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Adolescents care but don't feel responsible for farm animal welfare

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1 Abstract

2

3 Adolescents are the next generation of consumers with the potential to raise standards of farm
4 animal welfare — to *their* satisfaction — if their preferences and concerns are translated into
5 accurate market drivers and signals. There are no published data about adolescent views of
6 farm animal welfare to allow meaningful design, implementation and evaluation of
7 educational strategies to improve consideration of — and behaviour — towards farm animals.
8 Knowledge of, beliefs regarding, attitudes about and behavioural intention relevant to farm
9 animal welfare were determined in a sample of UK adolescents, using a survey incorporating
10 an extended version of the theory of planned behaviour and novel assessment tools. Our
11 results indicate that adolescents have only a limited knowledge of welfare problems for farm
12 animals or welfare-relevant product labels. Intentions to identify welfare standards of their
13 food were weak. Although they cared about farm animal welfare and agreed with
14 fundamental principles, e.g. the provision of space and the absence of pain and suffering, in
15 common with adults they held limited belief in the power and responsibility which they
16 possess through their choices as consumers; responsibility was often shifted to others such as
17 the Government and farmers.

18

19 **Key words:** *Adolescents, Attitudes, Beliefs, Behavioural intention, Farm animal welfare,*
20 *Knowledge, Theory of planned behaviour*

21

22 **Introduction**

23

24 Many studies have addressed stakeholders', including adult consumers, views of and
25 concerns about farm animal welfare (e.g. European Commission 2007; Verbeke 2009). For
26 farmed animals, it is the consumer's purchases of animal products such as meat, milk or eggs,
27 which can substantially affect welfare standards (FAWC, 2006; Regmi & Gehlhar, 2001);
28 adolescents are future policy makers and consumers but may not perceive that they possess
29 immediate consumer power. However, the knowledge that they acquire through education (at
30 school and elsewhere), together with cultural attitudes and exposure to societal use and
31 representation of animals (Rudman, 2004) all contribute to their decisions as active
32 consumers later in life.

33

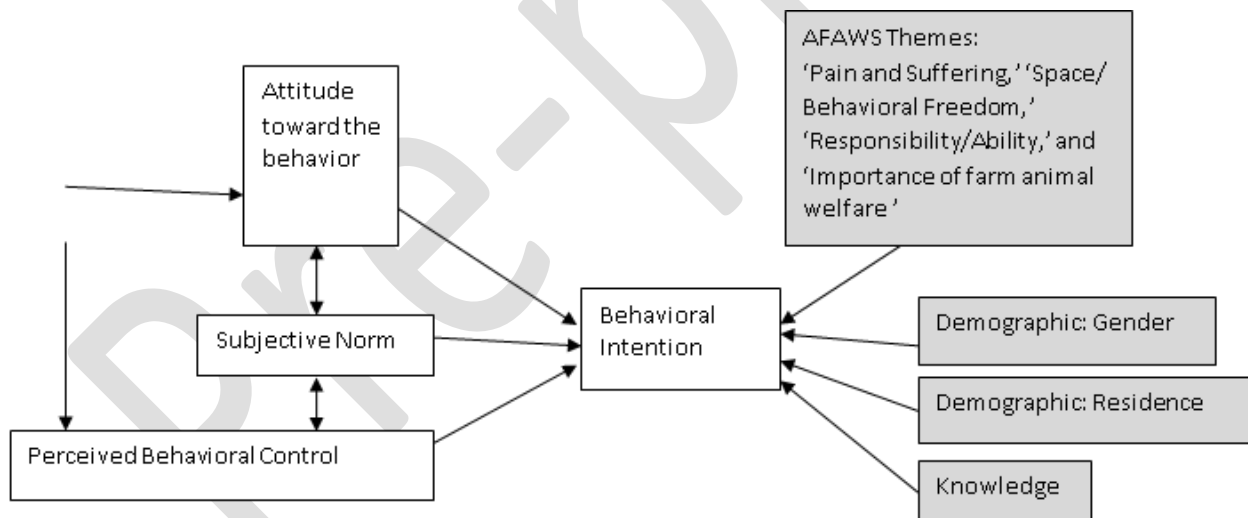
34 Education is of growing interest as a mechanism to improve consideration of — and
35 behaviour towards — animals (e.g. European Commission, 2010; FAWC, 2011a), but its
36 impact is difficult to determine without knowing a population's current views (Jamieson & et
37 al., 2012). Despite research about adult consumers' concern (e.g. European Commission,
38 2007; Kjaernes, 2007) and children's understanding of, attitudes towards, and emotional
39 attachment to animals (Muldoon, Williams, Lawrence, Lakestani & Currie, 2009), there is
40 little literature focusing on adolescents' perceptions of farm animal welfare. What is available
41 demonstrates that adolescents, though holding generally positive attitudes to animals, afford
42 lower considerations to agricultural species in comparison with pets and use distancing
43 mechanisms to cope with societal use of animals for meat and other products (DeRosa, 1987;
44 Ellis & Irvine, 2010; Jamieson & et al., 2012).

45

46 There is also an absence of tools to determine adolescents' views about animal welfare.
47 Existing adult-directed assessment tools are not necessarily suitable for the adolescent
48 audience; requiring excessive concentration, or using audience-specific language / content
49 (e.g. Kauppinen & et al., 2010; Austin, Deary, Edwards-Jones & Arey, 2005). Limited
50 literature exists which combines citizen-oriented attitudes towards farm animal welfare and
51 beliefs with more consumer-oriented behaviours (Vanhonacker, Verbeke, Van Poucke &
52 Tuytens, 2007). As the exact relationship between attitude, knowledge and behaviour is
53 unclear (e.g. Shrigley, 1990; Wallace, Paulson, Lord & Bond, 2005), assumption of a positive
54 relationship may be inappropriate and it is imperative to measure multiple pertinent variables
55 to explore those which drive relevant behaviour. When a direct measure of behaviour is not

56 readily available or logistically possible, Ajzen's theory of planned behaviour (Figure 1;
 57 Ajzen, 1991; Ajzen, 2002) has been used. Behavioural intention indicates an individual's
 58 readiness to perform a given behaviour and is viewed as the immediate precedent. Ajzen's
 59 theory illustrates that behavioural intention is guided by: (a) attitude towards a behaviour, i.e.
 60 the extent to which an individual perceives the behaviour as favourable or useful; (b)
 61 subjective norm, i.e. the extent to which an individual perceives others want them to perform
 62 the behaviour; and (c) perceived behavioural control, i.e. the extent to which an individual
 63 feels they can engage with and are able to perform the behaviour. The theory has been shown
 64 to be robust in relation to other measures of adolescent consumptive behaviour (e.g. Vermeir
 65 & Verbeke, 2008), in the context of farmers' intentions with regards to farm animal welfare
 66 (e.g. Coleman, McGregor, Hemsworth, Boyce & Dowling, 2003; Kauppinen, Vainio, Valros,
 67 Rita & Vesala, 2010), and it is often applied to studies of the relationships among beliefs,
 68 attitudes, behavioral intentions and behaviours in various other fields. It offers a basic
 69 framework from which a model could be developed to determine the impact of additional
 70 variables, such as knowledge.

71



72

73 **Figure 1. The extended model used in the prediction of specific behavioral intentions.**
 74 **Nonshaded boxes represent the theory of planned behavior (Ajzen, 1991). Shaded boxes**
 75 **are factors additional to the original model: Attitude to farm animal welfare scale**
 76 **(AFAWS) themes, Demographics and Knowledge (of welfare issues for six different**
 77 **farm species and of welfare standard labeling). Arrows indicate predicted direction of**
 78 **relationships.**

79

80 To understand adolescents' potential role as future consumers of farm animal products, and to
81 evaluate the efficacy of education as a means by which to improve their consideration of farm
82 animals' welfare, it is important to determine current associated adolescent views. This study
83 sought to provide a national benchmark in the UK of adolescents' (14 to 15 year-old
84 secondary school attendees) views about farm animal welfare, and assess those variables
85 which may predict a specific, farm animal welfare-relevant behavioural intention. To address
86 the lack of robust and relevant assessment tools in the specific study of attitudes towards farm
87 animal welfare, novel assessment methods were developed.

