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Public Attitudes Toward Animal Research: Some International Comparisons

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A comparative analysis was made of the public's attitudes toward the use of animals in scientific research in 15 different nations. The intensity of opposition to animal research was found to vary from relatively low levels in Japan and the United States to much higher levels in France, Belgium, and Great Britain. More women than men were opposed to animal research in all 15 nations. Scientific knowledge, or the lack of knowledge, was not found to have a consistent relationship with attitudes toward animal research. Concern about the environment was found to be related to opposition to animal research in some western European nations, in particular West Germany. Cluster analysis was used to group the nations into four patterns based on intensity of opposition, level of opposition, gender differences in opposition, and the relationship between attitudes toward animal research and both environmental concern and scientific knowledge.

The use of animals in scientific research has become an increasingly controversial topic over the past decade. Gluck and Kubacki (1991) compare the situation to a "state of war" between animal rights activists and research scientists. Critical as well as less critical research efforts in biomedical and consumer research have been disrupted. Biomedical researchers have been threatened, their laboratories vandalized, research halted, and their motivation questioned. Corporations are shifting research methodologies in product safety research so that they can say that no animals were used in testing. The status quo in animal research is no longer acceptable to some portion of the public. The question of whether animal research is necessary and good must be answered by researchers as never before (Birke & Michael, 1992; Galvin & Herzog, 1992a; Harris, 1985).

A number of studies, both in the United States and other nations, have asked adults about their opinions on this topic. It is apparent from these studies that several factors are involved in the public's attitudes toward animal research. First, what is the actual purpose of the research? Will the animals be used in critical biomedical research (eg., cancer or AIDS research), cosmetics testing, or for some other purpose (Kane, Parsons, & Associates, 1989)? Second, people express differing levels of concern when asked questions about the use of animals at different points along the phylogenetic scale. Respondents offer a range of approval levels based on whether a question mentions the use of rats, dogs, monkeys, or some other species (Associated Press/Media General, 1985; Driscoll, 1987). Finally, the perception of the relative necessity of the use of animals in research is important. Is animal research the only option available, or is it one of many options available, including computer simulations and cell studies?

While many different surveys have included one or more questions about the public's attitudes toward animal research, identical questions have been used across few surveys. Many of the studies have utilized either college students or animal rights activists rather than the general public (Herzog, Betchart, & Pitman, 1991). As a result, few comparisons can be made across time or across nations regarding public attitudes toward animal research. An additional problem occurs when a survey consists solely, or primarily, of questions about the rights of animals, and the use of animals in research. Much of the general public has simply not considered the issue of animal research. When confronted by a survey consisting primarily of questions about animal research and animal rights, respondents are cued, or sensitized, to the topic, and may give answers that would be quite different if the question were embedded in an instrument surveying other attitudes or behaviors.

The present study is a secondary analysis of data from surveys conducted in 15 different nations, each of which included an identical question about the use of animals in scientific research. Our purpose in conducting this analysis was to move the study of attitudes toward animal research to a cross-cultural setting. Within this context we hoped to examine cross-cultural similarities and differences that might further our understanding of the public's attitudes toward animal research.

This research follows four major lines of inquiry. First, do attitudes toward the use of animals in scientific research vary in intensity cross-culturally? Second, what is the role of gender with regard to public attitudes toward animal research,

and is it consistent cross-culturally? Third, does scientific knowledge enhance the public's receptivity to the use of animals in research? Finally, what is the relationship between environmental concern and attitudes toward animal research?

Method

The data used in this secondary analysis was collected by research teams in 15 nations. It is stored in the archive of the International Center for the Advancement of Scientific Literacy at the Chicago Academy of Sciences, and is available for analysis by researchers.

The Canadian survey was conducted in October and November, 1989, by Decima Research of Toronto. Telephone interviews were conducted with 2,000 adults, from a random, stratified sample representing the population in each of the provinces of Canada. The file has been weighted to reflect demographic parameters from Statistics Canada (Einsiedel, 1990, 1991).

The Japanese survey was conducted by Shin-joho Center under the direction of the National Institute of Science and Technology Policy (Nagahama & Shimizu, 1993). A two-stage cluster design was used, based on 45 clusters, for a total potential sample of 2,000 adults. In-person interviews were completed with 1,457 individuals in November of 1991, for a response rate of 72.9%. The file was weighted to reflect demographic parameters from the Japanese census.

