

# 1 **Plant-based meat packaging and consumer dietary habits**

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11

## 12 ***Abstract:***

13 Plant-based meat is still a niche category. However, interest in these products is increasing among  
14 both vegetarians and non-vegetarians who aim to reduce their meat consumption. This new situation  
15 has generated great interest, as well as new challenges. The definition of the target, choosing  
16 between vegetarians and vegans or omnivores, affects communication and the message plant-based  
17 meat brands should convey these groups, especially on the packaging. We conduct two different  
18 studies, to answer two main questions: 1) which packaging features consumers look at when  
19 making a purchase decision? 2) do visual and textual cues used by plant-based meat brands and  
20 dietary habits affect product associations? Results confirm the importance of dietary habits in  
21 affecting product associations, instead packaging has a role only when it is strongly differentiated  
22 from competitors.

23

24 **Keywords:** Packaging, communication, brand associations, dietary habits.

25

## 26 **1. Introduction**

27 Plant-based meat is still a niche category (Van Loo et al., 2020). However, interest in these products  
28 is increasing among both vegetarian and non-vegetarian consumers thanks to an increasing  
29 willingness to reduce meat consumption for health, environmental and animal welfare reasons  
30 (Hopwood et al., 2020). Previous research demonstrates that the motives to reduce meat consumption  
31 are manifold and can depend on dietary habits. The so-called “flexitarian”<sup>1</sup> does so for health, weight  
32 control, natural nutritional content, concern for animal welfare and environmental issues. In contrast,  
33 vegans and vegetarians are primarily motivated by compassion for animal welfare and the  
34 environment (Armstrong Soule and Sekhon, 2019).

35 This new situation creates great interest, as well as new challenges, for firms operating in meat or  
36 meat alternative industries. The potential for high profits and low competition renders plant-based  
37 products for omnivores. The recent introduction of plant-based burgers at leading fast-food chains

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<sup>1</sup> As explained by Armstrong Soule and Sekhon (2019), flexitarians are those who commit to eating less animal protein, thus reducing meat assumption, but without completely eliminating them from their diet.

38 such as Burger King, KFC, and McDonald's shows that they are becoming an interesting new food  
39 category and a global market phenomenon. The cooking process, for which buns are cooked on the  
40 same grills as beef patties, results in flexitarians being the primary target, because of the  
41 contamination.

42 In this sense, firms should carefully define their targets. They need to better understand what different  
43 segments are searching for and looking at during the purchasing process, in order to create an  
44 adequate product's image.

45 One of the most important tools used to communicate product's image is the packaging. Previous  
46 studies suggest that packaging plays a crucial role in product success, especially in the fast-moving  
47 consumer goods industry (Simms & Trott, 2010), where an increasing number of buying decisions are  
48 made at the point of purchase. Labelling and design elements such as size, colour, shape, imagery, and  
49 lettering all contribute to the appeal of a product and create an impression of both the product and the  
50 brand in consumers' minds (Wang, 2013).

51 Concerning the plant-based meat products' packaging, there has been much debate about labelling  
52 and naming because the use of a term such as "meat" or "burger" might be misleading. Some US  
53 states have even banned the use of meat-related terms to refer to plant-based products. On the other  
54 hand, in October 2020 the European Parliament rejected the Amendment aiming to ban names such  
55 as "steak", "sausage", "scallop", "burger" and "hamburger" referring to vegetable products  
56 (European Parliament, 2020).

57 Plant-based meat companies often use meat-related images, drawings, or symbols (i.e., a barbecue or  
58 fire) to draw consumers' attention, but there is still a scarcity of research on consumer preferences  
59 and perceptions of these different stimuli from different segments (i.e., vegans, vegetarians, and  
60 flexitarians.). Despite practitioners' interest in the area, research that investigates both omnivore and  
61 vegan/vegetarian perceptions of vegan food is scarce (Martinelli and De Canio 2021), and new  
62 research is needed.

63 Thus, in focusing on the role of packaging in driving product selection, some questions remain  
64 unanswered, and this chapter aims to address them: (RQ1) *Which packaging features do consumers*  
65 *look at while making a purchase decision?* (RQ2) *Do visual and textual cues used in the packaging*  
66 *of plant-based meat products affect product associations in vegans/vegetarians and omnivores*  
67 *differently?*

68 The chapter is organised as follows. In the first section, a literature review on the relationships  
69 between dietary habits, purchasing, and communication - packaging in particular - is presented. In  
70 the second section, we introduce the two studies we carried out to answer our research questions and  
71 the methodologies adopted. The findings of these studies follow. Finally, we discuss our overall  
72 results and discuss managerial implications for practitioners.

73

## 74 **2. Theoretical background**

75 Consumers have different motives and abilities in evaluating information depending on internal  
76 factors (such as previous knowledge of products, their eating habits) and external factors (such as the  
77 source of information, message complexity, media sources).

78 Literature about the role of information in purchasing decisions in the food industry is vast, but  
79 research focused on meat alternative products is still limited and covers only certain topics. As far as

80 internal factors are concerned, a study conducted by Vainio et al. (2018) analysed the influence of  
81 prior beliefs about red meat-based diets on consumers' responses to persuasive messages that  
82 encouraged them to adopt a plant-based diet. The authors found that individuals' prior beliefs play a  
83 key role in determining responses to persuasive messages. In particular, people are more easily  
84 persuaded by information that confirms their prior beliefs, such as the need to consume (or not  
85 consume) red meat. Regular red meat eaters have strong positive beliefs about eating meat; thus,  
86 communication through informative messages is not an effective means to persuade them to try meat  
87 alternative products because people usually want to reduce cognitive dissonance. However,  
88 informative messages were found to be effective at modifying behavioural intentions among "meat  
89 sceptics".

