

1 **Nudging, formulating new products, and the lifecourse: a qualitative assessment of the**
2 **viability of three methods for reducing Scottish meat consumption for health, ethical,**
3 **and environmental reasons**

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24 **Abstract**

25 Most governmental initiatives designed to improve dietary and planetary health have
26 adopted a light-touch informing approach. However, it may be necessary to consider more
27 direct measures that go beyond simply informing the public if the current high levels of meat
28 consumption in Scotland are to be addressed. This paper considers three possible avenues
29 through which more sustainable meat consumption patterns may be promoted: 'nudging', the
30 formulation of new meat-alternative products, and targeting those in particular stages of the
31 lifecourse. Through focus groups held in various locations in Scotland, the perceived viability
32 of these measures was explored. While each measure shows some promise for reducing
33 Scottish meat intake, the complex nature of food choice means that more qualitative
34 research into meat consumption in Scotland is required.

35 **Keywords:** meat reduction; sustainable consumption; consumer choice; nudging; plant-
36 based; lifecourse

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42 **the viability of three methods for reducing Scottish meat consumption for health,**
43 **ethical, and environmental reasons**

44

45 **Introduction**

46 High levels of meat consumption, particularly of red and processed meats, have negative
47 impacts on human health and the environment (Aston, Smith and Powles 2012; Micha,
48 Wallace, & Mozaffarian 2010; Steinfeld et al. 2006; Foresight 2011). Both problems could be
49 partially mitigated by encouraging the intake of more plant-based foods (Friel *et al.* 2014;
50 Garnett *et al.* 2015). The health case for dietary reform is particularly strong in Scotland as
51 diet-related diseases are a major cause of morbidity and mortality (Scarborough *et al.* 2011;
52 Food Standards Scotland 2015). There is however, a dearth of research specifically
53 examining meat consumption reduction in Scotland, but research into sustainable food
54 consumption suggests that dietary change is unlikely to be brought about through the use of
55 information campaigns alone (Campbell-Arvai, Arvai, and Kalof 2014).

56 A recent meta-analysis of studies reviewing consumer acceptance of replacing meat with
57 alternative protein sources report that knowledge of the environmental impact of meat was
58 limited. It is therefore unclear whether supplying this type of information to the general public
59 leads to greater willingness to reduce consumption (Hartman and Siegrist 2017). Public
60 knowledge of the welfare of slaughtered animals is also low; it may be that, for many, the
61 disassociation of eating meat from the slaughtering of animals allows them to consume meat
62 without concern for the animals (Kunst and Hohle 2016). Further, information campaigns,
63 which have traditionally formed the bedrock of governmental attempts to alter eating
64 behaviours, also have limited impact (Winkler 2013; Guthrie *et al.* 2015).

65 It has been suggested that one of the reasons that previous healthy eating campaigns (e.g.
66 food pyramid in the UK) were limited in their ability to change behaviour is that they do not

67 present their message in a manner which is easily relatable to people's lived experience
68 (Sunstein 2014). It may be that tailored approaches are more effective, if also more costly
69 (Guthrie et al. 2015). This also requires more knowledge about attitudes and beliefs of
70 consumers.

71 There are numerous ways of moving beyond simply informing consumers of the benefits of
72 eating a diet with less meat and more plant-based foods. This paper examines the possibility
73 of encouraging such a change among Scottish consumers through three commonly cited
74 intervention strategies: nudging, formulating new plant-based products, and lifecourse
75 transition interventions.

76 Nudges are interventions that "alter people's behaviour in a predictable way without
77 forbidding any options or significantly changing their economic incentives" (Thaler and
78 Sunstein 2008: 8), referring to behaviours and decisions that occur without reflection or
79 deliberate thought. Examples of nudging include simplification and framing of information,
80 and altering the physical layout of places where food is consumed or purchased.

81 It has been argued that there is a need for new plant-based products. A recent qualitative
82 study on European consumers reports food preferences in older and mixed age participants,
83 based on their perception of foods high in protein (Banovic et al. 2018). They highlight that
84 participants could not differentiate between natural sources of protein and foods with
85 enhanced (increased) protein content, no matter whether foods originated from animal or
86 plant source. Furthermore, older-age participants expressed more scepticism towards foods
87 with increased protein content than mixed-age participants. The reported main obstacles for
88 plant protein and specifically legume protein preference were lack of trust in product,
89 unethical production, bad sensory qualities in terms of product taste, as well as perceived
90 lack of healthiness.

91 This matches a common sociological approach that seeks to understand variances between
92 those of different ages. It employs the concept of the 'lifecourse', which refers to the interplay

93 between the culturally-defined stages of life that individuals in a society progress through
94 (e.g. 'childhood', 'adolescence', 'adulthood', 'old age') and the historical context in which they
95 do so (e.g. World War II, The 'BSE Crisis', Post 9/11, The Great Recession). People who
96 are at a similar stage in life, and who have lived through similar historical experiences, can
97 be expected to have certain traits and beliefs in common, though these will be mediated by
98 other factors such as gender, class, and ethnicity (Macionis and Plummer 2012). It has been
99 argued that events in the lifecourse, such as prior experiences with food, role transitions
100 such as parenthood, and changes to the food system, can influence food choice (Furst *et al.*
101 1996; Devine *et al.* 1998). Thus, rather than food consumption being simply the result of
102 fixed habits, there are times of transition whereby individuals' tastes and consumption
103 routines are more prone to change, which has implications for attempts to convince people
104 to alter their diets. (Devine *et al.* 1998). This 'habit discontinuity hypothesis' states that due
105 to the habitual nature of consumption, any times wherein these habits are subject to change
106 (i.e. during lifecourse disruptions) will be times when new habits can be formed, and people
107 are more open to new sources of information (Verplanken *et al.* 2008; Verplanken and Roy
108 2016). Alongside this, the shifting of social identity or roles associated with transition may
109 also allow for behaviour change (Burningham and Venn 2017).

