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The relationship between student consumption of animal products and attitudes to animals in Europe and Asia

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Abstract

Purpose – This research aims to determine the relationship between the consumption of animal products and attitudes towards animals among university students in Eurasia.

Design/methodology/approach – A survey was conducted with collaborators in each country who supervised volunteers to personally invite 16,777 students to take part. The sample was composed of 3,433 students from 103 universities in 11 Eurasian countries. ANOVA was used to compare the responses. All analyses were conducted using the statistical packages Minitab 15 and SPSS 15.

Findings – A total of 47 per cent of university students avoided some meat products, 4 per cent were vegetarians and 0.4 per cent vegans. Students avoiding some meat did so principally for environmental and health reasons, and beef and lamb were the meats most likely to be avoided. Vegetarians avoided meat mainly for health reasons. Vegans had greater concern about humans using animals than vegetarians, who in turn had greater concerns than those avoiding some meat.

Social implications – Avoidance of animal products was related to an increased level of concern for animal rights, animal experimentation and wildlife, with vegans demonstrating the greatest concern. This implied that students' attitudes to animal welfare and rights can affect animal product-eating behaviours.

Originality/value – This study conflicts with previous studies by demonstrating that health rather than environment was a major reason for vegetarianism. The study highlights the importance of environmental, health and welfare concerns but not religion in avoidance of animal products.

Keywords Animal products, Animals, Diet

Paper type Research paper

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Introduction

In recent decades vegetarianism has increased in popularity (Dietz *et al.*, 1995; Phillips, 2005; Craig, 2009) and followers now constitute an important consumer group (Janda and Trocchia, 2001). The main reasons for adopting a vegetarian diet are believed to be ethical, environmental, socio-political and religious in nature (Fox, 1999). It is generally assumed that the link between a utilitarian attitude to animal suffering and vegetarianism is relatively straightforward. It is acknowledged that for any given person utility-based vegetarianism is causally impotent in reducing the overall number of animals raised for food, given the scale of animal agribusiness (Garrett, 2007). However, the scale of vegetarianism and veganism may be dwarfed in their effect on animal agriculture by the number of people that avoid some animal products.

Animal product avoidance may be explained by some of the factors that affect the decision to be vegetarian. These have been variously reported as health and the ethical treatment or welfare of animals (Spencer *et al.*, 2007; Fox and Ward, 2008) or environment (Kalof *et al.*, 1999). This has been elaborated upon by a study in Belgium, where attitudes towards specific meats have been identified as a concern for safety in beef, a concern for safety, leanness and animal welfare in pork and a perception of poultry being a healthy meat (Verbeke and Viaene, 1999). These concerns caused consumption of beef to decline most, then pork and finally poultry between 1995 and 1997.

People avoiding meat are potentially concerned more about animal issues than those not avoiding animal products. In the present study, we aimed to explore the reasons for avoiding animal products and the relationship with consumption of animal products and attitudes to animal issues. We utilised data from a survey (Meng, 2009; Meng *et al.*, 2009) of the student population in a wide range of Eurasian countries to give our study international applicability and relevance to the future leaders in society.

In this paper, we describe the attitudes towards animals of students that avoided meat at different levels and investigated their correlation with their reasons for meat avoidance and their attribution of sentience to a variety of animal species.

Methods

The survey method was approved by the Human Ethics Committee of the University of Queensland and has been described in full previously by Meng (2009). In brief, a call was distributed through relevant organisations, e.g. International Society for Applied Ethology, for volunteer academic collaborators to organise the survey in their country. Suitable collaborators volunteered in 21 countries worldwide, but those in nine countries dropped out over the course of the project, leaving 12 countries representing a convenience sample. Subsequently Portugal was also excluded because of the low response rates to the survey. Those remaining represented a broad spectrum of cultures and geographical regions in Europe and Asia (China, Czech Republic, the UK, Iran, Ireland, South Korea, Macedonia, Norway, Serbia, Spain, and Sweden). In all cases except Norway and Sweden, where access to entire student populations by e-mail was possible, collaborators organised a team of student volunteers in a representative sample of universities in their country. In the case of Norway and Sweden the initial approach to students was by e-mail. Student volunteers were tasked with approaching students at a central location in the university (not related to any subject area) and asking them if they would take part in a social survey. This was anticipated to avoid

