Citation:

Talati, Z., Pettigrew, S., Kelly, B., Ball, K., Dixon, H., & Shilton, T. (2016). Consumers' responses to front-of-pack labels that vary by interpretive content. *Appetite*, 101, 205–213. https://doi.org/doi: 10.1016/j.appet.2016.03.009

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

2

3   Abstract

4

5   Previous research has shown that front-of-pack labels (FoPLs) can assist people to make

6   healthier food choices if they are easy to understand and people are motivated to use them.

7   There is some evidence that FoPLs providing an assessment of a food's health value

8   (*evaluative* FoPLs) are easier to use than those providing only numerical information on

9   nutrients (*reductive* FoPLs). Recently, a new evaluative FoPL (the Health Star Rating (HSR))

10   has been introduced to Australia and New Zealand. The HSR features a summary indicator,

11   differentiating it from many other FoPLs being used around the world. The aim of this study

12   was to understand how consumers of all ages use and make sense of reductive FoPLs and

13   evaluative FoPLs including evaluative FoPLs with and without summary indicators. Ten

14   focus groups were conducted in Perth, Western Australia with adults (n=50) and children

15   aged 10-17 years (n=35) to explore reactions to one reductive FoPL (the Daily Intake Guide),

16   an existing evaluative FoPL (multiple traffic lights), and a new evaluative FoPL (the HSR).

17   Participants preferred the evaluative FoPLs over the reductive FoPL, with the strongest

18   preference being for the FoPL with the summary indicator (HSR). Discussions revealed the

19   cognitive strategies used when interpreting each FoPL (e.g., using cut offs, heuristics, and the

20   process of elimination), which differed according to FoPL format. Most participants reported

21   being motivated to use the evaluative FoPLs (particularly the HSR) to make choices about

22   foods consumed as part of regular daily meals, but not for discretionary foods consumed as

23   snacks or deserts. The findings provide further evidence of the potential utility of evaluative

24   FoPLs in supporting healthy food choices and can assist policy makers in selecting between

25   alternative FoPL formats.

26

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

28

29   Introduction

30   Front-of-pack labels (FoPLs) provide at-a-glance nutrition information through their

31   prominent placement on the front of food packages. The main aim of FoPLs is to clearly and

32   efficiently inform consumers of the nutritional quality and/or composition of products to help

33   them purchase and consume healthier foods (Wartella, Lichtenstein, & Boon, 2010).

34   Numerous FoPLs exist in the global marketplace. These range from simple (e.g. the Nordic

35   Green Keyhole and the Dutch Choices Logo) to more complex (e.g. the Nutrition Information

36   Initiative; Van Der Bend et al., 2014).

37

38   Unlike the nutrition information panel (also known as the nutrition facts label) that

39   comprehensively details the level of multiple nutrients within a product (and is often

40   mandated to appear on the back of food packages), FoPLs provide abbreviated nutrition

41   information. For example, the Daily Intake Guide (DIG: also known as the Guideline Daily

42   Amount) displays the recommended percentage daily intake of energy and nutrients (e.g.,

43   sugar, fat, saturated fat, and sodium) contained within one serve of a product. The DIG is

44   known as a reductive FoPL because it does not provide an assessment of a product's

45   nutritional quality (Hamlin, McNeill, & Moore, 2014; Newman, Howlett, & Burton, 2014).

46   Evaluative FoPLs, on the other hand, provide an interpretation of the levels of nutrients

47   within a product (e.g., through colour and text). The multiple traffic light system (MTL) is an

48   evaluative FoPL that has received considerable research attention. Although it was also

49   considered for adoption by the EU, the DIG was adopted instead (European Parliament and

50   the Council of the European Union, 2011; Howlett & Kennedy, 2011). The application of

51   colour to the DIG (to create MTLs) is currently recommended by the UK Health Minister as a

52   uniform, voluntary system (Food Standards Agency, 2013). This FoPL uses the colours red,

53   amber, and green to indicate high, medium, and low (respectively) values for specific

54 nutrients. The MTL and DIG systems are the most frequently studied evaluative and

55 reductive FoPLs, respectively (for reviews see Hawley et al., 2013; Hersey, Wohlgenant,

56 Arsenault, Kosa, & Muth, 2013).

57

58 Previous food labelling studies have used experimental designs, randomised control designs,

59 discrete choice tasks, and surveys of shoppers in supermarkets. The results of these studies

60 suggest that evaluative FoPLs (such as the MTL) generally lead consumers to more

61 accurately identify healthier food products compared to reductive FoPLs (such as the DIG:

62 Borgmeier & Westenhoefer, 2009; Gorton, Ni Mhurchu, Chen, & Dixon, 2008; Kelly et al.,

63 2009; Maubach, Hoek, & Mather, 2014; Murphy, Fallows, & Bonwick, 2008). This may be

64 due to the difficulties associated with processing numerical information (required when

65 interpreting reductive FoPLs) in a time-pressured context (van Herpen & van Trijp, 2011).

66 Equally important when considering the value of a FoPL system is whether consumers are

67 motivated to use these tools when making purchases. More favourable attitudes towards, and

68 greater motivation to use, an evaluative FoPL (such as the MTL) relative to reductive FoPL

69 (such as the DIG) have been reported in previous studies (Maubach & Hoek, 2010; Signal et

70 al., 2008).

71

72 Research outcomes relating to purchase and consumption choices are less clear. In one study

73 assessing willingness to pay, consumers indicated a preference for food packages with MTLs

74 over the DIG (Drichoutis, Lazaridis, & Nayga, 2009). Another study found that participants

75 were more likely to purchase foods containing any FoPL (including MTL and DIG)

76 compared to no FoPL. However, the type of FoPL, and more importantly the healthiness of

77 the food, did not predict purchase intentions (Hamlin et al., 2014). In terms of consumption,

78 McCann et al. (2013) found that participants consumed a greater amount of a product when

79   there were traffic lights showing low fat and low energy (compared to a baseline, no label

80   condition), but did not consume less when the traffic lights showed high fat and high energy.

