Brazilian attitudes towards the use of animals in research

Atitudes de brasileiros no uso de animais em pesquisa

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Abstract

Little research has examined the views of Latin Americans on the use of animals in research. This study examined the degree to which Brazilians support the use of animals in research and the reasons they put forth to explain their position. Participants were randomly assigned to research scenarios describing the use of animals for biomedical or environmental benefits, and varying in the number of pigs required. Each scenario began by proposing the use of conventional pigs and then advanced to the development and use of genetically modified animals (GMA). A total of 151 quantitative and 307 qualitative answers were analysed. Scenario and number of animals had little effect on support, but opposition increased from 25% to 58% when pigs were used to develop a GM strain for the environmental scenario. Support to use of animals was often conditional upon adequate protection of the animals' welfare. Participants were less willing to support research on environmental scenario when this involved the creation of GMA, in part because they feared the risk associated with this technology.

Keywords: Animal ethics. Animal welfare. Animal experimentation. Genetic engineering.

Resumo

Há poucos estudos sobre a opinião de latino-americanos quanto ao uso de animais em pesquisa. Este estudo avaliou o grau de apoio e as motivações de brasileiros em relação a essa questão. Os participantes foram aleatoriamente apresentados a dois cenários, um biomédico e outro ambiental, variando também o número de animais usados. Cada cenário se iniciava com o uso de suínos convencionais e prosseguia com o desenvolvimento e uso de animais geneticamente modificados. Foram analisadas 151 respostas quantitativas e 307 qualitativas. O cenário e o número de animais tiveram pouco efeito no apoio ao uso dos animais, no entanto, a oposição aumentou de 25% para 58% quando o uso de suínos geneticamente modificados foram apresentados no cenário ambiental. O apoio ao uso de animais em pesquisa estava frequentemente condicionado ao grau de bem-estar animal, e o apoio à pesquisa diminuiu com o uso de animais geneticamente modificados, em parte, devido aos riscos associados a essa tecnologia.

Palavras-chave: Ética animal. Bem-estar animal. Experimentação animal. Engenharia genética.

Introduction

The use of animals in research is widespread, as is public criticism of this form of animal use (ROLLIN, 2003). The total number of animals used for experimental and other scientific purposes in Member States of the European Union (EU) in 2008 was twelve million (EUROPEAN COMMISSION, 2010b). Little data is available for much of Latin America. In Brazil, there is no official reporting of the number of animals used in research. One recent study attempted to estimate numbers using bibliographic methods, and calculated that 216,223 vertebrates were used in research in 2006 in just one of the twenty-seven Brazilian states (SILLA et al., 2010), and Taylor et al. (2008) estimated a total of 1.2 million vertebrates.

In response to public concerns, some countries have developed policies that regulate the treatment of animals in research (OLFERT et al., 1993; EUROPEAN COMMISSION, 2010b), and some have also monitored public opinion related to animal use and in particular to biotechnology such as genetic modification (EUROPEAN COMMISSION, 2010a). In Brazil, the Arouca Act (BRASIL, 2008) established the National Council for the Control of Animal Experimentation (CONCEA) and required research and teaching institutions to establish an ethics committee on the use of animals. The Brazilian Environmental Act (BRASIL, 1998) established penalties for using animals in experiments if alternative methods are available, although enforcement appears to be lax (BONES et al., 2014).

The use of genetically modified (GM) animals in research is increasing rapidly (ORMANDY et al., 2009), and some of this research has targeted farm animals. In Brazil, the Recodisa Project genetically modified goats to produce milk with human enzyme lyzesome, useful for treating childhood diarrhea (CARVALHO et al., 2012). However, there are a number of public concerns about the use of GM animals, including perceived risks associated with this technology (FREWER, 2004). The objectives of this paper were to describe the range of views of Brazilian participants on use of animals in biomedical and environmental research, and determine the reasons the participants put forth to explain their position.

Material and Methods

This study was approved by the Behavioural Research Ethics Board at the University of British Columbia (H06-80532).

