

Impact of health claims in prebiotic enriched breads on purchase intent, emotional response and product liking

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1 Impact of health claims in prebiotic enriched breads
2 on purchase intent, emotional response and product
3 liking

4

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21 **Keywords:** functional food; emotions; inulin; purchase intent; sensory.

22

23 **Abstract:**

24

25 The impact of health claims on purchase intent, emotional response and liking has never
26 been previously reported. In this study prebiotic enriched bread was used as a model
27 functional food. Purchase intent, emotional response and liking were investigated in 3
28 phases: 1: focus groups were used to gauge consumer perception of health claims and
29 functional foods. 2: the impact of health claims on purchase intent and emotional
30 responses were measured using an online survey (n = 122) and 3: hedonic ratings on
31 bread rolls presented with or without any associated claims were obtained (n = 100). A
32 cluster analysis of the purchase intent data identified two clusters of consumers who
33 were either receptive or non-receptive to health claims. Receptive and non-receptive
34 consumers significantly differed in the emotions they reported with respect to the
35 claims. The hedonic ratings did not significantly differ between the breads tasted with
36 or without health claims.

37

38

39

40 INTRODUCTION

41 The market for functional foods is expanding rapidly (Siró et al. 2008), and the
42 definition of functional food has been the subject of a number of revisions. However,
43 the idea that it provides a health benefit beyond that of a regular food product is well
44 established (Diplock et al. 1999; Doyon and Labrecque 2008). These health benefits are
45 often communicated to consumers through health claims which have been described as
46 a "short-cut cue" to prompt the consumer to further check the labelling (Hodgkins et al.
47 2012).

48

49 The nature of the claim used (enhanced nutrient content, health benefit or reduced
50 disease risk) has been investigated with mixed findings. Verbeke, Scholderer and
51 Lähteenmäki (2009) reported that reduced disease risk claims were not perceived as
52 positively as health or nutrition claims while van Kleef, van Trijp and Luning (2005)
53 found that reduced disease risk claims were more attractive to consumers than
54 psychological or appearance related claims. This was further supported by van Trijp and
55 van der Lans (2007) who showed that claims related to "infections" scored significantly
56 higher than "weight" which in turn obtained higher scores than "stress" or
57 "concentration" claims. Ares, Giménez and Gámbaro (2009) did not observe any
58 difference in "healthiness" or "willingness to try" between "enhanced function" and
59 "reduced disease risk" claims although both resulted in higher scores than the control
60 (no claim). It appears likely that interactions between the product and the claim exist:
61 Lähteenmäki et al. (2010) reported a strong active ingredient x claim type interaction on
62 "healthiness" while Ares and Gámbaro (2007) found that both "healthiness" and
63 "willingness to try" were higher when the functional ingredient was inherent to the
64 original product. Thus, the success of a functional food concept may be partially
65 dependent on the congruency between the product, the active ingredient and the claim.
66 In turn, perceived congruency may be enhanced by familiarity with the active ingredient
67 and health claims which has been suggested to impact on perceived healthiness
68 (Lähteenmäki et al., 2010).

69

70 Over the last decade, a number of authors have researched different segments of the
71 population in order to identify consumers who are more likely to be receptive to

72 functional foods and health claims. The parameters of interest most often studied were
73 age and gender. While some studies have reported that older (Ares et al. 2009; Baglione
74 et al. 2012) and female (Ares et al. 2009; Baglione et al. 2012; Childs and Poryzees,
75 1997) consumers were more likely to consume functional foods; others have not shown
76 any trend with respect to socio-demographic parameters (Sabbe et al. 2009; Verbeke
77 2005; Verbeke 2006; Verbeke et al. 2009). Gender x type of functional food interactions
78 were reported (Ares and Gámbaro, 2007) suggesting that different product categories
79 may appeal more to one gender or the other. Overall, recent reviews of the literature on
80 functional food consumers concluded that it was not possible to predict the parameters
81 (age, gender, education) which may impact on functional food consumption
82 (Lähteenmäki 2013; Ozen et al. 2012); this is presumably due to the numerous
83 interactions reported. In the absence of obvious demographic factors to rationalise
84 consumer perception of health claims, themes such as price (Lalor et al. 2011a), the
85 consumer's health or the health of other family members (Dean et al. 2012; van Kleef et
86 al. 2005) have been explored and there is evidence that reduced disease risk claims may
87 appeal more to consumers directly affected by the disease. Under these circumstances,
88 health claims may trigger an emotional response impacting on purchase intent.

89
90 The role of emotions in marketing has been researched for some time (Bagozzi, et al.
91 1999) but the focus on food and emotions is more recent. The interaction between food
92 and emotions is complex and the mechanisms by which emotions result in; or are
93 elicited by; eating have been well described, highlighting the impact of sensory,
94 physiology and psychology on emotions related to food (Gibson 2006). In relation to
95 the product itself, sensory attributes have been identified as one of five potential sources
96 of emotions in the food experience (Desmet and Schifferstein 2008). It has been
97 suggested that hedonic ratings alone may not be enough to discriminate between equally
98 liked products; and emotions elicited by the product itself need investigating in an effort
99 to fully understand the consumer's experience and align the product with the brand.
100 This has resulted in a number of research outputs on emotions elicited by food and food
101 names (Cardello et al. 2012) or unbranded food products (Manzocco et al. 2013;
102 Thomson et al. 2010). The emotions elicited by the overall buying, preparing and eating

103 experience have also been studied (Schifferstein et al. 2013) acknowledging the role of
104 packaging in generating emotions linked to food consumption.

105

106 The nutritional information, typically found on the packaging, has often been reported
107 to impact negatively on consumers' expectations (Carrillo et al. 2012; Lähteenmäki et
108 al. 2010; Raghunathan et al. 2006; Verbeke 2006). However, taste is widely
109 acknowledged to be the main driver for the overall consumer experience (Pothoulaki
110 and Chryssochoidis 2009). Despite this, there appears to be relatively few studies
111 directly investigating the impact of health claims on product liking. Miele et al. (2010)
112 found no impact of nutrition claims for walnut oil enriched mayonnaise while Sabbe et
113 al. (2009) and Vidigal, et al. (2011) reported a significant increase in overall liking of
114 unfamiliar functional fruit juices when nutrition information was supplied.