90 Indeed, as far as external factors are concerned, the role of the source of information was studied by  
91 Vainio (2019), who analysed the perceived influence of commercial and scientific information  
92 sources combined with a person's motivations for eating. The findings suggest that commercial  
93 information is associated with unhealthy food choices. Health purposes were usually positively  
94 associated with scientific sources and negatively associated with commercial sources; thus, health-  
95 oriented consumers were more likely to prefer information from scientific sources. To convince meat  
96 eaters or veg\*ns, the messages that promote plant-based diets need to correspond to what motivates  
97 each group to eat a given kind of product because the reasons for doing so vary. As far as messages  
98 are concerned, to persuade people to consume plant-based meat, framing that combines health and  
99 environmental motivations is more effective than health or climate messages presented alone (De  
100 Boer et al., 2014). Moreover, messages focusing on the effects of food on well-being are more  
101 convincing when framed as conditional propositions ("if ... then") rather than as factual statements.  
102 Messages focusing on the effects of meat consumption on health are more convincing when framed  
103 as factual statements rather than as conditional propositions (Bertolotti et al. 2014). Sucapane et al.  
104 (2021) found that the "plant-based" (vs. "meat alternative") descriptor positively affects perceptions  
105 of healthiness and eco-friendliness as well as trial likelihood and negatively impacts the predicted  
106 consumed quantity. Moreover, the authors demonstrated how "meat alternative" descriptors  
107 mismatched (vs. matching) with a green (vs. red) packaging colour negatively affects perceptions of  
108 eco-friendliness and trial likelihood. Conversely, the "plant-based" descriptor and matching (vs.  
109 mismatching) with green (vs. red) packaging negatively affect predicted satiety.

110 The importance of packaging in marketing strategies has been extensively studied (Krishna et al.,  
111 2017) as a communication tool to create brand identity and draw consumers' attention (Moya et al.,  
112 2020), to influence purchase decisions (Méndez et al., 2011; Clement, 2007) and to improve  
113 acceptance of a new food. Packaging can help visualise what a brand stands for in terms of values,  
114 missions, and beliefs, thus contributing to both creating and communicating brand identity. Packaging  
115 helps position a product within a specific and concrete category (Gómez et al., 2015) and differentiate  
116 a product (Underwood et al., 2001) due to an association with intangible values (Schafer, 2013).  
117 Under time pressure, packaging can be a decisive driver in shaping consumers' choices (Silayoi &  
118 Speece, 2004). As summarised by Moya (2020: 19), "both packaging attributes and purchase context  
119 characteristics act by influencing consumers' perceptions of the products, which conditions their  
120 evaluation of them and, consequently, affects the purchase decision".

121 Packaging informs, attracts, promotes, and conveys messages. It has a pivotal role in the fast-moving  
122 consumer goods industry and is one of the key factors involved in driving purchasing decisions (De  
123 Bono et al., 2003). Silayoi and Speece (2007) analysed consumer responses to packaging and found  
124 visual aesthetics to be one of the most important elements influencing a consumer's likelihood to buy.  
125 Vila-López and Küster-Boluda (2017) demonstrated that visual cues are more strongly associated

126 with young consumers' positive attitudes and willingness to buy a product than technical cues. In a  
127 study on snack food, Kim-Soon et al. (2018) found that consumers rely on visual packaging features  
128 rather than textual information during the purchase phase. Many laboratory-based studies provide  
129 evidence of how consumers' attention to packaging is influenced by simple visual features, such as  
130 colour, shapes, and labelling (Huang et al., 2021). In recent years, in line with growing consumer  
131 sophistication and higher living standards, consumers' awareness of label information has increased,  
132 along with greater attention to food safety and nutritional health (Grunert, 2017). For meat alternative  
133 products, Bryant and Barnett (2019) have shown that different product names (e.g., cultured meat,  
134 lab-grown meat, etc.) affect consumers' attitudes towards these types of products (e.g., expected taste  
135 and disgust) and their related behavioural intentions. Consumers have a more positive attitude  
136 towards in vitro meat when it is called "clean meat" or "animal free meat" instead of "lab-grown  
137 meat". They also have a positive behavioural intention when it is called "clean meat" instead of "lab-  
138 grown meat". In general, meat eaters' perceptions of plant-based food attractiveness have been  
139 demonstrated to be higher when language that describes rewarding eating experiences is used (Papies  
140 et al., 2020). Written information on packaging helps the consumer in making decisions, clarifying  
141 the characteristics of the product and its nutritional values (Wills et al., 2009).

142 These findings support the idea that effective communication must first define its target because, as  
143 suggested by Silayoi & Speece (2007), there is strong segmentation in consumer responses to food  
144 packaging. In this sense, understanding how omnivores and veg\*ns perceive plant-based  
145 communication is crucial, and in the food industry, one of the most important communication tools  
146 is packaging (Simms & Trott, 2010).

147 Due to the aforementioned role of communication, in particular regarding packaging, and given the  
148 paucity of research about how different segments may respond to plant-based meat communication,  
149 the aim of this chapter is to answer the following research questions: (RQ1) *Which packaging features*  
150 *do consumers look at while making a purchase decision?* Moreover, previous studies have not  
151 explored the differences in perceptions between omnivores and veg\*ns when they are exposed to the  
152 same packaging. Thus, our aim is to analyse which visual and textual cues are used by plant-based  
153 meat brands and understand (RQ2) *whether the packaging affect product associations in veg\*ns and*  
154 *omnivores differently.*

155

## 156 **Methodology**

157 Our research aims to understand how and to what extent different dietary habits influence perceptions  
158 of plant-based meat packaging. To investigate this topic and answer our research questions, two  
159 studies were performed:

- 160 ● Study 1: we conducted an explorative qualitative study to understand eating habits and  
161 packaging features that aim to persuade consumers to try the new food category;
- 162 ● Study 2: we tested three brands' packaging (Next Level Burger, Via Emilia and  
163 Unconventional Burger) by performing a brand associations test using the 'Brand Association  
164 Reaction Time Task' (BARTT), which enables the measurement of the frequencies and  
165 reaction times of participants' judgements as to whether or not certain words are associated  
166 with the brands appearing in front of them (Till et al., 2011). We then combined the  
167 measurement of these associations with participants' dietary habits.

168 Study 1 have an exploratory purpose. Beyond answering RQ1 it also helped us define brand  
169 associations to in the second study.

170 For the first study, 17 participants volunteered to answer questions about their dietary habits and their  
 171 knowledge of alternatives to traditional animal-based meat. Participants were recruited by word of  
 172 mouth by one of the authors who distributed a message seeking participants in an in-depth interview  
 173 about eating habits. Among the 17 participants, six were male, while the remaining eleven were  
 174 female (mean age = 23,71; Sd = 1,16). Additionally, six of the seventeen one-to-one in-depth  
 175 interviews were conducted in person, while the others were conducted online through a virtual call  
 176 (using the Zoom or Skype platform). All interviews lasted approximately 20-25 minutes, and at the  
 177 beginning of each interview, each participant was informed that the interview would be recorded and  
 178 that their name, surname and personal data would not be disclosed to third parties. Due to the  
 179 exploratory purpose of this study, participants were selected for their different eating habits:  
 180 omnivores, vegetarians, pescatarians, and flexitarians, with some intolerances. First, we collected  
 181 information on dietary habits including the participants' current or previous consumption habits,  
 182 openness to trying new foods, and food preferences. Regarding purchase behaviour, respondents were  
 183 invited to think of a supermarket scenario and were invited to share the information they typically  
 184 look for on food packaging when making a purchase decision. Henceforth, the focus of the interview  
 185 shifted to meat substitutes, and respondents were then asked if they were aware of some of so-called  
 186 "meat substitutes" to explore their knowledge and perceptions of innovative alternatives to traditional  
 187 animal-based meat products.