88

89 **Aims**

90

91 The aims were:

- 92 1. to determine adolescent beliefs about, knowledge regarding, and attitudes towards
93 farm animal welfare;
- 94 2. to assess the behavioural intention of adolescents about the welfare standards of their
95 food
- 96 3. to examine whether the constructs of Ajzen's theory of planned behaviour can be used
97 to predict these intentions, and;
- 98 4. to examine factors influencing behavioural intention.

99

100 **Materials and Methods**

101

102 A questionnaire was devised and subsequently approved by the RVC's Ethical Review
103 Committee. A pilot study was used with non-study, year 10 adolescents to check suitability
104 and reliability ($n = 30$, 14-15 year olds).

105

106 ***Questionnaire design***

107

108 The questionnaire (available from the first author) comprised four sections concerning (a)
109 beliefs about, (b) attitudes to, (c) knowledge of and (d) behavioural intention regarding farm
110 animal welfare. Two statements, measured on a Likert scale from 'strongly agree' to
111 'strongly disagree', were included to check for social desirability effects. Respondent
112 demographics previously shown to affect views of animal welfare were also determined: i.e.
113 area of residence (urban / rural), pet ownership, diet and gender (Herzog, 2007; Hills, 1993;
114 Izmirlı & Phillips, 2011; Paul & Serpell, 1993; Te Velde, Aarts & Van Woerkum, 2002).

115 *Beliefs*

116

117 Belief assessment allowed comparison with previous findings for adult consumers (Welfare
118 Quality Project 2007a; Welfare Quality Project 2007b). It covered concern for farm animal
119 welfare, relative perception of species' welfare and responsibility to improve farm animal
120 welfare. Respondents ranked six farm species (broiler chickens, laying hens, pigs, beef cows,
121 dairy cows and sheep) from perceived best (1) to worst (6) welfare, and ranked responsibility
122 of various groups (veterinarians, the general public, supermarkets, charities, Government, and
123 farmers) for improving farm animal welfare.

124

125 *Knowledge*

126

127 Seven questions (multiple choice and open formats) were posed to determine adolescents'
128 knowledge of common welfare issues (for broiler and egg laying chickens, dairy and beef
129 cows, sheep and pigs), and of welfare standard labelling, which affects their ability to
130 purchase products representative of animal welfare standards above the legal minimum.
131 Adolescents were given one mark for each correct answer (maximum score of seven).

132

133 *Attitude*

134

135 A novel scale was devised to address attitudes specific to farm animal welfare. Welfare was
136 considered an ethical concern for the mental and physical health of animals over which we
137 have a degree of control or ownership (Lawrence & Stott, 2010) and so the scale
138 encompassed more than just species level considerations in accordance with this broader
139 definition. The Attitude to Farm Animal Welfare Scale (hereafter referred to as the AFAWS)
140 comprised 14 statement pairs; one statement within each pair expressed positively and one
141 negatively to allow reliability assessment, answered on 7-point unipolar Likert scales from
142 'strongly agree' to 'strongly disagree'. Although not an exhaustive list, these statements
143 formed four themes on which adolescents commonly based their views when discussing
144 various aspects of farm animal welfare (discussions took place with 27 students from six
145 schools, external to the main data collection, on the key aspects on which they felt they based
146 their views on animal welfare and contexts they considered relevant). The statements were:

147

148

- 149 1. Pain and suffering (6 statements), e.g. *“It doesn’t matter if a farm animal is in pain”*
150 2. Space / behavioural freedom (8 statements), e.g. *“Living conditions provided for farm*
151 *animals should not restrict their movements or normal behaviours”*
152 3. Consumer responsibility / ability to improve farm animal welfare (8 statements), e.g. *“I*
153 *can make a positive difference to the way farm animals are treated”*
154 4. Perceived importance of farm animal welfare (6 statements), e.g. *“Not enough*
155 *consideration is given to the welfare of farm animals these days”*.

156

157 Reliability testing (Cronbach’s alpha) at the pilot stage indicated within statement-pair
158 reliability and high internal consistency both overall and within themes: all $\alpha > 0.7$ (George
159 & Mallery, 2003; Gliem & Gliem, 2003).

160

161 *Behavioural Intention*

162

163 Consumers influence standards of farm animal welfare through their purchases; adolescents
164 make some purchases of animal products, e.g. when out with friends or buying for lunch
165 though few purchase food on a household scale. Thus, adolescents are dependent to a large
166 extent on what their carers purchase for them. For this reason, the study did not focus on their
167 intentions to purchase animal products of a certain welfare standard but instead focussed on a
168 precursor of such behaviour, i.e. the behavioural intention of individuals to identify the
169 welfare standards of the farm animals used to produce the food (eggs, meat and dairy) they
170 consume (Figure 1). Respondents were informed within the questionnaire that *“identify*
171 *means that if you were served an animal product at home, or were selecting or buying food*
172 *containing an animal product in a shop / school, would you either look for information on the*
173 *welfare standards involved, such as a label or ask your parent / a shop-seller for the*
174 *information”*. This provided a good starting point and pre-requisite from which adolescents
175 can become more informed about animal welfare and more-conscientious consumers. The
176 intention was piloted and developed based on discussions with a sample of adolescents
177 regarding the type of intention which they perceived to be both possible and relevant to their
178 age-group (as with the AFAWS statements; 27 students from six schools). Following Ajzen’s
179 theory of planned behaviour, respondents were asked to rate statements regarding their view
180 of this behavioural intention, and three direct measures of the model constructs (constraints
181 on questionnaire length necessitated exclusion of indirect measures):

- 182 1. Behavioural intention, four statements e.g. *“From now on, I will make an effort to identify*
183 *the welfare standards of the farm animals used in the production of my food”*;
- 184 2. Perceived behavioural control, six statements addressing controllability e.g. *“There are*
185 *many things which prevent me from identifying the welfare standards of the farm animals*
186 *used in the production of my food”*, and self efficacy, e.g. *“It would be really easy for me*
187 *to identify the welfare standards of the farm animals used in the production of my food”*;
- 188 3. Subjective norm, three statements, e.g. *“People in my life whose opinions I value think*
189 *that it is important to be able to identify the welfare standards involved in producing the*
190 *food which I consume”*; and
- 191 4. Attitude towards the behaviour, five statements: importance, interest, usefulness,
192 worthiness, and overall evaluation, measured on 7-point bipolar Likert scales.

193

194 Unless otherwise indicated, all statements were measured on 7-point unipolar Likert scales
195 from ‘strong agreement’ to ‘strong disagreement’, though specific terms varied according to
196 the individual wording of each statement.

197

198 ***Participants and Procedure***

199

200 The online questionnaire (Survey Monkey™) was deployed via the e-mail service sprint mail
201 (Sprint Media Ltd) on September 8th 2010 through emails to the Heads of Science and
202 Citizenship in a cross-sectional sample of 5911 UK schools. Participation was up to the
203 discretion of the teachers and the final number of students whom the questionnaire reached
204 before they were able to decide whether or not to complete the survey cannot be identified.
205 The survey was left open until December 18th 2010. A reminder email was sent on November
206 4th 2010.

207

208 1274 responses were obtained from > 51 schools (not all schools provided identification since
209 this was optional to aid confidentiality). Data were rigorously examined and responses
210 removed if they failed to meet the criteria of completeness, reliability and low levels of social
211 desirability (see Appendix 1), leaving 423 (33% of total) responses in the final sample.

212

213 The ratio of male to female respondents was 43% ($n = 182$) male to 57% ($n = 241$) female, with
214 the average and majority age (range 14 - 15) of 14 years old (84%, $n = 355$). Respondents
215 lived mainly in urban areas (66%, $n = 281$) and 87% ($n = 369$) owned a pet, either currently

216 or previously. The majority ate meat (92%, $n = 389$), with those 34 adolescents avoiding
217 meat citing taste / texture (76%, $n = 26$) and/or welfare (65%, $n = 22$) as the main reasons for
218 this (multiple answers were allowed). Most had not previously been taught about animal
219 welfare in school (69%, $n = 292$), though all but 27 had previous knowledge of farm animal
220 welfare; television was the most common source (70%, $n = 276$) and friends the least cited
221 (13%, $n = 53$).

