



## **The combined effect of front-of-pack nutrition labels and health claims on consumers' evaluation of food products**

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1 **The combined effect of front-of-pack nutrition labels and health claims on consumers'**  
2 **evaluation of food products**

3  
4 **Abstract**

5 The majority of studies examining the effect of nutrition information on food packets (such as  
6 the Nutrition Information Panel (NIP), front-of-pack labels (FoPLs) and health claims) have  
7 examined each in isolation, even though they often occur together. This study investigated  
8 the relationship between FoPLs and health claims since (i) they both appear on the front of  
9 packs and typically receive more attention from consumers than the NIP, (ii) they can convey  
10 contradictory messages (i.e., health claims provide information on nutrients that are  
11 beneficial to health while FoPLs provide information on nutrients associated with increased  
12 health risks) and (iii) there is currently scant research on how consumers trade off between  
13 these two sources of information. Ten focus groups ( $n= 85$ ) explored adults' and children's  
14 reactions when presented with both a FoPL (the Daily Intake Guide, Multiple Traffic Lights,  
15 or the Health Star Rating) and a health claim (nutrient content, general-level-, or high-level).  
16 A particular focus was participants' processing of discrepant information. Participants  
17 reported that health claims were more likely to be considered during product evaluations if  
18 they were perceived to be trustworthy, relevant and informative. Trust and ease of  
19 interpretation were most important for FoPLs, which were more likely than health claims to  
20 meet criteria and be considered in during product evaluation (especially the Health Star  
21 Rating and Multiple Traffic Lights). Results indicate that consumers generally find FoPLs  
22 easier to interpret than health claims.

24 **Keywords:** Front-of-pack label; health claim; Daily Intake Guide; Traffic light; Health Star

25 Rating

## 1. Introduction

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A substantial proportion of consumers report using nutritional information contained on food packets to make decisions about food products (Campos, Doxey, & Hammond, 2011; Grunert, Wills, & Fernández-Celemín, 2010). The three main sources of nutrient information available on food packs are the nutrition information panel (NIP), front-of-pack labels (FoPLs) and health claims. Each of these differs in content, purpose and style of presentation. The NIP appears on the back or side of food packs and reports levels of many key nutrients and, in some cases, their contribution to recommended daily intakes (Gorton, Ni Mhurchu, Chen, & Dixon, 2008). FoPLs and health claims typically appear on the front of packs and provide summary information that may or may not be replicated in the NIP (Hawkes, 2010; Van Der Bend et al., 2014). FoPLs tend to refer to multiple nutrients, whereas health claims generally refer to a single nutrient.

Despite food products in the marketplace commonly featuring multiple forms of nutrition information, most research in this area has examined how each source of nutrition information works independently and the literature on their combined effects is scant. The aim of the present study was to explicitly investigate these combined effects to provide insight into how consumers make food choices when there is competing health information. The context of the study is the Australian marketplace where new regulations for health claims are currently being implemented (Food Standards Australia New Zealand, 2014) and a new government-developed, voluntary FoPL (the Health Star Rating) has been recently

48 introduced (Australian Department of Health, 2015). An example of each of these FoPLs is  
49 shown in Figure 1.

50

51 *Figure 1 about here*

52

## 53 **1.1 Independent effects of front-of-pack nutrition information sources**

### 54 **1.1.1 FoPLs**

55 FoPLs provide simplified nutrition information, generally by reporting and/or interpreting the  
56 levels of key negative nutrients. FoPLs can be categorised into two main types: *reductive*  
57 FoPLs, which provide only numerical information on nutrients and *evaluative* FoPLs, which  
58 provide an assessment of a food's health value (Hamlin, McNeill, & Moore, 2014). Evidence  
59 suggests that evaluative FoPLs are more effective than reductive FoPLs in assisting  
60 consumers identify healthier food choices (Hawley et al., 2013; Hersey, Wohlgenant,  
61 Arsenault, Kosa, & Muth, 2013). The Daily Intake Guide (DIG) is a reductive FoPL that is  
62 widely used in Australia and details the levels of nutrients such as sugar, total fat, saturated  
63 fat and sodium within one serve of a product. The nutrient levels are expressed as a percent of  
64 a reference adult's (70kg male) recommended daily intake. There are multiple forms of  
65 evaluative FoPLs. The Multiple Traffic Lights system (MTL), which is currently being used  
66 voluntarily in the UK, is the most studied to date (Hawkes, 2010; Hawley et al., 2013; Hersey  
67 et al., 2013). This system uses the three colours (red, amber and green) to indicate high,  
68 medium and low (respectively) values for specific nutrients (fat, saturated fat, sugar and  
69 sodium). As noted above, the Health Star Rating (HSR) is a more recently developed FoPL  
70 that combines evaluative and reductive elements. The evaluative component assigns foods a

71 rating between half a star and five stars based on the nutritional profile of the food, while the  
72 reductive component details the amount of sugar, saturated fat and sodium per 100g of  
73 product, or per single serving when the pack is less than 100g (Australian Department of  
74 Health, 2015).

