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# Animal ethics profiling of vegetarians, vegans and meat eaters

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30 **Abstract**

31 The aims of this study were to identify the animal ethical profile of vegetarians, vegans, and meat  
32 eaters. Using questionnaire data collected in 2013 (N=356), we measured propensity to subscribe to  
33 five different positions within animal ethics based on a novel measure of animal ethical stance  
34 (adopted from the 'Animal Ethics Dilemma' learning tool). We found clear relationships between  
35 diet choice and ethical profile. The responses of meat eaters indicated that they were relying on a  
36 mixture of ethical positions (relational, respect for nature, contractarian, and animal rights), but  
37 predominantly the utilitarian position. Propensity to hold animal rights and relational views  
38 increased with the number of meat products not consumed by meat eaters. Vegans and vegetarians  
39 revealed more consistent animal ethics viewpoints, especially the vegan group who had a very high  
40 propensity to hold an animal rights position. Vegetarians were also inclined to hold the animal rights  
41 position, but additionally had a tendency to draw on utilitarian reasoning. Subscription to animal  
42 rights views was a defining characteristic of vegans regardless of the number of years they had  
43 followed the diet, while this was not the case for vegetarians. Contrary to expectations, the number  
44 of years a vegetarian diet had been followed was not positively associated with animal rights views.  
45 This study should be followed up in a larger and more representative population, but it is the first to  
46 attempt to quantitatively profile vegetarians, vegans, and meat eaters across a range of animal  
47 ethics frameworks. We argue that the novel approach used to assess animal ethics stance in this  
48 study could be applied to a wide range of animal related activities.

49 **Keywords:** vegetarianism, veganism, animal ethics

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53

## 54 **Introduction**

55 Abstinance from eating meat and meat products is a well-known phenomenon in Western societies.  
56 Recent polls provide varying figures depending on geographical location, but suggest that 1-9% of  
57 people identify as vegetarian in North America and Europe (European Vegetarian Union 2007;  
58 Cunningham 2009; UK Food Standards Agency 2011; Newport 2012). According to e.g. Beardsworth  
59 and Keil (1991), 'vegetarianism' can be described as a continuum of categories, with a progressive  
60 avoidance of animal derived foods. Vegans are positioned at the most extreme end of this  
61 continuum in which animal derived foods are avoided completely, while vegetarians include such  
62 foods in their diet to varying extents.

63 Motivations for following a vegetarian or vegan diet are wide ranging. They include concern for  
64 animals and animal welfare, religious beliefs, concern for personal health, concern for the  
65 environment, disgust at the properties of meat or a combination of these (reviewed in Ruby 2012).  
66 The terms 'ethical vegetarianism' (or 'moral vegetarianism', (Rozin, Markwith and Stoess 1997) and  
67 'health vegetarianism' have been proposed to characterize two separate models for the adoption of  
68 a vegetarian diet (Beardsworth and Keil 1991; Jabs, Devine and Sobal 1998). These groups differ in  
69 various ways including rate and abruptness of dietary change, attitudes to meat and range of animal  
70 products avoided (Jabs, Devine and Sobal 1998).

71 Most people at a general level care for animals and their well-being. Despite this, they are likely to  
72 maintain the use of animals for specific means that compromise animals' welfare, including using  
73 animals for food. The 'meat paradox' is supported by cultural and psychological mechanisms, which  
74 serve to reduce this conflict (Plous 1993; Loughnan, Bastian and Haslam 2014). A dominant carnist  
75 ideology (Joy 2011) facilitates the continued use of animals for food by keeping the welfare  
76 consequences of modern farming systems invisible and framing meat as normal, natural and  
77 necessary. Meat eating is also linked to masculine self-identification (Rothgerber 2013).  
78 Furthermore, the moral tension that can emerge because of the disjunction between values and

79 behavior is handled through a number of attitudinal and perceptual means. It has been found that  
80 meat eaters deny minds or ascribe diminished mental capacities to food animals (Bastian et al.  
81 2012a), view them as less able to suffer (Bratanova, Loughnan and Bastian 2011), and as less  
82 deserving of moral concern (Loughnan, Haslam and Bastian 2010), and view humans to be  
83 psychologically unique (Bilewicz, Imhoff and Drogosz 2011; Bastian et al. 2012b). Such strategies are  
84 activated to a higher extent when meat eaters are faced with vegetarians and vegetarian arguments  
85 (Rothgerber 2014b).

86 Mechanisms underlying the justification of meat eating are probably supported by values of a more  
87 general kind, and research has shown that omnivores tend to hold stronger social dominance  
88 orientations and right-wing authoritarianism than vegetarians (Allen et al. 2000). Vegetarians are  
89 also assumed to draw on an ethical framework. Fox and Ward (2008) reported that ethical  
90 vegetarians were more likely to frame their choices within a 'philosophical, ideological or spiritual  
91 framework', but apart from recent qualitative (McDonald 2000; Larsson et al. 2003; Hirschler 2011)  
92 and quantitative studies (Rothgerber 2015b), which highlight that animal rights attitudes play an  
93 important role in ethically motivated diet conversions, it is not clear whether other animal ethical  
94 frameworks are in play, or how these vary among vegetarian and vegans.

95 Sandøe and Christiansen (2008) present five major ethical principles or theories (contractarian,  
96 utilitarian, animal rights, relational and respect for nature), which provide us with answers to  
97 questions regarding animal use. The contractarian view considers only human self-interest: what is  
98 in it for oneself (and for those fellow humans on whose collaboration one depends). This view has  
99 no objections against the use of animals for anything, in principle. According to the utilitarian view,  
100 one needs to consider the interests of all affected sentient beings, and seek to produce the greatest  
101 total fulfilment of interests, thus including the welfare of the affected animals. On this view it is  
102 acceptable, for example, to raise animals for slaughter as long as their welfare is protected, which  
103 will typically mean an end to the most intensive production methods. On the animal rights view the

104 interests of all affected beings count, with an emphasis on respectful treatment, including respect  
105 for life. Furthermore, human interests do not overrule animal rights. This view will favour an  
106 abolitionist position if the integrity or rights of animals are sacrificed in any way. The relational view  
107 emphasises the nature of the human-animal relationship and the strength of the human-animal  
108 bond. This view will accept animal use as long as the human-animal bond is still maintained. In the  
109 respect for nature view the protection of species, genetic integrity, ecosystems and other collective  
110 entities matter. Here, focus will be on the effects of animal production on biodiversity where meat  
111 eating may be viewed as a problem due to the significant environmental effects of livestock  
112 production.