110 The paper has three aims. 1. To better understand attitudes towards and practices of meat
111 consumption among particular groups of Scottish consumers. 2. To consider the extent to
112 which key drivers of change (nudging, new products, lifecourse interventions) are applicable
113 to consumers in Scotland. 3. To explore whether going beyond simply informing the general
114 public of the health, environmental, and ethical dimensions of meat consumption may bring
115 about behaviour change.

116

117 **Methodology**

118 Data were collected through eleven focus groups, which were audio recorded. Immediately
119 prior to the focus group discussions, participants were shown a range of high-protein plant-
120 based products (e.g. hemp butter, buckwheat flour, pea snacks) and took part in two
121 activities that were organised to aid discussion and are data collection techniques in their
122 own right: card sorting and word association. Asking participants to sort cards (e.g. with
123 pictures of different food products) into piles (e.g. in order of perceived 'tastiness') at the
124 start of the focus group helped participants to focus on each other rather than the moderator
125 (both during the task and in the subsequent discussion) and also helped to encourage
126 everyone to speak (e.g. by asking if they agreed with the choices made) (Kitzinger 1994).
127 This also helped to give an understanding of the thought processes that individuals go
128 through when evaluating food, and how these can be affected by their social environment. It
129 is argued that word association techniques are a relatively quick and effective method for
130 exploratory research into new concepts (Roininen, Arvola & Lähteenmäki 2006), and were
131 used in this research to understand perceptions around new food products and sustainable
132 food. This method involves using a stimulus (e.g. written description or pictures of products)
133 and asking participants to provide the first thoughts that come into their heads. Using this
134 technique, it is argued that less conscious thoughts or concepts may be accessed (Roininen,
135 Arvola & Lähteenmäki 2006). A topic guide was used to help ensure consistency across all
136 groups. The themes covered were: general thoughts on how much participants thought
137 about the food they ate, their perceptions of meat, their considerations of the
138 ethical/environmental/health consequences of the food they eat, their perception of plant-
139 based alternatives to meat, and their thoughts on dietary change.

140 Purposive sampling was used: individuals (or groups of people) were selected as they
141 appeared to address the research question and could supply the 'rich' or complex qualitative
142 data that our approach required (Draper and Swift 2011). The sample in this study was
143 selected after reviewing the existing literature on consumption of meat and plant-based
144 alternatives, feedback from food industry stakeholders, and the formulation of the research

145 themes and questions. Research was held at various sites in Scotland, with reference to the
146 Scottish Government 6-fold urban/rural residence classification (Scottish Government 2014),
147 as previous research has shown that this may be a factor in meat and meat substitute
148 consumption (Hoek *et al.* 2004). Groups were chosen based on the lifecourse approach
149 outlined below (groups 1, 2, and 3), and were identified as being at points where more
150 sustainable lifestyles may be considered (Thompson *et al.* 2011), were underrepresented in
151 research (group 4), or were hypothesised to be groups to which new products could be
152 successfully marketed (groups 5 and 6).

153 Participants were recruited through two main channels. Posters and leaflets advertising the
154 study were distributed on two university campuses and at several events. Charities which
155 worked with target groups were also approached, and several participants were recruited
156 through their networks. None of the participants in the study claimed to currently follow a
157 non-meat diet.

158 The first group identified were parents with young children. Parenthood is a 'role transition'
159 stage in the lifecourse of most individuals, and it is argued that this is a time when people
160 may be more open to changes in their diets (Devine *et al.* 1998), although such change is
161 unlikely to occur spontaneously (Laroche *et al.* 2012). However, successful interventions
162 with this group could have a positive long-term impact through instilling good food habits in
163 their children (Golan and Crow 2004). Following Bourdieu (1984), likes and dislikes for
164 certain foods are part of an individual's habitus. This is formed from a young age as food is
165 provided by parents (or other caregivers), and as children are taught to judge foods (i.e.
166 good/bad, healthy/unhealthy). This group therefore may be more willing to change, and any
167 changes may have a profound impact on their children. The first two years of life may be
168 particularly important stages during which interventions may be designed to promote good
169 dietary habits (Skinner *et al.* 2002; Nicklaus 2016). This group consisted solely of women,
170 which was not part of the research design but was due to their recruitment through a charity
171 designed to support families with young children which mainly attracted mothers. This will

172 likely have had an impact on our results, given the gendered nature of meat discussed later
173 in this section and the constraint on food choice felt by women considered in the discussion
174 section.