75

### 76 **1.1.2 Health claims**

77 The term ‘health claims’ refers to the broad category of nutrient-specific and health-related  
78 claims that provide a written description of one or more positive nutritional aspects of the  
79 food. There are three types of health claims in Australia (FSANZ, 2014): (i) nutrient content  
80 claims, which inform consumers about the presence or absence of a nutrient (e.g., ‘Good  
81 source of calcium’); (ii) general-level health claims, which relate nutrients within the food to  
82 a health function (e.g., ‘Contains calcium for healthy bones and teeth’); and (iii) high-level  
83 health claims, which relate a nutrient to a specific disease (e.g., ‘Contains calcium to reduce  
84 the risk of osteoporosis’).

85

86 Health claims can be beneficial as an educational tool to inform consumers of nutrients that  
87 are beneficial in preventing or managing chronic diseases (Ippolito & Mathios, 1991).

88 However, they may also be a public health concern when they prevent consumers from  
89 accurately assessing the nutritional value of products, especially nutritionally poor products.

90 Health claims have been criticised as being potentially misleading or deceptive because their  
91 purpose is to present products in a positive manner rather than provide a balanced summary  
92 of the product’s nutritional value (Hastak & Mazis, 2011). Some studies have found that  
93 health claims can induce a positivity bias whereby products featuring them receive more

94 favourable evaluations (Gorton, Ni Mhurchu, Bramley, & Dixon, 2010; Saba et al., 2010) or  
95 are consumed in larger portions (Faulkner et al., 2014; Wansink & Chandon, 2006) compared  
96 to products without a health claim. This effect has been found to occur among adults,  
97 children and adults buying food for children (Abrams, Evans, & Duff, 2015; Dixon et al.,  
98 2011, 2014; Harris, Thompson, Schwartz, & Brownell, 2011; Soldavini, Crawford, &  
99 Ritchie, 2012). In an attempt to ensure consumers have access to unbiased nutritional  
100 information, a number of countries have mandated the use of an NIP when health claims  
101 appear on the pack (Hawkes, 2010), or have established criteria for the overall nutritional  
102 profile of products eligible to make a health claim (FSANZ, 2014).

103

## 104 **1.2 Combined effects of nutrition information**

105 In the studies described above where health claims appeared in isolation, food product  
106 evaluations were found to be influenced by the claims. However, some studies have provided  
107 participants with the option to view an NIP (which has been manipulated to indicate either a  
108 good or poor nutritional profile) along with the health claim. The findings of these studies  
109 have been mixed, with some reporting that the NIP had little to no effect when presented with  
110 a health claim (Kozup, Creyer, & Burton, 2003; Study 1; Wansink, 2003; Wong et al., 2013,  
111 2014) and others finding that the NIP had a greater influence on product evaluations than  
112 health claims (Dixon et al., 2011; Ford, Hastak, Mitra, & Ringold, 1996; Garretson & Burton,  
113 2000; Keller et al., 1997; Kemp, Burton, Creyer, & Suter, 2007; Labiner-Wolfe, Lin, &  
114 Verrill, 2010; Mazis & Raymond, 1997; Mitra, Hastak, Ford, & Ringold, 1999).

115

116 If the NIP is to attenuate the positivity bias induced by health claims, consumers must first be  
117 motivated to read the NIP. The chance of this occurring in a real world food choice setting is  
118 unlikely for several reasons. First, due to its less prominent location and greater complexity  
119 and level of detail, the NIP is infrequently used (Graham & Jeffery, 2011; van Herpen & van  
120 Trijp, 2011). Second, the mere presence of a health claim can reduce the likelihood of  
121 consumers looking at the NIP (Roe, Levy, & Derby, 1999), even when they report being  
122 sceptical of the claim (Chan, Patch, & Williams, 2004; Szykman, Bloom, & Levy, 1997).  
123 Third, observational studies carried out in supermarkets reveal that the proportion of  
124 consumers who look at the NIP in actual shopping environments is low (e.g. Grunert et al.,  
125 2010). This all suggests that consumers are less likely to turn the pack over to view the NIP  
126 in a real world shopping context compared to the laboratory or online environments in which  
127 most health claims studies have been conducted.

