Research Report

ATTITUDES TOWARD THE USE OF ANIMALS IN PSYCHOLOGICAL RESEARCH AND EDUCATION: Results From a National Survey of Psychology Majors

S. Plous

Wesleyan University

Abstract—*This article reports the results of a national survey in which psychology majors were asked about the use of animals in psychological research and teaching. In general, the attitudes of psychology majors closely resembled the attitudes of practicing psychologists. Students tended to (a) support animal experiments involving observation or confinement, but disapprove of studies involving pain or death; (b) support mandatory pain assessments and the federal protection of rats, mice, pigeons, and reptiles; and (c) support the use of animals in teaching, but oppose an animal laboratory requirement for the psychology major. Opposition to the use of animals was greatest among women, among students at selective schools, and among students living in the Northeast/Mid-Atlantic region of the country.*

The use of animals in research and teaching has been a subject of growing debate within psychology (Baldwin, 1993; Bowd & Shapiro, 1993; Plous, 1996; Ulrich, 1991). Thus far, however, most participants in this debate have been either animal rights supporters or members of the animal research community. Virtually absent have been the people who will ultimately shape the long-term future of animal research within psychology: college students currently majoring in psychology.

The psychology majors of today will become the clinicians and researchers of tomorrow, yet relatively little is known about their attitudes toward the use of animals in psychology. Under what conditions do these students support animal research? Under what conditions do they oppose it? Do psychology majors support the use of animals in the classroom? How do the attitudes of psychology students compare with the attitudes of practicing psychologists?

Although national surveys concerning animal use have been conducted with random samples of veterinary students and with teenagers in general (Jacobson, 1992; Shurtleff, Grant, Zeglen, McCulloch, & Bustad, 1983), no such studies have been conducted with psychology majors. To date, only six published reports have focused specifically on the attitudes of students interested in psychology: two studies conducted with introductory psychology students (Broida, Tingley, Kimball, & Miele, 1993; Sieber, 1986), two studies with students taking social or experimental psychology (Galvin & Herzog, 1992; Herzog & Galvin, in press), and two brief reports of research conducted with students taking a mixture of psychology classes (Takooshian, 1988; Vigorito, Juliano, & Murph, 1992).

Address correspondence to S. Plous, Department of Psychology, Wesleyan University, 207 High St., Middletown, CT 06459; e-mail: splous@wesleyan.edu.

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In the largest of these studies, Broida et al. (1993) surveyed 1,055 general psychology students at seven universities in an effort to uncover various correlates of "anti-vivisectionist" attitudes. The results indicated that supporters of animal research were more likely than opponents to be male, masculine in sex role orientation, and conservative, whereas opponents were more likely than supporters to be vegetarian, empathic toward animals, concerned about the environment, opposed to the military, and skeptical of science. Somewhat surprisingly, Broida et al. also found that students who were likely to encounter animal research in their major course of study (i.e., psychology, biology, premedicine, and preveterinary majors) were more opposed to animal experimentation than were other students.

Along similar lines, Sieber (1986) found that science majors were more likely than nonscience majors to say that the educational and scientific use of animals was in need of improvement. In this study, 211 introductory psychology students answered a battery of questions about the use of animals in research and teaching, and the overall results reflected a high degree of ambivalence over current practices. For example, of the 192 students who reported having taken a course with animal dissection, most felt they had learned a great deal; at the same time, only 1 student in 4 felt that the instructor had conveyed a respect for animals.

The third and fourth studies mentioned (Galvin & Herzog, 1992; Herzog & Galvin, in press) examined individual differences in concern about animals among students enrolled in social psychology or experimental psychology courses. Consistent with the results of Broida et al. (1993), this research found that attitudes toward the use of animals were related to gender (with females relatively more protective of animals than males were), ethical idealism, and the belief that animals are capable of feeling pain and suffering.

The remaining two studies were published in abbreviated form. Vigorito et al. (1992) surveyed 112 introductory psychology students and 63 psychology majors, and found relatively few differences between the two groups. Although psychology majors tended to be somewhat more supportive of animal research than were introductory psychology students, 77% of all students supported the animal rights movement. In the study by Takooshian (1988), student volunteers collected 589 surveys from a wide variety of respondents, including medical research-

ers, psychology students, and members of the New York public. Takooshian found no significant differences among students, researchers, and members of the general public when it came to attitudes toward animal research; most groups averaged near the center of Takooshian's scale, indicating "equally mixed feelings" about animal research (p. 8).