222

223 In terms of the wider UK population, in 2010 80% of the total population were reported to
224 live in urban areas (Central Intelligence Agency, 2010), and among individuals aged between
225 14 and 15 there was a reported sex ratio of 1 female to 1.05 males (Office for National
226 Statistics, 2010). In 2011, 46% of UK households owned at least one pet (Pet Food
227 Manufacturers Association, 2011), and in 2008 8% of the UK population were either
228 completely or partially vegetarian (GfK Social Research, 2009). The study sample here
229 appears to have a gender and potential pet ownership bias when compared with the wider
230 population; however, with regards to pet ownership, the statistic quoted (46%) refers to all
231 households inclusively as opposed to only those households with adolescents, which may at
232 least partly explain this difference. Murray, Browne, Roberts, Whitmarsh and Gruffydd-Jones
233 (2010), for example, found a significant interaction between dog ownership and the presence
234 of children aged 11 to 15 years in a household, and also that households with both a dog and
235 children of the same age range were more likely to own a cat than those without either dogs
236 or children of a similar age.

237

238 *Statistical Analysis*

239

240 Prior to analysis, the following data calculations were conducted:

241

- 242 1. AFAWS 1-7 Likert scale statements were re-coded (and reverse coded where necessary)
243 such that the most 'welfare positive' choice was assigned +3 points and the least -3
244 points, neutral scoring zero. An 'overall AFAWS score' from -3 to +3 was then calculated
245 for each respondent by summing all 28 statements and dividing by the number of
246 statements, repeated for each theme to obtain 'theme scores' from -3 to +3 (continuous
247 scale, normal data). Each statement pair, and group of statements within each theme, had

248 to meet an internal consistency of Cronbach's $\alpha > 0.7$, checked post data collection with
249 unreliable statements excluded as necessary.

250 2. For the theory of planned behaviour data, statements were reverse coded where necessary.
251 Choices most promoting the intention of adolescents to identify the welfare standards of
252 their food were assigned seven points and the least one point. To standardize construct
253 scores (1 to 7), each construct (behavioural intention, perceived behavioural control, etc.)
254 score was quantified by summing all relevant statements into a single score and dividing
255 this sum by the total number of statements for that construct across constructs: 7
256 representing a positive response, 4 indifferent, and 1 negative. Cronbach's alphas were
257 calculated for statements within constructs.

258
259 All data were analysed using SPSS Statistics 17.0 (SPSS Inc), with a two-tailed significance
260 of $P < 0.05$. Where data did not conform to assumptions of parametric testing, non-
261 parametric analyses were used. Where necessary, P -values were corrected for multiple testing
262 using the Bonferroni correction. The unit of analysis was a single survey respondent.
263 Analysis was conducted in the following stages:

264
265 *Beliefs*

266
267 Belief section data were viewed graphically and Friedman tests were used to determine
268 differences between: (a) the welfare status rank assigned to six farm species; and (b) the rank
269 assigned to six stakeholders for their responsibility to improve farm animal welfare. Post-hoc
270 Wilcoxon tests used where appropriate.

271
272 *Knowledge*

273
274 Pair-wise McNemar's tests were used to assess which questions the adolescents were more
275 likely to answer correctly. Mann-Whitney U tests were conducted to examine the effects of
276 demographic variables gender (male / female) and area of residence (urban / rural).
277 Insufficient variation within the sample meant the effects of pet ownership and diet could not
278 be examined.

279
280

281 *Attitudes*

282

283 A General Linear Model was used to examine the effects of gender and area of residence (as
284 fixed effects) on Attitude Score (continuous dependent variable). Friedman tests (and post-
285 hoc Wilcoxon tests) were used to compare scores allocated to the four AFAWS themes (pain
286 and suffering, space / behavioural freedom, responsibility / ability to improve, and
287 importance of farm animal welfare).

288

289 *Behavioural Intention*

290

291 Friedman tests were used to compare the four theory of planned behaviour construct scores
292 (attitude towards the behaviour, subjective norm, perceived behavioural control and
293 behavioural intention).

294

295 *Does the theory of planned behavior and gender, area of residence, knowledge and/or*
296 *attitude contribute to variability in behavioural intention?*

297

298 A three-step hierarchical multiple regression analysis was conducted to determine whether
299 demographic factors (gender and area of residence), AFAWS score (split by theme) and
300 knowledge score predicted behavioral intention beyond prediction engendered by the theory
301 of planned behaviour constructs alone (Figure 1). With behavioural intention as the
302 dependent variable, attitude towards the behaviour, subjective norm and perceived
303 behavioural control were entered as the first step in the hierarchy (the basic theory of planned
304 behaviour framework). Gender (female / male) and area of residence (urban / rural) were
305 entered second, and AFAWS theme scores and total knowledge score entered lastly as
306 independent variables. Preliminary analyses were conducted to ensure no violation of the
307 assumptions of normality, linearity, multicollinearity and homoscedasticity, and to determine
308 a good fit of the model. Pearson and Spearman's correlations (depending on normality) were
309 used to examine the connections between the three theory (of planned behaviour) constructs.
310 Correlations of less than 0.3, even when significant, were deemed negligible and so only
311 correlations ≥ 0.3 were considered relevant to this study (Ajzen & Fishbein, 1980).

312

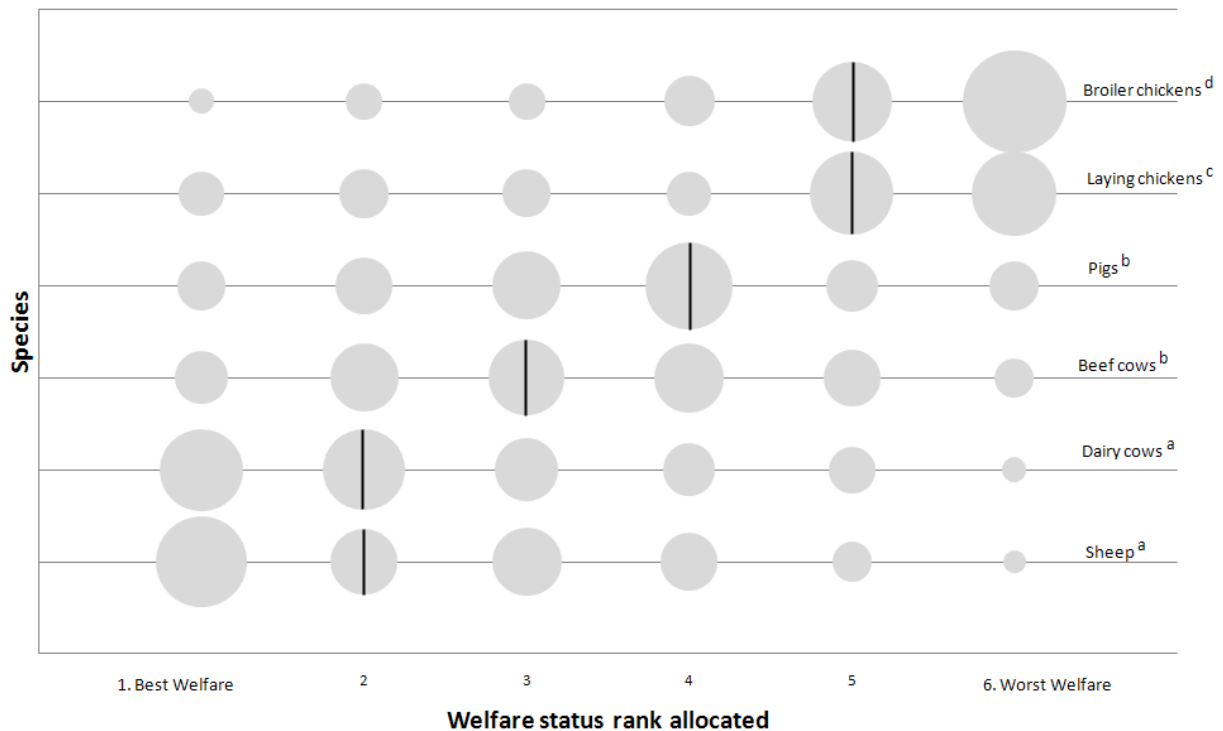
313 **Results**

314

315 Beliefs

316

317 There was a statistically significant difference in ranking allocation of welfare status, from
318 best (1) to worst (6), across the six farm species by adolescents (Figure 2; Friedman: χ^2 (5, n
319 = 423) = 602.07, $P < 0.001$). The relative welfare of sheep and dairy cows was considered as
320 > beef cattle and pigs > laying chickens > broiler chickens.