Survey design

An interactive online engagement tool designed to investigate public perceptions of new technologies was used. Following Schuppli et al. (2013) study, participants were asked their views on the use of domestic pigs for research in order to improve organ transplant success in humans (the biomedical scenario, BS) and to reduce agricultural pollution (the environmental scenario, ES). The species was selected because it fits both scenarios, since pigs are widely used for human consumption and medical research worldwide. In addition, as a domestic animal, pigs would be familiar to most respondents.

Both scenarios included a proposal to create or use genetically modified pigs, and the ES also included a proposal to feed pigs GM corn. The proposed number of pigs varied from ten to 1000. Participants were randomly assigned to a scenario and a proposed number of pigs. After they were introduced to the study goals, demographic information was requested and a series of three questions was presented, asking participants to indicate their level of support for this use of pigs using a six-point Likert scale (strong yes, weak yes, neutral, weak no, strong no, undecided). In the BS the following series of questions were proposed: 'Would you support the use of (X) pigs (where X = ten, 100 or 1000) for research on organ rejection', 'Would you support the use of (X) pigs to develop a genetically modified strain for research on organ rejection?' and 'Would you support the use of (X) genetically modified pigs for research on organ rejection?'. In the ES, the following questions were proposed: 'Would you support the use of (X) pigs for research to reduce phosphorus pollution from pig farms', 'Would you support the use of (X) pigs for research to reduce phosphate pollution by feeding the pigs genetically modified corn' and 'Would you support the use of (X) pigs to develop a genetically modified pig to reduce phosphorus pollution from pig farms?' Following each question, participants were provided with an open-ended text box and invited to explain their answers. All quotes presented were translated from Portuguese by the first and second authors.

Participant recruitment

Participants were recruited using two methods. First, through e-mail messages to colleagues in veterinary medicine and animal science programs working in Brazilian universities, and from personal contacts, obtained from the Ministry of Education (MEC) (http://portal.mec.gov.br/sesu/) and the Federal Veterinary Medicine Council (CFMV) (http://www.cfmv.org.br/portal/index.php) websites. Second, from personal contacts, through a variant of the purposive sampling, known as snowball sampling (PALYS, 2003). The intention was not to collect a random or representative sample of members of public, but rather to focus on individuals aware of animal issues. Data collection took place from November 2008 to April 2009. A total of 210 participants answered the first question (106 on BS and 104 on ES). This number decreased to 175 (87 on BS and 88 on ES)

on the second question and 151 on the third question (78 on BS and 73 on ES). Most respondents were from Brazil (96.6%), were young (64.4%, 19-29 years), female (55.7%), well educated (56.4% graduate and 32.8% post-graduate level), were currently or had been pet owners (98.8%) and ate meat (88.4%). About 82.3% of respondents considered themselves familiar with animal research, 36.0% with genetic modification, 92.5% with animal welfare, and 89.1 % with ethical issues.

Statistical analyses of quantitative data

Only participants who answered all the three questions were considered in this analysis. To evaluate the level of support of respondents, strong yes and weak yes answers were considered as supportive, and strong no and weak no were considered as non-supportive. Kruskal-Wallis test was used to compare responses between scenarios. A chi-square test was used to compare responses between questions within each scenario and according to the number of animals in each question.

Analysis of qualitative data

Participants who answered one, two or all three questions were included in the qualitative analysis. First, comments were compared to Likert responses and classified as: support regardless of other factors (SR), conditional support (CS), no support (NS), and uncertain or indifference (UN). Comments were grouped into themes extracted from respondents' answers following the methods described by Knight and Barnett (2008). All themes were evaluated according to the emphasis given by the respondents, and one comment can have more than one identified theme.

Results and Discussion

Quantitative results

We analyzed responses from 151 participants (51% from the BS and 49% from the ES). The level of support for the use of animals in research of 55% in the current study was similar to that reported elsewhere in the literature. For example, the support in other studies ranged from 30% to 70% (CRETTAZ VON ROTEN, 2009, 2012; IPSOS MORI, 2012). Schuppli et al. (2013) found similar levels of support to the identically worded BS, despite using English speaking respondents, mostly from Canada and the United States. The similarity in support in these two studies is not consistent with the work of Franzen and Meyer (2010) who claimed that public attitudes towards animal research was higher in industrialised versus post-industrialised countries.