Taken together, these six studies suggest, among other things, that students interested in psychology (a) feel a sense of ambivalence over the use of animals in research and education, (b) do not differ systematically from other people in their concern for animals, and (c) exhibit a gender difference in which women are more likely than men to oppose animal experimentation. Except for the study by Vigorito et al. (1992), however, these studies were not designed to describe the attitudes held by psychology majors, so it is unclear how representative the findings are of the attitudes of students continuing on in psychology. Moreover, all six studies relied on convenience samples rather than random samples, further complicating the question of generalizability.

In an effort to gather a representative cross section of attitudes from psychology majors nationwide, the present study was based on a probability sample of psychology majors drawn from colleges and universities around the country. In all, 1,188 students from 42 schools completed a survey on their attitudes toward the use of animals in psychology. To facilitate comparisons between students' attitudes and psychologists' attitudes, the survey was designed to parallel a contemporaneous national survey of nearly 4,000 practicing psychologists (Plous, 1996). The focus of the survey was on three main topics: (a) the use of animals in psychological research, (b) research regulations and the humane care of animals, and (c) the use of animals in undergraduate psychology classes.

METHOD

Participants

A two-stage cluster sampling technique was used to generate a national probability sample of undergraduate psychology majors.

Stage 1

A sampling frame of 708 eligible schools was constructed using *Peterson's Guide to Four-Year Colleges: 1994* (Peterson's Guides, 1993). The frame included only "state," "state-related," and "independent" colleges and universities (e.g., religious schools were excluded). Institutions were also excluded if they had enrollments below 1,000 or if they had obvious specializations (e.g., colleges of design). So as to ensure regional diversity, the sample was further limited to a maximum of two institutions per state and one campus per university or college system. From this sampling frame, 50 schools offering an undergraduate psychology major were randomly selected. The departmental chair at each school was then contacted and told that the study was being underwritten by the National Science Foundation, that all participating departments would be entered in a drawing for a laser printer, and that the only requirement for participation was that a department have a minimum of 30 psychology majors. Two schools did not meet this criterion at the time they were approached, leaving a total of 48 eligible colleges and universities. Of these institutions, 42 (87.5%) chose to participate.

Stage 2

In the next stage, a sampling frame of psychology majors was constructed for each school. In 35 cases, the department sent an exhaustive list of majors, which was then returned to the department with up to 50 randomly selected students designated to receive a survey (in departments with fewer than 50 psychology majors, all psychology majors received a survey). In the remaining 7 cases, the department simply counted the total number of majors (without sending a list of names) and was furnished with 50 randomly generated slots corresponding to students on their list (this procedure allowed schools to participate without disclosing students' names). In all, 2,022 psychology majors were selected for participation, and a total of 1,188 students (58.8%) completed usable surveys.[1]

Respondent profile

Of the 1,158 students who indicated their gender on the survey, 73.0% were female and 27.0% were male. These figures agree closely with government statistics showing that 73.1% of students who receive psychology bachelor's degrees are women and 26.9% are men (U.S. Department of Education, 1995). Just over half the sample was 21 years old or younger, with the following breakdown according to college year: 7.5% 1st-year students, 12.8% sophomores, 30.8% juniors, 48.1% seniors, and 0.9% "other." Most students indicated an interest in continuing in psychology: 58.3% said that they planned to attend graduate school in psychology, 27.8% said that they might attend, and 13.9% said that they would not attend.

Survey

In most respects, the survey format and procedure followed the total design method outlined by Dillman (1978). The survey appeared as a four-page booklet with the title "Animals & Science: A Survey of Undergraduates," and the cover stated that the project constituted "the first large-scale survey of psychology majors' opinions concerning the use of animals in research and teaching." On the first inside page of the survey booklet, respondents were told the following:

> This survey concerns the use of animals in psychological research and education. For present purposes, "animal research" refers only to *psychological* research on animals—not biomedical research or toxicology testing. Although the lines are sometimes fuzzy, psychological research should be taken to include areas such as behavioral neuroscience, psychopharmacology, and psychophysiology, as well as studies of animal behavior, perception, and cognition.

