Animals in Psychology Education

A Guide to Understanding the Issue of Student Choice

Prepared by
Paul F. Cunningham, Ph.D.
Associate Professor of Psychology
Social and Behavioral Sciences Department
Rivier College, 420 Main St., Nashua, NH 03060-5086
e-mail:pcunningham@rivier.edu

Table of Contents

Page

Page

Page

Introduction

What This Handbook is All About

There continues to be considerable student/teacher conflict regarding the use of animals in education (Balcombe, 1997; Hepner, 1994). This is especially the case when a teacher refuses to grant students a "choice" to alternative learning methods for students who honestly feel a deep and sincere moral revulsion at having to expose a caged animal to what they consider to be harmful and aversive stimuli. Students may seek advice from a variety of persons about what to do, including other faculty members and students, deans and chairpersons, and even animal protection groups and the media. The classroom and even the university campus itself can become a battleground over the issue of student choice. Addressing the issue of student choice early in the academic advising process therefore can help prevent and even defuse potential student-teacher conflicts and unwanted publicity that could occur if students' conscientious objections to animal use in the psychology classroom are ignored, denied or ridiculed.

Understanding the causes of a conflict is an important first step in resolving it (Worchel & Simpson, 1993). This Handbook has been developed for faculty advisors, administrators, faculty, and students to use as a resource guide that elaborates the complex issues regarding student choice in the psychology classroom. The aim of the Handbook is to outline the various animal welfare, student welfare, instructional, and ethical concerns and the diversity of perspectives and values that underlie most student-teacher conflicts regarding the use of animals in psychology education, and to suggest possible strategies for conflict resolution. By understanding the causes of student/teacher conflicts regarding animal use in the psychology classroom and becoming aware of possible solution strategies, all parties will be in a better position to anticipate and manage the considerable anger and dissatisfaction, resentment and unhappiness that can result when students and teachers come into conflict over this issue.

The Handbook answers commonly asked questions about animal use and student choice in psychology education today. Why do some students refuse to participate in psychology animal laboratories? Why do some teachers of psychology support student choice and consider certain procedures on animals beyond scientific and ethical justification and unacceptable irrespective of any educational benefit that might be derived? Why do other psychology teachers refuse to accommodate those students who object to an animal laboratory requirement? Why is establishing a formal student choice policy a sensible way to avoid student/teacher conflicts in the psychology classroom? What guidelines can faculty advisors offer students who want a choice? What can the psychology teacher expect to occur when a student choice policy is in place?

The Handbook also contains an illustrative invasiveness scale for classroom use to assess animal pain and suffering that can be used to address students' animal welfare concerns (Appendix A). It describes various methods, models, and approaches that address teachers' instructional concerns for non-animal alternatives that can be as pedagogically sound, class-time efficient, and cost effective as the standard animal laboratory (Appendix B). It contains a partial list of schools that do not use animals in their undergraduate psychology programs (Appendix C). It provides sample evaluation forms for faculty proposals and students research projects, respectively, that can facilitate the work of institutional animal care and use committees (IACUCs) whose responsibility it is to review and evaluate proposed use of animals for educational purposes in the psychology classroom (Appendix D).

Why Student Choice Is an Advising Issue

Academic advising is an important teaching-related activity of most undergraduate psychology faculty beyond regular teaching load requirements. It contributes significantly to student retention and is essential for identifying conditions to maintain and improve psychology programs' quality (Fretz & Stang, 1980; Lunnenborg & Baker, 1986; McGovern, 1993; Ware, 1987; Woods, 1988). Although "most academic psychologists appear relatively uninterested in advising-related activities and outcomes" (Ware & Associates, 1993, p. 47), the Principles for Quality Undergraduate Psychology Programs (Quality Principles), adopted by the American Psychological Association (APA) Council of Representatives as official association policy in February 1994, place academic advising as a central, if not prerequisite, activity in all quality undergraduate programs (McGovern & Reich, 1996).

Despite the importance of academic advising in psychology education, however, little has been written about an advising issue that may seem new and different to some faculty advisors although it is commonplace enough to warrant increased attention -- the issue of student choice in the psychology classroom. Student choice is an advising issue because there are psychology students who conscientiously object to the use of invasive procedures on live animals for educational purposes and because there are teachers of psychology who refuse to acknowledge that the use of animals in psychology education is a moral issue for some students. Student choice is an advising issue in those circumstances where psychology majors are required to take courses in learning, physiological psychology, research methods, animal behavior, or introductory psychology in which students are expected to participate in weekly animal laboratory sessions. The best way to prevent the classroom from becoming a battleground over mandatory psychology animal laboratories is to identify and discuss student objections early during the academic advising process, gather information, generate ideas, and decide what to do. Students need to know that they can turn to the academic advisor for help.

The Advisor's Point of View

Imagine that you are an academic advisor or the chairperson of a psychology department and two students have urgently requested an appointment to talk with you. You learn that the students have conscientious objections to participating in the mandatory animal laboratory of a psychology course that is required for the major. A review of the syllabus indicates that the course objective is to provide "a rigorous data-oriented introduction to behavioral/physiological psychology" and that all students are expected to participate in weekly animal laboratories. The purpose of the assigned lab sessions is to give students hands-on experience with concepts and procedures discussed in the course, such as knowledge of the principles of classical and operant conditioning as applied to drug addiction, phobias, depression, and memory and skill in using the procedures and apparatus with which physiological experiments are actually conducted (Office of Teaching Resources in Psychology, 1977). In order to learn course content, students are expected to condition confined animals using food deprivation and shock, surgically ablate or lesion the brains of small mammals, insert and implant electrode recording devices through the animal's skull, administer drugs to alter animals' sensory capabilities, and decapitate and dissect animals for tissue analysis.

The two students who meet with you want permission to use an alternative laboratory activity that does not involve the use of such invasive procedures on live animals. They have asked for your help in resolving the conflict with their instructor who feels that the animal laboratory is the cornerstone of the course. It is clear that the students' ethical principles of "reverence for life" and "respect for the sanctity of being" which serve as an ultimate concern in these students' lives have come into direct conflict the instructor's philosophy of education and teaching practices. What should you do? Should you unconditionally support the course instructor who requires the use of animals (no "if", "ands", or "buts") and leave the matter entirely up to his/her discretion? Or would you recognize that some students have conscientious beliefs that conflict with certain teaching practices in which animals are used and encourage the instructor to make some reasonable accommodation to the students' beliefs? Would you intervene on the students' behalf and discuss with the instructor the possibility of arranging alternative exercises to take the place of what the students perceive to be morally objectionable experimental procedures that cause harm to animals?

The Teacher's Point of View

If you are the instructor of the course, should you try to desensitize the students by explaining why these laboratory experiences are necessary for acquiring research skills, that they are valuable demonstrations of course material, an indispensable part of scientific education, and leave it at that? Should you insist that the students participate in the animal lab even if such activity violates their ethical principles or values? Should you tell the students to drop the course and change their major if they refuse to participate in the assigned animal labs? Or would you recognize the debatable ethics of using animals for surgical demonstration and acknowledge that a few students have moral objections to these invasive procedures? Should you be ready to grant these students access to alternative learning strategies?

The Student's Point of View

Now imagine that you are the student who has ethical objections to animal experimentation and dissection for educational purposes? Suppose you recoil at the prospect of administering to an animal what you consider to be painful stimuli, then having to kill him, handle his dead body, dissect and remove his organs for what you

perceive to be an unnecessary educational exercise? What should you do? Should you go to the instructor and privately express your concerns? Should you raise your objections publicly in the classroom? Should you go to the chairperson or to someone outside the department whom you suspect may be more sympathetic to your concerns? Or should you do the animal laboratory without open complaint, even though it goes against your ethical convictions?

The issues surrounding animal use and student choice in the psychology classroom are complex. There is no straightforward resolution to the controversy because solutions depend upon your point of view and value-fulfillment. These points of view and values can come into conflict and often do (Dewsbury, 1990).

Major Issues

Student Objections to Animal Labs

Animal welfare concerns. Student objections to psychology animal laboratories generally center upon one primary issue: animal welfare (J. A. Kelly, 1985). Animal welfare concerns focus upon whether or not the broad environmental, biological, cognitive, emotional, and social needs of laboratory animals are genuinely being taken into consideration in animal housing, care, and management. Students may take a dim view of the way animals are housed and maintained, believing that adequate consideration is not being given to the animal's physical, social, or emotional needs. Welfare concerns also focus on the treatment of animals during and after the teaching demonstration itself. Students may disapprove of aversive techniques used on animals, believing that the procedures are not sufficiently mild enough and cause unnecessary pain and distress to the animal (e.g., when animals are shocked, ablated, lesioned, drugged, or otherwise operated upon and manipulated). Students may protest what will be done to the animal at the end of the semester or laboratory session (e.g., the animal is euthanized to make way for naïve animal subjects used in next year's course).

Faculty Support of Student Choice

Psychology teachers who support student choice have three main concerns: (a) welfare of students, (b) the availability of instructional alternatives, and (c) scientific and ethical problems dealing with the value and use of animals in psychology education.

Student welfare concerns. Student welfare concerns focus on the negative cognitive, emotional, and social consequences that occur when unwilling students are coerced to observe or perform procedures that they find objectionable on animals (Bowd & Shairo, 1993). Forcibly coercing unwilling students to experiment upon or dissect animals can lead to a range of undesirable effects that interfere with the learning process, including the dulling of observational and critical thinking skills (Kelly, 1985). Repeatedly exposing students to an experience that they find aversive (i.e. desensitization) can lead to emotional numbing and a cognitive acceptance of those experiences (Thomas, Horton, Lipencott & Drabman, 1977). This desensitization process subsequently emotionally distances students from animals and develops hardened attitudes toward animal suffering (Heim, 1981). Rationalizing the instrumental value of animals for educational purposes teaches students to regard animals as expendable tools and fosters a disrespect for life (Bowd, 1993). Forcing unwilling students to participate in animal labs can also create a conflict of values in the student. As children, we are regularly taught to be kind and caring to animals, not to harm them. Students who are required to observe or participate in psychology animal labs where aversive procedures are used on animals become torn between the contradictory values of kindness to animals versus using animals even if such use causes distress, pain, or harm to animals. F. B. Orlans (1988), Senior Research Fellow at the Kennedy Institute of Ethics at Georgetown University observes: "In times when we are struggling to reduce violence in our society, the practice of harming and killing sentient creatures to conduct an 'educational exercise' seems out of place" (p. 12).

Instructional concerns. Instructional concerns have evolved from the concept of reduction, refinement, and replacement of animal use that was originally proposed by zoologist William Russell and microbiologist Rex Burch (1959/1992). Instructional concerns of teachers who support student choice focus on enhancing student access to alternative teaching methods, models, and approaches that (a) lead to the reduction of the number of animals required for classroom demonstrations, (b) incorporate refinements of procedures that result in the lessening of pain and distress to animals in laboratory exercises, and (c) provide for the replacement of animals with non-animal systems (Russell and Burch, 1959/1992). Most of the many

attractive and useful alternatives to animals are either computer-based (Stoloff & Couch, 1992; Cunningham & Randour, 1998) or human-based (Orlans, 1974; Ware & Johnson, 1996).

Scientific and ethical concerns. Scientific and ethical problems arise when animals are used as models for human beings in psychology education specifically, and in psychology research generally (Bowd & Shapiro, 1993). What is the justification for taking healthy beings from species not our own that have different genetic, environmental, developmental, and evolutionary histories and that have been selected for classroom use on nonscientific grounds such as cost and maintenance, size and ease of handling, availability and reproductive capacity, and then trying to analogically generalize results to humans by overlooking what is disanalogous? What is the justification for caging the animal under stressful laboratory and classroom conditions that modify treatment effects yet whose effects are rarely controlled or evaluated? What is the justification for giving the animal painful surgery, addictive drugs, or artificially-induced experimental pathologies that only superficially resemble the naturally occurring condition they are supposed to simulate? What is the justification for observing animal behavior on dependent variable tasks that have little logical relationship or empirical correspondence to the human behavior they are intended to model? What is the justification for sacrificing the animal's life to educational ends in classroom demonstrations that would be unethical if conducted on human beings? To what extend are all these activities ethical? Does demonstrating already-obtained knowledge about brain and behavior require killing animals? Must we kill in pursuit of that ideal? Does the end truly justify the means? At what point does the value of life become less in animals?

Faculty Objections to Student Choice

Teachers of psychology who refuse students choice defend the practice on several grounds. They may believe that reducing student opposition to animal labs is simply a matter of instruction and discussion of the value and ethics of animal research (Furnham & Heyes, 1993). They may think student choice is a threat to the future use of animals for scientific research Thomas & Blackman, 1992). They may regard student choice policies as a challenge to faculty academic freedom (Francione & Charlton, 1992). They may believe that no acceptable alternative exists to this kind of hands-on experience (Abramson, 1994; Gallistell, 1981; Gallup & Suarez, 1985). They may consider animal laboratories to be indispensable to the training of behavioral scientists because they initiate students into scientific psychology (American Psychological Association, 1996; Domjan & Purdy, 1995). They may think that the conduct of animal studies, including those which involve procedures that cause pain to animals, represent one of the few ways to effectively demonstrate the effects of certain behavioral phenomena (Miller, 1985,1986). They may maintain that there are sufficient controls to ensure the welfare of animal subjects in laboratory exercises and classroom demonstrations (Committee on Animal Research and Ethics, 1996).

Why Do Students Object to Psychology Animal Labs?

Animal Welfare Concerns

What are the reasons why a student might find it objectionable to participate in psychology animal labs? The primary reason that students object to animal focuses upon one major concern: animal welfare. Students' animal welfare concerns focus on the treatment of animals before, during and after the teaching demonstration itself, especially when aversive procedures are used (e.g. when animals are shocked, ablated, lesioned, drugged, operated upon, or otherwise caused pain or distress). Aversive techniques in psychology animal laboratories harm the animal when they cause pain, distress, suffering or the death of the animal (Orlans, 1993. chaps. 8,9). At the conclusion of laboratory sessions, the animal is usually "sacrificed" (killed). Killing is permitted and allowed and considered ethical as long as it is done in a "humane" manner (i.e., quickly and painlessly). The use of a tabletop guillotine to decapitate conscious animals for collection of brain neurochemicals, for example, is considered humane (Carbone, 1997). Students, however, may regard the practice of animal euthanasia ("good death") at the conclusion of lab sessions as the ultimate deprivation. Since life has meaning for animals, death is the ultimate harm even if the act of killing itself no pain/distress to the anesthetized animal. As far as the individual animal's life is concerned, all potential value-fulfillment is ended with the end of his physical existence, no matter how justified the killing may be in the pursuit of educational ideals from the instructor's viewpoint.

The "rat lab": A critique. One graduate student from the College of William and Mary relates her perceptions of the traditional operant learning "rat lab" that was assigned as a part of Experimental Methods or Learning course work (Devine, 1990).

> Typically, students work with rats in the lab to study learning principles such as habituation, shaping, extinction, spontaneous recovery, and other operant concepts. Through the lab, students gain experience in handling animals and taking responsibility for their care. They can observe first hand the principles of operant and respondent conditioning. However, in the traditional protocol, the animals are put on a deprivation schedule and are often euthanized at the conclusion of the lab sessions to make way for new, untreated animals that can be studied by the next group of students enrolled in the class. These animals still tend to be housed in old, small, wire mesh cages. During my experience working with students participating in the rat lab, I have found that many are troubled, as I am, by these aspects of it. (pp. 12-13)

Changing student attitudes in the U.K. G. V. Thomas and Blackman (1992) hypothesize that the decline of 25% in animal work that occurred In the United Kingdom (UK) between 1977 and 1991 is largely due to changing student attitudes.

> Specifically, undergraduate students seem to be increasingly reluctant to undertake practical classes and animal research in animal psychology. Students remain interested in biological approaches to psychology at an intellectual level but seem to find unacceptable the idea of personal involvement with animal work if there is any possibility that the animals they use may suffer. Even if the procedures entail no suffering (e.g., a purely observational study), the fact that the animal may have to be (humanely) killed at the end of the exercise seems to be sufficient to deter many students from participating. A few students have felt so uncomfortable about the ethics of animal work that they have avoided discussing in their term papers relevant data derived from animal studies. (p. 1679)

Few Students Object Publicly

Teachers of psychology may believe that such unsolicited student objections to animal labs are rare based upon estimates reported by department chairpersons (Hull, 1996). In Hull's 1996 survey of 52 undergraduate psychology chairpersons who reported animal use at their schools, 63% indicated that some form of aversive conditions are used on animals in course work, classroom demonstrations, and student research. These aversive procedures (in decreasing order) include deprivation (food or water), surgery, shock, drugs, injections, and pain. When asked to assess student response at their college to such animal use in psychology, 35% of department chairpersons responded that students had favorable attitudes, 24% stated that students had mixed attitudes, 4% reported negative feelings, 3% reported that students had little interest, while 34% of respondents provided no answer.

Why students are reluctant to voice their concerns. However, students find it difficult to voice their concerns for a variety of reasons (Balcombe, 1997). Students may be reluctant to privately express their concerns to the instructor because they fear the possible rejection of their teacher. Students may be reluctant to voice their objections publicly in the classroom because they fear the possible ridicule of their peers. The department environment may be such that students fear the possibility of punishment (e.g., losing a grade), humiliation and embarrassment in front of their fellow students, or lost time as a result of dropping the course, if they go public with their objections. A discussion of ethical concerns regarding animal use in the classroom may not be openly encouraged. The animal lab may be presented to students as a requirement and not an option. If the option to use alternatives does exist, it may not be made known to students unless they request it. Jonathan Balcombe (1997), Associate Director for Education and Research Issues at the Humane Society of the United States comments that “schools with [student] choice policies that go unannounced can be likened to restaurants that bake apple pies but excludes them from their menus; very few diners will request apple pies” (Balcombe, 1997, p. 22). Or a moral conflict may be created for the student who considers it unacceptable to participate in invasive procedures on animals but who has a faculty advisor or teacher who thinks such animal use is justified and beneficial to learning. Students, especially freshmen, may not feel entitled to express their opposition. As a result, many students with ethical objections go ahead and do the animal laboratory without open complaint, even though it goes against their conscience. Just because a teacher is not aware of any student giving voice to complaints about animal use in their psychology classroom, therefore, does not necessarily mean that none exist. “Teachers must realize that a paucity of complaints [about psychology animal labs] . . .does not necessarily represent a lack of objection to it. . . The average

student in this environment will the do required [psychology animal lab] without open complaints, even if it goes against ethical convictions" (Balcombe, 1997, pp. 22-23).

Psychology majors support student choice. Surveys where psychology students themselves are asked about their views on animal laboratories reveal a sizable proportion of students who oppose the use of aversive conditions and invasive procedures on animals (Devine, 1990; Furnham & Heyes, 1993; Keith-Spiegel, Tabachnick & Allen, 1993; Plous, 1996a; Thomas & Blackman, 1992;). Plous (1996a), for example, surveyed 1,158 randomly selected psychology majors (56% response rate). Results indicated that whereas a majority (57%) of students endorse the use of animals in undergraduate psychology courses, more than one-quarter of psychology majors (28%) oppose the use of animals in the psychology classroom, while 15% are unsure. Moreover, a majority (54%) of students believe that laboratory work with animals should not be a required part of the undergraduate psychology major, compared with one-third (34%) who believe animal labs should be required, and 12% being uncertain. Support for the use of animals in the psychology classroom tends to be limited to procedures involving observation or confinement, with approximately 60% indicating disapproval of classroom demonstrations involving pain or death to the animal. A clear majority of students (85%) support a requirement that the degree of pain which animals experience during a teaching demonstration be assessed prior to its approval by appropriate authorities.

Animal Pain Scales Address Students' Concerns

The most important concern of students is the degree of pain, suffering, distress, anxiety, fear or harm that is caused to the animal by the use of aversive procedures (shock, surgery, or deprivation) (J.A. Kelly, 1985). Since the issue of animal pain is a primary concern for many students who object to animal labs, and since any adequate review of the justification of aversive and invasive procedures in the psychology classroom requires knowing how much animal pain is involved, it is important for teachers to be able to recognize the point at which the intensity or duration of a procedure becomes inhumane and the classroom demonstration becomes ethically problematic to most reasonable persons. Pain in human and non-human animals is a multi-dimensional construct having physical, cognitive, and emotional dimensions that requires considerable sensitivity to detect. How can a teacher determine whether a proposed psychology animal lab is humane or ethically troublesome to students? One method is to use an objective scale that measures the degree of pain, distress or harm suffered by an animal in a scientific experiment. Invasiveness Scales (also called harm or pain scales) are one objective way of quantifying animal pain and clarifying communication between student and teacher about how much harm or pain is involved in an particular classroom demonstration.