For the BS, 28% were opposed to the proposed research when it involved non-GM animals (Question 1), but opposition tended to increase to 41% when the research proposed the creation of a new line of GM pig (Question 2, P = 0.09) and to 42% with the use of GM pigs (Question 3, P = 0.057) (Figure 1). For the ES, 25% were opposed to the proposed research when it involved non-GM animals (Question 1). Opposition tended to increase to 37% when the research proposed the use feeding pigs of GM corn (Question 2, P = 0.07) and increased further to 58% with the creation of a new line of GM pigs (Question 3, P < 0.0001).

There was no difference between the two scenarios for opposition to the use of non-GM animals (Question 1 in both scenarios; P = 0.157). In contrast, Schuppli et al. (2013) found that mostly North American participants were more supportive of the use of non-GM pigs for the ES than for the biomedical use. According to Franzen and Meyer (2010) and Crettaz von Roten (2012), respondents from richer countries typically report higher levels of environmental concern. With the creation of a new line of GM pigs, fewer respondents were opposed in the BS compared to the ES (41% in Question 2 in the BS versus 58% in Question 3 in the ES; P = 0.02), which means that participants were also more cautious about the use of the GM pigs in the ES. As argued by Schuppli et al. (2013), these effects may be based on concerns about pigs intended for human consumption. People often avoid foods that they associate with negative attributes, including beliefs about negative impacts on the environment and risks to human or animal health (FREWER et al., 2004).

Our results showed only a weak effect of the number of animals on participant support. For the BS, level of opposition was higher to 1000 animals compared to ten and 100 for Question 1 (P = 0.009, P = 0.002); and was higher for ten and 1000 animals compared to 100 for Question 3 (P = 0.03, P = 0.02). For the ES, the level of opposition was higher for 100 animals compared to ten and 1000 for Question 1 (P = 0.018, P = 0.009). Crettaz von Roten (2012) found that acceptance of animal use for medical research was not related to the number of animals used. Schuppli et al. (2013) also found little influence of numbers of research animals on attitudes.
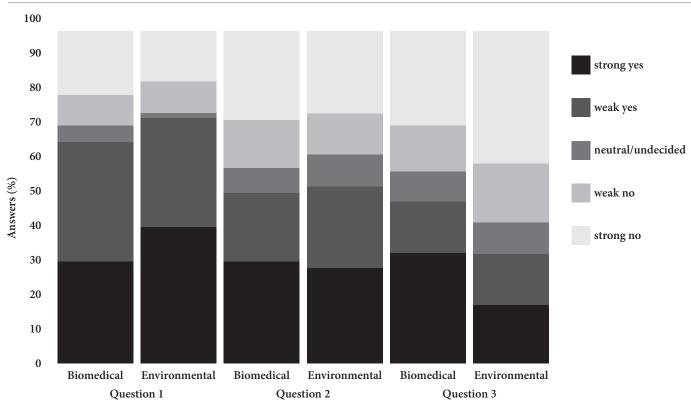
Figure 1 - Percentage of Brazilian respondents in the biomedical scenario (78 participants) and the environmental scenario (73 participants), according to level of support to the use of animals using a Likert scale, November 2008 to April 2009. Biomedical scenario: question 1, use of non-genetically modified (non-GM) pig; question 2, creation of a GM pig; question 3, use of GM pig. Environmental scenario: question 1, use of non-GM pig; question 2, use of GM corn; question 3, creation of GM pig

Qualitative results

Participants provided a total of 307 comments, 141 in BS and 166 in ES.

Animal-based motivation

Many of the comments (33%) across both scenarios were based on concerns about animals (Table 1). Half of the conditional decisions cited welfare concerns. Some of these cited general concerns, relevant to both scenarios, such as reducing pain and suffering of animals or regarding the conditions in which animals were kept. For example, one participant wrote: 'I think that when we use animals to the benefit of humans, we should first consider the needs of the animals. If they are to (involuntarily) give their lives for us, these pigs should have an appropriate environment to express their natural behaviour. They must have proper feed and everything to provide them with a happy life, and not be locked in bad and small places, without adequate structure'. Some participants referred to the rights of the pigs (3% of all comments). For example, participants suggested that humans do not have the right to genetically modify

