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Consumers' responses to front-of-pack labels that vary by interpretive content

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Keywords
front, responses, labels, consumers, interpretive, content, pack, that, vary

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Abstract

Previous research has shown that front-of-pack labels (FoPLs) can assist people to make healthier food choices if they are easy to understand and people are motivated to use them. There is some evidence that FoPLs providing an assessment of a food's health value (*evaluative* FoPLs) are easier to use than those providing only numerical information on nutrients (*reductive* FoPLs). Recently, a new evaluative FoPL (the Health Star Rating (HSR)) has been introduced to Australia and New Zealand. The HSR features a summary indicator, differentiating it from many other FoPLs being used around the world. The aim of this study was to understand how consumers of all ages use and make sense of reductive FoPLs and evaluative FoPLs including evaluative FoPLs with and without summary indicators. Ten focus groups were conducted in Perth, Western Australia with adults (n=50) and children aged 10-17 years (n=35) to explore reactions to one reductive FoPL (the Daily Intake Guide), an existing evaluative FoPL (multiple traffic lights), and a new evaluative FoPL (the HSR). Participants preferred the evaluative FoPLs over the reductive FoPL, with the strongest preference being for the FoPL with the summary indicator (HSR). Discussions revealed the cognitive strategies used when interpreting each FoPL (e.g., using cut offs, heuristics, and the process of elimination), which differed according to FoPL format. Most participants reported being motivated to use the evaluative FoPLs (particularly the HSR) to make choices about foods consumed as part of regular daily meals, but not for discretionary foods consumed as snacks or deserts. The findings provide further evidence of the potential utility of evaluative FoPLs in supporting healthy food choices and can assist policy makers in selecting between alternative FoPL formats.

Keywords: Daily Intake Guide; Traffic light; Health Star; Nutrition label; Front of pack

Introduction

Front-of-pack labels (FoPLs) provide at-a-glance nutrition information through their prominent placement on the front of food packages. The main aim of FoPLs is to clearly and efficiently inform consumers of the nutritional quality and/or composition of products to help them purchase and consume healthier foods (Wartella, Lichtenstein, & Boon, 2010). Numerous FoPLs exist in the global marketplace. These range from simple (e.g. the Nordic Green Keyhole and the Dutch Choices Logo) to more complex (e.g. the Nutrition Information Initiative; Van Der Bend et al., 2014).

Unlike the nutrition information panel (also known as the nutrition facts label) that comprehensively details the level of multiple nutrients within a product (and is often mandated to appear on the back of food packages), FoPLs provide abbreviated nutrition information. For example, the Daily Intake Guide (DIG: also known as the Guideline Daily Amount) displays the recommended percentage daily intake of energy and nutrients (e.g., sugar, fat, saturated fat, and sodium) contained within one serve of a product. The DIG is known as a reductive FoPL because it does not provide an assessment of a product's nutritional quality (Hamlin, McNeill, & Moore, 2014; Newman, Howlett, & Burton, 2014). Evaluative FoPLs, on the other hand, provide an interpretation of the levels of nutrients within a product (e.g., through colour and text). The multiple traffic light system (MTL) is an evaluative FoPL that has received considerable research attention. Although it was also considered for adoption by the EU, the DIG was adopted instead (European Parliament and the Council of the European Union, 2011; Howlett & Kennedy, 2011). The application of colour to the DIG (to create MTLs) is currently recommended by the UK Health Minister as a uniform, voluntary system (Food Standards Agency, 2013). This FoPL uses the colours red, amber, and green to indicate high, medium, and low (respectively) values for specific

nutrients. The MTL and DIG systems are the most frequently studied evaluative and reductive FoPLs, respectively (for reviews see Hawley et al., 2013; Hersey, Wohlgenant, Arsenault, Kosa, & Muth, 2013).

Previous food labelling studies have used experimental designs, randomised control designs, discrete choice tasks, and surveys of shoppers in supermarkets. The results of these studies suggest that evaluative FoPLs (such as the MTL) generally lead consumers to more accurately identify healthier food products compared to reductive FoPLs (such as the DIG: Borgmeier & Westenhoefer, 2009; Gorton, Ni Mhurchu, Chen, & Dixon, 2008; Kelly et al., 2009; Maubach, Hoek, & Mather, 2014; Murphy, Fallows, & Bonwick, 2008). This may be due to the difficulties associated with processing numerical information (required when interpreting reductive FoPLs) in a time-pressured context (van Herpen & van Trijp, 2011). Equally important when considering the value of a FoPL system is whether consumers are motivated to use these tools when making purchases. More favourable attitudes towards, and greater motivation to use, an evaluative FoPL (such as the MTL) relative to reductive FoPL (such as the DIG) have been reported in previous studies (Maubach & Hoek, 2010; Signal et al., 2008).

Research outcomes relating to purchase and consumption choices are less clear. In one study assessing willingness to pay, consumers indicated a preference for food packages with MTLs over the DIG (Drichoutis, Lazaridis, & Nayga, 2009). Another study found that participants were more likely to purchase foods containing any FoPL (including MTL and DIG) compared to no FoPL. However, the type of FoPL, and more importantly the healthiness of the food, did not predict purchase intentions (Hamlin et al., 2014). In terms of consumption, McCann et al. (2013) found that participants consumed a greater amount of a product when

there were traffic lights showing low fat and low energy (compared to a baseline, no label condition), but did not consume less when the traffic lights showed high fat and high energy. These studies illustrate that although evaluative FoPL are generally preferred and may be more useful in helping consumers identify healthier products, this does not always lead to healthier purchase or consumption behaviours.

Evaluative FoPLs can be nutrient specific (e.g., MTLs) or they can carry a summary indicator that provides an overall interpretation of the product's healthiness. The indicator can have one level that indicates healthiness through its presence/absence (e.g., a logo), or multiple levels with a rating scale that indicates healthiness (Wartella et al., 2010). Examples of multi-level summary indicator systems include: the simple traffic light (which rates foods as red, amber, or green), the US Institute of Medicine's Healthy Stars (a rating from 0–3 stars), the 5 colour nutrient label (a rating from A–E with corresponding colours), and the NuVal (a rating from 0-100).