Pain scales serve useful purposes. Pain classification systems serve several useful purposes. They can help department chairpersons better assess the courses or projects in which animals are used, assess the reasons why animals are used in those courses, and assess the invasiveness of the procedures to which animals are subjected. They can help teachers and students better recognize pain in animals, become more sensitive to animal welfare issues, generate greater appreciation of the different types of research methods employed by psychologists in their study of animal behavior, and even develop awareness of the need for a student choice policy on their campus (Field, Shapiro, & Carr, 1990, Fall). They can help Institutional Animal Care and Use Committees (IACUCs) in the review process of the treatment of animals and the consideration of practical alternatives to techniques that cause animal pain and distress. An invasiveness scale can help determine at which point experimental controls and manipulation of animals become unnecessarily severe and inhumane. The use of invasiveness scales can also help colleges and universities properly assess institutional progress in addressing national trends to reduce, refine, and replace animal use in the classroom. Because the presence of pain may confound scientific results (Morton, 1990; Morton & Griffiths, 1985), pain assessment can improve the validity and reliability of scientific observations made in the classroom.

Animal pain scales: An international perspective. Systems of classifying pain and harm in animal experiments been proposed in Britain, Sweden, Canada, Australia, and the United States (Smyth, 1978; Obrink, 1982; Canadian Council on Animal Care, 1989; Olfert, 1995; National Health and Medical Research Council, 1991; Ad Hoc Committee on Animal Research, 1988; U.S. Department of Agriculture,

1987, pp. 10313-14). The use of a pain classification system in animal research is mandatory in Canada, the United Kingdom, and the Netherlands. No system has been adopted in the United States (Orlans, 1993, chap.8). The USDA scale currently in use to gather national statistics concerning animal pain, however, focuses only on the use or nonuse of anesthesia, and does not assess the overall level of pain for the animal (Orlans, 1993, pp. 125-126). Beginning in 1985 a number of invasiveness scales were developed based on behavioral manifestations and physical appearance (posture, vocalizing, temperament, locomotion, response to handling, body weight) of specific species of animals (Barclay, Herbert, & Poole, 1988; Boom, 1986; Manser, 1992; Mroczek, 1991; Wallace, Sanford, Smith, & Spencer, 1990).

Animal pain scales for use in education. Educators can use one of several invasiveness scales that have been published for general application: Shapiro and Field's (1987) Scale of Invasiveness and F. Barbara Orlans's (1980, 1987, 1993, pp. 87-88) Pain Classification System specifically designed for the use of animals in education. The rating scale developed by Shapiro and Field (1987) (see Appendix A) rates experiments on a 6-point scale from 0 (little or no invasiveness) through 5 (highest level of pain, suffering, discomfort/ distress, anxiety/fear, or long-lasting physical and psychological harm). Its psychometric qualities are adequate. The scale has an inter-rater reliability of 0.80, has good construct validity in correlating with three other invasiveness scales ranging from 0.42 to 0.66, but has undetermined predictive validity (Shapiro & Field, 1987). F. Barbara Orlans (1993, pp. 87-88) reports wide use of her pain scale by IACUCs in the protocol review process because of its general relevance, applicability, and the important guidance it provides animal researchers about the amount of animal pain involved in experimental procedures. Ellen Reese (1987) has produced two forms to help faculty and students, respectively, prepare proposals that include issues of humane care and use of animals (see Appendix D for faculty, Appendix E for students).

Animal pain and distress in the classroom. Behavioral observations or conditioning studies in naturalistic settings that do not interfere with an animal's normal behavior patterns and involve virtually no pain, distress, or harm to the animal pose students few ethical concerns (e.g., Cohen & Block, 1991; see "Category O" in Shapiro & Field's Invasiveness Scale, Appendix A). All laboratory experiments, on the other hand, involve some loss of freedom for the animal and diminished opportunities to pursue normal species-specific activities (e.g., travel and migration). Some in-class demonstrations may cause little *or no* pain and distress to the animal (e.g., teaching students about operant principles of motivation and learning by demonstrating how a cat can be conditioned to press a lever with positive reinforcement). Other experiments may involve an extended period of extreme pain and distress or severe long-term harm for the animal (e.g., altering the sensory capabilities of an animal by surgically ablating or lesioning a portion of their brain and then inserting and implanting invasive measuring instruments).

Animal pain and harm is influenced by numerous variables. The degree of animal pain or harm involved is strongly influenced by the level of invasiveness of the procedure, the particular circumstances in which a procedure is conducted (the intensity, site of application, frequency and duration of shock) and by the type of animal species used (Orlans, 1993, pp. 86-90, 118-127). Because pain and harm changes over time, the maximum intensity and duration of pain or harm that the animal is likely to experience during the procedure, after the procedure, and during convalescence should be assessed. In order to categorize a particular procedure on a pain scale, typical questions to be asked include: What is the degree of pain, suffering, discomfort/ distress, anxiety/fear, physical harm, psychological/social harm to the animal as a result of the procedure? How abnormal is the animal as a result of the procedure? Is the animal put to death? "By classifying procedures in this way, it will be possible to direct attention on developing alternatives to those procedures, altering procedures to reduce their invasiveness, or requiring stronger justification for, their use" (J. A. Kelly, 1985, p. 179).

Definition of animal pain and suffering. How is animal pain and suffering, discomfort and distress, anxiety, fear, and harm defined on these invasiveness (pain or harm) scales? Pain arises from a particular part of the body due to physical damage. Technically, pain is "an unpleasant sensory and emotional experience perceived as arising from a specific region of the body and associated with actual or potential tissue damage" (Orlans, 1993, p.129). Some behavioral indicators of pain include flexor

reflexes to withdraw from the noxious stimulus, crying out, moaning, writhing, and struggling. The American Veterinary Medical Association defines pain as

> "a perception that depends on activation of a discrete set of receptors (nociceptors) by noxious stimuli, e.g., thermal, chemical, or mechanical. Further processing in neural pathways, e.g., spinal cord, brainstem, thalamus, and cerebral cortex, enables noxious stimuli to be perceived as pain" (American Veterinary Medical Association (AVMA), 1987).

Suffering can be defined as the unpleasant response to pain. It can be emotional, behavioral, or cognitive. It is mental anguish produced by an inability to cope or adapt. Suffering is "akin to severe distress… [that] can result from disease, starvation, exhaustion, and adverse mental states arising from deprivation of exercise or companionship, or stimulation or frustration of other psychological needs" (Orlans, 1999, p. 130). Suffering "carries overtones of mental experience like fear, pain, or a generalized longing for freedom" (Dawkins, 1980b, p.502). Some behavioral indicators of suffering include: lack of care of body surface, ears flattened, muscle rigidity, unsteady gait, lack of muscle tone, screaming, ocular or nasal discharge, constipation, vomiting, diarrhea, lethargy, agitation, rapid or shallow breathing, and muscle weakness (Mroczek, 1991, pp. 289-292).

Definition of animal discomfort and distress, anxiety and harm. Discomfort can be defined as a small change in ability to achieve homeostasis "not sufficient to cause pain or distress" (Orlans, 1993, p. 131). Distress can be defined as an inability to adapt resulting in harmful responses. Distress is

> "a state in which the animal is unable to adapt to an altered environment or to altered internal stimuli.... In the acute form, distress can be relieved by tranquilizers, but sustained distress does not respond to drug therapy and can be relieved only by environmental change and behavioral conditioning.... Prolonged or excessive distress may result in harmful responses, such as abnormal feeding and social interaction behavior" (Orlans, 1993, P. 131).

Anxiety is an aroused and alert state prompted by the unknown. Indicators include: little or fitful sleep, pacing, twitching, tremors, shivering, panting, hyper-vigilance, exaggerated startle response, deep and staggered breathing (Mroczek, 1991). Fear is the response to expected painful events. An animal who is afraid may crouch, hiss, spit, growl, display immobility and a "freezing" position, attack, fight, or grunt (Mroczek, 1991). Harm is occurs when there is prolonged injury and damage produced by injections, deprivations, physical restraint, implants, brain damage, and surgery that results in body deterioration (e.g., prolonged anorexia, dehydration), lack of grooming, extreme hyperactivity or lethargy, abnormal vocalizing, social problems (e.g., withdrawal. isolation), behavior problems (e.g., increased aggression, self-mutilation), and body infection (Olfert, 1995, Spring).

Pain, Suffering, and Death in Warm- and Cold-Blooded Vertebrates and Invertebrates

What evidence exists to support the claim that animals have the capacity to feel pain and adverse mental states such as distress and suffering? The fact that pain and chronic distress can exist in animals is acknowledged by national social policy, documented by neurophysiological studies, indicated by behavioral research, and logically implied by evolutionary theory (Rose & Adams, 1989). Scientific evidence now clearly indicates that “the perception of pain and the capacity to suffer extends further down the phylogenetic scale than was previously thought" (Orlans, 1993, p. 128). "It is now generally accepted that the physiological mechanisms of pain sensation in all vertebrate and some invertebrate animals and man are very similar” (Rowan, 1984, p.79), even though the pain experience is likely to be different in different species (Kuchel, Rose & Burrell, 1992).

International policies recognize that warm- and cold-blooded animals feel pain. International policies recognizes that both warm-blooded and cold-blooded vertebrates feel pain. The Animal Welfare Act (AWA, 1985), the national policy of the United States, acknowledges that all warm-blooded vertebrates (primates, dogs, cats, guinea pigs, hamsters, rabbits) and non-food agricultural animals (pigs, sheep, cows, pigeons, quail, chickens, hens, turkeys) used in research, experiments, testing, and teaching do feel pain (Breazile, 1994, Spring). The AWA requires that anesthetics, analgesics, and

tranquilizers are to be appropriately used. The AWA requires that lab personnel be adequately trained in the recognition of animal pain and in its relief. The AWA requires that a researcher should consider alternatives to painful procedures. A humane death is also required. These provisions exist because it is recognized that these animals feel pain. Cold-blooded vertebrates (reptiles, amphibia, fish) are subject to similar provisions under the Public Health Service (PHS) Health Research Extension Act of 1985. The PHS policy Guidelines state: "In general, unless the contrary is known or established it should be assumed that procedures that cause pain in humans also cause pain in animals" (National Research Council (NRC), 1996, p.64). American field research guidelines also acknowledge that cold-blooded vertebrates are capable of feeling severe and chronic distress and recommend the use of anesthetics (Orlans, 1988). The similarity in pain perception between humans and other vertebrates is an acknowledged part of a number of national policies of other countries. Canadian policy acknowledges the possibility that chicken embryos may feel pain at least in the period near to hatching time (Canadian Council on Animal Care (CCAC), 1972). British and Australian policies assume that cold-blooded vertebrates and fetal forms are capable of pain and are included in animal protection laws (Australian Council for the Care of Animals in Research and Teaching [ACCART], 1990; Home Office, 1986). A widely used rule-of-thumb is "Would it be painful to me?"

Neurophysiological evidence identifies pain and anxiety chemicals in vertebrates and some invertebrates. Neuropharmacological and neurophysiological research indicates that neural elements and various biochemicals (nociceptors and “free nerve endings”, A-delta and C fibers, opiod receptors and peptides, endorphins and enkephalins, substance P and bradykinin) associated with pain sensation and perception in humans are present to some degree in the brain and spinal cord of all warm-blooded vertebrates (mammals and birds), all cold-blooded vertebrates (bony fish, frogs, reptiles), and in some invertebrates (earthworms, octopi, segmented worms, slugs, snails, squid) (Alumets, Hankanson, Sundler & Thorell, 1979; Balls & Balls, 1989; Dennis & Melzack, 1983; Fiorito, 1986; Liebeskind & Paul, 1977; Royal Society for the Prevention of Cruelty to Animals (RSPCA), 1980, pp.7-10). The existence of specific binding sites for chemicals that play a role in the pharmacology of anxiety in humans suggest that most vertebrates may be capable of experiencing some form of anxiety that is mediated by similar receptors in the brain (Rowan, 1984, p. 83). Neural elements (benzodiazepine receptors in the CNS) associated with stress and anxiety in humans have been found in warm-blooded vertebrates (birds, giraffes, pigs, rodents, sheep,) and some cold-blooded vertebrates (turtles, lizards, frogs, toads, and bony fish), but not in cartilaginous fish (hagfish) or invertebrates (earthworms, lobster, locust, squid, woodlouse) (Nielsen, Braestrup & Squires, 1978). Pain research on stress-induced analgesia indicates that aversive stimuli (e.g., shock) activate endogenous opiod systems in rodents (D. Kelly, 1986). Pain research indicates that analgesics appear to be effective in some mollusks (snails) (Kavaliers, Hirst & Teskey, 1983) and anesthetics effective at the insect level (J. A. Lockwood, 1987). Because invertebrate animals lack a spinal cord and thalamus to integrate sense perception (as occurs in vertebrates), it is unclear exactly how pain sensation and pain perception occurs in these creatures. Pain researchers, nevertheless, cannot deny animal pain when they presuppose it in their analgesic and anesthetic research.

Behavioral evidence demonstrates pain behavior at lowest levels of phylogenetic scale. Animals at all levels of the phylogenetic scale show pain behaviors (e.g., flexor reflexes, crying out, growling, moaning. writhing, grimacing, struggling) in response to stimuli that is destructive of tissue, that provokes a defense or escape behavior, and that evokes painful sensation when applied to humans (Mroczek, 1991; Pratt, 1980). "Distinctive behavioral responses to intense stimulation are displayed by virtually all animal species down to the protozoan suggesting that rudimentary pain-like behavior emerges at a very low level of organismic complexity" (Dennis & Melzack, 1983, quoted in Orlans, 1993, p. 131). Pain in both humans and animals also finds expression in abnormal behaviors (e.g., self-mutilation and gnawing at limbs in deafferentiated monkeys). The fact that animals other than human are used as models of human depression and pathology is an admission that species such as monkeys, dogs, cats, and rodents are sentient, have subjective feelings, and suffer (Dawkins, 1980; Griffin, 1992; Kuker-Reines, 1982; Overmier & Burke,1992; Stephens, 1986).

Pain perception is logical from an evolutionary standpoint. Pain perception in animals is logical from an evolutionary standpoint. It is critical for adaptation to the environment and survival of the organism. It provides feedback about the current functioning of bodily systems and about the presence of noxious stimuli In the environment. The adaptive significance of pain can be seen in humans born without the ability to feel pain (as in Hansen's Disease) where the person remains unaware of bodily injury.

Animal Pain in Psychology Experiments

Psychology conducts some of the most invasive experiments in science. Psychologists perform some of the most invasive animal experiments in science (Pratt, 1980, chap. 3; Shapiro & Field, 1987). A recent review of a quarter century of behavioral research using animal models of human pathology provides example after example of how invasive, aversive independent variables continue to be used in basic research in psychology (Overmier & Burke, 1992). These areas include learning and motivation, social and instinctive behavior, genetics, neuropsychology and neurology, electrophysiology, physiological processes, psychophysiology, psychopharmacology, psychological disorders, behavior disorders and antisocial behavior, and clinical psychopharmacology. Mice, rabbits, and other animals that are used for teaching demonstrations in the psychology classroom may be raised in laboratory captivity, or bred in sanitized environments for many generations until genetically “pure” strains are obtained. Some animals are born as dwarfs, or hairless without thymus glands or with deformed limbs or missing heads. These "ideal models” for study into human physical or psychological defects are expected to be born with, or develop obesity, epilepsy, or various cancers. Other animals, genetically engineered to have little bodily resistance to disease are patented, bred and sold for experimental purposes so that the animal develops disease more readily (e.g., the “oncomouse”) (Arluke, 1994). The animal’s biological integrity is tampered with in a process in which a form of life is made to go against nature’s flow and intent, against its own value fulfillment, its own *telos* (Rollin, 1985).

What kinds of aversive procedures are used in the psychology classroom? Aversive procedures include classical conditioning with aversive stimuli, employing learned helplessness analogue paradigms, administering drugs, surgically ablating or lesioning the brain, inserting and implanting invasive measurement instruments, and invasively altering sensory capabilities (J. A. Kelly, 1985, p. 167). Hull (1996) found that of the 52 out of 110 (47%) undergraduate institutions that report using animals in the psychology classroom, 40% indicated that deprivation of food or water were used, 25% practiced surgery, 6% employed shock, 4% gave injections, 4% applied drugs, and 2% involved pain. Several respondents reported using more than one aversive condition on animals.

Classic experiments commonly use aversive methods. Aversive methods are in the classroom because these techniques have been used as independent variables (treatments) in many "classic" experiments commonly cited in general psychology textbooks, especially in chapters on biological foundations of behavior, learning, motivation, emotions, and psychological disorders (Domjan & Purdy, 1995). In a review of 11 college introductory psychology textbooks, Field (1990) identified the following invasive animal studies as being most-often cited: maternal deprivation in infancy, perceptual restriction in newborns, avoidance/escape conditioning (learned helplessness, conditioned food aversions, escapable/inescapable shock), surgery (to brain eating/satiety center, to limbic emotional centers including electrical/chemical stimulation, to peripheral nutritional systems, split-brain, and castration), pain-induced aggression, Selye's experiments on stress, Pavlovian experimental neurosis, and curarization. Field (1990) believed that one reason why such experiments are cited in general psychology textbooks is to initiate students into scientific psychology.

Do Sufficient Controls Exist to Ensure Animal Welfare?

Psychologists who use animals in the psychology classroom maintain that there are sufficient controls to ensure the welfare of animal subjects in laboratory exercises and classroom demonstrations. The extensive system of US laws and regulations, professional guidelines and principles designed to provide oversight of animal welfare, especially the Animal Welfare Act (AWA), Public Health Service (PHS) policy, and APA professional guidelines offer more than sufficient protection of animal welfare (Committee on Animal Research and Ethics, 1996).

Classroom use of animals fall outside AWA and PHS regulations. The claim that there are sufficient controls to ensure the welfare of animal subjects, however, is overstated and misleading. Most of the animal species used in the psychology classroom fall outside the purview of federally-regulated controls. For instance, 85-90% of all animals used in psychology course work, in-class demonstrations, and student/faculty research are rodents (rats, mice), birds (pigeons, finches, chickens), invertebrates (planaria, worms), anthropods (crickets, spiders, insects), and cold-blooded species (fish, reptiles, amphibians) (APA, 1995; Hull, 1996; Benedict & Stoloff, 1991). All these species are currently exempt from provisions of the AWA and are therefore excluded from its protective regulations. PHS provisions cover laboratory research conducted using rats and mice but excludes birds and only applies to those 1,000 or so institutions who receive federal funds from PHS. Virtually no college animal laboratory receives PHS funding; virtually all use AWA unregulated species. Thus the majority of psychology teaching animal laboratories fall outside the purview of AWA regulation and PHS policy.

AWA definition of "animal" requires expansion. If the definition of "animal" in the AWA were to be revised to include laboratory rats, mice, and birds, many animal facilities at colleges and universities that are currently exempt would come under U.S. Department of Agriculture (USDA) regulation. The majority of animals now being used in the psychology classroom would then fall under federal protection (Rowan, 1994, June). Expanding regulative authority of the AWA to include rats, mice, and birds cannot guarantee that pain and harm will not occur to animals in the psychology classroom. In 1997, there were 101,160 AWA-regulated animals used in research that involved pain or distress without relief because the researchers decided that use of pain- or distress-relieving drugs would interfere with the results of the research or testing (United States Department of Agriculture (USDA] 1998, p. 14). The expansion of controls to ensure the welfare of all animal subjects, however, may discourage the continued use of rats, mice, and birds in laboratory exercises and classroom demonstrations in those schools who cannot afford the cost and effort to achieve compliance with federal regulations. This expansion of controls may also result in a more careful examination of what is done in the name of psychology education.

Voluntary controls are inadequate. A voluntary mechanism for control of standards exists within APA's Guidelines for the Ethical Conduct in the Care and Use of Animals and in a national program of certification called the American Association for the Accreditation of Laboratory Animal Care (AAALAC). Both APA Guidelines and AAALAC accreditation, however, rely heavily on the concept of enforced self-regulation, a trust mechanism, and written assurrances of satisfactory compliance kept hidden away from the public accessibility provided by the Freedom of Information Act. It is up to the conscience of individual faculty members or department chairs to establish formal in-house policies and Institutional Animal Care and Use Committees (IACUCc) that ensure the welfare of animal subjects. Unfortunately, IACUCs do not guarantee the humane treatment of animals. A recent investigation by the USDA Inspector General (APHIS, 1995) reported that "the activities of IACUCs, which are responsible for evaluating the care, treatment, and use of animals at research facilities, did not always meet the standards of the AWA. . . . Committee activities did not always provide assurance that pain and discomfort used in research activities would be minimized, or that unnecessary or repetitive experiments would not be performance" (p. 24).

Scientists' inability to recognize animal pain. In another instance, sociologist Mary Phillips (1993) conducted a three-year study of 27 scientists in 23 animal research laboratories in the New York City area. She found that post-operative pain-relieving analgesics were often withheld from animals even when they would have been prescribed for human patients, because the drugs altered the physiological functioning of the animal and would "add another variable to the experiment" (p. 71). Phillips also found that animal researchers tend to define "pain" very narrowly. It means "the acute pain of surgery on conscious animals, and almost nothing else" (p. 76). The inability to recognize pain in laboratory animals and the tendency to view animals only as tools of research are two reasons for the failure of self-regulation in the behavioral sciences with respect to ensuring the welfare of animals in the teaching and research setting. The failure of self-regulation is exemplified in the Edward Taub 1981 Silver Spring Monkey case (Barnard, Selby, Robinson, Schreckenberg, & Van Petten, 1990). It can be further illustrated in the USDA charges of 70 AWA violations brought against the University of Pennsylvania in 1985 (PETA, 1985).