113 Sandøe and Christiansen (2008) note that it is possible to hold a hybrid position that is distinct from  
114 each of the main views but contains elements of each. For example, people may hold that animals  
115 have a number of very basic rights and beyond that the main concern should be on protecting  
116 animal welfare. Thus concern for animals (and by implication ethical vegetarianism) may be  
117 defended in complex ways that rely on more than one principle. For example, a moral objection to  
118 meat eating could be framed in utilitarian terms ('the welfare cost borne by the animal by an  
119 intensive method of production is not outweighed by benefits to society'), animal rights terms  
120 ('animals have a right to life and are not resources for us to use') or respect for nature terms  
121 ('modern farming is unnatural and damaging to the environment'). The link between diet choice and  
122 these specific ethical perspectives has never been investigated systematically. The aim of this study  
123 was to identify and compare the animal ethical profile of vegetarians, vegans and meat eaters. In  
124 investigating this, we also address some hitherto unexamined questions and hypotheses, which are  
125 highlighted below.

126 Some previous qualitative studies have examined vegans in relation to identity and lifestyle (e.g.  
127 McDonald 2000; Sneijder and Molder 2009; Greenebaum 2012), and the few studies examining  
128 vegan motivations suggest that a conviction to animal rights is central both in the process of

129 converting from a meat eating or vegetarian diet to a vegan diet (McDonald 2000; Larsson et al.  
130 2003; Hirschler 2011) and if the vegan diet is to be maintained in the long term (Larsson et al. 2003).  
131 A recent study supports the assumption that commitment to animal rights is central in diet  
132 conversion by showing that vegans adopt animal rights views to a greater extent than vegetarians  
133 whom in turn are more animal rights oriented than “conscientious omnivores” (defined as those that  
134 only eat meat from farms where animals are treated humanely) (Rothgerber 2015b). It is less clear  
135 whether and to what extent commitment to animal rights is needed to maintain a vegan and  
136 vegetarian diet. Since (especially ethical) vegetarianism has been portrayed as a moralization  
137 process in which the justification behind the diet continuously is reinforced (Rozin, Markwith and  
138 Stoess 1997), it is reasonable to hypothesize that vegetarians will tend to have stronger animal rights  
139 views the longer they have followed the diet. It is evident from theory and empirical studies  
140 mentioned earlier that meat eaters will have different animal ethical views compared to vegans and  
141 vegetarians. Also it seems likely that meat eaters, as a group, will be least consistent in their  
142 viewpoints. Thus, they are arguably a highly varying group stretching from conscientious omnivores  
143 in the one pole (Rothgerber 2015a; Rothgerber 2015b) to those with low universalistic values in the  
144 other (De Boer, Hoogland and Boersema 2007). Similarly, it seems probable that propensity to draw  
145 on several animal ethical positions will be higher among meat eaters. Thus, a subgroup of meat eaters  
146 will probably pay minimal attention towards animal ethics, and therefore have less developed  
147 attitudes implying that more ethical viewpoints will be drawn upon. Even though meat eaters are  
148 expected to be the most diverse in their views it is still interesting to examine which animal ethical  
149 viewpoints are associated with meat eating behavior. This can help to elucidate the mechanisms  
150 through which meat eaters become more or less attracted to a non-meat diet. Recent studies have  
151 portrayed semi-vegetarians as less negative in their evaluation of and disgust toward meat than  
152 strict vegetarians (Rothgerber 2014a). Also, conscientious omnivores have been found to be less  
153 animal rights oriented than vegetarians and vegans (Rothgerber 2015b), making it relevant to  
154 explore what ethical viewpoints are accentuated in its place among the meat eaters that abstain

155 from one or several meat derived foods. By applying an already available tool for animal ethics  
156 profiling to vegans, vegetarians and meat eaters, we employ a novel methodology to systematically  
157 examine not just adherence to animal rights views, but the balance of ethical views across five  
158 relevant frameworks.

159

## 160 **Methods**

### 161 *Procedures and Participants*

162 Data for this study were collected through an online questionnaire in May-June 2013, where a link  
163 was made available through which the questionnaire could be responded to online (via the Survey  
164 Monkey hosting system). Aiming to reach a large number of vegans and vegetarians, the UK  
165 Vegetarian Society was contacted and they agreed to promote the survey to their members via  
166 notices on their website and Twitter. In order to obtain a meat eating comparison group,  
167 participants were also recruited through social networking sites (e.g. Facebook) where invitations to  
168 respond to the questionnaire were distributed to colleagues, family and friends of two of the  
169 authors. These invitees were also asked to distribute the link and invitation to their acquaintances.  
170 The study was approved by the College of Medical, Veterinary and Life Sciences Ethics Committee at  
171 the University of Glasgow.

172 Data were collected from 423 self-selected participants. 41 participants were discarded because  
173 they did not complete the questionnaire. The remaining 382 participants were asked whether they  
174 were vegans, vegetarians, or meat eaters. Additionally, vegetarians and vegans were excluded if  
175 they did not comply with their diet (based on responses to a question about which foods they do not  
176 eat, see Table 1). Three self-reported vegans were excluded, as they responded that they eat dairy  
177 or meat, and 23 vegetarians were excluded because they reported eating meat products (primarily



178 fish). Of the final 356 participants used in analysis (see Table 1), 111 (29.1%) were self-reported  
179 vegetarians, 79 (20.7%) were self-reported vegans and 166 (43.5%) were self-reported meat eaters.  
180 Further characteristics of the sample are shown in Table 1; 62.9% were from the UK, 22.2% were  
181 from another country, and the remaining 14.9% did not report their country of origin or had mixed  
182 background. 67.7% were female and 32.3% were male, while the most typical age of the participants  
183 was 20-30 years. Clearly, the sample is not representative of the sexes and age profile across the  
184 countries. This is perhaps not surprising considering the recruitment process described that was  
185 designed to promote purposeful sampling from specific groups (vegans/vegetarians) that have a  
186 characteristic socio-demographic profile e.g. women are more often vegetarian than men  
187 (Henderson, Gregory and Swan 2002; Newport 2012). However, even among the sampled vegans  
188 and vegetarians there is an over-representation of respondents in their 20s compared to what  
189 available data suggests about the typical age of vegetarians. In the US, for instance, the prevalence  
190 of vegetarians increases in the +50 years group (Newport 2012), and in the UK, the proportion of  
191 vegetarians does not decrease with age among men even though it does so among British women  
192 (Henderson, Gregory and Swan 2002). Obviously, meat eaters in the 20-30s age bracket are also  
193 over-represented. In order to ensure that possible differences between animal ethics positions and  
194 dietary types are not confounded by age differences, we controlled for age, gender, nationality, and  
195 whether the respondent is religious or not in multivariate analyses.