188  
 189 The second study analysed the frequency and strength of consumers' product associations related to  
 190 three different packaging. Recalling the concept of brand association and the idea that it can have  
 191 different strengths in a consumer's mind (Keller, 1993), we tested eight brand associations for each  
 192 one. Associations can have stronger or weaker links to consumers' memories depending on the  
 193 intensity of the connection between the association and the brand or product (Crawford Camiciottoli  
 194 et al., 2014), and these associations change according to communication stimuli (Caldato et al., 2020),  
 195 such as packaging features. To measure how strongly an association is linked to a brand, the strength  
 196 of the brand association was employed as a dependent variable and measured by the speed of the  
 197 response given as recommended by Till et al. (2021). To select the packaging used as stimuli we  
 198 analysed 7 plant-based burgers packages of brands available at the leading Italian supermarkets  
 199 (Conad, Coop, Famila, Lidl, etc.). Then, we analysed each based on the main food packaging design  
 200 elements that came up during the first study and supplemented them with other elements highlighted  
 201 in the literature (Table 1).

202  
 203 Table 1: Summary of the studies

	Research method	Unit of analysis	Respondent selection
Study 1	Qualitative – in depth interviews with explorative purpose	17 consumers	Word of mouth, based on dietary habits
Study 2 – pre-study	Secondary data – real brand packaging analysis	7 plant-based burger products available at the leading Italian supermarkets. Two of the researchers visited Conad, Coop, Famila, Alì and Lidl and collecting available	N.A.

plant-based burgers. Then they analyzed them based on 8 elements: transparent film; a picture of a traditional burger; the presence of barbecue or meat-related words; sustainability cues; nutritional elements; a “vegan” label or indication, materials, colours.

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Study 2	Quantitative - survey	277 consumers	Snowball sampling based on referrals from multiple sources. To increase veg*ns respondents the questionnaire was posted in different Facebook vegetarians’ groups and through Instagram vegetarian profiles
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206 **Findings**

207 **Study 1**

208 With an explorative purpose, Study 1 sheds light on dietary habits and purchase behaviour related to  
 209 meat consumption, attributes looked at during the purchase phase, and packaging elements that draw  
 210 attention.

211 The respondents seemed aware of the impact that meat consumption has on the planet. Most of them,  
 212 even omnivores, stated that they are trying to reduce their meat consumption and their red meat  
 213 consumption above all. The interviews revealed that the general decrease in meat consumption was  
 214 attributed to on both ethical and health reasons. Most of the respondents referred to their family’s  
 215 dietary habits to justify their (high) meat consumption.

216 “I had been vegetarian for one year; it was not easy. I gave up because  
 217 I am the only one in the family, so after one year I started to eat meat  
 218 again. [...] I remember that for Christmas lunch I had a special course,  
 219 just for me”.

220 This evidence shows that 1) dietary habits depend on childhood habits; thus, food and nutritional  
 221 education play an important role in forming consumers’ food behaviour, and 2) younger generations  
 222 are more aware of the environmental and health problems that high meat consumption can cause.  
 223 Omnivores seem to be more concerned with the second finding over the first, as it affects their  
 224 willingness to try new and different products as well as how they select meat alternatives.

225 Regarding the elements capable of drawing consumers' attention during the purchase phase, colours  
226 and images were frequently mentioned, but as primers. For omnivores, nutritional facts and  
227 information are checked to confirm their first impression, whereas for vegans or people with  
228 intolerances these are the first elements that they look for.

229 "I am more attracted to packaging aesthetics, I like simple and linear  
230 design, but first I need to check if I can eat the product" (respondent 9).

231 Respondents concerned with food's impact on the environment, or their personal health also pay  
232 attention to sustainability features such as organic certifications or proof of local (or at least  
233 national) origin.

234 To increase new food acceptance, packaging and labels are considered important but not as a primary  
235 source of information. This kind of new product requires deeper understanding, as suggested by  
236 respondent 3:

237 "Consumers can't choose by just reading the packaging. They must already be  
238 aware of the food category, especially in the case of synthetic meat. If I just read  
239 the labels, this might not be enough to change my mind regarding meat  
240 alternatives".

241 Moreover, to increase plant-based meat consumption, companies should highlight that these products  
242 are eco-friendly alternatives to meat.

243 The use of the word "hamburger" or "burger" for plant-based meat bothered some omnivores, but  
244 opinions differed on this issue:

245 "In my opinion, a 'hamburger' is meat. It's one of the things that bothers me more  
246 [about vegan/vegetarian products]" (respondent 6).

247 "I understand the logic. Calling it a 'piece of tofu/soy to grill' makes no sense.  
248 Calling it a 'tofu/soy burger' would be better. [...]. This label doesn't bother me. If  
249 they want to call it this, I think that is ok" (respondent 7).

250 Future research should further investigate this element to understand the buyer personas profiles and  
251 the reasons behind these choices. Before explaining their support for the 'hamburger' label,  
252 respondent 7 mentioned a social situation wherein a friend brought a soy burger to a barbecue.  
253 Respondent 9 mentioned their intolerance to lactose, comparing the 'burger' label to the use of the  
254 word 'milk' when referring to rice milk. Thus, we can hypothesise that having relatives or friends  
255 who consume these types of products or other "substitute" products and talk about them allows  
256 omnivores to understand the need to use common words. Food has strong symbolic meaning (Das  
257 and Mishra, 2021), and due to peer influences, people often have common patterns of food  
258 consumption (Rosenrauch et al., 2017). Food consumption and conversations provide opportunities  
259 for individuals to socialise and develop a sense of cultural identification. Therefore, using the same  
260 words to refer to similar products may act as an inclusive indicator and prevent social stigma  
261 (Bolderdijk and Cornelissen, 2022). Moreover, using the same words simply makes dialogue easier.

