

# Female students' attitudes towards the use of animals in scientific research and teaching

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## Background

At the World Conference on Science in 1999, concern was expressed by the scientific community about public attitudes towards the use of animals in scientific research and teaching (Worcester 1999). Public concern about animal research is also present in New Zealand, with organisations perceived as being radical such as SAFE (Save Animals from Exploitation) having perceptions of animal mistreatment. Despite the way that the use of animals in research, testing and teaching (RTT) is covered by specific legislation, namely the Animal Welfare Act 1999 (New Zealand Government, 1999), there have been calls for greater transparency about this issue (Lang 2003).

There has been research carried out into the New Zealand public's attitudes towards the use of animals in RTT. This research was commissioned and conducted by the Ministry of Agriculture and Forestry (MAF) in 2005. It consisted of a telephone survey of 750 people 16 years of age and over who were representative of New Zealand's population. This research found that 72% of the respondents thought that the use of animals in teaching was acceptable (Williams et al. 2007). More specifically, the use of animals in research was acceptable to 68% of respondents, provided that it was for research into life-threatening diseases. Generally, a low level of interest and concern was found.

As the Williams et al. (2007) study was carried out with people 16 years and over, we believed there

was opportunity for investigating young people's attitudes towards the use of animals in RTT. Previous research has shown that such attitudes can affect students' learning. In particular, girls seem to have strong opinions about this issue (Tulloch & Verrinder 2007). In a United Kingdom survey of 15–16 year old students, females gave more empathetic responses than males when questioned about their attitudes towards the use of animals (Stannisstreet et al. 1993). Research has shown that negative attitudes towards the use of animals in teaching could form barriers for learning. Holstermann et al. (2009) argue that the use of dissections in learning can alter cognitive, motivational and affective processes during learning because of the feelings of disgust engendered in some students. Even though using animals in teaching can provide an enriched educational experience, the actions of animal rights groups have also impacted on learning with their protests affecting biology teachers' choices of experiments (Stannisstreet et al. 1993).

## Research design

The survey used by Williams et al. (2007) was adapted to investigate students' awareness and interest in the use of animals in RTT, their attitudes and opinions, and their awareness of the legislation. It consisted of a mixture of open-ended questions and 5-point Likert scales. The students surveyed were from a decile 10<sup>1</sup> urban girls' secondary school. These students were in Year 10 (14–15 years of age) and 90 completed the anonymous written survey during class time.

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<sup>1</sup> Decile refers to the Ministry of Education's ranking system based on a school's predicted potential to access community resources and support according to its community's socio-economic rating with 10 being the highest level and most socio-economically privileged.

## Awareness and interest

When asked how concerned they were about the use of animals in research, 43% said that they were concerned. When responding to the open-ended question asking for the reasons for their concern, there were a variety of responses. Violating the rights of animals was the most common response (19%), feelings of compassion for animals used (18%), cruelty to animals (16%), that it was necessary (16%) or students considered themselves uninformed (21%). An example of a response illustrating a violation of animal rights response was:

*I feel bad as animals have the right to live as well. And they don't deserve to face all the consequences of testing done to them by us. The fact that animals are used for testing is that we can't do it on humans. Don't animals live? They have feelings too and I am against all animal testing.* (Student 71)

An example of a positive but uninformed response was:

*I get to learn! When the new discoveries come out I can read it. It would be a waste if we don't USE the animals.* (Student 90)

An example of a negative but uninformed response was:

*I am not very informed about animal testing but what I have heard is pretty inhumane.* (Student 3)

When they were asked to identify the types of animals commonly used in research and testing (RT) (see Table 1), their perceptions did not match with the reality (Table 2). Although these students identified rodents, they were not aware of the significant numbers of birds, sheep, cattle, fish and reptiles used in research in New Zealand during 2009 (NAEAC 2010). It must be noted that this number of birds is unusually high due to testing for avian influenza. What is significant is that many of the animals that they identify such as rabbits, hamsters and guinea pigs, dogs, pigs and cats reflect the animals they have encountered in their own lives. Because these students lived in an urban area, they may have not considered animals involved in agriculture, except for pigs.