115

116 In the light of the current literature, it is clear that there are conflicting reports around
117 both the impact of the nature of the claim and the profile of a "typical" functional food
118 consumer. This is very likely due to the fact that factors such as familiarity with the
119 bioactive element, perceived healthiness of the base product, congruency between the
120 base product, the bioactive element and the claim as well as relevance to self are all
121 likely to play an important role in consumer perception and those need to be
122 investigated on a case-by-case basis. It is also clear that emotions have a strong impact
123 on both purchasing and the overall food experience. Despite, this, to the best of our
124 knowledge, the impact of health claims; which form an integral part of the food
125 experience; on emotions has never been reported.

126

127 This study sought to investigate consumer' purchase intent, emotional response and
128 liking of a model functional food associated with different claims.

129

130 Prebiotic enriched breads were chosen as a recent review by Morris and Morris (2012)
131 indicated that a supplementation of up to 5 % inulin should not result in significantly
132 less acceptable bread. There is evidence that, if consumed on a regular basis, inulin can
133 promote a range of health benefits such as prevention of colorectal cancer (Taper and
134 Roberfroid 1999; Pool-Zobel 2005; Pool-Zobel and Sauer 2007; Asad et al. 2008);

135 increased mineral absorption (Roberfroid 2000; Hawthorne and Abrams 2008; Rastall
136 2010); improved immune response (Macfarlane et al. 2007; Seifert and Watzl 2008);
137 satiety and weight management (Weickert et al. 2006; Willis et al. 2009). These putative
138 health benefits were used in this study as the basis for different health claims.

139

140 **MATERIALS AND METHODS**

141

142 Focus groups:

143 It has been hypothesised that nutrition knowledge and understanding may impact on the
144 perception of health claims and emotional responses; therefore two focus groups were
145 set up for this explorative work:

146

147 A consumer group: the participants (n = 12, 9 females, aged 20 to 65 years) were
148 recruited via advertisement and were not affiliated to a nutrition/food related profession
149 or course.

150

151 A nutrition group: final year and master students studying towards a nutrition based
152 degree (n = 8, 6 females, aged 22 to 45 years) were recruited during lectures and
153 seminars.

154

155 All participants were regular bread eaters. Each participant signed an informed consent
156 sheet and agreed to being recorded before taking part in study. The focus groups were
157 moderated by two researchers, one of which was an experienced panel leader. The
158 qualitative data was analysed thematically.

159

160 **Health claims selection:**

161 The claims investigated were chosen to be representative of the categories identified in
162 the literature: nutritional claim (enhanced nutrient content); health claim (enhanced
163 health benefit); reduced disease risk (prevention) and appearance and to have a credible
164 link to the model functional food under study (see introduction):

165 1. Nutritional claim: “This product contains added prebiotic”

166 2. Health claim: “This product contains inulin, which is a type of fibre that can
167 increase satiety” and “This product contains added fibre which could help you feel
168 fuller for longer”

169 3. Appearance: “This product contains inulin which could aid weight management”
170 and “This product contains inulin, a type of fibre which can support weight loss”

171 4. Reduced disease risk: “This product contains added inulin, a prebiotic which
172 could help in the prevention of colorectal cancer” and “This product contains added
173 inulin, a prebiotic which could help in the prevention of cancer”

174 5. Health claim: “This product contains inulin which could help improve mineral
175 absorption”

176

177 Impact of health claims on purchase intent and emotional responses:

178 An online survey (www.esurveypro.com, Outside Software Inc, Bucharest, Romania)
179 was set up to present a picture of white bread together with a different claim on each
180 page (in all cases the image of the bread presented was identical). The claims were
181 worded as follows

182 1. “White flour bread”. Hereafter referred to as the control claim.

183 2. “White flour bread, this product contains the prebiotic inulin”. Hereafter
184 referred to as the prebiotic claim.

185 3. “White flour bread, this product contains added fibre which could help you feel
186 fuller for longer”. Hereafter referred to as the satiety claim.

187 4. “White flour bread, this product contains inulin, a type of fibre which can
188 support weight loss”. Hereafter referred to as the weight claim.

189 5. “White flour bread, this product contains added inulin, a prebiotic which could
190 help in the prevention of cancer”. Hereafter referred to as the cancer claim.

191 6. “White flour bread, this product contains inulin which could help improve
192 mineral absorption”. Hereafter referred to as the minerals claim.

193

194 Participants were asked to rate their purchase intent in the form of the question “how
195 likely would you be to buy this bread?” on a scale from 1 (definitely would NOT buy)
196 to 5 (definitely would buy). On the same page, participants were then presented with a
197 check all that applies (CATA) list of 20 emotions and asked to check all the emotions

198 that applied (see emotion selection section). While CATA scales provide less scope for
199 statistical analysis than Likert scales, they are also less cumbersome for the participant
200 and they have been found to produce similar emotional spaces (Ng et al. 2013). The last
201 page of the questionnaire related to the participant's personal information: age (18-25,
202 26-35, 36-45, 46-55, 56-65, 66-75, 76-85 and ≥ 86), gender and self-reported nutrition
203 knowledge, ranging from 1 -5 (1: no interest or knowledge whatsoever, 2: basic (I read
204 food labels), 3: Intermediate (I read and understand food labels), 4: Advanced (I use my
205 nutrition/food understanding to make informed decisions about what I eat), 5: Expert (I
206 am a registered nutritionist/I have a degree in food or nutrition). Self-reported nutrition
207 knowledge was used as purchase intent of functional foods and has been previously
208 shown to vary with differing levels of self-reported nutrition knowledge (Baglione et al.
209 2012).

210

211 **Emotions selection:**

212 An emotion lexicon specific to health claims was derived from a mixture of existing
213 literature on food related emotions, specifically the EsSense profile method (King and
214 Meiselman 2010) and consumer input (focus groups). This approach was successfully
215 adopted elsewhere (Ferrarini et al. 2010; Rousset et al. 2005). Emotions not listed in the
216 literature but explicitly expressed by participants (e.g. annoyed) were added; emotions
217 present in the literature but conspicuously absent from the discussions (e.g. wild) were
218 removed. The final list of emotions selected comprised 20 terms: angry, annoyed,
219 anxious, bored, confused, energetic, good, guilty, healthy, helpless, offended,
220 optimistic, patronised, reassured, self-conscious, surprised, threatened, upset, virtuous
221 and worried. Additionally, participants were able to type in any other emotion they felt
222 was relevant, this option was provided to ensure that all the relevant emotions were
223 captured. While "good" and "healthy" are not often considered as emotions per se;
224 "good", as an emotion, was found to discriminate between food products elsewhere
225 (Manzocco et al. 2013) and "feeling healthy" was deemed indicative of an emotional
226 response relevant to health claims.