The few studies comparing multi-level summary indicator FoPLs to nutrient-specific FoPLs have thus far produced mixed findings. Ducrot et al. (2015) found that participants were better at ranking product healthiness using the 5 colour nutrient label than MTLs and the DIG. FoPLs with 1–5 stars (Feunekes, Gortemaker, Willems, Lion, & van den Kommer, 2008), 1–3 stars (Newman et al., 2014), and 0–7 stars (Maubach et al., 2014) were found to result in low to moderate increases in accuracy in food healthiness ratings. The NuVal system led to more healthy choices in one study (Helfer & Shultz, 2014), but was reported by participants as the least liked FoPL in another (Savoie, Barlow, Harvey, Binnie, & Pasut, 2013). Recently, Hersey and colleagues (2013) called for more research comparing MTLs to summary indicator FoPLs as this area is relatively understudied and thus poorly understood.

The DIG has been in the Australian marketplace since 2006, but is in the process of being replaced by the Health Star Rating system (HSR). Both of these FoPL systems have been introduced on a voluntary basis. The DIG was an industry initiative while the HSR is an Australian and New Zealand government endorsed initiative and developed as part of a negotiated process between public health and the food industry (Australian Department of Health, 2015). The primary feature of the HSR is a 10-point summary indicator that provides a rating from 0.5 to 5 stars, increasing in 0.5 star increments. This star rating system is different to the other star rating systems described in the previous paragraph. An optional reductive nutrient information panel can be placed alongside the star rating. This panel lists the grams of specific positive and negative nutrients, usually per 100g/mL or by packet size if the product is less than 100g/mL (Australian Government Department of Health, 2012). It may also display interpretive text. It is anticipated that there will be widespread voluntary uptake of the HSR by the food industry because the Government has indicated that otherwise it will become mandatory (Australian Government Department of Health, 2013).

The aim of the present study was to examine and compare consumer responses to (i) an evaluative FoPL with a summary indicator (the HSR), (ii) an evaluative FoPL without a summary indicator (MTL), and (iii) a reductive FoPL (DIG). A qualitative approach was adopted to observe participants' immediate and spontaneous reactions to each FoPL. Specifically, focus groups were used to create a collaborative setting in which participants could build off each other's statements and indicate areas in which they held similar or different views. This was useful for gaining an understanding of areas of consensus and identifying multiple views (Wilkinson, 1998). Participants were grouped by gender, age, and

SES to assess whether certain themes were more prominent for a particular demographic subsection of the sample (Stewart & Shamdasani, 2014).

Despite children's substantial role as both food buyers and consumers (Marshall, 2010), they have rarely participated in FoPL research to date. To help address this short-coming, the present study sample included individuals aged 10 years and over to assess the extent to which FoPLs may be effective with consumers at varying stages of cognitive development and consumer socialisation. Previous research has reported that children rarely read food labels and generally express confusion when shown daily intake percentages (Neeley & Petricone, 2006). However, children's attitudes to and understanding of evaluative FoPLs have yet to be examined. Furthermore, in line with previous findings relating to children's attentiveness towards colours and images on food packs (Brierley & Elliott, 2015), it was expected that both adults and children would demonstrate greater understanding of and preference for evaluative FoPLs.

Participants were expected to be familiar with the DIG as it has been in use in Australia for the last decade. They were expected to be less familiar with the HSR (which has only recently appeared on products) and the MTL system (which has been used to determine the suitability of foods sold in Australian school canteens since 2008: Pettigrew, Pescud, & Donovan, 2012). The comparison of these FoPLs provides further insight into the potential effectiveness of labels featuring different information display approaches (reductive vs evaluative vs evaluative with summary indicator).

Materials and methods

153 Participants

154 Ethics clearance was obtained from the (*blinded for review*) University Human Research
155 Ethics Committee. A social research agency recruited 100 participants to take part in 10
156 focus groups in Perth, Western Australia, using telephone random digit dialing, online
157 advertising, snowball sampling and flyers. This number of groups permitted segmentation by
158 age (10-13, 14-17, 18-25, 26-45, 46+ years) and gender (male, female). In accordance with
159 recommendations for 8-12 focus group participants to optimise discussion quality (Stewart &
160 Shamdasani, 2014), efforts were made to recruit 10 participants for each focus group.
161 Potential participants were advised that the discussions would relate to food and nutrition.
162 After no-shows, the final sample consisted of 85 participants, with 7 to 10 attending each
163 group. Details of participants' demographic characteristics are shown in Table 1.

164

165 Table 1

166 *Participant demographics (n = 85)*

Demographics	N
Gender	
Males	45
Females	40
Age	
10-13	18
14-17	17
18-25	16
26-45	16
46+	18
Focus group location SES	
Low	26
Medium	15
High	44

167

168

To access those with varying levels of nutrition literacy, the sessions were conducted in community centres in suburbs with SES classifications ranging from low to high (Australian Bureau of Statistics, 2011). In this way, location acted as a proxy for SES.

Procedure

Upon arrival, participants were given information letters and provided signed consent (including additional parental consent for the children) prior to the commencement of the focus groups. Group discussions started with broad questions about food preferences, shopping habits, and sources of nutrition information. Participants were then shown the three FoPLs projected onscreen and distributed on large print outs in the order that reflected likely levels of prior exposure: DIG, then MTLs, then HSR (FoPL formats shown in Fig. 1). Participants were shown the most familiar FoPL first to facilitate discussion and to ensure that when they were exposed to unfamiliar FoPLs they understood their purpose and were able to actively compare them. Each FoPL was presented and discussed individually before all FoPLs were subsequently shown together as one image and participants were asked to discuss their preferences.

Towards the end of the sessions, participants were shown mock packages for six different food products, with each featuring one of the three FoPLs. Rather than using the same product to display the different FoPLs, a range of products were used to gain insight into participants' reactions to varying product categories. All products shown featured a 2 star rating or equivalent to minimise any bias in participants' interpretations of the FoPLs based on the products themselves. The HSR was shown on the front of yoghurt and chicken nuggets, MTLs were shown on cheese and muesli bars, and the DIG was shown on cereal and potato crisps. Discussion prompts were kept very general (e.g., "What do you think about

this?") to elicit spontaneous reactions to the different FoPLs. Group discussions ranged from 70-110 minutes in duration, with an average of 88 minutes (adult groups 96 minutes, child groups 76 minutes). All focus groups were conducted by the second author, with the first author present to observe and assist.

Data analysis

The discussions were digitally audio-recorded and transcribed. Coding and analysis of the transcripts was conducted using NVivo10. An inductive approach to thematic analysis was used whereby a node hierarchy was created according to the topics discussed by participants and progressively updated as new content emerged (Strauss & Corbin, 1990). This approach permitted highly detailed and fine-grained coding of the data. The themes were then derived by reading the transcripts in their entirety, interrogating specific nodes, and conducting coding and matrix searches (as per NVivo's functionality) to further explore emerging interpretations. The coding of the data was undertaken by the first author and reviewed by the second author. The thematic interpretation was then developed through discussions among the author team.