175 The second group comprised retirees. Consumption patterns, and attitudes towards meat
176 and plant-based alternatives, appear to be different for older people, which may also be due
177 to lifecourse variances (Gossard and York 2003; Rimal 2002; De Boer & Aiking 2011). As we
178 age, our nutritional requirements change, with less energy and more protein required
179 (Mcintosh and Kubena 2008), and older people appear to eat less meat (Gossard and York
180 2003). With recent retirees also going through a 'role transition' stage, this group might also
181 be open to increased consumption of plant-based alternatives to meat. However, we were
182 unable to recruit any recent retirees; all participants in this category had retired at least eight
183 years earlier. After completing the 1st focus group with this cohort, we analysed the data and
184 included more questions on long-term dietary choices during the discussion with the second
185 group.

186 The third group were 1st year undergraduate students living away from home. They were
187 chosen as they are also going through a lifecourse role transition, which for many will involve
188 making food choices and cooking for themselves for the first time. Younger people also may
189 be more open to ethical and environmental messages regarding their food choices, as they
190 are less likely to be sceptical about anthropogenic climate change (Poortinga *et al.* 2011).

191 The fourth group contained working class men. This group was chosen because it appears
192 to be underrepresented in previous qualitative studies into food consumption (Lea *et al.*
193 2005; Gough and Connor 2006). We decided to focus on men because meat is considered a
194 strong marker of masculine identity (Rotherberger 2013), and it was hypothesised that they
195 will be a group that is less likely to consider reducing their meat intake (Gossard and York
196 2003; Graça, Oliveira and Calheiros 2015)

197 The fifth sample group comprised regular gym users. This group was suggested during
 198 consultation with industry stakeholders, as it was proposed that people with apparently
 199 healthy lifestyles may be particularly open to the health benefits of plant-based alternative
 200 protein sources.

201 The final group were cohabiting couples with no children, sometimes called 'DINKs' (Dual
 202 Incomes No Kids). This group was recruited on the basis that they tend to have a large
 203 disposable income and may be open to trying new foods.

204

Focus Group Type	Scottish Council Area	Scottish Government 6-Fold Classification	No of Participants	Age Range of Participants	Gender of Participants
Parents	Glasgow	Large Urban Area	11	21-40	11 female
Parents	Aberdeenshire	Remote Small Town	7	21-40	7 female
Retirees	Aberdeen City	Large Urban Area	8	71-90	5 female, 3 male
Retirees	Aberdeenshire	Remote Small Town	4	71-90	4 female
Students	Aberdeen City	Large Urban Area	6	18-21	2 female, 4 male
Students	Aberdeen City	Large Urban Area	4	18-30	2 female, 2 male
Working Class Men	Moray	Accessible Rural	5	21-50	5 male

Working Class Men	Glasgow City	Large Urban Area	3	41-60	3 male
Gym Users	Aberdeen City	Large Urban Area	4	21-40	3 female, 1 male
Gym Users	Aberdeen City	Large Urban Area	4	21-40	1 female. 3 male
DINKs	Aberdeen City	Large Urban Area	4	21-40	2 female, 2 male

205 *Table 1: Information on each focus group*

206 Audio recordings were professionally transcribed and uploaded into NVivo 11 for analysis.

207 We employed thematic analysis, whereby certain reoccurring responses were identified as

208 having relevance to our research aims (Braun & Clarke 2008). First, open coding was used

209 to identify the main themes and concepts of each focus group. These were then compared

210 with previous literature and the data in order to develop more insightful and theoretically

211 sophisticated codes which were then applied to the data (a process known as indexing).

212 Further coding then took place whereby conceptual links and explanations were developed

213 (Ritchie & Spencer 1994). Coding was both inductive (i.e. codes were constructed as a

214 response to the data) and deductive (i.e. codes were derived from our focus group questions

215 and the data was fitted accordingly). An example of the former is data pertaining to shopping

216 behaviour. This was not one of the topics in our interview schedule but was spontaneously

217 discussed during the focus groups. During analysis patterned responses within these

218 discussions were identified and coded, and these went on to inform our analysis of the

219 potential utility of nudging. In contrast, deductive coding was used for data which we had

220 more explicitly asked our participants questions on, such as attitudes towards meat

221 consumption. Here, we started with a simple code “attitude towards meat consumption”,

222 which was then further inductively coded as “positive” or “negative” which then led to more

223 elaborate codes such as “positive taste” or “positive health”.

224

225 *Ethical Issues*

226 This research was approved by the Rowett Institute Research Ethics Committee, and fully
227 complies with the Declaration of Helsinki. Informed consent was obtained from all
228 participants; pseudonyms have been used.

229

230 **Results**

231 At the beginning of each focus group we invited participants to discuss how they define
232 meat, as it is a broad term with differing definitions (see Fiddes 1991). Although there were
233 some disagreements, all groups were in general accord that “meat” included red, white,
234 and processed animal flesh.

235 Resistance to calls for change from information campaigns was apparent in all groups when
236 they were asked if informing them of the environmental, health, or ethical impacts of high
237 meat consumption were likely to have any impact on their meat consumption. However,
238 there were differing reasons for disregarding the information on the impact of meat
239 overconsumption on each of these categories.

240 The health impact was generally ignored as people were sceptical as to the validity of the
241 information, or were confused due to contradictory messages:

242 Charlie (Working Class Man): They come out with that much stuff you don't know what
243 to believe...I think a lot of the research is sponsored by different companies and a lot of
244 it is influenced by the companies that are providing the money for the research and
245 there's a lot of lobbying going about with different companies to promote their
246 products.