321

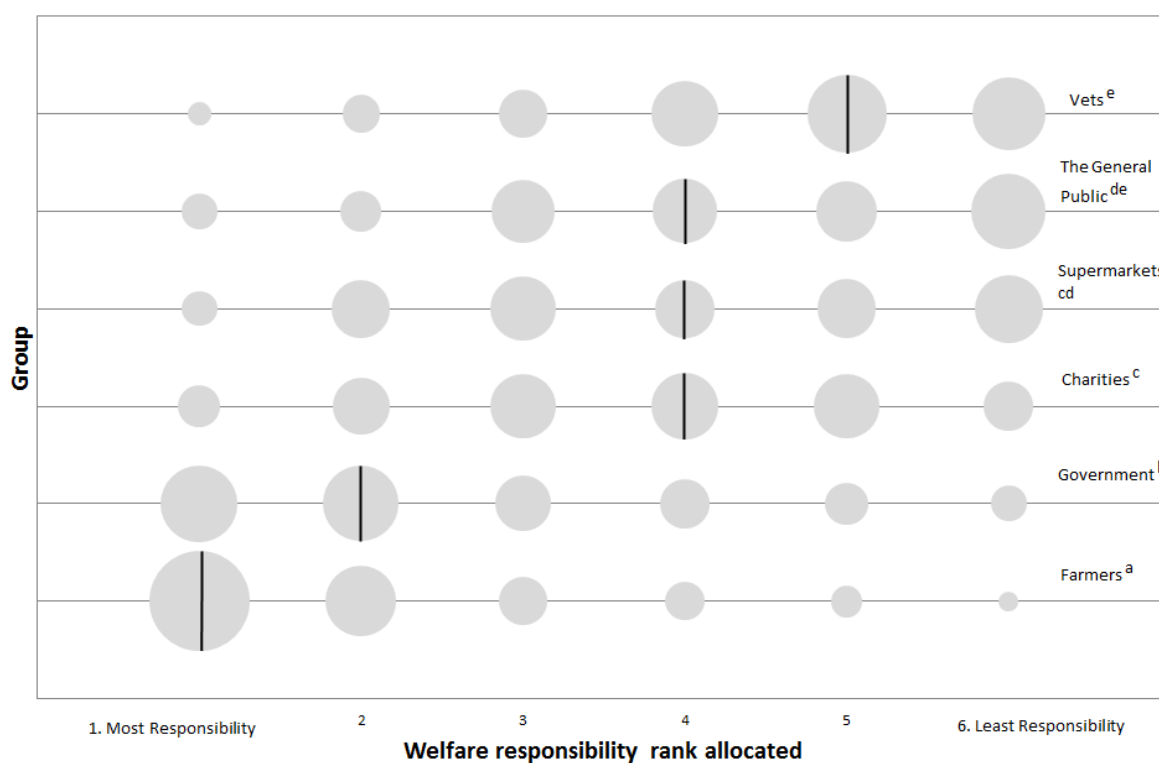
322 **Figure 2. Distribution of adolescents' (N = 423) ranking of six UK farm animal species**
323 **according to best (1) to worst (6) perceived welfare. Bubble size at each rank value (X-**
324 **axis) represents the proportion of the sample choosing the particular rank for the**
325 **relevant species (Y-axis). Differing superscripts indicate significant differences between**
326 **species (Y-axis; P < 0.05). Vertical black lines indicate the median rank for each species**
327 **(within row).**

328

329

330 Responsibility for improving farm animal welfare attributed to UK stakeholder groups by
331 adolescents is shown in Figure 3, with a statistically significant difference in rank allocation
332 across groups (Friedman: χ^2 (5, $n = 423$) = 566.544, $P < 0.001$). The relative responsibility of
333 farmers was considered as > Government > charities, supermarkets and the General Public \geq
334 veterinarians.

335



336
 337 **Figure 3. Distribution of adolescents' ($N = 423$) ranking [most (1) to least (6)] of six**
 338 **groups' responsibilities for improving UK farm animal welfare. Bubble size at each**
 339 **rank value (X-axis) represents the proportion of the sample that chose the particular**
 340 **rank for the relevant species (Y-axis). Differing superscripts indicate significant**
 341 **differences between species (Y-axis; $P < 0.05$). Vertical black lines indicate the median**
 342 **rank for each group.**

343
 344 Overall, adolescents cared about how farm animals are kept and treated (64.5% caring either
 345 very much or quite a lot) and many were concerned about this (49.4% either very concerned
 346 or quite concerned). Although the majority (71.6%) felt they knew some to a fair bit about
 347 farm animal husbandry, a large proportion (38.3%) felt that they did not know enough to give
 348 an opinion on their concerns. Most (70.4%) considered that there was not enough information
 349 on farm animal welfare available to them.

350
 351 *Knowledge*

352
 353 Out of a maximum total score of 7, 23.2% of adolescents scored 0, 33.6% scored 1, 26.2%
 354 scored 2, 12.8% scored 3, 3.3% scored 4, and 0.9% scored 5. No adolescent scored more than
 355 5.

356

357 Adolescents were most likely to attempt answering questions relating to chickens,
358 significantly more likely to be able to identify welfare problems for laying hens in battery
359 systems (question one; 55.3% correct, $P < 0.001$ for all McNemar test comparisons), and
360 significantly less likely ($P \leq 0.05$ for all comparisons) to demonstrate knowledge of problems
361 for dairy cows and sheep (questions five and six; 13% and 6.6% correct, respectively) or to
362 choose the correct option for the definition of an 'outdoor reared' pig (question four; 9.9%
363 correct). Nearly all (93.4%) failed to identify labels representative of welfare standards higher
364 than the legal minimum (question 7). Though Freedom Foods ($n = 347$) and Soil Association
365 Organic ($n = 288$) were most frequently chosen as representative of higher animal welfare
366 standards, as adolescents often additionally ticked an incorrect response, such as Assured
367 Food Standards ($n = 261$), it was not possible to determine whether the high selection of the
368 correct labels was based on knowledge or an artifact of randomly selecting multiple options.

369

370 Adolescents living in rural areas (Median *Md*, Inter quartile range IQR, of scores out of 7:
371 1.00, 1.00 – 2.00) scored significantly higher for knowledge than those living in urban areas
372 (*Md*, IQR: 1.00, 0.00 – 2.00; Mann-Whitney *U* test: $U = 17393.5$, $z = -2.234$, $P = 0.025$, $r = -$
373 0.11). Females (*Md*, IQR: 1.00, 1.00 - 2.00) scored significantly higher for knowledge than
374 males (*Md*, IQR: 1.00, 0.00 - 2.00; $U = 18081.0$, $z = -3.208$, $P = 0.001$, $r = -0.16$).

375

376 *Attitudes*

377

378 The AFAWS showed high internal consistency, indicating that the statements and themes
379 within the scale measured a single underlying construct (i.e. attitude towards farm animal
380 welfare as defined); overall Cronbach's α score of 0.93, and all attitude statement pairs and
381 individual themes met the reliability and consistency criteria of $\alpha > 0.7$: pain and suffering
382 0.863; space / behavioural freedom 0.813; responsibility / ability 0.811; importance of farm
383 animal welfare 0.79, suggesting adolescents were responding consistently within these groups
384 of paired statements.