81   These studies illustrate that although evaluative FoPL are generally preferred and may be

82   more useful in helping consumers identify healthier products, this does not always lead to

83   healthier purchase or consumption behaviours.

84

85   Evaluative FoPLs can be nutrient specific (e.g., MTLs) or they can carry a summary indicator

86   that provides an overall interpretation of the product's healthiness. The indicator can have

87   one level that indicates healthiness through its presence/absence (e.g., a logo), or multiple

88   levels with a rating scale that indicates healthiness (Wartella et al., 2010). Examples of multi-

89   level summary indicator systems include: the simple traffic light (which rates foods as red,

90   amber, or green), the US Institute of Medicine's Healthy Stars (a rating from 0–3 stars), the 5

91   colour nutrient label (a rating from A–E with corresponding colours), and the NuVal (a rating

92   from 0-100).

93

94   The few studies comparing multi-level summary indicator FoPLs to nutrient-specific FoPLs

95   have thus far produced mixed findings. Ducrot et al. (2015) found that participants were

96   better at ranking product healthiness using the 5 colour nutrient label than MTLs and the

97   DIG. FoPLs with 1–5 stars (Feunekes, Gortemaker, Willems, Lion, & van den Kommer,

98   2008), 1–3 stars (Newman et al., 2014), and 0–7 stars (Maubach et al., 2014) were found to

99   result in low to moderate increases in accuracy in food healthiness ratings. The NuVal system

100 led to more healthy choices in one study (Helfer & Shultz, 2014), but was reported by

101 participants as the least liked FoPL in another (Savoie, Barlow, Harvey, Binnie, & Pasut,

102 2013). Recently, Hersey and colleagues (2013) called for more research comparing MTLs to

103 summary indicator FoPLs as this area is relatively understudied and thus poorly understood.

104

105   The DIG has been in the Australian marketplace since 2006, but is in the process of being

106   replaced by the Health Star Rating system (HSR). Both of these FoPL systems have been

107   introduced on a voluntary basis. The DIG was an industry initiative while the HSR is an

108   Australian and New Zealand government endorsed initiative and developed as part of a

109   negotiated process between public health and the food industry (Australian Department of

110   Health, 2015). The primary feature of the HSR is a 10-point summary indicator that provides

111   a rating from 0.5 to 5 stars, increasing in 0.5 star increments. This star rating system is

112   different to the other star rating systems described in the previous paragraph. An optional

113   reductive nutrient information panel can be placed alongside the star rating. This panel lists

114   the grams of specific positive and negative nutrients, usually per 100g/mL or by packet size if

115   the product is less than 100g/mL (Australian Government Department of Health, 2012). It

116   may also display interpretive text. It is anticipated that there will be widespread voluntary

117   uptake of the HSR by the food industry because the Government has indicated that otherwise

118   it will become mandatory (Australian Government Department of Health, 2013).

119

120   The aim of the present study was to examine and compare consumer responses to (i) an

121   evaluative FoPL with a summary indicator (the HSR), (ii) an evaluative FoPL without a

122   summary indicator (MTL), and (iii) a reductive FoPL (DIG). A qualitative approach was

123   adopted to observe participants' immediate and spontaneous reactions to each FoPL.

124   Specifically, focus groups were used to create a collaborative setting in which participants

125   could build off each other's statements and indicate areas in which they held similar or

126   different views. This was useful for gaining an understanding of areas of consensus and

127   identifying multiple views (Wilkinson, 1998). Participants were grouped by gender, age, and

128   SES to assess whether certain themes were more prominent for a particular demographic

129   subsection of the sample (Stewart & Shamdasani, 2014).

130

131   Despite children's substantial role as both food buyers and consumers (Marshall, 2010), they

132   have rarely participated in FoPL research to date. To help address this short-coming, the

133   present study sample included individuals aged 10 years and over to assess the extent to

134   which FoPLs may be effective with consumers at varying stages of cognitive development

135   and consumer socialisation. Previous research has reported that children rarely read food

136   labels and generally express confusion when shown daily intake percentages (Neeley &

137   Petricone, 2006). However, children's attitudes to and understanding of evaluative FoPLs

138   have yet to be examined. Furthermore, in line with previous findings relating to children's

139   attentiveness towards colours and images on food packs (Brierley & Elliott, 2015), it was

140   expected that both adults and children would demonstrate greater understanding of and

141   preference for evaluative FoPLs.

142

143   Participants were expected to be familiar with the DIG as it has been in use in Australia for

144   the last decade. They were expected to be less familiar with the HSR (which has only

145   recently appeared on products) and the MTL system (which has been used to determine the

146   suitability of foods sold in Australian school canteens since 2008: Pettigrew, Pescud, &

147   Donovan, 2012). The comparison of these FoPLs provides further insight into the potential

148   effectiveness of labels featuring different information display approaches (reductive vs

149   evaluative vs evaluative with summary indicator).

150

151   Materials and methods

152

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

169 To access those with varying levels of nutrition literacy, the sessions were conducted in

170 community centres in suburbs with SES classifications ranging from low to high (Australian

171 Bureau of Statistics, 2011). In this way, location acted as a proxy for SES.

172

173 Procedure

174 Upon arrival, participants were given information letters and provided signed consent

175 (including additional parental consent for the children) prior to the commencement of the

176 focus groups. Group discussions started with broad questions about food preferences,

177 shopping habits, and sources of nutrition information. Participants were then shown the three

178 FoPLs projected onscreen and distributed on large print outs in the order that reflected likely

179 levels of prior exposure: DIG, then MTLs, then HSR (FoPL formats shown in Fig. 1).