247 Julia (Gym User): There's almost too much information sometimes, there are
248 conflicting studies done or you don't know exactly what information to believe, how
249 does it rank and that is believable, that maybe not so much.

250 As reported in an earlier study of Scottish attitudes towards meat consumption (MacDiarmid
251 *et al.* 2016), knowledge of the link between meat consumption and environmental
252 degradation was limited. The student group seemed most informed on the various problems
253 associated with livestock production. This is probably related to the fact that many of them
254 joined the study after hearing it advertised in a lecture on a course whose syllabus includes
255 environmental change. Most people, however, showed little or no concern for the
256 environmental impact of the food that they consume, and highlighted other areas where
257 greenhouse gas emission reductions could be achieved:

258 William (DINK): It's food, I don't care what the environmental impact is, it's food. If you
259 want to be good to the environment we can make savings in other areas, not food. It's
260 food. We need it to survive. We don't need petrol, we don't need diesel to survive but
261 we do need food.

262 There was concern for the welfare of animals, with most groups discussing a preference for
263 free-range eggs. However, to extend this concern to the treatment of slaughtered animals
264 was constrained by two factors. First, there was an apparent belief that welfare standards,
265 particularly of British products, were already satisfactory. Second, people equated higher
266 welfare products with more expense, and thus they would not buy them:

267 Colin (Retiree): I think generally British farming has set high standards and you know
268 yourselves when you are on the continent, the husbandry and the way that British
269 farming is set up, really is at a much higher standard.

270 Pete (Gym User): Yes, I think what a lot of these things comes down to is the cost, you
271 are going to go for a cheaper option if you can.

272 Although knowledge of the health, environmental, and ethical implications of high meat
273 consumption is limited, it is not clear that increasing public knowledge of the impact of their
274 dietary choices will be enough to stimulate change (Graça *et al.* 2014; MacDiarmid *et al.*
275 2016). Although it is vital to inform the public of the problems associated with high meat
276 consumption, the limited success of previous campaigns means that more direct measures
277 could be considered. This involves moving up the Nuffield intervention ladder and therefore
278 needs strong justification (Nuffield Council on Bioethics 2007). We discuss three possible
279 measures and the extent to which they may promote lower meat consumption in Scotland:
280 nudging, promoting plant-based meat alternatives, and exploiting lifecourse changes.

281 *Nudging*

282 Our study suggests that, for many, meat purchasing and consumption are highly routinized
283 and entail little reflection:

284 Owen (Working Class Man): I think it's just the (imprint) of just normally buying meat or
285 getting bought meat as a routine. If you are in a routine it's harder to (...) change it I
286 think.

287 Yvonne (New Parent): Yes, I suppose being younger, your mum and dad making your
288 meals and stuff is always some sort of meat on your plate. If I'd been growing up just
289 having pulses or whatever then obviously that's what you'd probably just continue
290 doing.

291 Gemma (Student): I think it's almost like everyone, a lot of people think that meat is the
292 staple of the diet, it's not really a meal unless there's meat on the plate.

293 Given this, there may be an opportunity for nudges to be developed that steer people away
294 from meat overconsumption. We consider two categories of nudge tools: simplification and
295 framing of information, and changes to the physical environment.

296 Simplification and framing of information

297 As outlined above, knowledge of the environmental impact of meat was low. However, many
298 participants did appear to take an interest in environmental food labelling, with provenance
299 labelling being the most widely used example:

300 Heather (Gym User): When I buy fruit and vegetables I do sometimes look at the label
301 to see where they've come from and think, 'Oh my God, this has come all the way from
302 Morocco!' I've got Dutch tomatoes, why can't I get British tomatoes but that's as far as
303 my thought process goes.

304 Nadia (DINK): I always go for a local label.

305 Colin (Retiree): I think we all read labels much more than we did, I think everybody
306 does, certainly in our circle of friends, read what they are buying

307 However, with reference to simplification, it appeared that while the nutritional information
308 traffic light system was clear and appreciated, other information was considered too abstract
309 or difficult to understand:

310 William (DINK): That's the thing, nobody knows... For example, strawberries, there
311 could be strawberries in the summer right next to each other, Scottish strawberries and
312 strawberries from Spain but actually the Spanish strawberries environmentally might
313 actually be better because the Scottish strawberries, they might be applying heat into
314 their tunnels, they might be using lots more chemicals, they might be doing this, that
315 and another thing... And so you have no real means of being able to tell what is more
316 environmentally friendly than another. Unless it specifically says on the label, and
317 there's very, very few things that say on the label specifically 'this is...'

318 Harry (Gym User): That's the thing – things are labelled 30% less something and it's
319 like '30% less compared to what? We've got no basis for comparison there and you
320 just get the feeling it's the same thing with 30% written on the packet.

321 How the information is framed may be a key factor in the success of environmental
322 labelling. One key reference point appears to be that food is less environmentally
323 damaging than transport. This suggests that if environmental labelling could show the
324 cost relative to, for example, a car journey, then people may start to appreciate the
325 environmental impact of the food they eat:

326 Researcher: What would examples of those [environmental concerns] be?

327 Heather (Gym User): Air travel, road travel, fossil fuels and all that kind of thing.

328 Nothing to do with food.

329 Daniel (Student): People also say that it doesn't really matter, we have CO2 production
330 which produces incredible amounts of CO2, we have cars, cities, aeroplanes,
331 factories, we burn coal to heat, what is having a few cows around is not going to make
332 the problem go away.

