
TOPICAL ARTICLES

Animal Use, Student Choice, and Nonanimal Alternatives at “America’s Best” Undergraduate Colleges

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Chairs at 262 prominent U.S. and Canadian colleges and universities (75% response rate) completed a questionnaire about animal use, student choice policies, and alternatives to the use of animals in undergraduate psychology education. Results indicated that a majority of institutions used animals in teaching, only a minority had choice policies within animal-based courses, and most schools used alternative learning methods, either as a substitute for or adjunct to live animal laboratories. In this article, I discuss the educational policy implications of practices in the undergraduate psychology animal-based curriculum at “America’s best” colleges, especially the common practice of advising reluctant students away from animal course work.

Although a majority of psychology students believe that research on animals is necessary for progress in psychology (Plous, 1996), most students are troubled about pain and suffering in animals (Gallup & Beckstead, 1988), support animal rights (Vigorito, 1996), and are more opposed to invasive animal experimentation than students who declare other selected majors (Broida, Tingley, Kimball, & Miele, 1993). Given the same description of a hypothetical research proposal and using the same factors to judge its ethical adequacy (e.g., cost–benefit analysis, suffering to animals, phylogenetic considerations, experimental design), psychology students differ in their evaluation of its acceptability (Galvin & Herzog, 1992; Herzog, 1990). Psychology students approve of experiments on animals that “reveal basic facts about psychological processes,” but they disapprove of animal experimentation that “contributes to the education and training of people” (Furnham & Heyes, 1993, p. 6). Although a majority of psychology students support the use of nonhuman animals in undergraduate psychology courses, almost one of every six majors expressed uncertainty about such use, and most opposed an animal laboratory requirement as a part of the undergraduate psychology major (Plous, 1996).

Student ambivalence over animal use appears to vary, among other things, with exposure to psychology courses such that the more courses that a student has taken in psychology, the more positive that student’s attitude toward animal use in research and education tends to be (Vigorito, 1996). Despite the more supportive attitudes toward animal use among junior and senior psychology majors, relatively few students choose to take animal course work (Plous, 1996), and fewer students select to pursue graduate study in animal psychology. Thomas and Blackman (1992) noted the far-reaching consequences that a decline in the number of

undergraduate students undertaking animal course work has had for psychology in the United Kingdom:

[It] reduces the pool of potential graduate students who could be recruited to work in this area, reduces the case for making or renewing academic appointments to faculty positions in the area of animal psychology, [and] makes it an unattractive choice for students contemplating graduate research studies, thus further exacerbating the decline. (p. 1679)

What is unclear from these studies is the influence of the psychology curriculum on student attitudes toward animal use. Detailed information about the curricular structure and instructional practices of schools using animals in undergraduate psychology education in the United States has been difficult to obtain. For instance, three surveys about animal use in research and education conducted in 1983, 1986, and 1996 by the American Psychological Association’s (APA) Committee on Animal Research and Ethics did not yield data of sufficient quality to merit publication (Dewsbury, 1993; Science Directorate, 1999). In another national survey, institutions were reluctant to release information about animal use because of concerns about who would receive a copy of the final report (Allen, 1994–1995).

To date, only a handful of published reports have focused specifically on the educational use of nonhuman animals in the undergraduate psychology curriculum (Benedict & Stoloff, 1991; Bowd & Shapiro, 1993; Hull, 1996; Plous, 1996). Taken together, these studies indicate that (a) between 50% to 70% of higher education institutions in the United States offer undergraduate animal-based instruction in psychology, (b) schools with graduate programs in psychology offer more undergraduate animal-based instruction than schools without graduate programs, (c) a little more than one third of psychology majors at schools with animal-based instruction and one fifth of majors nationwide report having taken animal course work, and (d) less than half the schools that offer undergraduate animal-based instruction have a policy to accommodate students who object to the use of animals in psychology classrooms.

These studies, however, did not describe (a) how faculty handle student conflicts over animal use in a class demonstration or animal laboratory, (b) why psychology departments refuse students the choice to opt out of an animal lab within a course and complete an alternative nonanimal laboratory activity instead (also called “student choice”), or (c) the relative availability of alternative nonanimal learning

methods (e.g., interactive computer simulations, videos, mechanical models, human participants, Web-based information resources) at schools that use animals vis-à-vis schools that do not use animals. One goal of this research was to fill this gap in the literature by investigating curricular structure and instructional practices regarding animal use, student choice policies, and nonanimal alternatives in undergraduate psychology education at “America’s best” colleges, as defined by *U.S. News and World Report* (2001).