180 Participants were shown the most familiar FoPL first to facilitate discussion and to ensure

181 that when they were exposed to unfamiliar FoPLs they understood their purpose and were

182 able to actively compare them. Each FoPL was presented and discussed individually before

183 all FoPLs were subsequently shown together as one image and participants were asked to

184 discuss their preferences.

185

186 Towards the end of the sessions, participants were shown mock packages for six different

187 food products, with each featuring one of the three FoPLs. Rather than using the same

188 product to display the different FoPLs, a range of products were used to gain insight into

189 participants' reactions to varying product categories. All products shown featured a 2 star

190 rating or equivalent to minimise any bias in participants' interpretations of the FoPLs based

191 on the products themselves. The HSR was shown on the front of yoghurt and chicken

192 nuggets, MTLs were shown on cheese and muesli bars, and the DIG was shown on cereal and

193 potato crisps. Discussion prompts were kept very general (e.g., "What do you think about

194   this?") to elicit spontaneous reactions to the different FoPLs. Group discussions ranged from

195   70-110 minutes in duration, with an average of 88 minutes (adult groups 96 minutes, child

196   groups 76 minutes). All focus groups were conducted by the second author, with the first

197   author present to observe and assist.

198

199   Data analysis

200   The discussions were digitally audio-recorded and transcribed. Coding and analysis of the

201   transcripts was conducted using NVivo10. An inductive approach to thematic analysis was

202   used whereby a node hierarchy was created according to the topics discussed by participants

203   and progressively updated as new content emerged (Strauss & Corbin, 1990). This approach

204   permitted highly detailed and fine-grained coding of the data. The themes were then derived

205   by reading the transcripts in their entirety, interrogating specific nodes, and conducting

206   coding and matrix searches (as per NVivo's functionality) to further explore emerging

207   interpretations. The coding of the data was undertaken by the first author and reviewed by the

208   second author. The thematic interpretation was then developed through discussions among

209   the author team.

210

211   Results

212

213   The main themes to emerge from the focus group discussions related to differences in

214   participants' attitudes to, and processing of, each FoPL and their views on the relevance of

215   FoPLs on discretionary foods (i.e., foods that are not essential for a healthy diet). The

216   findings were remarkably consistent across participants regardless of age, gender, and SES,

217   indicating that FoPLs may be similarly processed by a broad range of consumers.

218

219 Overall, participants preferred the evaluative FoPLs (HSR and MTLs) to the reductive FoPL

220 (DIG) because they were considered easier to understand and more conducive to making fast

221 and effective product comparisons. The HSR was considered useful mainly because of the

222 summary indicator of product healthiness, and participants rarely discussed the nutrient icons.

223 Participants reported using different cognitive strategies (generally involving a threshold)

224 when using each FoPL to make decisions about product healthiness. Figure 1 graphically

225 illustrates how participants' reactions appeared to be influenced by the perceived ease of use

226 and level of detail of each FoPL. In the case of the HSR, the summary indicator and nutrient

227 icons of the HSR are classified separately because participants reacted to them differently.

228 Ease of use and level of detail uniquely contribute to consumer understanding. This can be

229 seen in the fact that the HSR summary indicator and the MTL are both intuitive, but the HSR

230 contains only one piece of information, whereas the MTL contains several. The intuitiveness

231 of the MTL cannot fully compensate for the fact that multiple pieces of information still need

232 to be integrated. Thus, the HSR summary indicator, which is holistic, is portrayed as slightly

233 higher on ease of use than the MTL. Finally, FoPLs in general were usually considered

234 inappropriate for use on very unhealthy foods, although a small number of participants stated

235 an intention to use the evaluative FoPL for all purchases, including for discretionary foods.