128  
129 Finally, of the studies showing that the NIP can counteract the positivity bias, most presented  
130 participants with an NIP physically next to the health claim (Ford et al., 1996; Keller et al.,  
131 1997; Kemp et al., 2007; Labiner-Wolfe et al., 2010; Mazis & Raymond, 1997; Mitra et al.,  
132 1999). This makes the NIP highly salient and more prominent than it would be in the real  
133 world. A more ecologically valid design is one in which participants need to exert extra effort  
134 to view the NIP as they would in a normal product purchase situation. Studies using this  
135 technique find that the NIP only has an effect on the minority of participants who chose to  
136 view it and thus has a much weaker, almost negligible, effect overall (Dixon et al., 2011;  
137 Maubach, Hoek, & Mather, 2014; McLean, Hoek, & Hedderley, 2012). As a result, even



138 though the NIP is, in theory, capable of attenuating the effects of health claims, this is  
139 unlikely to happen in practice.

140

141 Since FoPLs appear in close proximity to health claims, they may have a stronger attenuating  
142 effect on these claims than the NIP (Maubach, Hoek, & Mather, 2014; McLean, Hoek, &  
143 Hedderley, 2012). In general, information on nutrient levels can be expressed in a written  
144 (e.g., words such as ‘low’ or ‘high’) or numerical format (e.g., percentages). Written nutrition  
145 information has been found to have a stronger effect on liking, perceptions of healthiness and  
146 willingness to purchase the product than numerical information (Viswanathan, 1996),  
147 suggesting that health claims (which mainly use words) could override the influence of  
148 reductive FoPLs (which often use numbers). However, colours (Antúnez, Giménez, Maiche,  
149 & Ares, 2015) and symbols (Oh, 2010) are highly effective in drawing people’s attention.  
150 They also aid in comprehension. The mere addition of colour to an otherwise monochrome  
151 DIG leads to increased understanding (Antúnez et al., 2015). This is likely to be because  
152 colours, unlike numbers, are processed innately (Ozturk, Shayan, Liszkowski, & Majid,  
153 2013) and unconsciously (Ro, Singhal, Breitmeyer, & Garcia, 2009). Similarly, symbols have  
154 been found to help people differentiate healthy and unhealthy foods (Feunekes, Gortemaker,  
155 Willems, Lion, & van den Kommer, 2008; Maubach et al., 2014). This suggests that  
156 evaluative FoPLs may be more influential in product decisions than health claims.

157

158 There have been very few studies to date examining how consumers make sense of FoPLs  
159 and health claims when they are presented together on food packets. McLean, Hoek and  
160 Hedderley (2012) used a discrete choice task to look at consumers’ willingness to buy

161 products that varied in their level of sodium (high or low), FoPLs (none, DIG or MTL) and  
162 nutrient content claims (none, 'low salt' or 'reduced salt', although they did not include the  
163 'low salt' health claim on high sodium products). They found that participants were less  
164 likely to be influenced by health claims and more likely to be influenced by FoPLs on low  
165 sodium products. Crucially, for high sodium products, the MTL FoPL (but not the DIG)  
166 influenced product selection to a greater extent than the 'reduced salt' health claim. Similarly,  
167 Maubach et al. (2014) used a discrete choice experiment to investigate consumers'  
168 perceptions of product healthiness for healthy and unhealthy products. The primary finding  
169 was that when a general-level health claim (as opposed to no claim) appeared alongside a  
170 DIG or star-rating based FoPL (compared to the MTL FoPL), products with a poor nutritional  
171 profile were more likely to receive a positive evaluation. This suggests that general-level  
172 health claims in combination with the DIG or star-rating created inflated positive evaluations  
173 of the unhealthy product. The majority of participants did not choose to view the NIP. It is  
174 important to note that unlike the HSR, the stars FoPL created by Maubach et al. (2014) for  
175 their study rated product healthiness on a scale from one to seven stars and did not provide  
176 information on levels of energy, saturated fat, sugar, or sodium. Together, these two studies  
177 suggest that the MTL are more effective than the DIG, the star-rating or the NIP at  
178 attenuating any unrealistic positive effects of health claims on product perceptions. However,  
179 the quantitative nature of these studies precludes an explanation of why this was the case.  
180  
181 Understanding more about the interaction between health claims and FoPLs is critical given  
182 the high prevalence of both forms of nutrition information on food packages (Hughes,  
183 Wellard, Lin, Suen, & Chapman, 2013; Lalor, Kennedy, Flynn, & Wall, 2010; Van Der Bend

184 et al., 2014). From the perspectives of public health and consumer protection, it is important  
185 for consumers to have an accurate understanding of the nutritional value of a product and this  
186 is unlikely to occur if consumers are more influenced by health claims than FoPLs or if health  
187 claims exist without FoPLs. This may be particularly important for children, as they have  
188 more difficulty distinguishing between objective information and persuasive marketing  
189 content (John, 1999).

190

191 The aim of this study was to explore adults' and children's reactions when presented with  
192 foods containing multiple forms of front-of-pack nutrition information (i.e., FoPLs and health  
193 claims) and any trade-offs made between these information sources. Previous studies  
194 examining this issue have been quantitative in design. While their findings are useful in  
195 showing that people's decisions can be influenced by different types of FoPLs, health claims  
196 and combinations of the two, the present study used focus groups to better understand how  
197 the various characteristics of different on-pack nutrition information sources are processed  
198 during product evaluation. The findings contribute to the limited literature on this topic and  
199 provide information that can inform future FoPL policies and regulations.