There are important reasons to explore these issues more closely in the undergraduate psychology curriculum of top-ranked schools. If colleges reputed for overall excellence in undergraduate education are making sound curricular decisions, then a national survey of schools judged to be excellent by peers and independent reviewers ought to reveal best practices that would be useful for other psychology departments to model (or benchmark) in reaching desired educational outcomes. *Best practices* are defined broadly as those policies and procedures that help university and college psychology programs better accomplish their mission and purposes, improve the quality of undergraduate psychology education, and aid the academic department become more proactive in setting standards for their future (Alstete, 1995). In the context of undergraduate animal-based curricula, for instance, best practice reflects APA’s Board of Educational Affairs (1995) learner-centered psychological principles and their recognition that students need opportunities to make choices about learning in line with their personal interests. Best practice adheres to APA’s *Quality Principles* (McGovern & Reich, 1996) and their recognition that effective student advising encourages students to “play an active role in shaping policies and procedures” (p. 254). Best practice puts into action APA’s (1996) *Guidelines for Ethical Conduct in the Care and Use of Animals* and their recognition that “consideration should always be given to the possibility of using non-animal alternatives” (p. 10).

Method

Participants

I selected a purposive nonprobability sample of 350 schools listed in *U.S. News and World Report* (2001) rankings of “America’s Best Colleges” using a three-stage process. First, I identified 1,350 four-year colleges and universities in the United States and Canada that offered an undergraduate degree in psychology or psychobiology using Peterson’s (2001) *Guide to Four-Year Colleges*. Second, from this initial sampling frame, I identified a subset of 250 schools that offered graduate programs in an animal-related research area (e.g., behavioral genetics, behavioral neuroscience, comparative, experimental animal behavior, learning, physiological, psychobiology, psychopharmacology) using APA’s (2000) *Graduate Study in Psychology*. Third, I systematically selected 350 “top-ranked” (Tier 1) national universities, national liberal arts colleges, and regional (North, South, Midwest, and West) universities and liberal arts colleges listed in *U.S. News & World Report* rankings of “America’s Best Colleges” to ensure regional diversity and an equal representation of schools with and without graduate programs in psychology.

Instrument

Survey construction followed the total design method (TDM) described by Dillman (1978, chap. 4). The 10-item survey appeared as a five-page booklet that requested psychology department chairs (or designated representative) to provide information about instructional practices in three broad curricular areas. Four questions asked about the extent of animal use in undergraduate psychology courses (i.e., category of courses, species of animals, type of laboratory procedures). Four questions asked about how faculty handled student objections to witnessing animal demonstrations or participating in animal laboratories (i.e., whether students have a choice within an animal-based course between participating in an animal lab or doing an alternative nonanimal laboratory activity instead, what mechanism exists to inform students about the choice, and why faculty would refuse students the choice). Two questions asked about the availability of alternative nonanimal instructional modalities in courses that traditionally use live animal laboratories. An “alternative” was defined as any method, model, or approach that results in the *reduction* in the number of animals used for classroom demonstrations and laboratory assignments, the *refinement* of laboratory procedures that result in the lessening of pain and distress to animals, or the *replacement* of live animals with nonanimal systems, also known as the Three Rs (Russell & Burch, 1992). Three survey items required “yes” or “no” responses, six items followed an “items-in-a-series” format requiring respondents to select among vertically arranged response categories, one item required respondents to place an “X” in appropriate spaces of a matching row (alternatives) and column (course) matrix, and the back cover consisted of an invitation to make additional comments.

Procedure

In most respects, survey implementation followed the highly detailed and personalized TDM procedures prescribed by Dillman (1978, chap. 5). Because the survey addressed a controversial issue in psychology (i.e., the use of nonhuman animals in education) and to minimize experimenter bias and social demand characteristics, six academic psychologists on the Steering Committee of the New England Psychological Association independently evaluated a draft of the survey for balance, clarity, and neutrality. Of the 350 institutions surveyed in February 2001, representatives from 262 schools (75% response rate) completed and returned the survey by July 2001. Following completion of data analysis, all 350 institutions in the original sample received feedback of results.

Results

Analysis of the 262 returned surveys indicated equivalent response rates from institutions that had graduate programs ($n = 131$) and schools that did not have graduate programs ($n = 131$). Using Gallup and Eddy’s (1990) geographical divisions, 78 schools (74% response rate) responded from the Northeast, 57 (69% response rate) from the North Central region, 80 (79% response rate) from the South, 13 (87% response rate) from the Rocky Mountain region, 23 (66% re-

sponse rate) from the Pacific region, and 11 (100% response rate) from outside the United States (i.e., Canada).