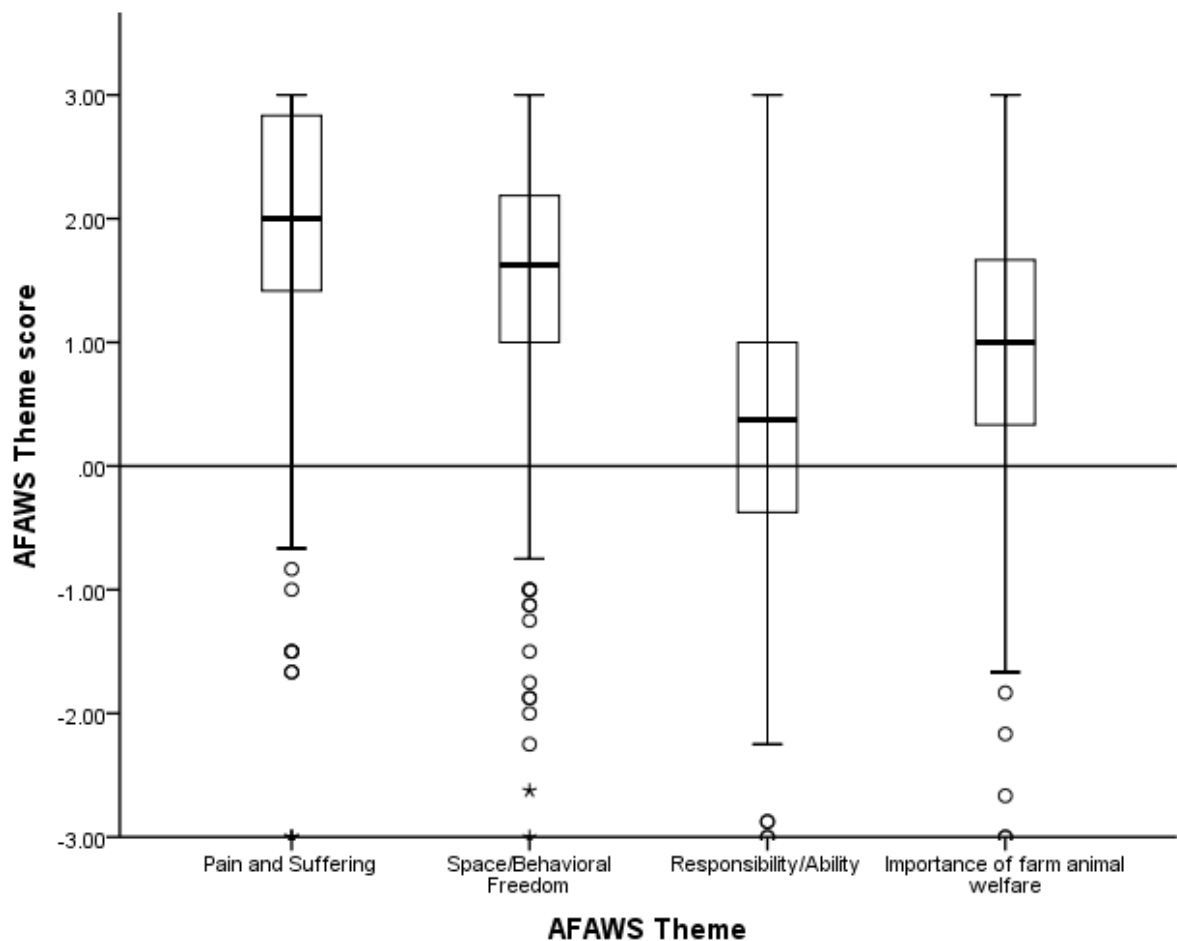
385

386 Adolescents achieved a total mean \pm SE AFAWS score of 1.13 ± 0.04 ; tending towards the
387 positive end of the scale (maximum 3, minimum -3). Scores varied significantly by gender;
388 females scoring higher than males (Univariate General Linear Model: $F_{1, 419} = 33.976$, $P <$
389 0.001; female: mean \pm SE: 1.37 ± 0.057 ; male: mean \pm SE: 0.85 ± 0.060). Area of residence

390 had no effect on total AFAWS score (Univariate General Linear Model: $F_{1, 419} = 2.474$, $P =$
391 0.116 ; urban: mean \pm SE: 1.04 ± 0.051 ; rural: mean \pm SE: 1.18 ± 0.073).

392

393 Scores were significantly different across AFAWS themes (Friedman: $\chi^2 (3, n = 423) =$
394 703.80 , $P < 0.001$), with significant differences between all pairwise theme comparisons
395 (Wilcoxon: $P < 0.001$ for all). Most positive attitude was attributed to minimizing pain and
396 suffering for farm animals, and least was indicated towards respondent responsibility / ability
397 to effect change with regards to farm animal welfare (Figure 4).



398

399 **Figure 4. Adolescents' ($N = 423$) median, interquartile, max, and min range for AFAWS**
400 **Theme scores (Pain and Suffering, Space/Behavioral Freedom, Responsibility/Ability to**
401 **improve, and Importance of farm animal welfare). Significant differences (Wilcoxon**
402 **tests) indicated by asterisks: * = $P < 0.05$, ** = $P < 0.01$, and *** = $P < 0.001$.**

403

404 *Behavioural Intention*

405

406 Each construct of the theory of planned behaviour met Cronbach's α reliability of > 0.7 ,
407 except for subjective norm (attitude towards the behaviour 0.869, subjective norm 0.580,
408 perceived behavioural control 0.716, and behavioural intention 0.789); the results concerning
409 this construct should therefore be treated with caution.

410

411 Overall and out of a maximum total score of 7 (most positive) per construct, median (IQR;
412 Min to Max) scores were: attitude towards the behaviour 5.60 (4.80 – 6.40; 1 – 7); subjective
413 norm 3.67 (2.67 – 4.33; 1 – 7); perceived behavioural control 3.67 (3.00 – 4.33; 1.17 – 6.83);
414 behavioural intention 4.00 (3.25 – 5.00; 1 – 7). Scores were significantly different across
415 constructs (Friedman: $\chi^2(3, n = 423) = 571.625, P < 0.001$), with all comparisons significant
416 (Wilcoxon: $P < 0.001$ for all), except for perceived behavioural control compared with
417 subjective norm (Wilcoxon: $Z = -1.44, P = 0.151$). Most positive responses were attributed to
418 adolescents' attitudes towards the behavioural intention in question (to identify the welfare
419 standards of their food), in terms of its importance, interest, usefulness, worthiness and an
420 overall evaluation. Adolescents tended to respond most negatively when they considered the
421 extent to which they felt they could engage with — and be able to perform — the behaviour
422 (perceived behavioural control) and the extent to which they perceived that others want them
423 to perform the behaviour (subjective norms). The overall behavioural intention score of 4 out
424 of 7 suggests adolescents held an uncertain middle-ground opinion on the likelihood of trying
425 to identify the welfare standards of their food either currently or in the future.

426

427 *Does the theory of planned behavior predict adolescents' behavioural intention?*

428

429 In the first regression step, attitude towards the behaviour ($\beta = 0.454, P < 0.001$), subjective
430 norm ($\beta = 0.332, P < 0.001$) and perceived behavioural control ($\beta = 0.160, P < 0.001$)
431 significantly predicted 49% of the variation in behavioural intention ($P < 0.001$). Thus the
432 constructs of the theory of planned behaviour predicted adolescents' intentions to identify the
433 welfare standards of the food that they consume.