In 1992 the European Community, through the Eurobarometer program, sponsored a survey of public attitudes toward and knowledge about science and technology (International Research Associates, 1993). The European survey was conducted in the fall of 1992 by survey institutions in each country, coordinated by the International Research Associates. The total European sample size is 13,024, with approximately 1000 in-person interviews conducted in each nation. The survey contained a split ballot on a series of attitude questions. Half of the respondents were shown "uncertain" as a possible response, while the other half were not. The "uncertain" response was not offered as a possibility in any of the other surveys, therefore this study uses only those respondents who were not offered "uncertain" as a response category (Split Ballot B). Germany can be examined in this data base either as a combined nation, or separately for the former East Germany and West Germany. In this analysis, the latter approach is used.

The United States survey was conducted between December of 1992 and March of 1993 by the Public Opinion Laboratory (POL) at Northern Illinois

University for the Chicago Academy of Sciences. A total of 2,001 adults were interviewed for the study. The overall cooperation rate for the study was 72%. The data are weighted to correct for any biases in the sample due to age, gender, race, or level of education (Miller & Pifer, 1993).

There was extensive coordination in the development of the different studies. The coordination resulted in comparable measures of science attentiveness, scientific knowledge, and science policy attitudes in each of the surveys, including attitudes toward the use of animals in scientific research. The focus of each of the surveys is on a broad range of scientific, technological, and citizenship topics. A question about animal research was only one of over one hundred questions the respondents were asked. As a result respondents were not sensitized to the topic of animal research.

Results

Attitudes Toward the Use of Animals in Research in 15 Countries

Beginning in 1988, a series of surveys conducted in the United States and funded by the National Science Foundation have asked respondents to agree or disagree with the statement that:

“Scientists should be allowed to do research that causes pain and injury to animals like dogs and chimpanzees if it produces new information about human health problems.”

This same question has been replicated in surveys conducted in Canada, Japan, and the European Community, allowing for international comparisons. The principle investigators and translators in each nation worked together to produce translations that would yield equivalent meanings across all cultures. Respondents are being asked to weigh the relative worth of benefits to human health against possible harm to popular animals. This question, in a sense, measures relatively solid public support for animal research, given the probability of popular animals like dogs and chimpanzees suffering pain and injury. Other surveys have clearly shown only minor opposition to the use of animals such as rats in research (Driscoll, 1987). Additionally, the public is more likely to support animal research if they are assured that the animals will suffer *no* pain or injury (Miller, 1992).

The highest level of opposition to animal research was found in France, where 68% of the population either strongly disagreed or disagreed with the statement regarding the use of animals in scientific research. Similarly high levels of opposition were exhibited in most of the European Community, with over 50% of the population being opposed to animal research in West Germany, Belgium, East Germany, Italy, Great Britain, Ireland, Denmark, and Spain. Only Portugal (35%) and Greece (36%), among the European Community members, had less than 50% of their population opposed to animal research. In contrast, all of the non-European nations – Japan (42%), Canada (49%), and the United States (42%) – had less than a majority of the population opposed to animal research (see Figure 1).

