moderator, $\beta=0.49$.
 HC = Health Check; * $p<0.05$; ** $p<0.01$; *** $p<0.001$

Health Check logo to help them select lower-fat foods. Second, there was strong association between awareness of the Health Check logo and its use. This relationship was moderated by the perceived meaning of the logo. We believe this indicates that consumer promotional efforts should aim not only to increase awareness of the Health Check program but also the logo's value in helping to make healthier purchase decisions. Third, awareness of the Health Check logo was related to overall use of information on the food package. This suggests that efforts aimed at encouraging consumers to pay more attention to food package information will have a positive impact on program awareness. In January 2003, Health Canada introduced changes designed to improve nutrition information on food labels – including mandatory nutrition labelling, nutrient content claims, and diet-related health claims.¹³ Promotional efforts surrounding the introduction of new nutrition labels are likely to have a positive effect on the Health Check program.

Limitations of these data should be recognized. First, the questionnaire was partially comprised of questions adapted from a previous survey in Australia.⁸ The validity and reliability of these questions is unknown. The brief (often single-item) scales used to measure some of the constructs may have caused us to underestimate the strength of associations between variables. Second, analyses are based on cross-sectional data and, therefore, do not allow conclusions regarding causal relationships between variables. It

will be necessary to validate the model in a planned prospective investigation. Third, while there is evidence that survey respondents were similar to national samples (e.g., Health Check program awareness in our sample was similar to the 48% observed in national polls),⁷ the small sample size and selection bias may limit our ability to generalize the results to the entire population of food shoppers. Fourth, the return rate for the FFQ was 36% and people returning the FFQ may have been more health conscious. This may have led to an over-estimation of the observed negative relationship between fat intake and Health Check purchases.

Environmental interventions such as the Health Check program aim to improve the nutritional health of all people in Canada, not just small groups of motivated or high-risk individuals. The program does not require self-selection into a defined educational program. It can help create an environment conducive to dietary change by influencing the availability of healthy foods, access to information about making healthy food choices, and the accessibility, consistency and attractiveness of the nutrition education experiences.¹⁴ In the literature, there are few evaluations of environmental interventions like Health Check.

Overall, our results suggest that the Health Check food information program has achieved a sustainable level of awareness in the minds of food shoppers and is being used by some shoppers to help them make purchase decisions. Persons successfully limiting their fat intake purchase Health Check products, suggesting the

program has utility in this regard. This study adds detail to our understanding of the potential impact of this national effort to promote healthy eating.

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RÉSUMÉ

Contexte : Nous avons proposé et testé un modèle théorique afin d'établir des liens éventuels entre a) les facteurs d'attitude et de sensibilisation pouvant expliquer les changements dans les comportements d'achat d'aliments et dans les habitudes alimentaires et b) le programme de renseignements nutritionnels « Visez santé » de la Fondation des maladies du cœur du Canada.

Méthode : Deux cents acheteurs de produits alimentaires ont répondu à un sondage comportant des questions sur leur profil démographique, les troubles médicaux liés à leur régime alimentaire, leur attitude envers l'achat d'aliments sains, leur utilisation des renseignements qui figurent sur les emballages et leur connaissance, la valeur perçue et leur utilisation déclarée du logo « Visez santé ». Les participants ont fourni un reçu de leurs achats de produits d'épicerie et se sont soumis à une évaluation de la teneur en matières grasses de leur régime alimentaire. Nous avons testé notre modèle à l'aide d'une analyse causale.

Résultats : Les apports en matières grasses des acheteurs de produits portant le logo « Visez santé » étaient inférieurs à ceux des acheteurs de produits ne portant pas ce logo (30,4 % c. 33,9 % de calories provenant de matières grasses; $p < 0,05$). Il y avait une forte association ($\beta = 0,81$; $p < 0,001$) entre la connaissance du logo et son utilisation, et cette relation était pondérée par la signification que les consommateurs attribuaient au logo ($\beta = 0,53$; $p < 0,01$). La connaissance du logo était liée à l'utilisation générale des renseignements figurant sur l'emballage des produits alimentaires ($\beta = 0,14$; $p < 0,05$) et à l'attitude envers l'achat d'aliments sains ($\beta = 0,15$; $p < 0,05$).

Interprétation : Les personnes qui réussissent à réduire leur apport en matières grasses achètent des produits « Visez santé », ce qui porte à croire que le programme est utile à cet égard. Les efforts promotionnels du programme devraient chercher à mieux faire comprendre que le logo « Visez santé » peut favoriser la prise de décisions d'achat de produits alimentaires plus sains. Les efforts promotionnels entourant le lancement du nouvel étiquetage nutritionnel au Canada devraient également avoir un effet positif sur le programme.

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