262 Price was identified as another important attribute of food products mentioned by the respondents.  
263 As suggested by respondent 6, "packaging sustainability is important, perhaps before the price, but  
264 only up to a certain point". Respondent 11 felt similarly: "I prefer organic products, but sometimes  
265 the price gap between organic and traditional food is so high that I give up and buy traditional  
266 products". This evidence supports previous findings about a higher willingness to pay for ethical and

267 sustainable food (Martinelli and De Canio, 2021), especially by heavy users of organic food (Wier et  
 268 al., 2008). This finding also supports Popovice et al.'s (2019) study, which suggests that  
 269 environmentally friendly packaging needs to be both convenient and environmentally friendly.

## 270 Study 2

271 The aim of this study is to investigate the effects of packaging in eliciting strong associations. Using  
 272 the 'response latency task', as defined by Till et al. (2011), we compared the strength of the  
 273 associations for three different packages. To select packages as stimuli we analysed 7 of them based  
 274 on main findings of Study 1 and the main packaging elements outlined in the literature review (e.g.,

Brand and Product Name	Transparent packaging	Traditional burger image	Barbecue or meat related words	Sustainability cues	Highlighted Nutritional Elements	"Vegan" label or indication	Packaging Materials	Packaging Colours
<i>Next Level Burger</i>	Yes	No	No	Yes	Yes	No	Paper and plastic	Green, white and brown
<i>Unconventional Burger</i>	Yes	Yes, a grilled burger	No	No	Yes	No	Paper and plastic	Black and yellow
<i>Via Emilia - Ideale Burger</i>	Yes	Yes, a hamburger	No	No	Yes	No	Plastic	Black, green and white
<i>Valsoia - Super Burger</i>	No	Yes, a hamburger	No	No	Yes	No	Paper	Green, white and gold
<i>Vegamo - Fantastic Burger</i>	Yes	Yes, a grilled burger	No	Yes	Yes	No	Paper and plastic	Green, white, black and yellow
<i>Fior di Natura - V-Burger</i>	Yes	Yes, a hamburger	No	No	Yes	Yes (indication)	Paper and plastic	Green, white and brown
<i>Vemondo - Burger Vegetali</i>	Yes	Yes, a hamburger	No	No	Yes	Yes (certificate on label)	Plastic	Green and red

275 Van Loo et al. 2020, Kim-Soon et al. 2018): transparent film allowing consumers to see the food  
 276 inside; a picture of a traditional burger; the presence of barbecue or meat-related words; sustainability  
 277 cues; nutritional elements; and a "vegan" label or indication, materials and colours (Table 2).

### 278 Table 2 - Plant-based meat packaging analysis

279

280 Transparent film on the front side is used by almost all brands, allowing consumers to see the food inside. This  
 281 is important because of the novelty of the product: having a transparent window makes the food easier to  
 282 inspect. Furthermore, except for that for the Next Level Burger, all of the packaging presents an image referring  
 283 to a grilled burger or hamburger (a sandwich consisting of a patty of ground "beef" served in a cut bread roll  
 284 with various garnishes). If hamburger images are more common, it is still interesting to note that the packaging  
 285 for Famila's *Unconventional Burger* and Vegamo's *Fantastic Burger*, on which the image of a grilled burger  
 286 prevails, places an image of bread or other typical hamburger sandwich garnishes such as tomatoes, cheese or  
 287 salad in the background. This highlights how reference to hamburger sandwiches is never lacking. Moving  
 288 further, none of the packaging shows a barbecue or any traditional animal-raised meat-related words. All of  
 289 the products highlight some form of nutritional information on their packaging: many of them indicate the  
 290 presence of vegetable fibres and proteins in their composition. Others, such as Via Emilia's, also include  
 291 gluten-free, lactose-free, soy-free, and egg-free labelling. Regarding the "vegan" label or indication, only two  
 292 packages present this information. Specifically, *V-Burger* from Fior di Natura includes a vegan indication,  
 293 while Vemondo's *Burger Vegetali* packaging presents the European V-Label certification. Regarding  
 294 sustainability cues, only a few of the packages explicitly present this type of information. Lidl's *Next Level*  
 295 *Burger* presents a carbon footprint indicator next to a QR code that consumers can scan to learn more.



296 Vegamo's packaging includes a sustainability-inspired claim: "Cambia il mondo morso dopo morso!"  
297 ("Change the world bite by bite!").

298 The packages are mainly made of plastic and paper and most often of both. However, while two of  
299 the analysed packages, Via Emilia's and Vemondo's, are exclusively made of plastic, only one, that  
300 of Valsoia's *Super Burger*, is made only of paper. Finally, in terms of colours, green is the most  
301 frequently used colour, a colour traditionally associated with nature and consequently with natural  
302 food. Black, white, yellow and golden shapes are also frequently used in contrast to green shapes,  
303 perhaps to create the impression of an innovative and disruptive product.

304 Based on this analysis we selected three real brand packages for our test: Next Level Burger,  
305 Unconventional Burger, and Via Emilia because among the analysed brands three different levels of  
306 "traditional hamburger recall" appears on them: no reference (Next level Burger), grilled burger  
307 references (Unconventional Burger) and hamburger reference (Via Emilia). Moreover, Next Level  
308 Burger appears with a minimal design with no pictures at all; instead, Via Emilia highlights the word  
309 "Plant".

310 *Fig. 1: Next Level Burger, Unconventional Burger and Via Emilia Packaging*



311

312 Then, we defined the set of associations to test based on a previous study (Stenis et al., 2017) and  
313 confirmed by Study 1: high quality, affordable, low price, tasty, innovative, natural, healthy, and  
314 sustainable.