227

228

229 **Participants:**

230 The participants were recruited by e-mail using a bank of consumers who routinely
231 perform commercial sensory work. 141 respondents started the questionnaire and 122
232 completed it. **Table 1** details the gender, age and self-reported nutrition knowledge of
233 the 122 respondents who completed the survey.

234

235 **Table 1:** Age, gender and self-reported nutrition knowledge of volunteers
236 (n=122) who completed the online survey. * see definitions in Materials and
237 Methods.

Gender	Male	n=37
	Female	n=85
Age	18-25	n=50
	26-35	n=12
	36-45	n=15
	46-55	n=11
	56-65	n=24
	66-75	n=10
	≥ 76	n=0
Self-reported nutrition knowledge*	None	n=2
	Basic	n=26
	Intermediate	n=44
	Advanced	n=39
	Expert	n=11

238

239 Hedonic rating – consumer panel:

240 Based on the survey results in section 3.2 and using the specific criteria of increased
241 purchase intent and high emotional contrast, 3 claims (control, weight and cancer) were
242 selected to investigate the impact of health claims on consumer liking. 100 regular bread
243 eaters were recruited via e-mail to assess the impact of health claims on liking using a 9
244 point hedonic scale (1: dislike extremely to 9: like extremely). Identical bread rolls
245 (white flour, 60 g) were used for all cases. The control sample was always presented
246 first and the order of the two remaining claims was balanced between the sessions.
247 Claims were read out to the panellists twice as the samples were being distributed.

248

249 Statistical analysis:

250 SPSS v20 (IBM Corporation, Armonk, USA) was used to conduct all statistical
251 analysis. P values lower than 0.05 were considered as significant.

252

253 Purchase intents: a 1 way (factor: claims) repeated measures ANOVA with a Bonferroni
254 post-hoc test was used to compare purchase intent from the online survey. A
255 Greenhouse-Geisser correction was applied. In order to investigate the effect of the
256 claim rather than attitude towards the basal product (white bread), the corrected
257 purchase intent was calculated by subtracting the purchase intent score for the control
258 (no claim) from each claim's score.

259

260 Cluster membership: a Hierarchical Cluster Analysis (Ward's linkage method, squared
261 Euclidean distance) was performed to identify consumer clusters from the corrected
262 purchase intents of each health claims. Two tailed t-tests were used to compare the
263 corrected purchase intents between clusters for each claim. A reliability test
264 (Cronbach's alpha) was conducted to test the independence of the health claims from
265 one another.

266

267 Cluster membership, emotions and participants' characteristics: Pearson's Chi-square
268 were performed on cluster membership, participants' gender, age (collapsed into 3
269 categories: < 36, 36-55 and \geq 56), reported emotions and self-reported nutrition
270 knowledge (categories collapsed into 3 categories: \leq 2, 3 and \geq 4).

271

272 Sensory consumer panel: a 1 way ANOVA (fixed factor: claim) and Tukey's HSD post-
273 hoc test were used to analyse the hedonic consumer data.

274

275 **RESULTS**

276 **Focus groups: three themes emerged from the focus groups:**

277

278 Nutrition knowledge and trust/distrust of health claims:

279 The impact of nutrition knowledge and differences between the 2 focus groups were
280 reflected in statements such as "no one will know what inulin is" from the consumer
281 group to comments which reflected an understanding of prebiotics and their function

282 e.g. “probiotics are bacteria themselves whereas prebiotics are things that make the
283 environment friendlier” from the nutrition group. Participants from the nutrition group
284 understood the claims and the regulatory processes involved in the application to use
285 health claims “companies have to be really careful on the wording they use on
286 packaging because of the whole EU legislation” or “I think if it was scientifically
287 justified by the FSA etc I think a lot of people would be at least intrigued to buy it” but
288 most felt confident they knew how to eat to keep healthy without resorting to functional
289 food “I would much rather buy my five fruit and vegetables a day and know that that is
290 working towards my health”. In contrast, participants from the consumer group
291 expressed confusion “I wouldn’t have a clue” and “would that be a health claim?” The
292 emotional content was sometimes strongly verbalised as in “it would cause confusion
293 and upset if people did not know what it meant”. Participants from the consumer group
294 were more likely to be negative about claims “I am in the category of being dubious of
295 all claims on food labels” or “I would be like, where is the proof?” or “I think it’s
296 important that consumers really understand claims as my grandparents would just buy
297 into anything”. In general, concerns were expressed around the validity of the claim: “I
298 would just be a bit worried about the validity of that statement”.

299

300 Price/marketing ploy:

301 Price was mentioned a number of times, the view that functional foods are pricier was
302 expressed often “they are quite expensive though aren’t they, functional foods. The
303 price would put me off” or “if two products were similar in nutritional content but
304 differed in price I would probably buy the cheaper one at the end of the day”. The price
305 issue was raised more often amongst the consumer group participants and was linked to
306 the concept of marketing scam: “it’s a marketing ploy to put the price up”.

307

308 Emotional response/relevance to self:

309 The responses to claims were often highly emotional. The cancer claim, specifically
310 drew out a lot of personal comments such as: “I would buy it but I don’t know if I would
311 get that anyway” or “I wouldn’t associate myself with that” and generally, the responses
312 to the cancer claim were negative “I think people think they are never going to get it”;
313 “mentioning cancer would put me off, I wouldn’t like it”; “a claim with the word cancer

314 in would annoy me!"; "claims like that annoy me, it would annoy me. I think to have
315 things about cancer on a food is wrong and emotive for a lot of people". Only 2
316 participants expressed that they would be likely to buy bread associated with a cancer
317 claim but did not elaborate on why. In contrast, the emotional responses to the weight
318 claim were lighter: "Oh, I think that would sell" or "that would probably be a huge
319 seller", "if you put it in chocolate, I'd try it!"