When asked how concerned they were about animals being used in teaching, 17% were concerned and 41% were unconcerned, principally because animals were understood as having rights (14%) or should be treated humanely (10%). An example of an

**Table 1** Ranked % of Year 10 students' mentions of animals used in research and testing, not teaching (N= 185).

Species	% of combined mentions	Rank
Rats	45.7	1
Mice	42.2	2
Rabbits	18.8	3=
Hamsters and guinea pigs	18.8	3=
Dogs	16.6	5=
Pigs	16.6	5=
Cats	8.8	7
Monkeys and primates	7.7	8
Possums	5.5	9
Cattle	4.4	10
Fish	3.3	11
Frogs	2.2	12=
Birds	2.2	12=

**Table 2** Ranked % of total animals used in New Zealand in 2009.

Species	Actual % of total animals used in 2009 in New Zealand*	Rank
Mice	30.6	1
Birds	16.5	2
Sheep	15.5	3
Cattle	8.3	4
Fish	8	5
Reptiles	5.8	6=
Rats	5.8	6=
Miscellaneous species	3.8	8
Deer	2	9
Possums	1.6	10
Guinea pigs	1.4	11
Goats	1	12
Dogs	<1	
Pigs	<1	
Cats	<1	

\* Figures sourced from National Animal Ethics Advisory Committee's Annual Report for 2009 (NAEAC 2010).

animal rights opinion expressed in emotional terms was:

*It would affect the way they feel. They have the right to stay at their homes and with their families.* (Student 71)

The two main reasons given for unconcern were that the use of animals enhanced learning (29%) and

that parts of animals they used were from animals that were already dead (30%). An example of an opinion legitimising the use of animal parts because the animal was already dead was:

*Well we eat animals so as long as we are not killing the animals like kill a cow just so we can use its eye is wrong. But if we get the eye from the butchers where they have used the whole animal then it is ok.* (Student 60)

One student had a sophisticated view of the use of animals in teaching when she suggested a way forward in the future:

*Animals should be used, but we don't use real humans for teaching purposes, we use a model. That's what they should do with animals.* (Student 56)

In summary, nearly half of this group of students expressed concern about the use of animals in research. When asked to give reasons for their concern, they mostly gave responses that related to animal rights or cruelty to animals. Emotional responses such as feelings of compassion were also expressed. In addition, their perceptions of the animals used in research did not match reality because they only seemed to be aware of animals they encountered in their lives and did not consider agricultural animals. Their opinions about the use of animals in teaching were reversed with nearly half unconcerned. Many thought that animals enhanced their learning and that the parts they did use in dissections came from animals that were already dead, thus legitimising their use.

## Attitudinal responses

The following set of questions was developed to gather fine-grained data about their attitudes. Firstly, they were asked to rate their level of acceptance of animal use in RTT using a five-point Likert scale. Table 3 provides data about the students' responses and the Williams et al. (2007) figures are included in brackets in order to show some similarities and comparisons even though undoubtedly the sample is much smaller and specific. However, it does provide some trends.

From this limited sample, it appears that these female students' responses were similar to the New Zealand survey of people 16 years and over in many ways. For example, 75.3% of the students agreed that it was acceptable to use animals in teaching provided that there was no unnecessary suffering and that was similar to the New Zealand population sample (72%).

It appeared that these students had different responses from the New Zealand older population's attitudes when asked about the use of animals in medical research for life-threatening diseases. Far more of our students adopted a neutral stance (32.6%) compared with the New Zealand older population responses (22%) even though nearly half had expressed concern about the use of animals in research. It seemed that when animal use in research was qualified into a context that they felt was justified, they adopted this neutral stance. Only a few of our

**Table 3** Percentage of respondents disagreeing, agreeing or neutral in response to attitudinal statements about the use of animals in RTT. Bracketed figures are from Williams et al. 2007, p. 65.

Attitudinal Statement	% Agree	% Neutral	% Disagree
Teaching using animals is acceptable provided no unnecessary suffering	75.3 (72)	12.4 (14)	9 (14)
Animal research and testing is acceptable if no unnecessary suffering	70.8 (68)	13.5 (17)	12.4 (15)
Use for medical research should be for life-threatening diseases only	56.2 (50)	32.6 (22)	7.8 (28)
Use acceptable for medical research purposes	55.6 (60)	27.8 (21)	13.4 (19)
Use acceptable for all types of research if no alternative	31.5 (52)	27 (21)	37 (26)

students (7.8%) were prepared to express an opinion disagreeing with this statement compared with the New Zealand population (28%).

The other statement where students' attitudes differed from the New Zealand older population survey was in the acceptability of the use of animals for all types of research where no alternative was available. While 31.5% of students agreed with this statement, by comparison 52% of the New Zealand sample agreed. These figures were reversed when 37% of students disagreed that it was acceptable to use animals in this way but just 26% of the New Zealand older population disagreed. Reasons for these differences could be found in the open-ended questions used in the previous section where our students expressed concern about animal rights and cruelty as well as calling for humane treatment.