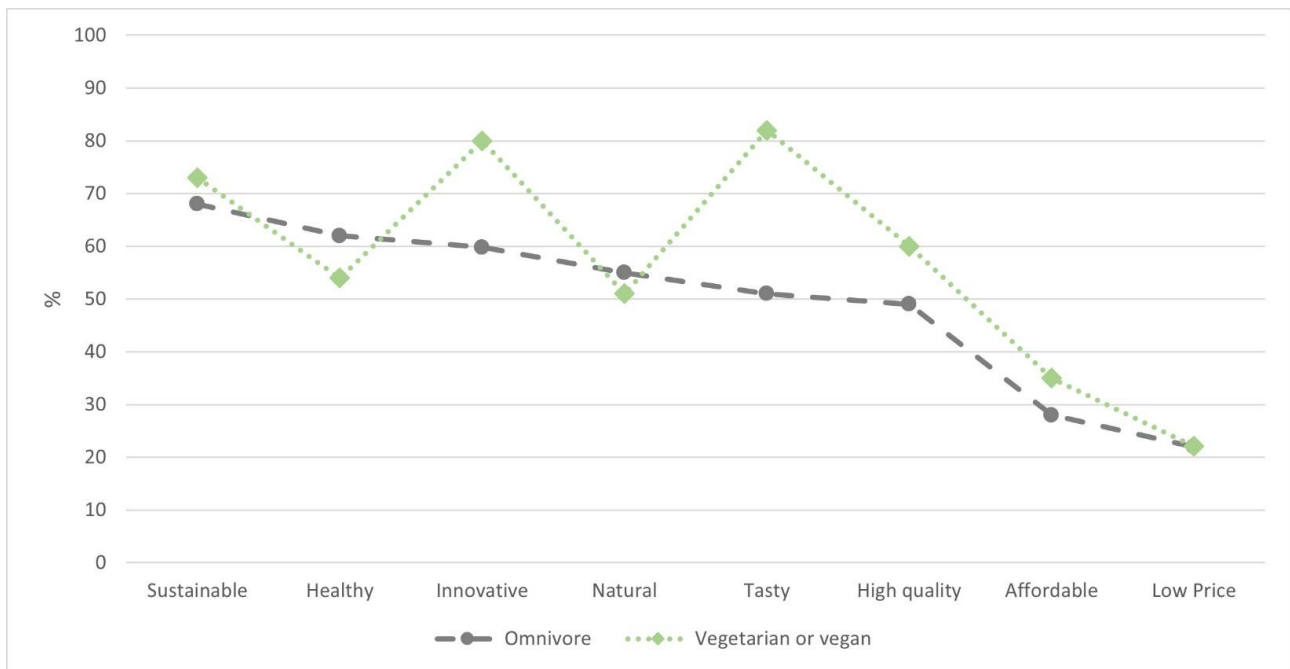
315 After defining stimuli and associations, we recruited via snowball sampling technique a sample of  
316 277 participants. We asked the participants to identify the dietary category to which they identified  
317 (151 omnivores; 126 vegetarians or vegans). The participants then engaged in a response latency task,  
318 responding "yes" or "no" to each packaging/association pair while the researchers recorded the  
319 responses (yes or no) and their reaction times (response latency). This method has been used in the  
320 marketing field (Fazio et al. 1989; Caldato et al., 2020) to test the strength of brand associations (Till  
321 et al., 2011), but to the best of our knowledge, this is the first application for testing associations  
322 related to packaging. The method measures the presence of associations in consumers' minds and  
323 their strength. According to the model created by Till et al. (2011), in addition to explicit responses  
324 (*yes* or *no*), we considered the response speed as an implicit measurement of the association strength:  
325 the faster the response to the association was, the stronger the association to the packaging was. Our  
326 procedure was based on the BARTT script provided by Inquisit 5.0.7, which enables the measurement  
327 of the frequency and reaction times of participants' judgements regarding to what extent words are  
328 associated with packaging.

329 Participants were first exposed to one of the packages for 750 milliseconds (ms). The packaging was  
330 then replaced with one of the eight associations from the association task. Participants were instructed  
331 to press a key as fast as possible while making as few mistakes as possible, including either a key for  
332 *yes* if the association described the packaging or a key for *no* if the association did not describe the  
333 packaging. As suggested by Fazio (1989), practice trials were used to familiarise the participants with  
334 the task and to achieve motor skill proficiency at a fairly constant rate. The presentation of packaging  
335 and associations were randomised to reduce any order from creating bias or association chaining.

336 Based on the theoretical perspective described above, our methodology provides a detailed analysis  
 337 of the chosen associations in terms of their frequency and strength. Frequency was defined as the  
 338 number of times an association was confirmed over the number of associations with the packaging,  
 339 as suggested by Teichert and Schontag (2010). Strength was defined as ‘the latency of response to  
 340 the brand associations’ (Fazio, 1989). The faster participants responded to the target inquiry, the  
 341 stronger the association was. For each type of packaging, we first calculated the frequency of  
 342 associations (FoA) and then calculated the strength of associations (SoA). Only the *yes* responses  
 343 were considered for the FoA and SoA (Till et al., 2011).

344 First, we analysed the average FoA (Fig. 2). “Innovative”, “tasty”, and “high quality” were more  
 345 frequently associated with plant-based meat by vegetarians or vegans than by omnivores.

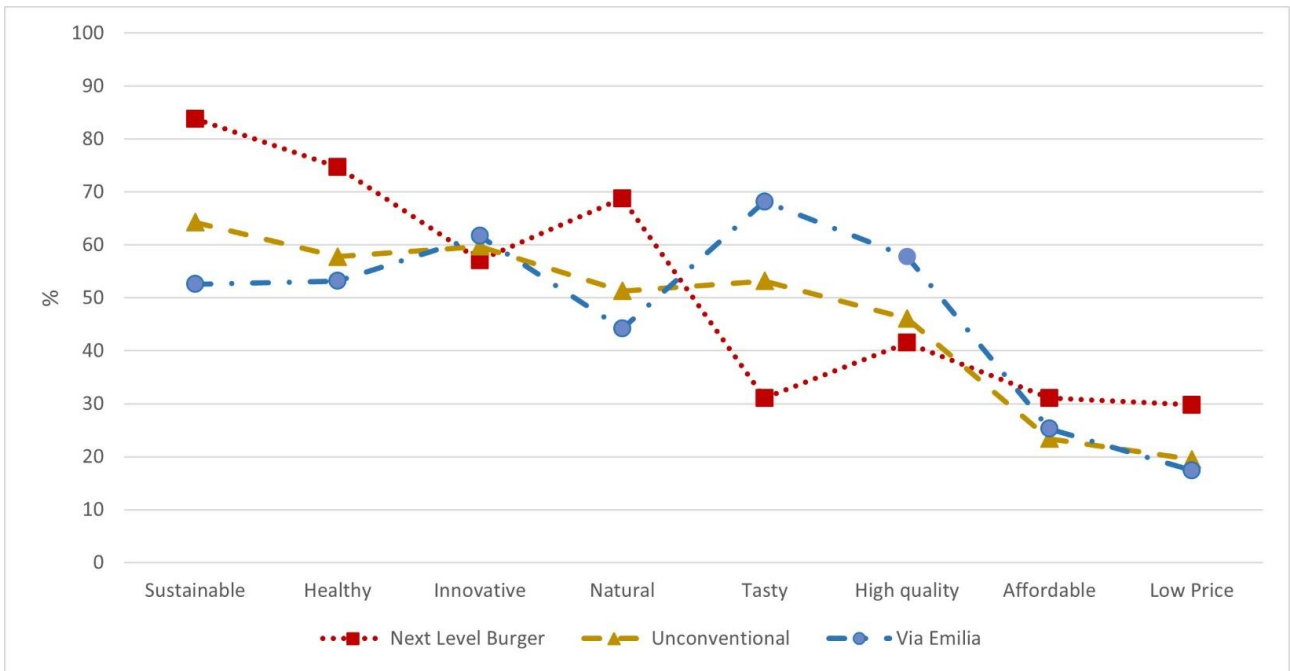
346 Average FoA for omnivores and vegetarians/vegans



