Conditioning and Learning - Lab

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RUTGERS
THE STATE UNIVERSITY OF NEW JERSEY

Instructor	Email	Office
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To help you identify your instructor, here are two pictures representing the extremes of my face-gradient.
(This is a case of learning by generalization)

Terrible picture!
The picture I should never show anyone

Nice picture!
The picture I use on Facebook

When and Where: Thursday, 6:40-9:30 PM, at PSY-361A (Busch Psychology Building)

Office hours: By appointment or if you can catch me inside the Psych Building
(For simpler questions, send me an email or ask during class)

Textbook: None. Required readings are on Sakai

Course Description

With this course, my aim is to give you a hands-on understanding of the scientific method, as well as familiarity with behavioral analyses in the field of learning. These two main themes of the course are, as I argue below, extremely important, and have the extra advantage (and it is not a trivial one) of being awesome.

On the Scientific Method: science is not just a collection of facts. Instead, science is an ongoing process with methods that allow us to understand and manipulate reality. From understanding why things have mass (through the discovery of the Higgs boson) to saving millions of lives from diseases (through antibiotics and vaccines)! And contrary to the stereotype shoved down by popular media, science is not a mechanical and dry process performed by robot-like humans. Most of the time, science is an organic and creative process performed by passionate people. Sadly, however, almost no one understands how science works. In a democratic society absolutely dependent on science and technology, I believe that a basic understanding of the scientific method is critical in shaping competent professionals and conscientious citizens.

On Learning: from an academic/poetic angle, learning is what allows life to represent the universe, and to adapt to local regularities on the small scale of a lifetime. From a practical angle, learning is what makes you able to listen to music while driving, able to avoid sunburns during noon, and able to be (shamefully) afraid of bunnies. Whichever angle you might prefer to see it from, learning does influence every aspect of what we think and do; sometimes in perplexing ways. In addition, since many of these learning processes are fairly general, a lot can be induced from one species to other animals. And when I say "animals", I do not mean only rodents, birds, and dogs, but also naked apes known as humans.

Specifically, when this course is over, you should (hopefully!) be able to:

- have a basic understanding of the methods and techniques used in animal learning research
- understand the procedures for collecting data in animal learning research
- use basic statistics and statistical software to analyze data
- interpret the results of the statistical analyses
- produce an APA-style empirical paper

Moreover, this course has been certified as satisfying four of the Writing and Communication Learning Outcome Goals (including WCR and WCD) of the SAS Core Curriculum. Among other things, you will learn how to: 1) Analyze and synthesize information and ideas from multiple sources to generate new insights; 2) Respond effectively to editorial feedback from peers, instructors, and/or supervisors through successive drafts and revision (WCR); 3) Communicate effectively in modes appropriate to a discipline or area of inquiry (WCD); 4) Evaluate and critically assess sources and use the conventions of attribution and citation correctly.

Welcome and I hope you enjoy the ride.

Grading

I want engagement from all of you, and the grading system for this course is based on that desire. The course has three scientific reports (based on the experiments in class), presentations, quizzes, and an assignment that I call "creative extensions".

Scientific Reports: Three reports (one for each experiment) to be done individually. You have to write it following the APA format, and submit a digital version on Sakai (under "Assignments"). And remember: although the experiments are a group activity, these reports are not! Late submissions lose 10% of the points for that report for each day it is late. Since the reports are totally dependent on the experiments in class, any unexcused absence during the data collection results in a zero.

Presentations: For each experiment, I provide supporting articles as relevant background information. You work in groups in order to present the relevant information from these articles to the class. And since the information presented is important for the quizzes and the scientific reports, each student is responsible for reading all articles.

Constructive Feedback: You have to revise a scientific report from one of your colleagues (chosen randomly) following the guidelines given in class. I, then, grade the quality of the feedback, and the author receives the revision back (this does not change the original grade for the report itself, so no need for you to be nice). Like the Scientific Reports, this assignment is individual. There are two in total; one for Scientific Report#1, and another for Scientific Report#2.

Creative Extensions: Each group has to write a page proposing a fictional extension to the experiments from the course. Imagine that you are all scientists (with limitless resources like Tony Stark – the Iron Man), and design an experiment that you would like to perform in order to solve an interesting question. While writing it, you should discuss the question to be solved, the methods to be employed, and the potential results. This is a group assignment in class, and there are three in total. The only limitation is that the proposal needs to follow the scientific method and be relevant to the topics. Besides this, no other strings attached. Be creative!