196

### 197 *Materials*

198 Aiming to assess animal ethical positions among vegans and vegetarians, we made use of an existing  
199 animal ethics learning tool, Animal Ethics Dilemma, which was constructed by Hanlon and others  
200 (2007). This tool was initially developed for training in bioethics in educational programs (e.g. for  
201 veterinary undergraduates). However, since the questions that are presented to participants are

202 general in scope and, arguably, are easily understood by ordinary consumers, we assume that the  
203 tool is widely applicable. The questionnaire presents participants with questions regarding animal  
204 use. For each question there are five possible responses that are constructed so as to represent one  
205 of the five ethical views discussed earlier (contractarian, utilitarian, animal rights, relational, respect  
206 for nature). The original questionnaire consisted of twelve questions (Hanlon et al. 2007). The  
207 questions are available at [www.animaethicsdilemma.net](http://www.animaethicsdilemma.net). We presented nine of these questions to  
208 the survey participants (three questions were excluded primarily to reduce the time taken to  
209 complete the questionnaire in an attempt to maximise engagement and ensure high completion  
210 rates; they were removed in a manner which as far as possible reduced redundancy). The nine  
211 questions covered a wide range of types of animal use in society. All nine questions and the  
212 response options are displayed in Appendix A in the order that they were presented to the  
213 participants together with frequencies and percentages for the entire sample featured in the paper.

214 The vegetarians and vegans were also asked how long they had followed the diet (response options:  
215 less than 1 year, 1-3 years, 4-10 years, over 10 years, whole life). We used this measure in the  
216 analysis (the two latter response options (over 10 years or whole life) were collapsed). Possible  
217 transitions from a vegan to a vegetarian diet, or vice versa, were not measured.

218

### 219 *Data analysis*

220 In order to compare the animal ethical profile of the three dietary groups, five variables were  
221 constructed indicating the number of times each respondent gave a contractarian, utilitarian, animal  
222 rights, relational, and respect for nature response to the nine animal ethical dilemma questions. To  
223 assess tendency to hold hybrid ethical views, a variable was constructed counting how many of the  
224 five available ethical stances respondents used. For all six derived variables, we tested whether the  
225 scores in the vegetarian, vegan, and meat eating group were statistically different while controlling

226 for age, sex, nationality, and whether or not the respondent is religious. For the first five dependent  
227 variables, which all are count variables, either a linear regression, poisson regression or a negative  
228 binomial regression was used depending on which of these distributional assumptions imposed on  
229 the data that exhibited the best model fit (based on the AIC criteria). For the latter variable, an  
230 ordinal logistic regression analysis was used. For all six regressions two models were set up, making  
231 it possible to detect significant differences between diet groups: in the first model, vegans were  
232 inserted as reference group, and in the second meat eaters were the reference.

233 In order to compare the character and strength of animal rights views among vegans and  
234 vegetarians we then analysed the animal rights response data in more detail. First, we aimed to  
235 ensure that the animal rights responses to the questions were valid in the sense that people  
236 responded in an ethically consistent way across the questions. This is an important step in this study,  
237 as the animal rights responses were quite different in character (encompassing different kinds of  
238 animal use, animal species, and arguments e.g. "should not encourage" (question 3), "mere means"  
239 (question 5), "right to be here" (question 4), and no specific arguments (questions 2 and 9). We  
240 tested whether the response options conceptualized to represent animal rights options by the  
241 original developers (Hanlon et al. 2007) were also interpreted as such by the participants through a  
242 mokken scale analysis. A mokken scale analysis evaluates whether the items that are available to  
243 assess an underlying trait is cumulative (e.g. Van Schuur 2003). When a trait is cumulative in nature  
244 it means that the items can be ordered in degree of difficulty (or in endorsement) from lowest to  
245 highest, and that an affirmative response to a specific item on the scale entails that all items that are  
246 less difficult also will be responded to affirmatively. If a subset of the questions can be identified in  
247 which there is a systematic cumulative tendency for the animal rights option to be chosen (indicating  
248 endorsement), there is a very strong case for the existence of an underlying animal rights trait.  
249 Mokken proposed a measure ( $H =$  coefficient of homogeneity) to assess whether an item taps onto  
250 an underlying trait, and that items with  $H < 0.30$  should be excluded (Van Schuur 2003). We made  
251 use of this decision criterion.

252 Having identified a satisfactory animal rights mokken scale, we compared vegetarians and vegans  
253 based on their minimum values on the animal rights mokken scale (means and boxplot information),  
254 while taking into account the number of years they had followed the diet in question.

255

## 256 **Results**

### 257 *The character of animal ethical views among meat eaters, vegetarians, and vegans*

258 The average number of times meat eaters, vegetarians, and vegans opted for each of the five animal  
259 ethical views is displayed in Table 2 (denoted as mean scores in the range 0 to 9) along with  
260 information about standard deviation, and variance. Totals are also displayed.

261 The propensity to hold an animal rights view was by far the highest in the vegan group (animal rights  
262 score=6.60), and lowest in the meat eating group (animal rights score=2.14), while vegetarians had  
263 an intermediate score (animal rights score=4.82). Subsequent regression analysis (Table 3) revealed  
264 that the animal rights scores of the dietary groups were significantly different from each other.  
265 Turning to the utilitarian view, this position was highest among meat eaters (utilitarian score=4.39),  
266 lowest among vegans (utilitarian score=1.43), and again the vegetarians held the intermediate  
267 position (utilitarian score=2.65). The differences between the dietary groups were all significant. It  
268 can be seen from the totals in Table 2 that the animal rights and utilitarian responses were chosen  
269 much more frequently than the relational view, respect for nature view, and contractarian view.  
270 However, the meat eaters in particular tended to be heterogeneous, as other ethical views besides  
271 the predominant utilitarian view also were drawn upon. Thus, among meat eaters, respect for  
272 nature received a higher score (1.34) compared to vegetarians (0.91) and vegans (0.48). The  
273 contractarian view also received a significantly higher score in the meat eating group (contractarian  
274 score=0.50), while it was virtually non-existent among vegetarians (contractarian score=0.06), and

275 vegans (contractarian score=0.07). The propensity for the three dietary groups to opt for the  
276 relational view, on the other hand, was not different.

277 Generally speaking, vegans appeared to display the most consistent animal ethical position, scoring  
278 very high on the animal rights variable. Vegetarians to a higher extent exhibited a dual ethical  
279 position, the animal rights view being most prevalent followed by some tendency to draw on  
280 utilitarian reasoning. While the utilitarian principle clearly was predominant among meat eaters,  
281 they also tended to a larger extent to draw on several ethical views. Reflecting this, meat eaters on  
282 average made use of more ethical positions (3.26) than vegetarians (2.91) and vegans (2.53). All  
283 three diet groups were different from each other in this respect (see Table 3).