347  
 348 Then, among each dietary habit cluster, we analysed the FoA to our three packages. Despite the  
 349 packaging they evaluated, associations among the veg\*n cluster were more consistent than those of  
 350 the omnivore cluster (Figs. 3 and 4). Veg\*ns showed very similar perceptions in terms of associations  
 351 between types of packaging. Only “sustainable” appears slightly lower for Unconventional Burger.  
 352 Some differences were found between Next Level Burger and its competitors for the terms  
 353 “affordable” and “low price”. In the omnivore cluster, different perceptions were found for Next  
 354 Level Burger and Unconventional Burger for “sustainable”, “healthy”, “natural” and “tasty”. This  
 355 finding supports the idea that packaging visuals can affect consumers’ perceptions of a product, even  
 356 if this effect seems to be mainly confined to omnivores.

357

358 *Fig. 3: Average FoA for each package in the omnivores cluster*



359

360 *Fig. 4: Average FoA for each package in the vegans and vegetarians cluster*



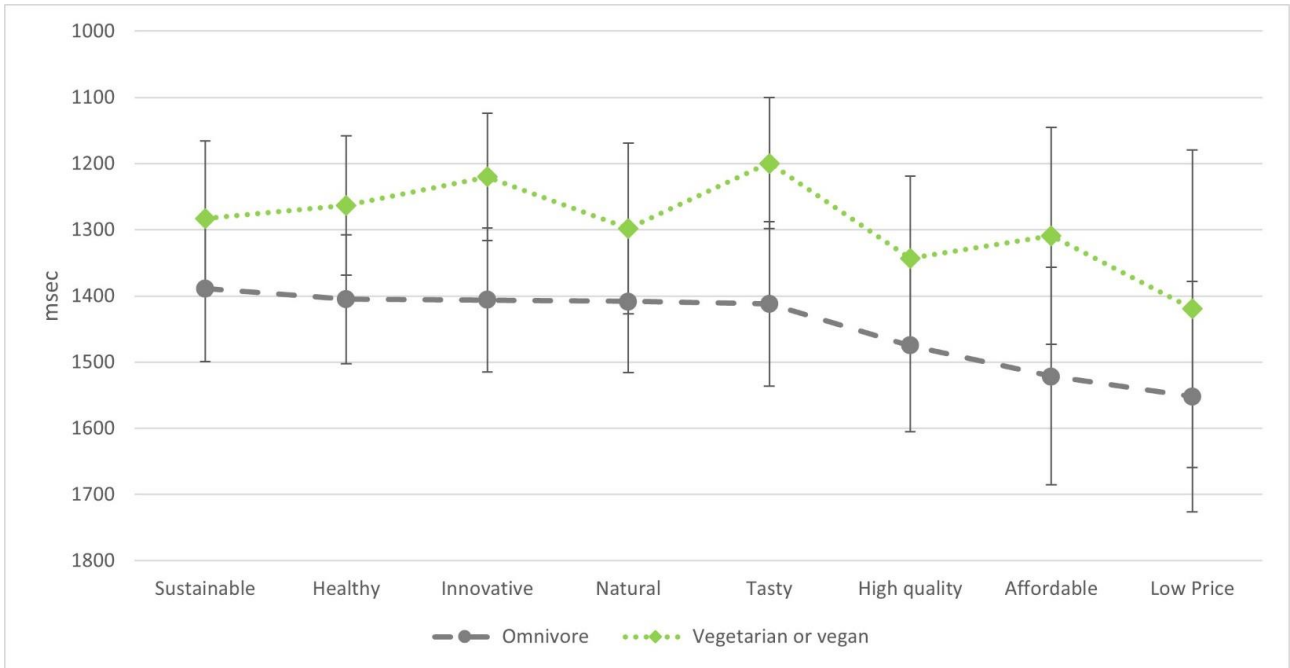
361

362 Next, we analysed the strength of associations based on the participants' reaction time (milliseconds)  
 363 to the associations themselves. Only the yes responses to the associations (FoA) were considered.  
 364 Before proceeding with the analysis, we removed outliers that were defined as response latencies of  
 365 below 300 ms and above 3000 ms (Greenwald et al., 1998). Outliers represented 2.7% of the dataset.  
 366 To test significant differences, the Wilcoxon test for paired samples was performed since response  
 367 latencies were not normally distributed.

368 For the FoA, we first analysed the average SoA without considering packaging differences (Fig. 5),  
 369 and then we split our dataset to test both packaging and dietary habits. The strength of associations is  
 370 higher in veg\*ns than in omnivores for each value. This result suggests that the images of vegetable  
 371 burgers for each value have a stronger effect on veg\*n consumers than on omnivores.