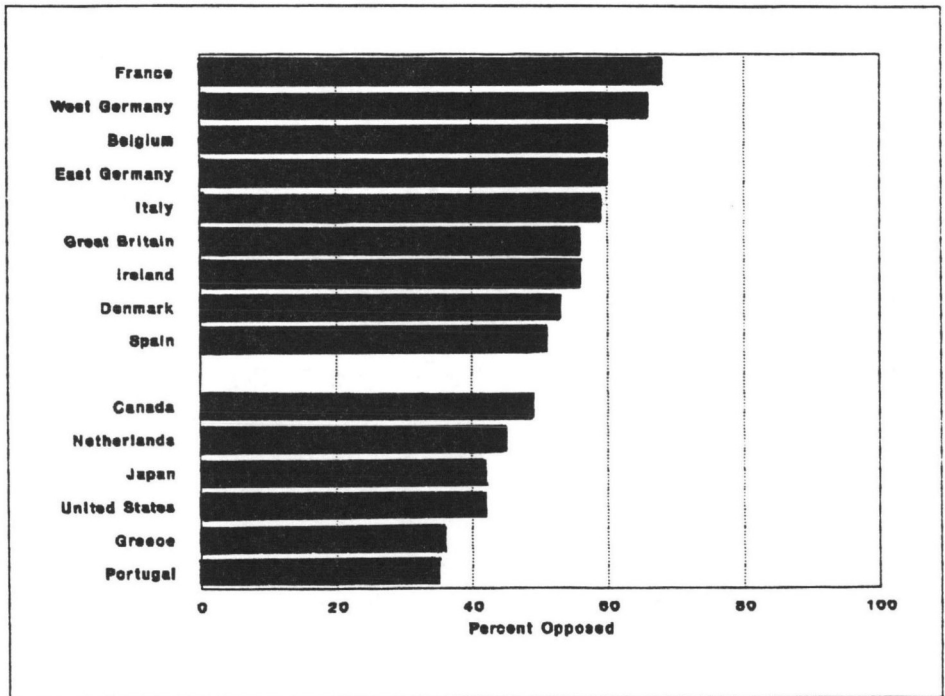


Figure 1. Opposition to Animal Research in 15 Nations

Table 1. Public Attitudes Toward the Use of Animals in Research in 15 Nations

Country	SA [*]	A	U	D	SD	N
Belgium	11%	23%	5%	21%	39%	519
Canada	7	36	8	29	20	2000
Denmark	13	32	2	18	35	504
France	8	19	4	18	50	511
Germany-E**	9	22	8	25	35	507
Germany-W**	9	20	5	27	39	517
Great Britain	10	30	4	15	41	534
Greece	18	37	8	18	18	501
Ireland	9	24	12	15	41	499
Italy	10	22	9	21	38	510
Japan	6	49	3	36	6	1457
Netherlands	11	39	5	15	30	489
Portugal	17	32	17	19	16	500
Spain	17	24	9	17	34	513
United States	9	44	4	28	14	2001

Question: "Scientists should be allowed to do research that causes pain and injury to animals like dogs and chimpanzees if it produces new information about human health problems. Do you strongly agree, agree, disagree, or strongly disagree?"

^{*}SA = Strongly agree; A = Agree; U = Uncertain/Don't know; D = Disagree; SD = Strongly disagree

^{**}Germany-E=Former East Germany; Germany-W=Former West Germany

In addition to overall level of opposition, it is important to examine the intensity of opinions regarding animal research. In the United States, both opposition and support for animal research were of a moderate nature. Few of the respondents took an extreme position on the animal research question. Only nine percent strongly agreed with the statement, while 14% strongly disagreed. The Canadian public is more strongly opposed to the use of animals in research than is the American public. In a 1989 survey conducted in Canada, 20% of the respondents indicated that they strongly disagreed with animal research. Opposition to animal research is of a stronger nature in all of the European nations than in Canada

with the exception of Greece (18% strongly disagree) and Portugal (16% strongly disagree). In France, 50% of the respondents indicated that they strongly disagreed with the use of animals in research. Second were Belgium and Great Britain, each with 41% of the population strongly opposed to animal research. In contrast to these patterns, only six percent of Japanese adults, when questioned in a 1991 survey, indicated that they strongly disagreed with the use of dogs and chimpanzees in scientific research (see Table 1).

Gender

Past studies conducted in the United States have found that women are more likely to oppose animal research than are men (Herzog et al., 1991). This relationship between gender and attitudes toward animal research holds true across all countries studied. In each of the 15 countries a greater percentage of women than men were opposed to research using animals. χ^2 tests indicate that the gender difference is significant at the .05 level in all but five of the 15 nations (see Table 2). The largest gender difference occurred in the Netherlands where 32% of men and 58% of women indicated that they were opposed to animal research. The smallest gender difference occurred in the former West Germany where both men (66%) and women (67%) were opposed to animal research. In the United States, over 50% of women and only about 30% of men were opposed to animal research (see Table 2).

Science Knowledge

It has been suggested by some authors that opposition to animal research can be directly linked to the general level of scientific illiteracy in the United States (Morrison, 1992). All of the surveys, with the exception of the one conducted in Japan, included a series of ten items designed to measure the respondents' knowledge about science. Japan was eliminated from this portion of the analysis because of the lack of comparable data on scientific knowledge. The respondents in the other 14 nations were asked to indicate whether each of the following statements is true or false:

- The center of the earth is very hot.
- The oxygen we breathe comes from plants.
- Radioactive milk can be made safe by boiling it.