A very good advice now! Do not simply memorize words and facts for this course. Memorization has its role, of course, but you should focus on understanding the methods and concepts. Try to think about the reasoning behind what you learn in class, and how the dots connect with each other. This is the easiest path to get a good grade, and also the most rewarding; since it gives you a knowledge that can be carried over after the course ends.

Here is an example of memorizing vs. understanding (bear with me): Rats of an experimental group get food when they press one of two levers depending on the intensity of a shock (either 1.0 mA or 0.25 mA). Each animal receives 100 trials of high intensity shock (learning to press the H lever) and 100 trials of low intensity shock (learning to press the L lever). Then, each animal gets 5 trials with a varying current for the experimenter to define the value where the animal perceives the shock's intensity as moderate (it is the point where presses of L and H are the same). With this set, now the animals receive 5 trials of a tone signaling the coming of a moderate shock. If an unsignaled moderate shock had, by definition, 50/50% of lever presses, will this ratio change when the shock is signaled? In other words: Is signaled pain perceived as more or less intense? This is a cool experiment that manages to make rats "talk" about their feelings, and tackles an interesting question about learning. However, I bet you will not remember most of those facts after some months. I cannot. On the other hand, if I think about the reasoning of the experiment, I am able to remember what matters: the concepts behind its design, the conclusions, and the relevance of its results.

Grade calculation

The maximum total is 100.

Assignment	Maximum Points
Scientific Report #1	15
Scientific Report #2	20
Scientific Report #3	25
Presentations	15 (5 each)
Constructive Feedback	10 (5 each)
Creative Extensions	15 (5 each)

Course Schedule

Like any other complex phenomenon, the development of this course has a considerable degree of uncertainty. Therefore, the course schedule might change. Keep up!

Date	Content	Stuff due
September 12th	Course introduction. OSHA surveys. Plagiarism Overview of the scientific method Experimental design. Care and handling of lab animals Introduction to experiment 1	Nothing
September 19th	APA: Introduction (Literature Review and Hypotheses) Presentations of experiment 1 articles Data collection for experiment 1: Week 1	Read experiment 1 articles
September 26th	APA: Method Section, Title page, References Introduction to experiment 2 Data collection for experiment 1: Week 2	Nothing
October 3rd	Review of the data for experiment 1 Presentations of experiment 2 articles Data collection for experiment 2: Week 1	Read experiment 2 articles
October 10th	APA: Results, Figures, Discussion Review of statistics Data collection for experiment 2: Week 2	Nothing
October 17th	Creative extensions for experiment 1 Review of the data for experiment 2 Introduction to experiment 3	Scientific Report #1
October 24th	Presentations of experiment 3 articles Data collection for experiment 3: Week 1	Constructive Feedback #1 Read experiment 3 articles
October 31st	Data collection for experiment 3: Week 2	Nothing
November 7th	Creative extensions for experiment 2 Data collection for experiment 3: Week 3	Scientific Report #2 due
November 14th	NO CLASS	Constructive Feedback #2
November 21st	Review of the data for experiment 3 Creative extensions for experiment 3 Peer-Review of the Scientific Report #3	Nothing
November 26th	NO CLASS	Nothing
December 5th	Optional class to consult me	Scientific Report #3 due by Wednesday 12/12

Academic Integrity

You are required to abide by the Rutgers policy on academic integrity; please familiarize yourself with this policy, you can view it at http://academicintegrity.rutgers.edu/integrity.shtml

Plagiarism is a violation of academic integrity. I will use "Turnitin" to check for plagiarism in the Scientific Reports.

Additional Stuff

If you want to do extra work in order to get a better grade, do it during the course, not after it is over. Study, ask questions, prepare for the assignments, and get engaged!

An absence will be excused only with a note from the Dean's office. You are responsible for any information you missed.

Mistreating or mishandling of the rats will result in a dismissal from the class and an 'F'.

At last, since you had the patience to read this syllabus, here is a quote for your delight:

"The truth may be puzzling. It may take some work to grapple with. It may be counterintuitive. It may contradict deeply held prejudices. It may not be consonant with what we desperately want to be true. But our preferences do not determine what's true. We have a method, and that method helps us to reach not absolute truth, only asymptotic approaches to the truth — never there, just closer and closer, always finding vast new oceans of undiscovered possibilities. Cleverly designed experiments are the key."

– Carl Sagan, in "Wonder and Skepticism". Skeptical Inquirer 19 (1), 1995.