434

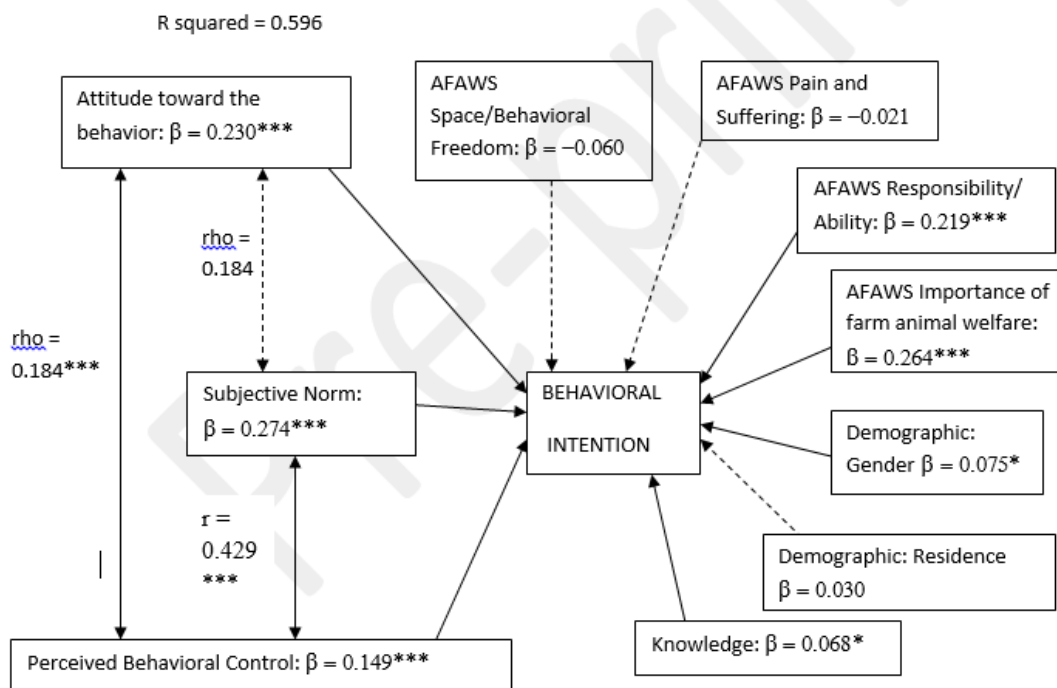
435 *Does gender, area of residence, knowledge and/or attitude contribute to variability in*
436 *behavioural intention?*

437

438 In step 2, inclusion of gender ($\beta = 0.138, P < 0.001$) significantly improved the model such
439 that overall it predicted 51% of variation in behavioural intention (R squared change = 0.019,
440 F change (2, 417) = 8.378, $P < 0.001$). Attitude towards the behaviour ($\beta = 0.230, P < 0.001$),
441 subjective norm ($\beta = 0.274, P < 0.001$) and perceived behavioural control ($\beta = 0.149, P <$
442 0.001) continued to contribute significantly.

443

444 In step 3, AFAWS theme scores and total knowledge score were added as explanatory
445 variables, subsequently increasing the total amount of variation in behavioural intention
446 explained by the model to 60% (R squared change = 0.089, F change (5, 412) = 18.51, $P <$
447 0.001). In this final model, whether an individual lived in an urban rural setting (area of
448 residence) and how important they felt it was for farm animals to be provided with adequate
449 space and behavioural freedom and be free from pain, regardless of the effect this may have
450 had on product prices (AFAWS themes ‘pain and suffering’ and ‘space / behavioural
451 freedom’) did not explain the variation in behavioural intention; significant and non-
452 significant relationships, including correlations between the theory of planned behaviour
453 constructs, are shown in Figure 5.



¹ R squared provides an indicator of how well the model fits the data. r is the correlation coefficient from Spearman's test and rho the Pearson product moment correlation coefficient.

454

455 **Figure 5. Model illustrating the variance in behavioral intention predicted by Attitude**
456 **toward the behavior, Subjective Norm, Perceived Behavioral Control, AFAWS Themes,**

457 **Knowledge, and Demographic characteristics. Standardized regression weights from**
458 **the multiple regression analysis (single-headed arrows) and correlations (double-headed**
459 **arrows) between the elements of the Theory of Planned Behavior. Solid arrows indicate**
460 **statistically significant relationships, dashes indicate nonsignificant relationships.**
461 **Significant relationships are indicated by asterisks: * = $P < 0.05$, ** = $P < 0.01$, and *****
462 **= $P < 0.001$.¹**
463

464 The theory of planned behaviour constructs ‘attitude towards the behaviour’ and ‘subjective
465 norm’ and the AFAWS themes ‘responsibility / ability’ and ‘importance of farm animal
466 welfare’ had the greatest influence on intention; in all cases the relationship was positive, i.e.
467 individuals who perceived that: (a) they could engage with — and were able to perform — the
468 behaviour; (b) others wanted them to perform the behaviour; (c) they were responsible for
469 and able to improve farm animal welfare; and (d) it was an important issue; had a more
470 positive intention to identify the welfare standards of the food they consume. Females and
471 those with knowledge of farm animal welfare were more likely to score highly on the
472 behavioural intent measure. However, in comparison with other significant factors, gender
473 and knowledge only contributed slightly to the overall variation in behavioural intention.

475 **Discussion**

477 *The role of consumers for promoting animal welfare*

478
479 Farm animal welfare is increasingly being seen as an important and concerning issue
480 throughout Europe and the developing world (Commission, 2007; Kjaernes, 2007; Mayfield,
481 Bennett, Tranter & Wooldridge, 2007). A strong interest in the potential of individuals as
482 consumers to collectively improve farm animal welfare through their purchasing decisions
483 has long been known (e.g. Bennett, 1996) and continues to be apparent in recent literature
484 (e.g. Evans, 2007; Harper, 2001; Project, 2007). We (the authors) feel this is important but
485 emphasise that it is but one lever. Miele and Bock (2007) reviewed a number of papers
486 discussing the variability within individual concepts of farm animal welfare, and the
487 developing ambivalence towards livestock farming. Consumers do vary in their
488 understanding of the role and potential power which they hold as consumers and a

¹ R squared provides an indicator of how well the model fits the data. r is the correlation coefficient from Spearman’s test and rho the Pearson product moment correlation coefficient.

489 discrepancy exists between their concerns, willingness to pay and what is actually reflected in
490 market statistics (e.g. Harper & Henson, 2001; Mayfield, Bennett, Tranter & Wooldridge,
491 2007); thus, they may be too diffuse a group to exercise a coherent and identifiable influence.
492 As such, a current debate exists as to who should support animal welfare, with another sub-
493 set of literature instead focusing on different levers, or a combination of such: influencing
494 government directly so that certain improvements happen as a consequence of legislation
495 (e.g. banning of sow stalls in UK in 1999); changes at the level of food retailers, so restricting
496 the decisions and responsibilities which need to be undertaken by individuals as consumers
497 (e.g. FAWC, 2005; FAWC 2011b; IGD, 2007; Jacobsen & Dulsrud, 2007; Köhler &
498 Wickenhäuser, 2001; Ransom, 2007). However, even governmental decisions tend to be
499 strongly influenced by consumer attitudes; indeed, in recent years campaigning organisations
500 like CIWF, while keeping up the pressure on governments, have put increased effort into
501 lobbying supermarkets to change their practices directly (i.e. independent of legislation) as a
502 result of consumer preferences (e.g. Brooke, 2008).

503

504 Despite the current debate on the exact role of individuals (either as consumers or citizens)
505 for promoting farm animal welfare, on the premise that there is some potential for consumers
506 to influence farm animal welfare, this study, to our knowledge the first of its scale and in this
507 age group, examined relevant views of UK adolescents, as future consumers. The aim was to
508 provide a benchmark of current beliefs, attitude, knowledge and behavioural intention in
509 adolescents. Results are based on an opportunistic and reasonably random sample: over 51
510 schools were represented and the resulting student demographics appear comparable with the
511 UK population. However, a small sample size (relative to the size of the population) and a
512 slight gender bias (with an over-representation of females) are apparent, so caution in
513 interpreting and generalizing the results should be exercised. Gender is commonly found to
514 impact upon survey response rate, women responding in greater proportions than men
515 regardless of topic (e.g. Porter & Whitcomb, 2005). This common bias may have been
516 heightened here as a result of the topic involved being related to animal welfare; females are
517 often found to be more sensitive and empathetic toward animal issues (e.g. Herzog, 2007;
518 Phillips & McCulloch, 2005) and so may have been more receptive and persistent with
519 regards to completion of the survey.

