

## INTRODUCTION

For ethical, economic, practical, and pedagogical reasons, psychology educators are increasingly interested in replacing animal use in their courses with nonanimal methods.<sup>1,2,3</sup>

APA guidelines state that nonanimal methods be used for educational purposes whenever available.<sup>4</sup>

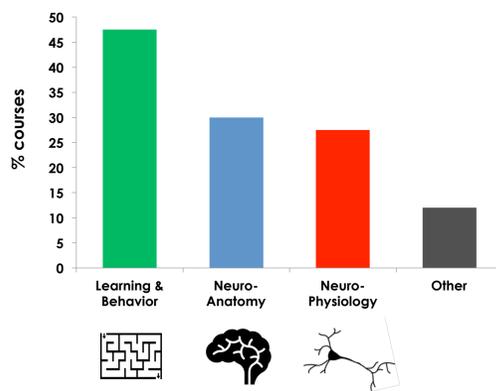
## METHODS

The most common animal-based teaching methods in undergraduate psychology courses were identified from publicly available course syllabi and course descriptions (N = 50).

Nonanimal methods available to teach the same concepts were identified.

## RESULTS

Topics Taught Using Live Animals



The most common animal-based teaching methods include operant conditioning of rodents, sheep brain dissection, and electrophysiological recording in frogs and rodents.

## NONANIMAL ALTERNATIVES

### PRINCIPLES OF LEARNING AND BEHAVIOR

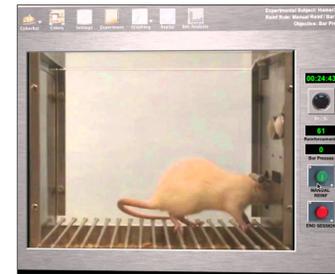


**Sniffy the Virtual Rat**

Virtual operant and classical conditioning experiment software.

**CyberRat**

> 1600 videos to observe, collect, and analyze real animals' behavior.



### NEUROPHYSIOLOGY

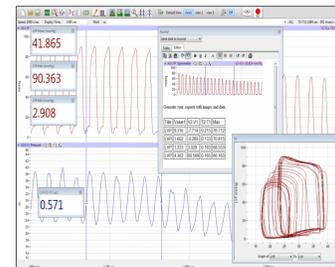


**Swimmy the Fish**

Free software to teach basics of neurophysiology.

**iWorx**

Computer-based system to collect human physiological data, including EEG.

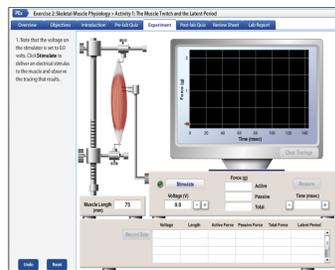


**MetaNeuron**

Free software to model the basic electrical properties of neurons (e.g. resting potential, action potential).

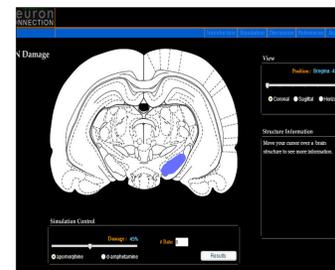
**PhysioEx 9.0**

Interactive simulations of > 60 experiments. Users manipulate variables, use virtual tools, and apply exogenous agents to organs.



**Neuron Connection**

Free web-based simulation of the effects of neurotoxins on a rat brain to produce Parkinson-like symptoms.



### NEUROANATOMY



**Anatomy in Clay Learning Systems, Inc.**

Construct three-dimensional clay models of human brain anatomy.

**Plastinated Brain Specimens**

Reusable three-dimensional plastic infused human tissue samples.



## BENEFITS

### For educators

- Teach key concepts
- No/low-cost
- Minimal prep time
- Reusable
- No safety concerns
- Humane



### For students

Students using nonanimal methods...

- Learn concepts as well as or better
- Enjoy learning more
- Learn faster



...than students taught using animal laboratories.<sup>5,6,7,8</sup>

## ATTITUDES

**53%** of young adults oppose animal testing<sup>9</sup>

**54%** of psychologists oppose mandatory animal use in psychology courses<sup>10</sup>

**54%** of psychology majors oppose mandatory animal use in courses<sup>10</sup>

## CONCLUSIONS

Nonanimal methods are effective at teaching basic and advanced behavioral and neurobiological concepts, reducing animal use, saving money, and accommodating students opposed to animal use.

## REFERENCES

1. Capaldo, T. (2004). The psychological effects on students of using animals in ways that they see as ethically, morally or religiously wrong. *Alternatives to Laboratory Animals*, 32, 525-532.

6. Patronek, G.J., & Rauch, A. (2007). Systematic review of comparative studies examining alternatives to the harmful use of animals in biomedical education. *Journal of the American Veterinary Medical Association*, 230(1), 37-43.

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

7. Stuart, M.D., & Henry, R.W. (2002). Plastinated specimens can improve the conceptual quality of biology labs. *The American Biology Teacher*, 64(2), 130-134.

3. Lopresti-Goodman, S.M. (2012). Towards plasticity in brain science pedagogy. *Psychology and Education*, 49(3), 25-28.

8. Trench, L.S. (2011). Comparing live and virtual rats in psychology of learning: Objective and subjective student learning. *Journal of Behavioral and Neuroscience Research*, 9(2), 62-68.

4. American Psychological Association. (2012). *Ethical Principles of Psychologists and Code of Conduct*. From <http://www.apa.org/ethics/code/principles.pdf>.

9. Goodman, J.R., Borch, C.A., & Cherry, E. (2012). Mounting opposition to vivisection. *Contexts*, 11(2), 68-69.

5. Estevez, M.E., Lindgren, K.A., & Bergethon, P.R. (2010). A novel three-dimensional tool for teaching human neuroanatomy. *Anatomical Sciences Education*, 3(6), 309-317.

10. Cunningham, P.F. (2000). Animals in psychology education and student choice. *Society & Animals*, 8(2), 191-212.