200

201

## 2. Method

202

203 This study was part of a larger project examining consumer attitudes to nutrition information.  
204 In the present study, ten focus groups comprising 50 adults (27 males and 23 females) and 35  
205 children (18 males and 17 females) were conducted in Perth, Western Australia. Focus  
206 groups were considered a suitable data collection method for this study because of their

207 utility in assessing how people come to individual and collective interpretations of  
208 phenomena (Wilkinson, 1998). Participants were recruited by a social research agency that  
209 was commissioned to source individuals from across the city of Perth. Groups ranged in size  
210 from seven to 10 participants and were segmented according to gender (male, female) and  
211 age (10-13, 14-17, 18-25, 26-45, 46+ years). Ethics clearance was obtained from the Curtin  
212 University Human Research Ethics Committee. Participants were provided with information  
213 letters informing them that the group discussions would focus on food and nutrition. Signed  
214 consent (including additional parental consent for the 10-13 year olds) was provided by all  
215 participants prior to the focus groups.

216


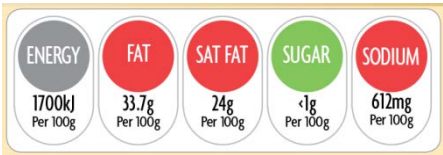
217 Discussions began with broad questions about food preferences, shopping habits and sources  
218 of nutrition information used, including any information contained on product packaging.  
219 Participants were then shown examples of different types of FoPLs (DIG, MTL and HSR)  
220 and different types of claims (nutrient content, general-level and high-level). The health  
221 claims developed for use on the mock packages were based on the type and content of claims  
222 permitted by Food Standards Australia New Zealand (2014). Participants were also shown  
223 mock food packages featuring different combinations of FoPLs and health claims (see Table  
224 1 for details). The relationship between the FoPLs and health claims was designed to be  
225 somewhat contradictory in that the health claims promoted one positive aspect of the food  
226 while the FoPLs provided a negative overall picture of the food. The foods used in this study  
227 were selected because they are common every-day foods that adults and children consume,  
228 there are healthier and less healthy options available within these product categories and  
229 manufacturers will often modify the nutrition content of these foods to increase healthier


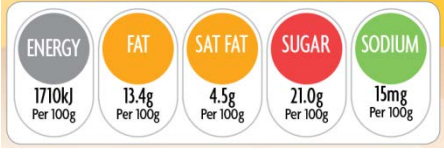


230 nutrients (e.g., fibre) or decrease less healthy nutrients (e.g., fat). The combinations of FoPLs  
 231 and health claims were designed such that no pair appeared more than once. The mock foods  
 232 were based on real products in the Australian market place that had poor nutrition profiles (a  
 233 2 health star rating or equivalent) to enable participants' reactions to the discrepancy between  
 234 an unhealthy FoPL and a health claim to be observed.

235  
 236 The moderator led into the focus group discussions by asking participants to imagine they  
 237 were viewing the products in a supermarket. Discussion prompts relating to the mock  
 238 products were mainly kept general and open-ended (e.g., "What do you think about this?") to  
 239 elicit spontaneous reactions to the different FoPLs and health claims. Towards the end of the  
 240 sessions, participants were specifically asked which label they found easiest to interpret.  
 241 After the focus group discussion had finished, participants were thanked and paid \$80AUD  
 242 (participants under 18 received \$60AUD and their caregiver received \$20AUD) to  
 243 compensate them for their participation.

244

245 *Table 1: Front-of-pack labels and health claims appearing on mock food packages*

| Food             | Health claim                                                                       | Label type                                       | Example front-of-pack label image                                                    |
|------------------|------------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|
| Breakfast cereal | High in fibre (nutrient content claim)                                             | Daily Intake Guide (DIG) – reductive label       |  |
| Cheese           | Contains calcium which reduces your risk of osteoporosis (high-level health claim) | Multiple Traffic Lights (MTL) – evaluative label |  |

|                 |                                                                                                 |                                             |                                                                                    |
|-----------------|-------------------------------------------------------------------------------------------------|---------------------------------------------|------------------------------------------------------------------------------------|
| Chicken nuggets | Contains protein necessary for tissue building and repair (general-level health claim)          | Health Star Rating (HSR) – evaluative label |  |
| Muesli bar      | Contains zinc which is necessary for normal immune system function (general-level health claim) | Multiple Traffic Lights – evaluative label  |  |
| Potato chips    | Contains vegetables which reduce the risk of coronary heart disease (high-level health claim)   | Daily Intake Guide – reductive label        |  |
| Yoghurt         | 99% fat free (nutrient content claim)                                                           | Health Star Rating – evaluative label       |  |