Table 2. Gender and Attitudes Toward Animal Research in 15 Nations

Country	Male		Female		χ^2 2 d.f.	N	
	Support	Oppose	Support	Oppose			
Belgium	38%	56%	31%	64%	3.29, $p > .05$	200	
Canada	50	42	36	56	40.28, $p < .00$		
Denmark	59	40	32	65	36.53, $p < .00$		
France	32	63	22	74	7.83, $p < .05$		
Germany-E*	36	60	28	61	7.90, $p < .05$		
Germany-W*	31	66	26	67	3.31, $p > .05$		
Great Britain	46	52	34	60	14.81, $p < .00$		
Greece	62	32	48	41	10.00, $p < .01$		
Ireland	37	52	29	59	3.86, $p > .05$		
Italy	36	56	29	61	3.29, $p > .05$		
Japan	58	41	52	44	11.51, $p < .01$		145
Netherlands	66	32	35	58	50.52, $p < .00$		
Portugal	55	34	41	36	15.87, $p < .00$		
Spain	45	48	37	52	5.26, $p > .05$		
United States	65	32	43	51	93.72, $p < .00$	200	

Question: "Scientists should be allowed to do research that causes pain and injury to animals like dogs and chimpanzees if it produces new information about human health problems. Do you strongly agree, agree, disagree, or strongly disagree?"

Note. Support=Strongly Agree or Agree; Oppose=Strongly disagree or disagree; those respondents indicating that they were uncertain about their response have been omitted from this table.

*Germany-E=Former East Germany; Germany-W=Former West Germany

- Electrons are smaller than atoms.
- The continents on which we live have been moving their location for millions of years and will continue to move in the future.
- The earliest humans lived at the same time as the dinosaurs.
- Lasers work by focusing sound waves.
- Human beings, as we know them today, developed from earlier species of animals.

Respondents were also asked:

- Does the Earth go around the Sun, or does the Sun go around the Earth?

Those indicating that the Earth goes around the Sun were asked:

- How long does it take for the Earth to go around the sun: one day, one month, or one year?

The ten items were combined to create a science knowledge scale. The scale was collapsed into three values: low (less than five correct); medium (between five and seven correct); and high (eight or more correct).

Although χ^2 tests indicate a significant relationship exists between science knowledge and attitudes toward animal research in all but France and the United States, no clear, consistent relationship was found. In some nations there is a positive relationship between scientific knowledge and support for animal research with individuals with higher levels of scientific knowledge being more likely to support animal research. In some nations, there is a negative relationship, with individuals with higher levels of scientific knowledge being more likely to oppose animal research. The strongest, positive relationship occurs in Denmark, where 72% of those with low levels of science knowledge were opposed to animal research, and only 46% of those with high levels of science knowledge were opposed. In contrast to this is Belgium, where 48% with low levels of science knowledge and 63% with high levels of science knowledge were opposed to animal research (see Figure 1).

Environmental Concern

The relationship between concern for the environment and concern for animals rights has been noted by several authors (Collard, 1990; Greanville, 1989). Knox (1991) suggests that animal rights activists have deliberately sought to align themselves with the environmental movement in order to make their cause more acceptable to the public. Each of the surveys included questions about the respondents' interest in various public policy issues, including the environment. Respondents were told:

“There are a lot of issues in the news and it is hard to keep up with every area. I'm going to read you a short list of issues and for each one – as I read