Results

The main themes to emerge from the focus group discussions related to differences in participants' attitudes to, and processing of, each FoPL and their views on the relevance of FoPLs on discretionary foods (i.e., foods that are not essential for a healthy diet). The findings were remarkably consistent across participants regardless of age, gender, and SES, indicating that FoPLs may be similarly processed by a broad range of consumers.

Overall, participants preferred the evaluative FoPLs (HSR and MTLs) to the reductive FoPL (DIG) because they were considered easier to understand and more conducive to making fast and effective product comparisons. The HSR was considered useful mainly because of the summary indicator of product healthiness, and participants rarely discussed the nutrient icons. Participants reported using different cognitive strategies (generally involving a threshold) when using each FoPL to make decisions about product healthiness. Figure 1 graphically illustrates how participants' reactions appeared to be influenced by the perceived ease of use and level of detail of each FoPL. In the case of the HSR, the summary indicator and nutrient icons of the HSR are classified separately because participants reacted to them differently. Ease of use and level of detail uniquely contribute to consumer understanding. This can be seen in the fact that the HSR summary indicator and the MTL are both intuitive, but the HSR contains only one piece of information, whereas the MTL contains several. The intuitiveness of the MTL cannot fully compensate for the fact that multiple pieces of information still need to be integrated. Thus, the HSR summary indicator, which is holistic, is portrayed as slightly higher on ease of use than the MTL. Finally, FoPLs in general were usually considered inappropriate for use on very unhealthy foods, although a small number of participants stated an intention to use the evaluative FoPL for all purchases, including for discretionary foods. Each of these themes is described in detail below.

Level of detail

- Simple
- One cut-off used
- Facilitates multiple comparisons
- Evaluation based on overall health value of the product

- Detailed
- Many cut-offs used
- Requires more cognitive effort
- Evaluation based on predicted daily intake of nutrients

Holistic | **Nutrient specific**

Ease of use

Intuitive

- Understood at a glance
- Highly salient
- Easy to use
- Positive attitudes towards
- Resistance to use on discretionary foods

Complex

- Does not stand out
- Requires mental arithmetic
- Confusing
- Serving size not standardised
- Requires prior nutrition knowledge
- Acceptable to use on discretionary foods

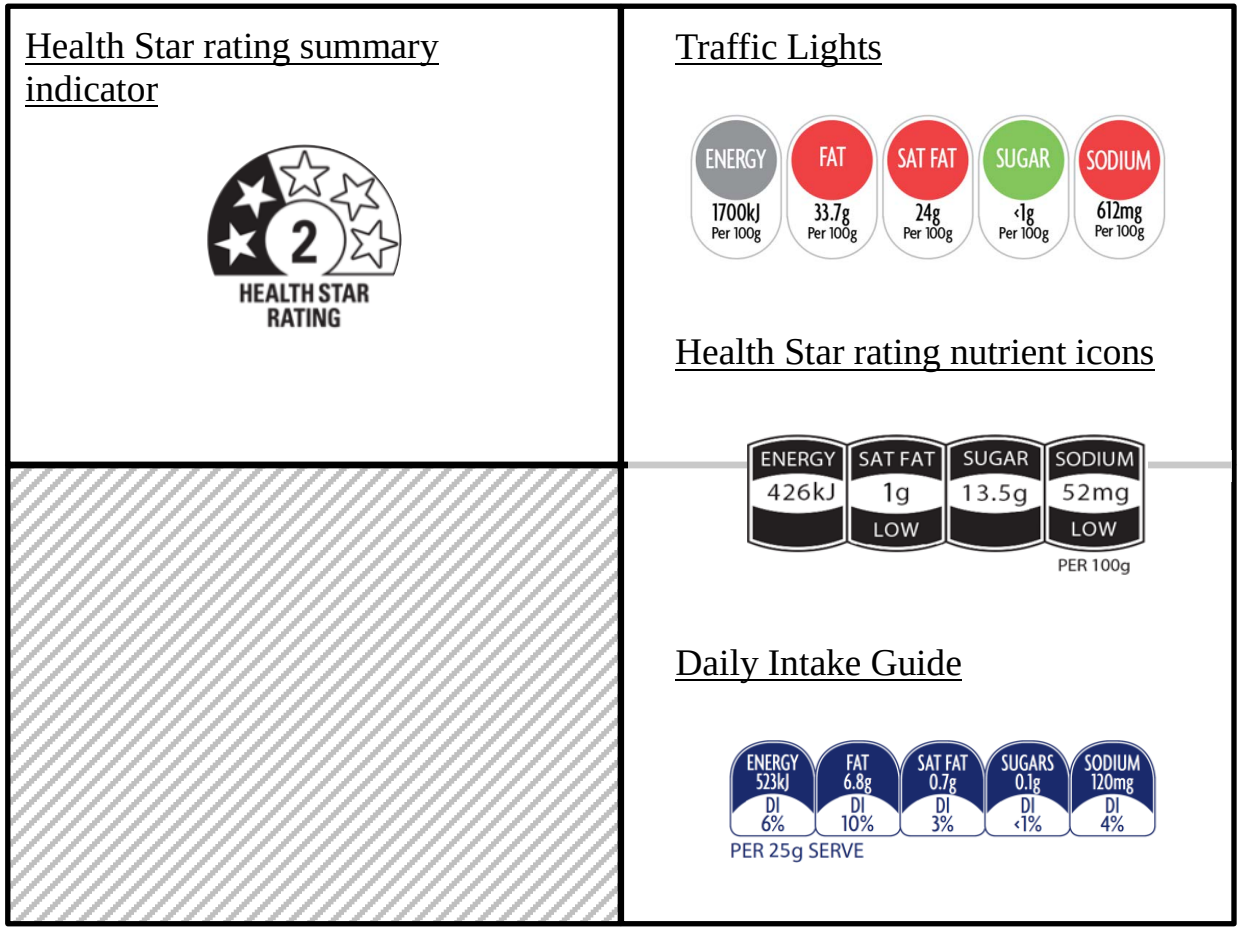

Fig. 1. Interpretation matrix for three FoPLs: Health Star Rating, Traffic Lights, and Daily Intake Guide

Theme 1: Attitudes to the FoPL systems

Attitudes to each FoPL appeared to be primarily driven by how easy they were to understand. There was a clear divide between the two evaluative systems (HSR and MTLs) and the reductive system (DIG), with the former two strongly preferred. Although the DIG has appeared on Australian food packages for the last decade and participants were familiar with the label, many adults and children reported confusion about how to interpret it and some felt it was deliberately confusing.