Guidelines require strengthening. Any failure to ensure the welfare of animal subjects will have to be corrected either by peer pressure from other faculty, from students themselves, or from the public. Barbara Orlans (1993), Senior Research Fellow at the Kennedy Institute of Ethics at Georgetown University, recognizes that both federally-mandated and voluntary guidelines require strengthening. "New policies are needed that encourage avoidance of harming or killing vertebrate animals for educational purposes whenever possible and that allow student conscientious objection to animal experiments" (p. 246).

Why Do Teachers of Psychology Support Student Choice?

Many teachers of psychology recognize that the use of animals in psychology education is a controversial moral issue and support student objections to mandatory psychology animal laboratories (Bowd & Shapiro, 1993; Plous, 1996b). Plous (1996b), for example, surveyed 3,982 randomly selected APA psychologists (80% response rate). Whereas a majority (58%) of respondents endorse the use of animals in undergraduate psychology courses, one of every four psychologists (26%) oppose the use of animals in the psychology classroom, while 16% were uncertain. A majority (54%) of psychologists believe that laboratory work with animals should not be a required part of the undergraduate psychology major, compared with 31% who favor such a requirement, while 15% are uncertain. Support for animal use in the psychology classroom appears to be limited to demonstrations involving observation (ranging from 87%-96%) and confinement (63%-72%). Experiments involving pain or death to the animal are less strongly approved (44%-62%) and more than 80% of respondents support mandatory pain assessment whenever animals are used in the psychology classroom.

Student Welfare Concerns

Teachers' student welfare concerns focus upon the negative psychological, emotional, and social effects that occur in unwilling students who are required to perform or observe procedures that they find objectionable. Exposure to aversive and invasive animal labs can teach students to regard animals as expendable tools (objectification), can create negative emotions that interferes with learning (blunting of perception and critical thinking), can harden attitudes toward animal suffering (desensitization), can teach students to emotionally distance themselves from other people (depersonalization), and can foster a more general disrespect for life (socialization into a culture of violence). What implicit attitudes and values are we, as teachers of psychology, transmitting to students when we expose them repeatedly to animal pain, when we accustom them to causing animal pain, or when we display our own desensitization toward animal pain as a model we expect students to imitate? What message are we giving to students when we tell them that they must go against their beliefs in order to fulfill a course requirement? Students receive the implicit message that their beliefs and value system do not hold up in the academic world, that knowledge is more important than morals, that the detached and unrestricted desire to know and understand is a value higher than conscience, and that personal ethics can be booted aside by an indifferent scientific foot. We teach students obedience to authority as they incarcerate, confine, control, manipulate and even take the animal's life under the supervision of a teacher.

Object-ification of sentient beings. Consider how instructors typically deal with students who have mixed emotions about experimenting upon and dissecting animals. Instructors would talk to the students first and explain why it is important. They would try to desensitize the students and teach them how to distance themselves emotionally from the animal. Students would be taught how to conceptually isolate the animal from all influences that may individualize or "animate" him. Standing solely on the side of intelligence and reason, logical thought and objectivity, teachers would train students to be unemotional, to stand apart from their experience, to separate themselves from the animal, and to view with an ironical eye any emotional sensitivity or identification with the animal they are about to experiment upon and dissect. This classroom environment of non-feeling objectivity mirrors the standard for scientific ideas and behavior. And in their effort to please the teacher who legitimizes performance of experiments involving pain or distress on animals by his or her example, students would learn what it means to be "scientific." A student would learn that to be scientific means that one understands a phenomenon under study by object-ifying it, de-personalizing it, de-valuing it, emotionally distancing oneself from it, and then destroying it in order to understand its reality. Students learn that scientific "truth" is to be found by

studying the objective world, the world of objects including animals, and viewing them as if they are themselves without intrinsic value, as if their existences have no meaning. The animal loses his vital individualism and living quality in the student's eyes so that he or she can dissect, number, categorize, and examine the animal's body portions, without qualm and without being aware of the living voice that protests. A living being becomes effectively reduced to the status of an object in order to learn.

Language is one device used to introduce and reinforce this conceptual distancing from the animal (Birke & Smith, 1995). Animals are referred to as "specimens," "materials, "tissue samples," or "targets' that are "sacrificed" or "put down" in the laboratory. Language acts as a reductive lens for perception whereby individual animals becomes regarded simply as one physical object among others, like rocks and stars, as if they are themselves without intrinsic value or worth, as if their existence has no meaning or purpose, except as transmitters of educational information, teaching devices for students, or carriers of scientific data solely for human use and consumption. The great individual thrust of life that lies within each animal becomes reduced to a generalized mass of biological conditions and neurological processes, genes and hormones, neurotransmitter systems and body parts. Any role that consciousness might play is not considered. Each creature is literally a being without a center of meaning, seen to operate by the mechanism of instinct alone, blind alike to pain or desire.

The objectification process continues during the standard dissection procedure where animals are literally separated from themselves. Animal dissection conveys the strange idea to students that one can perceive the life mechanism of an animal by killing him; that one must first rob an animal of his life in order to understand what made him live. The individual life of the animal is almost beside the point. The fact that students can do things to animals that would be unethical to do with human beings erroneously suggests to students that the animals do not warrant ethical treatment and that the ends automatically justify the means. The point here is that if scientific psychology did not feel the need to destroy life in order to understand it, then teachers of psychology would not need to experiment upon and then dissect animals.

De-sensitization to animal pain. A substantial body of research demonstrates that exposure to violence or other aversive experience gradually leads to desensitization, numbing, and an emotional acceptance of that experience (e.g. M. H. Thomas, Horton, Lippincott & Drabman, 1977). "There is no reason to think that psychologists or psychology students do not experience the same attitudinal shifts in our laboratories and classrooms.... We may be desensitizing them to the fact that they are hurting living beings and we may inadvertently be promoting students' tolerance or acceptance of inhumaneness" (J. A. Kelly, 1985, p.168). Events that formerly startled, shocked, upset, or troubled students can become emotionally unarousing to them, tolerated and accepted.

Blunting of perception and critical thinking. Using teaching practices that produce desensitization not only blunts a student's ability to empathize with others but also can blunt his or her observational skills. Being in a highly emotional state, on the one hand, or repressing the direct experience of emotions, on the other hand, can result in a disruption of thought or behavior, can influence what we attend to and learn, and can affect what kinds of judgments we make about the world (Ekman & Davidson, 1994). Students who are emotionally upset or shocked at what they see in a psychology animal lab are likely to experience a disruption of thought or behavior. Subsequently their learning performance declines because they cannot devote enough cognitive resources to the task. The same effects can occur in students experiencing low levels of emotional arousal as a result of being desensitized to, or unaffected by, an animal's pain; they may not attend well to sensory information. By allowing students to somehow 'pretend' that animals are inanimate or insensitive objects -- a precursor, it would seem to intentionally hurting them - we encourage students to misperceive and distort other aspects of what they observe (J. A. Kelly, 1985, p.170).

De-personalization. The object-ification and de-sensitization process that trains students to distance themselves emotionally from animals so that they may dissect and examine the animal's parts without qualm is not without its consequence for human relationships. A potentially negative effect to students subjected to teaching practices that produce desensitization to animal pain is the generalization of this attitude to human beings (i.e., reduce human sensitivity) (Kelly, 1985). Students may become

inadvertently conditioned and programmed to see human life in somewhat the same non-feeling "object-ified" fashion (Felthous & Kellert, 1986)? Many psychologists believe that it is our vulnerability to pain and capacity for identification that helps us to sympathize and empathize with others (e.g., Rogers, 1992). If we deny ourselves the direct experience of our own emotions, and instead muffle them, through deadening our sensitivity to pain or by repressing our emotions, we can create a deadened emotional state within ourselves (Maddison, 1978). If we project that unfeeling emotional state outward upon others, then we can hurt others much more easily (Thomas, Horton, Lippencott, & Drabman, 1977). In medical practice, the "depersonalization of the patient" (i.e., nonperson treatment) is one problem identified by health psychologists that can impair the quality of the patient-practitioner relationship. It has been suggested that the desensitization promoted by the physician's scientific training fosters the problem (Maddison, 1978).

Socialization into a culture of violence: The animal connection. A further question arises regarding the consequences of the object-ification, de-sensitization, blunting of perception, and de-personalization. Is there a connection between the prejudiced reasoning that somehow makes an animal's life worth less than a human's and the psychological processes that prepares us to harm other human beings? Is the way we learn to accept and cause pain to animals fundamentally similar to the way we learn to accept and cause pain to humans? Does learning one help prepare us psychologically to learn or accept the other? The idea that there is a connection between accepting and causing harm to animals and accepting and causing pain to people is not new (Psychologists for the Ethical Treatment of Animals (PSYETA), 1994). Religious figures such as Gatama Buddha and St. Francis of Assisi, philosophers such St. Thomas Aquinas, Immanuel Kant, and John Locke, social activists such as Mahatma Gandhi, humanitarians such as Albert Schweitzer, scientists such as Albert Einstein, and artists such as Leonardo da Vinci have all discussed this observation: Causing harm to animals is wrong because it forms bad character and leads to causing harm to human beings (see Wynne-Tyson, 1989).

The possibility of a connection or linkage between the harm we inflict upon other species in the name of science or education and the violence we inflict upon each other is a difficult one for many teachers of psychology to accept. We take it for granted that killing animals for educational purposes represents something quite different from the private patterns of violence or aggressive behavior. There seems to be some impenetrable psychological barrier in the human psyche that neatly separates the capacity for violence by species and dissociates the violence we do to animals from the violence we do to each other. A given individual, for example, may come to act quite differently in his family life and as a behavioral scientist – loving the family dog at home while at the same time thinking nothing of injecting other animals in laboratory exercises or classroom demonstrations with drugs in his or her professional capacity as a psychology teacher or research psychologist.

An example from the Holocast. It might seem that other animals, such as rats, mice, and birds, are far divorced from our own species. Rats are not considered human; they are not. So like any animal, they are thought of as dispensable, sacrificed to a fine humanitarian end. This same thinking, however, was applied to the Holocaust Jews who were killed in experiments for fine humanitarian ends except, in that case, members of our own species were involved. Psychiatrist Robert Jay Lifton of the City University of New York, notes that Jews were thought of as examples of "life unworthy of life" in the war camps and because they were thought of as being not quite human, they could be examined, altered, manipulated, mutilated, or killed as justifiable sacrifices on the altar of science in the name of the genetic betterment of mankind (Lifton, 1986, p. 302). In many contemporary instances of genocidal violence when atrocities are committed against other human beings the same kind of twisted reasoning is often applied (Staub, 1996). Other humans are not considered humans, but merely animals, and like the animal in the psychology classroom laboratory or research lab, is thought of as dispensable.

Ethical Concerns

The ethical concerns of teachers who support student choice focus upon animal welfare issues similar to those of concern to students, including the severity of aversive procedures and deprivation states, the irremediable deficit that is produced by surgery, and the death of the animal discussed previously. Concern also extends to the socially-sanctioned and culturally-approved attitude that it is moral to use

unethical means to achieve ethical (educational) ends. Helping students develop an attitude of "reverence for life" is viewed as a corrective measure to this "ends justifies the mean" approach to psychology education.

Fanaticism in the behavioral sciences. In pursuit of the ideal of the educational betterment of students and to improve the quality of student learning in our classrooms, the quality of other kinds of life is destroyed. The death of thousands of animal lives become justified if it is a means towards the goal of a scientific education in the behavioral sciences regardless of the consequences. Conscience is encountered and conquered once and for all by the unrestricted and detached desire to know and understand. Such thinking and unthinking tolerance of this kind of psychology education is a classic case of a society using ends to justify means (Shapiro, 1998). There is nothing more stimulating and worthy of actualization than the desire to give our students the best educational experience possible. We become fanatics, however, when we consider the possibility of killing in pursuit of our educational ideals, when we are not willing to examine the worthiness of our instructional means to achieve those ideals, or when we refuse to try alternative teaching methods because we are afraid to try. These attitudes can lead us to be less careful of life than we should be and can separate us from nature in a way that can lead to some contempt of individual living things, human life included.

Importance of a reverence for life. Since most psychology majors are likely to be working with people in clinical, counseling, business or school settings (Thurgood & Clarke, 1995), teachers of psychology must look for ways to encourage, not hinder, in students the development of those personal qualities that are necessary and sufficient conditions for effective communication and interpersonal skill (i.e., sensitivity, genuineness, congruence, unconditional positive regard, empathy) (as in Rogers, 1992). This can be done very effectively by enhancing students' sensitivity to the humane treatment of animals (Ascione, 1992). Sensitivity to animal welfare can facilitate sensitivity to human welfare. In a culture with so much violence, teachers of psychology have an opportunity to practice humane education in the classroom. Modeling compassionate behavior with animals can help teach children how to react positively with others and promote pro-social behavior (Strayer & Roberts, 1989). Teachers of psychology have an opportunity to seek ways to increase sensitivity, concern and empathy for other living beings, and not diminish it by requiring students to perform aversive procedures on animals.

Albert Schweitzer, once observed that "by having a reverence for life, we enter into a spiritual relation with nature" (Joy, 1950). This is why developing a reverence for life is so important. According to writer Jane Roberts, "A reverence for life, is a saving characteristic of any personality who has it. It adds *of itself* important elements of understanding and growth in a direct manner. Reverence for life will enable you to understand and deal with other human beings in a more kindly and beneficial manner. It will enable you to act and help without blaming people for shortcomings" (Butts, 1997, p. 250-51). A reverence for life will enable you to view each human being and particular animal as a "vital, conscious portion of the universe (that), simply by being, fits into the universe and into universal purposes in a way no one else can. Each being is an individualized segment of the universe; a beloved individual, formed with infinite care and love (by God), uniquely gifted with a life like no other" (Roberts, 1997, pp. 147-48). Having an attitude of "reverence for life" can enable us to understand that when we kill any kind of life for humanitarian ends, we lose some respect for all life along the way, human life included. A reverence for life can strengthen our awareness that the sacredness of animal life cannot be sacrificed for humanity's benefit or else the quality of life itself suffers as a result.

The psychologist's dilemma. APA (1996) Guidelines encourage the teachers of psychology "to include instruction and discussion of the ethics and values of animal research in all courses that involve or discuss the use of animals" (p. 10). Vonk (1997) describes the ethical dilemma:

> The very assumption that animals are like humans makes it hard to legitimize why we do things to animals that we would not do to humans. On the one hand, if we claim that they are entirely different, that they cannot feel and suffer like us, this means they are a useless subject sample in most studies. On the other hand, if they are similar enough to humans to be useful subjects, they may be able to suffer like humans, and there is no reason to deny them of the rights we have given to other powerless groups. (p. 1249)

Animal models perpetuates animal suffering. Though a behavioral principle found operative in animals may occasionally prove useful for understanding human behavior, it is just as likely that the principle will fail to address fundamental aspects of human behavior or experience. For instance, helplessness theory derived from animal models incorrectly sees perceived lack of control (i.e., non-contingency) as the basis of human depression, whereas cognitive theory derived from human clinical observation sees internal attribution for bad events as the basis)(Hahner, 1989, pp. 1-8). The use of animals as models, surrogates, or substitutes for human beings lead not only to a misunderstanding of the dynamics of human experience and behavior and a misrepresentation of human physiology but also to the perpetuation of animal suffering (Bannister, 1981). The "learned helplessness" animal model of human depression established by Seligman and Maier (1967) at the University of Pennsylvania, for example, "is still being used as a means to stress animals in fields such as physiological psychology, behavioral pharmacology, and immunology, [even though] its original use, as a model of human depression, has been abandoned" (Hahner, 1989, p. 1).

Scientific Concerns

Psychologists who support student choice perceive several significant scientific problems with using non-human animals as models for human beings in the psychology classroom. These scientific problems make the value and alleged benefits of using psychology animal laboratories as means of initiating students into scientific psychology highly questionable. These scientific problems are: (a) unscientific sampling, species variation, and generalizing on insufficient grounds, (b) artificially-induced independent variables, (c) low validity dependent variables, (d) confounding laboratory and classroom variables, and (e) a narrow, limited, and distorting philosophy of science (Shapiro & Bowd, 1993; Kaufman, 1993).

Unscientific sampling. There is the sampling problem in animal laboratory exercises and classroom demonstrations. Humans may be the population to which results are intended to be generalized, but humans are not the population from which subjects are selected. The non-human animal subjects used are not selected because of their similarity to humans but on nonscientific grounds, such as cost and maintenance, size and ease of handling, ready availability, and reproductive capacity (Gallup & Suarez, 1985, p. 1106). There are so many different animal strains and species that you can get virtually any result you want (Kaufman, Reines, Casele, Lawson, Lurie, 1989). "With the 'right' choice of animal model, it becomes possible to 'prove' almost anything" (Bross, 1991, p. 82).

Problem of species variation. Animals are poor models for humans for the same reason that humans are poor models for animals: species variation. Species variation is the reason why people do not go to a veterinarian when they get sick. There is a great difference in overall health and disease patterns and in the immune system of human and non-human animals because of the quite diverse nature of their physical existence and evolutionary histories (e.g., rats live in sewers, dogs drink water from puddles, and cats lick dirt off their bodies without getting sick). All biological, psychological, and behavioral phenomena have system-wide effects and involve many interacting facts. This is one reason why psychologists insist that intact animal systems be used in teaching. Subtle systemic differences in biological organization and functioning between human and non-human animals, however, can result in widely divergent responses to the same stimuli. Biochemical effects vary widely depending on animal species used (e.g., pain in cats may be similar to pain in dogs yet aspirin kills cats but does not kill dogs; sheep can swallow enormous quantities of arsenic without harm and owls can safely eat potassium cyanide, yet both are deadly poisonous to humans). Each species is a different biological, chemical and mechanical entity and not simply the same animal in different clothing. Non-human species are totally different from the human species and from each other genetically, histologically, anatomically, physiologically, imunologically, emotionally, psychologically, and sexually.

Although rats, mice, birds and humans are similar in certain respects, the differences are great. The rat, a species commonly used in demonstrations of operant conditioning, for example,

- is a nocturnally active creature that sleeps 14-15 hours a day
- has an average life expectancy of 2.5 years

- is completely colorblind
- is physiologically unable to vomit,
- has a smooth non-convoluted cortex
- has a liver that regenerates
- has no gall bladder
- has no tonsils
- has a metabolism and heart rate more than twice that of humans
- produces 8-10 litters a year
- walks on four legs

Are such differences inconsequential to understanding the dynamics of human behavior and experience? If the validity of an animal model depends on how closely it resembles the original in key aspects, then at what point do systemic differences between species become significant enough to make the animal-to-human analogy break down and become disanalogous (LaFollette & Shanks, 1993; Shapiro, 1997)? Because there is a significant difference in the data, there must be a difference in understanding the data.

Problems with analogical reasoning between species. When psychology students are mapping structural or functional similarities between the behavior of a rat and a human during the process of analogical reasoning, however, students ignore or overlook these important biorhythmic, genetic, physiological, anatomical, immunological, metabolic, reproductive, sexual, and physiognomic differences in causal mechanisms. Told to focus his or her attention upon certain superficial similarities, the psychology student becomes programmed to perceive information that fits into preconceived patterns established by his or her prior knowledge of human biology, psychology, and behavior -- to be aware of certain characteristics within certain conditions -- so that what is dissimilar or contradictory becomes psychologically invisible. Facts are proven by excluding what does not agree. The process of reasoning by analogy from non-human to human animals leads to erroneous conclusions by overlooking what is disanalogous.

The process of analogical reasoning from non-human to human animals encourages generalizing on insufficient grounds and can lead to erroneous conclusions by overlooking what is disanalogous (Barnard & Kaufman, 1997; Shapiro, 1997). Psychologists cannot rightly generalize from one group of humans to another when there are genetic, developmental, and environmental differences between individuals. Difficulties are compounded for the psychology student who is asked to view such differences as inconsequential when extrapolating data between species. Analogical reasoning can yield a valid argument only if the two concrete situations exhibit no significant dissimilarity (Getner & Markham, 1997).