Further questions in the survey sought a level of acceptance and these data are shown in

Table 4. Again the Williams et al. (2007) data are shown in brackets for comparison purposes. As with the previous data, there were many similarities between students' responses and those of the New Zealand older population. Differences between the two groups were mostly found in the 'Never okay' and 'Unsure' columns. It seemed that students were far more likely to admit that they were unsure or possibly indifferent about the situations than the New Zealand older population sampled, with the percentages for students ranging from 6.7% to 20%. On the other hand, the percentages for the New Zealand older population were either 1% or 2%. Because these students were willing to admit uncertainty, this difference could indicate an opportunity for education about animal use in research.

Our students seemed to find the use of animals for teaching purposes such as dissecting rats more acceptable with only 11.1% disagreeing with this

**Table 4** Percentages of respondents finding different situations where animals used in RTT is always okay, sometimes okay, never okay or unsure compared with the New Zealand sample.

Situation	% Justified			
	Always okay	Sometimes okay	Never okay	Unsure
Improving livestock welfare such as preventing disease in cattle herds and stress in transported animals	48.9 (41)	35.6 (48)	0.0 (10)	13.3 (1)
Research into life-threatening diseases	43.3 (53)	43.3 (36)	6.7 (9)	6.7 (2)
Research into debilitating diseases such as Alzheimer's and multiple sclerosis	40 (48)	33.3 (40)	4.4 (11)	17.8 (1)
Teaching and learning purposes such as dissecting rats in school classes	26.7 (22)	51.1 (49)	11.1 (28)	10 (1)
Finding out answers to help control health issues like obesity and hair loss	26.7 (15)	46.7 (49)	12.2 (34)	13.3 (2)
Teaching and learning purposes such as school science projects	25.6 (19)	43.4 (58)	11.1 (21)	17.8 (2)
Improving reproduction in animals, e.g., increasing lambing rates	24.4 (21)	43.3 (53)	11.1 (24)	18.9 (2)
Increasing the productivity of farm animals, e.g., milk or wool production	24.4 (24)	47.8 (53)	13.3 (22)	14.4 (1)
Testing the safety of food products, e.g., whether shellfish are fit for human consumption	16.7 (33)	50 (37)	13.3 (29)	20 (1)
Developing measures to control pests such as possums	13.3 (38)	45.6 (48)	20 (13)	16.7 (1)
Testing the safety of cosmetics such as skin care products	10 (8)	35.6 (31)	44.4 (60)	10 (1)
Testing the safety of chemicals used in the home such as disinfectants	7.8 (16)	38.9 (37)	40 (46)	13.3 (1)

situation, whereas 28% of the New Zealand older population disagreed. A similar situation was found where animals were used in science-fair projects with only 11.1% of our students disagreeing with their use and 21% of the New Zealand survey disagreeing. This finding linked back to that in the previous section where nearly half were unconcerned about the use of animals in teaching.

There were three other situations where there were marked differences between the two groups. These were the control of obesity and hair loss, the testing of the safety of food products and developing measures to control pests. More of these students thought that it was 'Always okay' to use animals to find answers to these types of issues (26.7%) than did the New Zealand older population (15%) and only 12.2% thought it was 'Never okay' compared with 34% of the New Zealand older population. In the other two situations, fewer of our students agreed with the use of animals when compared with the New Zealand older population. In the case of the food testing, many of our students seemed to retreat to the middle ground with 50% saying that it was 'Sometimes okay'. Finally, it seems that our students are not aware of the problems caused by pest animals like possums with only 13.3% thinking it was 'Always okay' to use animals compared with the opinion of 38% of the New Zealand population. This response could be indicative of the students' urban upbringing and lack of experience with the damage caused by these species.

## Awareness of the legislation

The final part of the survey asked questions to investigate these students' knowledge of legislation and in which organisations and groups they placed their trust. They were asked if they knew of any rules and regulations around the use of animals in RTT. The majority (82%) replied 'no' with 18% replying 'yes'. They were also asked using a five-point Likert scale if they thought this legislation was sufficient to protect animals used in RTT and, despite the fact that 82% said that they were unaware of any legislation, 29% expressed confidence in such legislation. A further 26% were not confident and 40% had no opinion.