1. Of this total, 29 respondents (2.4%) indicated that they had not yet formally declared psychology as their college major. Surveys from these respondents were therefore excluded from further analysis.

Use of Animals

Table 1. *Comparison of survey responses from psychology majors and practicing psychologists (given in percentages)*

Attitude	Psychology majors	Psychologists
In general, do you *support* or *oppose* the use of animals in psychological research?***		
Strongly support	14.3	31.4
Support	57.4	48.6
Oppose	13.8	9.1
Strongly oppose	4.7	5.0
Not sure	9.8	5.8
Do you believe that the use of animals in psychological research is necessary for progress in psychology, or not?		
Yes	68.4	68.9
No	15.7	13.4
Not sure	15.9	17.7
Some people say that funds for animal research would be better spent studying humans. Others feel that funding for animal research should be maintained or increased. What is *your* opinion?		
Decrease portion of funds spent on animal research	28.2	29.4
Maintain portion of funds spent on animal research	65.0	64.5
Increase portion of funds spent on animal research	6.8	6.1
In general, how do you feel about the legal regulations governing animal research?**		
They should be tougher and/or more inclusive	38.6	32.3
They are adequate and should be maintained	55.1	61.2
They are excessive and should be reduced	6.2	6.5
Federal regulations protect the "psychological well-being" of primates used in research. Do you *support* or *oppose* the idea of protecting the psychological well-being of primates?		
Support	85.1	85.9
Oppose	4.0	3.9
Not sure	10.9	10.2
Before being granted approval to run an experiment, investigators in Great Britain, Canada, and the Netherlands are required to assess the degree of pain animals may experience. Would you *support* or *oppose* a similar requirement in the United States?*		
Support	85.2	81.2
Oppose	7.0	7.2
Not sure	7.8	11.6
As far as you know, are the animals used in psychological research treated humanely, or not?		
Yes	43.9	42.8
No	11.7	10.7
Not sure	44.4	46.6
In general, do you *support* or *oppose* the use of animals in undergraduate psychology courses?		
Support	56.9	57.8
Oppose	28.4	26.2
Not sure	14.7	16.0
Do you feel that laboratory work with animals should be a required part of the undergraduate psychology major?*		
Yes	34.1	31.1
No	54.3	53.9
Not sure	11.6	15.0

Note. Some percentages do not add up to 100 because of rounding.
*$p < .01$ by $\chi^2(2)$. **$p < .001$ by $\chi^2(2)$. ***$p < .0001$ by $\chi^2(4)$.

After these instructions came a series of questions asking students about their support for animal research, their attitudes and knowledge concerning various animal welfare regulations, and their attitudes about the use of animals in psychology education (see Table 1). Next, an empty table was presented, with four columns labeled "Primates," "Dogs," "Rats," and "Pigeons," and three rows labeled "Observational studies in naturalistic settings," "Research involving caging or confinement, but no physical pain or death," and "Research involving physical pain or death." Students were instructed to "place a '+' in a cell when you think that psychological research is usually *justified,* a '−' in a cell when you think that psychological research is usually *unjustified,* and leave the cell blank if you do not have a strong opinion one way or the other. For present

purposes, assume all research has been institutionally approved and deemed of scientific merit." Following this question, students were asked several self-descriptive questions (e.g., gender, age, desire to attend graduate school), and they were invited to submit additional comments.

Independent Ratings

Because the survey covered a controversial topic, special steps were taken to minimize experimenter bias and social demand characteristics. As part of this effort, the survey was independently rated for clarity, balance, and neutrality in tone by 100 anonymous psychology majors drawn from three schools (for details on these ratings, see Plous, 1996). Results showed that 96 of these students thought the survey was very or fairly clear; 69 students thought the survey was fairly balanced, 21 thought it favored animal research, 9 thought it opposed animal research, and 1 did not answer; and the mean rating of tone on a 9-point scale was 5.2 (not significantly different from the neutral point of 5.0). These ratings suggest that the survey was generally perceived as clear, balanced, and neutral in tone.