If it is scientifically impossible to understand the experience and behavior of a rat by experimenting on a healthy human being, then how can one reasonably expect to understand the experience and behavior of a human by experimenting on a healthy rat? Human psychology cannot validly be based on animal psychology. Intrinsic systemic, causal disanalogies between species resulting from divergent evolutionary histories undermines the direct utility of animal models of human biology, psychology, and behavior, both to predict human response to stimuli and to offer new ways of conceptualizing human psychology, pathology, anatomy or physiology (LaFollette & Shanks, 1996; Shapiro, 1997). Non-human animal subjects may be used in the psychology classroom to demonstrate principles of behavior within an experimental paradigm, but the human being enters the picture only analogically. Is it good science to study the human brain by manipulating and then destroying the brains of non-human animals when such experiments provide only analogical knowledge and can never prove cause and effect or correlation in humans (Lafollette & Shanks, 1992, 1996)? How well can any animal model recreate human psychological capacity for perceptiveness, for imaginative projects, for memory, or for skillful and economically performed movement, when so many cultural, social, psychological and spiritual factors that govern human behavior and experience fall outside the animal model altogether? There are no drug placebo groups in animal studies. As someone once observed, “You know you have a good animal model of drug addiction when the rat hides the dope.”

Uncertainty of extrapolation recognized by law and clinicians. The inherent uncertainty in extrapolating the results of animal studies to human beings can be seen in the status of animal research results as sources of evidence for use in court cases and clinical therapeutics. Gary Francione, Professor of Law at Rutgers University observes that: "Case after case is being decided in which trial and appellate courts are rejecting the data from animal tests as unreliable, and therefore, as insufficient to establish a causal relationship between substance X and injury Y [in humans]" (p. 8). Shapiro (1997c) documents the relative infrequency with which mental health workers and clinical psychologists use findings from psychological research on animals. Out of 3330 articles in the Journal of Clinical and Counseling Psychology published in 1984, only 10 articles (or one-third of 1%) cited animal studies; out of 1150 articles in Behavior Therapy, only 23 (2%) cited animal studies (J. A. Kelly, 1986).

Artificially-induced independent variables used. Artificially-induced independent variables are applied to animals that only superficially resemble the naturally occurring independent variables of the human condition that they are supposed to simulate. Overmier & Burke (1992) provide numerous examples in their review of various animal models of human pathology.

- One or both eyelids of kittens or monkeys may be sewn up to simulate blindness in humans.
- Convulsions may be produced in mice or rabbits by repeated electric stimulation of the amygdala to mimic human epilepsy.
- Neurotoxic chemicals may be injected into the brain of rats to damage their dopaminergic or cholinergic system to imitate human working memory disorders or to reproduce human Alzheimer disease.
- Rats and cats may be taught to obtain alcohol infused into the juglar vein to duplicate human alcohol dependence and withdrawal.
- Limbs of rhesus monkey's may be de-afferented to emulate human spinal cord injury.
- The brains of primates may be isolated outside of the animals' body to represent human brain disease.
- Newborn animals may be separated from their mothers to mirror human maternal deprivation.
- Rats and dogs may be exposed to pain and fear while at the same time frustrated in their attempt to escape in order to model human depression.
- A metal plate may be propelled into the skull of cats to portray human head injury.

Although given the same name as the human condition, the artificially-induced disorder mimics only selected aspects of the human condition, and so there is always fundamental differences between the experimental disorder and the condition as it occurs in human beings. The validity and soundness of these particular independent variables as analogs of the human condition will never and can never be tested on human beings because would be unethical to do so. How scientifically valid and generalizable can the results of an independent variable be that can never be administered to the population of interest (i.e., humans)?

Low validity dependent variables. There is a problem of using dependent-variable tasks that have no apparent correspondence to human behavior (i.e., low construct and criterion validity). Laboratory exercises to study the effects of drugs on animal behavior, for instance, use dependent measures that have little relationship to the comparable human behavior they are intended to assess (Hull, 1996). Overmeir & Burke (1992) provide numerous examples of these types of uninterpretable dependent variables.

- A mouse pole-climbing task may be used to assess the effect of anti-psychotic drugs (Serban & Kling, 1976). In laboratory exercise, mice are classically conditioned to climb a pole in their cage in response to the sound of a buzzer, by sending a sharp jolt of electricity through the floor of their cage at the moment the buzzer sounds. Any drug (e.g., phenothiazine derivatives) that causes the animal to ignore the buzzer and receive the electric shock is suspected to have anti-psychotic properties because it makes the animal less afraid of the shock.

- The Porsolt Swim Test would be used to assess the effect of antidepressant drugs (Porsolt, le Pichon, & Jalfre, 1977). A rat is forced to swim in an inescapable situation, where he eventually ceases to move altogether, making only movements which are necessary to keep his head above water. Behavioral immobility is said to indicate a state of despair in the animal and to resemble human depressive illness. Anti-depressant drugs are assessed for their ability to reduce behavioral immobility.

- The Morris Water Maze would be used to assess spatial abilities and navigational skills of brain lesioned or drugged animals (Pinel, 1993, p. 157). Rats would be placed in a circular, featureless pool of cool milky water, where they must swim until they discover the escape platform, which is invisible just beneath the surface of the water.

- The Elevated-plus-Maze Test is used to assess anxiety drug treatment (Pinel, 1993, pp. 602-603). This is a four armed cross-shaped maze that is raised approximately 50 cm (approximately 20") from the floor; two arms have sides and two arms have no sides. The measure of fearfulness (read "anxiety") is the proportion of time that rats spend in the enclosed arms, rather than venturing out onto the unexposed arms. The assumption is that "defensive behavior is motivated by fear and that fear and anxiety are similar states" (Pinel, 1993, p. 602-603).

All of these dependent variables have low construct validity. Measurements may be precise, but we do not know the correctness of the constructs being measured given the multiple interpretations possible for the observed behavior and the fact that animals cannot tell us what effect the drug is having on their psyches. Species variation and the artlessness of these tasks make it unlikely that any of these dependent variables measures have any reasonable criterion validity or correspondence to human behavior or experience.

Confounding laboratory and classroom variables. Uncontrolled variables in the laboratory and classroom setting confound interpretation of animal data. Situational factors that can modify treatment effects in laboratory exercises and classroom demonstrations include (Mroczek, 1991, p. 290; Pratt, 1980, p. 283):

- classroom conditions (temperature, humidity, impurities in water or air, noise levels);
- laboratory conditions (number of animals per cage, housing conditions, diet, duration of starving prior to testing);
- teacher bias (self-serving bias, prejudiced perception of animals as tools of research, reluctance to use post-operative analgesic pain relievers, inability to recognize pain in animals, differences in behavior toward different animals);
- student bias (negative emotional reactions, laughing and joking, shaking while handling the animal, prior training);
- animal stress, fear, and pain (shipped as freight, chronically confined within the lab situation, deprived of natural habitat and native travel patterns, inability to get away from their own wastes, plucked from cages at unpredictable times for tests or surgery, change in staff);
- animals' age, sex, condition (inbred genetic strain, immune status, state of nutrition, extent to which animals were handled in infancy, variations in the electrical resistance of the animal)

These variables modify treatment effects yet rarely do teachers control for them or evaluate their effects (Barnes, 1991). We cannot expect to find in the animal's behavior anything more than the current adaptation of that animal – an adaptation that is superimposed upon their natural reactions.

Materialistic, reductionistic, mechanistic philosophy of science. Although classroom demonstrations and laboratory exercises using animals may occasionally inform theories of human behavior, they can also lead students astray in terms of their understanding of human psychology. Using non-human animals to understand human behavior promotes a philosophy of science that is materialistic (the belief that mind is brain and nothing more), reductionistic (the belief that psychological phenomenon originate from biochemical and physiological events), and mechanistic (the idea that human biology and

behavior can be understood largely independent of psychological and social processes). Mind is brain and body is machine, reducible to elemental fragments that can be understood independent of psychosocial factors.

An alternative philosophy of science: TV and linguistic metaphor. Such a theory, however, is like saying that a television program ("cognitive process") is available for inspection by analyzing the components that make up the television set ("brain and nervous system structures"). Psychiatrist Stanislav Grof (1985) clarifies the problem inherent in this philosophy of science by using the metaphor of a television set.

> The quality of the picture and sound is critically dependent on proper functioning of all the components, and malfunction or destruction of some part of them will create very specific distortions. A television mechanic can identify the malfunctioning component on the basis of the nature of the distortion and correct the problem by replacing or repairing the hardware in question. None of us would see this as scientific proof that the program must therefore be generated in the television set. . .yet this is precisely the kind of conclusion materialistic mechanistic science has drawn in regard to brain and consciousness. (p. 22)

Just because damage to the components can affect the picture and sound produced by the TV receiver, does not prove that either the pictures or the sounds are stored inside the components, yet this is precisely the conclusion promoted by the philosophy of science that drives animal research. Traces of the program will not be found by any search inside the TV set because the set tunes into TV transmissions but does not store them. Biologist Rupert Sheldrake (1990) expands upon the biological implications of the TV metaphor.

> But what about the fact that memories can be lost as a result of brain damage? Some types of damage in specific areas of the brain can result in specific kinds of impairment: for example, the loss of the ability to recognize faces after damage to the secondary visual cortex of the right hemisphere. A sufferer may fail to recognize the faces even of his wife and children, even though he can still recognize them by their voices and in other ways. Does this not prove that the relevant memories are stored inside the damaged tissues? By no means. Think again of the TV analogy. Damage to some parts of the circuitry can lead to loss or distortion of pictures; damage to other parts can make the set lose the ability to produce sounds; damage to the tuning circuit can lead to loss of the ability to receive one or more channels. But this does not prove that the pictures, sounds and entire program are stored inside the damaged components. (p. 94).

The TV set transmits the program but does not store them, just as physically spoken words or the printed words on this page do not literally contain the thought or emotion that seeks to convey. The physical words are not the intangible thoughts and emotions they attempt to express. There must then always be a gap between one's thought and feeling and one's expression of them. Words are used to tell of an experience, but they are not the experience that they attempt to describe. The information is not an attribute of the letters of the words themselves that only have the reality of black marks on white paper. The letters are symbols with agreed upon meaning but are not the reality – the information or thoughts – that they attempt to convey. The information is invisible. The spoken word and printed line does not contain information – it transmits information. The information, thought, and feeling is not in the letters or in the words any more than the mind is contained in the brain. Where is the information that is being transmitted the, if it is not in the words or on the page? Where is the program if not in the set? Where is the mind if not in the brain (Newberg,Newberg, & d'Aquili, 1997)?

McKinney & Bunney's scientific criteria are not satisfied. In summary, how scientifically valid are animal models? McKinney and Bunney (1969) identify four criteria that a scientifically valid animal model must satisfy: The animal model and the human condition must have (a) similar neurological mechanisms, (b) similar causes, (c) similar symptoms, and (d) similar response to therapy. Taking a healthy being from a species with different neurological mechanisms, artificially inducing an experimental condition that only superficially resembles the human one, measuring animal behavior on tasks that only tangentially corresponds to human behavior, and then testing animal results in clinical studies on human

volunteers with naturally-occurring disorders to observe the effect of a strictly biological treatment on multi-determined symptoms and behaviors that occur within unique psycho-social-cultural-spiritual contexts and frameworks does not come close to satisfying these criteria. Psychology animal laboratories present a distorted, incomplete, and simplistic picture of the human phenomenon they are designed to represent. The question arises: To what degree can teachers trust the knowledge contained in general psychology textbooks to provide an accurate representation and understanding of human psychology, biology, and behavior when much of that information is derived from experiments on non-human animals (Domjan & Purdy, 1995)?

Instructional Concerns

What makes for a suitable "alternative"? For an activity or out-of-class project to function as an alternative it should accomplish one or more of the learning objectives identified for the specific laboratory exercise (Abramson, 1990, 1994; Hart, 1976; Skinner, 1971; Wellman, 1985). It should also achieve one or more of the curriculum goals set forth in APA's Principles for Quality Undergraduate Psychology Programs (McGovern & Reich, 1996, 254-255). The relative importance of these educational objectives may differ for students and teachers. One objective may be to gain knowledge about and appreciation of the key principles of animal behavior, of anatomy and physiology, and of the variation between individual animals of the same species. Another objective may be to improve student learning through active involvement. A third objective may be to have students gain "hands-on" experience performing such tasks as electrode implantation, organ removal, and histological analysis using animals as subjects. A third objective may be that students develop higher level thinking skills, practical research skills, and observational skills as they obtain experience in the design and execution of psychology experiments using animals as subjects.

There are many noninvasive, alternative laboratory projects to the "hands on" experimentation of psychology animal labs that can be evaluated to determine whether or not they meet the same or similar educational objectives. Alternatives to aversive animal experiments in psychology exist that are arguably as pedagogically sound, class-time efficient, and cost effective as the traditional animal laboratory (Cunningham & Randour, 1998; Stoloff & Couch, 1992; see also Acker, Goldwater, & Agnew, 1990; Anton, 1995). Alternatives to dissection in medical and veterinary education are of proven value in teaching students about the characteristics of different species in the animal kingdom, in actively involving the student and in developing higher thinking skills (Association of Veterinarians for Animal Rights (AVAR), 1986-1996; Dewhurst, Hardcastle, Hardcastle & Stuart, 1994; Greenfield, Johnson, Scaheffer & Hungerford, 1995; Jones, Olafson & Smith, 1978; Physicians Committee for Responsible Medicine (PCRM), 1995; Samsel, Schmidt, Hall, Wood, Shroff * Schumacker, 1994). There is no reason to doubt that similar outcomes cannot be achieved in the psychology classroom.

Static models. Some alternatives are entirely non-animal and completely replace animals (e.g., static and dynamic plastic models of a sheep brain in physiological psychology, computer simulations of operant conditioning a rat in learning courses). When used in conjunction with lectures, reading assignments, and group discussion activities that encourage students to listen carefully, read comprehensively, understand accurately, and think critically about the behavioral and psychological information, they can prove quite effective (Acker, Goldwater, & Agnew, 1990; Downie & Meadows, 1995).

Videotaped animal experiments. Other alternatives are animal-based and at one time involved the pain and distress or harm of an animal (e.g., videotapes of professionally conducted surgery on the brain of an animal in physiological psychology). In those circumstances where pain/distress and harm-causing phenomena must be seen to be understood, videotapes of the procedure may be an acceptable alternative to the student. In this case, only one animal was killed at an earlier time, and the videotape can be reviewed (i.e. practiced) as many times as necessary with no additional animal deaths and no additional cost. For example Richard Deyo of Winona State University has developed The Psychology Video Lab Series (available from Allyn & Bacon) that offers pre-recorded individual experiments in which one or more groups of animals have received some treatment (e.g., drug or legion) that students view and then record the behavioral responses using data sheets provided. Topics include:

The role of dopamine in the regulation of motor and aggressive behaviors, the effects of naxolone on social-play behaviors in the albino rat, the effects of perinatal hippocampal lesions on learning and memory in rats, and the effects of caffeine on open-field behaviors in the rat. Animal laboratories performed by undergraduates on these topics are rarely done well enough to develop any skill. The lack of expertise of a typical psychology student's performance of an animal lab becomes evident when compared with the performance of a professionally conducted laboratory captured on videotape.

Interactive video disk (IVD) computer program simulations. Still other alternatives use interactive video disk (IVD)-based computer program simulations to more actively involve the student and promote understanding of behavioral or physiological principles, higher thinking skills, computer competency, perceived value in learning and a positive attitude toward science. An advantage of IVD-based computer programs and videotapes over traditional animal labs is that these reusable tools are cost effective in the long run. They result in substantial savings to the department, a buildup of assets over time that are not "used up" at the end of courses, and do not carry with them the cost of housing, maintenance, and safe disposal as animal resources require. Videotapes as well as interactive videodisks and other alternatives permit making up missed classes and working outside of class on the student's own time.

Human-based alternatives. Many human-based alternatives are available (i.e., using students as experimental subjects in experimental methods, observational studies, respondent and operant conditioning studies, simple physiological measurements, behavioral tests such as perceptual discrimination and preference testing). Most textbooks for traditional animal lab courses (e.g., introductory psychology, learning and motivation, sensation and perception, experimental psychology) have instructor manuals containing descriptions of demonstrations that can use students as experimental subjects. The Handbook of Demonstrations and Activities in Teaching of Psychology (Vol. 2) edited by Mark Ware and David Johnson (1996) contains a wide range of educational strategies and approaches for teaching physiology, perception, learning, memory, and developmental psychology suitable for college student investigations. PsychLIT, the optical disc counterpart of Psychological Abstracts, is another resource that can facilitate the teacher's access to databases concerning non-animal alternatives (Joswick, 1994). Teaching of Psychology, a publication of the Society for the Teaching of Psychology (Division Two, APA) publishes numerous articles describing demonstrations utilizing human subjects (e.g., Jacobs, 1980; Puente, Matthews, Williams, & Matthews, 1991; Webster & Muir, 1995). Rapid improvements in technology have led to the development of interactive computer programs (e.g., BIOPAC Student Lab by BIOPAC Systems of Santa Barbara, CA) that allow a large number of students to easily and inexpensively record, measure and analyze a wide variety of physiology parameters (muscle contraction, cardiac activity, respiratory cycle, reaction time, EEG, pulse, GSR) from their own bodies either alone or in groups.

Advantages of human-based alternatives. There are numerous teaching advantages to using human paradigms instead of animal paradigms to directly study simple non-human and complex human animal phenomenon. Having students conduct their own behavioral self-management projects to demonstrate behavior modification principles allows students to more easily understand relevant behavioral principles. Having students implement task failure or frustration paradigms in student group experimental projects to demonstrate learned helplessness paradigms allows students to more effortlessly remember relevant motivational principles. The reason is that students can more readily apply the results directly to themselves (this is also called "the self-reference" effect). Students experience important concepts as they are learning about it, and gain an understanding of the joys and frustrations of data collection on human subjects by actually engaging in it with themselves as subjects. Another teaching advantage of using human paradigms instead of animal paradigms to directly study simple and complex human phenomenon is that the problem of generalizing on insufficient grounds due to species variation is avoided and the scientific objections of animal models are circumvented. Results can be confidently applied to humans because it is the population from which subjects have been selected.

Barbara Orlans (1974), Senior Research Fellow at the Kennedy Institute of Ethics and former research physiologist for the National Institutes of Health, identifies other benefits and advantages to using students as experimental subjects for physiological-biological observations.

> Human subjects are always at hand; there is minimum preparation for such experiments. Human subjects can follow directions and respond verbally, to provide data not obtainable from other mammals. Whereas it may be difficult to interest students in the physiological processes of a [rat, mice, or bird], the functioning physiological processes of the human body is of great importance and interest to most students. Some [students] may fail to recognize the relevance of some live-animal [physiology] demonstrations to their own problems; for instance, some may have difficulty relating the nutritional requirements of guinea pigs to their own food needs. Is it not more forceful and of more direct value for a student to learn as much as possible by direct study of himself? (p. 401)

Disadvantages of animal laboratories. Animal laboratories often require the use of expensive equipment (lesioning devices, stereotaxic instruments, microscopes), considerable planning and supervision, time for extensive set-up and facilities maintenance, the necessity of very large laboratory rooms, laboratory room and personnel availability, and raise the debatable ethics of using animals for surgical demonstrations. Moreover, animal laboratories typically last only one or two sessions and emphasize a micro-analysis instead of a macro-analysis of physiological and behavioral functioning. Using human subjects to learn about human physiology acknowledges students ethical objections, overcomes the expensive equipment requirements of using non-human animals, and "blends the advantages of independent student inquiry with inexpensive instrumentation without sacrificing animals for demonstration purposes" (Anton, 1995, p. 131). Whereas studying wild animals in their native habitats or domesticated animals under captive conditions present certain problems for the psychology teacher, these problems do not exist when students are used as experimental subjects.

More research on alternatives needed. More empirical research needs to be done to assess the comparative effectiveness of the above-mentioned categories of non-animal alternatives vis-a-vis traditional psychology animal laboratories in meeting specific educational objectives. Do students learn information as well or better using a non-animal teaching alternative that does not cause pain/distress or harm to animals? This is an unresolved question that needs additional research. For example, undergraduate grades for an introductory psychology course could be compared for semesters following the implementation of an IVD-based computer program on operant conditioning (e.g., Sniffy the Rat or OpRat) with the average grades of prior semesters using traditional animal labs. Or students' exam scores on knowledge of properties of the nervous system using a computer simulation (e.g., NeuralSim or Neurosys) twice a week could be compared to scores of a comparable group of students in the traditional two-hour animal laboratory. Such research can show that student choice is workable, that alternatives are satisfactory in practice, and that the conduct of such research is in itself a valuable experience for teachers of psychology.

Why Do Teachers of Psychology Refuse Students Choice?

Teachers of psychology may refuse students choice to non-animal alternatives for five reasons. (1) Animal labs are indispensable to behavioral science education. (2) Choice threatens academic freedom. (3) Choice threatens future animal research. (4) Animal labs are tradition. (5) There is no alternative to hands-on experience. (6) The "right" information will produce the "correct" values. These reasons are elaborated and responded to in more detail below.