333 Changes to the physical environment

334 For our participants, the most significant factor appears to be the centrality of meat in
335 supermarkets. Shopping was often planned around the prominent 'meat aisle', which
336 appears to suggest that meat is the default option when shopping:

337 Harry (Gym User): In the supermarket...does everyone start with a meat...they go to
338 the meat section first and then decide what they are having from the meat section?

339 Julia (Gym User): Yes I do

340 In contrast, many of our groups commented on the fact that meat-alternatives were not
341 stocked in supermarkets, and when they were, they were often situated in aisles that they
342 rarely visited:

343 John (Student): And also the availability because they [meat alternatives] are not
344 stocked in every supermarket. I think if it's next to what you are buying in a
345 supermarket and it's a similar price you could look at it as a serious option.

346 Pauline (Retiree): I must admit in the supermarket I just wouldn't consider...I just never
347 think of going to a shelf where I would get those [meat alternatives], it never crosses
348 my mind. But having seen them I would be quite happy to give them a try.

349 *Formulating new products*

350 Apostolidis and McLeay (2016) identified six potential consumer segments, and suggested
351 that a targeted approach could help convince certain consumers to eat more meat
352 substitutes. We report that regular gym users might be one such segment. They all had an
353 interest in health and nutrition and many were interested in new forms of protein. However,
354 they were sceptical as to their value in comparison to animal-based protein sources:

355 Pete (Gym User): I was under the impression you get different forms of protein and it
356 reacts in your body differently. For me your eggs, your tuna, your chicken, that's – for a
357 muscle building thing I think I'd go for that and I couldn't imagine getting the same
358 gains from vegetable proteins. Although you probably do, I've heard people are
359 vegetarians who are in much better shape and they survive.

360 Raymond (Gym User): I think it's just easier to get a lot of protein from a meat based
361 meal than a plant based meal. If there is protein it's mainly anywhere between eight (..)
362 and twelve grams per hundred grams, whereas with meat it's about twenty-five, thirty.
363 And a lot more volume to get the same amount of protein.

364 Heather (Gym User): If I think in terms of macro-nutrients, if we are going back to the
365 protein thing, I would go for eggs next after meat. It's just easier.

366 More generally, the lack of clarity as to what certain meat substitute products were made of
367 was unattractive to some. Several participants stressed that such products were
368 unappealing due to the fact they were processed rather than 'natural'. This is a similar
369 finding to Rozin's (2005), who argued that perceived naturalness is a key factor in consumer
370 acceptance of new products:

371 Albert (Retiree): This is where the risk is with Quorn, it's factory made.

372 William (DINK): Meat substitutes, like the sausages or whatever, you are eating it and
373 you are like, 'what is this?' Like Trevor said and you said as well, if it's a vegetable
374 based meal, if it's a vegetarian meal and not an alternative in it, you know what you are
375 eating. But if it's some sausage or burger, what...am I putting in my mouth, what is
376 this? It's meat? What is this made of?

377 In addition to this, when presented with various alternative protein sources most participants
378 believed that these would be expensive and would not represent value for money. They saw
379 meat as being cheaper, more convenient, and more economical:

380 Charlie (Working Class Man): I wouldn't be tempted to replace them [meat] with them
381 [meat alternatives] at the moment because of the price and because I wouldn't really
382 know how to use them [meat alternatives].

383 Pete (Gym User): For me, like everything, it's convenience and cost and trying
384 something new which you might not like, the price of the thing and figuring out what is
385 the best way to cook it as well and what it's going to go with, it's all issues that's going
386 to take up time.

387 Hartman and Siegrist's (2017) meta-analysis found that the sensory properties of alternative
388 products are key to their acceptance or rejection by consumers. They argue for more
389 research into the perception of the sensory qualities of meat replacements, with a view to
390 emulating the taste and texture of meat. However, several participants in our study seemed
391 to reject foods that tried to mimic meat. This suggests that a more focused approach (i.e.
392 those that target specific consumer segments) is vital:

393 Heather (Gym User): I find that a bit weird, I've lived on Quorn for my vegetarian years
394 and it's like a synthetic thing, to me in my head it's not real food. It's a substitute but I
395 think why bother having a second class substitute, just have something completely
396 different like a pile of vegetables instead which you can do things with. Like Portobello

397 mushrooms, really, really meaty, that's more satisfying to me than having a meat
398 replacement that just isn't going to be as good as meat because it's not as tasty.

399 Trevor (DINK): We don't eat tofu, I don't like the texture of tofu or any of that fake
400 meat. Not a big fan of. If we're going out to restaurants sometimes I'll pick a vegetarian
401 option because it's a bit different.

402 With regards to the 'meal context' There were certain dishes that were generally seen as
403 being appropriate for incorporating meat alternatives into. Curries, chilli's and stews were
404 mentioned most frequently in this regard:

405 Iona (Gym User): Yes, I would agree with all of those examples, all of those meals that
406 you would have some veg in, I would put some veg in anyway – if I was making chilli it
407 would have peppers and mushrooms and different things. So instead of meat I'd put in
408 a aubergine and some black beans and things where I feel the meat doesn't
409 necessarily play a huge part already.