Procedure

The survey was distributed in October 1994. Although the mode of distribution varied somewhat from school to school, all students received the same standard packet of materials: (a) a hand-signed cover letter from the author, (b) a memo from the departmental chair or representative telling students where to return their completed surveys, (c) a survey booklet, and (d) a return envelope marked "Completed Survey." The cover letter explained that students had been chosen randomly as part of a sample of psychology majors from around the country, and it stressed that the survey was anonymous. The cover letter also instructed students to seal their completed survey in the enclosed envelope and return it to the person listed in the memo, so that the person collecting the surveys could enter all participants in a drawing for $500 as a way of thanking them for their time. Survey responses were included in the study if they were received by March 1, 1995. After that date, drawings were held for the laser printer and $500 prize, and the awards were sent to the winning department and student participant, respectively.

RESULTS

One of the most striking results to emerge from this study was the close correspondence between students' attitudes and the attitudes of professional psychologists (see Table 1). With few exceptions, the marginal distributions of opinion given by psychology majors were within 3% of the opinions given by practicing psychologists in the parallel survey mentioned earlier (Plous, 1996). Although psychology majors were somewhat less likely than psychologists to be strong supporters of animal research, a clear majority approved of using animals in both research and teaching.

As with the survey of psychologists, however, this support for animal research did not extend to experiments involving pain or death. For example, even though the experiments were described as "institutionally approved and deemed of scientific merit," only 10.3% of students felt that painful or terminal research on primates was justified, and only 9.4% approved of such experiments with dogs (compared with 78.8% and 79.7% of respondents opposed, respectively, and the remainder having no strong opinion one way or the other). Similarly, only 21.6% of students felt that painful or terminal experiments on pigeons were justified, and only 29.1% approved of such research on rats (compared with 64.3% and 58.3% opposed; see Fig. 1 for the margin of support on each item, calculated as the percentage of respondents in favor minus the percentage opposed).

Students were also asked two questions about the Animal Welfare Act. The first item, intended to assess knowledge, was as follows: "The Animal Welfare Act is a federal law that governs the use of animals in research. As far as you know, which of the following animals are presently covered under this law?" Possible responses were "Primates," "Dogs," "Cats," "Pigeons," "Rats and mice," "Reptiles," and "None of these animals." In answer to this question, 84.4% of students responded correctly that primates are protected under the Animal Welfare Act, 74.8% responded correctly that dogs are covered, and 72.3% responded correctly that cats are covered. At the same time, 62.1% mistakenly believed that rats and mice are covered, 38.5% mistakenly believed that pigeons are covered, and 18.1% mistakenly believed that reptiles are covered. All

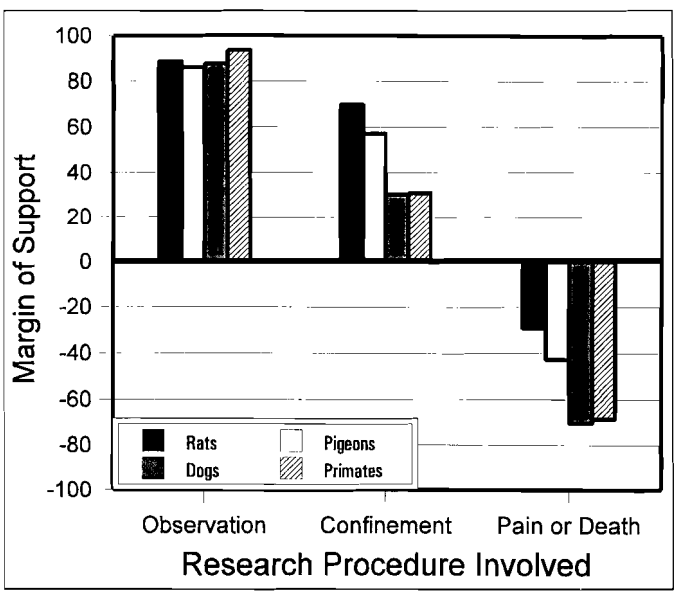

Fig. 1. Margin of support for various types of research. Respondents were given an empty table with four columns labeled "Primates," "Dogs," "Rats," and "Pigeons," and three rows labeled "Observational studies in naturalistic settings," "Research involving caging or confinement, but no physical pain or death," and "Research involving physical pain or death." They were told to assume that the research was "institutionally approved and deemed of scientific merit," and they were asked to indicate whether each type of research was usually justified or unjustified (see the text). Margin of support equals the percentage of respondents saying "justified" minus the percentage of respondents saying "unjustified."

told, only 18.9% of psychology majors were able to answer this question accurately, and the percentage answering correctly did not increase with additional years in college or with experience taking college courses that use animals.