236 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

Health Star rating summary indicator

Traffic Lights

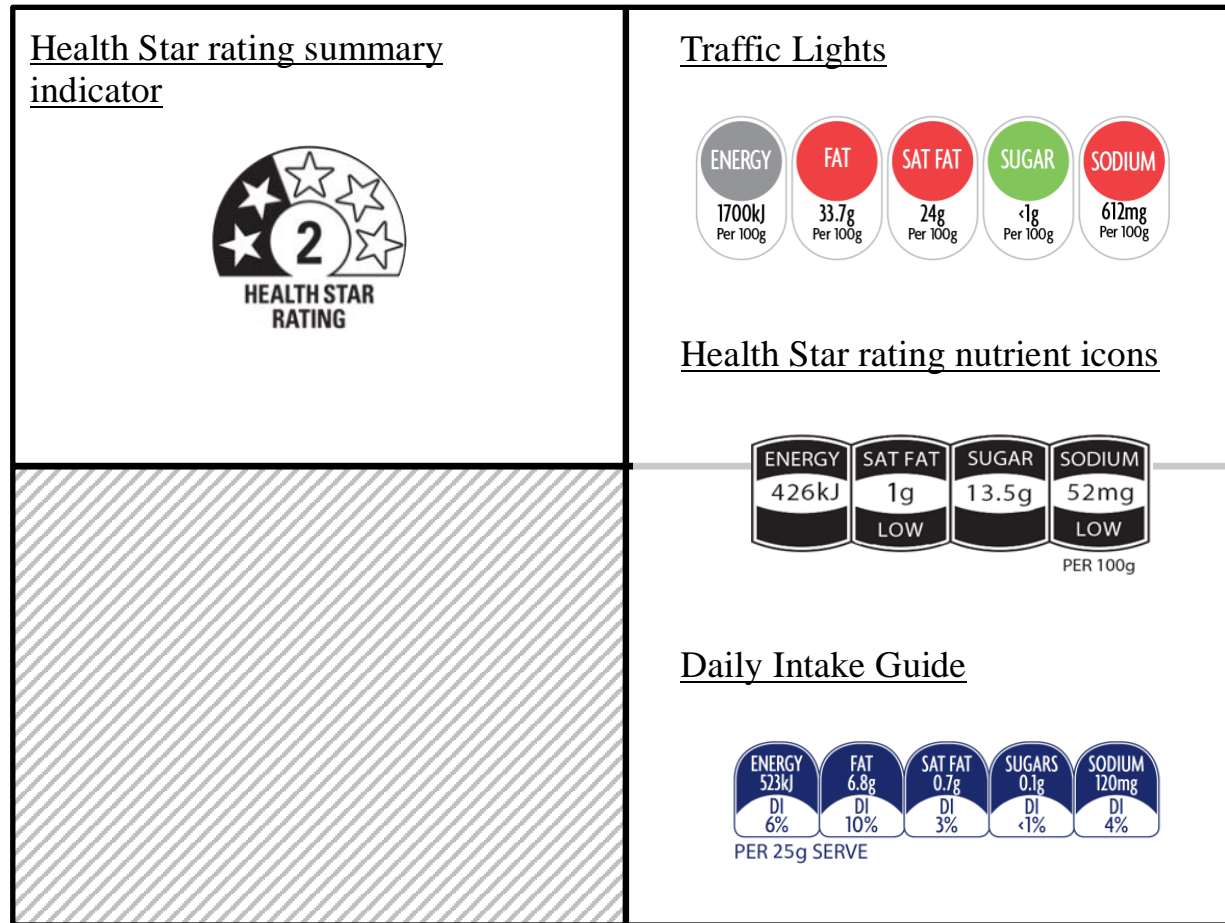Health Star rating nutrient icons

Daily Intake Guide

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

148   Theme 1: Attitudes to the FoPL systems

149   Attitudes to each FoPL appeared to be primarily driven by how easy they were to understand. There

150   was a clear divide between the two evaluative systems (HSR and MTLs) and the reductive system

151   (DIG), with the former two strongly preferred. Although the DIG has appeared on Australian food

152   packages for the last decade and participants were familiar with the label, many adults and children

153   reported confusion about how to interpret it and some felt it was deliberately confusing.

154

155   *See, the problem I have with that thing* [DIG] *is I've got very little idea about whether it's high*

156   *or low when I look at that. That might be a relatively healthy product but I can't really tell*

157   *from that system.* Male, 26-45.

158

159   *Facilitator: Why is that one* [HSR] *your preference?*

160   *Female: Because with the other ones* [DIG and MTL] *I'd have to go "Oh, what's this? What's*

161   *the daily intake on that one? And what's the other one, the other one, and the other one?"*

162   Female 10-13.

163

164   Conversely, almost all participants were able to easily understand the information being conveyed by

165   the HSR and MTLs. Young children (10 – 13 years) voiced appreciation for how the evaluative FoPLs

166   simplified their evaluation of the individual food products under examination. Most adults and some

167   teenagers went a step further by indicating that this simplified information would help them when

168   comparing across different brands within product categories..

169

170   *With the nutrition one* [DIG], *I'd probably only compare maybe one or two, at most three,*

171   *brands because it's more time consuming. But this one* [HSR] *you could just scan through and*

172   *find the best - the one with the highest amount of stars.* Female, 14-17.

173

174   *But it's* [MTL] *good for* [comparing] *like to like. If you lined up all the muesli bars and they all*

175   *had this traffic light you could, quite easily, have a look and go, "Right, these ones are better*

176   *because they have one red, these ones are worse because they have three reds", so we'll get rid*

177   *of those. You could look through all the muesli bars and pick the best one.* Female, 26-45.

178

179   Adults reported that they often found it difficult to make comparisons across different products using

180   the DIG because of its reliance on manufacturers' nominated serving sizes. This approach to the

181   presentation of nutrition information was strongly disliked and distrusted because recommended

182   serving sizes were seen to be typically unrealistic, and it was noted that different products within the

183   same category can vary in their serving sizes. By comparison, the HSR and MTL systems used in the

184   study were based on per 100g servings, which was generally considered to be a more user-friendly and

185   informative approach for the provision of nutrition information.

186

187   *On one two litre package it might say there's eight servings in that and in another it might say*

188   *only five. What is a serving?* Male, 46+

189

190   *I go for 100 grams because it's the same for every product. Whereas per serve, serves are*

191   *different sizes, and it can make it difficult to judge.* Female, 26-45.

192

193   In terms of attention paid to each FoPL, many participants reported not using the DIG when shopping.

194   By comparison, they indicated they would be more likely to notice and use the evaluative systems

195   because they are more salient (especially MTLs), and it was believed that the colours and the stars

196   would be processed automatically and therefore be harder to ignore.

197

198   *It shows the nutrition* [DIG] *and everything up the top, but I don't think it could catch your eye*

199   *as much as the other ones* [FoPLs]. Female 10-13.

200

201   *Male 1: You don't really notice it* [DIG] *because it's just this drab thing. That's why I reckon*

202   *the traffic lights one would actually catch you straight away. You'd recognise the colours*

203   *before you even looked at any percentages or anything.*

204   *Male 2: It competes with the marketing; that's a good point. Yeah it competes with the razzle*

205   *dazzle.* Males, 26-45.

206

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

208

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

210

211 Appreciation of each evaluative system's unique benefits led to the frequent suggestion to combine the

212 two systems such that a star rating and traffic light colours were both present. It was thought that

213 combining the two systems would reduce, rather than increase, the complexity of information being

214 conveyed.

