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Animal Dissection and Evidence-Based Life-Science and Health-Professions Education

RESPONSE TO BALCOMBE'S COMMENTATORS

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Cambridge mathematician and philosopher W. K. Clifford (1879/1999) concluded his famous essay, "The Ethics of Belief" with the bold claim that "it is *wrong* always, everywhere, and for anyone to believe anything upon insufficient evidence" (p.77). Clifford's enthusiasm for *evidentialism*—the principle that one should proportion one's belief to the strength of the evidence—may have been overzealous, but a plausible interpretation of his view is this: Because beliefs often have serious moral consequences, one should base one's beliefs on the evidence, and it is intellectually and morally irresponsible not to do so. This perspective motivates recent so-called "evidence-based" methods in the fields of medicine and education.

Balcombe's (2000, 2001) case for replacing learning methods that require pain, suffering, and death for animals with methods that do not (computer-assisted learning, three-dimensional models, videotapes, and other alternatives) can be seen as motivated by this evidentialist perspective. Balcombe provided a wealth of empirical evidence from educational studies to show that in most contexts animal dissection is not necessary—and even counterproductive—to achieve valid educational goals, especially higher order goals (concept learning and problem solving). He demonstrated that no sound defense of dissection has been given.

In her response, Rasmussen (2001) summarized Balcombe's case:

Can we learn as effectively without hurting or killing another being? If so, why do we not try? Many of the studies Balcombe cites have supported sufficiently the adequacy and, often, superiority of learning methods that do not harm animals or students....The first of the aforementioned questions is being answered; we can learn effectively with these non-detrimental methods. Those who seek to educate [and accept the principle of "do no harm"] must seize the second question because they see, in the big picture, the benefit for themselves, their students, their society, and other sentient beings. (p. 132)

Other commentators often fail to address Balcombe's pedagogical, scientific, and moral arguments and engage the evidence he presented. Their support of dissection thereby is not evidence based. Their unjustified belief in the importance of dissection, widely held by instructors in science and health professions, has moral consequences for students; society; and, especially, the animals who suffer and die because of it. In this article I summarize their criticisms and respond.

Moore (2001) and, to a lesser extent, Marr (2001), focused on alleged benefits for humans that come from animal dissection in medical research. Moore claimed that dissection "has produced knowledge that has improved our lives ... reduced needless pain and suffering...has been important for developing vaccines, cancer treatments, and surgical procedures ... and [has] been critical to ... prolonging [human] life" (pp. 136–137). Marr suggested that "whole animal models" (p. 139) are needed for testing drugs for humans and falsely states that, historically, human anatomy and physiology could not have been understood without animal dissection (p. 139).

I have two replies: First, these claims are irrelevant to the issue of whether dissection is necessary for educational purposes. Second, they assume that animal models are reliable and effective for understanding and curing human diseases. This assumption has been seriously criticized in light of the history of medicine, comparative physiology, and evolutionary theory (Goodall, 2000; Greek & Greek,

2000, 2002; LaFollette&Shanks, 1993a, 1993b, 1994, 1995a, 1995b, 1996). If the critics' arguments are sound (and no one has shown that they are not), then, contrary to Marr's (2001) claims, it is false that students who wish to improve human health by "[becoming] involved in pharmacology, anatomy, and the medical aspects of biology need a basic framework that uses animal models as the underpinning" (p. 140).

Although Moore (2001) believed education would be "hindered" by banning earthworm dissection and seemed to suspect that "enhancing science education depends on dissecting rats," (p. 137), he gave no evidence for these claims. Valli (2001) and Marr (2001) argued, however, that alternatives to dissection are appropriate for precollege and nonmajor biology courses. For these students, Valli found that "alternative methods of learning animal anatomy appear to be adequate" (p. 127). Marr emphasized that dissection "has absolutely no place in the precollege classroom" (p. 140) and that it is not even necessary for biology majors whose interests are in other areas of biology. Here, Balcombe (2000) and his critics agreed. Advocates of humane education surely would find progress were Valli's and Marr's views widely accepted among biology teachers.

Disagreements, however, concern dissection and students in the health professions. Concerning medical students, Valli (2001) claimed that "what is critical is that the professional colleges, to produce competent graduates, provide sufficient hands-on animal experience with both live and dead animals" (p. 127). He asserted that "the sensitivity gained to the feel and smell of fresh or fixed animal tissue is in itself a core component of a medical education" (p. 128). He claimed, "For students who plan to practice medicine, the more exposure they have to the sight, smell, and texture of tissues, the better their preparation to become confident clinicians" (p. 129).

Again, these claims are only assertions: No evidence is given. Furthermore, the research that Balcombe (2000) reviewed shows that Valli's (2001) claims are false. This is to be expected, as it is implausible *prima facie* that physicians would be less competent or confident had they not dissected animals. Animal dissection is not necessary to enter medical school or to practice or teach medicine: If it were educationally essential, then it would be required (Bekoff, 2002).

Valli (2001) correctly noted that physicians need to learn hand-eye coordination, the texture of tissues, and instrumental techniques. Valli also noted that veterinarians need to learn safe animal handling and restraint; intubation; anesthesia and monitoring; the effects and control of bleeding; and the sight, smell, and feel of live tissues (pp. 129–130). However, clearly there are ways to learn these skills in both medical and veterinary contexts that do not harm any animals. Experience working in a clinic, assisting professionals, works very well, as Valli noted. It is likely that on-the-job education and training is more effective. Thus, no reason is given to believe that animal dissection is needed for students, at least in the human health professions.

Veterinary students clearly need to be familiar with their patients' anatomy; some dissection is necessary. Balcombe (2000) clearly recognized this in his support of client-donated and ethically sourced animal cadaver programs at www.educationalmemorial.org. Balcombe (2002) showed, however, that there are many viable alternatives to terminal-surgery laboratories, that students who use alternatives are just as competent and confident, and that this "provide[s] a strong case for the replacement of traditional labs in which healthy animals are killed" (pp. 123–124). It is not clear why Balcombe's (2000) critics disagree.

Concerning terminal research designed to benefit animals, we do not allow nonconsenting humans to be experimented on and killed for the sake of other humans. Ethical constraints prohibit the conduction of research to enhance "our knowledge of life," satisfy personal curiosity, or spark scientific inspiration (Moore, 2001). It is doubtful that strong arguments could be found to morally justify these protections for humans but not for animals.

Balcombe (2000) demonstrated that alternatives to dissection are educationally sound. No successful objections to his arguments have been given. Most animals who are dissected suffer greatly in their procurement and, obviously, all die (People for the Ethical Treatment of Animals, 1990). This raises serious and broad moral questions concerning society's treatment of animals. The views of defenders

and even critics of animal rights imply that the status quo concerning dissection is, at least, highly morally objectionable (Cohen & Regan, 2001; Engel, 2001; Nobis, 2002; Sapontzis, 1995). There are no moral, religious, or legal objections to the use of alternatives (Francione & Charleton, 1992). Dissection is costly; alternatives are cheaper. The evidence is clear: From both educational and moral perspectives, with exceptions for only some select aspects of veterinary curricula, animal dissection is indefensible. To deny this is to deny the evidence, which violates both reason and morality.

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