284 Animal ethical views were associated with the number of meat products that were consumed by  
285 meat eaters. More specifically, the animal rights score (Spearman's rho = 0.194, p 0.012) and the  
286 relational score (Spearman's rho= 0.213, p 0.003) decreased in tandem with number of meat  
287 products consumed, also when controlling for the same background factors as in Table 3. The  
288 remaining three ethical positions did not vary as a function of number of meat products eaten at the  
289 0.05 significance level.

290

#### 291 *Identifying an animal rights mokken scale*

292 Results from the mokken scale analysis revealed a well-functioning animal rights scale (H = 0.56;  
293 Cronbach's alpha = 0.83) by employment of eight of the nine questions (see Table 4). The question  
294 that did not work well on the scale was: "Do you find it acceptable that ownerless cats are being  
295 euthanized?" A likely reason for this is that the animal rights response to this question contains a  
296 sub-statement suggesting that humans in fact are entitled to put cats down under a certain  
297 condition ("No, cats have a right to life - we're permitted to euthanize them only if they're incurably  
298 ill"). This may not be appealing from the perspective of some adherents of animal rights.

299 Inspecting the remaining eight questions that form a statistically satisfactory animal rights scale (H  
300 coefficients between 0.41-0.66), animal rights statements were endorsed more frequently when the  
301 questions presented situations in which the purpose of the action arguably was not of vital  
302 importance and the action undertaken towards the animal in question was a major welfare insult  
303 (“killing wild rats with slow functioning poisons”) or had terminal consequences (“euthanasia of  
304 surplus animals in zoos”).

305 The questions that generated fewer animal rights responses at the other end of the scale consist, on  
306 one hand, of situations in which there were rather important human gains (“use of genetically  
307 modified animals as models for serious human diseases such as cancer” and “toxicological studies  
308 using animal testing”). The other type of questions generating fewer animal rights responses  
309 consisted of situations where we were dealing with companion animals and there were arguments  
310 appealing to animal health or arguments appealing to the ability of animals to function in a natural  
311 way speaking against the action undertaken. Thus, a majority of participants rejected “Breeding dogs  
312 according to fashion” on utilitarian grounds (“extreme breeding goals typically lead to less healthy  
313 animals”) or respect for nature (“these dogs are highly unnatural and typically cannot reproduce”).  
314 At this end of the scale, it was only the very principled animal rights defender who adhered to a very  
315 clear animal rights view that would not allow humans to keep animals as companions (“should not  
316 encourage that animals are things for us to consume”). It should be noted that keeping of animals as  
317 companions is a divisive issue among adherents of animal rights (against – Francione 2012; pro –  
318 Regan 1984). A similar effect was apparent when it came to the issue of “cloning valuable race  
319 horses”, so that the animal rights perspective (that it is wrong to treat horses “as mere means”) was  
320 less frequently opted for, except among the most convicted animal rights participants whereas the  
321 rest in this group seemed to accept that horses can be kept by humans.

322 The latter three columns of Table 4 display the extent to which the animal rights option was chosen  
323 for all three dietary groups. The cumulative nature of the scale, as identified in Table 4, by and large,

324 was retained for all groups. Thus, the question regarding “euthanasia of surplus animals” received  
325 the most prevalent animal rights response after which there was a systematic decrease in the extent  
326 to which the animal rights response was chosen. The only serious deviation from this order occurred  
327 in the meat eating group, where the question relating to slaughtering and producing meat (“Is it ok  
328 to keep animals for slaughter?”) received the lowest animal rights response of all questions (7.2%),  
329 while it was the 3<sup>rd</sup> most frequent animal rights response according to the mokken scale analysis.

### 330 *Differences in animal rights views among vegetarians and vegans*

331 When summing responses to the mokken scale items to a total animal rights score, there was a  
332 statistical significant difference between the two groups, as the mean score for vegetarians is 4.40  
333 (SD=2.19) and for vegans 6.03 (SD=1.48) (linear regression results: Wald  $\chi^2$  17.45; df. 1;  $p < 0.0000$ ).  
334 This is a quite substantial difference. Indeed, Cohen’s  $d$  is 0.87, which amounts to a medium to large  
335 effect size (Cohen 1992). Furthermore, when looking at the minimum level of animal rights  
336 conviction in the two groups, a defining characteristic of the vegans was revealed that set them  
337 apart from others (including vegetarians). Thus, vegans always exhibited a certain level of animal  
338 rights conviction, scoring at least 3 points on the mokken animal rights scale. Such a minimum level  
339 was not observed among vegetarians, where a substantial proportion (17.1%;  $n=19$ ) scored below 3  
340 (data not shown). This characteristic even holds for vegetarians that have followed the diet for more  
341 than 10 years. The distribution of the animal rights mokken scale among vegetarians and vegans  
342 given the number of years the diet has been followed is outlined in the boxplot shown in Figure 1.  
343 Indeed, the animal rights score did not relate to the number of years a vegetarian diet had been  
344 followed, neither before (linear regression results: Wald  $\chi^2$  0.142; df. 1;  $p < 0.70$ ) nor after  
345 controlling for gender, age, nationality, and religiousness (linear regression results: Wald  $\chi^2$  0.309;  
346 df. 1;  $p < 0.58$ ). Propensity to hold animal rights views among vegans, on the other hand, was related  
347 to the number of years the diet had been followed (linear regression results: Wald  $\chi^2$  4.25; df. 1;  
348  $p < 0.039$  when controlling for background factors). More specifically, vegans who followed the diet

349 for between 0-1 years scored significantly lower (5.09) compared to those who had followed the diet  
350 for longer (6.18).