410 William (DINK): One-pot things are always the easiest things to do like a chilli, have
411 less meat and more kidney beans.

412 However, while most people were open to the idea of trying new foods, the idea of even
413 partially replacing meat was largely rejected. The reasons given reflected the '4Ns'
414 (natural, normal, necessary, and nice) of meat consumption (Piazza *et al.* 2015), and
415 suggests that a broad cultural shift would be required in order to convince large sections
416 of the population to replace meat with plant-based products:

417 Kevin (Working Class Man): Highly unlikely for myself [eating less meat], I wouldn't
418 change it, I like the taste of meat so I'm not going to – I've tried Quorn and lots of
419 different vegetarian meats but it's not that they don't taste good or anything, I just don't
420 feel they've got the same full flavour and that... it's never going to be meat.

421 Christina (Retiree): I love chicken, I like all food. I don't think I'm going to eat less,
422 sorry.

423 *Lifecourse interventions*

424 Although we were unsuccessful in recruiting any recent retirees, our discussions with those
425 who had retired offered insights into the impact of the lifecourse on long-term food
426 preferences. They spoke fondly of the foods they had as children, and claimed that they still
427 ate many of them. This suggests that early food experiences can have a lasting impact.

428 Rhona (Retiree): There's a lot of things coming back that when we were young and
429 then it went out [out] of fashion but they are coming back again.

430 Pauline (Retiree): If I'm anywhere near a butcher's shop I get liver and then have a big
431 fry up with sausages and bacon.

432 The new parents seemed particularly keen on altering their diets and were interested in
433 the benefits that plant-based meals could have over meat. However, they felt they were
434 unlikely to do so as their children and partners would resist such a change:

435 Vicky (Parent): I would like to do it [eat less meat and more plant-based foods] but I
436 couldn't see my kids...I think they would starve, I don't think they would adapt to it.

437 Yvonne (Parent): I think [her husband] would be like, 'it's not a meat – where's the
438 meat?'

439 We had hypothesised that the 1st year undergraduate students may be open to dietary
440 change as many of them may be largely or solely responsible for all food choices for the first
441 time. Furthermore, people may be more responsive to targeted interventions promoting
442 sustainable practices if they have moved house, with the effect lasting for around three
443 months (Verplanken and Roy 2016). However, despite their increased concern for the
444 environmental impact of meat there was little evidence that this led, or was likely to lead, to
445 any concrete changes in behaviour. There was also no mention of “flexitarianism” or “meat-

446 free Mondays”, which supports the argument that these approaches have yet to find
447 widespread recognition (Morris et al. 2014):

448 John (Student): it's [eating meat] something you are brought up with and to change
449 that routine of your life is quite difficult. Because I born and brought up with it but (..)
450 change when I was really young but if I tried to stop eating meat now it would probably
451 be like a million times harder because especially (when you are cooking and you had
452 to cook, you always use meat with it) and sometimes you are not taught about meat
453 alternatives and they are not as fun to cook with as meat.

454 Ian (Student): I would say that in my mind it doesn't make sense not to have meat

455 Francesca (Student): For me I guess it's what mood I'm in. I'm going into the dining
456 hall, the time that I do and it's like, 'that chicken looks really good, I'm going to eat it.'
457 It's not a matter of 'I said I'd cut down some (meat), this is the day I should cut down
458 because what if tomorrow there is a bad option of meat and my only option would be to
459 take that but if something was appealing to me I'm going to take it.

460

461 **Discussion**

462 The three aims of this paper, as outlined in the introduction were: 1. To better understand
463 attitudes towards and practices of meat consumption among particular groups of Scottish
464 consumers. 2. To consider the extent to which key drivers of change (nudging, new
465 products, lifecourse interventions) are applicable to consumers in Scotland. 3. To explore
466 whether going beyond simply informing the general public of the health, environmental, and
467 ethical dimensions of meat consumption may bring about behaviour change. In this section,
468 we take points 1 and 2 in turn, by outlining our participants' thoughts and practices regarding
469 meat and meat-alternatives before considering the specific intervention strategies that we
470 have identified. Our 3rd aim is addressed implicitly as we consider the first two points.

471 Given the broad scope of this paper, and the qualitative nature of the research, we have only
472 offered a brief overview of the three methods and their potential impact on each of our
473 consumer segments. Although our conclusions are therefore tentative, they identify areas
474 which may be fruitful for further investigation. Our findings suggest that the measures we
475 considered as possibilities for bringing about reduced meat consumption in Scottish
476 consumers show some potential, but are unlikely on their own to bring about widespread
477 change. Although it is not appropriate to generalise from qualitative research, the broad
478 consensus on certain matters (e.g. attachment to meat consumption) suggests that these
479 attitudes may remain prevalent in the wider Scottish population (Macnaghten and Jacobs
480 1997). Furthermore, many of our results are consistent with similar research conducted in
481 different countries (see Stoll-Kleemann and Schmidt 2017).