372

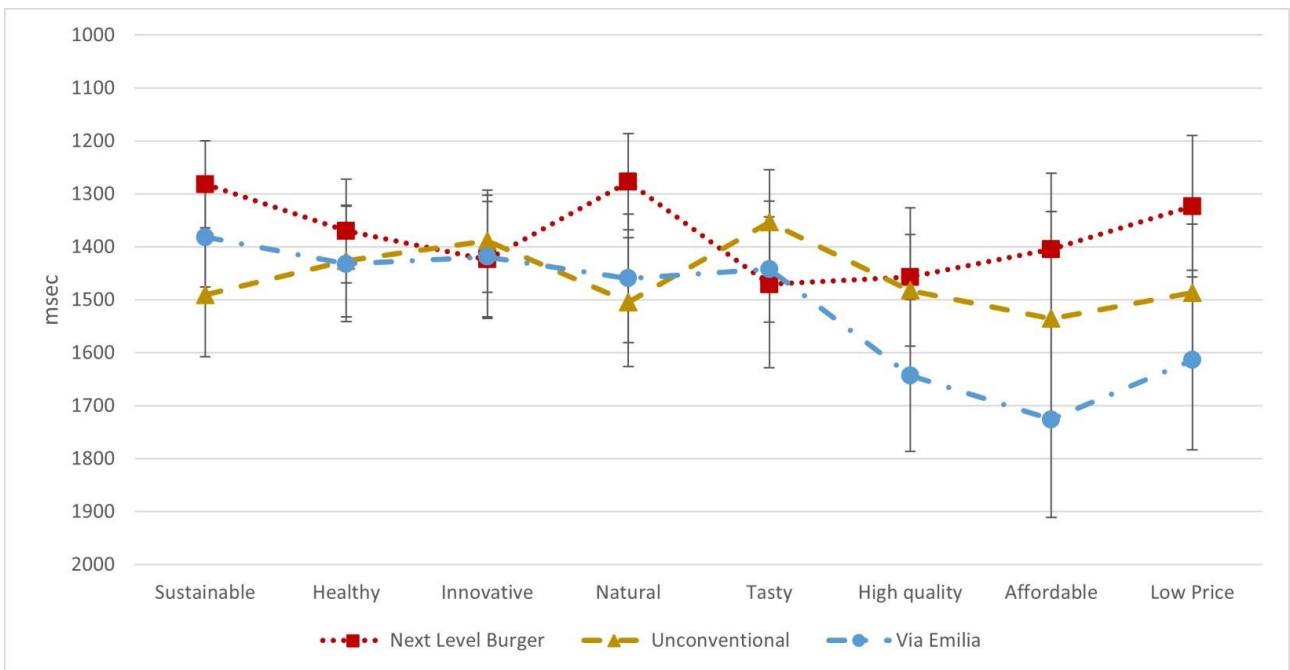
373 *Fig. 5: Average SoA*



374

375 Concerning the SoA for the omnivore group (Fig. 6), Next Level Burger better conveys the concept  
376 “Low Price” than Via Emilia ( $W = 187, p = .010$ ) and is seen as more “natural” than Unconventional  
377 Burger ( $W = 609, p < .001$ ) and Via Emilia ( $W = 1065, p = .006$ ). No other significant differences  
378 were found.

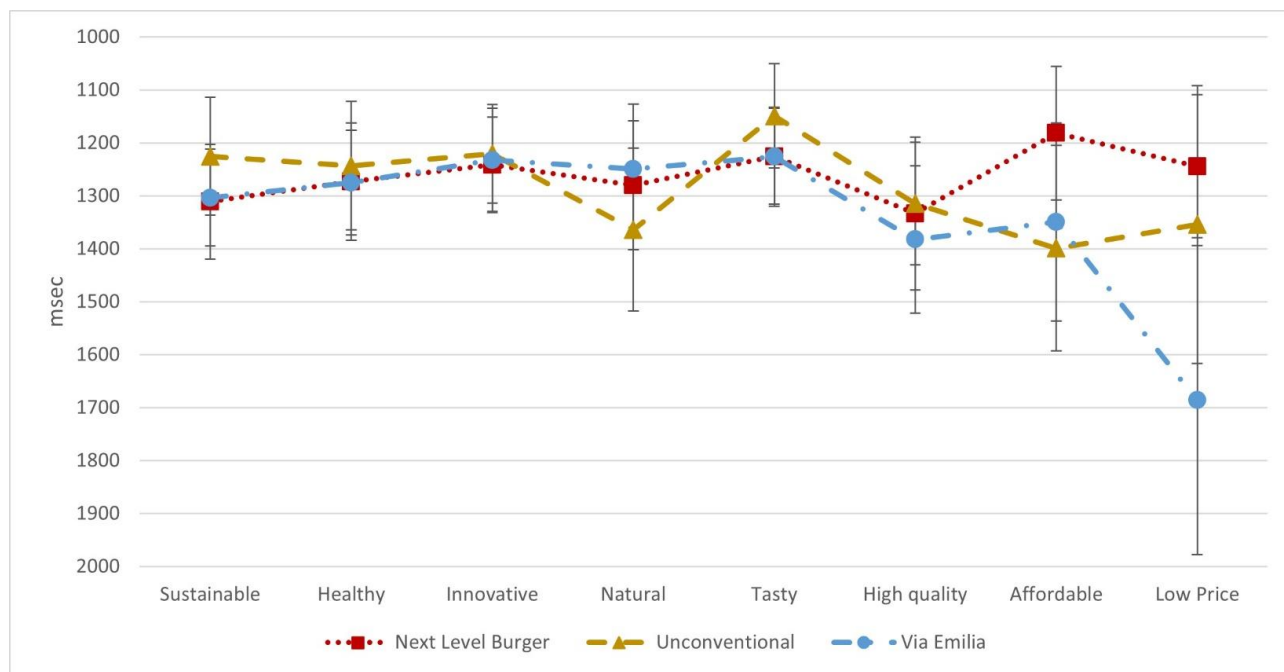
379 *Fig. 6: Omnivore SoA*



380

381 Regarding veg\*ns' SoA (Fig. 7), we do not find any noticeable differences, with the exception of a  
 382 perceived "Low price" image for Via Emilia. This difference is statistically relevant compared to that  
 383 values for Unconventional Burger (W = 192, p <.01) and Next Level Burger (W = 501, p <.001).

384 Fig. 7: Vegetarians' and vegans' SoA



385

386 In conclusion, despite their packaging, vegetable burgers are commonly perceived as "innovative",  
 387 "tasty", and of "high quality" (average FoA). These associations are statistically stronger in  
 388 vegetarians and vegans than in omnivores (average SoA). Concerning the associations with different  
 389 packaging, the main differences were found among the omnivore group rather than among  
 390 vegetarians or vegans.

### 391 Discussion

392 The purpose of this research is to shed light on how eating habits affect the evaluation of different  
 393 packaging designs of plant-based meat products. We performed two studies to first evaluate  
 394 packaging attributes that might draw consumers' attention and then to test how the frequency and  
 395 strength of associations to three forms of packaging change based on respondents' eating habit clusters  
 396 (veg\*ns vs. omnivores).

397 Overall, the findings demonstrate that dietary habits play an important role in the associations with  
 398 plant-based meat and in (declared) behaviour. From the evidence of these studies, we suggest that  
 399 depending on their eating habits, consumers behave differently and the associations of veg\*ns  
 400 consumers to plant-based meat are different from those of omnivores despite packaging visuals.  
 401 Consumers respond to packaging design in a different way, but only when packaging is strongly  
 402 differentiated.