Animal Labs are Indispensable to the Training of Behavioral Scientists

First, animal labs are indispensable to behavioral science education. Teachers refuse students choice because they may consider animal labs to be essential to the training of behavioral scientists (APA, 1995, 1996). Animal labs initiate undergraduate students into scientific psychology (Domjan & Purdy, 1995). By learning how to apply aversive stimuli to animals under controlled conditions and perform invasive surgical techniques and medical procedures, students acquire necessary research skills for career opportunities in the behavioral sciences (Rosenzweig, Leiman, & Breedlove, 1996, chap. 1). The APA Board of Directors in June 1990 formally endorsed the following resolution of the American Association

for the Advancement of Science (AAAS, 1990) as a part of its mission in advancing psychology as a science, a profession, and as a means of promoting human welfare:

> Whereas the use of animals has been and continues to be essential not only in applied research with direct clinical applications in humans and animals, but also in research that furthers the understanding of biological processes.... [be it resolved] that the use of animals by students can be an important component of science education as long as it is supervised by teachers who are properly trained in the welfare and use of animals in laboratory or field settings and is conducted by Institutions capable of providing proper oversight.

Teachers are reluctant to offer alternatives because they may think that the conduct of animal studies, especially those which involve procedures that cause pain to animals, represent one of the few ways to effectively demonstrate the effects of certain behavioral phenomena (Miller,1986). Dewsbury (1990) reports that many psychologists have historically believed that research and teaching with animals is not only desirable but necessary and should not be limited or restricted in any way (see also Gallistell, 1981). They believe that the knowledge obtained through animal studies, including those that expose animals to aversive stimuli, has advanced psychology as a behavioral science, promoted understanding of animal welfare, and helps a person better understand the biological and environmental mechanisms that underlie human behavior, health and disease (Perkins, 1990). The use of aversive procedures is justified on the grounds that instruction in their use has resulted in benefits that far outweigh their cost to animals. Neal Miller (1985) asserts in a trenchant defense of animal research that the use of aversive methods in behavioral research on animals has laid the foundation for breakthroughs in the treatment of drug addiction, anxiety disorders, phobias, urinary incontinence, ruminative vomiting, the neural bases of schizophrenia, depression, retrograde amnesia, and a range of other psychological phenomena. Elsewhere Miller (1986) argues that it is not only moral to expose animals to aversive stimuli in research on human stress and pain, but that it would be immoral not to do so.

Many schools no longer maintain animal facilities. Recent survey results, however, suggest that psychology animal laboratories are no longer be the indispensable element of quality psychology education or a necessary requirement for a successful research career in the behavioral sciences that they may have been in the past (Plous, 1996b; Gallup and Eddy, 1990). Many colleges and universities successfully teach psychology without animal labs (Benedict & Stoloff, 1991; Hull, 1996) and many students go on to rich and fruitful professional lives without ever having performed animal experimentation or dissection as a part of their scientific training. Gallup and Eddy (1990) report that many colleges and universities are disbanding their animal facilities or are considering this possibility as a part of their long-term strategic planning process. They found that approximately 14.9% (or one of every seven) of the197 graduate departments of psychology that used to maintain animals for teaching and research no longer do. Many departments that no longer maintain animal facilities have PhD programs. These schools include DePaul University, Claremont Graduate School, Georgetown University, Illinois Institute of Technology, New Mexico State University, Rice University, University of Denver, University of Houston, University of Missouri at Kansas City, University of Nevada at Reno, and the University of South Dakota. Georgetown University decided to disband its animal research facility after considering for many years

> the ethical basis upon which persons would maintain sentient and complex animals in confinement and for purposes that did not appear to bear upon any significant human concern. In time, the traditional defenses seemed to most to be self-serving and entirely unconvincing, not to mention at variance with any number of ethical principles carefully examined in any number of undergraduate courses in philosophy (Robinson, 1990, p.1269).

There is a difference between semantic and procedural knowledge. Moreover, there is a difference between general knowledge (principles, concepts, and facts) and procedural knowledge (skills). While all psychology students need to understand the biological foundations of behavior, learning and motivation, and so forth, most do not need to develop mastery of specific procedures and techniques. Students do not need to personally shock or experimentally operate on animals just so they can see some known behavioral phenomenon first hand. Students do not need to develop individual expertise in

operating an operant conditioning chamber in order to learn the key concepts of learning and motivation. Students do not need to develop private skill at implanting electrodes or expertise at ablating and lesioning the brains of small animals in order to understand the essential principles of physiological psychology. Students do not have to personally perform the tasks of electrode implantation, organ removal, and histological analysis using animals as subjects or dissect different organs such as brains and eyes to learn about the apparatus and techniques of animal science. A student can understand the operation of the central nervous system, identify control variables, formulate hypotheses and generate predictions without having to personally remove part of the brain of an animal. Practice of the procedural skills that are used to conduct animal experiments is not necessary in order to teach students knowledge, principles, concepts, and facts about animal behavior and learning, physiological psychology, or research methods. Students can fully understand the phenomenon they are studying, be exposed to the methods of basic animal research, and understand its alleged benefits without personally conducting adversive experiments on animals.

Student Choice Is a Threat to Faculty Academic Freedom

Second, choice threatens academic freedom. Teachers refuse students choice because they may regard such a policy as a challenge to faculty academic freedom (Francione & Charlton, 1992). "Defenders of animal experimentation and of academic authority might claim that it is teachers who decide the curriculum, they know best what the content of a [psychology] course should be, and therefore giving students a choice of this kind undermines authority" (Downie & Meadows, 1995, p. 192). Giving choices to students regarding teaching strategies and the format of a psychology curriculum -specifically the omission of animal laboratories -- takes away the authority of and respect for the teacher (Baldwin, 1993). Faculty are "giving away" their academic freedom when they permit student choice.

Choice does not threatened academic freedom but enhances it. This view, however, represents a misunderstanding and misconception of the concept of student choice (Shapiro, 1988). The academic freedom of faculty need not conflict with the academic freedom of students. Student choice does not mean that the use of psychology animal labs as a part of a course has to be abandoned. Students who do not object need not be deprived of the lab experience because of the ethical objections of some students. Student choice means that when there is a psychology animal lab, students are allowed the opportunity to "opt-out" on conscientious grounds. Nothing is taken away from the teacher; a choice of learning strategies is simply added for the student. Teachers are free to present their course content as they have in the past. The only change is the additional availability of substitute materials for students who elect such an alternative. Francione & Charlton (1992) clarify this point:

> The student who objects to [a psychology animal lab] is not trying to stop the instructor from imposing the requirement on students who do not object… [and] is not challenging the right of the instructor to structure the course in the way that the instructor chooses – the student is only challenging the right of the instructor to violate the student's first amendment rights. (p. 85)

Students have become more litigious. Teachers need to be aware that "students who object to animals used in psychology classrooms are on sound legal ground whether or not such a policy exists or not; it is, in fact, a Constitutional issue (Psychologists for the Ethical Treatment of Animals (PSYETA, 1991). News stories show that "the number of areas in which discrimination is perceived and pursued as a legal battle has increased. . . .[and] students have become more litigious" (Cantu-Weber, 1999, p. 45). Two veterinary students, Gloria Binkowski and Eric Dunayer sued the University of Pennsylvania School of Veterinary Medicine for the right to refuse to operate on and euthanize healthy dogs (Francione & Charlton, 1992, p. vii). The students won the case and the University now offers alternatives to surgery on healthy animals. Saffia Rubaii, in August 1995, won a $95,000 lawsuit against the University of Colorado School of Medicine (UCSM) for the right to be granted an alternative to the required dog lab in a freshmen physiology course (McCaffrey, 1995). UCSM now accommodates all students whose religious beliefs prevent them from conducting lethal experiments on live, anesthetized animals.

Choice is a First Amendment issue. Current U.S. law recognizes that the only valid reason for objecting to vivisection or dissection is sincere religious belief, a stance strengthened by the 1993 Religious Freedom Restoration Act. Suppose a court decides that a student's objection is based upon a sincerely held traditional religious belief or a belief that addresses "an ultimate concern" of the student. The student's claim then falls within the scope of the First Amendment (the free exercise of religion and freedom of speech). According to Attys. Francione and Charlton (1992) the student is entitled to an alternative exercise. Since the ethical principles of "reverence for life" and "respect for the sanctity of being" are basic ethical and moral principles of most world religions, they may also serve as an "ultimate concern" in a student's life and could be considered a stand-alone non-theistic religion (Francione & Charlton, 1992, p. 29).

Choice is a civil rights issue. The right of students to refuse to participate in any procedure involving an animal that goes against their religious or ethical values is not only a religious rights issue but also a civil rights issue. Suppose a psychology major is forced to engage in an action (i.e., participate in an animal laboratory) that she feels is inimical to her sincerely held moral, ethical, or religious beliefs (i.e., it is wrong to harm or kill non-human animals). What is to prevent her from suing the college or university on the grounds that she is being penalized and discriminated against because of her beliefs when students who are similarly situated are being accommodated (Francione & Carlton, 1992, pp. 83-84)? Or suppose the college or university has a policy of granting exemptions from course requirements. For example, some course requirements might be exempted for the special "needs" of students, such as allowing the use of a bilingual dictionary for foreign students, alternate modes of evaluation for test anxious students, or alternate teaching strategies for learning disabled students. Suppose the college routinely grant exceptions to accommodate students' religious beliefs. A student could claim that a department's refusal to accommodate to his particular belief (i.e., that it is wrong to harm or kill non-human animals) is an act of discrimination based on the content of his or her belief (Francione & Charlton, 1992, pp. 83?

Choice already exists under other circumstances. The issue of whether or not to experiment on animals in the psychology classroom can also be viewed as a matter of subjective preference and human choice. Student choice already exists in other situations. Students are normally allowed choice as to whether or not they want to participate in most classroom exercises and demonstrations under ordinary circumstances. Students are not generally coerced to participate in projects that would potentially cause them stress. Teachers are routinely careful to avoid making students feel under pressure to participate in classroom demonstrations that could be a potential source of embarrassment. Students are routinely informed about the nature of any experiment in which they may be asked to participate and their freedom to decline or to discontinue participation at any time without loss of benefit is respected. Why should the issue be different when it comes to student choice not to participate in laboratory exercises or classroom demonstrations involving animals to which a student objects because it violates his or her ethical principles and affective values (Callahan, 1995; Krathwohl, Bloom, & Masia, 1964/1974)? "A helpful analogy comes from the issue of abortion. In medical education, no student is required to perform an abortion if he or she finds that practice objectionable, raising the question as to their right to decline on ethical grounds without penalty" (Barnard & Baron, 1989, p. 92).

Student Choice Is a Threat to the Future Use of Animals for Research

Third, choice threatens future of animal research. Teachers refuse students choice because they may view such a classroom policy as a threat to the future use of animals for scientific research (Thomas & Blackman, 1992). "Some psychologists fear that undergraduates who do not have hands-on experience with animals will neither understand as well the science of psychology nor be attracted to the field" (Hull, 1996, p. 172). British psychologists Glyn Thomas and Derek Blackman (1992) believe that giving students choice to non-animal alternatives can have a devastatingly negative effect and far-reaching consequences on the future of animal studies in psychology.

> First, a decline in numbers of undergraduate students willing to undertake animal practical work inevitably reduces the pool of potential graduate students who could be recruited to work in this area. Second, lack of student interest in animal projects and animal practical classes reduces the

> case for making or renewing academic appointments to faculty positions in the area of animal psychology. The resulting lowered prospect of future academic employment in this area must then make it an unattractive choice for students contemplating graduate research studies, thus further exacerbating the decline [p. 1679).

Choice can encourage interest in animal science. Paradoxically, however, mandatory animal labs may not encourage entry into animal science for many students, but instead have the opposite effect – discourage interest and produce relatively small recruitment in graduate school. An openly declared student choice policy, instead of discouraging interest in animal science, can help educate future psychologists for sensitivity to students' ethical objections and the humane treatment of animals, and may encourage students to pursue psychology careers who might otherwise have avoided the field because of the mandatory animal labs. Instead of discouraging interest in animal science and graduate school the adoption of an openly declared student choice policy can help produce a graduate student who is more open to the full spectrum of viewpoints on animal use in psychology. Choice can help form a future psychologist who is less reluctant to acknowledge that animal labs may present an ethical problem for some students. Choice can help create a teacher of psychology who is more willing to take the sensible step of allowing student choice in order to ease the conflict and tension that currently accompany the use of animals in the psychology classroom. Student choice in the psychology classroom can actually encourage interest in animal science and graduate school.

How are future psychologists to be prepared? "How is one to prepare the laboratory teachers and animal researchers of tomorrow"? High school and college is the occasion when faculty have the opportunity to act as mentors for their students, modeling values, practices, and attitudes that reflect a sensitivity to both animal and student welfare, and graduate students have the chance to exhibit a willingness to alter research paradigms in order to promote animal and student welfare. It is the proper time for administrators to reward faculty and students who develop and implement research and teaching alternatives that reduce the number of animals used, reduce the adversiveness of lab procedures, and replace the use of living animals.

More graduate coursework in animal welfare issues needed. Educating future psychologists for sensitivity to students' ethical objections and humane treatment of animals, begins in high school and college, and continues in graduate school. Graduate schools in psychology that maintain animal facilities for research and teaching have done well in the past at developing technical skill in students for working with animals and inculcating a belief in the value of animal research. Training in the ethical issues that arise from doing such research, however, has been weak until relatively recently. Results of the1996-1997 APA Committee on Animal Research and Ethics (CARE) survey of 704 graduate departments of psychology (44% response rate) showed that about 75-80% of responding graduate departments now offer courses discussing the ethics of animal research, double the number of such courses available in 1985. All such coursework help produce a more ethical professional for the future who is more sensitive to animal welfare issues and more open to offering students a choice to alternative learning activities.

Coursework on the requirements of federal regulations governing the humane care and use of animals can help faculty and graduate students who are unaware of key provisions of the Animal Welfare Act, Public Health Service policy. Coursework on how to search databases for non-animal alternatives can help faculty and graduate students become more aware of their responsibilities to assure that proposed use of animals is not unnecessarily duplicative and that alternatives have been considered. Coursework on how to recognize pain and distress in animals, on how to minimize animal suffering by using minimal levels of aversive stimuli, and on how to use anesthetics and analgesics appropriately, helps faculty and graduate students who may not recognize the animal pain to which they have become emotionally desensitized and who may react defensively to any suggestion that animals are treated inhumanely even in the most invasive experiments.

Coursework on how to apply the 3 R's of refinement, reduction and replacement help faculty and graduate students who may be unaware of new alternatives to traditional research methods. Coursework on how to meet the social, emotional, and physical needs of animals necessary for their well-being helps faculty and graduate students whose investment in their work may lead them to make overstated and

exaggerated claims about the benefits of animal research and under-emphasize its limitations or inhumaneness. Coursework in how to address humane issues during thesis/dissertation proposal development and how to anticipate the ethical and humane concerns of IACUCs helps shape humaneness among the laboratory teachers and animal researchers of tomorrow.

Animal Labs Have Been a Traditional Component of Psychology Curricula

Fourth, animal labs are traditional. Dating from the late 1800's and early 1900's when books were poorly illustrated, few visual aids or films were available, far less was known about behavior and biology, and not many alternatives existed, animal laboratories initiated students into scientific psychology. Teachers are reluctant to offer alternatives because they may consider animal laboratories to be a traditional component of psychology curricula, especially courses in physiological psychology, learning and motivation, research methods, and comparative psychology. According to Benedict & Stoloff (1991) survey of animal laboratory facilities at "America's best" undergraduate colleges, of the 74 psychology departments responding (without doctoral programs) that maintained animal facilities for teaching purposes, "the most common course titles were learning (60.8%), physiological psychology (58.2%), research methods (28.4%), animal behavior (13.5%), and introductory psychology (10.9%). Undergraduates also used animal facilities for individual research at 29.8% of the schools that currently have animal facilities" (p. 535). At 14 schools identified as "superlative institutions," the most frequent courses taught using animals were physiological psychology (69%), learning (40%), introductory psychology (27%), and animal behavior (20%). Serious discussions about the possibility of closing psychology department animal facilities had occurred only at 18% of the 74 colleges and universities that maintain them, while 82% reported that no such discussions had occurred. In Hull's (1996) survey of 52 undergraduate psychology programs that maintained animal facilities, 71% used animals for course work, 48% as a part of student research, 44% for classroom demonstrations of psychological or behavioral principles, and 35% of programs used animals for faculty research.

Technologically advanced laboratories are overlooked. Certainly the use of animal experimentation and dissection has a long history as being a part of courses in learning and motivation, physiological psychology, and research methods, but experimenting on and killing animals for educational use become very controversial (Bannister, 1981; Bowd and Shapiro, 1993; Hepner, 1994). Tradition may no longer be a "good enough" reason to continue the practice of old-fashioned psychology animal labs. Psychology animal labs in the classroom may continue today out of custom and convenience and be "an example of reinforced behavior" (Ulrich, 1991, p. 49). Since laboratory exercises that use animals may be the only "hands-on" experience that some teachers of psychology know, and s they continue to teach in the same way that they themselves were taught. A bias toward laboratory exercises using animals and over-reliance on its use can become a tradition so deeply embedded in the teacher's belief system that more technologically advanced laboratory exercises are inadvertently overlooked.

There Are No Alternatives for "Hands-on" Experience

Fifth, teachers refuse students choice because they may believe that no acceptable alternatives actually exist to the "hands-on" experience of handling the actual bodies of animals, physically manipulating the animal's environment, and directly experiencing the behavior of the animal as he reacts or responds to experimental treatments (Abramson, 1994; Davis, 1993; Gallistell, 1981; Gallup & Suarez, 1985; Moses, 1991). "There is no adequate substitutes for this hands-on, 'real-thing' experience. The assumption is that since direct contact with the body of an animal most closely approximates the paradigmatic biomedical treatment, surgery, it follows that [animal experimentation and] dissection best teaches [psychology and] biology, the basic science of which biomedicine [and biopsychology] is an application" (Shapiro, 1995, p. 1).

What animals are used in the psychology classroom? What types of animals are typically used in this version of "hands-on" psychology? According to Hull's 1996 survey of 52 undergraduate programs that used animals in some portion of the psychology curriculum, the following kinds of animals were used (in decreasing frequency): rats, other rodents (mice, gerbils, and hamsters), birds (pigeons, finches, and chickens), anthropods (crickets, spiders, and insects), invertebrates (planaria and worms),

fish, reptiles and amphibians (frogs and lizards), and monkeys. Brains from sheep or cows are also used. According to Hull (1996), "although the number of schools using rats (i.e., 81% of 52 schools] has remained fairly constant, there is more use of other animals today than 5 years ago" (pp. 172-173).

How many animals are used in the psychology classroom? How many animals are used to provide students "hands-on" experience? No data are currently available on the precise number of animals used nationally for the teaching of psychology. According to Hull's 1996 survey of the 52 out of 110 department chairpersons who reported animal use in the psychology classroom, 42% (n=22) used between 11-100 animals, 21% (n=11) reported using 10 or less animals, 19% (n=10) used more than 100 animals annually, and 17% (n=9) gave no response. The United States Department of Agriculture/Animal and Plant Health Inspection Service (USDA/APHIS) reported that in fiscal year 1997 approximately 1,267,828 animals (i.e.. species covered under the Animal Welfare Act (AWA)) were used in research, testing, experiments, and teaching combined (United States Department of Agriculture [USDA], 1998), but no separate figures identifying the number of animals only used for educational purposes are reported. This 1.27 million figure represents only about 10% of the animals used for scientific and educational purposes. Ninety percent of animals that used in research, testing, experiments, and teaching (i.e., rats, mice, birds, invertebrates, anthropods, and cold-blooded animals) are excluded from coverage of the AWA and therefore are not included in USDA/APHIS reports (Crawford, 1996, Summer).

Institutions are reluctant to report animal use. APA's Committee on Animal Research and Ethics (CARE) conducted a 1996 national survey of 704 graduate and 1288 undergraduate psychology department concerning animal use in research and teaching (Science Directorate, 1999). Because overall response rate was only 56%, the Committee decided not to release survey data to the public. As this CARE survey illustrates, institutions are not always willing to cooperate with surveys requesting information about the number of animals used for scientific or educational purposes. In early 1995, a comprehensive national survey sponsored by the National Center for Research Resources and National Institutes of Health to obtain information on current animal facility resources and animal use was mailed to all U.S. institutions that had animal use assurances on file with the Public Health Service (PHS) that used cats, mice, birds, and invertebrate animals in research, experiments, testing, or teaching (i.e.. about 1300 facilities) (Allen, 1994/1995, Winter; United States Department of Agriculture [USDA], 1997). Because of researcher and institution complaints of how the information would be used, the survey was subsequently halted due to lack of cooperation from the institutions.

No empirical evidence supports "hands-on" argument. "The hands-on argument has always been weak, never backed by empirical demonstration" (Shapiro, 1995, p. 1). We don't really know what students are missing if they don't experience "hands-on" animal laboratories. It could be that alternative teaching methods and approaches which involve virtually no pain/distress or harm to animals (e.g., observations of wild or captive populations in natural or semi-natural settings) provide a more valuable learning experience for some students. In fact, existing scientific studies of alternatives to dissection in biology education provide evidence that students using alternatives perform academically as well or better than those participating in animal labs (Dewhurst, Hardcastle, Hardcastle & Stuart, 1994; Downie & Meadows, 1995; Greenfield, Johnson, Schaeffer & Hungerford, 1995; Jones, Olafson & Smith, 1978; Samsel, Schmidt, Hall, Wood, Shroff & Schumacker, 1994). There is no reason to expect the case to be different in psychology education (Acker, Goldwater & Agnew, 1990; Anton, 1995; Cunningham & Randour, 1998).