The next set of questions contained statements that provided contexts for them to identify their level of agreement of legislation protecting animals used in RTT. Table 5 suggests that students are not sure if they trusted the regulations with 45 responses in the middle column and this opinion is also reflected in the fifth statement in Table 5 about the enforcement of the rules around the use of animals in RTT. When asked if inspections would uncover any mistreatment, their responses are again distributed around the middle ground.

Students did not trust scientists. When asked if scientists 'would not cause unnecessary suffering to animals', the distribution of their responses was skewed towards the negative end of the scale. These opinions about scientists were reinforced with students

**Table 5** Confidence in rules and legislation (N=90). Three to six students did not respond to the individual questions.

	1 Strongly agree	2	3	4	5 Strongly disagree
I don't really trust the regulations for controlling the use of animals for RTT	3	26	45	7	3
Scientists would not cause unnecessary suffering to the animals being used in RT	6	12	27	27	15
Some experiments with animals are repeated unnecessarily	29	33	13	7	4
I think that some research and testing on animals goes on behind closed doors without an official licence	41	28	10	4	4
I expect that the rules in New Zealand on the use of animals for RTT are well enforced	9	13	45	14	4
The inspections of where animals are kept and how they are looked after would uncover any mistreatment that may be occurring at animal research and teaching institutes	11	20	29	22	3

thinking that scientists would unnecessarily repeat experiments and carry out experiments illegally.

Table 6 shows that these students trust the SPCA (78/90) and veterinarians (70/90). Teachers and universities seem to be moderately trusted. These students do not think that the government and governmental organisations are particularly trustworthy. As found in the previous data set, the students' trust in scientists is not high with the distribution skewing towards the mistrustful end of the scale. It seems that they find the media untrustworthy (42/90 would not trust at all) as well as industry-related organisations (60/90 were mistrustful).

## Discussion

One of the aims of this research was to investigate these students' concern about the use of animals in RTT. Nearly half of them indicated that they were concerned about animal use. Their reasons were often expressed in emotional terms, for example feelings of compassion and empathy. This finding is similar to research which has shown that emotions can strongly affect students' attitudes (Holstermann et al. 2009). The findings also show that their opinions do not correspond with reality. For example, many students indicated that they were concerned about animal use because of cruelty to animals. However, the 2009 NAEAC Annual Report indicates that only a small percentage (7.5%) of animals used were exposed to manipulations that had a very severe impact (NAEAC 2010). Even though such manipulations have a very severe impact, the students' perception is

that all research using animals is at this level of cruelty which is not the case.

The students' awareness of the types of animals used in RTT also differed from reality. The animals that our students identified tended to be animals with which they were familiar in their urban-based lives. They did not seem to consider that much of the animal use in research was due to New Zealand being an agricultural country and consequently, many animals involved in RTT, such as cows and sheep, would be related to farming. They also lacked the awareness that primates are not used in any animal research in New Zealand.

When asked about their concern for animals being used in teaching, 41% were unconcerned and many justified their lack of concern with the opinion that their learning would be enhanced by the use of animals. Others thought that the use of animal parts was acceptable because the animal was already dead, legitimising dissection activities.

We were also interested in their attitudes towards the use of animals in RTT and asked questions designed to gather data for a fine-grained analysis. This analysis showed that their concern and justification of the use of animals in RTT resulted in complex responses which in many instances paralleled the New Zealand research carried out by Williams et al. (2007). While there was a moderate level of concern about the use of animals in research and testing (43%), when given the opportunity to qualify their response where the outcomes were worthwhile, for example, improving livestock welfare (48.9% agreed always okay), the use of animals was more acceptable.

**Table 6** Level of trust in organisations/groups expressed in numbers (N=90). Two to six students did not respond to the individual questions.

Organisations/Groups	1 Trust a lot	2	3	4	5 I would not trust at all
MAF (Ministry of Agriculture and Forestry)	12	31	29	11	1
SPCA (Society for the Prevention of Cruelty to Animals)	61	17	7	1	0
Government	4	21	32	23	7
Veterinarians	45	25	14	3	0
Scientists	11	29	21	13	12
Media	4	5	14	21	42
Industry/Manufacturers/Pharmaceutical companies	3	6	17	31	29
Teachers/Universities	9	40	25	12	2
Local councils	5	12	42	25	3

The use of qualifiers illustrated the complexity of attitudes. There are situations where they found animal use in research more acceptable. For example, nearly half of the students found animal use more acceptable when researching life-threatening or debilitating diseases. When the research focus was non-medical, such as testing the safety of household chemicals or cosmetics, they were less accepting.