246

247 Discussions lasted 70-110 minutes, with an average of 88 minutes (adult groups averaged 96  
248 minutes, child groups averaged 76 minutes). The discussions were recorded and transcribed  
249 and the transcriptions were imported into NVivo10 qualitative data analysis software. Text  
250 was coded according to a node hierarchy that was progressively updated as new codes  
251 emerged from the data. The coding of the data was undertaken by the first author and  
252 reviewed by the second author until a consensus was obtained. An inductive approach was  
253 used to develop a thematic interpretation of the data (Strauss & Corbin, 1990). This  
254 interpretation was then refined through discussions among the author team.

255

256

### 3. Results

257

258 A series of focus group discussions with Western Australians of varying age, gender and SES  
259 provided insight into how consumers evaluate the nutritional value of a product when both a  
260 FoPL and a health claim are present. A summary of the key findings of this study are shown  
261 in Figure 2. As can be seen, there appeared to be a number of criteria that FoPLs and health  
262 claims needed to meet individually before being considered together in the evaluation  
263 process. These findings were largely consistent among men and women and all the age  
264 groups sampled.

265

266 Participants reported that health claims needed to demonstrate their value by providing new,  
267 relevant and reliable information, whereas FoPLs needed to be trusted and easy to use. If the  
268 featured claim and FoPL met all the criteria for inclusion in the evaluation process and no  
269 discrepancy was detected, participants felt that both would be considered during product  
270 assessment. However, if a discrepancy was detected, only the FoPL would be used as this  
271 was considered a more reliable source of information. These stages of the evaluation process  
272 depicted in Figure 2 are explained below.

273

274 *Insert Figure 2 about here*

275

### 276 **3.1 Decision to use health claims**

277 Participants reported three main reasons for not incorporating health claims in their  
278 evaluations. The first was a general distrust because health claims were viewed primarily as  
279 marketing messages that were constructed by the food manufacturer rather than balanced,  
280 informative statements about the health value of the product. As such, it was assumed they

281 may not be grounded in objective facts and instead worded in a deceptive manner to achieve  
282 their marketing objectives. Some participants expressed uncertainty about whether  
283 regulations exist to govern health claims usage, while others believed there is little to no  
284 regulation.

285

286 *I don't trust words...They're just trying to get you to buy the product. They can say*  
287 *whatever they want. Male, 18-25.*

288

289 *The bigger the claims on the front, the more suspicious. Female, 18-25.*

290

291 *Who's making the claims? Are these regulated claims, so they have to pass a*  
292 *standard? If so, I think it's good. The more information the better. But if it's*  
293 *companies can more or less say what they like then I think it's probably not a good*  
294 *thing. Male 26-45.*

295

296 Participants had specific reasons for distrusting both nutrient content claims and  
297 general/higher-level claims. Nutrient content claims were thought to be deceptive if they  
298 promoted a particular nutrient in a food product also containing substantial quantities of  
299 unhealthy nutrients. The other main criticism of nutrient content claims was that there is a  
300 lack of clarity regarding the meaning of the terms “high” or “low”. This was mentioned by  
301 adults and children alike.

302



303 *Ones that say like 97% fat free...you turn them over and they're just full of other shit.*

304 Male, 18 – 25.

305

306 *When it says that now 65% less fat, you don't know how much fat's in it. Even though*  
307 *there's less fat, you don't know how much is still there.* Female, 14 – 17.

308

309 *Female 1: I'm thinking they can't really say it's got zinc or whatever if it hasn't*

310 *Female 2: But it might be an insignificant amount of zinc though.* Females, 46+.

311

312 *High? What's high? It's subjective.* Male, 18 – 25.

313

314 It was also argued (mostly by adults) that the nutrient-disease link made by general- and  
315 higher-level health claims could be deceptive because people may develop the nominated  
316 disease even while consuming the profiled nutrient. For example, as described below, various  
317 unhealthy behaviours could offset the benefits of a particular healthy choice.

318

319 *Female 1: You don't need to tell people it's good for heart health because there are*  
320 *other things that are good for your heart health apart from eating two serves of*  
321 *vegetables.*

322 *Female 2: They'll end up just going, "Oh well, if I ate those that's all I need to do to*  
323 *stop me from having a problem". They'll think that you can still smoke and drink and*  
324 *eat fat and what not.* Females, 46+

325

326           *It depends how they're [vegetables] cooked. They could be swimming in a cheese*  
327           *sauce, but just because there's two serves of vegetables it doesn't mean it's any good*  
328           *for you. Female, 26-45.*

329

330   The second main reason health claims were discounted was if they were deemed irrelevant.  
331   General- and higher-level health claims in particular were often assumed to be directed at  
332   older people who are more at risk of chronic disease. Thus younger consumers more often  
333   reported feeling that these health claims were not relevant to them.