320

321 Summary:

322 Three main themes emerged, two of them loosely related and centred on trust/distrust of
323 health claims and the marketing techniques used to capture consumers' attention and
324 increase prices. The emotional element was well articulated and often correlated to one's
325 personal health or wellbeing. The impact of nutrition knowledge was only observed in
326 relation to trust/distrust of health claims and the existing mechanisms to validate them;
327 the core emotions in reaction to the claims were very similar in both groups.

328

329 **Impact of health claims on purchase intent and emotional response - survey data**

330 The purchase intent for inulin enriched white bread presented with different claims is
331 presented in **Table 2**.

332

333 **Table 2:** Average purchase intent and standard deviation (on a scale of 1: definitely
334 would NOT buy to 5: definitely would buy) for bread presented with different claims (n
335 = 122). The letters indicate significantly different average purchase intent ($p < 0.05$).

Claim	Average purchase intent
Control (no information)	2.55 ^a (1.03)
Prebiotic	3.00 ^b (0.92)
Satiety	2.58 ^a (0.99)
Weight	2.93 ^b (1.22)
Cancer	2.89 ^b (1.16)
Minerals	3.11 ^b (0.99)

336

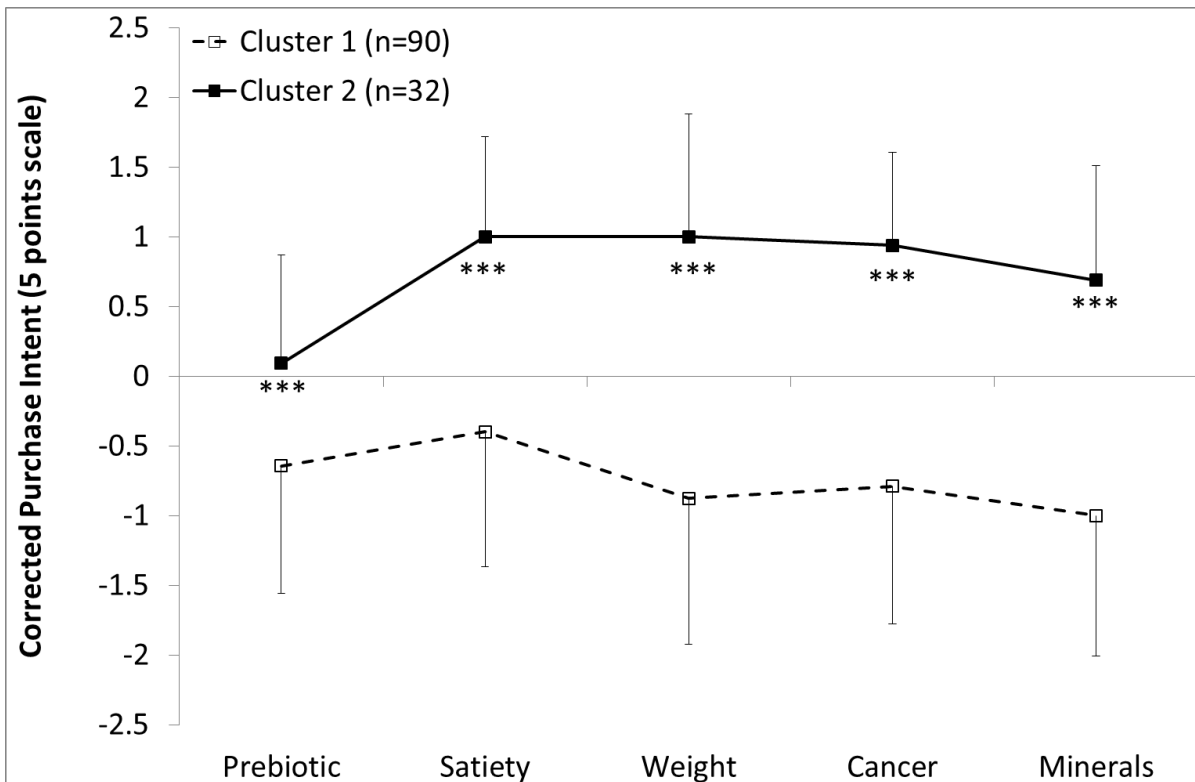
337 There was a significant effect of the factor "claim" ($p < 0.001$). Overall, all the claims
338 tended to increase purchase intent when compared to the control. The claims

339 “prebiotic”, “weight”, “cancer” and “minerals” resulted in a significant increase in
340 purchase intent, although “satiety” did not.

341

342 In order to identify segments of population which may respond positively or negatively
343 to specific claims, a hierarchical cluster analysis was carried out on the corrected
344 purchase intent. A two-solution cluster was deemed optimum. **Figure 1** presents the
345 corrected average purchase intents per cluster for each claim. Cluster 1 (n = 90) was not
346 receptive to health claims and, on average, the presence of any claim resulted in a drop
347 in purchase intent compared to the control (no claim). In contrast, cluster 2 (n = 32) was
348 found to be largely receptive to the different claims (with the exception of "satiety") and
349 this resulted in a marked increase in purchase intent compared to the control (no claim).

350



351

352 **Figure 1:** average corrected purchase intent per claim and per cluster. *** indicates that
353 the average corrected purchase intents for clusters 1 and 2 are significantly different
354 ($p < 0.001$) for each claim. Error bars represent + 1 standard deviation (cluster 2) or -1
355 standard deviation (cluster 1).

356

357 The nature of the claim used did not appear to have a major impact on purchase intent,
358 this was confirmed by a reliability test on the corrected purchase intent for all the
359 claims, Cronbach's alpha was 0.888 indicating a high internal reliability (> 0.7) between
360 the claims.

361

362 No trend in cluster membership was observed with respect to age ($p = 0.382$), gender (p
363 $= 0.895$) or self-reported nutrition knowledge ($p = 0.385$).