the potential bias of students that were particularly interested in animals being more likely to agree to participate on this topic. The survey format and content was discussed and agreed by all collaborators, and the survey was then translated by the collaborator and checked by a third-party for accuracy and consistency of meaning. The target number of respondents was related to each country's population. If they agreed the students were asked to give their e-mail address to the volunteer. Weblinks to the survey were then distributed to the students by e-mail with an accompanying password. Animal and World Issue questions were randomised in their order of presentation for each respondent.

Students were asked whether they avoided eating animal products, with the following possible responses:

- No, there are no animal products that I avoid eating.
- I avoid certain types of meat.
- I am vegetarian and avoid eating meat.
- I am vegan avoiding eating all animal products.

They were also asked to specify which animal products they ate regularly, from beef/veal, eggs, lamb, milk, poultry meat and seafood. If they avoided meat at all, they were asked to specify the major reason, from health concerns, religious instruction, concerns for the suffering of animals or for the environment.

Students were also asked about the acceptability of 43 animal issues and importance of 13 world issues. The 43 issues were originally based on the major human concerns about our use of animals. These are:

- the use of animals;
- animal integrity;
- killing animals;
- animal welfare;
- experimentation on animals;
- changes in animal genotypes;
- animals and the environment; and
- societal attitudes towards animals.

Each concern was represented by approximately five questions. The questions were chosen by the project team, including country collaborators, to be of international, not regional concern, and to be mutually exclusive. They were as follows:

Use of animals

- AI No. 1 Keeping animals for the production of food or clothing.
- AI No. 2 Keeping animals as pets.
- AI No. 3 Keeping animals for the education of the public in zoos, wildlife parks etc.
- AI No. 4 Using animals for work.
- AI No. 5 Using animals for entertainment or sports.

Animal integrity

- AI No. 6 Operations on animals to improve their health.
- AI No. 7 Decoration of animals, such as dying or cutting their hair for aesthetic reasons.
- AI No. 8 Desexing by hormone implants.
- AI No. 9 Removal of a body part, such as tail docking, or declawing.
- AI No. 10 Marking animals by branding or ear notching.
- AI No. 11 Removal of dead tissue, such as hair/wool removal or foot trimming.

Killing animals

- AI No. 12 Killing young animals that are dependent on their parents.
- AI No. 13 Allowing animals to experience pain during slaughter.
- AI No. 14 Using animals for products after their natural death.
- AI No. 15 Killing animals when they are seriously injured or ill.
- AI No. 16 Euthanasing healthy and unwanted pets because of overpopulation.

Animal welfare

- AI No. 17 Depriving animals of their needs for food and water.
- AI No. 18 Depriving animals of an appropriate environment to rest, including shelter.
- AI No. 19 Inflicting pain, injury or disease on animals.
- AI No. 20 Not providing sufficient space, proper facilities and company needed for animals.
- AI No. 21 Subjecting animals to conditions and treatment which cause mental suffering.

Experimentation on animals

- AI No. 22 Observing animal behaviour in an experiment.
- AI No. 23 Experiments to improve AW or health.
- AI No. 24 Medical experiments using animals to improve human health.
- AI No. 25 Testing cosmetics or household products on animals.
- AI No. 26 Operating on living animals for the benefits of human medicine research.

Changes in animals' genotypes

- AI No. 27 Increasing animals' reproductive or productive capabilities by genetic changes, e.g. cows producing more milk.
- AI No. 28 Increasing animals' health or disease resistance by genetic changes.
- AI No. 29 Creating farm animals that are more profitable because they feel happy with little stimulation and have little desire to be active.