334

335           *It's [osteoporosis] not at the forefront of my mind. If I was 80, maybe then I'd think a*  
336           *different thing. Male, 26-45.*

337

338           *That one [cheese packet] says you can have calcium for strong bones. Like, that's*  
339           *what adults will want to have. Male, 10-13.*

340

341   Finally, the third reason for ignoring health claims was if they were considered  
342   uninformative. For nutrient content claims, the information was deemed redundant if the food  
343   product was well known for containing that nutrient. For general- and higher-level health  
344   claims, the information was considered redundant if participants were already aware of the  
345   diet-disease relationship being reported.

346

347           *Any dairy product will reduce your risk [of osteoporosis]. Female, 18-25.*

348

349 *If you're buying something, you know it's got vegetables in there. I don't have to be*  
350 *told again that it's got two serves of vegetables. Male, 46+*

351

### 352 **3.2 Decision to use front-of-pack nutrition labels**

353 Trust and ease of use were the main factors reported by adults and children as affecting their  
354 willingness to incorporate FoPLs into the evaluation process. Participants considered FoPLs  
355 to be more objective (and therefore less likely to be deceptive) compared to health claims.  
356 They expressed the belief that they are created and monitored by a third party (i.e., the  
357 government) rather than food manufacturers.

358

359 *That would still be better though, as long as you know that you are looking at the*  
360 *government one [FoPL] and not a similar one that a company's put on their own*  
361 *products. Female, 26-45.*

362

363 There were, however, some specific aspects of the evaluative FoPLs (i.e., MTL and HSR)  
364 and reductive FoPL (i.e., DIG) that were distrusted. Among the adults, a lack of trust in the  
365 DIG was mostly due to the perception that serving sizes were often manipulated by the  
366 manufacturer to be unrealistically small to produce more favourable figures. Most  
367 participants lacked experience with the evaluative FoPLs shown in the focus groups since the  
368 MTL have not been adopted in Australian supermarkets and the HSR had only recently begun  
369 appearing on packs. This created some doubt about whether these FoPLs could be applied  
370 and enforced uniformly. However, participants were still more trusting of them than DIGs.

371

372 *Sometimes that [serving size on the DIG] can be deceiving, can't it? You look at that*  
373 *and say it's only 100 grams, then you get home and eat 600 grams. Male, 46+.*

374

375 *So will some [companies] just not put it [HSR] on there if it's bad? Female, 46+*

376

377 *By the sounds of it, there's not going to be anything on the shelves that's got one star*  
378 *on it anyway because it's not compulsory. Male, 26-45.*

379

380 Although the DIG was distrusted by a number of participants, this was not the main stated  
381 reason for their reluctance to use it. The DIG (unlike the HSR and MTL) was considered  
382 harder to understand since it contains a larger amount of information, which participants felt  
383 they were less likely to use, especially under time pressure. Most participants were more  
384 trusting of the evaluative FoPLs and adults indicated they would be likely to use them when  
385 shopping. The main reason reported for this was the ability to quickly and easily understand  
386 the nutrition information and the ability to make comparisons across numerous products.  
387 Overall, the evaluative labels (particularly the HSR) were considered easier to interpret than  
388 the DIG.

389

390 *I don't go up to the top looking to start analysing that [DIG]. I can never understand*  
391 *what it means. Male, 46+.*

392

393 *It's just a lot easier to just look at the stars and compare everything. Female 14-17.*

394

395 *If you had two products you could compare the star rating on it quite easily. For this*  
396 *type of product, which you know isn't very healthy, it probably would help. And that*  
397 *traffic light thing, I think would do the same. Male 26-45.*

398

### 399 **3.4 Trade-off between FoPLs and health claims**

400 From the group discussions in response to the mock packages, it was clear that in most cases  
401 product evaluation began with consideration of the food type (e.g., yoghurt), the images on  
402 the pack and then the FoPL and/or health claim. This was particularly evident among younger  
403 participants. Once they paid attention to the front-of-pack nutrition information, many  
404 participants reported that their default mode of evaluation when presented with a health claim  
405 and a FoPL together on a pack was to use the FoPL. The health claim was apparently viewed  
406 as an afterthought and even once it was read it was often not considered in the product  
407 assessment process.

408

409 *Male 1: My eyes did go straight to the nutritional information [MTL]...*

410 *Male 2: There's that "Contains calcium which reduces..." thing. I got to admit I only*  
411 *just read that a second ago and it had been up for however long now. Males, 18-25.*

412

413 *Facilitator: Anyone else some thoughts on the protein [claim]?*

414 *Female 1: Well, I actually wouldn't even read it until after. So it didn't take my eye.*

415 *Facilitator: What did take your eye from that one?*

416 *Female 2: The two stars took my eye.*

417 *Female 1: Well I just looked at the picture of the food and I looked at the [HSR] label.*

418 Females, 46+.

419

420 Most adult participants noticed the discrepancy between the unhealthy nutrition profile of the

421 foods (as conveyed by the FoPL) and the health claims, although this occurred most

422 frequently when the HSR was present on the pack. This is likely to be a function the HSR

423 being considered the easiest FoPL to interpret.