Table 3. Science Knowledge and Attitudes Toward Animal Research in 15 Nations

Country	Low		Medium		High		χ^2 4 d.f.	N
	Sup	Opp	Sup	Opp	Sup	Opp		
Belgium	41%	48%	33%	63%	32%	63%	10.53, $p < .0$	519
Canada	38	53	44	49	46	45	12.78, $p < .0$	200
Denmark	24	72	44	53	52	46	14.63, $p < .0$	
France	31	61	26	70	27	71	6.48, $p > .05$	
Germany-E*	22	56	37	54	29	66	24.52, $p < .0$	
Germany-W*	26	60	29	68	30	67	18.78, $p < .0$	
Great Britain	30	60	39	56	47	53	20.21, $p < .0$	
Greece	54	28	55	41	57	41	33.80, $p < .0$	
Ireland	27	50	34	61	41	55	40.63, $p < .0$	
Italy	27	52	38	56	27	67	30.65, $p < .0$	
Netherland	40	50	46	51	60	37	15.67, $p < .0$	
Portugal	39	30	54	38	56	38	50.00, $p < .0$	
Spain	34	46	39	54	47	48	27.31, $p < .0$	
United States	50	44	53	43	56	39	7.50, $p > .05$	200

Question: "Scientists should be allowed to do research that causes pain and injury to animals like dogs and chimpanzees if it produces new information about human health problems. Do you strongly agree, agree, disagree, or strongly disagree?"

Note: Sup=Strongly Agree or Agree; Opp=Strongly disagree or disagree; those respondents indicating that they were uncertain about their response have been omitted from this table.

*Germany-E = former East Germany; Germany-W = former West Germany

it – I would like you to tell me if you are very interested, moderately interested, or not at all interested...Issues about environmental pollution. Are you very interested, moderately interested, or not at all interested?"

χ^2 tests indicate that concern for environmental issues is significantly related to attitudes toward animal research in eleven of the nations (see Table 4).

Table 4. Environmental Interest and Attitudes Toward Animal Research in 15 Nations

Country	Very		Moderate		Not		χ^2 4 d.f.	N
	Sup	Opp	Sup	Opp	Sup	Opp		
Belgium	31%	63%	36%	59%	42%	51%	2.67,	519
Canada	42	50	45	47	37	55	4.59, $p > .05$	200
Denmark	41	56	53	45	41	59	8.01, $p > .05$	
France	24	74	30	64	35	52	16.92, $p < .0$	
Germany-E*	33	60	30	63	33	42	11.35, $p < .0$	
Germany-W*	22	75	40	56	33	48	37.43, $p < .0$	
Great Britain	38	58	44	51	24	66	8.20, $p > .05$	
Greece	52	40	63	30	63	12	12.57, $p < .0$	
Ireland	36	58	32	60	26	41	52.78, $p < .0$	
Italy	32	62	32	53	29	54	12.07, $p < .0$	
Japan	54	44	56	41	52	31	58.06, $p < .0$	145
Netherlands	47	50	56	39	41	38	17.70, $p < .0$	
Portugal	56	35	48	37	36	27	23.26, $p < .0$	
Spain	45	51	37	53	43	31	23.15, $p < .0$	
United States	48	48	61	35	64	33	38.02, $p < .0$	200

Question: "Scientists should be allowed to do research that causes pain and injury to animals like dogs and chimpanzees if it produces new information about human health problems. Do you strongly agree, agree, disagree, or strongly disagree?"

Note: Sup=Strongly Agree or Agree; Opp=Strongly disagree or disagree; those respondents indicating that they were uncertain about their response have been omitted from this table.

Very=Very interested in environmental issues; Moderately=Moderately interested in environmental issues; Not=Not at all interested in environmental issues

*Germany-E=Former East Germany; Germany-W=Former West Germany

West Germany was previously seen to have the smallest gender difference in attitudes toward animal research. This is not the case with the relationship between attitudes toward animal research and environmental concern, where 75%

of West Germans who were very interested in the environment expressed opposition to animal research, while only 56% who were moderately interested, and 48% who were not at all interested expressed similar opposition. France was earlier seen to have the highest overall levels of opposition to animal research. There is some differentiation in this opposition based on environmental concern, with 74% who were very interested in the environment being opposed to animal research, and only 52% who were not at all interested being opposed.

Societal Differences in Attitudes Toward Animal Research

Some cross-cultural differences have been seen in the public's attitudes toward animal research. In some west European nations such as the former West Germany, attitudes toward animal research seem to be associated with environmental concerns. Likewise, in some societies, there appears to be a direct relationship between higher levels of scientific knowledge and support for animal research, while in other nations there appears to be no linkage.

A final analysis, utilizing cluster analysis, was conducted to see if the 14 nations (with Japan deleted) group together in any discernable patterns with regards to public attitudes toward animal research. Cluster analysis is an agglomerative hierarchical procedure that clusters cases together based on a selected number of variables (Rosenthal & Rosnow, 1984).