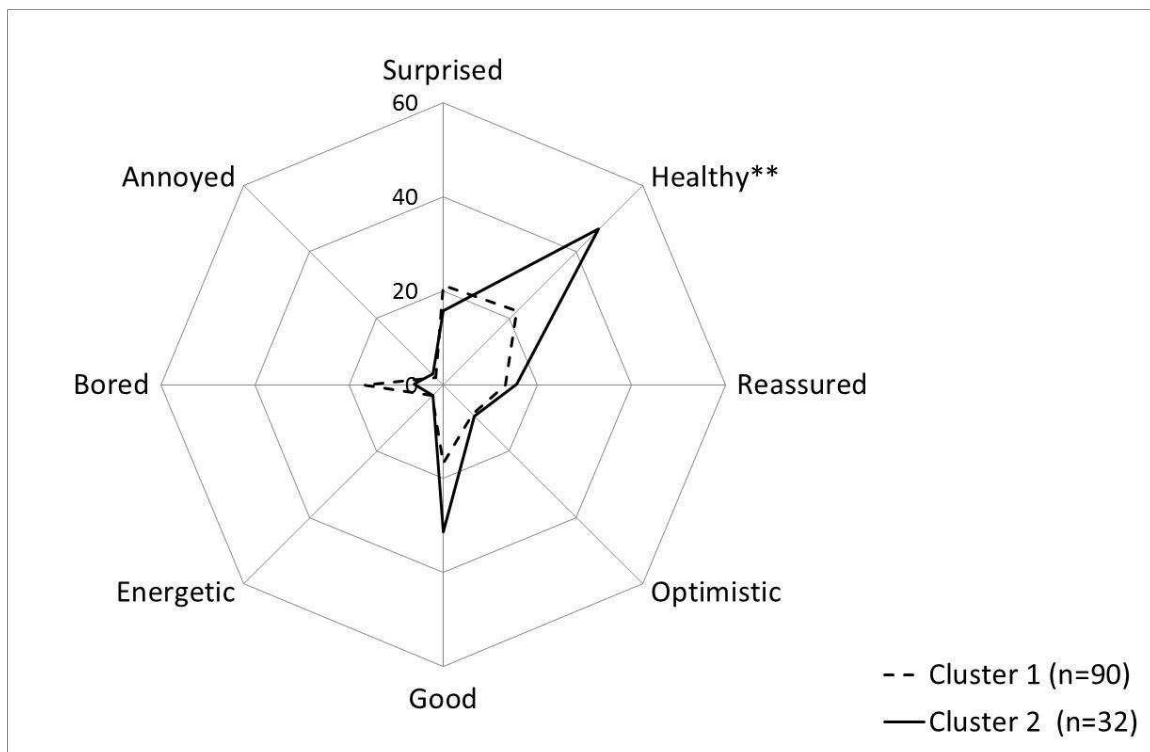
364

365 **Figures 2 - 7** present the emotions elicited in each cluster by each of the different
366 claims. The figure for the control (no claim) is not presented as the emotions it elicited
367 did not differ significantly between the two clusters. Only the emotions which varied
368 significantly between the clusters at any point are presented.

369

370 Cluster 2 reported feeling significantly more "healthy" than cluster 1 ($p = 0.008$) when
371 viewing white bread associated with the prebiotic claim (**Figure 2**).

372



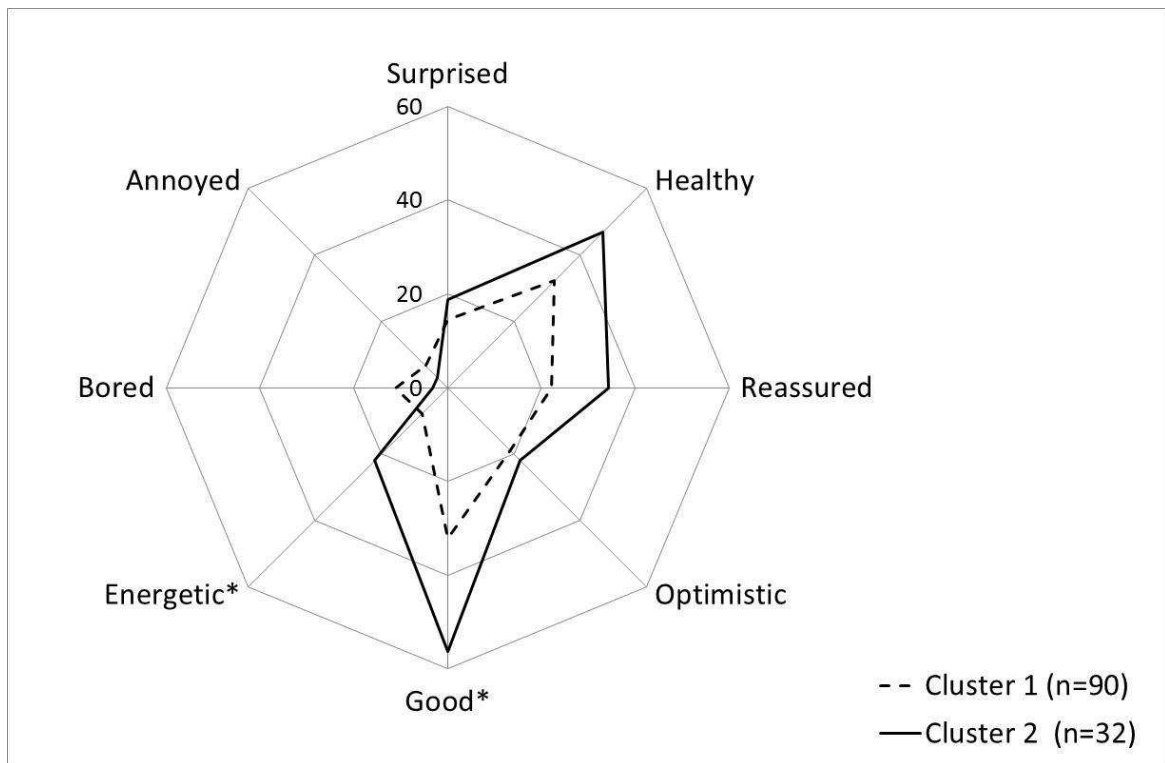
373

374 **Figure 2:** percentage of respondent in each cluster citing the emotion in response to the
375 "prebiotic" claim. Significance level: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

376

377 The satiety claim (**Figure 3**) elicited significantly more feelings such as "good" and
378 "energetic" in cluster 2 than in cluster 1 ($p = 0.016$ and $p = 0.032$, respectively). Cluster
379 2 also reported more often other positive emotions such as healthy and reassured while
380 cluster 1 reported feeling "bored" and "annoyed" more often than cluster 2, however,
381 this did not reach significance levels.