Traditional animal laboratories are used to teach students well-known facts and not to make important research discoveries. Faculty can reassess the objectives normally cited for doing animal laboratories to see if in fact they can be met in other ways for students who conscientiously object (e.g., replacing aversive procedures with non-aversive ones such as using positive reinforcement rather than punishment, positive control instead of negative control). Can students acquire observational and experimental skills, learn to think critically and hypothesize about a phenomenon in ways other than conducting an animal laboratory investigation? It would be beneficial for teachers of psychology to learn all about "alternatives" so that they can make informed judgments and support their decisions whether to make animal labs mandatory for all students or not.

False dichotomy oversimplifies complex objectives of behavioral science education. Moreover, it makes a false dichotomy to say "it is the animal laboratory or nothing." It is an oversimplification of the complex objectives of behavioral science education to allow only one course of action where multiple other possibilities exist. For instance, virtual reality simulations can be used to train students in experimental procedures (such as administering injections) and surgical procedures. Interactive video disk-based computer programs can be used to teach students about shaping, response acquisition, schedules of reinforcement and other phenomena in operant conditioning. Pre-recorded videotapes of individual experiments in which one or more groups of animals have received some treatment (e.g., drug or lesion) can be repeatedly viewed by students who record behavioral responses on data sheets provided. Students themselves can be used as experimental subjects for simple physiological-biological observations, behavioral tasks such as perceptual discrimination and preference testing, observational and respondent conditioning studies. All these "alternatives" to live animal labs are educationally effective as well as economical since they offer reusable tools that become cost-effective in the long run, resulting in cost savings. They allow students more opportunity to pace their own learning, as well as the opportunity for repeated use. They not only preserve the integrity of scientific psychology education, but enhance it.

The Right Information Will Produce the Correct Attitude

Sixth, teachers are reluctant to offer alternatives because they may believe that reducing student opposition to animal labs is simply a matter of instruction and discussion of the ethic and value of animal research. "Opposition to animal experimentation may be reduced not only by informing students of research rationale, but also by specifying the nature of procedures more clearly, and by providing information about regulations governing the use of animals for experimental purposes" (Furnham & Heyes, 1993, p. 10). Research on animals is viewed as having played a central role in psychology throughout most of the 20th century and such contributions need to be made more explicit to psychology majors and to all students enrolled in introductory psychology courses (Domjan & Purdy, 1995). If students have the same information as the teacher, then they will develop the same values – (i.e., the "right" information will produce the "correct" attitudes or beliefs).

Same information does not always produce same values. The assumption that knowledge of specific facts lead to the appreciation of specific values is questionable, however, as indicated by student reactions to faculty attempts to coerce students to dissect animals in biology education (Rowan & Weer, 1993). If students who think animal labs are unjustified and wrong are required to participate despite their objections, then their experience is likely to reinforce their initial negative attitudes. There is no reason to expect the case to be different in psychology education.

The Case for Student Choice

Choice is Consistent with APA "Quality Principles"

There are several additional reasons why adoption of an openly declared student choice policy is a reasonable thing to do from an academic advising point of view. First, the concept of student choice is consistent with APA's Quality Principles (McGovern & Reich, 1996) that address the issue of effective student advising.

Choice fosters effective student advising. The Quality Principle that addresses the issue of student advising offers several recommendations that can guide faculty and administrators in their ongoing efforts to understand their professional obligation to inquire about students' objections to animal labs during the advising process.

> Quality undergraduate programs should. . .foster effective student advising that goes beyond providing information about institutional procedures and policies by motivating students (a) to explore and develop their values, interests, abilities, and career and life goals; (b) to become increasingly independent in their decision making; and (c) to play an active role in shaping policies and procedures. (McGovern & Reich, 1996, p. 254)

The aim of the Quality Principles is to guide faculty and administrators in their ongoing efforts to renew their undergraduate psychology programs by encouraging student growth and development through "effective student advising" (McGovern & Reich, 1996, p. 254). Student-advisor discussions are characterized by

> respect for students' talents and interests, and shared responsibility that leads to an informed choice using decision-making skills. Moreover, respect for students' values and interests that might differ from those of their advisors' can contribute to a trusting, supportive relationship. Such a trusting relationship promotes an ongoing process of helping students to assess and develop their academic, career, and personal skills. (McGovern, 1993; pp. 49-50)

If, according to the Quality Principles, effective student advising ought to motivate students "to become increasingly independent in their decision making" (p. 254), then why are we surprised and even resentful that they question the use of animals in psychology labs? If effective student advising motivates students "to explore and develop their values" (p. 254), then why do many teachers of psychology find it difficult to allow students to challenge as a matter of conscience the prevailing ethical standards governing the care and use of animals in psychology? If effective student advising motivates students "to play an active role in shaping policies and procedures" (p. 254), then why are most students denied educationally sound non-animal alternative learning activities when they rationally decide to object to the traditional animal lab? Is it any wonder that students are asking difficult ethical questions relating to animal use in our classrooms given the fact that we live in a pluralistic society that allows for the expression of a wide variety of moral platforms for choice and action?

Choice is Consistent with APA Learner-Centered Principles

Second, the concept of student choice is consistent with APA's 1995 Learner-Centered Psychological Principles: A Framework for School Redesign and Reform, (Woolfolk, 1998, pp.511-514). These principles advocate student-centered learning and motivation practices that are consistent with accommodating students who object to animal labs.

- Principle 2: Goals of the learning process. To construct useful knowledge and acquire learning strategies for life-long learning, students need to pursue personally relevant goals
- Principle 6: Content of learning. Instruction must fit the students' level or prior knowledge, cognitive abilities, and ways of thinking; the nurturing qualities of the classroom environment are particularly influential in student learning
- Principle 7: Motivational and emotional influences on learning. Intense negative cognitions and emotions (i.e., feeling insecure, worrying about failure, being self-conscious or shy, and fearing punishment, ridicule, or stigmatizing labels) thwart complex learning. This means that unwilling students will not be in the right frame of mind to learn effectively from the lab experience if an alternative is not provided.
- Principle 8: Intrinsic motivation to learn. Students need opportunities to make choices about learning in line with their personal interests. This means that an openly declared student choice policy not only allows students an opportunity to learn in a way that they prefer but also provides an opportunity for practical experience in ethical decision-making.
- Principle 8: Intrinsic motivation to learn. Students need opportunities to make choices about learning in line with their personal interests.
- Principle 9: Effects of motivation on effort. Unless students are motivated to learn, they are unlikely to expend the needed effort without being coerced
- Principle 10: Developmental constraints and opportunities. Students learn best when materials are developmentally appropriate.
- Principle 11: Social influences on learning. Learning situations that allow for and respect diversity encourage flexible thinking, social competence, and moral development.
- Principle 13: Learning and diversity. When learners see that their individual differences in abilities, background, and cultures are valued and respected, then motivation is enhanced

and learning supported. This means that the non-animal alternative, while not ideal from a teacher's point of view, nevertheless, may be a more effective option for some students than coercing them to perform a procedure that they find ethically objectionable.

Choice is Consistent with APA Animal Care Guidelines

Third, the concept of student choice is consistent with APA's (1996) Guidelines for Ethical Conduct in the Care and Use of Animals. These Guidelines while affirming that "laboratory exercises as well as classroom demonstrations involving live animals can be valuable as instructional aids" also recognize that "some procedures that can be justified for research purposes may not be justified for educational purposes" and the "consideration should always be given to the possibility of using non-animal alternatives" (p. 10). Guidelines also recommend that "animals may be used for educational purposes only after review by a committee appropriate to the institution" (p.10).

Choice Has Precedence in Psychology Education

Fourth, there are precedents for student choice. We have seen that scientific studies indicate that there is majority support by psychologists and psychology majors for the use of animals in teaching and learning, provided such course work is offered on an optional basis (Plous, 1996a, 1996b). Different surveys indicate that approximately 32%-53% of undergraduate psychology departments do not use animals in the classroom for instructional purposes (Benedict & Stoloff, 1991; Gallup and Eddy, 1990; Hull, 1996). Of the remaining 47%-68% that continue to utilize animal facilities in undergraduate courses, approximately 37%-40% have an informal student choice policy to accommodate students who object to animal labs. One reason for continued student-teacher conflict regarding animal labs may be that approximately 60% of psychology departments that continue to use animals in the teaching of college courses do not have any policy at all to accommodate students who object.

For example, according to a 1990 national survey of 300 psychology departments conducted by Bowd & Shapiro (1993) of 63 respondents (21% response rate), 57% reported not using animals in the classroom whereas 43% did. Of those that did use animals in the teaching of courses, "only 40% had a policy to accommodate students who objected" (p. 138). Departments that reported having a formal student choice policy included Ithaca College, Montclair State College, St. Louis University, University of Evansville, and the University of W. Florida. Benedict and Stoloff (1991) reported in their survey of 137 psychology departments (without doctoral programs), that of 109 respondents (80% response rate), two-thirds or 68% maintained animal facilities for teaching purposes whereas one-third did not. No information is presented about the availability of alternatives to students who object to the animal labs. Hull (1996) reported in her survey of 342 undergraduate psychology departments (without doctoral or master's degree programs), that of 110 respondents (32% response rate), 47% reported that animals were used in some part of the psychology curriculum whereas 53% did not use animals for psychology education at all. Of those departments that did use animals, approximately 37% (n=19) provided alternatives to students who objected (e.g., computer simulations, films, videotapes, tissue slides, use of human participants, and so forth).

Choice is Available in Other Academic Disciplines

Fifth, other academic disciplines support choice. Sarah Lawrence College and the University of New Mexico both have formal student choice policies regarding dissection in undergraduate biology courses. All 125 U.S. civilian medical schools make available alternatives in which no healthy animals are harmed or killed in physiology, pharmacology, and other courses for students who choose not to participate in live animal laboratories (Physicians Committee for Responsible Medicine (PCRM, 1995). Although most medical students and professors may consider live-animal labs useful, 36% (45 out of 125) do not use live animal laboratories in their medical curriculum at all, including Columbia, Harvard, Michigan State, and Yale University (Foundation for Biomedical Research (FBR), 1995; PCRM, 1996). The availability of alternatives in medical school is supported by the American Medical Student Association (AMSA, 1993). Alternative programs in which no healthy animals are harmed or killed in classroom laboratories are available in veterinary medical education, including programs at Auburn, Colorado State, Michigan State,

Mississippi State, and Tufts University (Association of Veterinarians for Animal Rights (AVAR), 1989-1996, pp. 17-29). "The school of veterinary medicine at the University of Utrecht in the Netherlands does not harm or kill any non-human animals in its surgical or other training programs. . . .[and] is fully accredited by the American Veterinary Medical Association" (AVAR, 1989-1996, pp. 14-15). British medical and veterinary surgeons have acquired their skills without live animal labs since 1876 and annually compete successfully for residency and faculty positions in the U.S. (Home Office, 1985). If the laboratory use of live animals is not critical to undergraduate biology or graduate medical and veterinary education, then how essential can it be to undergraduate psychology education where the majority of majors do not pursue professional careers in either animal science or physiological psychology?

Society and Law Supports Choice

Sixth, there is increasing societal support for student choice at all levels of education – elementary and secondary, undergraduate and graduate (Francione & Charlton, 1992; Hepner, 1994). California, Florida, Louisiana, Maine, Massachusetts, New Jersey, New York, Pennsylvania, and Rhode Island currently have laws or advisories that acknowledge a student's right not to dissect animals in high school biology. Illinois has considered legislation (H.B. 811) that would extend this right to choose alternatives to dissection to undergraduate students at Illinois public or private colleges and universities. The American Bar Association recommends against dissection or vivisection requirements for students with moral or religious convictions. "Students who object to animals used in psychology classrooms are on sound legal ground whether or not such a policy exists or not; it is, in fact, a constitutional issue" (Psychologists for the Ethical Treatment of Animals (PSYETA, 1997).

How To Establish a Student Choice Policy on your Campus

What Is a Student Choice Policy?

A basic Student Choice policy has at least three provisions. First, the course requirement of an animal laboratory and the availability of alternatives would be stated in course description materials (e.g., course syllabus) and announced to students at least 10 days before the day of the scheduled animal laboratory. Second, any student requesting an alternative learning exercise would not be reprimanded, penalized, or otherwise discriminated against for his/her decision not to participate. Third, the student would be allowed an appropriate alternative activity of comparable time and effort investment and educational value as a replacement for the actual animal laboratory (Psychologists for the Ethical Treatment of Animals (PSYETA), 1997).

Helpful Guidelines for Negotiating Student-Teacher Conflicts

How is the academic advisor to help resolve student-teacher conflicts regarding animal use in psychology education? The best way to prevent the classroom from becoming a battleground over mandatory psychology laboratories is to identify and discuss student objections early during the academic advising process. The best solution is to find some common ground so that the concerns of all parties are to some degree addressed. The "middle way" of student choice provides a better solution between the one extreme of abolishing all animal labs completely in those psychology courses that have traditionally had them and the other extreme of mandatory animal lab requirements for all students regardless of student objections. The middle way grants access to alternatives to students who conscientiously object while allowing those who do not object access to a live animal lab. The middle way allows the teacher of psychology the academic freedom to continue teaching the course as he or she sees fit while also allowing the psychology student the academic freedom to learn course material in a way that does not conflict with his or her moral or ethical beliefs. The middle way acknowledges the validity and significance of both teacher and student positions while honoring their respective experience and values. The middle way negotiates agreement without getting angry. Separating the people from the problem, focusing on interests and not positions, inventing options for mutual gain, and insisting on using objective criteria offers one of the most promising approaches for students and teachers to deal with their differences in this matter of student choice in the psychology classroom (Fisher & Ury, 1991).

The method of "Principled Negotiation". What can the advisor do to help in a situation where a student finds it objectionable to participate in psychology animal labs at a college or university in which there is no student choice? The student would be advised to approach the teacher responsible for the particular course and attempt to resolve the matter informally. Many teachers allow students use of an alternative, but do not inform students about the choice unless they request it (Balcomb, 1997). The advisor can persuade students to use the method of "principled negotiation" outlined by Fisher & Ury (1981/1991) to approach agreement with the teacher during their discussion. When the student and teacher are communicating back and forth, for example, encourage the student to explain the reasons why he or she finds the lab to be objectionable, clearly describing his or her needs and desires, concerns and interests. Urge the student to be open to different options that provide for mutual gain based upon shared interests (i.e, learning). Advise the student to make offers and requests, not threats or warnings. Direct the student to bring objective standards of fairness, morality, precedence, the educational value and scientific merit of alternatives, and expert opinion into the discussion. Conscientious objectors might describe how they feel about seeing animals used in the classroom or discuss their sincerely held religious and moral belief about the sanctity of all life. They would then ask to be excused, without penalty, from the lab and request that some other, substitute learning activity be provided for the animal lab.

Advisor as facilitator/mediator. In situations where students want to remain anonymous, the advisor may wish to take a more active role of advocate on behalf of students by initiating discussion with the teacher without involving the students. The advisor can recommend high quality, educationally comparable, and commercially available alternative learning tools, such as those identified in Appendix B. These non-animal alternatives are intentionally designed to help conscientious objectors obtain the same general knowledge as other students in the course and meet one or more of the learning objectives in psychology education traditionally claimed for animal laboratories but without harming animals. Given sufficient forethought, the advisor, student and teacher should be able to agree on an acceptable alternative to the animal lab.

"Principled Negotiation": How it works in practice. Fisher and Ury (1981/1991) provide such useful advice (based on the Harvard Negotiation Project) for administrators, academic advisors, students, and faculty in resolving student-teacher conflict regarding student choice that it is worthwhile to elaborate its four basic components described below.

(1) *"Separate the people from the problem"* (Chapter 2). This means that student and teacher should view each other as partners working together to find a solution to a mutual problem that will result in a fair agreement advantageous to each, and not as opponents who attack each other. Students and teachers are people with egos, emotions, values, different viewpoints and backgrounds that need to be respected. Both parties have a two-fold need to satisfy their interests and to keep a good working relationship going in the classroom. Maintain clear communication, accurate perceptions, and appropriate emotions during discussions by having the student and teacher view the situation from each other perspective, not expect the worst from each other, not blame each other for the problem, and do openly discuss each other's perception of the situation. Find something to agree on and work together so that both student and teacher feel ownership of the proposed solution and neither feels as if they have backed down from their values or interests. Acknowledge any spontaneous emotion that may arise during discussion as legitimate, allow it open but controlled expression, and be sure student and teacher end their discussion on a friendly basis. Encourage student and teacher to listen to each other with respect and show each other courtesy. The student should know ahead of time what it is one wants to communicate and keep that forward-looking, purpose constantly in mind. "The basic approach is to deal with the people as human beings and with the problem on its merits" (Fisher & Ury, 1981/1991, p. 39).

(2) *"Focus on interests, not positions*" (Chapter 3). This means that student and teacher work together to identify their underlying needs and desires (e.g., learning). The goal is to reconcile the student's and teacher's needs (security, belonging, self-esteem, recognition, control, power, value fulfillment, and so forth), desires, concerns, and fears, by identifying those that differ but are shared and compatible as well as those that conflict. Be specific. Why does the student object to the animal lab and want an alternative? What alternatives does the student propose? Why does the teacher refuse to grant

an alternative? Why not? What stands in the way of an agreement? What will each person lose or gain? What are the short-term and long-term consequences of agreeing or refusing to agree to student choice? If student and teacher were "in each other's shoe's," what results would they fear most? What would each hope for? Sort out the various interests and consequences by writing them down. Advise students and teachers to acknowledge the validity and significance of each person's interests. Each should be open to the other's point of view but firm in discussing options that take one's principles into account.

(3) "*Generate a variety of possibilities before deciding what to do*" (Chapter 4). This means that students and teacher identify their common ground and common interests and brainstorm together think up as many possible solutions to achieve those shared interests as possible. For each need, desire, concern, and fear there usually exist several possible ways to satisfy or meet them. Discover what those ways are by avoiding premature judgments, propose a large number of possible alternatives, and appeal to each other's self-interest. Are there common principles, like moral values or educational merit or fairness, that teacher and student can both respect? Stress these shared principles. Avoid one-sided solutions. Urge student and teacher to consider brainstorming together. Afterwards evaluate each option from the other's point of view.

(4) "*Insist that the result be based on some objective standard*" (p.11, Chapter 5). This means that student and teacher discuss objective standards and criteria (e.g., scientific merit and educational value of alternatives, moral standards, reasonableness, precedents, fairness, efficiency, social support, what a court would decide, economic feasibility, reciprocity, and so forth) that can be appealed to and that both agree are legitimate and practical in coming upon a fair solution. A solution is more likely to be accepted if it is perceived as being fair, legal, and honorable. Agreement is easier to reach if there are precedents for proposed solutions. Focus on principle, the objective merits of the problem, and remain open to reason but closed to threats. "Reason and be open to reason" (p. 89). What would be a fair agreement? The advisor can play a role of mediator to help teacher and student reach a fair decision about what standards to use in settling the dispute. If a person refuses to negotiate, invite them to state their reason, suggest objective standards that can be applied, and insist that they respond in a principled way. If this fails, then other means of settling the matter will need to be considered.

What to do if negotiation fails. Grievances are best resolved by the individuals directly involved; however, instances arise when no resolution can be reached with the student and teacher. In such cases, the advisor may wish to take further action. The advisor may choose to address his or her concerns to the head of the psychology department. If the chairperson cannot resolve the matter to the satisfaction of both student and teacher, then the issue may be brought before the Institutional Animal Care and Use Committee (IACUC) that formally reviews courses and research projects in which animals are used. If the IACUC cannot reasonably resolve the conflict, then the student may be advised to file a formal grievance, with all relevant data, to the Dean of the college. If the student remains unsatisfied, an appeal may be made to the Provost or Vice President for Academic Affairs.

Students may want to involve other students and psychologists who oppose an animal laboratory requirement. Members of the campus student animal rights group (if the college has one) can be asked for assistance. Students can raise the issue in the school media (e.g., student newspaper and radio station) in an effort to encourage campus-wide awareness and discussion of the issue. Organizations on campus that are designed to promote common interests within the framework of the mission of the school (e.g., student government association, faculty senate) can be contacted to help review possible policy changes regarding a student's right to object to the use of animals in psychology classrooms. If the school resists students' efforts, students may want to obtain legal advice or assistance to defend his/her right to object to animal labs (e.g., Psychologists for the Ethical Treatment of Animals at 301-963-4751 or the Animal Legal Defense Fund at 1-800-922-3764). In all these proceedings, effort should be made to conduct oneself with justice, integrity, and consideration for those with whom one interacts.