424

425 *When I first read that I saw “99 per cent fat free” ...But then I saw that it was two*

426 *stars, so I got conflicting things. Female, 46+.*

427

428 *I just like that the words say “Got calcium to reduce osteoporosis” and then there's*

429 *just red lights. You just see these red lights, so you don't eat this. Male 26-45.*

430

431 Although children sometimes noticed the discrepancy between the health claim and FoPL,

432 this *only* occurred when the HSR was used. Children on the whole paid more attention to

433 other front-of-pack elements, such as graphics and colours, before discussing the FoPLs or

434 health claims.

435

436 *The first two things that pop out at me would be the fruit in the title and also the*

437 *picture of the actual cereal...Then it says high in fibre and at the top it's got some sort*

438 *of nutritional thing [DIG] which sort of indicates that it might be healthy for you.*

439 Female, 10-13.

440

441 *Well, it says it contains protein, but it's only got two stars. But I guess the protein is*  
442 *just a small portion of it. That [star rating] might be the whole thing. Female, 10-13.*

443

444 *It says 99% fat free. The health rating is two again, which doesn't really make sense.*  
445 *Male, 10-13.*

446

447

#### 4. Discussion

448

449 The present study examined how consumers' evaluations of food products (in terms of  
450 attitudes towards the product, willingness to buy and perceived healthiness) are affected  
451 when FoPLs and health claims are both present on the front of packs. The primary finding  
452 was that FoPLs were the preferred source of nutrition information, particularly if the  
453 information in the health claim and the FoPL conflicted. Participants also offered insights  
454 into the criteria they consciously used to determine whether each piece of nutrition  
455 information should be used in their evaluations. They reported that health claims needed to be  
456 trusted, relevant and informative, whereas FoPLs needed to be trusted and easy to understand.  
457 Trust in FoPLs was greater than for health claims, which appeared to be largely due to the  
458 perception that FoPLs have a stronger factual basis and are more tightly controlled by  
459 regulations.

460

461 Some of these findings support previous research. For example, studies have found that  
462 personal relevance and trust are important motivators for processing information provided in

463 health claims (Chan et al., 2004; Dean et al., 2012; Lähteenmäki, 2013; Szykman et al.,  
464 1997). In the present study, participants were more trusting of FoPLs than health claims. This  
465 appeared to be partly a result of participants believing that the health claims were made by  
466 the food manufacturer rather than a trusted, credible institution. Future research could explore  
467 if and how reactions to health claims change according to the entity making the claim.

468

469 Past research has also indicated that evaluative FoPLs are easier to interpret than reductive  
470 FoPLs and thus are more likely to be considered in decision making (Hawley et al., 2013;  
471 Hersey et al., 2013). However, these studies looked at health claims or FoPLs in isolation  
472 while the present study makes an important contribution by exploring how these information  
473 sources interact to affect product assessment. The primary finding was that when participants  
474 became aware of a discrepancy between FoPLs and health claims, they more often relied on  
475 the information contained in the FoPL to assist them in evaluating the food. Discrepancies  
476 were more readily noticed by adults when the HSR was present (compared to the DIG and  
477 MTL) and were only noticed by children in the HSR condition. This is consistent with the  
478 finding that participants found the HSR the easiest FoPL to understand, which may be due to  
479 the reduced cognitive load that comes with interpreting a single, star-based rating system as  
480 opposed to the multiple pieces of information in the MTL and DIG. However, further  
481 research is needed to clarify this.

482

483 The present findings could explain the results of Maubach et al. (2014). In their study,  
484 participants preferred and were more accurate at rating the healthiness of foods containing an  
485 MTL compared to a DIG or star FoPL. This was the case regardless of whether a health claim



486 was present alongside the MTL. This is consistent with the current finding that participants  
487 will prioritise information in the FoPL over a health claim in decision making if the FoPL is  
488 easy to understand. Of note is that the star rating system used in Maubach et al.'s study  
489 differed from the HSR in the present study in that it assigned foods a rating of 1 – 7 stars.  
490 This may go some way toward explaining the differences in outcomes between their research  
491 and the present study.