animals or treat them as 'slaves'. Participants spoke of the rights of animals to be respected and to have freedom. One participant based their concern on a belief in sentience of pigs: 'Pigs are similar to human beings. They are sentient: can feel pain, frustration and pleasure. This means that these animals have value and also have some rights, we cannot use them solely for our benefit'. Concerns about pain have figured prominently in earlier studies of public attitudes towards animal research (HAGELIN et al., 2003; LUND et al., 2014). These quotes illustrated the importance of welfare concerns in people's willingness to support animal research. Requiring and documenting compliance with high welfare standards, including pain prevention, is thus likely to improve public acceptance of animal use. Information regarding compliance is typically unavailable to the public in Brazil (SILLA et al., 2009). Typically, this documentation would be responsibility of governing bodies such as the Animal Ethics Committee. Governance structures were rarely mentioned in the responses, suggesting a lack of awareness or a lack of trust in their ability to ensure high welfare for the research animals.

Table 1 – Themes and sub-themes raised in the 307 comments provided by 151 Brazilian participants answering questions about the proposed use of pigs in research, from November 2008 to April 2009. The percentages of comments that referenced the specific theme and sub-theme are shown separately for the question involving the use of pigs in an environmental research scenario and in a biomedical research scenario – 2008 - 2009

Themes	Key words	Enviro. (%)[b]	Biomed. (%)[b]	Total (%)[c]
Animal-based		72 (48.6)	76 (51.4)	148 (32.6)
	Animal welfare	56 (37.8)	54 (36.5)	110 (24.2)
	Animal rights	5 (3.4)	7 (4.7)	12 (2.6)
	Consequences to animals	2 (1.4)	2 (1.4)	4 (0.9)
	IACUC evaluation	2 (1.4)	5 (3.4)	7 (1.5)
	It is not animal ill-treatment	3 (2.0)	1 (0.7)	4 (0.9)
	No to animal use	4 (2.7)	3 (2.0)	7 (1.5)
	Others	0 (0.0)	4 (2.7)	4 (0.9)
Research		46 (48.9)	48 (51.1)	94 (20.7)
	Decrease environmental damage	11 (11.7)	0 (0.0)	11 (2.4)
	In favor of research animal use	5 (5.3)	6 (6.4)	11 (2.4)
	Need for research	25 (26.6)	27 (28.7)	52 (11.5)
	Research quality	3 (3.2)	12 (12.8)	15 (3.3)
	Others	2 (2.1)	3 (3.2)	5 (1.1)
GM		49 (80.3)	12 (19.7)	61 (13.4)
	Doubts about GM consequences	21 (34.4)	0 (0.0)	21 (4.6)
	In favor of GM	5 (8.2)	0 (0.0)	5 (1.1)
	No to GM / GM food / GM animal	10 (16.4)	5 (8.2)	15 (3.3)
	Risks of GM	13 (21.3)	3 (4.9)	16 (3.5)
	Other	0 (0.0)	4 (6.6)	4 (0.9)
Philosophical		23 (39.7)	35 (60.3)	58 (12.8)
	Anthropocentrism	12 (20.7)	23 (39.7)	14 (3.1)
	Humans should decrease consumption	4 (6.9)	0 (0.0)	4 (0.9)
	Abolitionism	6 (10.3)	0 (0.0)	6 (1.3)
	Utilitarianism	0 (0.0)	6 (10.3)	6 (1.3)
	Other	1 (1.7)	6 (10.3)	7 (1.5)
Alternatives		23 (59.0)	16 (41.0)	39 (8.6)
	Search for alternatives	23 (59.0)	15 (38.5)	38 (8.4)
	There is no alternative	0 (0.0)	1 (2.6)	1 (0.2)
Numbers		16 (47.1)	18 (52.9)	34 (7.5)
	Animal number (low, high or ok)	16 (47.1)	15 (44.1)	31 (6.8)
	Animal number (others)	0 (0.0)	3 (8.8)	3 (0.7)
Other		13 (65.0)	7 (35.0)	20 (4.4)
	Answer based on advisor(s)	5 (25.0)	2 (10.0)	7 (1.5)
	Risks to human health	7 (35.0)	3 (15.0)	10 (2.2)
	Others	1 (5.0)	2 (10.0)	3 (0.7)
Total		242 (53.3)	212 (46.7)	454 (100)[a]