520

521 It was important to measure all relevant aspects with the same sample so that relationships
522 between variables could be examined. While reducing the survey's length might have

523 improved response rate, data comprehensiveness would have been lost. Rigorous screening
524 reduced the sample size even further but ensured that the sample was of the highest quality,
525 thus enabling the authors more confidently to draw valid conclusions. Novel assessment tools
526 to address the deficit of robust and relevant tools yielded results aligned with similar
527 conclusions to those of studies with adult consumers.

528

529 *Demographic influence*

530

531 Greater empathy and concern for general animal welfare issues, and specifically farmed
532 animals' welfare has been reported in females than males (e.g. Heleski & et al., 2006;
533 Herzog, Betchart and Pittman, 1991; Herzog, 2007; Phillips & et al., 2011). Here, gender
534 effects were also found on all main outcomes: females had more positive attitudes to — and
535 knowledge of — farm animal welfare, and had greater intention to identify the welfare
536 standards of the food which they consume. Other than for knowledge, for which the effect
537 size was comparatively small (Cohen, 1988) and scores were low overall, there was no effect
538 of residence for any outcome. This is not necessarily surprising. Though there is literature to
539 support such a difference, and intuitively it is expected that those rural individuals who are
540 closer to farm production would show more awareness of the issues than urban residents
541 (Fuller, 1999; Harper & Henson, 2001), differences resulting from origin of residence were
542 not always pronounced or in the expected direction (e.g. Miele, 2010; Schroder &
543 McEachern; 2004). For example, Vanhonacker & et al. (2007) found that experience of
544 farming, but not the living environment resulted in pronounced differences in how Flemish
545 respondents evaluated the current state and importance of animal welfare in Flanders.
546 Schroder and McEachern (2004) found that poor knowledge of labeling indicating production
547 systems, coupled with little desire to choose knowledgably and a clear profession of caring
548 about animal welfare were characteristic of both urban and rural adults. Very few studies
549 have addressed the influence of an urban / rural residence in children (see Muldoon,
550 Williams, Lawrence, Lakestani and Currie, 2009).

551

552 Current and childhood pet ownership has been shown to affect attitudes to animals, most
553 commonly in a positive sense (e.g. Paul & Serpell, 1993; Prokop & Tunnicliffe, 2010), and
554 dietary choices, including avoidance of certain animal products, may be attributed to an
555 underlying concern for animal welfare and rights or a more detailed level of understanding
556 about farming issues (e.g. Izmirlı & Phillips, 2011; Miele, 2010). Unfortunately within our

557 sample we were not able to address such considerations; however, future work should
558 consider their significance.

559

560 *Adolescent beliefs and knowledge about farm animal welfare*

561

562 As with adults, adolescents have little awareness of welfare problems for farm animals and a
563 poor ability to recognise product labels representative of animal welfare standards above the
564 legal minimum (European Commission, 2005; Miele, 2010). Inferences about knowledge
565 partially depend on the perception of a question's difficulty; however, five of the questions
566 simply required suggestions of a species-relevant welfare problem rather than detailed
567 knowledge or explanation. Poor knowledge means consumers may associate high welfare
568 standards with inappropriate indicators and market choices may be incongruent with
569 concerns.

570

571 Adolescents were more able to suggest a welfare problem for chickens than for any other
572 species. Constraints on questionnaire design prevented formal discrimination between
573 questionnaire fatigue and species-specific knowledge (e.g. the question order did not change).
574 Nevertheless, the presence of answers stating "*don't know*" or that species such as the dairy
575 cow "*don't have problems*" and the absence of blank responses suggest that fatigue was not
576 an issue. Our findings also correspond with adult knowledge and the effects of television
577 campaigns, e.g. 'The Big Food Fight' (broadcast January 2008, Channel 4) and Chicken Out
578 campaign (<http://www.chickenout.tv/>). Mass media influences adult consumers (Mayfield &
579 et al., 2007; Miele, 2010) and television was the most common farm animal welfare
580 information source cited by adolescents. As with adults, adolescents perceived broiler
581 chickens to have the worst welfare in the UK and sheep and dairy cows to have the best (e.g.
582 European Commission, 2005; Heleski & et al., 2006; Mayfield & et al., 2007). Their ranking
583 may also be affected by (a) the perceived distancing of dairy cows and to a lesser extent
584 sheep production from slaughter — often a main welfare concern of adult consumers (Welfare
585 Quality Project, 2007b); and (b) space allowance and outdoor access — two tangible
586 production features and areas of concern from a societal and consumer perspective (e.g.
587 Miele & et al., 2011). The latter aspect was reflected in adolescents' answers; for species-
588 specific welfare problems sheep and dairy cows were considered as "*fine*" or "*they have*
589 *space*".

590

591 *Do adolescents care about and take responsibility for farm animal welfare?*

592

593 High total scores on the AFAWS characterise individuals who think that: (a) it is important
594 that farm animals are provided with adequate space and behavioural freedom (space /
595 behavioural freedom), and are free from pain regardless of any effects this may have on
596 product prices (pain and suffering); (b) farm animal welfare is an important issue with farm
597 animals not simply being a means to consumption (importance of farm animal welfare); and
598 (c) it is their responsibility to take action which can have a positive effect on farm animal
599 welfare (responsibility / ability).

600

601 Adolescents scored the AFAWS themes positively, suggesting a positive attitude to farm
602 animal welfare in line with previous findings (DeRosa, 1987; Jamieson & et al., 2012).
603 However, both low AFAWS theme responsibility / ability scores and beliefs findings suggest
604 that adolescents perceived minimal personal responsibility to improve farm animal welfare
605 and a poor ability to make changes through choices. This finding is similar to adults where
606 concern and placement of importance does not definitively mean that consumers believe that
607 their voice as a consumer counts, and that they will act to support their beliefs, or feel or want
608 responsibility for affecting welfare standards through their purchases; a common preference
609 exists for responsibility to be delegated and enforced at a higher level, with personal choice
610 within consumption removed (e.g. Mayfield & et al., 2007; McEachern & Schröder, 2002;
611 Schröder & McEachern, 2004). In this study, the Government was ranked highly in terms of
612 responsibility, reflective of adult beliefs and UK practice where legislation is usually the
613 main tool by which minimum welfare standards are imposed (Bennett, 1997).

614

615 *Are adolescents willing and able to identify welfare standards?*

616

617 To the authors' knowledge, this is the first study to use the theory of planned behaviour to
618 assess those factors which are important in predicting adolescents' intentions to identify the
619 welfare standards of their food. A mean behavioural intention score of 4 (out of 7) indicates
620 neither a positive nor a negative intention. Measures were based on self-report and are
621 vulnerable to self-presentation bias, yet adolescents' concerns for farm animal treatment
622 (beliefs) and attribution of importance to the issue of farm animal welfare in general
623 (AFAWS) were mirrored in their positive attitude towards identifying the welfare standards
624 of their food; they tended to agree that this behaviour was both important and interesting

625 (attitude towards the behaviour). However, they disagreed that they would be able to carry
626 out the behaviour (perceived behavioural control) or that others thought that they should be
627 able to (subjective norm).

628

629 *How intentions might be encouraged*

630

631 Current educational materials and strategies aim to develop an understanding that sentient
632 animals feel pain and hence suffer and so should be treated with respect. Our results suggest
633 that adolescents are aware of this and do not dispute its importance. Although it is
634 encouraging that AFAWS total scores were towards the positive, even a knowledgeable and
635 interested individual who feels that an issue is outside of their responsibility or capability is
636 likely to remain impotent. A weak belief in individual influence has been suggested as one
637 mechanism acting to reduce any guilt associated with meat consumption, and may explain the
638 discrepancy between expressed concern and consumer choices in adults (e.g. Harper &
639 Henson, 2001). Such barriers need to be altered if the intention is to increase the likelihood of
640 welfare-enhancing behaviours being performed.