482 It appears that, for Scottish consumers, meat is generally regarded as the default choice for
483 any meal; it is eaten habitually and with little consideration of alternatives. When alternatives
484 are considered, they are generally compared unfavourably to meat. Thus, the perception of
485 meat as the default or natural option for consumption represents a major barrier. One way
486 that this could potentially be challenged is by increasing visibility and knowledge of meat
487 alternatives. Many participants in this study claimed they had little, if any, knowledge of
488 plant-based meat alternatives. Even people aware of such products' suitability as food were
489 generally unsure how they should be used. This is consistent with Lea, Crawford &
490 Worsley's (2006) finding that lack of information on alternatives was a significant barrier to
491 reducing meat consumption.

492 In addition, measures to help consumers understand the impact of high meat consumption
493 could be considered. Most participants were either ignorant, confused, or sceptical as to the
494 amount of red and processed meat that could be consumed safely and the potential health
495 effects of overconsumption. Concerning the environmental impact of red meat consumption,
496 most participants were largely unaware of, or sceptical towards, any problems. This is
497 consistent with earlier research (Wellesley *et al.* 2015; Macdiarmid *et al.* 2016; Hartmann

498 and Siegrist 2017). Although it emerged that, in accordance with Lea, Crawford & Worsley
499 (2006), arguments regarding the environmental impact of meat are unlikely to be sufficient
500 on their own to change consumption patterns, attempts to change their behaviour will
501 probably need to be supported by unambiguous information explaining why it was
502 necessary.

503 Similarly, concerns surrounding animal welfare are currently unlikely to be primary drivers of
504 behaviour change (Lea, Crawford & Worsley 2006; Thorslund and Lassen 2017). However,
505 many in this study insisted that they generally or even exclusively consume free-range eggs.
506 This may be due to the prevalence of free-range options in supermarkets, but also suggests
507 there may be opportunities for higher welfare products to succeed even when more
508 expensive. Public knowledge of the welfare of slaughtered animals is low, and an
509 information campaign targeted at specific consumer segments could impact meat
510 purchasing decisions (Vanhonacker and Verbeke 2014).

511 *Nudging*

512 However, our findings, and previous literature, suggest that information alone will not be
513 enough to bring about changes in behaviour (Ratner *et al.* 2008), and if people are to
514 change their consumption patterns it may be necessary to consider more direct approaches.
515 If the public is informed of the environmental consequences of their food choices, then the
516 use of on-pack labelling could again be considered. Systems similar to the nutritional traffic
517 light approach (Sacks *et al.* 2009), whereby the complexities of the environmental impact of
518 meat products are simplified, could be tested. Alongside the simplicity of the message, how
519 the information is framed is crucial. Given the apparent disconnect between food choices
520 and environmental impact, it may be necessary to compare meat products with better-known
521 sources of environmental pollution (e.g. this burger is equal to x car journeys).

522 The physical layout of supermarkets, with plant-based alternatives separated and placed in
523 rarely visited aisles, serves to highlight the 'otherness' of the products; marking them out as

524 not for people like them. Research into the effect of ‘protein aisles’, where meat and non-
525 meat products are stocked, could discover the extent to which this apparent barrier actually
526 constrains purchasing behaviour. However, although large food retailers in the UK supply
527 some information on sustainable consumption to customers, their main focus is still on
528 encouraging consumption through offers (Jones, Hillier, and Comfort 2011). The extent to
529 which they would engage in any attempts to reduce meat consumption is unclear.

530 It is imperative that any research into nudging includes a significant qualitative component.
531 While much research into sustainable consumption nudging has often relied on choices
532 made in controlled environments (Lehner, Mont, and Heiskanen 2016), the complex and
533 multi-faceted nature of food choice means that what holds true in controlled conditions may
534 not work in everyday life. Despite the claim that nudges work by targeting what Kahneman
535 (2011) termed System 1 (i.e. instinctive) thought, by understanding the system 2 (i.e.
536 reflexive) thinking that also goes into food choice may give a more detailed understanding of
537 why some nudges may or may not work.

538 This suggests going beyond what Shove (2010) calls the ABC (Attitude, Behaviour, Change)
539 paradigm that has been dominant in attempts to tackle climate change. This approach,
540 which locates the solution to environmental degradation in individual consumer choice, has
541 also been prevalent in attempts to tackle public health problems (Kelly and Barker 2016).
542 This ignores, and thereby tacitly promotes, the economic and cultural context in which many
543 of these decisions are made, which as Webb (2012: 119) comments creates a tension
544 between “treating people as primarily consumers, whose well-being depends on acquisition
545 of an infinite array of products and services” and “messages informing them that ‘normal
546 consumption’ is threatening well-being”. This current paradigm is as much a political decision
547 – defending the so-called sovereignty of the consumer and in turn neoliberalism – as it is a
548 choice based on the best available evidence (Shove 2010). Indeed, the evidence for the
549 efficacy of this approach is limited, especially in regard to pro-environmental behaviours
550 (Webb 2012; Capstick *et al.* 2014). Therefore, in order for large-scale dietary change to be

551 achieved the food system as a whole needs to be engaged (Ranganathan *et al.* 2016), and
552 the concept of the sovereign consumer as agent-of-change needs to be reconsidered
553 (Korczyński & Ott 2004; Johnston 2008). Qualitative research is well placed to contribute in
554 this regard, as it allows the voices of participants to be heard and the contexts in which food
555 consumption decisions are made to be better understood.