382



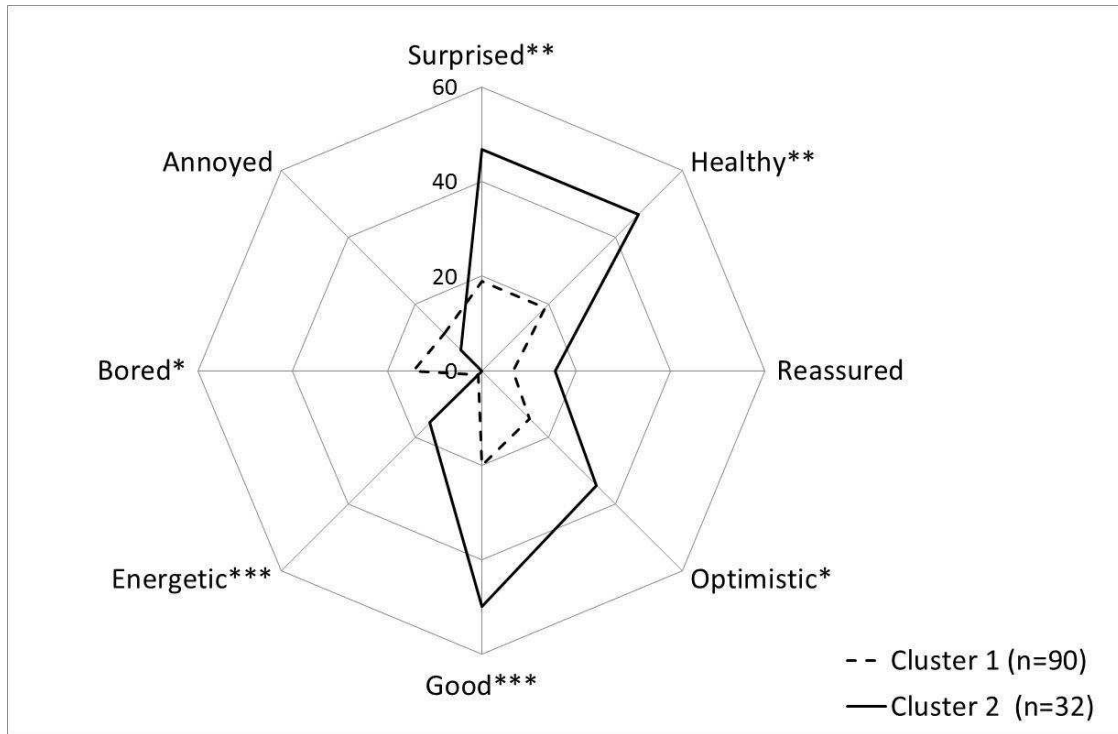
383

384 **Figure 3:** percentage of respondent in each cluster citing the emotion in response to the
385 "satiety" claim. Significance level: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

386

387 The weight claim (**Figure 4**) elicited strong emotional responses in both clusters.
388 Cluster 2 reported feeling "surprised", "healthy", "optimistic", "good" and "energetic"
389 significantly more often than cluster 1 ($p = 0.002$, $p = 0.002$, $p = 0.015$, $p = 0.001$, $p =$
390 0.001 respectively) while cluster 1 reported feeling "bored" more often than cluster 2 (p
391 $= 0.023$).

392



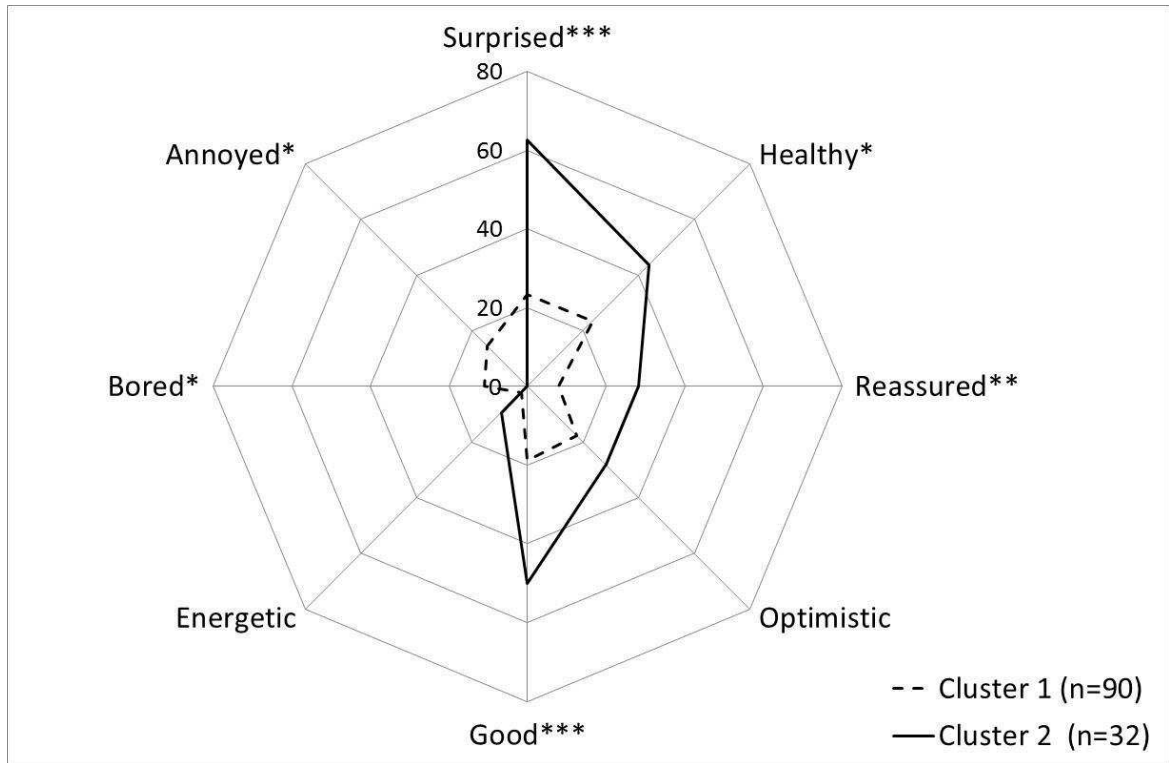
393

394 **Figure 4:** percentage of respondent in each cluster citing the emotion in response to the
 395 "weight" claim. Significance level: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

396

397 The cancer claim (**Figure 5**) tended to elicit significantly more positive emotions in
 398 cluster 2: healthy ($p = 0.028$), reassured ($p = 0.003$) and good ($p = 0.001$) than in cluster
 399 1 while it elicited significantly more negative emotions (bored, $p = 0.049$ and annoyed,
 400 $p = 0.023$) in cluster 1 than in cluster 2.