Over 80% of students stated that they had little understanding about the legislation governing the use of animals in RTT. Despite this lack of knowledge, many students (69%) had perceptions of scientists carrying out their research with little regard for the welfare of the animals being manipulated. When asked to identify organisations and groups in which they had a high level of trust, these perceptions were reinforced. These students had a high level of trust in the SPCA and veterinarians but far less trust in scientists.

These students also lacked awareness of the number of organisations involved in animal welfare. While they correctly identified the SPCA and veterinarians, they overlooked the role of governmental organisations such as local councils and MAF.

## Implications for teaching

This research has shown that there are gaps between students' awareness of the use of animals in RTT and the reality of current practice. These students seemed to find animal use in medical research more acceptable provided it had a worthwhile outcome, but did not find other types of research as acceptable, for example research into pest control measures. In addition, they had little knowledge of the legislation in place governing such use. These gaps indicate a need for educational strategies to develop students' awareness and knowledge about this issue.

Many students expressed concern about pain and suffering in animals, and a range of research suggests that education could help to develop more informed opinions through discussions about bioethics (Stannistreet et al. 1993). Student attitudes about animal research have been shown to be malleable and Saucier & Cain (2006) suggest that exposure to examples of ethical animal research could assist in changing students' attitudes. They suggested that the

focus of such examples should be on the contribution of research to the well-being of people and animals, rather than knowledge about legislation itself. Activities could be designed to raise awareness and knowledge about specific legislation that regulates the use of animals in RTT (Gallup & Beckstead 1988).

A further implication for teaching is the gender differences in attitudes towards animal use. Australian research into the attitudes of similarly aged students showed that females were more interested in animals and more consistently compassionate than males (Tulloch & Verrinder 2007). The authors suggest that educational strategies to address males' lower level of compassion need to be developed.

Our research has shown that there is a need for an educational resource to assist young people to develop informed opinions about the use of animals in RTT. The Australian and New Zealand Council for the Care of Animals in Research and Teaching (ANZCCART) has recently developed such a resource and its aim and contents are presented below.

## “Caring for the animals we use in research and teaching”: an educational resource

“Caring for the animals we use in research and teaching” (Birdsall & Wyatt 2010) aimed to foster discussion and the development of informed opinions about the use of animals in RTT. This resource comprises a DVD and a CD of teaching resources.

The DVD consists of seven case studies where scientists discuss their research, the way in which they use animals in their studies and their legal obligations around the welfare of those animals. A range of contexts has been used to appeal to students in different settings, from urban to rural schools. It is designed for students in Years 9-10 (13-15 years of age). The activities focus on developing literacy skills, a current Ministry of Education focus area, and on the new strand in *The New Zealand Curriculum* (Ministry of Education 2007), the Nature of Science.

The centrepiece of this resource is the DVD. It consists of a compilation feature which is narrated by Dr Jessie Jacobsen, the 2007 New Zealand MacDiarmid Young Scientist of the Year. There are also seven case studies where researchers discuss their

research. The following list provides the topics and the researcher-presenters:

- Animal Ethics Committees and regulations – Don Love and Sally Birdsall
- Prenatal nutrition – Jane Harding
- Infertility – Allan Herbison
- Xcluder Fencing – Tim Day
- Obesity – Kathy Mountjoy
- Anti-cancer drug development – Bill Wilson
- Pain relief in farming – Craig Johnson

Each case study has accompanying teacher notes and activities for students on a separate DVD. The activities have been developed by experienced secondary school teachers Carolyn Haslam, Colin North, Catherine Bartlett and Rachel Heeny. The teacher notes contain background information about the case study, New Zealand curriculum links, web links, answers to the activities and a transcript of the case study. Each case study presents a variety of activities that range from glossary activities, creative writing, fishbowl discussions, role-playing, domino activities, crosswords, designing presentations and carrying out interviews.

Two copies of the resource were distributed to every secondary school in New Zealand and it is hoped that teachers will incorporate this resource into their science programmes.

In summary, our research has provided some information about the opinions and attitudes towards animal use in RTT among a group of students. Future research is planned that will investigate the effectiveness of the ANZCCART resource in fostering the development of male and female secondary school students' opinions about and attitudes towards the use of animals in RTT.

This paper is an abridged version and the full version can be found in the November 2011 issue of *Kotuitui: New Zealand Journal of Social Sciences On Line*.

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