351

## 352 **Discussion**

353 This study is the first to directly measure adherence to a range of principles in animal ethics among  
354 vegetarians, vegans and meat eaters. Previous research has focused on adherence to animal rights  
355 views alone (McDonald 2000; Larsson et al. 2003; Hirschler 2011; Rothgerber 2015a), or examined  
356 how eating practices are linked to views on animal sentience and ways of dealing with cognitive  
357 dissonance (e.g. Plous 1993; Bilewicz, Imhoff and Drogosz 2011; Bastian et al. 2012b; Loughnan,  
358 Bastian and Haslam 2014). A profiling tool was applied that allowed us to take a broader approach  
359 to understanding the ethical motivations of vegetarians, vegans and meat eaters. The results  
360 confirm our overall hypothesis that the animal ethical views of vegetarians and vegans are different  
361 from those of meat eaters. The latter group tend to draw on a range of animal ethical views,  
362 especially utilitarian reasoning. Consistent with expectations (McDonald 2000; Larsson et al. 2003;  
363 Hirschler 2011; Rothgerber 2015b), we also found that vegans and vegetarians differ in the degree to  
364 which animal rights views are adopted where vegans have a significantly higher prevalence of  
365 responses expressing an animal rights position. We add to this by showing that vegans tend to  
366 consistently use animal rights reasoning, which demonstrates that this ethical position is an area of  
367 commonality for the dietary group. Our results also show that some vegetarians have no animal  
368 rights tendencies at all. Since it is known from earlier research that some choose a vegetarian diet  
369 for health reasons rather than ethical reasons (e.g. Jabs, Devine and Sobal 1998; Stiles 1998), a likely  
370 explanation for this is that our sample contained some health vegetarians, who will tend not to  
371 subscribe to the animal rights position. Unfortunately, this group cannot be identified from the  
372 present data. Interestingly, even among vegetarians that have followed their diet for more than 10  
373 years, animal rights convictions may be completely absent. As the study data is cross-sectional we



374 cannot say anything conclusively about the nature of this non-relationship. It could possibly be  
375 accounted for by the health vegetarians in the sample. Motivation for turning to a vegetarian diet  
376 may also change over time. Nevertheless, this finding should be seen in the light of the assertion laid  
377 out by Whit (1998) and identified empirically by Stiles (1998) and Fox and Ward (2008) that over  
378 time, vegetarians strengthen their beliefs and motivations for eating a vegetarian diet and also  
379 integrate further arguments and values to facilitate this. Our results may indicate that the  
380 developmental trajectory of vegetarian values does not lead to adopting stronger animal rights  
381 views. Propensity to hold the utilitarian view was not different across vegetarians who had followed  
382 the diet for a different number of years (data not shown). This apparent stability in animal ethical  
383 views is a surprising finding, and it highlights the importance of longitudinal studies examining  
384 developments in values and attitude strength.

385 Animal rights scores among vegans, on the other hand, were different according to the number of  
386 years the diet had been followed. Notably, vegans that recently adopted their diet (0-1 years) had  
387 lower animal rights scores than those more established in this lifestyle. Given the nature of this  
388 cross sectional study, we are not able to identify the cause of this. It could be the case that time  
389 spent as a vegan increases animal rights conviction. Conversely, the explanation could be that the  
390 initial strength of the participants' animal rights views has a positive influence on the duration of  
391 adherence to the vegan diet. This would imply a survivor effect so that only those most dedicated to  
392 animal rights continue a vegan diet, which is notably harder to follow, and which involves more of a  
393 sacrifice than others forms of diet. As noted by Rothgerber (2015b), if animal rights are highly  
394 endorsed it is easier to adhere to a vegetarian (and by implication vegan) diet and it is more  
395 emotionally burdensome to violate the diets' prescription.

396 Compared to vegetarians and vegans, meat eaters relied on a wider range of ethical frameworks,  
397 and were the most varied group. This is likely to be because they are less animal focused than those  
398 who purposefully avoid eating animal products. However, it deserves mentioning that the

399 contractarian viewpoint was modestly represented. Considerations of animal welfare are therefore  
400 quite prevalent in our sample of meat eaters. This mimics other population-based studies showing  
401 that the majority of people try to find a middle position and balance human benefits against concern  
402 for animals (Rehbinder et al. 2009). Interestingly, propensity to hold animal rights and relational  
403 views increased with the number of meat products not consumed by meat eaters. The increased  
404 support for animal rights seems to fit a larger trend throughout this study, according to which the  
405 propensity to support animal rights is more pronounced the fewer types of meat a person consumes  
406 (see also Rothgerber 2015b). The additional finding that a reduction in meat types consumed was  
407 related to the propensity to hold the relational view is very interesting, as it can be taken to suggest  
408 that the process of phasing out meat consumption (at least when this is done because of ethical  
409 concerns) is not solely supported by adherence to animal rights. It would be important to pursue  
410 these ideas in a future, larger study where it also would be relevant to understand why the relational  
411 stance appears to play an intermediate role, and not the utilitarian viewpoint, which otherwise is  
412 very dominant. Here it deserves to be mentioned that we only measured meat consumption as  
413 number of animal foods consumed. Arguably, ethical propensities among meat eaters may also vary  
414 as a function of the amount of meat consumed (in kg) or the farming principles (conventional, free  
415 range, local, organic, etc) behind meat products purchased. Finally, all diet groups in the mokken  
416 scale analysis showed a similar ordering of animal rights responses except in the question where  
417 animals are used for food where meat eaters deviated. This is hardly surprising, as otherwise meat  
418 eaters would be in a state of dissonance (Plous 1993; Loughnan, Bastian and Haslam 2014).

419 Our study is the first that significantly refines our knowledge of the ethical motivations of  
420 vegetarians and vegans by providing an insight into the precise animal ethics frameworks (and their  
421 combinations) that are relied upon by groups with differing dietary choices. Furthermore, a broad  
422 range of contexts of animal use (adopted from the 'Animal Ethics Dilemma' learning tool) were  
423 employed to assess animal ethical positions. We consider that a strength of the study, because it  
424 shows that animal ethical views are general and traverse various areas of animal use. It should be

425 noted that the forced choice design of the employed tool both has advantages and disadvantages.  
426 The disadvantage is that the ethical frameworks are not independent of each other. When  
427 participants respond in accordance with a particular view it will by definition produce lower scores  
428 on other views. The advantage of this approach is that it mimics how actual arguments may compete  
429 with each other in actual deliberations and decision making processes.

430 There was an over-representation of participants in the 20-30's age groups (across all diets), which  
431 almost certainly relates to the use of social media for recruitment. Also, there were many more  
432 female than male vegetarian and vegan participants. This ratio agrees with strong and consistent  
433 evidence that women are more likely to be vegetarian than men (reviewed in Ruby 2012), but may  
434 also be biased to an unknown extent by our purposeful sampling of these groups and the routes for  
435 recruitment (social media and a vegetarian society). We tried to account for this by controlling for  
436 age as well as gender whenever possible. We do not think that the age misrepresentation flaws the  
437 study results beyond the trivial level. Given the very ideological character of vegetarianism and  
438 veganism, where attitudinal viewpoints on most accounts arguably must be in place before diet  
439 conversion (Rozin, Markwith and Stoess 1997; Jabs, Devine and Sobal 1998; Greenebaum 2012) it  
440 certainly appears probable that age is not a critical explanatory factor of the animal ethical  
441 differences observed within and between these two diet groups. Indeed, the results in Table 3 show  
442 that participant age did not affect propensity to exhibit any of the animal ethical views.