641

642 Adolescents should be able to differentiate between products to express a preference for
643 higher standards of animal welfare (traditional education to increase knowledge) and obtain
644 an element of satisfaction in their choice to sustain this behaviour. As with European adults,
645 adolescents felt that not enough information is available to them on the subject of farm
646 animal welfare (European Commission, 2007; Harper & Henson, 2001), and a large
647 proportion (38.3%) felt that they were not well informed about farm animal welfare issues
648 (cf. Mayfield & et al. (2007); a similar percentage of British consumers did not feel as well
649 informed about animal welfare issues as they should be.

650

651 However, provision of further information is not necessarily a solution if it does not directly
652 translate to knowledge. Consumers may choose voluntary ignorance and actively avoid
653 detailed information so as to remove themselves from accepting responsibility for farm
654 animal welfare, thus reducing discomfort where choices necessitate (e.g. those based on cost
655 as opposed to ethical considerations) or where current beliefs and practices do not match new
656 concerns, interpretation or knowledge offered from further information (Festinger, 1957;
657 Mayfield & et al., 2007; Te Velde & et al., 2002). As Miele and Evans (2010) point out,
658 information provision in the form of welfare labeling, can create two groups, i.e. ethically

659 competent and incompetent consumers. The latter group does not engage with information
660 and may not have the competence or inclination to accept responsibility for farm animal
661 welfare, a concern mirrored in Köhler and Wickenhäuser (2001). In the current study,
662 adolescents' low awareness of welfare issues may be the result of deliberate, functional
663 ignorance if the cost of processing the information involved, both cognitively and physically,
664 outweighed the perceived benefit. Interestingly, high scores attributed to the animal-based
665 themes within the AFAWS ('pain and suffering' and 'space / behavioural freedom') were not
666 reflected in behavioural intention, potentially as a result of adolescents suppressing these
667 concerns when faced with conflict regarding their current food choices. Though not highly
668 concerning in terms of immediate effect on the market, if such disengagement persists within
669 adolescents, their future behaviour will not reflect concerns and importance currently
670 attributed to farm animal welfare. Education to enhance knowledge or other ways of
671 information transfer, without also facilitating moral engagement and an increased sense of
672 competency, may also be ignored. If the intention is for adolescents to engage with farm
673 animal welfare and any improvements in information provisions, it is desirable for them to
674 develop into information-seeking competent consumers.

675

676 Transformative education to address cultural attitudes, values and beliefs surrounding a set of
677 behaviors may motivate change by changing the culture itself. Variation in social influence
678 has been shown to affect behaviour with regards to drinking and smoking (Russell-Bennett &
679 Golledge, 2009; Lotrean, Dijk, Mesters, Ionut & De Vries, 2010). Creating a peer
680 environment and social culture where expressing support for farm animal welfare is seen as
681 the preferable response may increase the number of adolescents making the effort to identify
682 the welfare standards of food and empower them to claim more responsibility. Further work
683 is needed to address the potential of such a solution. However, the current similarities with
684 discussions within both the alcohol-use and smoking literature suggest that these findings
685 may have value across a wider subject area.

686

687 **Conclusions**

688

689 These findings contribute to two areas of literature. First, as primarily an information-seeking
690 survey, they add to the growing literature on human-animal interactions by exploring a
691 previously un-represented issue. Secondly, this study takes the view that adolescents, as
692 future consumers, have the potential to affect farm animal welfare standards. As such, it

693 contributes to literature exploring the conditions required for consumers to make informed
694 and ethically guided decisions which match their allocations of importance and concern
695 towards farm animal welfare.

696

697 Adolescents are not immediate, large-scale consumers, but are at a stage in their lives when
698 they are increasingly beginning to make consumer choices. Though firm conclusions cannot
699 be drawn on the generalization of this study to the wider adolescent population, the results
700 indicate that within the sample here adolescents have limited knowledge of welfare problems
701 of farm animals and welfare relevant product labels but know most about chickens, perhaps
702 due to their prominence in the media. They seem to care about farm animal welfare but are
703 less aware of their power as consumers, and currently do not have either a positive or a
704 negative intention to identify the welfare standards of their food.

705

706 Presently, adolescents have the characteristics more typical of ‘ethically incompetent
707 consumers’, manifesting little inclination to seek information on — or accept responsibility
708 for — farm animal welfare and little confidence in their capacity to engage with information
709 regarding the treatment of farm animals. Thus, their interest and concern in welfare as a
710 quality of food, whilst important to maintain, was not reflected in the questions they might
711 ask and thus their considerations in future choices.

712

713 To resolve this discrepancy, adolescents should be enabled to become aware of their potential
714 power to raise welfare standards and be equipped with the necessary knowledge and
715 information by which to make and evaluate their decisions. However, though information
716 provision in the form of education may enhance adolescents’ knowledge of welfare problems
717 and their ability to identify welfare relevant product labels, it may not positively impact on
718 the wider findings. Barriers such as disassociation, voluntary ignorance and perceived lack of
719 personal influence are difficult to tackle, especially with physical separation of livestock
720 production and consumption and active avoidance of connecting the two. Increasing
721 information can even exacerbate the situation if adolescents do not feel it can easily be
722 incorporated into usual practice. Similarities between the sample here and the wider adult
723 population discussed suggest that instead a multi-faceted approach is required, including
724 research to determine the most effective means by which to provide adolescents with, and
725 empower them to request and use the information they will need to develop into ethically

726 competent consumers able to identify and engage with developments in the field of farm
727 animal welfare, if this is the preferred outcome.

728

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730

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734

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Appendices

Appendix 1. Response removal criteria; the following rules were used to determine which data were omitted from the final sample:

1. Inclusion of ridiculous and/or rude answers throughout the survey—e.g., respondent identification as a 301-year-old Yoda.
These were removed, as such answers rendered the majority of the data collected unreliable.
53 students were removed based on this criterion.
2. Ticking the same response category to sections of questions, e.g., all 4s.
These were removed, as the adolescents had simply provided one answer to every question (including both knowledge questions and responses to a Likert scale), and so it was inferred that they had not given any thought to the questions asked but had simply ticked one response to get through the exercise quickly.
115 students were removed based on this criterion.
3. Providing incomplete data sets both within questionnaire sections and across the questionnaire as a whole.
These were removed, as we wished to look for relationships among the sections and could not do this with incomplete sets.
311 students were removed based on this criterion.
4. Answering with a social desirability bias to social desirability statements—i.e., adolescents who strongly agreed to both statements “I never get angry” and “I have never even told a little lie,” measured on a Likert scale from (strongly agree) 1–7 (strongly disagree).
These were removed to account for the risk that questionnaire respondents would answer self-report questions or statements in a manner that they perceived would be viewed favorably by others rather than in a truthful manner (social desirability). Such a bias would interfere with interpreting the results. Though this reduced the number of students in the final sample, it makes the results more generalizable than if such a measure had not been included.
110 students were removed based on this criterion.
5. Respondents showing unreliable responses for 5 or more of the 14 statement pairs in the AFAWS section.
Paired statements with one worded positively and the other negatively, using a Likert scale to measure responses, had been specifically chosen in order to check whether adolescents were simply randomly ticking responses without reading the questions as they might then agree with two opposing statements. Where this occurred—i.e., students agreed with both of two contradictory statements within a pair, this pair was marked as an

973 unreliable response—e.g., responding with a 7 (strongly agree) to both the statement “It
974 doesn’t matter if a farm animal is in pain” and the statement “It is important that farm
975 animals are not in pain.” The same was true if they disagreed with two contradictory
976 statements in a pair. In addition, where a student responded in a strongly positive manner
977 to a statement or strongly negatively, but then responded with neither positive nor
978 negative for the paired statement (4), this pair was marked as an unreliable response—
979 e.g., a Likert scale response of 4 with either a “1” or a “7.”
980 262 students were removed based on this criterion.
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