The second question about the Animal Welfare Act was, "Regardless of the species now covered under the Animal Welfare Act, which of the following animals should, in *your* opinion, receive federal protection when used for research?" (the response categories were the same as for the previous question). Approximately 90% of students felt that primates, dogs, and cats should be covered (89.6%, 90.6%, and 87.1%, respectively), and roughly two thirds felt that rats and mice, pigeons, and reptiles should be covered (65.9%, 68.0%, and 64.3%, respectively).

Internal Analyses

A number of internal comparisons were conducted, including breakdowns by gender, graduate school aspirations, college year, selectivity of the schools, and geographic region of the schools. The highlights of these analyses are given in this section.

Gender

In keeping with the results of previous research (Broida et al., 1993; Galvin & Herzog, 1992; Herzog, Betchart, & Pittman, 1991), males (n = 313) were far more supportive of animal research than females were (n = 845). For example, males were more likely than females to label themselves strong supporters of animal research (25.2% vs. 10.2%), were more likely to believe that research animals are treated humanely (54.3% vs. 40.0%), and were more likely to support the use of animals in undergraduate psychology courses (68.2% vs. 52.6%). Conversely, females were more likely to support cuts in spending for animal research (32.4% vs. 17.9%) and were more likely to advocate strengthening the legal regulations that govern animal research (42.8% vs. 27.1%). All of these differences were significant at the .001 level by chi-square test.

Graduate school aspirations and college year

The attitudes of psychology majors did not differ substantially depending on whether they planned to attend graduate school (n = 676), were unsure (n = 322), or did not plan to attend graduate school (n = 161). Likewise, there were relatively few differences among underclass students (n = 235), juniors (n = 357), and seniors (n = 557). A significant difference did emerge, however, in response to the question "If you were to attend graduate school, would you consider a career conducting animal research?" This question was answered negatively by 50.4% of underclass students, 51.7% of juniors, and 60.9% of seniors, $\chi^2(2, N = 1{,}138) = 10.98, p < .005$. Across all college years, 15.7% of students planning to attend graduate school said they would consider a career conducting animal research, 53.5% said they would not, and the rest were unsure.

Selectivity of the school

Attitudes about animal research were significantly related to whether students attended a highly selective school (n = 252), a moderately selective school (n = 662), or a minimally selective school (n = 245). Selectivity classifications were based on ratings of "entrance difficulty" contained in *Peterson's Guide to Four-Year Colleges: 1995* (Peterson's Guides, 1994; or if this information was unavailable for a particular school, the 5-point ratings in Straughn & Straughn, 1992). Schools were classified as highly selective if they received a 4- or 5-star rating in *Peterson's Guide,* moderately selective if they received a 3-star rating in *Peterson's Guide,* and minimally selective if they received a 1- or 2-star rating in *Peterson's Guide*. In general, selectivity was negatively related to support for animal research. For example, students at selective schools were relatively more likely to favor tougher or more inclusive regulations, $\chi^2(2, N = 1{,}136) = 8.69, p < .02$; more likely to oppose animal laboratories as a required part of the psychology major, $\chi^2(2, N = 1{,}153) = 12.15, p < .003$; more likely to say that they would not consider a career in animal research, $\chi^2(2, N = 1{,}147) = 10.91, p < .005$; and less likely to regard painful or terminal research on primates as justified, $\chi^2(2, N = 1{,}120) = 11.88, p < .003$.

Geographic region

Attitudes also varied depending on whether students attended a school in the Southern region of the United States (n = 358), the Western-Mountain region (n = 266), the Midwestern region (n = 259), or the Northeast/Mid-Atlantic region (n = 276). On the whole, students in the Southern and Western-Mountain regions were most supportive of animal research, students from the Northeast/Mid-Atlantic region were most opposed to animal research, and students in the Midwest fell somewhere in between. For instance, the percentage of students who felt that research animals are treated humanely was 51.5% in the South, 47.5% in the Western-Mountain region, 40.9% in the Midwest, and 33.3% in the Northeast/Mid-Atlantic region, $\chi^2(3, N = 1{,}150) = 23.21, p < .001$. These results are consistent with national surveys on biomedical research showing greater support for animal experimentation in the West than in the Northeast (American Medical Association, 1989; Foundation for Biomedical Research, 1985).