215

216   *I'd like the star rating on the left, but I'd like the four things* [nutrients] *to the right of that to be*

217   *in the colours; either red, green, orange, or grey.* Male, 46+

218

219 Despite their frequently stated positive attitudes to MTLs and a similarly high level of understanding

220 for both the MTL and HSR, when asked to choose their most preferred FoPL the majority of

221 participants chose the HSR. This was typically attributed to the HSR providing an overall and

222 unambiguous measure of a product's nutritional value, along with most of the same information

223   conveyed by MTLs. By comparison, MTLs were seen to require additional cognitive work to make an

224   overall assessment to inform the purchase decision.

225

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

227

228   *The health star sort of averages it all out and just makes it easier for me. Yeah, it's 4.5, that's*

229   *easy.* Female, 10-13.

230

231   Participants predicted that the presence of either the HSR or MTL FoPLs would influence their

232   purchase decisions, with this response being more common among those who described themselves as

233   health-conscious and those reporting that they did not usually actively seek out nutrition information.

234   The ability of these two FoPLs to facilitate comparisons across more brands was considered useful in

235   assisting participants to switch to healthier products.

236

237   *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*

238   [HSR]. Female, 14-17.

239

240   *That would be just be straight off my shopping list. I'm seeing red, red, red and I'd think "God,*

241   *there's got to be something better than that". So I would consciously look for another product.*

242   Male, 46+

243

244   Theme 2: Cognitive processing strategies

245   Throughout the discussions, it became clear that participants had different techniques for making use

246   of the information contained in each FoPL. The minority of participants who reported already using

247   the DIG in their food choices mostly talked about using it to check product sugar levels, although

248 some males also made reference to monitoring saturated fat. Some applied a cut-off value as a rule of

249 thumb for one or more nutrients shown in the DIG, while others used the percentage of a nutrient or

250 total energy to calculate how many servings of the product would take them to a day's recommended

251 intake. If the cut-off was exceeded or the estimated number of servings was too high, the product was

252 classified as unhealthy.

253

254   *I normally judge if something's over five grams of saturated fat per 100 grams, it's getting*

255   *unhealthy.* Male, 18-25.

256

257   *So maybe if you were basing it around sugars, that is one-tenth of what your daily intake guide*

258   *would be. So I guess it's all right if you're only going to have nine other things similar to that.*

259   Female, 10-13.

260

261 When presented with the MTL labels, participants talked about applying the heuristic of "green means

262 go and red means stop" in relation to specific nutrients. However, few discussed how they would

263 integrate the colours across the nutrients. Those who did were unsure how they would determine a

264 product's overall healthiness if it didn't have a majority of red or green lights.

265

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

267

268 When it came to determining the healthiness of a product according to its HSR, the heuristic used was

269 far simpler. Products with a rating of 2 or fewer stars were generally considered unhealthy, whereas

270 those with 3 or more stars were seen as healthier options.

271

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

273   10-13.

274

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

276

277   *You could tell your kids, "Look, don't bother asking me for anything below three stars"...this*

278   *immediately, I think, knocks out a lot of products straight away, so that you can just focus on*

279   *the best of the best.* Female 26-45.

280

281   When commenting on the healthiness of the foods presented with the HSR, participants placed most

282   emphasis on the overall star rating, making only occasional mention of the specific nutrients included

283   in the label. Products with the HSR seemed to be evaluated more in terms of 'all or nothing', with

284   participants indicating that they would eliminate certain products within product categories based on

285   their star rating. A similar strategy was applied to specific nutrients when using MTLs (e.g., eliminate

286   any product with a red light for sugar). By comparison, when using the DIG they tended to attempt to

287   evaluate the healthiness of a product in the context of what else they were eating that day.

288

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

290   *at.* Female, 26-45.

291

292   *You see that overall summary* [star rating]*, but then if you looked to the right* [at the nutrient

293   icons] *you see 645mg and 1.1g and 4g, but you don't know, is that good or bad?* Male, 18-25.

294

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

318   Theme 3: FoPLs on discretionary foods

319   A topic that arose spontaneously in a number of adult and teenager focus groups (but not the younger

320   children's groups) was the appropriateness of FoPLs on discretionary foods (e.g., ice-cream,

321   chocolate, and chips). Most participants stated that they would avoid looking at any nutrition

322   information on these foods because they were purchased for non-health-related reasons. These

323   participants believed that the unhealthy nature of these food categories meant that it is pointless to

324   search for healthy alternatives and/or that it is acceptable to eat an unhealthy treat once in a while or in

325   small portions. This view was expressed even among participants who reported frequently checking

326   nutrition information on other foods.

327

328   *If I'm getting chocolate or something, I don't really bother about how healthy it is because it's*

329   *going to be bad no matter what.* Female, 14-17.

330

331   *I think for the bulk of your meals, like breakfast, lunch, and dinner, the star rating would be*

332   *important. But then for very discretionary food, you probably wouldn't take much notice of it*

333   *because you know it's only a little treat.* Male, 46+.

334

335   An occasionally expressed belief relating to discretionary foods was that the healthy alternative (e.g.,

336   low-fat ice cream) would taste inferior to the regular, more unhealthy version of the product.

337   Therefore, for some participants there was the unintended negative consequence of FoPL on

338   discretionary foods being used to gauge the tastiness of the product due to the assumption that a lower

339   healthiness rating equated to a better-tasting product.

340

341   *So you're walking down the chip aisle and it's like five stars, five stars, one star – well, that's*

342   *going to be the nice one.* Male, 18-25.