> *See, the problem I have with that thing* [DIG] *is I've got very little idea about whether it's high or low when I look at that. That might be a relatively healthy product but I can't really tell from that system.* Male, 26-45.

> *Facilitator: Why is that one* [HSR] *your preference?*
> *Female: Because with the other ones* [DIG and MTL] *I'd have to go "Oh, what's this? What's the daily intake on that one? And what's the other one, the other one, and the other one?"* Female 10-13.

Conversely, almost all participants were able to easily understand the information being conveyed by the HSR and MTLs. Young children (10 – 13 years) voiced appreciation for how the evaluative FoPLs simplified their evaluation of the individual food products under examination. Most adults and some teenagers went a step further by indicating that this simplified information would help them when comparing across different brands within product categories..

> *With the nutrition one* [DIG], *I'd probably only compare maybe one or two, at most three, brands because it's more time consuming. But this one* [HSR] *you could just scan through and find the best - the one with the highest amount of stars.* Female, 14-17.

> *But it's* [MTL] *good for* [comparing] *like to like. If you lined up all the muesli bars and they all had this traffic light you could, quite easily, have a look and go, "Right, these ones are better because they have one red, these ones are worse because they have three reds", so we'll get rid of those. You could look through all the muesli bars and pick the best one.* Female, 26-45.

Adults reported that they often found it difficult to make comparisons across different products using the DIG because of its reliance on manufacturers' nominated serving sizes. This approach to the presentation of nutrition information was strongly disliked and distrusted because recommended serving sizes were seen to be typically unrealistic, and it was noted that different products within the same category can vary in their serving sizes. By comparison, the HSR and MTL systems used in the study were based on per 100g servings, which was generally considered to be a more user-friendly and informative approach for the provision of nutrition information.

> *On one two litre package it might say there's eight servings in that and in another it might say only five. What is a serving?* Male, 46+

> *I go for 100 grams because it's the same for every product. Whereas per serve, serves are different sizes, and it can make it difficult to judge.* Female, 26-45.

In terms of attention paid to each FoPL, many participants reported not using the DIG when shopping. By comparison, they indicated they would be more likely to notice and use the evaluative systems because they are more salient (especially MTLs), and it was believed that the colours and the stars would be processed automatically and therefore be harder to ignore.

It shows the nutrition [DIG] *and everything up the top, but I don't think it could catch your eye as much as the other ones* [FoPLs]. Female 10-13.

Male 1: You don't really notice it [DIG] *because it's just this drab thing. That's why I reckon the traffic lights one would actually catch you straight away. You'd recognise the colours before you even looked at any percentages or anything.*
Male 2: It competes with the marketing; that's a good point. Yeah it competes with the razzle dazzle. Males, 26-45.

Yeah. It's almost subliminal. If you see that red, "Oh, it's pretty bad for you". Male, 18-25.

I like the stars because I could tell at a glance. Female, 46+

Appreciation of each evaluative system's unique benefits led to the frequent suggestion to combine the two systems such that a star rating and traffic light colours were both present. It was thought that combining the two systems would reduce, rather than increase, the complexity of information being conveyed.

I'd like the star rating on the left, but I'd like the four things [nutrients] *to the right of that to be in the colours; either red, green, orange, or grey.* Male, 46+

Despite their frequently stated positive attitudes to MTLs and a similarly high level of understanding for both the MTL and HSR, when asked to choose their most preferred FoPL the majority of participants chose the HSR. This was typically attributed to the HSR providing an overall and unambiguous measure of a product's nutritional value, along with most of the same information

conveyed by MTLs. By comparison, MTLs were seen to require additional cognitive work to make an overall assessment to inform the purchase decision.

> *I'd like to see it* [HSR] *on all packaged food frankly*. Female, 18-25

> *The health star sort of averages it all out and just makes it easier for me. Yeah, it's 4.5, that's easy*. Female, 10-13.

Participants predicted that the presence of either the HSR or MTL FoPLs would influence their purchase decisions, with this response being more common among those who described themselves as health-conscious and those reporting that they did not usually actively seek out nutrition information. The ability of these two FoPLs to facilitate comparisons across more brands was considered useful in assisting participants to switch to healthier products.

> *It's a good idea…I don't look at the back of the thing when I buy my things. I would look at that* [HSR]. Female, 14-17.

> *That would be just be straight off my shopping list. I'm seeing red, red, red and I'd think "God, there's got to be something better than that". So I would consciously look for another product.* Male, 46+

Theme 2: Cognitive processing strategies

Throughout the discussions, it became clear that participants had different techniques for making use of the information contained in each FoPL. The minority of participants who reported already using the DIG in their food choices mostly talked about using it to check product sugar levels, although

some males also made reference to monitoring saturated fat. Some applied a cut-off value as a rule of thumb for one or more nutrients shown in the DIG, while others used the percentage of a nutrient or total energy to calculate how many servings of the product would take them to a day's recommended intake. If the cut-off was exceeded or the estimated number of servings was too high, the product was classified as unhealthy.

> *I normally judge if something's over five grams of saturated fat per 100 grams, it's getting unhealthy.* Male, 18-25.

> *So maybe if you were basing it around sugars, that is one-tenth of what your daily intake guide would be. So I guess it's all right if you're only going to have nine other things similar to that.* Female, 10-13.

When presented with the MTL labels, participants talked about applying the heuristic of "green means go and red means stop" in relation to specific nutrients. However, few discussed how they would integrate the colours across the nutrients. Those who did were unsure how they would determine a product's overall healthiness if it didn't have a majority of red or green lights.

> *When you've got reds and greens and a lot on one label, it's not clear cut.* Female, 26-45.

When it came to determining the healthiness of a product according to its HSR, the heuristic used was far simpler. Products with a rating of 2 or fewer stars were generally considered unhealthy, whereas those with 3 or more stars were seen as healthier options.

It's got a two health star rating so I'm guessing that's not going to be healthy for you. Males 10-13.

Two [stars] *sounds pretty low and three sounds pretty good.* Male, 26-45.

You could tell your kids, "Look, don't bother asking me for anything below three stars"...this immediately, I think, knocks out a lot of products straight away, so that you can just focus on the best of the best. Female 26-45.

When commenting on the healthiness of the foods presented with the HSR, participants placed most emphasis on the overall star rating, making only occasional mention of the specific nutrients included in the label. Products with the HSR seemed to be evaluated more in terms of 'all or nothing', with participants indicating that they would eliminate certain products within product categories based on their star rating. A similar strategy was applied to specific nutrients when using MTLs (e.g., eliminate any product with a red light for sugar). By comparison, when using the DIG they tended to attempt to evaluate the healthiness of a product in the context of what else they were eating that day.