Statistics on Animal Use

In a supplemental survey, the chair (or designated representative) of each psychology department was asked whether any faculty members were currently conducting research on animals, and whether the number of faculty members conducting animal research had increased over the past 10 years, decreased over the past 10 years, or stayed the same. Just over half the departments (n = 22) had at least one faculty member who conducted animal research. Sixteen departments reported a decline in animal research, 5 reported an increase, and 21 reported no change over the past 10 years. This difference represents a significant decline in animal research, $\chi^2(2, N = 42) = 9.57, p < .009$, and it corroborates earlier declines observed by other

researchers (Benedict & Stoloff, 1991; Gallup & Eddy, 1990; Thomas & Blackman, 1992).

As for the use of animals in teaching, half of the participating schools (n = 21) offered psychology classes in which animals were used (i.e., as part of a class demonstration or animal laboratory), but only 37.0% of students at these schools reported having taken such courses (20.4% of the total sample). Also, the percentage of students who reported having taken animal course work differed by region: 32.5% of students in the South had taken such courses, compared with 17.8% of students in the Western-Mountain region, 10.2% of students in the Midwest, and 17.0% of students in the Northeast/Mid-Atlantic region, $\chi^2(3, N = 1{,}141) = 50.90, p < .001$.

DISCUSSION

The present results suggest that most psychology majors support the use of animals in psychological research and teaching. Nearly three quarters of those surveyed expressed some level of support for animal research, more than two thirds viewed animal research as necessary for progress in psychology, and more than half supported the use of animals in undergraduate psychology courses. These findings closely match the results of a related survey of practicing psychologists (Plous, 1996). At the same time, most students were opposed to animal research involving pain or death. This opposition may have important consequences for the future of areas such as behavioral neuroscience, psychopharmacology, and psychophysiology, in which animals are often put to death following the research. Moreover, opposition to animal research was greatest among psychology majors at selective schools—precisely those students who are most likely to gain admission to graduate school and ultimately become the next generation of psychologists.

Many psychology majors also felt that the regulations governing animal research should be strengthened, and most students supported two specific extensions of animal welfare policy. First, 85% of those surveyed felt that before being granted approval for an experiment, investigators should be required to assess the pain animals may experience (such pain assessments are mandatory in Canada and certain European countries, but not in the United States). Second, most students felt that rats and mice, pigeons, and reptiles should receive protection under the Animal Welfare Act. Such a change in policy would apply to the majority of animal researchers in psychology because roughly 95% of all animals used in psychological research are rats, mice, or birds (Gallup & Suarez, 1985).

On the whole, then, these results are consistent with earlier studies showing a high degree of ambivalence on the part of psychology students (e.g., Sieber, 1986; Takooshian, 1988). Most psychology majors in the present study viewed the animal research enterprise as valuable, yet most were also troubled by the infliction of pain or death, and many questioned whether research animals are treated humanely. Of course, given a survey return rate of less than 60%, it is possible that sample selection biases served to inflate the level of expressed ambivalence. Such biases are unlikely in this case, however, because the return rates at participating schools failed to correlate significantly with students' attitudes toward the use of animals in research or teaching, and, in any event, ambivalent students would probably be less likely to respond to the survey than would students with a firm opinion.

What implications do these results have for the future of animal research in psychology? Overall, they suggest that animals will continue to be used in research and teaching, but that the level of animal use will probably decline over time. The evidence for such a projection is fourfold. First, as discussed earlier, several studies (including the present one) have found that a decline in animal research is already under way (Benedict & Stoloff, 1991; Gallup & Eddy, 1990; Rowan & Loew, 1995; Thomas & Blackman, 1992). Second, undergraduate animal laboratories—a traditional staple of the psychology major— are no longer taken by most students and are no longer offered by most psychology departments. Third, female students support animal research significantly less than male students do, and the percentage of female psychologists is growing (Pion et al., 1996). Finally, despite the general similarity in attitudes between psychology majors and practicing psychologists, the percentage of students who described themselves as strong supporters of animal research was less than half the percentage of psychologists who did so (14% vs. 31%). Thus, without a larger core of strongly committed advocates of animal research, the current trend away from animal use is unlikely to reverse in the foreseeable future.

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