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Teaching Statement

My goal as an instructor is to embolden students to discover new ways of thinking about minds and how they work. Because I want to encourage students to think of the mind and mental processes from a scientific perspective, I aim to foster an open dialogue with my students on the state of our understanding of cognition, psychology in general, and the methods that we use to study them. These goals are best met by providing students with the opportunity to actively engage with the material and to make it relevant to their everyday lives. I do this by asking questions that encourage students to explore challenging concepts and consider how scientists might empirically explore cognitive phenomena. I also incorporate in-class activities, multimedia demonstrations, and homework that encourage students to critically engage with the material, rather than passively consume it. My efforts to put students at the center of my teaching, mentorship, and advising were recently recognized by the College of Arts and Sciences, with the *Robert A. and Donna B. Paul Award for Excellence in Advising*.

Over the last several years I have developed my approach to teaching as the instructor of three courses (which I have taught multiple times) and during lab meetings, journal clubs, and informal meetings with undergraduate and graduate students. Though these are all very different, each illustrates my view that my role as a course instructor is to encourage students to critically work through problems in cognition in addition to learning the field's current consensus, controversies, and theoretical approaches.

Introduction to Cognitive Science (PSYCH 1102/COGST 1101)

Introduction to Cognitive Science is an undergraduate lecture course of ~350-400 students and the second largest course in my department. The course offers brief introductions to five major areas of cognitive science, including cognitive psychology, neuroscience, linguistics, computer science, and philosophy, and examines how these areas approach the study of perception, action, memory, attention, language, problem solving, comprehension, and consciousness.

In this course I challenge students to think about the mind as an entity that is open to scientific inquiry, and as something that could exist in other, nonhuman forms. I introduce the ways that different branches of cognitive science have framed and defined mental processes, expose students to methods that cognitive scientists use to discover the mechanisms that make up human and nonhuman animal minds, and teach students concepts that they will need to critically evaluate claims about cognition and the mind that they are likely to encounter in the future. In addition to being exposed to new ways of thinking about the mind, students get to see immediately how this type of thinking is applied to real problems, yielding new insight into questions they may have previously believed unanswerable. To help students see the value of these questions, and our current best answers to those questions, I often present students with a real-world puzzle or challenge that violates naïve beliefs about the mind, or ask them to apply concepts they have already learned to a new problem. In class, I combine thought questions with Clickers and Catchboxes to encourage students to ask and answer questions, and to engage each other with their ideas. I utilize homework assignments to highlight an important conceptual topic (e.g., functional localization in the brain), to have students actively investigate that topic online (e.g., using neurosynth.org), and finally to integrate what they've learned with other material from the course in a brief paper (e.g., explaining what the data from neurosynth.org suggest about integration and segregation of function in the brain). Students are also given multiple extra credit opportunities that encourage them to attend related colloquia, critique popular press articles about cognitive science findings, connect cognitive science to art, and participate

in experimental research. These extra credit opportunities are designed to encourage students to relate the topics covered in the course to everyday problems and experiences.

The course is difficult for many students, as it covers a broad set of topics that span from concepts associated with artificial intelligence and information theory to biology and philosophy. As a result, I give students many opportunities to succeed in the course. Their grades are based on their best 2 out of 3 exams (two preliminary exams and a cumulative final), three homework assignments, and multiple opportunities for extra credit. To encourage attendance, participation, and regular studying, I also include a participation component in the grades that is based on attendance and performance on daily in class quiz questions .

This course was assigned to me, and I redesigned it during my first year at Cornell. I have taught it five times – every spring from 2014 to 2019, with the exception of 2018 when I was able to use a grant to fund another instructor for the course. The course attracts a wide variety of undergraduate students (Freshmen to Seniors, psychology majors, biology majors, computer science and information sciences majors, and engineering majors), and even graduate students. Students often take this course to fulfill a distribution requirement or as an elective. The course also is considered a feeder course for the cognitive science minor, which has grown over the last several years (the number of undergraduate students graduating with the minor increased by about 250% from 2013 to 2019). In addition to being responsible for course design, lectures, assessment, and management, I manage and advise 6-8 graduate student teaching assistants from psychology, linguistics, and cognitive science every semester. TAs are invited to give a guest lecture in their major area, for which I provide guidance, advice, and feedback.