403 Our findings contribute to the literature in several ways. Broadly speaking, we contribute to the  
 404 research on food packaging and corroborate previous studies. Our results suggest that images and  
 405 colours play the most important role in driving purchase intention, which confirms the strong impact  
 406 of packaging's visual features and sensory attributes (Kim-Soon et al. 2018). All our participants  
 407 declared that they pay more attention to visual elements than textual elements but veg\*ns also pay

408 attention to textual information, which confirms Wills et al. (2009), who found that textual  
409 information interests only a few consumers. As far as textual information is concerned, our findings  
410 contribute to the debate on the use of meat-related words to refer to plant-based meat. Omnivores  
411 surrounded by veg\*an relatives and friends are more inclined to accept the use of meat-related words.  
412 To help their friends feel comfortable, omnivores accept the use of meat-related words. This supports  
413 Bolderdijk and Cornelissen's (2022) results regarding meat-free social stigma and the related diffused  
414 sense of isolation (Bertella, 2020) and a tendency to be open to the use of such words on packaging  
415 to prevent people from giving up on reducing their meat consumption just because this implies taking  
416 a minority position.

417 Regarding associations and dietary habits (RQ2), our study demonstrates that the latter affect  
418 perceptions. First, despite their packaging differences, these products are generally considered a  
419 sustainable and healthy option for omnivores instead innovative and tasty food for veg\*ns. These  
420 associations reflect why these products are consumed: as a new and tasty alternative product for  
421 vegans and vegetarians and as a healthy and sustainable food for omnivores. Second, veg\*ns  
422 demonstrated stronger associations to all the values they judged, despite the packaging. This is  
423 consistent with the roles of internal factors and prior knowledge about products or brands that  
424 influence receivers' responses (Vainio et al. 2018).

425 As far as packaging features are concerned, we identified different design choices and no common  
426 patterns except for the need to highlight some nutritional elements and the use of transparent materials  
427 This confirm the need to test the efficacy of different solutions in presenting the plant-based product.  
428 At the same time, the use of transparency material by all the leading brands of Italian market confirms  
429 that they are pervasive in food consumption environments (Deng & Srinivasan, 2013) because they  
430 allow consumers to see a product. In the case of plant-based meat, this is particularly important, as  
431 this product category is new, and producers want to recall the appeal of meat. This choice might be  
432 effective since transparent packaging improves the product's perceived quality (Simmonds et al.  
433 2018) and brand purchase intention, especially when the product is associated with a high perceived  
434 quality risk (Sabri et al., 2020). Only a few brands communicate sustainability through their  
435 packaging, and based on our findings, product framing that combines messages about sustainability  
436 and health could increase plant-based meat consumption, corroborating Van Loo et al. (2020).

437 Our comparison of associations between the three brands' packaging demonstrates that omnivores  
438 are more influenced by packaging than the veg\*n cluster. In particular, the SoA for "natural" and  
439 "low price" changed with each brand for the omnivore group. Packaging seems to differently affect  
440 veg\*ns' associations regarding economic attributes (low price) only. The hamburger recall cue  
441 influences associations of taste for omnivores but not for veg\*ns and significantly impacts the  
442 "natural" attribute. An absence of pictures related to "traditional hamburger consumption" makes  
443 omnivores perceive a product as more natural than others. This finding is consistent with Simmonds  
444 et al. (2018), who demonstrated that consumers judge products with relatively spartan designs as less  
445 tasty, less fresh and of lower quality.

446 Our study also illustrates that plant-based meat presented with pleasant imagery is perceived as tastier  
447 and of higher quality than that presented without images, confirming that images on packaging affect  
448 consumers' perceptions and behaviours (Mizutani et al. 2010). Packaging also influences price  
449 perception: omnivores and veg\*ns judged Next Level Burger to be the least expensive option. Again,  
450 minimal design and an absence of visual cues affect quality perception.

451



## 452 **Conclusions**

453 This chapter investigates an emerging topic in the food literature: the use and role of some plant-  
454 based packaging attributes in affecting the product associations (namely, high quality, affordable, low  
455 price tasty, innovative, natural, healthy, and sustainable) of two segments (veg\*ns and omnivores).  
456 In particular, we analysed which packaging features consumers look at while making a purchase  
457 decision, and - based on how companies are using these elements on their packaging - whether dietary  
458 habits affect the resulting product associations. Two studies were performed to explore these issues.

459 Our study shows that dietary habits do affect perceptions. Despite packaging cues, associations are  
460 different between the two clusters. This is already an important information for firms operating in  
461 these and other similar markets (i.e. plant milk). Before deciding attributes to highlight and messages  
462 to convey, firms need to define their primary target. Sustainability and health associations with plant-  
463 based meat are stronger for omnivores than for veg\*ns.

464 Another finding improve the knowledge about plant-based packaging perception: the effect of  
465 traditional “hamburger recall” seems to positively influence associations with tastiness in the  
466 omnivore cluster, but it does not have any negative influence on veg\*ns.

467 This evidence should serve as a starting point in the definition of the concept of packaging. If the  
468 target are flexitarians, that are already reducing meat eating, communication should focus on taste,  
469 that is one of the reasons why plant-based burgers are left on the shelves. On the contrary, based on  
470 our results and previous findings on message persuasiveness (Vainio, 2019), brands that want to target  
471 the meat-sceptic group should improve information and visuals that support associations with  
472 sustainability and health. In fact, the improvement of these values could serve as cue to confirm  
473 beliefs that were already held in their minds. In this case, providing a direct comparison between real  
474 meat and plant-based meat in terms of sustainability and health could be a viable option. Moreover,  
475 firms need not be concerned about using visual cues related to the omnivore's diet, even if they target  
476 veg\*ns, because these cues do not affect them. Finally, minimal design and no pictures are suggested  
477 only for brands that need to support a low price positioning and aim to be the first-price product.

478 Our study has some important limitations. First, our sample is not representative of the population,  
479 and the study results cannot be generalised. Moreover, we used real brands as stimuli. A choice  
480 experiment using fictitious brands to test the different visual cues could have improved and clarified  
481 our findings. Given the novelty of this research area, there is abundant room for future research on  
482 factors affecting consumer preferences and not only brand associations. Thus, future research should  
483 investigate how different packaging features can impact not only perceptions but also purchase  
484 intentions and willingness to pay for both meat eaters and vegetarians.

485

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