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The Effect of Alternative Nutrition Information Formats on Consumers' Evaluations of a Children's Breakfast Cereal

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The Effect of Alternative Nutrition Information Formats on Consumers' Evaluations of a Children's Breakfast Cereal

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Abstract

Policy makers are considering whether enhanced on-pack nutrition labelling could improve consumers' diets and thus reduce obesity rates. While some manufacturers have voluntarily placed Percent Daily Intake (PDI) nutrition labels on the front of their products, health and consumer lobbyists have advocated for Traffic Light Labels (TLL) to become mandatory. This research investigated whether these alternative nutrition information formats affect consumers' product evaluations, compared to the current Nutrition Information Panel (NIP, the control). A three by two between-groups experiment, manipulating nutrition label format and nutritional profile, found that both front-of-pack nutrition labels enhanced consumers' ability to evaluate products more accurately, while product evaluations did not vary with changes to nutritional values in the control conditions. The TLL stimulus produced greater variation between groups, while the PDI labels elicited similar results to the control groups. Front-of-pack TLLs appear better able to help consumers identify products with poor nutrition profiles, and thus may be more effective than PDI labels in promoting improved diets.

Introduction

The proportion of obese adults in Australia and New Zealand has doubled over the past three decades, and the most recent nationally representative data shows one in five adults are now obese (Ministry of Health [MOH], 2004a; 2004b; Australian Institute of Health & Welfare [AIHW], 2003b). Overall, more than half the adults in both countries weigh more than considered healthy (MOH, 2004a; AIHW, 2003a). Similar rates of weight gain have also been observed among children and adolescents (Booth, Chey, Wake, *et al.*, 2003; MOH, 2003). As the risk of developing many serious, chronic, non-communicable diseases increases with increased body fat (Bray, 2004; Jung, 1997), policy makers are keen to consider options that could reverse this costly trend (Hodgson, 2006). Patterns of food consumption and exercise established while young typically continue into adulthood and affect life-long weight and health (Ferraro, Thorpe and Wilkinson, 2003; Birch and Fisher, 1998). Interventions that increase the chance that children and adolescents will stay within the healthy weight range are thus of particular interest. Swinburn, Jolley, Kremer, *et al.* (2006) modelled the relative contribution of energy intake and expenditure to children's net energy balance and found that energy intake was the main determinant of high body weight. Interventions that lower energy consumption should therefore have a larger effect on reducing childhood obesity rates than those promoting increased exercise levels.

Food industry representatives have argued that consumers are motivated to make healthy food choices for their families (Food Industry Group [FIG], 2006b), but they find it difficult to identify which products are best for their needs (FIG, 2006a). This stance is supported by a recent literature review, which suggested that consumers are not using the current Nutrition Information Panel (NIP) to inform food purchasing decisions, as they find it confusing and difficult to interpret (Ni Mhurchu and Gorton, 2007). In response, the FIG (2006a; 2005) suggested that increased consumer education and enhanced access to nutrition information at the point-of-purchase would assist people to improve their diets and manage their weight. The last two FIG Annual Reports supported Percent Daily Intake (PDI) front-of-pack nutrition labels (FIG, 2008; 2006a). PDI labels list the percentage of an average adult's daily recommended intake of seven nutrients and energy (based on 8,700 kJ diet) in one serving of a product. The FIG argues this labelling system aligns with international food industry moves, will allow consumers to recognise how much of their daily energy needs are met by one serve of a product, and supports use of this knowledge to inform appropriate food choices (FIG, 2008). However, some health and consumer lobbyists believe that PDI labels are too complex, and claim that even simpler front-of-pack information is necessary to influence consumers' purchase behaviour (e.g. Choice, 2007; Obesity Action Coalition and Public Health Association, 2007). These groups tend to favour the colour-coded multiple Traffic Light Label (TLL) system developed by the British Food Standards Agency (2006) (e.g. Fight the Obesity Epidemic, 2006; Johnston, 2006). TLLs use the colours red, amber, and green to signify whether a product has high, medium, or low amounts of four 'negative' nutrients (total fat, saturated fat, sugar, and sodium) per 100 g/mL.

Research into effective warning label design, which has shown that increasing information volume on the front of product packaging can "…cause visual confusion and serve to obscure information" (Buckley and Shepherd, 1993, p. 20), supports concerns over the PDI format. Furthermore, language barriers and literacy levels also need to be considered when developing effective warning labels (Laughery, 2006). However, industry advocates have argued that the TLL system is too simplistic and is therefore misleading. They claim that more complete information based on the recommendations in the food pyramid would better support informed food choices (FIG, 2006a).