[a] Note that 307 comments presented 454 ideas as classified by best broad categories, since more than one idea could be present in each comment. Topics that appeared less than 3 times were classified as others in each theme. [b] Percentages in relation to the total of comments within each theme on both scenarios. Results of topics are the percentages within each theme. [c] Percentages in relation to total of comments (454)

Emphasis on research

The need for research was identified by supporters of animal use in both scenarios (21% of comments). In the ES, people justified support on the basis of the importance of widespread environmental benefits to many people within society; and in the BS, comments included the benefit to humans, including improvements to human health. About 17% argued that appropriate methods are required to

avoid doing research "in vain". Schuppli et al. (2013) also found that participants raised concerns about scientific validity, mainly regarding the choice of species and number of animals. These concerns about poor study design rendering animal use of little value may be well founded. Kilkenny et al. (2009) identified a number of issues that could compromise the quality of research using animals, such as hypothesis and objective not clearly defined, poor identification of species and number of animals used, inappropriate experimental design or statistical method, and inconsistency on reporting results.

Genetic modification

This theme was cited in 13% of the comments (Table 1). Most of these comments (80%) arose in the ES and mostly related to the fear of consequences or risks associated with modification. Some comments specifically highlighted concern about the possibility that GM animals could end up in the human food chain. Previous work found that people often fear genetic modification of food (GASKELL et al., 2006; KNIGHT, 2006) and that non-food GM products are more accepted (CHRISTOPH et al., 2008). Some respondents commented that they did not have enough knowledge about genetic modification to know if this was safe and expressed concerns in the form of 'risks', including unintentional and unpredictable negative consequences to the environment. The majority of respondents did not mention what kind of risk they were worried about, but a few comments identified health risks like cancer and allergy. For the BS, respondents generally provided no real reason for their opposition, and instead just affirmed their anti-GM stance. Even when individuals perceive some benefits from genetically modified foods, these feelings are generally less intense than the fear of unknown consequences, perhaps explaining the lack of acceptance (COSTA-FONT; MOSSIALOS, 2007). GM product acceptance may be more difficult since, as demonstrated by Frewer et al. (2004) and Deckers (2005), education and more information does not increase support for GM.

Philosophical arguments

About 13% of comments attested some kind of philosophical argument or concern, including anthropocentrism, utilitarianism, and abolitionism (Table 1). Conflicts between animal use and human benefits appeared in both scenarios and considerations were given about the price of progress and animal

suffering versus environmental gain, e.g. 'I support the research, but I am not insensitive to the pigs. But I imagine if my father, mother, son or husband – or even I – needed this technology. Egotism, perhaps, but if some limits were established and respected, technology would not be that monstrous'. Comments on abolition of pig farming and reduction of consumption were present only in the ES (2% of all comments). The problem of agricultural pollution was considered as the direct result of animal farming.

Alternatives and new paradigms

The need for alternatives was mentioned in 8% of the comments. In the BS, respondents often mentioned the need for alternatives in relation to comments regarding the number of animals, but in the ES it was more frequently related to risks of GM, animal welfare and abolitionism. Interestingly, participants did not raise concerns around the need for alternative approaches in the BS when the use of non-GM animals was proposed. Knight and Barnett (2008) identified that support of some participants for the use of animals in medical research was based upon the belief that there were no suitable alternatives to using animals. Greek et al. (2010) concluded that people are more likely to support the use of animals if the research is likely to aid in the treatment and decrease the suffering of human patients, but that people are less likely to support animal use in basic research. This type of reasoning may figure in the utilitarian calculus of many participants, who see the life of a human patient as more valuable than one of a pig. We suggest that research is needed to test the limits of this reasoning.

In summary, many Brazilian respondents were willing to support the use of animals in research, but this support was often conditional upon adequate protection of the animals' welfare. Participants were less willing to support research when this involved the creation of GM animals, partly because they feared the risk associated with this technology. More research on public opinion regarding the support to the use of animals in research and the use of GM animals for different purposes in Brazil is welcome, given the intensification of animal research in the country and the paucity of specific Brazilian literature on this topic. It is also desirable that more information about the use of animals in research in Brazil become available to citizens, in order to give transparency to the scientific merit and the animal welfare issues involved.

Acknowledgements

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