343

344 While most participants saw little value in placing FoPL on unhealthy foods, a small number of males

345 reported that they would find this useful in terms of facilitating healthier decisions. Given that the

346 discretionary foods category contains some of the least healthy products, these participants felt that

347 FoPLs could assist by alerting them to relatively healthier alternatives or simply reminding them of

348 just how unhealthy the product was so they wouldn't overindulge.

349

350 *I think you do expect chips to be really high fat, but being able to compare it against say Grain*

351 *Waves, or something like that, would be handy. So if Grain Waves were chips but low fat, then*

352 *you could use them* [HSR and MTLs] *that way.* Male, 46+

353

354 *Male 1: I like it* [MTLs] *because the reason I don't eat chips as much anymore is because I*

355 *looked at the back. So if there's more* [nutrition information] *on the front I think more people*

356 *wouldn't eat it as often.*

357 …

358 *Male 2: I think some people would have a reaction to it like having plain packaged cigarettes,*

359 *because it's right there in their face seeing all the nutritional content that they might not eat it*

360 *nearly as much.* Males, 18-25.

361

362   Discussion

363

364 Focus group discussions with adults and children in the current study offered insights into how

365 consumers may perceive, interpret, and apply different FoPLs. While the reductive (e.g. the DIG) and

366 evaluative (e.g. MTL) FoPLs have been studied in the past (Hawley et al., 2013; Hersey et al., 2013),

367 there is little research on FoPLs featuring summary indicators. The recent development and

368   implementation of the Health Star Rating system in Australia provided the opportunity to undertake a

369   comparison of all three types of labels. Given the current implementation of this system in Australia

370   and New Zealand, it is critical to understand how it is perceived and interpreted. Using a sample of

371   Western Australians stratified by age, sex and location, the current study explored reactions to this

372   new system and compared the HSR with two pre-existing FoPLs: a reductive FoPL that has been used

373   in Australia for the last decade (DIG) and an evaluative FoPL that has been used in the marketplace

374   overseas and applied in school food policies in Australia (MTLs).

375

376   Despite its current proliferation in the marketplace, few participants reported using the DIG for

377   purchase decisions. Across adults and children, the main reasons provided were that it is confusing,

378   requires substantial cognitive effort, and is obscured by other packaging elements. Thus there appear

379   to be issues with attention, ability and motivation to process the DIG for all age groups. These results

380   are consistent with previous studies showing that adults dislike reductive FoPLs (Lando & Labiner-

381   Wolfe, 2007; van Kleef, van Trijp, Paeps, & Fernández-Celemín, 2007) and that children (Elliott &

382   Brierley, 2012; Neeley & Petricone, 2006) and adults have difficulty interpreting them (Hawley et al.,

383   2013; Hersey et al., 2013). The few participants who reported using the DIG indicated that they would

384   usually select products by imposing a cut-off on particular nutrients or by attempting to take into

385   account the other foods (and nutrients) they would consume across the day. The former strategy relies

386   on nutrition knowledge to inform where the cut-off should be and the latter relies on remembering

387   foods consumed across the day, as well as the motivation and ability to calculate nutrient and energy

388   consumption on an ongoing basis. The present study supports previous research indicating that few

389   people are willing to regularly perform these calculations (Lando & Labiner-Wolfe, 2007). Even

390   among those motivated to do so, this strategy is cognitively taxing and prone to failure (Levy & Fein,

391   1998).

392

393   In contrast, participants were overwhelmingly positive about the MTLs and HSR (the evaluative

394   FoPLs) and provided insight into how these labels could reduce the cognitive processing burden. This

395   is particularly important for low SES consumers for whom cognitively taxing decision making

396   imposes a heavier burden (Mullainathan & Shafir, 2013). Adults and teenagers could see themselves

397   using the MTLs to quickly compare levels of certain nutrients across products, but found it somewhat

398   difficult to interpret a product's overall healthiness. While the literature is generally positive about

399   MTL labels (Feunekes et al., 2008; Méjean et al., 2014), there is a lack of understanding of how

400   consumers integrate information across several nutrients to make an overall assessment. The present

401   findings suggest that the format of the MTLs may not be as conducive to a holistic assessment of

402   product healthiness as FoPLs with a summary indicator.

403

404   The HSR system was especially valued for its utility in facilitating rapid assessments of products

405   individually and comparatively. While children used the HSR to evaluate individual products, adults

406   and teenagers noted that it enabled them to quickly reduce the size of the choice set, thereby

407   decreasing the time and effort involved in the decision-making process. This is known as a non-

408   compensatory strategy (Edland & Svenson, 1993) and differs from compensatory strategies that

409   involve evaluating each product on all attributes and averaging the positives and negatives to give an

410   overall judgement. Non-compensatory strategies can save time and cognitive effort, although the

411   trade-off can be lower levels of accuracy (Chu & Spires, 2003). For food choices, where little time is

412   typically dedicated to decision-making (Signal et al., 2008), the ability to employ non-compensatory

413   strategies is a distinct benefit, as reflected in participants' frequent mentions of using such strategies

414   when evaluating product healthiness. Minimising decision time is especially important given that

415   healthiness is only one of the several dimensions on which a product can be evaluated and is often

416   considered less important than other attributes such as price and taste (Glanz, Basil, Maibach,

417   Goldberg, & Snyder, 1998; Pettigrew & Pescud, 2013; Sanlier & Karakus, 2010). However, a

418   potential downside of a summary indicator is that it may result in binary thinking (i.e., a product is

419   assessed as either 'good' or 'bad'), which may prevent people from achieving a balanced diet

420   (Shamdasani, Stewart, & Palascha, 2015). In the case of the HSR, this may be alleviated to some

421   extent by the inclusion of the nutrient icons that provide more detailed information for those who

422   choose to read them.

