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Short Communication

The relative ability of different front-of-pack labels to assist consumers discriminate between healthy, moderately healthy, and unhealthy foods

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ABSTRACT

The degree to which different front-of-pack labels (FoPLs) can assist consumers to make healthy choices seems to depend on the extent to which the FoPLs provide an interpretation of the nutrition information presented. The aim of this study was to assess the effectiveness of three FoPLs that vary by interpretive content in allowing consumers to discriminate between products of varying healthiness. Australian consumers (n = 2058) rated the perceived healthiness of mock food pack images that varied according to: nutritional profile (healthy, moderately healthy, unhealthy); FoPL (Daily Intake Guide (DIG), Multiple Traffic Lights (MTL), Health Star Rating (HSR), or control); and food type (cookies, cornflakes, pizza, yoghurt). Respondents were most accurate at differentiating unhealthy products from healthy ($p < 0.001$) and moderately healthy products ($p = 0.015$) when the HSR appeared on packs. The MTL was marginally ($p = 0.052$) effective at helping respondents distinguish between healthy and unhealthy products. When the DIG or no FoPL was used, however, respondents were unable to discriminate between a healthy and an unhealthy nutritional profile. Findings indicate that the HSR is more effective than other commonly used FoPLs in assisting consumers to accurately evaluate the healthiness of food products.

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1. Introduction

The provision of front-of-pack labels (FoPLs) on prepackaged foods is a common public health intervention aimed at reducing diet-related chronic disease (Cecchini et al., 2010; Hawkes, 2010). Different FoPLs vary in how effectively they assist consumers to make healthy choices, which is likely to be related to the degree to which they provide an interpretation of the nutrient profiles of foods (Hamlin, McNeill, & Moore, 2015). The Daily Intake Guide (DIG), which states the level of select negative and positive nutrients (e.g., fat, sugar, protein) within a product in grams per serve and as a percent of an average adult's recommended daily intake, is known as a reductive FoPL because it provides little interpretation of nutrition information. The Multiple Traffic Lights (MTL) FoPL, which use the colors red, amber and green to indicate whether negative nutrients are high, medium or low respectively, is known as an evaluative FoPL because it provides more interpretation of the nutrition information. Evidence suggests that evaluative FoPLs are more likely to lead to greater accuracy in determining relative healthiness and greater intentions to purchase healthier products than reductive FoPLs (Hawley et al., 2013; Hersey, Wohlgenant, Arsenault, Kosa, & Muth, 2013).

The Health Star Rating (HSR) has recently been introduced as a voluntary evaluative FoPL in Australia and New Zealand (Australian Government Department of Health, 2013). Manufacturers can choose to specify the amount of key nutrients per 100 g or per portion and include text to indicate whether nutrient levels are high or low. The key differentiating aspect of the HSR is a summary indicator (that is always present) that rates overall product

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healthiness from half a star to five stars. Focus group research suggests that consumers find the summary indicator in the HSR easier to interpret than nutrient-level information (both in the HSR and other FoPLs; Talati et al., 2016) However, quantitative evidence to support this suggestion is lacking. Another study recently found that across healthy and unhealthy foods, respondents were less likely to select a product if the HSR was present rather than absent (Hamlin & McNeill, 2016), although this may have been because the HSR was colored red in that study and red has been shown to create avoidance reactions to foods regardless of actual healthiness (Rohr, Kamm, Koenigstorfer, Groeppel-Klein, & Wentura, 2015). Importantly, the main effect of package design was far greater than the main effect of the HSR, suggesting that consumers were basing their choice more on other elements of the package design than the FoPL.

The aim of the present study was to quantitatively measure consumers' perceptions of product healthiness resulting from exposure to FoPLs characterized by varying levels of interpretive content. Listed from least to most interpretive content, the three tested FoPLs were the DIG that provides only reductive nutrient-level information, the MTL with its color-coded nutrient-level interpretations and the HSR with its summary indicator and text-based nutrient-level interpretations. It was hypothesized that ratings of perceived healthiness would be more aligned with a product's nutritional profile when the HSR or MTL was present, but not when the DIG or no FoPL was present. The interaction of these variables with demographic factors such as age, gender and socioeconomic status (SES) was also explored.