- AI No. 30 Genetic selection of pet animals, such as dogs and cats, to increase their rarity, potential for showing or pedigree value.
- AI No. 31 Genetic modification of crops grown for animal foods.

Animals and the environment

- AI No. 32 Killing animals because they are not native to the area where they live.
- AI No. 33 Killing wild animals to stop the spread of diseases that could affect humans.
- AI No. 34 Controlling wildlife populations by killing.
- AI No. 35 Controlling animal populations by sterilization.
- AI No. 36 Destroying the habitat of endangered animal species.
- AI No. 37 Destroying the habitat of non-endangered animal species to develop and promote urbanization or crops to feed humans.

Societal attitudes towards animals

- AI No. 38 Sacrifice of animals in religious rites.
- AI No. 39 Considering some animal species as sacred or good luck symbols or totems.
- AI No. 40 Considering some animal species as evil or bad luck.
- AI No. 41 Parents displaying cruel treatment of animals in front of their children.
- AI No. 42 Inflicting pain or injury on animals as part of cultural traditions.
- AI No. 43 Cloning animals for human benefit.

Students were asked to rate the acceptability of the practices described on a Likert scale of 1, extremely unacceptable to 5, extremely acceptable. A total of 13 questions were asked concerning major world social issues and students were asked to give their opinion about how important each was, on a scale of 1, not important, to 7, extremely important. The questions were:

- WI No. 1 Animal protection.
- WI No. 2 Professional ethics.
- WI No. 3 Capital punishment.
- WI No. 4 Environmental protection.
- WI No. 5 Racial equality.
- WI No. 6 Genetic engineering.
- WI No. 7 Equality for lesbian, gay, bisexual and transgender.
- WI No. 8 Human cloning.
- WI No. 9 Human euthanasia.
- WI No. 10 Reducing poverty.
- WI No. 11 Sustainable development.
- WI No. 12 Women right.
- WI No. 13 Peace and security.

Students were also asked to rank the following animals in relation to their capacity for feeling (hereafter termed sentience): cat, cattle, chicken, chimpanzee, dog, dolphin, fish, horse, human infant, octopus, pig and rat, using the approach of Herzog *et al.* (1991).

A pilot survey was conducted to test the methodology for recruitment of questionnaire respondents, which elicited a 50 per cent willingness to take part in 100 students approached and 17 completed questionnaires.

Statistical analysis

Previous analysis of the survey data utilised the responses to the 43 Animal Issues for a factor analysis that identified seven indices (Meng, 2009) representing views on use of animals: animal welfare, animal rights, unnatural practices on animals, killing animals, animals in experimentation, wildlife and animals as spiritual symbols (indices adopted from Meng (2009), but renamed for greater clarity). The formulae for creating the index scores, adopted from Meng (2009) and listed by question in order of declining importance, were:

- *Animal welfare index* = 98.8 − 6.2 A18 − 5.2 A13 − 4.3 A17 − 2.7 A12 + 2.5 A2 − 1.6 A9 − 0.5 A5.
- *Animal rights index* = 104 − 2.6 A8 − 2.4 A1 − 1.9 A12 − 1.8 A3 − 1.6 A13 − 1.6 A10 − 1.6 A5 − 1.5 A4 − 1.2 A9 − 1.1 A7 − 0.8 A.2
- *Unnatural practices on animals index* = 116 − 4.0 A28 − 3.9 A30 − 3.4 A27 − 3.0 A31 − 2.5 A3 − 2.2 A7 − 2.3 A36 − 1.9 A8 + 1.9 A12 + 1.9 A10 − 1.7 A2.
- *Killing animals index* = 107 − 3.6 A14 − 3.4 A22 − 3.1 A11 − 3.1 A4 − 2.8 A15 + 2.6 A36 − 2.3 A32 − 2.2 A8 − 2.0 A1 − 2.0 A12 + 2.0 A20.
- *Animals in experimentation index* = 115 − 5.2 A24 − 4.0 A26 − 3.5 A23 + 3.3 A36 + 2.2 A8 + 2.2 A30 + 1.9 A37 − 1.9 A43 − 1.8 A33 − 1.8 A1 + 1.7 A18).
- *Wildlife index* = 92 − 4.9 A37 − 4.4 A33 − 4.1 A36 − 3.2 A34 + 2.7 A22 − 2.6 A16 + 2.2 A14 − 2.0 A20 + 1.9 A25 − 1.8 A2 − 1.8 A9.
- *Animals as spiritual symbols index* = 108 − 6.5 A39 − 5.6 A40 − 4.9 A2 − 3.1 A6 − 2.3 A42 − 2.2 A9 − 1.8 A23 + 1.8 A29 − 1.8 A38 + 1.5 A35 − 1.3 A28).