Animal Use

Of the 262 institutions responding to this survey, 162 (62% of all schools) offered animal-based instruction, whereas 100 (38%) did not. The percentage of institutions that offered animal-based instruction (i.e., used animals as part of a class demonstration or animal laboratory) and those institutions that did not was evenly divided between schools that had *both* undergraduate and graduate programs and schools that had *only* undergraduate programs.

A variety of different undergraduate psychology courses used animals at institutions that offered animal-based instruction, as shown in Table 1. In most respects, these results are similar to those reported by Benedict and Stoloff (1991) in their survey of 109 “America’s Best Colleges” (80% response rate). One notable difference is the 23% increase in the number of institutions that used animals for individual research-type course work reported in this study compared to a decade ago.

Institutions offering animal-based instruction in undergraduate psychology courses used an assortment of different animals, as shown in Table 2. Although the data reported here do not purport to describe animal use among all schools in the United States but rather trends at more prestigious higher education institutions, a comparison with Hull’s (1996) national survey of 110 psychology departments without graduate programs (32% response rate) is informative. For instance, in this survey of 162 institutions (with and without graduate programs) that offered undergraduate animal-based instruction, 81% used rats (49.6% of all schools)—a rate comparable to that reported by Hull. A greater percentage of top-ranked institutions, however, performed animal dissections and used birds, rodents, fish, reptiles and amphibians, monkeys, and other primates. Although most of the animals in Table 2 are laboratory animals, the table also includes animals (e.g., pets, wild animals, marine mammals) observed in naturalistic or seminaturalistic settings.

Institutions that offered animal-based instruction performed many different procedures on animals, as shown in Ta-

Table 2. Percentages of Institutions Using Species of Animals in Animal-Based Instruction

Species of Animal	%	
	This Study ^a	Hull (1996) ^b
Rats	81	81
Brains (from sheep, cows, or pigs)	31	4
Birds (pigeons, finches, chickens, ducks)	28	12
Other rodents (mice, hamsters, gerbils, guinea pigs, ferrets, voles)	26	13
Fish	13	8
Reptiles and amphibians (lizards, frogs, newts, salamanders)	9	4
Arthropods (crickets, spiders, insects, crayfish)	9	10
Wild animals (bats, squirrels)	7	—
Invertebrates (planaria, worms)	6	10
Monkeys or other primates (chimpanzees)	6	2
Farm animals	3	—
Other (zoo animals, rabbits, dogs, cats, marine mammals)	7	—

Note. Percentages do not sum to 100% because several respondents reported using more than one species of animal.

^a*N* = 162. ^b*N* = 52.

ble 3. In comparison with other colleges (i.e., Hull, 1996), a greater percentage of top-ranked schools applied food or water deprivation (63% vs. 40%), surgery (55% vs. 25%), and drugs or toxic agents (45% vs. 4%) on animals. Respondents’ written comments indicated that institutions used aversive procedures (e.g., surgery, injections, drugs, shock) more frequently in advanced-level courses, individual student research, directed study, and honors thesis types of animal course work and rarely in introductory psychology courses. The type of procedure performed on an animal depended on the individual student’s research topic (e.g., exercise induced anorexia). None of the 162 institutions that offered animal-based instruction applied either extended physical mobilization or prolonged chronic sleep deprivation on animals as part of an animal laboratory procedure or demonstration.

Student Choice Policies

As shown in Table 4, institutions that offered animal-based instruction resolved faculty–student conflict over the use of animals in psychology classrooms in a variety of ways. Almost half the institutions offering undergraduate animal-based instruction advised students prior to course registration to select a different nonanimal-based course or lab section (e.g., in a human research area). Because this survey did not assess the actual frequency with which institutions advise students away from animal-based courses, it is unknown how frequently this practice occurs in the absence of significant discussion of educational objectives and ethical issues. About a third of schools that offered animal-based instruction provided an alternative learning exercise to students who expressed reluctance to participate in an animal laboratory activity—some schools as a matter of policy, other schools on a case-by-case basis, and others only if the student requested it. Table 5 shows the range of options

Table 1. Percentages of Institutions Offering Psychology Courses With Animal-Based Instruction

Psychology Course ^a	%
Biological Psych/Neuroscience/Neuroanatomy/Brain and Behavior	58
Learning/Behavioral Analysis/Methods in Conditioning	56
Individual Research/Directed Study/Honors Thesis	53
Research Methods (Elementary/Advanced)/Experimental Psych	25
Comparative Behavior & Cognition/Ethology/Behavioral Ecology	19
Introductory Psychology	12
Psychopharmacology/Behavioral Pharmacology	3
Motivation, Hormones & Behavior, Zoo Biology, Sensation Perception	3

Note. Percentages do not sum to 100% because animals may be used in more than one psychology course.