443 The recruitment of vegans and vegetarians through the UK Vegetarian Society, which stresses  
444 dialogue and cooperation with non-vegetarians, may have affected the likelihood of including people  
445 who do not share this philosophy and instead fight for the animal rights cause by other means. An  
446 effect of this could be that the animal rights propensity was underestimated. Plous (1991) showed  
447 that animal rights activists differ from non-activists as they have a higher propensity to value  
448 nonhuman life at or above the level of human life. However, it was noted by Rothgerber (2014a),  
449 who also used a vegetarian website for recruitment, that the resulting sample may have over

450 represented 'committed vegetarians' – those that seek communication and support from others  
451 sharing their dietary habits. However, the meat eating comparison group may be poorly  
452 represented in the study. Indeed, assuming that there is large diversity within meat eaters and  
453 considering the relatively small sample size and modest age variation of this group in our study this  
454 is quite probable. It should also be noted that since recruitment was initiated by inviting colleagues  
455 and friends of two of the authors, the sampled meat eaters might also deviate in their views from  
456 other meat eaters (e.g. because they were more highly educated, similar to the authors). We doubt  
457 that this invalidates the very clear finding that meat eaters subscribe less to animal rights and more  
458 to utilitarian views than vegans and vegetarians. It would have been preferable to take education  
459 into account in the employed analyses. However, the question educational response categories  
460 offered to respondents were unfortunately only applicable to UK based participants. We therefore  
461 chose not to insert this variable in multivariate analyses. But extra analyses carried out only on the  
462 UK participants reveals that statistically significant differences between diet groups laid out in Table  
463 3 did not change character when additionally controlling for education (except in one instance, as  
464 the differences between omnivores and vegetarians regarding respect for nature becomes  
465 borderline significant ( $p=0.069$ )). Even though this is encouraging, caution should nevertheless be  
466 exercised regarding interpretations of the meat eaters' animal ethics scores. This small-scale study  
467 demonstrates a novel approach to animal ethical profiling with a validated question set. Further  
468 work with a larger and more representative sample population is required to confirm if the results  
469 seen here apply to the wider population of vegetarians, vegans and meat eaters. Our approach  
470 could also be extended to other groups of interest to quantify attitudes to animal related activities  
471 across a wide range of topics.

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479

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**APPENDIX A: Overview of the nine questions concerning animal ethics in the order of which they were presented to the participants (with frequencies and percentages)**

	<b>Animal Rights</b>	n	%	<b>Utilitarian</b>	n	%	<b>Relational</b>	n	%	<b>Respect for Nature</b>	n	%	<b>Contractarian</b>	n	%
<b>1. Is it ok to keep animals for slaughter?</b>	No, because animals should not be kept and killed only to satisfy humans	167	46.9	Yes, if they are kept and slaughtered in a welfare friendly way	138	38.8	Yes, but I prefer small scale production where you can relate to the individual animal	29	8.1	Yes, if the production doesn't harm the environment	15	4.2	Yes, because animals and their products are ours to eat	7	2.0
<b>2. What do you think about toxicological studies using animal testing?</b>	Such studies should be banned	123	34.6	I can accept it for very important compounds or medicines, if it is the only way to get the results and the animal's pain and suffering is kept to a minimum	189	53.1	I can accept using mice and rats, but I can't accept using dogs	13	3.7	I can accept the use of animal testing when the animals have been specially bred and raised for that purpose	14	3.9	I'm glad chemical substances have been tested so we know that they are safe	17	4.8
<b>3. Is it acceptable to breed dogs according to fashion – for example, so that they become very small?</b>	No, we should not encourage the attitude that animals are things for us to consume	96	27.0	No, because extreme breeding goals typically lead to less healthy animals	181	50.8	Yes, as long as we can relate to these dogs	3	0.8	No, these dogs are highly unnatural and typically cannot reproduce without caesareans	71	19.9	Yes, as long as there is a market for these dogs	5	1.4
<b>4. Do you approve of killing wild rats with slow functioning poison?</b>	No, we all have a right to be here and share this planet, and if pest animals cause a real danger to us we must kill them quickly and efficiently	237	66.6	Yes, provided this is the only means to keep the rats away from us – as it often is	88	24.7	Yes, pests and vermin are disgusting	18	5.1	Yes, it is OK since brown rats are plentiful and pose a danger to other species	11	3.1	Yes, these animals are annoying, so why not eradicate them with all possible means?	2	.6
<b>5. Do you accept the use of genetically modified animals as models for serious human diseases such as cancer?</b>	No, I don't approve of using animals as a mere means to our ends – however important these ends or purposes may be	144	40.4	Yes, if that really is the best way to gain new knowledge about these diseases, and if great care is taken to prevent the animals from suffering	173	48.6	Yes, I can accept using mice and rats, but not dogs and monkeys	13	3.7	Yes, as long as these animals are closely confined and may not end up in nature	16	4.5	Yes, by all means	10	2.6
<b>6. Do you find it acceptable that valuable race horses are being cloned?</b>	No, this is a sign of lack of respect for the horses, treating them as mere means	69	19.4	No, cloning can lead to negative side-effects that may cause mothers and offspring to suffer; and there is no serious human benefit	146	41.0	No, it could lead to a similar treatment of humans	11	3.1	No, it is against nature to clone, and animals should be allowed to reproduce in a natural way	90	25.3	Yes, there is a market for cloned horses for breeding purposes	40	11.2
<b>7. Do you approve of the euthanasia of surplus animals in a zoo – e.g. lion cubs?</b>	No, killing of animals can never be justified. Neutering of the lionesses could be an alternative, although the lionesses' right to reproduce could be debated	264	74.2	Yes, then the lionesses will experience the motherhood, which is good in animal welfare terms, and the audience, especially the children, will feel the joy of watching lion cubs in the zoo	11	3.1	No, if this happens it could lead to similar treatment of humans	11	3.1	Yes, reproduction is a part of the lionesses repertoire of behaviour and there is nothing unnatural about the death of some of the offspring	65	18.3	Yes, then (until they are euthanised, at least) there will be lion cubs to watch in the zoo	5	1.4
<b>8. Do you find it acceptable that ownerless cats are being euthanised?</b>	No, cats have a right to life – we're permitted to euthanise them only if they're incurably ill	148	41.6	Yes, it may be necessary if there are too many cats in an area	81	22.8	No, cats are our friends – ownerless cats should be re-homed	95	26.7	Yes, cats are domestic animals and may harm wild birds	26	7.3	Yes, cats can be a nuisance	6	1.7
<b>9. Are you against hunting?</b>	Yes, we should not kill healthy animals	165	46.3	Not in all cases. It may be a good way of controlling a population and thus secure better welfare for wildlife. Also, it may be a way to get meat from animals that had good lives	131	36.8	No, this is a good way of sharing life with dogs and wildlife	1	0.3	No, unless the animal is of an endangered species or the hunting has a negative effect on the ecosystem	55	15.4	No, it is a good sport	4	1.1