How Would a Choice Policy Work in Practice?

The best scenario occurs when a teacher, department, or college adopts an openly declared student choice policy. A choice policy facilitates the prevention and resolution of conflicts. How would the choice

policy work? The teacher distributes a handout describing the choice policy to all students at the start of the course or at least a couple of weeks before the animal lab. The teacher lets students know that he/she recognizes that some students may object to animal labs and that the choice policy is introduced to deal with students' conflict of values. The teacher tells students that those who opt out of the animal lab will not be penalized in selecting an alternative and will be working just as hard as those who do not. The teacher lets students know his or her views about the comparative values of the animal lab and of the alternative. It is important for the teacher to be fair in his or her assessment. If there are lab sessions that involve virtually no pain/distress or harm to animals (i.e., "category 0" field studies on the Shapiro & Field (1988) Scale of Invasiveness), the teacher can inform students that there will be no choice option for those specific sessions. The goal of these instructions is to encourage students to think clearly about the value and ethics of animal studies and to make a reasonable decision.

The teacher who is interested in conducting research to assess educational outcomes will want to keep records. The teacher can (a) monitor how many students elect the choice option and who they are, (b) assess how well students who elect the choice option perform on tests and examinations compared to those who do the animal lab, and (c) ask all students about their experience in the course.

Downie and Meadow's (1995) study. An excellent illustration of what is likely to occur upon implementation of a choice policy can be found in the experience of J. R. Downie, senior lecturer in zoology, and J. I. Meadows, biology coordinator at the University of Glasgow, who describe their experience with an animal dissection choice policy in a college-level biology course (Downie & Meadows, 1995). Downie & Meadows (1995) found that on the average about 10% of students selected the choice option over a five year period in which the study was conducted. Three times as many females as males chose the option. Over 10 examinations recorded, there was no significant difference in average test scores between the students who elected the choice option and those who did not, over the 10 in-class examinations recorded for the five year period. Choice students found that using the alternative (i.e, a model rat, charts, and diagrams) was quite effective, especially when they could do the work under the supervision of the instructor instead of on their own. Some students who elected the choice option actually went to some of the opted-out lab sessions and watched other students carry out the assignment. All students, both those who selected to opt-out of the animal lab and those who did not, very strongly approved of have a student choice policy available. .Downie & Meadows (1985) consider the student choice option a reasonable course of action given the multiple and complex educational objectives that teachers and students seek to achieve in psychology courses. The best part of their experience with their dissection student choice policy was the chance to offer their students the opportunity for a practical experience in ethical decision-making. There is no reason to expect the case to be different in psychology animal laboratories.

Psychology teachers who offer a choice policy will find that classroom discussion of choice is an educational experience in itself which gives both teachers and students the opportunity for practical experience in ethical decision-making. Instead of simply discussing the value and ethics of animal studies in the abstract, a choice policy in the classroom provides for the making of a real decision with an ethical component that makes for a more effective learning experience for both students and teachers. Teachers may expect that students will discuss among themselves and with the teacher the ethics and value of animal studies both in and out of the classroom setting. An openly declared student choice policy in the psychology classroom not only allows students an opportunity to learn in a way that they prefer, but also provides an opportunity for practical experience in ethical decision-making.

Conclusion

Basic preparation for an academic advisor to deal with a student having a conflict with the teacher over an animal lab consists of gathering knowledge of the issue, understanding that a choice policy is the best compromise (a middle ground), and using a method of reaching student-teacher agreement that focuses on basic interests, mutually satisfying options, and fair standards.

There is much to recommend the adoption of an openly declared student choice policy. It offers psychology students the opportunity to explore and develop their values, become more independent

decision-makers, and play a more active role in shaping department policies and procedures (Quality Principles). It offers advisors the basis to assist students with conscientious objections to animal laboratories. It offers teachers of psychology the opportunity to act as mentors for their students, modeling values, practices, and attitudes that reflect a sensitivity to both animal and student welfare. As a result, animal welfare will be improved, student ethical and humane sensitivities will remain intact, not deadened, and the public image of psychology will remain positive.

July 15, 1999

References

Abramson, C. I. (1990). Invertebrate learning: A laboratory manual and source book. Washington, DC: American Psychological Association.

Abramson, C. I. (1994). A primer of invertebrate learning: The behavioral perspective. Washington, DC: American Psychological Association.

Acker, L. E., Goldwater, B. C., & Agnew, J. L. (1990, April). Sidney Slug: A computer simulation for teaching shaping without an animal laboratory. Teaching of Psychology, 17 (2), 130-132.

Ad Hoc Committee on Animal Research. (1988). Interdisciplinary principles and guidelines for the use of animals in research, testing, and education. New York: New York Academy of Sciences.

Allen, T. (1994/1995, Winter). The NIH/NCRR/ARTI survey of animal use: What it can do for you. Animal Welfare Information Center Newsletter, 5 (4), 14-15.

Alumets, J., Hankanson, R., Sundler, F., & Thorell, T. (1979). Neuronal localization of immunoreactive enkephalin and beta-endorphin in the earthworm. Nature, 279, 805-806.

America's best colleges. (1989). U.S. News and World Report, 197, 66-81.

American Association for the Advancement of Science. (1990, February). Resolution on the use of animals in research, testing, and education. Washington, DC: Author.

American Medical Student Association. (1993). Preamble, purposes and principles. Reston, VA: Author.

American Psychological Association. (1995). Behavioral research with animals. Washington, DC: Author.

American Psychological Association. (1996, April). Guidelines for ethical conduct in the care and use of animals. Washington, DC: Author.

American Veterinary Medical Association. (1987). Panel report on the colloquium on the recognition and alleviation of animal pain and distress. JAVMA, 191, 1186-1191.

Animal and Plant Inspection Service (APHIS). (1995, January). Enforcement of the Animal Welfare Act. Audit Report No. 33600-1-Ch. USDA: Office of Inspector General.

Animal Welfare Act. (1985). Public Law 99-158, United States Code 2131-2157. Washington, DC: Government Printing Office.

Anton, B. S. (1995, April). The Biolog project: Self-monitoring as a laboratory for physiological psychology. Teaching of Psychology, 22 (2), 130-131.

Arluke, A. (1994). “We build a better beagle”: Fantastic creatures in lab animal ads. Qualitative Sociology, 17(2), 143-158.

Ascione, F. R. (1992). Enhancing children's attitudes about the humane treatment of animals: Generalization to human-directed empathy. Anthrozoos, 5, 176-191.

Association of Veterinarians for Animal Rights. (1989-1996). Alternatives to the harmful use of nonhuman animals in veterinary medical education. P.O.Box 6269, Vacaville, CA 95696: Author.

Australian Council for the Care of Animals in Research and Teaching (ACCART). (1990). Australian code of practice for the care and use of animals for scientific purposes. GPO Box 84, Canberra ACT 2601: Australian Government Publishing Service.

Balcombe, J. (1997, January). Student/teacher conflict regarding animal dissection. The American Biology Teacher, 59 (1), 22-25.

Baldwin, E. (1993). The case for animal research in psychology. Journal of Social Issues, 49(1), 121-131.

Balls, M., & Balls, A. (1989). Anuran amphibians in the laboratory (or frog and toad have feelings too). Humane Innovations and Alternatives in Animal Experimentation, 3, 87-89.

Bannister, D. (1981). The fallacy of animal experimentation in psychology. In D. Sperlinger (Ed.), Animals in research (pp. 307-317). New York: John Wiley and Sons.

Barclay, R. J., Herbert, W. J., & Poole, T. B. (1988). The disturbance index: A behavioural method of assessing the severity of common laboratory procedures on rodents. Potter Bar, Herts, England: Universities Federation for Animal Welfare.

Barnard, N., & Baron, L. (1989). Alternatives to dissection. Humane Innovations and Alternatives in Animal Experimentation, 3, 92-93.

Barnard, N., Selby, R., Robinson, D. T., Schreckenberg, G. M., & Van Petten, C. (1990). NIH research protocol for Silver Spring Monkeys: A case of scientific misconduct. Perspectives on Medical Research, 2, 52-92.

Barnard, N. D., & Kaufman, S. R. (1997, February). Animal research is wasteful and misleading. Scientific American , 276 (2), 80-82.

Benedict, J., & Stoloff, M. (1991). Animal laboratory facilities at "America's best" undergraduate colleges. American Psychologist, 46, 535-536.

Birke, L., & Smith, J. (1995, Winter). Animals in experimental reports. Society and Animals, 1(1), 23-42.

Boom, D. M. (1986). Indicators of poor welfare. British Veterinary Journal, 142(6), 524-526.

Bowd, A. (1993). Dissection as an instructional technique in secondary science. Society & Animals, 1 (1), 83-89.

Bowd, A. D., & Shapiro, K. J. (1993). The case against laboratory animal research in psychology. Journal of Social Issues, 49 (1), 133-142.

Breazile, J. E. (1994, Spring). Recognition of pain in farm animals. Animal Welfare Information Center Newsletter, 5 (1), 5-7.

Bross, I. D. (1991). Fradulent statistical methods in animal research on mutagenic diseases. In N. Natelson & M. Cohen (Eds.), Proceedings of the first international medical conference: “Future medical research without the use of animals: Facing the challenge.” (pp. 81-90). Tel Aviv, Israel: Concern for Helping Animals.

Butts, R. (1997). The early sessions: Book 1 of the Seth Material. Manhasset, NY: New Awareness Network.

Callahan, S. (1995). The role of emotion in ethical decisionmaking. In J. H. Howell, & W. F. Sale (Eds.), Life choices (pp. 24-36). Washington, DC: Georgetown University Press.

Canadian Council on Animal Care. (1972). Guiding principles for animal experimentation at the pre-university level. Ottawa. Canada: Author.

Canadian Council on Animal Care. (1989). Categories of invasiveness in animal experiments. Ottawa, Canada: Author.

Cantu-Weber, J. (1999, May/June). Harassment and discrimination: News stories show litigation on the rise. Change: The Magazine of Higher Learning, 31 (3), 38-45.

Carbone, L.G. (1997). Death by decapitation: A case study of the scientific definition of animal welfare. Society & Animals, 5(3), 239-256.

Cohen, P. S. & Block, M. (1991). Replacement of laboratory animals in an introductory-level psychology laboratory. Humane Innovations and Alternatives, 5, 221-225.

Committee on Animal Research and Ethics (CARE). (1996, July). Guidelines for ethical conduct in the care and use of animals. Washington, DC: American Psychological Association.

Crawford, R. L. (1996. Summer). A review of the animal welfare enforcement report data 1973 through 1995. Animal Welfare Information Center Newsletter, 7(2), 1-11.

Cunningham, P. F., & Randour, M. L. (1998, September-October). Alternatives to the use of animals in education. Psychology Teacher Network, 8 (4), 8,11.

Davis, S. F. (1993). Animals in the classroom. Psychological Science Agenda , 6, 8.

Dawkins, M. S. (1980). Animal suffering: The science of animal welfare. New York: Chapman & Hall.

Dawkins, M. S. (1980b). The many faces of animal suffering. New Scientist, 20, 502-503.

Dennis, S. G., & Melzack, R. (1983). Perspectives on phylogenetic evolution of pain expression. In R. L. Kitchell, & H. Erickson, (Eds.), Animal pain: Perception and alleviation (pp. 151-160). Bethesda, MD: American Physiological Society.

Devine, L. (1990, Fall). The 'rat lab:' A critique and review of alternative methods. PsyETA Bulletin, 10 (l), 12-13.

Dewhurst, D. G., Hardcastle, J., Hardcastle, P. T., & Stuart, E. (1994). Comparison of a computer simulation program and a traditional laboratory practical class for teaching the principles of intestinal absorption. American Journal of Physiology, 267 (Advances in Physiology Education, 12 (1), S95-S104).

Dewsbury, D. A. (1990). Early interactions between animal psychologists and animal activists and the founding of the APA committee on precautions in animal experimentation. American Psychologist, 45, 315-327.

Domjan, M. & Purdy, J. E. (1995). Animal research in psychology: More than meets the eye of the general psychology student. American Psychologist, 50, 496-503.

Downie, R., & Meadows, J. (1995). Experience with a dissection opt-out scheme in university level biology. Journal of Biological Education, 29 (3), 187-194.

Ekman, P. & Davidson, R. J. (Eds.). (1994). The nature of emotion: Fundamental questions. New York: Oxford University Press.

Ernst, R., & Petrossian, P. (1996, March). Teachers of psychology in secondary schools (TOPSS): Aiming for excellence in high school psychology instruction. American Psychologist, 51 (3), 256-258.

Ethical Science Education Coalition. (1995). Model student "choice" dissection policy. 167 Milk St., #423, Boston, MA 02109-4315: Author.

Felthous, A. R., & Kellert, S. R. (1986). Violence against animals and people: Is aggression against living creatures generalized? Bulletin of the American Academy of Psychiatry and Law, 14 (1), 55-69.

Field, P. F. (1990, Spring). The most invasive animal experiments in psychology textbooks. PsvETA Bulletin, pp. 6-8.

Field, P. F., Shapiro, K. J., & Carr, J. (1990, Fall). Invasiveness of experiments conducted by leaders of psychology's animal research committee (CARE). PsyETA Bulletin, 10 (1), 1-10.

Fiorito, G. (1986). Is there pain in invertebrates? Behavioural Processes, 12, 383-388.

Foundation for Biomedical Research (FBR). (1995, September). Most medical students and professors consider live-animal labs useful. FBR Facts, 2 (5), 1.

Francione, G., & Chariton, A. (1992). Vivisection and dissection in the classroom: A guide to conscientious objection. 801 Old York Rd. #204, Jenkintown, PA: American Anti-Vivisection Society.

Fretz, B. R., & Stang, D. J. (1980). Preparing for graduate study in psychology: Not for seniors only! Washington, DC: American Psychological Association.

Furnham, A., & Heyes, C. (1993). Psychology students' beliefs about animals and animal experimentation. Personality and Individual Differences, 15 (1), 1-10.

Gallistel, C. R. (1981, April). Bell, Magendie, and the proposals to restrict the use of animals in behavioral research. American Psychologist, 36(4), 357-360.

Gallup, G. G., Jr., & Suarez, S. D. (1985, October). Alternatives to the use of animals in psychology experiments. American Psychologist, 40 (10), 1140-1151.

Gallup, G. G. Jr., & Beckstead, J. W. (1988, June). Attitudes toward animal research. American Psychologist, pp. 474-476.

Gallup, G. G., Jr., & Eddy, T. J. (1990, March). Animal facilities survey. American Psychologist, 400-401.

Getner, D., & Markham, A. B. (1997, January). Structure mapping in analogy and similarity. American Psychologist, 52 (1), 45-56.

Greenfield, C. L., Johnson, A. L., Schaeffer, D. F., & Hungerford, L. L. (1995). Comparison of surgical skills of students trained with models or live animals. Journal of the American Veterinary Medical Association, 206 (12), 1840-1845.

Griffin, D. R. (1992). Animal minds. Chicago. IL: University of Chicago.

Grof, S. (1985). Beyond the brain: Birth, death and transcendence in psychotherapy. New York: State University of New York.

Health Research Extension Act. (1985). Public Law 99-158, United States Code. Washington, DC: U.S. Government Printing Office.

Hahner, K. (1989). Learned helplessness: A critique of research and theory. Perspectives on animal research (Vol. 1, pp. 1-8). New York: Medical Research Modernization Committee.

Hart, B. L. (Ed.). (1976). Experimental psychobiology: A laboratory manual. San Francisco, CA: Freeman.

Heim, A. (1981). The desensitization of teachers and students. In D. Paterson (Ed.). Humane education – A symposium (pp. 37-46). Burgess Hill, England: Humane Education council.

Hepner, L. (1994). Animals in education: The facts, issues and implications. P.O.Box 91683, Albuquerque, NM 87199-1683: Richmond Publishers.

Home Office. (1985). Scientific procedures on living animals. Supplementary White Paper. London, England: Her Majesty's Stationary Office.

Home Office. (1986). Animals (scientific procedures) Act. London, England: Her Majesty's Stationary Office.

Hull, D. B. (1996). Animal use in undergraduate psychology programs. Teaching of Psychology, 23 (3), 171-174.

Hutton, J. S. (1983). Animal abuse as a diagnostic approach in social work. In A. H. Katcher, & A. M. Beck (Eds.), New perspectives on our lives with companion animals (pp. 444-447). Philadelphia, PA: University of Pennsylvania Press.

Jacobs, K. W. (1980, October). A self-paced laboratory section in physiological psychology. Teaching of Psychology, 7 (3), 175-176.

Jones, N. A., Olafson, R. P., & Sutin, J. (1978). Evaluation of a gross anatomy program without dissection. Journal of Medical Education, 53, 198-205.

Joswick, K. E. (1994, February). Getting the most from PsychLIT: Recommendations for searching. Teaching of Psychology, 21 (1), 49-53.

Joy, C.R.(Ed. and Trans.), (1950). The animal world of Albert Schweitzer. Hopewell, NJ: Ecco.

Kaufman, S. R., Reines, B. P., Casele. H., Lawson, L., & Lurie, J. (Eds.). (1998). An evaluation of ten randomly-chosen animal models of human disease. In Perspectives on Animal Research (Vol. 1, Supplement [Entire issue]. New York: Medical Research Modernization Committee.

Kaufman, S. R. (1993). Scientific problems with animal models. Perspectives on Medical Research, Vol. 4 (pp. 52-60). New York: Medical Research Modernization Committee.

Kavaliers, M., Hirst, M., & Teskey, G. C. (1983). A functional role for an opiate system in snail thermal behavior. Science, 220, 99-101.

Keith-Spiegel, P. C., Tabachnick, B. G., & Allen, M. (1993). Ethics and academia: Students' views of professors' actions. Ethics & Behavior, 3 (2), 149-162.

Kelly, D. (Ed.). (1986). Stress-induced analgesia (Annals of the New York Academy of Sciences, Vol. 467). New York: New York Academy of Sciences.

Kelly, J. A. (1985). Alternatives to aversive procedures with animals in the psychological teaching setting. In M. W. Fox, & L. D. Mickley (Eds.), Advances in animal welfare science 1985/86 (pp. 165-184). Washington DC: The Humane Society of the United States.

Kelly, J. A. (1986). Psychological research and the rights of animals: Disagreement with Miller. American Psychologist, 41, 839-841.

Krathwohl, D. R., Bloom, B. S., & Masia, B. B. (1964/1974). Taxonomy of educational objectives: The classification of educational goals. Handbook II: Affective domain. New York: David McKay.

Kuchel, T. R., Rose, M., & Burrell, J. (Eds.). (1992). Animal pain: Ethical and scientific perspectives. P.O. Box 19, Glen Osmond, SA. 5064: Australian Council on the Care of Animals in Research and Teaching. (Proceedings of a conference held at Barossa Valley, Adelaide, April, 1990)

Kuker-Reines, B. (1982). Psychology experiments on animals: A critique of animal models of human psychopathology. Boston, MA: New England Anti-Vivisection Society.

LaFollette, H., & Shanks, N. (1992). Animal models in biomedical research: Some epistemological worries. Public Affairs Quarterly, 7, 113-130.

LaFollette, H., &Shanks, N. (1993). The intact systems argument: Problems with the standard defense of animal experimentation. Southern Journal of Philosophy, 31, 323-333.

LaFollette, H., & Shanks, N. (1996). Brute science: Dilemmas of animal experimentation. New York: Routledge.

Larson, S. (Ed.). (1998, February). Beyond dissection: Innovative teaching tools for biology education. Boston, MA: Ethical Science Education Coalition.

Liebeskind, J. C., & Paul. L. A. (1977). Psychological and physiological mechanisms of pain. Annual Review of Psychology, 28, 41-60.

Lifton, R.J. (1986). The nazi doctors: Medical killing and the psychology of genocide. New York: Basic Books.

Lockwood, J. A. (1987). The moral standing of insects and the ethics of extinction. Florida Entonologist, 70 (1), 70-89.

Lockwood, R., & Hodge, 0. R. (1987). References on animal abuse and its connection with other forms of anti-social behavior. Violence, Aggression, and Terrorism, 1 (3), 305-307.

Lunneborg, P. W., & Baker, E. C. (1986). Advising undergraduates in psychology: Exploring the neglected dimension. Teaching of Psychology, 13, 181-185.

Maddison, D. C. (1978). What's wrong with medical education? Journal of Medical Education, 12, 97-102.

Manser, C. E. (1992). The assessment of stress in laboratory animals. Causeway, Horsham. West Sussex RH12 1HG, England: Royal Society for the Protection from Cruelty to Animals.

McGovern, T. V. (Ed.). (1993). Handbook for enhancing undergraduate education in psychology. Washington, DC: American Psychological Association.

McGovern, T. V., & Reich, J. N. (1996). A comment on the *Quality Principles*. American Psychologist, 51 (3), 252-255.

McKinney, W. T., & Bunney, W. E. (1969). Animal model of depression. I. Review of evidence: Implications for research. Archives of General Psychiatry, 21, 240-248.