401



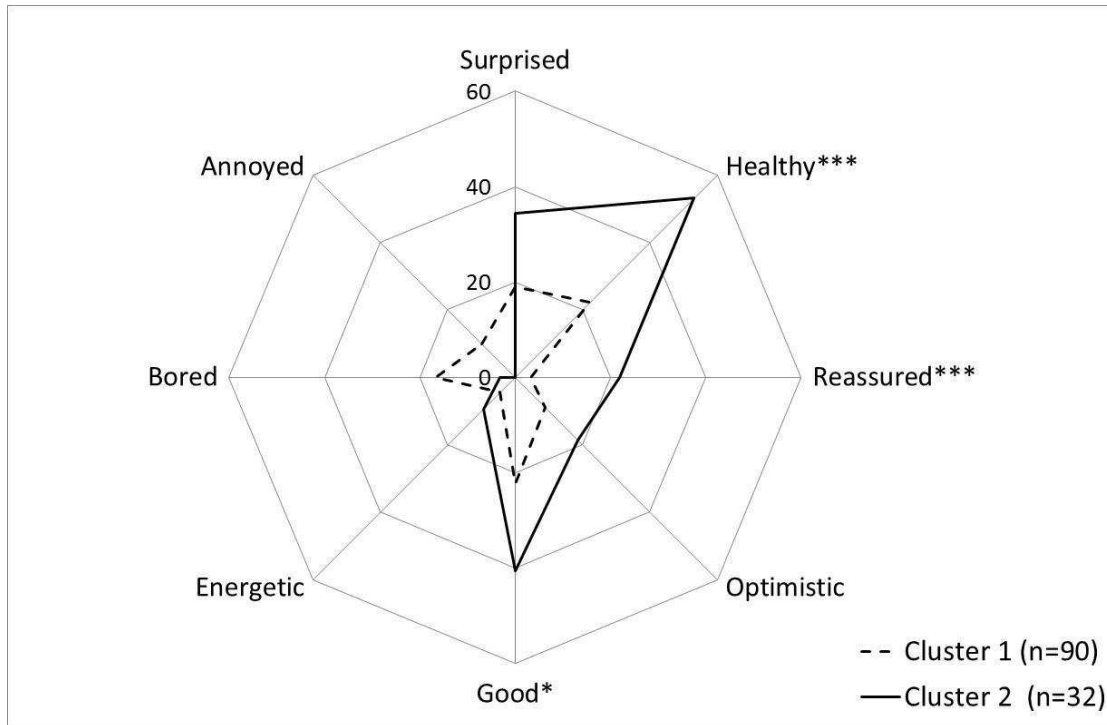
402

403 **Figure 5:** percentage of respondent in each cluster citing the emotion in response to the
 404 "cancer" claim. Significance level: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

405

406 The minerals claim (**Figure 6**) elicited significantly more positive emotions in cluster 2
 407 than cluster 1: healthy ($p = 0.001$), reassured ($p = 0.001$) and good ($p = 0.044$). Cluster 1
 408 reported more negative emotions (bored and annoyed), although this did not reach
 409 significance.

410



411

412 **Figure 6:** percentage of respondent in each cluster citing the emotion in response to the
 413 "minerals" claim. Significance level: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

414

415 Overall, the emotional responses of the 2 clusters differed significantly. The cluster of
 416 consumers receptive to claims as assessed by an increase in purchase intent in the
 417 presence of claims largely reported positive emotions more frequently than the
 418 consumers in cluster 1 (non-receptive to claims as assessed by a decrease in purchase
 419 intent in the presence of a claim).

420

421 The weight and cancer claims were selected to further investigate their impact on liking
 422 compared to the control (no claim). These particular claims were selected as they
 423 elicited the greatest number of contrasting emotions (**Figures 4 and 5**) while resulting in
 424 an increased overall purchase intent (**Table 2**).

425

426 **Consumer hedonic rating of bread rolls with or without claims**

427 Identical bread rolls were submitted for tasting by 100 consumers. They were presented
 428 with or without weight and cancer claims. **Table 3** presents the average hedonic ratings
 429 for overall liking (9 point hedonic scale).

430

431 **Table 3:** Average overall liking scores and standard deviations for bread rolls presented
432 with or without claims.

Claim	Average overall liking (n = 100) 9 point hedonic scale
Control: no claim	5.23 (1.75)
Weight	5.30 (1.68)
Cancer	5.53 (1.57)

433

434

435 Reading out claims to the participants during tasting did not impact on overall liking
436 and the rolls associated with either the weight or cancer claims produced scores which
437 were not significantly different from the control roll ($p = 0.413$).