In addition to the animal indices previously described for this study, a factor analysis was conducted for the world issues that summarised attitudes to these issues in one value, containing the following questions (again in order of declining importance):

- World issues index = 0.17 W4 + 0.16 W10 + 0.16 W11 + 0.16 W12 + 0.16 W5 + 0.15 W13 + 0.15 W1 + 0.15 W2 + 0.1 W7 + 0.09 W3 + 0.09 W6 + 0.08 W9 + 0.04 W8.

Binary logistic regression, ANOVA, and Chi square analyses were compared in terms of their effectiveness for modelling the data. Because binary logistic regression and ANOVA gave similar and more discriminating results than Chi Square, and the data either approximated a normal distribution or could be manipulated to a normal distribution, ANOVA was selected because of its flexibility for modelling the data. Following an initial analysis the residual data distribution was examined and where necessary transformed to approximate a normal distribution. This was only required

for two variables, the animal welfare and genetic change indices, and a squared function gave the necessary approximately normal distribution. The model for data responses included avoidance of animal products, reasons why food was avoided nation, ethnic group (nested within nation), gender, level of education, area of study, place of residence, religious affiliation and animal protection organisation participation. Only avoidance of animal products and the reason for this avoidance are considered in this paper, with least square means presented, other aspects having been considered separately (Phillips *et al.*, 2011). All analyses were conducted using the statistical packages Minitab 15 and SPSS 15.

Results

A total of 3,433 responses were obtained from 16,777 students that provided their e-mail addresses in 103 universities. Almost half of the respondents avoided some meats; 4 per cent were vegetarian and 0.4 per cent vegan (Table I). Students avoiding some meats mainly gave the environment and their health as the reason, whereas most vegetarian students gave their health as the main reason. Religious instruction was cited by very few students in all categories (Table II).

Of the students that did not avoid any meats, all consumed beef and nearly all consumed pork, poultry meat and eggs (Table III). About three quarters of them consumed milk but only about one half consumed lamb or seafood. Of the students that indicated that they avoided some meats, there was the greatest reduction in the proportion eating beef and lamb, compared with those that did not avoid any meats;

Table I.
Frequency of food avoidance

	n	%
Food avoidance		
No meats avoided	1,658	48.3
Some meats avoided	1,628	47.4
Vegetarian	133	3.9
Vegan	14	0.4
Reason for food avoidance		
Animal suffering	207	16.5
Environment	479	38.1
Religious instruction	66	5.3
My health	504	40.1

Table II.
The avoidance of animal products and the reasons for that avoidance

	Some meats avoided		Vegetarian		Vegan		
	n	%	*n*	%	*n*	%	Total responses
Animal suffering	196	17	10	10	1	14	207
Environment	468	41	9	9	2	29	479
Religious instruction	62	5	3	3	1	14	66
My health	421	37	77	78	3	43	501
Total responses	1,147	100	99	100	7	100	1,253

Notes: Chi-Square = 68.573, $p < 0.001$

there was also a small reduction in the proportion consuming pork and poultry and a very small reduction in the proportion eating eggs, milk and seafood. Vegetarian respondents indicated that they nearly all avoid beef, lamb and pork, a few consumed poultry and seafood and most consumed eggs and milk. No vegans reported eating any of the animal products mentioned.