^a*N* = 162.

Table 3. Percentage of Institutions Performing Laboratory Procedures in Animal-Based Instruction

Laboratory Procedure ^a	%
Positive reinforcement in behavioral learning experiments	78
Food deprivation (up to, but not exceeding, 80% free-fed body weight)	63
Simple behavioral tests (e.g., perceptual discrimination, preference testing, categorical judgments, habituation/dishabituation, Morris water task)	60
Surgery (e.g., electrode placement, CNS lesion, cannulation)	55
Administration of drugs or toxic agents (e.g., ethanol, anxiolytics, bradykinin, psychostimulants)	45
Water deprivation (up to, but not exceeding, 24 hr)	29
Dissection on specimens preserved or euthanized for use of tissue	24
Monitoring or measurements of biological functioning (e.g., EEGs, EMGs, blood tests)	22
Negative reinforcement (e.g., escapable noxious stimuli), punishment, or inescapable noxious stimuli (e.g., < 9 s radiant heat exposure to tail, mild foot shock)	19
Environmental manipulation in settings similar to the species' natural habitat	16
Nutritional deprivation of salt or milk	4
Water deprivation (exceeding 24 hr)	4
Forced addiction or addiction with withdrawal and convulsions	4
Environmental deprivation (e.g., reared in impoverished environment)	3
Food deprivation (exceeding 80% free-fed body weight)	3
Social isolation for extended length of time relative to species needs	2
Capturing an animal for tagging followed by immediate release	2
Environmental exposure (e.g., radiation)	2
Observation of activity or social behavior in open field studies	2
Other (e.g., taste aversion/taste reactivity learning, burn or wound studies on anesthetized animals allowed to recover, exercise-induced anorexia, animal care and facilities management protocols)	3

Note. Percentages do not sum to 100% because several respondents reported using more than one laboratory procedure.
^aN = 162.

available to students who objected to the use of animals in psychology classrooms at schools that offered animal-based instruction.

Student choice policies within animal-based courses. Of the 162 institutions that offered animal-based instruction, 38 (23%) reported having operational student choice policies within animal-based courses (14.5% of all schools). An operational student choice policy is a formal statement that (a) publicly informs students (b) of their prerogative to make a fully informed, independent decision about their participation in any animal-based classroom demonstration or laboratory activity and that (c) if any student finds such use of animals problematic, objectionable, or otherwise unacceptable for strong personal, moral, spiritual, intellectual, emotional, or health reasons, then the department provides the student, (d) without prejudice or penalty, (e) the opportunity to participate in an alternative learning activity that meets the same educational needs (i.e., comparable or equivalent learning objectives) and that does not involve the caging and confine-

ment, manipulation, or death of a live animal (Ethical Science Education Coalition, 1995; Psychologists for the Ethical Treatment of Animals, 1992).

Table 6 identifies the various mechanisms by which the 38 institutions informed students of the student choice policy within animal-based courses. Seventeen of the 38 schools that reported having an operational student choice policy within animal-based courses implemented the policy in a consistent and regular manner. The remaining 21 schools reported implementing the student choice policy in an inconsistent and unpredictable manner at their institutions. For instance, these departments would refuse students choice under some conditions but not others, make animal labs optional in some courses (e.g., learning) but not in others (e.g., neuroscience), or would not make the option known to students unless they requested it. To use a metaphor articulated by Balcombe (1997), these latter schools are much like "restaurants that bake apple pies but exclude them from their menus: Very few diners will request apple pies" (p. 22).