Five factors were selected for the cluster analysis. These factors are: 1) the percent of the population that strongly disagreed with animal research; 2) the percent of the population that was opposed to animal research (either strongly disagreed or disagreed); 3) the gender difference in attitudes toward animal research (the percent of women who were opposed minus the percent of men who were opposed); 4) the relationship between environmental concern and opposition to animal research (the percent of those who were very interested in the environment and opposed to animal research minus the percent of those not at all interested in the environment who were opposed to animal research); and 5) the relationship between science knowledge and attitudes toward animal research (the percent of those with high levels of science knowledge who were opposed to animal research minus the percent of those with low levels of science knowledge who were opposed to animal research). Three-, four-, five-, and six- cluster solutions were attempted, with the four-cluster solution yielding the most substantively meaningful result.

The 14 nations appear to cluster together in four discernible patterns. In the

first group of nations are Belgium, France, East Germany, West Germany, Ireland, Italy, and Spain. Each of these seven nations is characterized by a high level of opposition to animal research, ranging from a low of 51% of the population in Spain to a high of 68% in France. Additionally, each country also has a large segment of the population strongly opposed to animal research, ranging from a high of 50% in France to a low of 34% in Spain. Related to the high levels of opposition to animal research, the gender difference in opposition to animal research is among the smallest in nations in this cluster, ranging from a one percent difference in East Germany and West Germany to 11% in France. Support for animal research is negatively related to science knowledge in each of the nations, with a greater percentage of individuals with high levels of science knowledge being opposed to animal research than individuals with low levels of science knowledge (see Table 5).

Table 5. Cluster Patterns of Countries with Similar Attitudes toward Animal Research

Cluster	Intensity of Opposition	Gender Difference	Support & Science Knowledge	Opposition & Environmental Concern
One	Moderate to High	Low	Negative	Positive
Two	Moderate	Low to Moderate	Positive	Negative
Three	Low	Low	Negative	Positive
Four	Low to Moderate	Moderate	Positive	Positive

Cluster One = Belgium, France, E-Germany, W-Germany, Ireland, Italy, and Spain

Cluster Two = Canada, Denmark, and Great Britain

Cluster Three = Greece and Portugal

Cluster Four = Netherlands and the United States

Canada, Denmark, and Great Britain comprise the second cluster of nations. The gender difference in opposition to animal research tends to be greater in this cluster, ranging from a low of 8% in Great Britain to a high of 25% in Denmark. The major differences between this and the first cluster center around the relationships that environmental concern and science knowledge have with attitudes toward animal research. In contrast to the first cluster, each of the nations in the second cluster has a positive relationship between science knowledge and support for animal research, with a greater percentage of individuals with low levels of science knowledge being opposed to animal research than those with high levels of science knowledge. Also in contrast to the first cluster, environmental concern is negatively related to opposition to animal research, with a greater percentage of individuals not at all interested in the environment being opposed to animal research than individuals who were very interested in the environment.

The third cluster of nations, composed of Greece and Portugal, resembles cluster one in the relationship between both the environment and science knowledge with attitudes toward animal research. However, unlike both of the previous clusters, there is relatively low opposition to animal research in both Greece (36%) and Portugal (35%).

Opposition to animal research is slightly higher in the fourth cluster nations than was seen in the third cluster. In the Netherlands, 45% of the population was opposed to animal research while 42% was opposed in the United States. This level of opposition is lower than was seen in either of the first two clusters. There is a higher average gender difference in opposition to animal research in this cluster than in any of the other three clusters, with the Netherlands having the highest gender difference – 26% – of all of the nations. This cluster resembles the second group of nations in that a greater percentage of individuals with high levels of science knowledge support animal research than do those with low levels of science knowledge. It resembles cluster one in the relationship between environmental concern and opposition to animal research.