492

493 This study demonstrates that FoPLs can help consumers gain a comprehensive impression of  
494 the nutritional value of a product in the face of health claims that only promote positive  
495 attributes. This is especially important given that health claims frequently appear on foods  
496 that are not high in nutritional quality (Hughes et al., 2013; Kelly et al., 2009). For example, a  
497 survey examining the energy density of products with a 'Reduced Fat', 'Low Fat', or 'Fat  
498 Free' claim made in relation to their full fat counterparts found that although the former were  
499 lower in fat and energy density, they were still more energy dense than most foods in the  
500 average Australian diet (La Fontaine, Crowe, Swinburn, & Gibbons, 2004). Thus if health  
501 claims are not adequately regulated, they can be misleading. Given that past research  
502 indicates that the NIP often cannot attenuate the positivity bias created by a health claim  
503 (Ford et al., 1996; Kozup et al., 2003; Labiner-Wolfe et al., 2010; Mazis & Raymond, 1997;  
504 Mitra et al., 1999; Wong et al., 2013, 2014), the present findings suggest that mandating the  
505 inclusion of FoPLs whenever health claims appear on packs may be more effective than  
506 mandating an NIP. Specifically, the provision of more comprehensive nutrition information  
507 via FOPLs appears to bolster consumers' ability to evaluate the veracity of health claims that

508 refer to individual nutrients. Currently consumers must refer to the NIP located on the back or  
509 side of the pack to obtain more complete nutritional information.

510

511 As part of the informed consent procedure, participants were advised that the focus group  
512 discussions would relate to food and nutrition. This could be seen as a limitation of this study  
513 since the sample members, although diverse in age, gender and SES, were likely to have a  
514 higher level of nutrition knowledge and/or interest than the general population. Another  
515 limitation was the fact that the focus group methodology resulted in participants looking at  
516 nutrition information purposively and in a communal context, as opposed to a time-  
517 constrained, individual context as is usually the case when shopping. The negativity towards  
518 health claims expressed by the study participants is somewhat at odds with previous studies  
519 showing that health claims can induce a positivity bias (Abrams et al., 2015; Faulkner et al.,  
520 2014; Gorton et al., 2010; Harris et al., 2011; Saba et al., 2010; Soldavini et al., 2012;  
521 Wansink & Chandon, 2006). This is likely to have been at least partially the result of the  
522 intentional mismatch between the health claims and the nutrition profiles indicated by the  
523 FoPLs, but could also have been compounded by the focus group setting where participants  
524 may have been reluctant to appear gullible to marketing messages in front of their peers.  
525 Reactions to health claims may be less negative when FoPLs communicate a more favourable  
526 nutrition profile and further research is needed that combines a greater range of FoPLs and  
527 health claims to assess whether different results are obtained when more congruent forms of  
528 nutrition information are provided. In particular, future research could assess whether these  
529 findings hold for moderately healthy products where healthiness is more ambiguous and  
530 participants may not be as aware of any discrepancy between the FoPL and the health claim.

531

532 Finally, it is likely that the information provided on products affects consumers at a  
533 subconscious level, which they are unable to articulate in focus groups. A growing body of  
534 research demonstrates that consumers' choices can be subconsciously influenced by even  
535 very subtle product branding and packaging attributes (Chartrand & Fitzsimons, 2011;  
536 Chartrand, Huber, Shiv, & Tanner, 2008; Fitzsimons, Chartrand, & Fitzsimons, 2008). The  
537 present qualitative study explored more deliberative, conscious processes involved in  
538 consumers' evaluations of food products as a function of the types of front-of-pack nutrition  
539 information presented. Future research could explore the extent to which conscious and  
540 unconscious processes operate in 'FoPL only', 'health claim only' and 'combined FoPL and  
541 health claim' contexts, and how these impact on more distal outcomes such as product choice  
542 or purchasing behaviour.

543

544 In conclusion, the findings from the present study provide original insights into how  
545 consumers process different forms of front-of-pack nutrition information and have  
546 implications for policy makers' decisions about how such information should be presented.  
547 Evaluative FoPLs were found to have the potential to reduce any positivity bias created by  
548 health claims on unhealthy foods. This effect is likely to be due to the higher level of trust  
549 consumers place in evaluative FoPLs relative to health claims and the ease with which they  
550 are understood. This study contributes to the limited research on the interaction between  
551 different types of front-of-pack information by showing (i) the conditions under which  
552 combinations of health claims and FoPLs can add value to consumers and (ii) how the halo  
553 effect created by health claims can be overcome by FoPLs. Of note is that the findings were

554 generally consistent among age and gender groups, indicating that Australian consumers in  
555 general would benefit from a requirement for health claims to be accompanied by an  
556 evaluative FoPL. Further research is needed to assess the extent to which the findings apply  
557 to larger samples and to consumers in other countries.

558

559

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761 *Figure 1.* FoPLs used in mock pack images: A). The Health Star Rating (HSR), B). The Daily  
762 Intake Guide (DIG) and C). Multiple Traffic Lights (MTL).

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764 *Figure 2.* A proposed framework of consumers' use of health claims and FoPLs when there is  
765 a discrepancy in nutritional information