Vegans had greater concern for animal welfare, animal rights, animals in experimentation, wildlife and animals as spiritual symbols than students that only avoided some meats or no meats (Table IV). Vegetarians had animal welfare, animal rights and animals in experimentation index scores in between vegans and those avoiding some or no meat, but in other indices were similar to the latter two groups. Those avoiding some meats had higher levels of concern about killing animals than the other three groups, and vegetarians had particularly high levels of concern about unnatural animal practices.

The animal welfare index was highest for those citing animal suffering as the reason for avoiding animal products, then those that cited the environment and finally those citing their health and religious instruction (Table V). Students citing animal suffering as the major reason for animal product avoidance had greater concern for wildlife than those citing religious instruction or their health. They also had a greater animals-in-experimentation index score than those citing their health.

Perceptions of sentience were not affected by avoidance of animal products ($p > 0.05$). However, people who did not eat meat for animal suffering or health reasons had a greater difference in perception of sentience between the high scoring chimpanzee and the lower scoring animals, chicken and fish, compared with those who avoid meat for environmental or religious reasons (Table VI). This suggests that they perceived a wider range of sentience levels in the different animal species.

Discussion

This survey used novel techniques for recruitment of students across a major part of Europe and Asia, a logistical problem that has made this type of research difficult in the past. With opportunities for electronic transfer of survey forms and responses, such development of such techniques offers the possibility to investigate global attitudes much more easily than in the past. However, because of the scale and breadth of the survey co-ordination of collaborators' activities assumed a major importance. One area in which difficulties could potentially be experienced was translation as it was impossible with so many countries to arrange back-translation, as is usually advocated for such cross-cultural research (Brislin, 1970; Berry *et al.*, 2002). However, consistency

Table III.
Consumption of meat and other animal products by respondents who had indicated that they did not avoid meat, they avoided some meats or that they were vegetarian or vegan, together with the percentage of students indicating that they consumed each animal product

Percentage of total	No meat avoided		Some meats avoided		Vegetarian		Vegan	Probability p
	n	%	n	%	n	%		
Beef	108	100	761	47	1	1	0	<0.001
Lamb	58	54	319	20	1	1	0	<0.001
Pork	97	90	1,044	64	3	2	0	<0.001
Poultry meat	94	87	1,218	75	5	4	0	<0.001
Eggs	97	90	1,313	81	92	69	0	<0.001
Milk	85	79	1,211	74	106	80	0	<0.001
Seafood	56	52	696	43	36	27	0	<0.001

Table IV.
The relationship between avoidance of animal products and animal issues indices

	Animal welfare[2]	Animal welfare	Animal rights	Unnatural animal practices	Killing animals	Animals in experimentation	Wildlife	Animals as spiritual symbols
No meats avoided	5,409	73.5	52.7	57.3	46.9	53.4	54.7	46.7
Some meats avoided	5,340	73.1	56.5	55.4	53.8	56.1	59.9	45.0
Vegetarian	6,570	81.1	59.3	63.4	43.9	70.2	59.6	46.0
Vegan	7,237	85.1	63.2	56.7	40.4	77.4	63.0	55.4
Chi-square	60.57		113.91	19.35	129.92	78.73	74.98	11.23
p value	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	0.01

	Animal welfare[2]	Animal welfare	Animal rights	Unnatural animal practices	Killing animals	Animals in experimentation	Wildlife	Animals as spiritual symbols
Animal suffering	7,256[a]	85.5	65.6[a]	68.2	52.1	72.7[a]	60.9[a]	52.4
Environment	6,821[b]	82.2	64.9[a]	69.8	51.7	70.5[b]	60.1[a]	52.9
Religious instruction	6,366[c]	78.7	59.7[c]	63.3	46.2	70.6[b]	55.0[c]	53.0
My health	6,700[b]	81.1	63.1[b]	67.0	51.3	69.6[b]	57.2[b]	53.6
SED	70.75		0.45	0.81	0.65	0.68	0.63	0.70
p value	<0.001		<0.001	0.15	0.19	0.02	<0.001	0.73