Research conducted for Food Standards Australia New Zealand reported that current non-NIP users would not read PDI labels without comprehensive education as they do not possess the ability to use this information (TNS Social Research, 2007). However, ergonomics labelling research concluded that traffic light colours have inherent meaning for consumers (Edworthy and Adams, 1996; Braun and Silver, 1995; Chapanis, 1994), suggesting TLLs will require minimal conscious processing effort to be noticed and interpreted. The Elaboration Likelihood Model (ELM, Rucker and Petty, 2006) provides a framework for predicting the effect that differences in processing requirements may have on consumers' use of different nutrition labels. The ELM states that when people receive new information, the level of evaluation they undertake falls on a continuum from 'central' to 'peripheral' processing, which is determined by their motivation and ability to think about the attitude object. Central processing is more thorough and involves considering the merits of information presented, while with peripheral processing people use contextual cues and heuristics to form impressions (Petty and Wegener, 1999). Generally, consumers are 'cognitive misers' and are disinclined to exert mental effort unless the attitude object is perceived as very important. This model provides a theoretical rationale for expecting that more detailed information, as contained in the NIP and PDI formats, will be less useful to consumers than TLLs.

Jones and Richardson (2007) examined how NIP and TLL labels affected consumers' perceptions of food healthiness and concluded that TLLs elicited more accurate ratings. Feunekes, Gortemaker, Willems, *et al*. (2008) tested several simplified formats, and found TLLs were one of the most effective for detecting differences between products. However, neither study compared TLLs to PDI labels; this research tested whether these two alternative labels enhanced consumers' ability to accurately evaluate products' nutritional profiles. The research examines parents' views, since their status as 'nutritional gatekeepers' means their perceptions of and response to alternative label formats will shape children's diets.

Method

A three by two experimental survey design was employed (see Table 1) using children's breakfast cereal as the experimental vehicle, as cereal is a high penetration product category with nutritionally diverse options. A graphic designer developed a fictitious product for the project, given the novel name 'Hooplas', and depicted an extruded, wheat-coloured, hoop-shaped cereal. The two nutrition profiles were from two actual children's cereals, Sanitarium Weet-Bix® and Nestlé Milo®, which have very different nutritional values. Respondents were shown an A4 card displaying the front and one side panel of the packet (with ingredients list, Nutrition Information Panel, and in conditions five and six, an explanation of the PDI label).

Table 1: Experimental Conditions

	Control (NIP only)	Traffic Light Label	Percent Daily Intake
Better Profile	1	3	5
Worse Profile	2	4	6

Respondents were shown a card with one of the six breakfast cereal images, and asked to look at it as if considering buying it. Several questions measured their attitude towards the product and examined their beliefs about its attributes. The cereal image was then removed from sight, and respondents were asked to indicate how much sugar, sodium, and total fat the cereal had, using a five point scale from 'very low' to 'very high'.

No sampling frame exists from which a random selection of parents or caregivers can be drawn, so mall and street intercept interviews were used to recruit respondents. These were conducted over both weekdays and weekends and covered all day parts. Trained interviewers were instructed to approach every person passing them who appeared to be between the ages of 20 and 50 years. Two screening questions were used to ensure that respondents were either a parent or caregiver of children aged between two and 15 years, and had some degree of responsibility for household grocery shopping. The six survey versions were rotated among the team of interviewers to randomise any interviewer effects.

In total, 1,763 people were approached to take part in this research, and 604 people agreed to be surveyed (cooperation rate of 34%). However, 304 of these people (50%) were ineligible because they answered 'no' to either screening question, or they had already completed the survey on a prior day, or could not speak English. Overall, 294 interviews were completed, giving a minimum response rate of 20%. However, assuming that same rate of ineligibility among the 1,159 refusals gives an estimated response rate of up to 34%. Respondent's ages ranged from 19 to 62 years, with the average age being 39 years (*SD* = 8). The sample contained more women (72%) than men (22%), and there was a wide spread of educational attainment within the sample. Chi-square tests revealed no significant differences in the distribution of any demographic variable across the six experimental conditions.

Results and Discussion

We first examined respondents' attitudes and used 9-point items to estimate their opinion of the cereal, whether it would be bad or good to buy for children, and their purchase intention. Higher scores indicate more positive attitudes, and the items were averaged to form an overall attitude measure ($\alpha = 0.83$). A manipulation check confirmed that respondents evaluated the 'better' and 'worse' products as expected; overall, respondents shown a cereal image with the better nutrition profile gave a higher mean attitude rating than those shown a version with the worse profile ($M = 4.91$ cf. $M = 3.87$, $t(291) = 4.87$, $p <.001$).

A series of independent samples *t*-tests were run to determine whether respondents' perception of the product's nutrition profile varied according to the nutrition information format they had seen (see Table 2)Table , higher scores represent more positive attitudes). There was no significant difference in attitude towards the better and worse cereals between respondents who were in the control groups who saw the current NIP only, although the difference was in the expected direction. However, respondents who saw either the TLL or PDI labels held significantly different attitudes towards cereals according to their nutrition profile. The difference in attitudes was greatest between respondents who viewed images featuring TLLs. Respondents in the TLL condition who saw the product with the poorer nutrition profile reported the lowest attitude scores of any group. Those who viewed PDI labels also gave significantly lower ratings to the less healthy cereal, although the difference between the two nutrition profile ratings was not as great.