[The HSR is] *an easy way to eliminate things. So anything under this many stars, we can't look at.* Female, 26-45.

You see that overall summary [star rating], *but then if you looked to the right* [at the nutrient icons] *you see 645mg and 1.1g and 4g, but you don't know, is that good or bad?* Male, 18-25.

295 *A diabetic, for example, would be looking at the sugar in particular and would want to see a*
296 *green* [traffic light] *on the sugar. So I think that would be very helpful for people with certain*
297 *dietary ideas.* Male, 26-45.
298
299 *That is one tenth of what your daily intake guide* [for sugar] *would be. So I guess it's all right if*
300 *you're only going to have nine other things that are similar to that.* Female 10-13.
301
302 The focus group participants appeared to use different forms of cognitive processing when exposed to
303 different forms of FoPLs. While the HSR (and to a lesser extent MTLs) encouraged participants to
304 focus on the nutritional content of each product, the DIG seemed to encourage the small number who
305 reported using it to think more in terms of how to balance their nutritional needs over the day. The
306 issue with the latter approach is the need to remember what has been consumed in previous meals and
307 actively balance past meals with future ones. When this strategy was discussed, very few participants
308 reported having the motivation to apply it.
309
310 *Facilitator: Let's say you do a shop and you buy some of this stuff and you look at it and it's got*
311 *one-tenth of your days' worth of sugar. Do you remember that and then when you eat some of*
312 *it at home think "Right, I've done 10 per cent or 11 per cent of my sugar for today, I've got to*
313 *factor in how much else sugar I have." Do you do the maths?*
314 *Male 1: No [laughing]*
315 *Male 2: I'm too lazy for that. I just go and write it off and then just eat what I've got to eat…It's*
316 *too hard.* Males, 18-25.
317

Theme 3: FoPLs on discretionary foods

A topic that arose spontaneously in a number of adult and teenager focus groups (but not the younger children's groups) was the appropriateness of FoPLs on discretionary foods (e.g., ice-cream, chocolate, and chips). Most participants stated that they would avoid looking at any nutrition information on these foods because they were purchased for non-health-related reasons. These participants believed that the unhealthy nature of these food categories meant that it is pointless to search for healthy alternatives and/or that it is acceptable to eat an unhealthy treat once in a while or in small portions. This view was expressed even among participants who reported frequently checking nutrition information on other foods.

> *If I'm getting chocolate or something, I don't really bother about how healthy it is because it's going to be bad no matter what.* Female, 14-17.

> *I think for the bulk of your meals, like breakfast, lunch, and dinner, the star rating would be important. But then for very discretionary food, you probably wouldn't take much notice of it because you know it's only a little treat.* Male, 46+.

An occasionally expressed belief relating to discretionary foods was that the healthy alternative (e.g., low-fat ice cream) would taste inferior to the regular, more unhealthy version of the product. Therefore, for some participants there was the unintended negative consequence of FoPL on discretionary foods being used to gauge the tastiness of the product due to the assumption that a lower healthiness rating equated to a better-tasting product.

> *So you're walking down the chip aisle and it's like five stars, five stars, one star – well, that's going to be the nice one.* Male, 18-25.

While most participants saw little value in placing FoPL on unhealthy foods, a small number of males reported that they would find this useful in terms of facilitating healthier decisions. Given that the discretionary foods category contains some of the least healthy products, these participants felt that FoPLs could assist by alerting them to relatively healthier alternatives or simply reminding them of just how unhealthy the product was so they wouldn't overindulge.

> *I think you do expect chips to be really high fat, but being able to compare it against say Grain Waves, or something like that, would be handy. So if Grain Waves were chips but low fat, then you could use them* [HSR and MTLs] *that way.* Male, 46+

> *Male 1: I like it* [MTLs] *because the reason I don't eat chips as much anymore is because I looked at the back. So if there's more* [nutrition information] *on the front I think more people wouldn't eat it as often.*
>
> …
>
> *Male 2: I think some people would have a reaction to it like having plain packaged cigarettes, because it's right there in their face seeing all the nutritional content that they might not eat it nearly as much.* Males, 18-25.

Discussion

Focus group discussions with adults and children in the current study offered insights into how consumers may perceive, interpret, and apply different FoPLs. While the reductive (e.g. the DIG) and evaluative (e.g. MTL) FoPLs have been studied in the past (Hawley et al., 2013; Hersey et al., 2013), there is little research on FoPLs featuring summary indicators. The recent development and

implementation of the Health Star Rating system in Australia provided the opportunity to undertake a comparison of all three types of labels. Given the current implementation of this system in Australia and New Zealand, it is critical to understand how it is perceived and interpreted. Using a sample of Western Australians stratified by age, sex and location, the current study explored reactions to this new system and compared the HSR with two pre-existing FoPLs: a reductive FoPL that has been used in Australia for the last decade (DIG) and an evaluative FoPL that has been used in the marketplace overseas and applied in school food policies in Australia (MTLs).

Despite its current proliferation in the marketplace, few participants reported using the DIG for purchase decisions. Across adults and children, the main reasons provided were that it is confusing, requires substantial cognitive effort, and is obscured by other packaging elements. Thus there appear to be issues with attention, ability and motivation to process the DIG for all age groups. These results are consistent with previous studies showing that adults dislike reductive FoPLs (Lando & Labiner-Wolfe, 2007; van Kleef, van Trijp, Paeps, & Fernández-Celemín, 2007) and that children (Elliott & Brierley, 2012; Neeley & Petricone, 2006) and adults have difficulty interpreting them (Hawley et al., 2013; Hersey et al., 2013). The few participants who reported using the DIG indicated that they would usually select products by imposing a cut-off on particular nutrients or by attempting to take into account the other foods (and nutrients) they would consume across the day. The former strategy relies on nutrition knowledge to inform where the cut-off should be and the latter relies on remembering foods consumed across the day, as well as the motivation and ability to calculate nutrient and energy consumption on an ongoing basis. The present study supports previous research indicating that few people are willing to regularly perform these calculations (Lando & Labiner-Wolfe, 2007). Even among those motivated to do so, this strategy is cognitively taxing and prone to failure (Levy & Fein, 1998).