423

424   An emergent theme in the present study was the existence of polarised views on the appropriateness of

425   applying FoPLs to discretionary foods. Of note is that despite participants discussing these foods as

426   being infrequently consumed, a recent national survey found that 35% of Australians' total daily

427   energy intake comes from discretionary foods (Australian Bureau of Statistics, 2014). There thus

428   appears to be an important role for nutrition information in influencing demand for discretionary foods

429   given their high and increasing contribution to daily energy intake (Jahns, Siega-Riz, & Popkin, 2001;

430   Piernas & Popkin, 2010; Zizza, Siega-Riz, & Popkin, 2001), and empirical evidence suggests that

431   FoPLs can assist consumers to identify healthier alternatives in unhealthy food categories (e.g., ice

432   cream; Feunekes et al. (2008) and biscuits; Hodgkins et al. (2015)). However, data are lacking as to

433   whether they would actually use this information when purchasing such products, with some previous

434   studies indicating consumers would (Hassan, Shiu, & Michaelidou, 2010) and others suggesting

435   consumers would not (Directorate General for Health and Consumer Protection, 2015; McIntyre &

436   Baid, 2009).

437

438   The findings of the present study go some way to explaining these divergent results by revealing the

439   existence of different segments of consumers who use FoPLs in varying ways according to product

440   category. Some consumers may apply healthiness as a selection criterion across the full spectrum of

441   products, and hence find FoPLs useful when purchasing discretionary foods. This strategy was only

442   raised among males. However, since this strategy was not discussed in every focus group, further

443   research is needed to better understand which types of consumers would be most likely to take this

444   more holistic approach. Other consumers (probably the majority) exclude the consideration of

445   healthiness from the decision-making process for these purchases and thus find FoPLs irrelevant in

446   this choice context. A further group may use FoPLs to infer tastiness using the commonly held

447   assumption that tastiness and healthiness are inversely correlated (Raghunathan, Naylor, & Hoyer,

448   2006). Further research is needed to assess the relative size and composition of these segments to

449   identify the conditions under which FoPLs are best used.

450

451   A qualitative approach was used for its ability to elicit spontaneous and wide-ranging responses from

452   participants. This approach provided insight into the different cognitive strategies used when

453   interpreting each FoPL and permitted the emergence of participants' attitudes to FoPLs on

454   discretionary foods. However, this approach has limitations in terms of generalisability to the broader

455   population of consumers and to real-world shopping contexts where there is less time to contemplate

456   products and their labels and less potential influence from peers. Furthermore, although the current

457   sample exhibited wide coverage of age, gender, and SES groupings, self-selection effects were likely

458   given that participants were advised that the discussion would relate to food and nutrition. As a result,

459   it is possible that these individuals had a greater interest in nutrition-related issues than the average

460   consumer. There is thus a need for larger-scale quantitative studies and in-situ observational studies to

461   determine the extent to which the identified themes are applicable to Australian consumers and other

462   populations.

463

464   Conclusions

465   The current study is among the first to examine reactions to the Health Star Rating currently being

466   implemented in the Australian and New Zealand marketplaces. It is also novel in the inclusion of

467   children to assess whether they can understand and apply different forms of front-of-pack nutrition

468   labels. The study participants, regardless of age, gender, and SES, expressed a preference for HSR

469   over MTLs and DIG labels due to the ease of assessing overall product healthiness. This outcome adds

470   to the limited research on summary indictors by showing they can potentially reduce cognitive load

471   and increase the number of products compared during product selection.

472

473   **Acknowledgements**: This work was supported by an ARC Linkage grant (LP130100428), with

474   contributions from the South Australian Health and Medical Research Institute, the National Heart

475   Foundation, Cancer Council NSW, and Cancer Council Victoria.

476

477   **Conflict of interest**: SP has sat on committees providing advice to the Australian Government on food

478   labelling since 2009.

479   References

480

481 Australian Bureau of Statistics. (2011). *Census of Population and Housing: Socio-Economic Indexes*

482   *for Areas (SEIFA), Australia*. Retrieved from

483   http://www.abs.gov.au/websitedbs/censushome.nsf/home/seifa2011?opendocument&navpos=2

484   60

485 Australian Bureau of Statistics. (2014). *Australian Health Survey: Nutrition First Results – Food and*

486   *Nutrients, 2011-12* (No. 4364.0.55.007). Retrieved from

487   http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/4364.0.55.007~2011-

488   12~Main%20Features~Discretionary%20foods~700

489 Australian Department of Health. (2015). *Health Star Rating System: Information for Educators*.

490   Canberra. Retrieved from

491   http://www.healthstarrating.gov.au/internet/healthstarrating/publishing.nsf/Content/factsheet-

492   educators

493 Australian Government Department of Health. (2012). *Front-of-pack labelling updates*. Australian

494   Government Department of Health. Retrieved from

495   http://www.health.gov.au/internet/main/publishing.nsf/Content/foodsecretariat-front-of-pack-

496   labelling-1

497 Australian Government Department of Health. (2013). *Front-of-pack labelling update 14 June 2013*.

498   Australian Government Department of Health. Retrieved from

499   http://www.health.gov.au/internet/main/publishing.nsf/Content/CF7E670597F383ADCA257B

500   F0001BAFF5/$File/FOPL%2014.6.13%20Update.pdf

501 Borgmeier, I., & Westenhoefer, J. (2009). Impact of different food label formats on healthiness

502   evaluation and food choice of consumers: a randomized-controlled study. *BMC Public Health*,

503   *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-

529   of-pack nutrition labelling: Testing effectiveness of different nutrition labelling formats front-

530   of-pack in four European countries. *Appetite*, *50*(1), 57–70.