556 *Formulating new products*

557 Most participants declared an openness to try new foods. This suggests that, if products that
558 contain alternative proteins are formulated and marketed correctly, then there may be
559 demand for them. First, the products must be made appealing. While there were some who
560 regularly consumed meat alternatives and described them as tasty, and those who had tried
561 them before and found them palatable, many of those who hadn't viewed them as bland in
562 either taste or texture or otherwise unappealing. In this regard, such products were
563 compared unfavourably to meat.

564 Second, the products must be considered convenient. Our study suggests a common
565 perception that alternatives are either difficult or time-consuming to prepare in comparison to
566 meat dishes. To this end ready-made products could be developed that contain less meat
567 and more plant-based alternatives.

568 Third, such products need to be marketed effectively. Although the insistence by many that
569 price was the main driving factor in the food that they eat can be challenged, the perceived
570 high cost of alternatives can still be assumed to be a significant barrier.

571 One group that seemed particularly interested in alternative proteins was gym users. They
572 were more concerned with, and generally more knowledgeable about, healthy eating than
573 other groups and indicated they would like to learn more about the nutritional benefits of
574 eating plant-based vs meat-based proteins. If alternative protein products could be
575 developed and marketed to highlight any advantages over animal protein sources, there may
576 be a market.

577 *Lifecourse differences*

578 As discussed in the methodology section, three of the groups (Retirees, New Parents, and
579 1st Year Undergraduate Students) were selected as it was theorised that they could be at a
580 stage in their lives whereby they could possibly be more open to changing their dietary
581 patterns. In this respect, the new mothers seemed the most open to change, with the student
582 group mixed and the retirees less willing. Overall, there was little evidence of any lifecourse
583 influence on openness to dietary change. While, for some, lifecourse transitions may
584 represent periods when the potential for positive dietary change is increased, the complexity
585 of everyday life means that such a change is still unlikely. Thus, we concur with Burningham
586 and Venn (2017: 2) in their assessment that much of the work on the potential of lifecourse
587 transitions as fruitful periods for intervention “fail(s) to consider the lived experience of these
588 periods”. As with nudging, we feel that qualitative research has the potential to add much
589 needed depth to this debate.

590 While the new mothers were open to change, their ability to effect change tended to be
591 constrained by concern that their partners and children would reject any alteration to the
592 family diet. Other female participants mentioned similar concerns; the difference was that
593 many of the new mothers mentioned actively making a change to their diets, by attending
594 slimming groups, and the associated problems that had arisen as a result. Furthermore,
595 although they expressed concern as to what their children ate, most seemed to take the view
596 that they had to feed them something, and often all they were willing to eat was unhealthy
597 food. It is argued that women appreciate their role as caregiver to the family, and are
598 reluctant to put their own needs above others (DeVault 1991; Cronin *et al.* 2014). If this is
599 true then it is a potential problem for any large-scale dietary change. As women are largely
600 responsible for food shopping and preparation (Charles and Kerr 1988; Lake *et al.* 2006),
601 any attempts to nudge customers towards plant-based proteins may have limited
602 applicability unless their partners and children can be convinced to eat them.

603 However, one facet of lifecourse influences on food that shows promise for large-scale
604 dietary change is the attitudes of the retirees towards foods that they ate as children. Their
605 generally positive attitude towards such food, and insistence that they still ate much of it,
606 suggests that, although not all food habits are fixed, some preferences appear to persist.
607 While many respondents were reluctant to cut their consumption of meat, they claimed that
608 they were willing to eat some of the less fashionable cuts. However, they struggled to find
609 them. Consumption of more of each slaughtered animal may not be any better with regards
610 to health but could have an impact on the environmental footprint of the production of meat
611 for human consumption. It is suggested that such a shift could have support (Tucker 2014),
612 but the health and environmental effects need to be better understood.

613 More broadly, these enduring food preferences suggest that, if younger children could be
614 targeted for dietary change, then plant-based proteins could become a part of their food
615 repertoire. Education and 'nudging' in school dining spaces could play a part in this, as could
616 framing the eating of these foods as playing a key role in helping combat climate change.
617 One of the reasons that cheaper cuts are part of older people's diets is that during World
618 War II rationing was presented as assisting the war effort: eating novel meats became a
619 patriotic activity (Wansink 2002). With the caveat that patriotism in a time of war is likely to
620 be a more powerful force than attitudes towards the environment, similar rhetoric regarding
621 climate change may help guide future behaviour if instilled in the young. To this end,
622 research into the impact of the school meal as a site for learning about, and consuming,
623 meat alternatives should be considered (see Torres and Benn 2017).

624

625 **Conclusion**

626 Our research suggests that there is no one size fits all approach for reducing Scottish meat
627 consumption, but all of the techniques we considered have the scope for some impact.
628 However, these potential approaches often overlap: for example, new mothers may have a

629 desire to purchase more plant-based foods for their family but will not consider buying them
630 as they do not believe their families will like these products. This means that any attempts to
631 influence behaviour (e.g. by altering the physical layout of supermarkets) may have limited
632 applicability. Given the complexity of food choice decisions there is a need for more research
633 into each lever and its applicability to reducing meat consumption. We suggest that
634 qualitative research may be particularly salient in this regard, as what can appear simple
635 solutions often break down as individuals' lived experiences with food choice are better
636 understood. Furthermore, without overcoming the biggest barrier – the centrality of meat in
637 Scottish gastronomy – it is difficult to envisage how widespread reduction of meat
638 consumption could occur.

639

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643

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