In contrast, participants were overwhelmingly positive about the MTLs and HSR (the evaluative FoPLs) and provided insight into how these labels could reduce the cognitive processing burden. This is particularly important for low SES consumers for whom cognitively taxing decision making imposes a heavier burden (Mullainathan & Shafir, 2013). Adults and teenagers could see themselves using the MTLs to quickly compare levels of certain nutrients across products, but found it somewhat difficult to interpret a product's overall healthiness. While the literature is generally positive about MTL labels (Feunekes et al., 2008; Méjean et al., 2014), there is a lack of understanding of how consumers integrate information across several nutrients to make an overall assessment. The present findings suggest that the format of the MTLs may not be as conducive to a holistic assessment of product healthiness as FoPLs with a summary indicator.

The HSR system was especially valued for its utility in facilitating rapid assessments of products individually and comparatively. While children used the HSR to evaluate individual products, adults and teenagers noted that it enabled them to quickly reduce the size of the choice set, thereby decreasing the time and effort involved in the decision-making process. This is known as a non-compensatory strategy (Edland & Svenson, 1993) and differs from compensatory strategies that involve evaluating each product on all attributes and averaging the positives and negatives to give an overall judgement. Non-compensatory strategies can save time and cognitive effort, although the trade-off can be lower levels of accuracy (Chu & Spires, 2003). For food choices, where little time is typically dedicated to decision-making (Signal et al., 2008), the ability to employ non-compensatory strategies is a distinct benefit, as reflected in participants' frequent mentions of using such strategies when evaluating product healthiness. Minimising decision time is especially important given that healthiness is only one of the several dimensions on which a product can be evaluated and is often considered less important than other attributes such as price and taste (Glanz, Basil, Maibach, Goldberg, & Snyder, 1998; Pettigrew & Pescud, 2013; Sanlier & Karakus, 2010). However, a

potential downside of a summary indicator is that it may result in binary thinking (i.e., a product is assessed as either ‘good’ or ‘bad’), which may prevent people from achieving a balanced diet (Shamdasani, Stewart, & Palascha, 2015). In the case of the HSR, this may be alleviated to some extent by the inclusion of the nutrient icons that provide more detailed information for those who choose to read them.

An emergent theme in the present study was the existence of polarised views on the appropriateness of applying FoPLs to discretionary foods. Of note is that despite participants discussing these foods as being infrequently consumed, a recent national survey found that 35% of Australians’ total daily energy intake comes from discretionary foods (Australian Bureau of Statistics, 2014). There thus appears to be an important role for nutrition information in influencing demand for discretionary foods given their high and increasing contribution to daily energy intake (Jahns, Siega-Riz, & Popkin, 2001; Piernas & Popkin, 2010; Zizza, Siega-Riz, & Popkin, 2001), and empirical evidence suggests that FoPLs can assist consumers to identify healthier alternatives in unhealthy food categories (e.g., ice cream; Feunekes et al. (2008) and biscuits; Hodgkins et al. (2015)). However, data are lacking as to whether they would actually use this information when purchasing such products, with some previous studies indicating consumers would (Hassan, Shiu, & Michaelidou, 2010) and others suggesting consumers would not (Directorate General for Health and Consumer Protection, 2015; McIntyre & Baid, 2009).

The findings of the present study go some way to explaining these divergent results by revealing the existence of different segments of consumers who use FoPLs in varying ways according to product category. Some consumers may apply healthiness as a selection criterion across the full spectrum of products, and hence find FoPLs useful when purchasing discretionary foods. This strategy was only raised among males. However, since this strategy was not discussed in every focus group, further

research is needed to better understand which types of consumers would be most likely to take this more holistic approach. Other consumers (probably the majority) exclude the consideration of healthiness from the decision-making process for these purchases and thus find FoPLs irrelevant in this choice context. A further group may use FoPLs to infer tastiness using the commonly held assumption that tastiness and healthiness are inversely correlated (Raghunathan, Naylor, & Hoyer, 2006). Further research is needed to assess the relative size and composition of these segments to identify the conditions under which FoPLs are best used.

A qualitative approach was used for its ability to elicit spontaneous and wide-ranging responses from participants. This approach provided insight into the different cognitive strategies used when interpreting each FoPL and permitted the emergence of participants' attitudes to FoPLs on discretionary foods. However, this approach has limitations in terms of generalisability to the broader population of consumers and to real-world shopping contexts where there is less time to contemplate products and their labels and less potential influence from peers. Furthermore, although the current sample exhibited wide coverage of age, gender, and SES groupings, self-selection effects were likely given that participants were advised that the discussion would relate to food and nutrition. As a result, it is possible that these individuals had a greater interest in nutrition-related issues than the average consumer. There is thus a need for larger-scale quantitative studies and in-situ observational studies to determine the extent to which the identified themes are applicable to Australian consumers and other populations.

Conclusions

The current study is among the first to examine reactions to the Health Star Rating currently being implemented in the Australian and New Zealand marketplaces. It is also novel in the inclusion of children to assess whether they can understand and apply different forms of front-of-pack nutrition

labels. The study participants, regardless of age, gender, and SES, expressed a preference for HSR over MTLs and DIG labels due to the ease of assessing overall product healthiness. This outcome adds to the limited research on summary indictors by showing they can potentially reduce cognitive load and increase the number of products compared during product selection.

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References

Australian Bureau of Statistics. (2011). *Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA), Australia*. Retrieved from http://www.abs.gov.au/websitedbs/censushome.nsf/home/seifa2011?opendocument&navpos=260

Australian Bureau of Statistics. (2014). *Australian Health Survey: Nutrition First Results – Food and Nutrients, 2011-12* (No. 4364.0.55.007). Retrieved from http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/4364.0.55.007~2011-12~Main%20Features~Discretionary%20foods~700

Australian Department of Health. (2015). *Health Star Rating System: Information for Educators.* Canberra. Retrieved from http://www.healthstarrating.gov.au/internet/healthstarrating/publishing.nsf/Content/factsheet-educators

Australian Government Department of Health. (2012). *Front-of-pack labelling updates*. Australian Government Department of Health. Retrieved from http://www.health.gov.au/internet/main/publishing.nsf/Content/foodsecretariat-front-of-pack-labelling-1

Australian Government Department of Health. (2013). *Front-of-pack labelling update 14 June 2013*. Australian Government Department of Health. Retrieved from http://www.health.gov.au/internet/main/publishing.nsf/Content/CF7E670597F383ADCA257BF0001BAFF5/$File/FOPL%2014.6.13%20Update.pdf

Borgmeier, I., & Westenhoefer, J. (2009). Impact of different food label formats on healthiness evaluation and food choice of consumers: a randomized-controlled study. *BMC Public Health, 9*(1), 184 – 196. http://doi.org/10.1186/1471-2458-9-184