Table 2: Mean Attitude Scores by Nutrition Format

Label Format	Better Profile (*M*)	Worse Profile (*M*)	95% CI *M* difference	Sig.
Control	4.83	4.51	-0.39 – 1.04	$t(97) = 0.89$
PDI	4.98	4.13	0.10 – 1.60	$t(87) = 2.25$*
TLL	4.93	3.10	1.19 – 2.56	$t(93) = 5.45$***

*$p < .05$, ***$p < .001$

To examine the main and interaction effects of nutrition profile and nutrition label format on attitudes, a two-way ANOVA was run. A significant main effect of nutrition profile on attitudes was found, $F(1, 293) = 23.81$, $p < 0.001$; mean attitude was significantly higher among respondents shown the nutritionally superior cereal ($M = 4.91$, $SD = 1.84$) than among those who viewed the nutritionally inferior product ($M = 3.87$, $SD = 1.79$). The main effect of nutrition label format was also significant, $F(2, 293) = 4.25$, $p < 0.05$. Tamhane's T2 post hoc test was applied (at $p > 0.05$) as cell sizes and variances were unequal (Garson, 2008). This revealed that only the TLL format produced product evaluations that were significantly different from the control format conditions. A significant interaction effect also existed between the independent variables, $F(2, 24) = 5.05$, $p > 0.01$. That is, there was a greater difference between group means in the worse nutrition profile condition, as shown by the greater spread across scores in the third column of Table 2Table . This interaction suggests that respondents were able to identify the nutritionally superior cereal irrespective of label format, but that label format had a substantial effect on their ability to recognise the worse cereal.

Further analysis was undertaken to determine whether respondents perceived differences in the levels of three nutrients (sugar, sodium, and total fat) across the two nutrition profile conditions. Respondents' perceptions of nutrient levels were measured on a 5-point scale, from 1 = very low to 5 = very high. Cell means and the number of respondents who stated 'Don't know' are reported in Table 3 overleaf. The better cereal contained only 2.8g sugar per 100g, while the worse had 31.3g per 100g. The mean sugar level ratings differed significantly between the high and low conditions in each of the three formats; the largest differences emerged in the groups exposed to a TLL. The two cereal versions both contained a moderate amount of sodium (280mg and 194mg per 100g), thus the fact that respondents gave ratings around the scale midpoint in all conditions is accurate and no differences were expected. Interestingly, more people gave 'don't know' responses when asked how much sodium the cereal had, and several made unprompted comments to the effect that they did not look at sodium levels. Finally, the better cereal contained 1.3g total fat per 100g, while the worse had 5.8g per 100g. Those respondents shown the control and TLL versions were significantly more likely to perceive the lower fat cereal as lower fat; however, fat content perceptions of respondents exposed to the PDI label did not differ across nutrition profile.

Table 3: Nutrient content evaluation by nutrition format and condition

	Better Nutrition Profile		**Worse Nutrition Profile**		
	(*M*) §	**"Don't know" (n)**	**(*M*) §**	**"Don't know" (n)**	**Sig.**
Sugar					
Control	2.69	9	3.49	3	$t(87) = -3.53$**
PDI	2.73	3	3.72	3	$t(82) = -4.21$***
TLL	2.19	4	4.39	4	$t(94) = -11.89$***
Sodium					
Control	3.00	25	3.00	11	$t(63) = 0.00$
PDI	3.46	16	3.10	11	$t(61) = 1.34$
TLL	2.98	6	3.23	13	$t(65) = -1.35$
Total Fat					
Control	2.00	15	2.63	4	$t(80) = -3.06$**
PDI	2.35	6	2.40	5	$t(77) = -0.20$
TLL	1.98	8	3.07	9	$t(85) = -5.01$***

§ Mean calculated excluding "Don't Know" responses; ** $p > 0.01$, *** $p < 0.001$

Conclusions

Consumers have had over five years to become familiar with the current nutrition labelling system, yet the results show this information is not informing their attitudes or knowledge. However, it appears that consumers do evaluate a children's breakfast cereal differently when shown front-of-pack nutrition information labels. Respondents' attitudes were strongest following exposure to a TLL, which also seemed to help consumers identify and recall nutrient levels. Furthermore, the significant interaction effect between nutrition format and profile suggests TLLs are more likely to help consumers identify products with poorer nutritional profiles. This is a very important finding, given the need to help consumers identify high fat, sugar, and salt foods to manage or reduce energy consumption.

This study does have some limitations. Firstly, the product nutrition profiles differed strongly and further tests are required to examine how effective the alternative labelling schemes would be when differences between the nutritional profiles are not so pronounced.

Furthermore, the cereal images did not contain any additional health and nutrition information, such as content claims or logos to signify healthiness (such as the Heart Tick). Research is also needed to investigate the effect of nutrition and health claims in the presence of these alternative labelling formats and to explore how consumers use these different types of information when evaluating products. Finally, this study only measured consumers' attitudes towards the cereals, and did not include measures of behavioural response; further study is necessary to determine the effect label format has on consumers' choice behaviour.

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