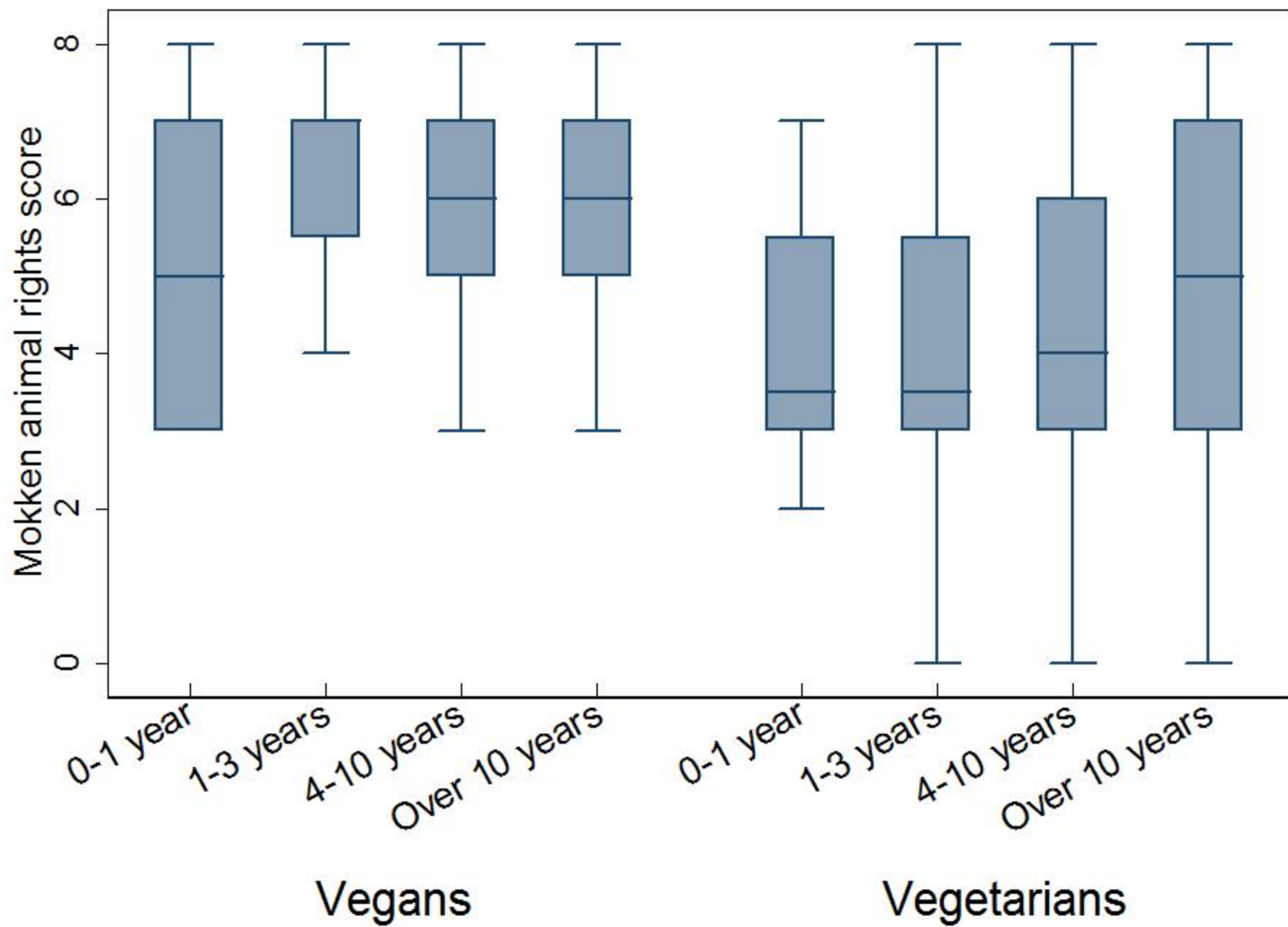


Figure 1: Boxplot of differences in animal rights score among vegans and vegetarians – divided into number of years the diet has been followed (top and bottom whiskers denote lower and upper adjacent values, respectively, and the middle whisker the median, while the bottom and top of boxes are the 1st and 3rd quintile)

**Table 1.** Descriptive statistics regarding dietary habits, age, sex, nationality, and religiousness among self-reported meat eaters, vegetarians, and vegans (n and column percentages)

	Meat eater N=166 (46.6%)	Vegetarian N=111 (31.2%)	Vegan N=79 (22.2%)	Total N=356 (100%)
<i>Dietary habits</i>				
Eats eggs and dairy Products <sup>A</sup>	165 (99.4%)	108 (97.8%)	0 (0%)	273 (77.5%)
Eats 1-3 meat products <sup>B</sup>	22 (13.3%)	0 (0%)	0 (0%)	22 (13.3%)
Eats 4 meat products <sup>B</sup>	20 (12.0%)	0 (0%)	0 (0%)	20 (12.0%)
Eats 5 meat products <sup>B</sup>	81 (48.8%)	0 (0%)	0 (0%)	81 (48.8%)
Eats 6 meat products <sup>B</sup>	43 (25.9%)	0 (0%)	0 (0%)	43 (25.9%)
<i>Socio-demography</i>				
<i>Sex</i>				
Man	75 (45.2%)	20 (18.0%)	20 (25.3%)	115 (31.9%)
Woman	91 (54.8%)	91 (81.3%)	59 (74.7%)	241 (68.1%)
<i>Age</i>				
Under 20	7 (4.2%)	5 (4.5%)	4 (5.1%)	16 (4.5%)
In the 20s	82 (49.4%)	46 (41.4%)	29 (36.7%)	157 (44.1%)
In the 30s	34 (20.5%)	19 (17.1%)	10 (12.7%)	63 (17.7%)
In the 40s	19 (11.4%)	26 (23.4%)	15 (19.0%)	60 (16.9%)
In the 50s	14 (8.4%)	10 (9.0%)	11 (13.9%)	35 (9.8%)
60 or more	10 (6.0%)	5 (4.5%)	10 (12.7%)	25 (7.0%)
<i>Nationality</i>				
UK (England, Wales, Scotland)	122 (73.5%)	67 (60.4%)	35 (44.3%)	224 (62.9%)
Other (Asian, Irish, American, Danish, German)	35 (21.1%)	25 (22.5%)	19 (24.1%)	79 (22.2%)
Mixed background/unreported	9 (5.4%)	19 (17.1%)	25 (31.6%)	53 (14.9%)
<i>Religious</i>				
Yes <sup>C</sup>	68 (41.0%)	40 (36.0%)	25 (31.6%)	133 (37.4%)
No	98 (59.0%)	71 (64.0%)	54 (68.4%)	223 (62.6%)

<sup>A</sup> Respondents reporting that they consume eggs, dairy, or both were recorded as dairy/egg eaters.