Animal-based instruction without in-course student choice policies. Of the 162 institutions that offered animal-based instruction, 124 (77%) had no student choice policy within any animal-based course (47.3% of all schools). At these schools, if students did not want to work with animals, departments advised the students either during the first class period or prior to registering for the course during the advising period to select a different course that did not have an animal lab component (e.g., in a human research area). Given the availability of other courses from which students could select, these departments saw little need or reason to establish a stu-

Table 4. Percentage of Institutions Reporting Methods of Resolving Faculty–Student Conflict Over Animal-Based Instruction

Method of Resolving Professor–Student Conflict ^a	%
Student is informed of educational (or research) rationale	66
Ethical/moral issues regarding animal use are openly discussed	65
Information is provided about regulations governing animal use	57
Educational benefits and usefulness for self-discovery is emphasized	53
Nature of the procedures is specified more clearly	48
Student is advised prior to course registration to select another course	47
An alternative nonanimal laboratory exercise is provided for the student	36
Student is informed he/she is not required to participate, but must observe	15
Student is asked to consider dropping the course or changing major	12
Student is told her/his refusal may result in a lower grade	5
Student is sent to the department head or other authority to discuss the issue.	2
Other (e.g., student is questioned about consistency of moral beliefs, completes Animal Care and Use program, submits Institutional Animal Care and Use Committee forms, writes a paper)	3

Note. Percentages do not sum to 100% because several respondents reported using more than one method of resolving conflict with students.

^aN = 162.

Table 5. Percentage of Institutions Reporting Types of Options in Animal-Based Instruction

Type of Option ^a	%
Student choice policy within a course ^b	
Strong (meets all 5 criteria of student choice)	10
Moderate (meets 4 of 5 criteria of student choice)	9
Weak (meets 3 of 5 criteria of student choice)	4
Option to take a different course (no student choice policy within a course)	
Strong (equivalent curriculum available)	17
Moderate (equivalent curriculum not available)	28
Weak (equivalent curriculum not available—minimum choice)	21
Independent Research (nonclassroom-based use of animals)	11

^a*N* = 162. ^bFive criteria for an operational student choice include: (a) publicly informing students (b) about the prerogative to make a fully informed, independent decision about participation in any animal-based classroom demonstration or laboratory activity; and (c) if any student strongly objects to the use of animals in psychology classrooms, then the department provides the student, (d) without prejudice or penalty; (e) an educationally comparable alternative learning activity (with equivalent educational objectives) that does not involve the caging and confinement, manipulation or death of an animal.

Table 6. Percentage of Institutions Reporting Method of Informing Students About Student Choice Policy in Animal-Based Instruction

Method of Informing Students ^a	%
An announcement is read aloud on the first day of class	47
An announcement is printed in the course syllabus	32
The option would not be made known to students unless they requested it	24
A printed announcement is distributed on the first day of class	18
An announcement is read either prior to or at the time of the lab	18
A formal policy announcement is printed in the college catalog	8
Students are orally informed prior to enrolling or registering for the lab	5
An announcement is printed in the college registration packet	5
An announcement is posted prominently on a bulleting board	3
An announcement is printed in the department information booklet	3

Note. Percentages do not sum to 100% because several respondents reported using more than one method of informing students.

^a*N* = 38.

dent choice policy within any animal-based course. As one respondent said: “A student is not faced with opting out as a special case. Curriculum allows de facto opting out.” In other words, these schools offered student choice *between* courses, but not *within* courses.

Of the 124 institutions that offered animal-based instruction without an in-course student choice policy, 27 (22%) schools gave students the curricular option to avoid the animal-based course by taking a nonanimal-based course (e.g., Experimental Research Methods) that had comparable or

equivalent learning objectives but without the animal lab (10.3% of all schools). If the definition of *student choice* is expanded beyond the in-course version to include the option of taking a nonanimal-based course that has educational (student) outcomes equivalent to the animal-based course for which it was intended to substitute, then the percentage of institutions having operational choice policies increased from 24% to 40%. This latter percentage is comparable to the findings of an earlier study by Bowd and Shapiro (1993), who found in their survey of 300 psychology departments that of the 150 schools (50%) that offered animal-based instruction, 40% reported having “a policy to accommodate students who objected” (p. 138).

An additional 45 (36%) institutions that offered animal-based instruction without an in-course student choice policy gave students the curricular option to avoid animal course work by taking a nonanimal-based course (e.g., Cognitive Psychology), but gave no indication that the substitute course had educational (student) outcomes comparable to the animal-based course it was intended to replace (17.2% of all schools). These schools confined animal-based instruction to elective upper level courses (e.g., neuroscience, physiological psychology, comparative animal behavior, psychopharmacology, hormones and behavior) or to individualized research courses.