531   http://doi.org/10.1016/j.appet.2007.05.009

532   Food Standards Agency. (2013). *Guide to creating a front of pack (FoP) nutrition label for pre-packed*

533   *products sold through retail outlets*. Unighted Kindom. Retrieved from

534   https://www.gov.uk/government/publications/front-of-pack-nutrition-labelling-guidance

535   Glanz, K., Basil, M., Maibach, E., Goldberg, J., & Snyder, D. (1998). Why Americans Eat What They

536   Do: Taste, Nutrition, Cost, Convenience, and Weight Control Concerns as Influences on Food

537   Consumption. *Journal of the American Dietetic Association*, *98*(10), 1118–1126.

538   http://doi.org/10.1016/S0002-8223(98)00260-0

539   Gorton, D., Ni Mhurchu, C., Chen, M., & Dixon, R. (2008). Nutrition labels: a survey of use,

540   understanding and preferences among ethnically diverse shoppers in New Zealand. *Public*

541   *Health Nutrition*, *12*(09), 1359–1365. http://doi.org/10.1017/S1368980008004059

542   Hamlin, R. P., McNeill, L. S., & Moore, V. (2014). The impact of front-of-pack nutrition labels on

543   consumer product evaluation and choice: an experimental study. *Public Health Nutrition*, 1–9.

544   http://doi.org/10.1017/S1368980014002997

545   Hassan, L. M., Shiu, E. M. K., & Michaelidou, N. (2010). The Influence of Nutrition Information on

546   Choice: The Roles of Temptation, Conflict and Self-Control. *Journal of Consumer Affairs*,

547   *44*(3), 499–515. http://doi.org/10.1111/j.1745-6606.2010.01180.x

548   Hawley, K. L., Roberto, C. A., Bragg, M. A., Liu, P. J., Schwartz, M. B., & Brownell, K. D. (2013).

549   The science on front-of-package food labels. *Public Health Nutrition*, *16*(03), 430–439.

550   Helfer, P., & Shultz, T. R. (2014). The effects of nutrition labeling on consumer food choice: a

551   psychological experiment and computational model. *Annals of the New York Academy of*

552   *Sciences*, *1331*(1), 174–185. http://doi.org/10.1111/nyas.12461

553   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

604 Pettigrew, S., Pescud, M., & Donovan, R. J. (2012). Traffic light food labelling in schools and beyond.

605 *Health Education Journal*, *71*(6), 746–753. http://doi.org/10.1177/0017896911424659

606 Piernas, C., & Popkin, B. M. (2010). Trends In Snacking Among U.S. Children. *Health Affairs*, *29*(3),

607 398–404. http://doi.org/10.1377/hlthaff.2009.0666

608 Raghunathan, R., Naylor, R. W., & Hoyer, W. D. (2006). The Unhealthy = Tasty Intuition and Its

609 Effects on Taste Inferences, Enjoyment, and Choice of Food Products. *Journal of Marketing*,

610 *70*(4), 170–184. http://doi.org/10.1509/jmkg.70.4.170

611 Sanlier, N., & Karakus, S. S. (2010). Evaluation of food purchasing behaviour of consumers from

612 supermarkets. *British Food Journal*, *112*(2), 140–150.

613 Savoie, N., Barlow, K., Harvey, K. L., Binnie, M. A., & Pasut, L. (2013). Consumer Perceptions of

614 Front-of-package Labelling Systems and Healthiness of Foods. *Can J Public Health*, *104*(5),

615 e359–e363.

616 Shamdasani, P. N., Stewart, D. W., & Palascha, A. (2015). How does thinking in Black and White

617 terms relate to eating behavior and weight regain? *Journal of Health Psychology*, *20*(5), 638–

618 648. http://doi.org/10.1177/1359105315573440

619 Signal, L., Lanumata, T., Robinson, J.-A., Tavila, A., Wilton, J., & Ni Mhurchu, C. (2008).

620 Perceptions of New Zealand nutrition labels by Māori, Pacific and low-income shoppers.

621 *Public Health Nutrition*, *11*(07), 706–713. http://doi.org/10.1017/S1368980007001395

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

623 Publications.

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

625 Van Der Bend, D., Van Dieren, J., Marques, M. D. V., Wezenbeek, N. L., Kostareli, N., Rodrigues, P.

626 G., … Verhagen, H. (2014). A Simple Visual Model to Compare Existing Front-of-pack

627 Nutrient Profiling Schemes. *European Journal of Food Research & Review*, *4*(4), 429–534.

628 http://doi.org/DOI: 10.9734/EJNFS/2014/10305

629   van Herpen, E., & van Trijp, H. C. M. (2011). Front-of-pack nutrition labels. Their effect on attention

630   and choices when consumers have varying goals and time constraints. *Appetite*, *57*(1), 148–

631   160. http://doi.org/10.1016/j.appet.2011.04.011

632   van Kleef, E., van Trijp, H., Paeps, F., & Fernández-Celemín, L. (2007). Consumer preferences for

633   front-of-pack calories labelling. *Public Health Nutrition*, *11*(02), 203–213.

634   http://doi.org/10.1017/S1368980007000304

635   Wartella, E. A., Lichtenstein, A. H., & Boon, C. S. (2010). *Purpose and Merits of Front-of-Package*

636   *Nutrition Rating Systems*. Washington DC (USA): National Academies Press.

637   Wilkinson, S. (1998). Focus Groups in Health Research Exploring the Meanings of Health and Illness.

638   *Journal of Health Psychology*, *3*(3), 329–348. http://doi.org/10.1177/135910539800300304

639   Zizza, C., Siega-Riz, A. M., & Popkin, B. M. (2001). Significant Increase in Young Adults' Snacking

640   between 1977–1978 and 1994–1996 Represents a Cause for Concern! *Preventive Medicine*,

641   *32*(4), 303–310. http://doi.org/10.1006/pmed.2000.0817

642