<sup>B</sup> Counted on basis on number of the following products that are consumed (chicken, beef, pork, lamb, fish, foie gras).

<sup>C</sup> Religious affiliations that were reported: Christian, Catholic, Jewish, Buddhist, Hindu, Muslim, Sikh, and other.

**Table 2.** Scores on five animal ethical dimensions and number of dimensions drawn on among meat eaters, vegetarians, vegans, and in total

	Meat eaters N=166	Vegetarians N=111	Vegans N=79	Total N=356
<i>Animal rights</i>				
Mean score	2.14	4.83	6.61	3.97
Std. Deviation	1.9	2.36	1.56	2.7
<i>Utilitarian</i>				
Mean score	4.39	2.66	1.44	3.2
Std. Deviation	1.9	1.94	1.36	2.17
<i>Relational</i>				
Mean score	0.63	0.52	0.41	0.54
Std. Deviation	0.83	0.63	0.57	0.72
<i>Respect for nature</i>				
Mean score	1.34	0.92	0.48	1.02
Std. Deviation	1.17	0.97	0.64	1.07
<i>Contractarian</i>				
Mean score	0.50	0.07	0.06	0.27
Std. Deviation	1.04	0.26	0.25	0.76
<i>Number of ethical views drawn on</i>				
Mean score	3.26	2.91	2.53	2.99
Std. Deviation	0.87	0.83	0.83	0.88

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**Table 3.** Results from regression analyses (N=356)

	Animal rights <sup>A</sup>		Utilitarian <sup>A</sup>		Relational <sup>A</sup>		Respect for nature <sup>A</sup>		Contractarian <sup>B</sup>		Number of ethical views drawn on <sup>C</sup>	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	B	B	B	B	B	B	B	B	B	B	B	B
(Intercept)	1.755**	0.676**	0.362**	1.453**	-0.762**	-0.395**	-0.617**	0.308**	-1.780**	0.145	<sup>D</sup>	<sup>E</sup>
<u>Diet type</u>												
Omnivore	-1.078**	0	1.090**	0	0.367	0	0.924**	0	1.925**	0	1.445**	0
Vegetarian	-0.301**	0.777**	0.567**	-0.523**	0.264	-0.103	0.652**	-0.272*	0.309	-1.616**	0.893**	-0.552*
Vegan	0	1.078**	0	-1.090**	0	-0.367	0	-0.924**	0	-1.925**	0	-1.445**
<u>Nationality</u>												
Mixed back-ground	0.089		-0.158		-0.261		-0.150		0.519		-0.532	
Non UK back-ground	0.016		-0.004		0.344*		-0.079		-1.124*		-0.157	
From UK	0		0		0		0		0		0	
<u>Gender</u>												
Woman	0.091		0.110		-0.135		-0.260*		-1.003**		-0.419	
Man	0		0		0		0		0		0	
<u>Age</u>												
50 years or more	0.069		-0.104		0.045		0.124		-0.639		-0.121	
30-49 years	0.034		0.054		-0.259		0.014		-0.644*		-0.073	
Under 30 years	0		0		0		0		0		0	
<u>Religious</u>												
Yes	0.009		-0.074		-0.008		0.278*		-0.297		0.326	
No	0		0		0		0		0		0	

Model 1: reference category=Vegan; Model 2: reference category=meat eater. All other variables are coded and input to the regression similar to model 1;

<sup>A</sup> poisson regression; <sup>B</sup> negative binomial regression; <sup>C</sup> ordinal logistic regression; <sup>D</sup> threshold parameters: -2.7314 (1), -0.389(2), 1.660 (3), 4.390 (4); <sup>E</sup> threshold parameters -4.177(1), -1.835(2), 0.215(3), 2.944(4).

\* < 0.05; \*\*<0.01

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**Table 4.** Percentage animal rights responses (ordered from lowest to highest degree of endorsement) and item homogeneity (Loewinger's H coefficient) for total sample – and percentage animal rights response per diet group

<i>Animal ethical dilemma:</i>	<i>Animal rights response</i>	Total sample (N=356)		Meat eaters (N=166)	Vegetarians (N=111)	Vegans (N=79)
		n %	H	n %	n %	n %
Do you find it acceptable that valuable race horses are being cloned?	No, this is a sign of lack of respect for the horses, treating them as mere means	69 19.4%	0.41	16 9.6%	27 24.3%	26 32.9%
Is it acceptable to breed dogs according to fashion – for example, so that they become very small?	No, we should not encourage the attitude that animals are things for us to consume	96 27.0%	0.49	20 12.0%	35 31.5%	41 51.9%
What do you think about toxicological studies using animal testing?	Such studies should be banned	123 34.6%	0.64	19 11.4%	50 45.0%	54 68.4%
Do you accept the use of genetically modified animals as models for serious human diseases such as cancer?	No, I don't approve of using animals as a mere means to our ends – however important these ends or purposes may be	144 40.4%	0.62	29 17.5%	54 48.6%	61 77.2%
Do you find it acceptable that ownerless cats are being euthanised?	No, cats have a right to life – we're permitted to euthanise them only if they're incurably ill	148 41.6%	#	55 33.1%	47 42.3%	46 58.2%
Are you against hunting?	Yes, we should not kill healthy animals	165 46.3%	0.57	29 17.5%	71 64.0%	65 82.3%
Is it ok to keep animals for slaughter?	No, because animals should not be kept and killed only to satisfy humans	167 46.9%	0.64	12 7.2%	78 70.3%	77 97.5%
Do you approve of killing wild rats with slow functioning poison?	No, we all have a right to be here and share this planet, and if pest animals cause a real danger to us we must kill them quickly and efficiently	237 66.6%	0.56	82 49.4%	80 72.1%	75 94.9%
Do you approve of the euthanasia of surplus animals in a zoo – e.g. lion cubs?	No, killing of animals can never be justified. Neutering of the lionesses could be an alternative, although the lionesses' right to reproduce could be debated	264 74.2%	0.66	93 56.0%	94 84.7%	77 97.5%

# Item removed from mokken scale due to too low homogeneity (H=0.27).

H<sub>scale</sub> = 0.56; Cronbach's alpha = 0.83.

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