Discussion

Cultural and Societal Impacts on Attitudes Toward Animal Research

When the data is looked at across cultures, a confusing picture emerges. Only gender shows a clear trend across all cultures studied, with women generally opposing animal research more than men. A further examination of the data

suggests there is some linkage between a nation's level of industrialization and urbanization and attitudes toward animal research. Within the European Community, the two least industrialized and urban countries had the lowest level of opposition to animal research. Could it be that countries that have closer relationships to the land have more pragmatic attitudes about animals? The chickens one cares for will yield eggs, the next generation of layers, and finally dinner when the birds are done laying. In more developed countries people may never come into contact with the animals they eat and that clothe them. Animals are companion animals. They are family members. They are named, given toys, endowed with human traits, protected from harm, given medical care, and mourned when they die.

Gender Issues

Past studies in the United States have found that women are more likely to oppose animal research than men (Gallup & Beckstead, 1988; Galvin & Herzog, 1992b; Herzog et al., 1991; Herzog et al., 1987). The present study confirms this finding and extends it to 15 countries. Herzog et al. (1991) surveyed an impressive range of data from other studies that lend support to the idea that females are more concerned about animal research than males. There are also differences in the ways males and females treat and react to animals in a variety of conditions other than research. Females tend to be more empathic toward, knowledgeable about, nurturing of, and positive toward animals than males (Kellert & Berry, 1987). Females also show more nurturance and emotional reactivity than males. Research points strongly to differences in gender role socialization as the cause of the differences (Berk, 1989; Vander Zanden, 1993). Doll-play and other forms of anticipatory socialization would be possible sources of these gender role variations. Males can acquire empathic and nurturing skills that rival those of the female. Our cultures generally do not provide males these learning experiences, nor do most of those studied. Bem (1975) coincidentally has provided data suggesting that androgynous males are more sensitive to animals. These males have a gender role that allows for a more nurturing reactive approach to life, than traditional males. Would more androgynous males be more sympathetic to animal rights causes?

An analysis of the gender roles in the countries surveyed might help indicate why in some countries females and males were close in the numbers opposing animal research. Germany would be an example of such a country. The seeming universality of gender role differences points to a further need to analyze what in

the gender role produces these outcomes and how these differences originate. The Herzog et al. (1991) study utilized the Bem Sex Role Inventory to study gender differences as they relate to animal rights attitudes in college students. An analysis of gender role differences and animal rights attitudes among a random sample of the public needs to be done. Instruments that are both valid and reliable for a similar purpose need to be located for similar analyses in other countries.

Scientific Knowledge

Scientists have suggested that scientific education is the answer to the animal rights movement. This study shows no clear and consistent impact of science knowledge. The variable of "scientific knowledge" is a generic one as used in this study. No effort has been made to look at what kind of knowledge is possessed and the relationship between the type of knowledge held and attitudes toward animal research.

Even if education had an effect on beliefs, would the effect be general to the entire population? A variety of sources suggest it would not. Culliton (1991) and Birke and Michael (1992) raise what might be called the irrationality factor. Many of the more extreme elements of the animal rights movement are not interested in facts and dialogue. Other researchers suggest there is a great deal of heterogeneity within the animal rights movement (Plous, 1991). The latter indicates that some members of these groups may be very amenable to educational discussions, while others may not. Knox (1991) suggests that the animal rights movement has taken on the characteristics of a religion. Given the nature of the movement, it may be that the sociology of religion might be a valid avenue of inquiry to pursue.

Environmental Concern and Animal Research

A number of theories may explain the relationship, or lack thereof, that was found between environmental concern and attitudes toward animal research in some nations. First, environmental concern and concern for animal welfare may be part of a larger attitudinal orientation, with neither causing the other. Second, in some countries, the animal rights movement and environmental movement may be aligned with each other under the rubric of left-wing political parties because that is simply where they fit in the political system. Finally, it is possible that in some

situations the animal rights movement may have aligned itself with the environmental movement in an effort designed to increase their power base.

Final Thoughts and Summary

It is the belief of many scientists that science education will negate the animal rights movement and result in positive public attitudes toward animal research. The present study does not support that belief. Environmental concern has also been felt to be a critical predictor of interest in animal rights. The present data do not support this conclusion. Science education and environmental concern vary widely in their degree and quality of relationship to animal rights attitudes. Consistent with prior research, the strongest relationship uncovered appears to be between gender and animal research concerns. It may also be that there are variables that have not been identified or fully addressed. The present study confirms some aspects of earlier studies, extends them cross-culturally, and suggests some directions for future research.

Note

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