2. Methods

This study was part of a larger research project investigating Australian consumers' attitudes towards packaged foods (Talati et al., 2017). Ethics clearance was obtained from a University Human Research Ethics Committee. The study design and variables relevant to the present analysis are described below.

2.1. Sample

A sample of Australian children and adults was recruited from a national online panel using radio and internet advertising, publicity and referrals. Quotas were set according to age, gender and SES (Australian Bureau of Statistics, 2011). Of the 2058 respondents, 50% were female, 25% were children (10–17 years of age) and 49% were from low SES neighborhoods (see Table 1 for a breakdown of the demographics). Participants received a small nominal payment for their time in completing this survey.

2.2. Stimuli

The design of the fictional mock packs and their corresponding nutritional profiles were created based on real products currently found in Australian supermarkets. The product attributes relevant to the present study were FoPL type (none, DIG, MTL and HSR) and nutritional profile (healthy, moderately healthy and unhealthy). Food type was also varied to ensure that FoPL effectiveness was generalizable across a diverse range of foods (i.e., cookies, cornflakes, pizza and yoghurt). The unhealthy, moderately healthy and healthy variants of the pizzas and cookies received a star rating of 1, 2 and 3 stars respectively, while the cornflakes and yoghurt (which tend to be healthier products) received a star rating of 1.5, 3 and 4.5 stars, respectively. All levels of each variable (FoPL, nutritional profile, food type) were fully crossed resulting in a full factorial design. Fig. 1 shows the FoPLs used for the different nutritional profiles for one of the food types (cornflakes) and Fig. 2 shows an example cornflakes mock pack.

2.3. Procedure

Respondents were recruited through an ISO accredited web panel provider (PureProfile) to take part in the online study via a computer or laptop. They completed demographic questions assessing their age, gender, SES and BMI before viewing and individually rating eight mock packs. Each participant saw 2 packs from each FoPL condition (with the first 2 coming from the no FoPL condition) and 2 mock packs from each food product category (with no 2 products from the same food category occurring in a row). Scores on two 5-point semantic differential scales (Unhealthy–Healthy, Non-Nutritious–Nutritious) were averaged to create one measure of perceived healthiness ($r = 0.82$, $\alpha = 0.90$). Two items were used to increase the reliability of this outcome measure (rather than using a one-item scale). Throughout the task, respondents could view the Nutrition Facts Panel (NIP) by clicking a link below the mock pack image. For each rating task, data was collected on whether the NIP was viewed or not. Over the entire study, the NIP was viewed 17% of the time.

2.4. Analyses

Nutritional profile, FoPL, NIP views, the nutritional profile x FoPL, nutritional profile x NIP views and nutritional profile x FoPL x NIP views interactions were entered as fixed effects, respondent ID was entered as a random effect and age, gender, SES and BMI were entered as covariates into a linear mixed model with perceived healthiness as the dependent variable. Where significant

Table 1
Age, gender and socioeconomic status of survey respondents ($n = 2058$).

Age (years)	Socio economic status		BMI (body mass index)		
	Low	Medium-high	Underweight	Normal weight	Overweight/obese
Males (n = 1028)					
10–18	132	139	32	81	63
19–35	118	117	6	78	93
36–55	126	133	0	63	145
56 +	128	135	2	50	182
Total	504	524	40	272	483
Females (n = 1030)					
10–18	126	135	34	101	46
19–35	122	119	20	76	68
36–55	131	130	12	73	110
56 +	132	134	6	74	135
Total	511	518	72	324	359

Note: BMI calculated according to categorization outlined by the World Health Organization (World Health Organisation, 2004).

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