504 Brierley, M., & Elliott, C. (2015). Nutritional components and children's interpretations of packaged
505 food. *International Journal of Health Promotion and Education*, *0*(0), 1–14.
506 http://doi.org/10.1080/14635240.2015.1010654
507 Chu, P. C., & Spires, E. E. (2003). Perceptions of accuracy and effort of decision strategies.
508 *Organizational Behavior and Human Decision Processes*, *91*(2), 203–214.
509 http://doi.org/10.1016/S0749-5978(03)00056-6
510 Directorate General for Health and Consumer Protection. (2015). *The European consumers' attitudes*
511 *regarding product labelling-qualitative study in 28 European countries*. Versailles. Retrieved
512 from http://ec.europa.eu/consumers/archive/topics/labelling_report_en.pdf
513 Drichoutis, A. C., Lazaridis, P., & Nayga, R. M. (2009). Would consumers value food-away-from-
514 home products with nutritional labels? *Agribusiness*, *25*(4), 550–575.
515 http://doi.org/10.1002/agr.20224
516 Ducrot, P., Méjean, C., Julia, C., Kesse-Guyot, E., Touvier, M., Fezeu, L. K., … Péneau, S. (2015).
517 Objective Understanding of Front-of-Package Nutrition Labels among Nutritionally At-Risk
518 Individuals. *Nutrients*, *7*(8), 7106–7125. http://doi.org/10.3390/nu7085325
519 Edland, A., & Svenson, O. (1993). Judgment and Decision Making Under Time Pressure. In O.
520 Svenson & A. J. Maule (Eds.), *Time Pressure and Stress in Human Judgment and Decision*
521 *Making* (pp. 27–40). Springer US. Retrieved from
522 http://link.springer.com/chapter/10.1007/978-1-4757-6846-6_2
523 Elliott, C., & Brierley, M. (2012). Healthy Choice?: Exploring How Children Evaluate the
524 Healthfulness of Packaged Foods. *Canadian Journal of Public Health*, *103*(6), e453–8.
525 European Parliament and the Council of the European Union. (2011). *Regulation (EU) no 1169/2011*
526 *of the european parliament and of the council*. Retrieved from http://eur-lex.europa.eu/legal-
527 content/EN/TXT/PDF/?uri=CELEX:32011R1169&from=en
528 Feunekes, G. I. J., Gortemaker, I. A., Willems, A. A., Lion, R., & van den Kommer, M. (2008). Front-

of-pack nutrition labelling: Testing effectiveness of different nutrition labelling formats front-of-pack in four European countries. *Appetite*, *50*(1), 57–70. http://doi.org/10.1016/j.appet.2007.05.009

Food Standards Agency. (2013). *Guide to creating a front of pack (FoP) nutrition label for pre-packed products sold through retail outlets*. Unighted Kindom. Retrieved from https://www.gov.uk/government/publications/front-of-pack-nutrition-labelling-guidance

Glanz, K., Basil, M., Maibach, E., Goldberg, J., & Snyder, D. (1998). Why Americans Eat What They Do: Taste, Nutrition, Cost, Convenience, and Weight Control Concerns as Influences on Food Consumption. *Journal of the American Dietetic Association*, *98*(10), 1118–1126. http://doi.org/10.1016/S0002-8223(98)00260-0

Gorton, D., Ni Mhurchu, C., Chen, M., & Dixon, R. (2008). Nutrition labels: a survey of use, understanding and preferences among ethnically diverse shoppers in New Zealand. *Public Health Nutrition*, *12*(09), 1359–1365. http://doi.org/10.1017/S1368980008004059

Hamlin, R. P., McNeill, L. S., & Moore, V. (2014). The impact of front-of-pack nutrition labels on consumer product evaluation and choice: an experimental study. *Public Health Nutrition*, 1–9. http://doi.org/10.1017/S1368980014002997

Hassan, L. M., Shiu, E. M. K., & Michaelidou, N. (2010). The Influence of Nutrition Information on Choice: The Roles of Temptation, Conflict and Self-Control. *Journal of Consumer Affairs*, *44*(3), 499–515. http://doi.org/10.1111/j.1745-6606.2010.01180.x

Hawley, K. L., Roberto, C. A., Bragg, M. A., Liu, P. J., Schwartz, M. B., & Brownell, K. D. (2013). The science on front-of-package food labels. *Public Health Nutrition*, *16*(03), 430–439.

Helfer, P., & Shultz, T. R. (2014). The effects of nutrition labeling on consumer food choice: a psychological experiment and computational model. *Annals of the New York Academy of Sciences*, *1331*(1), 174–185. http://doi.org/10.1111/nyas.12461

Hersey, J. C., Wohlgenant, K. C., Arsenault, J. E., Kosa, K. M., & Muth, M. K. (2013). Effects of

554 front-of-package and shelf nutrition labeling systems on consumers. *Nutrition Reviews*, *71*(1),
555 1–14. http://doi.org/10.1111/nure.12000
556 Hodgkins, C. E., Raats, M. M., Fife-Schaw, C., Peacock, M., Gröppel-Klein, A., Koenigstorfer, J., …
557 others. (2015). Guiding healthier food choice: systematic comparison of four front-of-pack
558 labelling systems and their effect on judgements of product healthiness. *British Journal of*
559 *Nutrition*, *113*(10), 1652–1663.
560 Howlett, S., & Kennedy, O. B. (2011). The UK food industry's views on front of pack nutrition
561 labelling: a quantitative study. *Proceedings of the Nutrition Society*, *70*(OCE4), E157.
562 http://doi.org/doi:10.1017/S0029665111002084
563 Jahns, L., Siega-Riz, A. M., & Popkin, B. M. (2001). The increasing prevalence of snacking among
564 US children from 1977 to 1996. *The Journal of Pediatrics*, *138*(4), 493–498.
565 http://doi.org/10.1067/mpd.2001.112162
566 Kelly, B., Hughes, C., Chapman, K., Louie, J. C.-Y., Dixon, H., Crawford, J., … Slevin, T. (2009).
567 Consumer testing of the acceptability and effectiveness of front-of-pack food labelling systems
568 for the Australian grocery market. *Health Promotion International*, *24*(2), 120–129.
569 http://doi.org/10.1093/heapro/dap012
570 Lando, A. M., & Labiner-Wolfe, J. (2007). Helping Consumers Make More Healthful Food Choices:
571 Consumer Views on Modifying Food Labels and Providing Point-of-Purchase Nutrition
572 Information at Quick-service Restaurants. *Journal of Nutrition Education and Behavior*, *39*(3),
573 157–163. http://doi.org/10.1016/j.jneb.2006.12.010
574 Levy, A. S., & Fein, S. B. (1998). Consumers' Ability to Perform Tasks Using Nutrition Labels.
575 *Journal of Nutrition Education*, *30*(4), 210–217. http://doi.org/10.1016/S0022-3182(98)70321-
576 8
577 Marshall, D. (2010). *Understanding Children as Consumers*. London: SAGE.
578 Maubach, N., & Hoek, J. (2010). A qualitative study of New Zealand parents' views on front-of-pack