Miller, N. E. (1985). The value of behavioral research on animals. American Psychologist, 40 (4), 423-440.

Miller, N. E. (1986). The morality and humaneness of animal research on stress and pain. In D. D. Kelly (Ed.), Stress-induced analgesia (pp. 402-404). New York: The New York Academy of Sciences. (Annals of the New York Academic of Sciences, Vol. 467)

Morton, D. B. (1990). Adverse effects in animals and their relevance to refining scientific procedures. ATLA, 1-8, 29-39.

Morton, D. B., & Griffiths, P. H. (1985). Guidelines on the recognition of pain, distress and discomfort in experimental animals and an hypothesis for assessment. Veterinary Record, 116, 431-436.

Moses, S. (1991, July). Animal research issues affect students. APA Monitor, pp. 47-48.

Mroczek, N. S. (1991). Recognizing animal suffering and pain. Humane Innovations and Alternatives, 5, 289-293.

National Health and Medical Research Council. (1991). Categories of experiments designated by NHMRC. Animal Experimentation Ethics Committee Newsletter, p. 13. (Medical Research Committee, CPO Box 9848, Canberra ACT 2601, Australia)

National Research Council. (1996). Guide for the care and use of laboratory animals. Washington, DC: National Academy Press.

Newberg, A. B., Newberg, S. K., & d'Aquili, E. G. (1997, February). The philosophy and psychology of consciousness. American Psychologist, 52 (2). 177178.

Nielsen, M., Braestrup, C., & Squires, R. F. (1978). Evidence for a late evolutionary appearance of brain-specific benzodiazepine receptors: An investigation of 18 vertebrate and 5 invertebrate species. Brain Research, 141, 342-346.

Obrink, K. J. (1982). Swedish law on laboratory animals. In W. J. Dodds, & F. B. Orlans (Eds.), Scientific perspectives on animal welfare (pp. 55-58). New York: Academic Press.

Office of Teaching Resources in Psychology (OTRP). (1997). Project Syllabus: Undergraduate Syllabi – Learning. (Available from OTRP, Department of Psychology, Georgia Southern University, P. O. Box 8041, Statesboro, GA 8041)

Olfert, E. D. (1995, Spring). Defining an acceptable endpoint in invasive experiments. Animal Welfare Information Center Newsletter, 6 (1), 3-7.

Orlans, F. B. (1974, October). Biology students as experimental subjects. The American Biology Teacher, 401-406.

Orlans, F. B. (1980). Animal welfare. Bioscience, 39 (3),144-145.

Orlans, F. B. (1987). Research protocol review for animal welfare. Investigative Radiology, 22, 253-258.

Orlans, F. B. (Ed.). (1988). Field research guidelines: Impact on animal care and use committees. Bethesda, MD: Scientists Center for Animal Welfare.

Orlans, F. B. (1988, January). Should students harm or destroy animal life? The American Biology Teacher, 50 (l), 6-12.

Orlans, F. B. (1993). In the name of science: Issues in responsible animal experimentation. New York: Oxford University Press.

Overmier, J. B., & Burke, P. D. (Eds.). (1992). Animal models of human pathology: A bibliography of a quarter century of behavioral research (1967-1292). Washington, DC: American Psychological Association. (Bibliographies in Psychology No. 12)

People for the Ethical Treatment of Animals (PETA). (1985). Unnecessary fuss: A PETA video [Film]. (Available from PETA, P.O. Box 42516, Washington, DC. 20015)

Phillips, M. T. (1993). Savages, drunks, and lab animals: The researcher's perception of pain. Society & Animals, 1 (1), 61-81.

Physicians Committee for Responsible Medicine (PCRM). (1995). Alternatives in medical education: Non-animal methods. Washington, DC: Author.

Physicians Committee for Responsible Medicine (PCRM). (1996, winter). Victory over animal labs at Harvard and Columbia. Good Medicine, 5 (1), 6, 23.

Pinel, J. P. (1993). Biopsychology (2nd ed.). Needham Heights, MA: Allyn & Bacon,

Plous, S. (1996a). Attitudes towards the use of animals in psychological research and education: Results from a national survey of psychologists. American Psychologist, 51 (11), 1167-1180.

Plous, S. (1996b). Attitudes toward the use of animals in psychological research and education: Results from a national survey of psychology majors. Psychological Science, 7 (6), 352-358.

Plous, S. (1997, November). Animal research in psychology. American Psychologist, 1250-1252.

Porsolt, R. D., le Pichon, M., & Jalfre, M. (1977). Depression: A new animal model sensitive to antidepressant treatments. Nature, 266 (5604), 730-732.

Pratt, D. (1980). Alternatives to pain in experiments on animals. New York: Argus Archives.

Psychologists for the Ethical Treatment of Animals [PSYETA]. (1994). The culture of violence: The animal connection (Slides with cassette recording)]. Washington Grove. MD: Author. (P.O. Box 1297, Washington Grove, MD 20880-1297)

Psychologists for the Ethical Treatment of Animals [PSYETA). (1997). The student rights option [Brochure]. Washington Grove, MD 20880: Author.

Puente, A. E., Matthews, J. R., Williams, J. M., & Matthews, L. H. (1991, February). Integrating clinical neuropsychology into the undergraduate curriculum. Teaching of Psychology, 18 (1), 17-21.

Reese, E. P. (1987). A form for college students that monitors as well as educates toward ethical sensitivity. Humane Innovations and Alternatives in Animal Experimentation, 1, 13-20.

Roberts, J. (1997). The way toward health. San Rafael, CA: Amber-Allen.

Robinson, D. N. (1990, December). Comment on animal research labs. American Psychologist, p. 1269.

Rogers, C. R. (1992). The necessary and sufficient conditions of therapeutic personality change. Journal of Consulting and Clinical Psychology, 60 (6), 827-832. (Original work published in 1957)

Rollin, B. E. (1985, August). The moral status of research animals in psychology. American Psychologist, 40 (8), 920-926.

Rose, M., & Adams, D. (1989). Evidence for pain and suffering in other animals. In G. Langley (Ed.). Animal experimentation: The consensus changes (pp. 42-71). New York: Chapman and Hall.

Rosenzweig, M. R., Leiman, A. L., & Breedlove, S. M. (1996). Biological psychology. Sunderland, MA: Sinauer Associates.

Rowan, A. N. (1984). Of mice, models, and men: A critical evaluation of animals research. Albany, NY: State University of New York. (Chap. 6. Pain and suffering in laboratory animals)

Rowan, A. N. (1994, June). Standing up for mice and rats under the Animal Welfare Act. The Animal Policy Report, 8 (2), 1-4.

Rowan, A. N,. & Weer, J. C. (Eds.). (1993). Biology education and animals: Opportunities and issues (Summary Proceedings). North Grafton. MA: Tufts Center for Animals and Public Policy.

Royal Society for the Prevention of Cruelty to Animals. (1980). Report of the panel of inquiry into shooting and angling. Horsham, England: Author.

Russell, W. M. S., & Burch, R. L. (1959/1992). The principles of humane experimental techniques. Herts, England: Universities Federation for Animal Welfare.

Samsel, R. W., Schmidt, G. A., Hall, J. B., Wood, L. D. H., Shroff, S. G., & Schumacker, P. T. (1994). Cardiovascular physiology teaching: Computer simulations vs. animal demonstrations. Advances in Physiology Education, 11, S36-S46.

Science Directorate. (1999, January/February). 1996-1997 CARE nonhuman animal use survey results. Psychological Science Agenda, 12 (1), 16.

Seligman, M.E.P., & Maier, S. F. (1967). Failure to escape traumatic shock. Journal of Experimental Psychology, 74, 1-9.

Serban, G., & Kling, A. (Eds.). (1976). Animal models in human psychobiology. New York: Plenum Press.

Shapiro, K. J. (1988). alternatives in education: A philosophical and pedagogical reflection. International Foundation for Ethical Research Newsletter, 2, 3.

Shapiro, K. J. (1995, January). Student rights option: Important developments. PSYeta Newsletter, 3.

Shapiro, K. J. (1997a). Animal models of human psychology: Critique of science, ethics, and policy. Kirkland, Washington: Hogrefe and Huber.

Shapiro, K. J. (1997b, July). [Use of animals in the teaching of psychology). Unpublished raw data.

Shapiro, K. J. (1997c, November). The separate world of animal research. American Psychologist, 1250.

Shapiro, K. J., & Field, P. B. (1987). A new scale of invasiveness in animal experimentation. PsyETA Bulletin, 7 (1), 5-7.

Shapiro, K. J., & Field, P. B. (1988). A new invasiveness scale: Its role in reducing animal distress. Humane Innovations and Alternatives in Animal Experimentation, 2, 43-46.

Sheldrake, R. The rebirth of nature: The greening of science and God. London, England: Century.

Skinner, J. E. (1971). Neuroscience: A laboratory manual. Philadelphia, PA: Saunders.

Smyth, D. H. (1978). Alternatives to animal experiments. London, England: Scolar Press.

Staub, E. (1996, February). Cultural-societal roots of violence. American Psychologist, 51(2), 117-132.

Stephens, M. L. (1986). Maternal deprivation experiments in psychology: A critique of animal models. Jenkintown, PA: The American Anti-Vivisection Society.

Stokes, W. S., & Jensen, D. (1995, May). Guidelines for institutional animal care and use committees: Consideration of alternatives. Contemporary Issues, 34 (3), 51-59.

Stoloff, M. L., & Couch, J. V. (Eds.). (1992). Computer use in psychology: A directory of software (3rd. ed.). Washington, DC: American Psychological Association.

Strayer, J., & Roberts, W. (1989). Children's empathy and roletaking: Child and parental factors, and relations to pro-social behavior. Journal of Applied Developmental Psychology, 10, 227-239.

Thomas, G. V., & Blackman, D. (1992, December). The future of animal studies in psychology. American Psychologist, p. 1679.

Thomas, M. H., Horton, R. W., Lippincott, E. L., & Drabman, R. S. (1977). Desensitization to real-life aggression as a function of exposure to television violence. Journal of Personality and Social Psychology, 35, 450.

Thurgood, D. H., & Clarke, J. E. (1995). Summary report 1993: Doctoral recipients from United States universities. National Research Council Office of Scientific and Engineering Personnel. Washington, DC: National Academy Press.

Ulrich, R. E. (1991). Animal research in psychology: An example of reinforced behavior. Perspectives in Medical Research (Vol. 1), 49-53.

U.S. Department of Agriculture. (1987, March, 31). 9 CFR Parts I and 2, Animal Welfare: Proposed Rules. Federal Register, pp. 10292-10322. (pages 10213-14 for pain scale)

U. S. Department of Agriculture. (1998). Animal welfare enforcement: Fiscal year 1997. Washington, DC; Author. (Report No. APHIS 41-35-054)

Vonk, R. (1997, November). Attitudes toward animal research. American Psychologist, 1248-1249.

Wallace, J., Sanford, J., Smith, M. W., & Spencer, K. V. (1990). The assessment and control of the severity of scientific procedures on laboratory animals. Laboratory Animals, 24 (2), 97-103.

Ware, M. E., & Johnson, D. E. (Eds.). (1996). Handbook of demonstrations and activities in teaching of psychology: Physiological- comparative, perception, learning, cognitive, and developmental. (Vol. 2). Mahwah, NJ: Lawrence Erlbaum Associates.

Ware, M. E. (1987). Career development and opportunities for psychology majors (2nd ed.). Omaha, NE: Creighton University Press.

Ware, M. E., and Associates. (1993). Developing and improving advising:
Challenges to prepare students for life. In T. V. McGovern (Ed.), Handbook for enhancing undergraduate education in psychology (pp. 47-70). Washington, DC: American Psychological Association.

Webster, D. G., & Muir, J. J. (1995, October). Presenting physiological measures: Effectiveness of demonstration versus lecture. Teaching of Psychology, 22 (3), 192-195.

Welman, P. J. (1985). Laboratory exercises in physiological psychology. Boston, MA: Allyn & Bacon.

White, K., & Shapiro, K. J.(1994, March/April). The culture of violence: The animal connection. The Animals' Agenda, 18-22.

Woods, P. J. (Ed.). (1988). Is psychology for them? A guide to undergraduate advising. Washington, DC: American Psychological Association.

Woolfolk, A. E. (1998). Educational psychology. Boston, MA: Allyn & Bacon.

Worchel, S., & Simpson, J.A. (Eds.). (1993). Conflict between people and groups: Causes, processes, and resolutions. Chicago, IL: Nelson-Hall

Wynne-Tyson, J. (Ed.). (1989). The extended circle: A commonplace book of animal rights. New York: Paragon Books.

APPENDIX B

ALTERNATIVES

I. General Sources

- **Computer Use in Psychology: A Directory of Software.** (1992). Stoloff, M. L., & Couch, J. V. (Eds.). American Psychological Association, 750 First St., NE. Washington DC 20002.

- **Audio-Visuals Relating to Animal Care, Use, and Welfare.** AWIC Series No. 93-01. Animal Welfare Information Center (AWIC), National Agricultural Library, Beltsville. MD 20705. (Updates Series No. 7). Provides listing of videocassettes relating to animal care, biomethodologies, and animal uses in education and research. Useful application for reducing the numbers of animals used in education.

- **Animal-Related Computer Simulation Programs for Use in Education and Research**. AWIC Series No.1. Provides listing of computer simulations that can be used to demonstrate physiological, pharmacological, anatomical, and medical concepts.

- **Alternatives in Education Database.** Provides database listing of alternatives to dissection and laboratory uses of animals in education (Windows format). Association of Veterinarians for Animal Rights (AVAR), P.O. Box 6269, Vacaville, CA 95696-6269.

II. Computer Software (by relevant course)

Learning

- **Alley-Rat Pack.** Simulates Hullian learning principles. Allows manipulation of number of trials and sessions, hours of deprivation, reinforcement amount, and inter-trial interval. Crofter Publishing, 4546 South Semoran, #690W, Orlando, FL 32822.

- **Op.Rat**. Simulates operant conditioning with in-screen cat who may be shaped to barpress, learn discriminations and reversals. Crofter Publishing, 4546 South Semoran, #690W, Orlando, FL 32822.

- **Shaping Behavior**. Simulates how an organism can be shaped to move to a goal box. Students supply values of control and independent variables. Life Science Associates. 1 Fenimore Road, Bayport, NY 11705-2115.

- **The World of Sidney Slug and His Friends.** Simulates use of shaping, differential reinforcement, punishment, extinction to teach students how organisms learn new behaviors. Associates in Analysis of Behavior, 16-2330 Harbor Road, Sidney, BC V8L2P8 Canada.

- **Laboratory in Classical Conditioning.** Simulates the learning of conditioned salivation, suppression, and taste aversion responses using Pavlovian principles. Allows selection of independent variables and data analysis for different experimental conditions. Conduit, University of Iowa-Oakdale Campus, Iowa City, IA 52242.

- **CC.Dog.** Simulates classical conditioning of salivating dogs. Allows student manipulation of stimulus and inter-stimulus intervals to study extinction, stimulus generalization and discrimination, shaping, trace and higher-order conditioning. Crofter Publishing, 4546 South Semoran, #690W, Orlando, FL 32822.

- Batsell, W. R. (December, 1993). **A classroom simulation of transitivity problems in animals.** Teaching of Psychology, 20(4), 22-230. This article describes "a classroom simulation modified from transitivity experiments with animals; its purpose is to familiarize students with the procedures and results from transitive inference studies with nonhuman subjects" (p. 228).

Animal Behavior

- **Sniffy the Virtual Rat**. Simulates typical rat behaviors. Allows application of operant conditioning techniques to "teach" new behaviors. Brooks/Cole Publishing, Monterey, CA 93940.

- **Animal Behavior Data Simulation.** Simulates 25 animal experiments. Students manipulate independent variables and analyze dependent variable data. Oakleaf Systems, P.O. Box 472, Decorah, IA 52101.

- **FIRM: Vol. III, Comparative Psychology.** Simulates six data-generating research models in comparative animal behavior: Deer Mouse, Behavior Genetics, Correlation, Enforced Interval, Imprinting, Hormones and Aggression. Conduit, University of Iowa-Oakdale Campus, Iowa City, IA 52242.

Physiological Psychology

- **Catlab and Catgen.** A genetics transmission simulation that allows students to mate domestic cats of known genotypes affecting coat color and pattern to produce genetically valid litters of kittens. Allows for the controlling of variables and analysis of data. Conduit, University of Iowa-Oakdale Campus, Iowa City, IA 52242.

- **NeuralSim.** Simulates the action potential, excitatory and inhibitory postsynaptic potentials, and passive electrical properties of the squid giant axon. Starpak, 237 22nd Street, Greeley, CO 80631.

- **Neurosys.** Simulates basic parameters of nerve cell function. Allows manipulation of independent variables and analysis of neuron electrical behavior in "real" preparations. Herbert Levitan, Zoology Dept. University of Maryland, College Park, MD 20742.

- **Physiological Stimulation Software.** Five simulation programs teaches concepts of physiology and pharmacology. Dr. James E. Randall, 609 S. Jordan, Bloomington, IN 47401

- **Biomethodology of the Laboratory Mouse and Rat.** (Videocassette No. 200). Provides demonstration of basic identification, restraint, injection, blood withdrawal, and euthanasia techniques. Silver Spring, MD: MTM Associates, 1987, 1/2# VHS, 13 min.

- **Dissection and Anatomy of the Rat.** (Videocassette No. 794). Training video describes step-by-step dissection and anatomy of the rat.

- **The Biolog project: Self-monitoring as a laboratory for physiological psychology.** Anton, B. 9, (April, 1995). Teaching of Psychology, 22 (2), 130-131. Serves as a non-animal alternative method of introducing students to regulative physiology problems. Students act as their own subjects as they monitor personal biological functions.

- **The Psychology Video Lab Series.** Developed by Richard Deyo (Winona State University). Contains pre-recorded individual experiments in which one or more groups of animals have received some treatment (drug or lesion) that students view and record behavioral responses using data sheets. Video Lab One: The Role of Dopamine in the Regulation of Motor and Aggressive Behaviors. Video Lab Two: Effects of Naloxone on social-Play Behaviors in the Albino Rat. Video Lab Three: Effects of Perinatal Hippocampal Lesions on Learning and Memory. Video Lab Four: Effects of Caffine on Open-Field Behaviors in the Rat. Available from Ally & Bacon, Dept. 894, 160 Gould St., Needham Hts. MA 02194-2315.

Experimental Psychology

- **ABI-1 and ABI-3.** Animated simulations of animal learning experiments that can allow for the manipulation of three or more variables. Students can conduct repeated experiments with one or more samples. Artificial Behavior Inc. 2124 Kittredge, Suite 215, Berkeley, CA 94704.

- Batsell, W. P. Jr. (December, 1991). **Timing like a rat: A classroom demonstration of the internal clock.** Teaching of Psychology, 18(4), 229-231. Provides non-animal alternative for studying timing and the properties of the internal clock. Students respond for reinforcement using the peak procedure.

- **MEL Lab: Experiments in Perception, Cognition, Social Psychology, & Human Factors**. Simulates 10 classic experiments in four areas of psychology. Allows students to create their own experiments. Psychology Software Tools, Inc., 511 Bevington Road, Pittsburg, PA 15221.

- **START: Tools for Experiments In Memory, Learning, Cognition, & Perception.** Contains 15 programs providing students hands-on experience in designing and conducting psychological research. Computer acts a research tool (tachistoscope, memory drum, reaction timer, visual stimulus display, audio tape) presenting stimuli and recording behavior. Students can act as subject or experimenter. Conduit, University of Iowa-Oakdale Campus, Iowa City, IA 52242.

III. Noninvasive Uses of Animals in Non-lab Settings

IV. Human Subjects

APPENDIX C

List of Schools That Do Not Use Animals in Their Undergraduate Psychology Programs

Alfred University (NY)
Bradley University (IL)
Central Connecticut State University (CT)
College at New Paltz (NY)
East Texas State University (TX)
Florida International University (FL)
Hope College (MI)
Ithaca College (NY)
Jacksonville University (FL)
Kansas State University (KS)
Lake Superior State University (MI)
LaSalle University (PA)
Liberty University (VA)
Northern Arizona University (AZ)
Ohio University (OH)
Pace University (NY)
Plattsburgh State University (NY)
Point Park College (PA)
Ramapo College (NJ)
Robert Morris College (PA)
San Francisco State University (CA)
San Diego State University (CA)
State University College (NY)
Stockton State College (NJ)
Sul Ross State University (TX)
University of California--Santa Cruz (CA)
University of Detroit Mercy (MI)
University of Northern Colorado (CO)
University of North Texas (TX)
University of Wisconsin--Green Bay (WI)
Wake Forest University (NC)
Washburn University of Topeka (TX)
Washington University (MO)
Western Carolina University (NC)
William & Mary College (VA)
Winston-Salem State University (NC)

Source: Dr. Kenneth J. Shapiro, Executive Director, Psychologists for the Ethical Treatment of Animals, P.O. Box 1297, Washington Grove, MD 20880-1297, (301) 963-4751