438

439

440 **DISCUSSION**

441 While it is worth noting that the use of focus groups is exploratory in nature and was not
442 aimed at producing data which is directly transferable to the whole population or
443 directly comparable to data obtained in the survey, it is remarkable that the overall
444 feeling about health claims in the focus groups were quite negative and ranged from
445 irrelevant at best to marketing scams at worst. This echoes the findings by Lalor et al.
446 (2011a) where the theme of trust/distrust was found to be prevalent and the notion of
447 "marketing gimmick" was introduced. This is in line with the cluster distribution
448 observed from the survey whereby 73.8 % of respondents reported a decrease in
449 purchase intent for breads associated with the health claims. The strong negative
450 emotions elicited by the cancer claim in the focus groups were reflected to some extent
451 by the survey's results in which the cancer claim attracted the greatest number of
452 participants reporting negative emotions such as "patronised", "worried" and "anxious".
453 This resonates with the concept of "life marketing" and "death marketing", the
454 respective successes of which have been hypothesised to depend on the nature of the
455 claim with death marketing proving more successful in relation to physiologically
456 related illnesses such as cardiovascular diseases (or cancer in this study) than in relation
457 to psychologically related diseases such as stress (Siró et al. 2008). Despite this strong
458 negative emotion content, positive emotions remained predominant for the cancer claim
459 and overall, although there was no significant difference in purchase intents for the
460 control (no claim) and the satiety (health claim), all the other claims: weight
461 (health/appearance claim), prebiotics (nutritional claim), minerals (health claim) and
462 cancer (reduced disease risk claim) resulted in an overall increased purchase intent in
463 line with the findings of van Trijp and van der Lans (2007) who showed that the
464 presence of a health-nutrition claim increased consumer appeal across the board. This
465 increase was strongly driven by the positive reaction of a modest proportion (26.2 %) of
466 consumers (cluster 2). This lack of discrimination in purchase intents based on the
467 nature of the claims (as highlighted by a strong internal reliability); indicates that all the
468 claims measured the same underlying response from the consumer, whether this was a
469 positive or negative one. This is consistent with the findings of Ares et al. (2009) who
470 did reported a lack of significant difference between "enhanced function" and "reduced
471 disease risk" even if both resulted in higher healthiness and willingness to try ratings

472 than the control (no claim) and to some extent with the findings of van Trijp and van der
473 Lans (2007) who reported that consumer appeal did not vary strongly with claim type.
474 However these contrast with the findings of Verbeke et al. (2009) and Dean et al. (2012)
475 with the former finding that nutritional and health claims performed better than disease
476 risk reduction claims while the latter found that disease risk reduction claims were more
477 successful than benefit claims; especially when those related to a disease relevant to the
478 respondent. Following a review of consumers' perception of health claims, Pothoulaki
479 and Chryssochoidis (2009) also reported a contrasting effect of health claims on
480 purchase decisions, highlighting the fact that price and taste were often driving purchase
481 intent to a greater extent than health claims.

482

483 The absence of any trend in consumers who are “receptive to health claims” with
484 respect to age and gender has been reported elsewhere (Lähteenmäki 2013; Pothoulaki
485 and Chryssochoidis 2009; Sabbe et al. 2009; Verbeke 2005; Verbeke 2006; Verbeke et
486 al. 2009). No correlation between self-reported nutrition knowledge and purchase intent
487 was observed in this study which is in line with the findings by Lalor et al. (2011b)
488 who, overall, reported no correlation between objective nutrition knowledge and claim
489 credibility. Baglione et al. (2012) identified two consumer clusters based on their
490 purchase intents for a number of claims and reported higher purchase intents in
491 consumers who were knowledgeable about the nutrients on which the claims focused.
492 This discrepancy may come from the fact that the nutrients and claims selected for their
493 study were less common and of a more technical nature providing greater potential to
494 discriminate between consumers on this basis.

495

496 These preliminary results show that where socio-demographic parameters fail to
497 correlate with functional food purchase intent; the emotional response to health claims
498 may be one of the underlying drivers, as consumers whose purchase intent increased
499 with health claims reported significantly more often positive emotions and significantly
500 less often negative emotions than consumers whose purchase intent decreased with the
501 presence of a health claim. This may be directly or indirectly related to consumers'
502 personal or familial health history which has been suggested to impact on consumer
503 perception by van Kleef et al. (2005) and Dean et al. (2012). This would be supported

504 by a number of comments from the focus groups where the link between the cancer
505 claim, highly emotionally charged responses and relevance to self was evident.
506 Mortality salience, which is expected to be relevant to consumers' choices when faced
507 with a disease risk reduction claim, has been shown to impact differently on food
508 choices in volunteers with different sources of self-esteem (Ferraro et al. 2005).

509

510 The overall liking ratings for the bread rolls with and without health claims were not
511 statistically different indicating that the impact of health claims on tasting was minimal.
512 This has been previously reported in walnut oil enriched mayonnaise (Miele et al. 2010)
513 while others (Sabbe et al. 2009; Vidigal et al. 2011) have reported increased acceptance
514 in the presence of nutritional information. This discrepancy between our results and the
515 latter two studies may be due to an exposure effect to unfamiliar products (as the
516 session with information occurred after the no-information session in their study).
517 Another possible explanation may be that the impact of claims on liking is product
518 dependent as product x claim interactions have been reported to impact on consumer
519 perception if not on taste (Ares and Gámbaro 2007; Lähteenmäki et al. 2010).

520

521 Study limitations and future work:

522 The number of consumers in cluster 2 is borderline (n = 32) to generalise the finding,
523 additionally, for the sake of participants' comfort, actual nutrition knowledge was not
524 assessed; instead self-reported nutrition knowledge was used and while we accept that
525 there may not be a direct correlation between them, self-reported nutrition knowledge
526 has been shown to be relevant to purchase intent of functional foods (Baglione et al.
527 2012). These preliminary findings suggest that purchase intent of functional food may
528 be related to emotions elicited by health claims. Future work should focus on exploring
529 this relationship using a greater number of participants and health claims / food products
530 dyads as well as exploring the links between participants' health (and that of their close
531 family members) and their emotional responses to health claims

532

533

534 **CONCLUSIONS**

535 Qualitatively investigating in-depth emotional responses to health claims in focus
536 groups produced strong positive and negative emotions around the themes of
537 trust/distrust and relevance to self. In terms of purchase intent; claims, regardless of
538 their nature, tended to increase the overall purchase intent, however two clusters of
539 consumers (receptive and non-receptive to health claims) were identified. While they
540 did not significantly differ in age, gender or self-reported nutrition knowledge, they
541 reported significantly different emotions to health claims. Consumers who were more
542 likely to purchase a bread associated with a health claim (26.2 % of respondents)
543 reported positive emotions more often and negative emotions less often than consumers
544 whose purchase intent was decreased by the presence of a health claim (73.8 % of
545 respondents). The origin of these emotions needs to be investigated further to better
546 understand consumer response to functional food.

547

548 **CONFLICT OF INTEREST**

549 The authors do not have any conflict of interest to disclose.

550

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554

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