Notes: Means with different superscripts within a column are significantly different ($p < 0.05$) by Student's "t" test

Table V.
The relationship between the reason for avoidance of animal products and animal issues indices

	Human infant	Chimpanzee	Dog	Dolphin	Cat	Horse	Cattle	Pig	Rat	Chicken	Octopus	Fish
Animal suffering	10.1	9.5^{ab}	9.2	9.2	8.9	7.7	4.7	5.4	4.6	3.7^{b}	3.0	2.1^{bc}
Environment	10.0	9.3^{b}	9.3	8.7	9.0	7.6	4.7	5.7	5.1	4.1^{a}	2.6	2.2^{b}
Religious instruction	10.4	9.4^{b}	9.2	8.5	9.0	7.7	4.6	5.5	4.9	4.0^{ab}	2.5	2.8^{a}
My health	9.8	9.8^{a}	9.5	8.9	8.5	7.6	5.0	5.9	4.8	3.6^{b}	2.5	1.8^{c}
SED	0.21	0.19	0.15	0.22	0.17	0.16	0.16	0.18	0.20	0.16	0.18	0.19
p value	0.38	0.05	0.08	0.22	0.36	0.21	0.66	0.49	0.17	0.01	0.13	0.02

Notes: Means with different superscripts within a column are significantly different ($p < 0.05$) by Students' "t" test

Table VI.
The perceptions of sentience in specified animals by respondents for the reason of avoidance of animal products

of meaning was assured by effective checking of the translated version and discussion of discrepancies with the translator. It was not possible to identify different responses concerning food consumption from students in the various countries included in this survey because of small numbers of students in some countries. However, differences between students in the different countries have been identified for their attitudes towards animals (Meng, 2009; Meng *et al.*, 2009). Religious influences were not found to exert a major influence on attitudes to animals (Meng, 2009).

Just over one half of the students avoided some or all meat, despite the fact that meat consumption in many regions of the world is increasing (Beardsworth and Bryman, 2004). In the present study, approximately 4 per cent of students considered themselves vegetarian and 0.4 per cent vegan. In the UK the number of people who claim to be vegetarian has increased considerably during the last half century; statistics from the Second World War suggest that 0.2 per cent of the population were vegetarian in the 1940s, and it is estimated that, in 2000, between 3 and 7 per cent of the population were vegetarian (Spencer, 1993). Between 5 (Kalof *et al.*, 1999) and 7 per cent (Dietz *et al.*, 1995) of US citizens claim to be vegetarians. The proportion claiming to be vegetarian in our study (4 per cent) is similar; however, it might be expected to be greater in students than the general populace. We found that even though vegetarians indicated that they avoid all meats, they mostly consumed eggs and milk and approximately one quarter consumed seafood. Consumption of these products is anticipated to be because of their high nutritional value, for example milk is acknowledged to be one of the most economical alternative sources of limiting nutrients to meat, especially calcium, potassium, and magnesium (Weaver, 2009).

The cost of meat may also influence consumption. For example, the primary meat in Chinese diets is pork, which has the lowest price of any meat in China. Poultry, beef, mutton, and fish are considered luxuries within the meat budget allocation of Chinese households and have lower consumption levels (Ortega *et al.*, 2009). Thus the meat price relative to student income may be an important factor influencing consumption.

According to a study in Sweden and Norway (Larsson *et al.*, 2002), low levels of meat consumption are seen mainly as a female phenomenon. We have previously reported from this survey that there were differences between males and females in the avoidance of animal products (Phillips *et al.*, 2011). Females were more likely to avoid meat than males, and the proportion of female vegetarians was three times that of males. Females were much more likely to cite their health as the main reason for avoiding eating or using animal products, whereas males were more likely to cite the environment and, to a lesser extent, animal suffering. Of the small proportion of students that cited religious instruction as the reason, most were males. Female students were more likely than male students to avoid meats, particularly the red meats, beef, lamb and to some extent pork and less likely to avoid eggs, milk and seafood than male students.