A further 34 (27%) institutions that offered animal-based instruction without an in-course student choice policy presumably gave students the option of avoiding animal work by taking a nonanimal-based course but did not explicitly state so on the survey (12.9% of all schools). These schools were less likely to provide an alternative nonanimal laboratory exercise to students who objected to the use of animals in the psychology classroom, gave more reasons why faculty would refuse students the choice, and used fewer nonanimal alternatives in the psychology lab than other schools that offered animal-based instruction without an in-course student choice policy.

The remaining 18 (15%) institutions that offered animal-based instruction with no in-course student choice policy used animals only for individual student research projects, directed study, internships, and honors thesis type of course work under a faculty member’s supervision, and not for traditional classroom-related course work (6.9% of all schools). Student participation in these research laboratory courses was optional and entered into only when the ongoing research in a faculty member’s lab was of interest to and chosen by the student. If students expressed reluctance to participate in animal laboratory procedures, then faculty would advise them to work in human research areas instead.

As shown in Table 7, a majority of the 21 institutions that offered animal-based instruction with moderate-to-weak in-course choice policies and the 124 institutions that offered animal-based instruction without an in-course choice policy gave “no response” when asked to identify reasons for refusing students the choice between participating in an animal lab or opt-out and doing an alternative nonanimal laboratory exercise. Of the 50 schools that did respond (31% of schools offering animal-based instruction and 19% of all schools), the most common reason for refusing students the choice to opt out of the psychology animal lab was the belief that no suitable alternative existed to the “hands-on” experience of live animal labs. None of these 50 schools refused student choice

Table 7. Percentages of Institutions Reporting Reasons for Refusing Student Choice in Animal-Based Instruction

Reasons for Refusing Choice	%	
	Moderate/Weak Choice Within a Course ^a	Option to Take Different Course ^b
No response	76	64
No suitable alternative is believed to exist to animal lab	14	18
Unsolicited student objections appear to be rare	14	14
Animal labs present no substantial ethical problems for students	0	11
Animal lab is indispensable to the training of psychologists	5	10
Animal lab is a traditional component of the curriculum	5	8
Other (e.g., students' concerns are judged to be insincere or ungrounded, choice policies threaten academic freedom)	0	2

Note. Percentages do not sum to 100% because several respondents reported refusing choice for more than one reason. ^aN = 21. ^bN = 124.

because they deemed the cost of alternatives too expensive or because they regarded choice policies as a threat to the future of animal research.

Alternatives to the Use of Animals

As shown in Table 8, of the 262 respondents to this survey, 185 (70.6% of all schools) used some form of alternative learning modality that did not involve the caging and confinement, manipulation, and death of an animal. Of the 162 schools that offered animal-based instruction, 109 (67.3%) used nonanimal learning methods (e.g., interactive computer simulations, Web-based information resources, audio-visual aids, human participants). These schools indicated in their written comments that they tended to use alternative learning modalities mostly as adjuncts to rather than replacements for traditional animal-consumptive methods. Of the 100 schools that did not offer animal-based instruction, 76 (76%) used some form of nonanimal alternative teaching modality in courses that have traditionally utilized live animals.

Discussion

Comments on Animal Use

This study indicates that the use of nonhuman animals for teaching purposes in the undergraduate psychology classroom continues to be a relatively common practice among prominent U.S. colleges and universities. Animal-based instruction is still heavily tied to traditional curricular content areas. The same traditional focus applies to the experimental and biological laboratory methods performed on animals,

with more invasive procedures emphasized as the student progresses beyond the introductory level.

A best practice approach requires departments offering animal-based instruction to recognize that the traditional disciplinary framework may not serve all undergraduate psychology students equally well. Manipulative environmental and invasive biological approaches to understanding animal behavior, cognition, and perception may serve as a barrier to interested but hesitant students undertaking animal work in psychology. Students may want to study “the mind-boggling and marvelous array of phenomena, species, and individuals that constitute the animal world” (Shapiro, 1998, p. 292), but are deterred from participating in animal-based courses because they are uncomfortable with the procedures they are required to perform on animals or troubled by the possibility that the animals may suffer or have to be killed.