579 nutrition labels. *Nutrition & Dietetics*, *67*(2), 90–96. http://doi.org/10.1111/j.1747-
580 0080.2010.01425.x
581 Maubach, N., Hoek, J., & Mather, D. (2014). Interpretive front-of-pack nutrition labels. Comparing
582 competing recommendations. *Appetite*, *82*, 67–77. http://doi.org/10.1016/j.appet.2014.07.006
583 McCann, M. T., Wallace, J. M. W., Robson, P. J., Rennie, K. L., McCaffrey, T. A., Welch, R. W., &
584 Livingstone, M. B. E. (2013). Influence of nutrition labelling on food portion size
585 consumption. *Appetite*, *65*, 153–158. http://doi.org/10.1016/j.appet.2013.02.013
586 McIntyre, C., & Baid, A. (2009). Indulgent snack experience attributes and healthy choice alternatives.
587 *British Food Journal*, *111*(5), 486–497. http://doi.org/10.1108/00070700910957311
588 Méjean, C., Macouillard, P., Péneau, S., Lassale, C., Hercberg, S., & Castetbon, K. (2014).
589 Association of Perception of Front-of-Pack Labels with Dietary, Lifestyle and Health
590 Characteristics. *PLoS ONE*, *9*(3), e90971. http://doi.org/10.1371/journal.pone.0090971
591 Mullainathan, S., & Shafir, E. (2013). *Scarcity: Why having too little means so much*. UK: Penguin.
592 Murphy, M., Fallows, S., & Bonwick, G. (2008). Parents' use and understanding of front-of-pack food
593 labelling, and the impact of socio-economic status. *The Proceedings of the Nutrition Society*,
594 *67*(OCE8), E413.
595 Neeley, S. M., & Petricone, B. (2006). Children's (Mis)understanding of Nutritional Information on
596 Product Packages: Seeking Ways to Help Kids Make Healthier Food Choices. *Advances in*
597 *Consumer Research*, *33*(1), 556–557.
598 Newman, C. L., Howlett, E., & Burton, S. (2014). Shopper Response to Front-of-Package Nutrition
599 Labeling Programs: Potential Consumer and Retail Store Benefits. *Journal of Retailing*, *90*(1),
600 13–26. http://doi.org/10.1016/j.jretai.2013.11.001
601 Pettigrew, S., & Pescud, M. (2013). The Salience of Food Labeling Among Low-income Families
602 With Overweight Children. *Journal of Nutrition Education and Behavior*, *45*(4), 332–339.
603 http://doi.org/10.1016/j.jneb.2013.01.025

Pettigrew, S., Pescud, M., & Donovan, R. J. (2012). Traffic light food labelling in schools and beyond. *Health Education Journal*, *71*(6), 746–753. http://doi.org/10.1177/0017896911424659

Piernas, C., & Popkin, B. M. (2010). Trends In Snacking Among U.S. Children. *Health Affairs*, *29*(3), 398–404. http://doi.org/10.1377/hlthaff.2009.0666

Raghunathan, R., Naylor, R. W., & Hoyer, W. D. (2006). The Unhealthy = Tasty Intuition and Its Effects on Taste Inferences, Enjoyment, and Choice of Food Products. *Journal of Marketing*, *70*(4), 170–184. http://doi.org/10.1509/jmkg.70.4.170

Sanlier, N., & Karakus, S. S. (2010). Evaluation of food purchasing behaviour of consumers from supermarkets. *British Food Journal*, *112*(2), 140–150.

Savoie, N., Barlow, K., Harvey, K. L., Binnie, M. A., & Pasut, L. (2013). Consumer Perceptions of Front-of-package Labelling Systems and Healthiness of Foods. *Can J Public Health*, *104*(5), e359–e363.

Shamdasani, P. N., Stewart, D. W., & Palascha, A. (2015). How does thinking in Black and White terms relate to eating behavior and weight regain? *Journal of Health Psychology*, *20*(5), 638–648. http://doi.org/10.1177/1359105315573440

Signal, L., Lanumata, T., Robinson, J.-A., Tavila, A., Wilton, J., & Ni Mhurchu, C. (2008). Perceptions of New Zealand nutrition labels by Māori, Pacific and low-income shoppers. *Public Health Nutrition*, *11*(07), 706–713. http://doi.org/10.1017/S1368980007001395

Stewart, D. W., & Shamdasani, P. N. (2014). *Focus Groups: Theory and Practice*. SAGE Publications.

Strauss, A., & Corbin, J. (1990). *Basics of Qualitative Research*. Newbury Park: CA: Sage.

Van Der Bend, D., Van Dieren, J., Marques, M. D. V., Wezenbeek, N. L., Kostareli, N., Rodrigues, P. G., … Verhagen, H. (2014). A Simple Visual Model to Compare Existing Front-of-pack Nutrient Profiling Schemes. *European Journal of Food Research & Review*, *4*(4), 429–534. http://doi.org/DOI: 10.9734/EJNFS/2014/10305

van Herpen, E., & van Trijp, H. C. M. (2011). Front-of-pack nutrition labels. Their effect on attention and choices when consumers have varying goals and time constraints. *Appetite*, *57*(1), 148–160. http://doi.org/10.1016/j.appet.2011.04.011

van Kleef, E., van Trijp, H., Paeps, F., & Fernández-Celemín, L. (2007). Consumer preferences for front-of-pack calories labelling. *Public Health Nutrition*, *11*(02), 203–213. http://doi.org/10.1017/S1368980007000304

Wartella, E. A., Lichtenstein, A. H., & Boon, C. S. (2010). *Purpose and Merits of Front-of-Package Nutrition Rating Systems*. Washington DC (USA): National Academies Press.

Wilkinson, S. (1998). Focus Groups in Health Research Exploring the Meanings of Health and Illness. *Journal of Health Psychology*, *3*(3), 329–348. http://doi.org/10.1177/135910539800300304

Zizza, C., Siega-Riz, A. M., & Popkin, B. M. (2001). Significant Increase in Young Adults' Snacking between 1977–1978 and 1994–1996 Represents a Cause for Concern! *Preventive Medicine*, *32*(4), 303–310. http://doi.org/10.1006/pmed.2000.0817