According to the study of Spencer *et al.* (2007) the most commonly cited reason for self-reported vegetarianism was health (66 per cent). Less common reasons were animal welfare (47 per cent), environment (34 per cent), better taste (31 per cent), religion (28 per cent), weight control (14 per cent), and "other" reasons (11 per cent). Another study has found that the strongest predictor of vegetarianism as a dietary choice is the belief in supporting the environment (Kalof *et al.*, 1999). This was not supported by our study, which indicated that concerns about health were more important than the environment. However, those avoiding just some meats cited the

environment as the most important reason, and then health. Recent publicity given to the impact of livestock farming on climate change has focused on the adverse effects of the world's cattle industries (Rifkin, 1992; Steinfeld *et al.*, 2006) which is likely to be related to our finding that those students avoiding some meat were most likely to avoid eating beef and lamb. Red meat consumption has been linked by consumers to many concerns about human health, in particular transmissible diseases, heart disease, cancer, obesity and cardiovascular disease (Verbeke and Viaene, 1999).

Some social structural variables have a direct influence on vegetarianism as a dietary choice (Kalof *et al.*, 1999). Altruistic values increase, and traditional values decrease the belief that vegetarianism is beneficial to health, the environment, farm animals, and world hunger. There is a dichotomous nature to arguments about the relationship between food and health, since food can both promote health and cause ill-health (Wilson *et al.*, 2004). Meat-eating as a dominant practice is supported by the rhetorical use of notions of "balance", implying moderation, inclusion and rationality (Wilson *et al.*, 2004). Thus tradition plays an important part in attitudes towards meat consumption, especially red meat consumption (Wulff *et al.*, 1998).

There is a complex relationship between animal activism and vegetarianism; nearly half of animal activists eat meat, and half of vegetarians do not consider themselves to be animal activists (Herzog and Golden, 2009). Kubberød *et al.* (2006) studied about vegetarianism and found that there is positive relationship with the moral concerns for animals. In our study, we found a positive relationship between avoidance of animal products and levels of concern for animal rights, animal experimentation and wildlife indices. Vegans had the highest levels of concern. The particularly high level of concern about killing animals in students that avoided some meat suggests that this could be a major reason for their avoidance, and it further suggests that it is an ethical concern about life termination, not related to animal suffering during slaughter, since only 17 per cent cited this as a reason for their avoidance.

Perception of animal sentience appeared to be partly driven in our study by people's concern about animal suffering, with greater difference between most and least sentient species in those with high levels of concern. An international student survey has similarly found that students opposing, or advocating constraints on the use of animals in society attributed more sentience to those animals (Phillips and McCullough, 2005).

Implications

The conclusions of the study might be important because of the students' responses included 11 countries in Eurasian that was very wide range. Therefore, the conclusions give us broad and comprehensive implications.

This study indicates that student' attitudes to animal welfare and rights are related to eating attitudes and behaviours. It derives from a broad base of the student population in Europe and Asia and therefore has widespread applicability. The strengthening animal rights and welfare and environment movements might be expected to result in an increasing number of vegan and vegetarian students. It is important that students are not stigmatised by their meat eating position because it clearly relates to deeply held views on the environment, animal welfare and to a lesser extent, their religion. In an increasingly mixed culture student population tolerance to meat consumption preferences is very important in maintaining racial harmony.

Choosing to avoid meat consumption may be of increasing significance in a health-conscious world, where many infectious diseases are controlled, but there is a perceived relation between meat consumption and other diseases, especially cardiovascular and certain types of cancer. That students chose to become vegetarians primarily because of health concerns suggests that food choices in the young are changing in response to beliefs about the harmful effects of meat consumption. Older or less well educated members of society may be less likely to change their meat consumption habits because of tradition. These attitudes towards meat consumption may have major implications for employment in the livestock industries.

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