These students require alternative disciplinary frameworks to traditional curricular content offerings and animal consumptive methods currently in favor at prominent U.S. institutions—precisely those schools that are most likely to produce the next generation of animal psychologists. Operationally, an “alternative disciplinary framework” in animal-based instruction means several things. It means providing an alternate focus to controlled laboratory experiments whereby

study should be limited to investigations of animals for their own sake, to attempts primarily to understand them and only incidentally ourselves; and to noninvasive and only minimally manipulative studies to that end that are conducted in naturalistic or semi-naturalistic settings. (Shapiro, 1998, p. 292)

It means the wider development and scheduling of course offerings in subfields such as *applied animal welfare science* (the

Table 8. Percentages of Institutions Using Alternative Learning Methods in Psychology Courses

Alternatives Used	%	
	Use Animals ^a	Do Not Use Animals ^b
Computer models and interactive simulations	82	86
Textbooks, articles, atlases, databases, CD-ROMs	65	82
Film slides, overhead transparencies, diagrams	50	72
Filmed or videotaped animal experiments	61	57
Observation/experiments by students on self or peers	44	59
Animal case study discussions (e.g., ethics)	22	34
Observation of live animals in naturalistic or semi-naturalistic settings	32	17
Mechanical models	22	21
In vitro methods	15	3
Other (e.g., pets, human tissue, robots, Web)	4	2

Note. Percentages do not sum to 100% because several respondents reported using more than one alternative. ^aN = 109. ^bN = 76.

study of “the capabilities, sensibilities, needs, and interests of animals as they relate to their welfare”; Shapiro & Zawistowski, 1998, p. 1) and *animal studies* (“the investigation of nonhuman animals as they influence and are present to us human animals”; Shapiro, 1993, p. 1).

Best practice requires psychology departments to recognize that students need opportunities to make choices about learning in line with their values and personal interests in animals (i.e., APA’s “learner-centered psychological principles”). This acknowledgment means establishing a broadened notion of animal work in psychology that is more in tune with current widely shared concerns for wildlife and the environment, applied uses of animals such as in agriculture, animals in popular culture and in literature, animal rights and animal welfare, companion animals, and zoo and laboratory animals. This larger conceptual framework naturally leads to a cross-disciplinary curriculum and use of broadly empirical quantitative and qualitative methods of inquiry that critically inform practices and policies involving nonhuman animals in psychology.

Comments on Student Choice Policies

From a best practice perspective, the advise-away policy raises problems. One obvious consequence of advise-away policies is to deter students away from entry into the field of animal psychology—students who psychologists may believe would benefit greatly from the content of these topical offerings (e.g., Abramson, 1994; Baldwin, 1993; Domjan & Purdy, 1995; Eaton & Sleigh, 2002; Gosling, 2001). The widespread implementation of advise-away policies at top-ranked undergraduate institutions in the United States and abroad (i.e., Canada) suggests one possible explanation for the decline in numbers of undergraduate students willing to undertake animal work in the United Kingdom (Thomas & Blackman, 1992) and why only a little more than a third of psychology majors at U.S. institutions offering animal-based instruction report having taken animal course work (Plous, 1996). The advising of students away from animal-based courses has not been accompanied by a correlative infusion of choice policies within animal-based instruction. It is possible that implementation of operational student choice policies within all animal-based courses may avert future declines in the number of students undertaking animal work and in the number of schools offering courses in animal psychology (Perlman & McCann, 1999).

Faculty may lament students’ tendency to view animal-based instruction as a kind of course to avoid. This avoidance may be an understandable response to a curricular norm that advises students away from animal-based instruction in response to faculty–student conflict over animal use in psychology classrooms (Tantleff-Dunn, Dunn, & Gokee, 2002). A greater emphasis on student-oriented, or constructivist, approaches to classroom planning that are ongoing, shared, and negotiated where faculty and students together make decisions about activities and approaches (i.e., *APA Quality Principles*) has the potential to pave the way for the integration of student choice policies and alternative disciplinary frameworks into animal-based curricula (Cunningham, 2000). Such integration may be critical if students are to perceive animal-based course work as anything more than something to be ignored or avoided and then forgotten.

Although the dominance of the advise-away policy approach among top-ranked institutions that offer animal-based instruction implies some sense of its superiority over the within-course choice policy approach, no empirical studies exist that compare these approaches in terms of educational (student) outcomes. Studies of student choice policies in biology education (e.g., Downie & Meadows, 1995) offer no specific recommendations regarding choice policies within the psychology curriculum, but they do provide some indication of how such policies might function. Such work could serve as a starting point for more thorough investigations into the relative merits of choice policies within animal-based psychology courses. Given the ambivalence toward animal use in research and education on the part of psychology students in the United States noted earlier and the reluctance of undergraduates to undertake course work and research projects in animal psychology in the United Kingdom noted by Thomas and Blackman (1992), such studies are potentially quite valuable.

Comments on Alternatives to the Use of Animals

From a best practice perspective, the relatively high rate of use of a wide range of alternatives at most top-ranked schools is commendable. This high utilization rate probably reflects growing administrative and faculty awareness of the availability of technologically advanced, cost effective, labor- and time-saving approaches to teaching that can serve as alternatives to traditional animal-consumptive methods. The high utilization rate of alternatives also likely reflects the growing acknowledgment that animal facilities are increasingly expensive to maintain, books are better illustrated, quality visual aids and films are easily obtainable, engaging interactive video displays are widely available, diverse Web-based informational resources are more accessible, and much more is known about human genetics and evolution, physiology, and psychology that undercuts the traditional use of animal models (Greek & Greek, 2002; LaFollette & Shanks, 1996; Shapiro, 1998).

Although it is unknown whether institutions using alternatives in animal-based courses are using the same number of animals at the same level of consumption as before, survey comments indicate that alternatives are used more as an adjunct to rather than substitute for live animal laboratories at schools offering animal-based instruction. Respondents’ comments suggested that the infusion of instructional technology that serve as genuine “alternatives” to the use of animals is lagging behind advances in journals (e.g., *Alternatives to Laboratory Animals*, *Journal of Applied Animal Welfare Science*, *Laboratory Animal Science*, *Teaching of Psychology*), major databases (e.g., AGRICOLA, BIOSIS Previews, Dialog, CAB Abstracts, MEDLINE), information directories (e.g., Animal Welfare Information Center), Web-based information sources, and research technology (Anderson & Kreger, 1998a, 1998b; Balcombe, 2000; Bottrill, 1999; Crawford, 1998; Cunningham & Randour, 1998; Kapis & Gad, 1993; Larson, Anderson, Ungar, & Stark, 1995; Smith, 1994; Summers, 1998).

One reason for the lag in progress in the consideration, development, and implementation of genuine alternatives to the use of animals in animal-based instruction may be that faculty is unaware of the information on alternatives in the

scientific literature or unfamiliar with the methods of retrieving this information from databases (Van der Valk et al., 1999). For instance, requirements for the consideration of alternatives are frequently the basis for cited deficiencies in animal care and use programs (Office of Inspector General, 1995), and Institutional Animal Care and Use Committees themselves often have difficulty in assessing the adequacy of animal study proposals for such requirements (Graham, 2002; Plous & Herzog, 2001). Another reason for the lag in progress may be the inertia generated by the advise-away policy itself. As one respondent said:

In our experience, problems due to 'squeamishness' are common, but problems related to ethical issues are very rare, perhaps related to the fact that the courses in question are all electives. Thus we have never had a need to construct alternatives.

Although highlighting the themes of the Three Rs in graduate and postgraduate work is often discussed (Stokes & Jensen, 1995), it may be unwise in the long run to ignore the consideration, development, and implementation of alternatives to live animal labs at the *undergraduate* level. Best practice requires consideration of the use of nonanimal alternatives in all animal-based instruction (i.e., APA *Guidelines*). Training in the development and implementation of alternatives should be the norm rather than the exception for all psychology majors receiving animal-based instruction (Kelly, 1985).

It is unknown whether students who decline to take animal-based instruction before leaving college are as informed about the existence of nonanimal alternatives in the scientific literature or the methods of retrieving this information from databases as students who take animal course work. Content analyses of syllabi, catalogs, and introductory psychology and research methods textbooks could determine whether there has been adequate consideration of the themes of the Three Rs in the undergraduate curriculum. If advising students who have objections away from animal-based courses remains the curricular norm, however, then postponing the consideration, development, and implementation of alternatives in animal-based instruction to the graduate level may mean little coverage for most psychology students.

Conclusions

From a best practice perspective, new ways of thinking about the themes of the Three Rs while maintaining access to animal-based courses for all psychology majors deserve careful exploration. Clearly, establishing alternatives to traditional disciplinary frameworks of animal use; allowing students to take an active role in shaping classroom policies and procedures by implementing a choice policy within all animal-based courses; and making available alternative methods, models, and approaches to traditional animal-consumptive methods presents its own set of challenges. A thorough discussion of the changes in teaching strategies needed to effectively deliver these curricular and instructional innovations, and how to encourage departments offering animal-based courses to make such changes, would be fruitful. If accompanied by careful empirical evaluation, these innovations may prove to be important ways that psychology

departments update and invigorate this important area of the undergraduate psychology curriculum in ways that can benefit not only students but the discipline of psychology as well.

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Notes

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