The Psychology of Attention (PSYCH 3350/6350)

This is a seminar for advanced undergraduate and graduate students. This course broadly covers basic research that uses behavioral and neuroimaging methods to better delineate and characterize attentional mechanisms. My goal is to engage students in a semester long discussion about what attention is, what it might and might not do, how scientists can best answer these questions, and how insights about attention from cognitive neuroscience can help us understand real-world problems. The course introduces students to many of the debates that the field wrestles with, both historically (e.g., early vs. late selection, and why we should care) and in contemporary research (e.g., the effects of learning on attention and its relationship to prediction). Because attention often refers to multiple, distinct constructs, we first explore the nature of attention, including how it should be defined and how it relates to conscious awareness. We then make our way through several topics that are primarily related to how people select or prioritize some sources of information over others (e.g., visual search, how attentional selection might be accomplished by neural systems, how the body affects attentional allocation, bottlenecks and dual-task performance, the effect of learning on attentional selection, etc.). To make these issues more concrete, students run themselves through experimental tasks and write two lab reports. A third lab at the end of the semester asks the students to consider how their new understanding of attention helps account for the problems associated with distracted driving (and walking) and what might be done to ameliorate them. They are asked to discuss this problem within the context of an application of Marginal Value Theorem to information foraging. Throughout, our focus is on conceptual issues, research methods, the logic and assumptions that underlie the research, and on the conclusions that a particular approach affords.

In addition to lab reports, students are evaluated on writing assignments and presentations. Every week students read three primary research articles, and either write a critique of those articles,

or write responses to others' critiques. Readings include classic papers (such as Desimone & Duncan's 1995 paper on biased competition) and more recent additions to the literature (such as work on value-driven attention). Additional articles or book chapters are also made available. The goal is to begin active conversations about these topics prior to our class meetings. This student-centered approach is also encouraged by requiring students to present and lead a discussion on a selected research article (all students present at least once during the semester). Students are expected to ensure that the class understands the nature of the question addressed by the article, the approach the authors took to examine it, and why the authors reached their conclusions. They must also push the class into new territory by proposing a new question and method for addressing it, or by presenting another article that expands on the initial reading. Students are expected to develop new questions, and propose methods for addressing them as part of presentations on selected research articles. When no students are presenting, I may ask the class as a whole to develop a presentation during our meetings by breaking them up into smaller groups and assigning different sections of the paper to each group, which then presents their work to the whole class. For a final project, students identify a topic of interest that is related to course content, perform a literature review, define a research question, propose methods to test it, and describe what the data should look like if the hypothesis were correct. Students propose a topic for their final presentation mid-way through the semester in class, to receive feedback and input from me and their peers.

I created this course my first year at Cornell and have taught it four times (Fall 2013, 2014, 2016, and 2018). Each time enrollment has been between 13 and 19 students, with junior and senior undergraduates from the psychology major, as well as from business, marketing, human development, sociology, and information sciences majors. Graduate students in psychology have also taken the course.

Psychology at the Sciencenter! (PSYCH 4500/6500)

Most of the general public knows that psychology is the study of the mind. But, to many this ends with clinical and counseling psychology. Psychology is also the study of how minds work, the mechanisms that produce thought, choices, memories, communicate, and imagine the future. This disconnect between public and expert perception of psychology exists alongside a tendency for academia to overlook the importance of science communication and public engagement. To address this issue, my colleague, Michael Goldstein, and I took advantage of a new Cornell initiative to encourage faculty and student engagement with the community and applied for funding to develop a novel course on science communication through interactive exhibit development. Since that time we have taught the course twice, in 2017 and 2018, with about 11 graduate and undergraduate students each time, and received two grants to support the course and exhibit development. We will teach it again this fall.

In this seminar, advanced undergraduate and graduate students learn to communicate psychological science to the public by designing and building concrete demonstrations that illustrate a psychological or brain based process. Students have developed exhibits on the scientific measurement of behavior, affordances, how neural networks represent animals, the Turing Test, color blindness, change blindness, and schemas. The class is inherently active: from the first day students learn about how to implement and develop demonstrations of basic cognitive science (starting with things like momentum and friction), and quickly begin to brainstorm and flesh out their ideas for new exhibits from psychological and brain sciences. Students evaluate and modify these exhibits by prototyping them with the public and with expert staff at the Sciencenter of Ithaca. Classes can also include

discussion of weekly readings that include primary research articles on informal learning as well as chapters on science communication and public engagement. Students prepare for these meetings by submitting weekly discussion questions to the course website, and by writing weekly reflection journal entries on their learning from class activities. Student's work has consistently shown that, in addition to improving public understanding of psychological science this course increases student engagement with the community, increases their confidence with communicating complex psychological phenomena to individuals with diverse backgrounds and age ranges (from toddlers to grandparents), allows them to deeply explore several psychological phenomena, and, finally, promotes a deeper understanding of how individuals informally learn about science.

Independent Study (PSYCH 4700/4710), Lab Meetings, and Journal Clubs

I believe that informal interactions with students in the lab and in journal clubs can be one of the most effective and rewarding ways to spark student's curiosity and engage them in cognitive science. This belief motivates the way I run my lab and conduct lab meetings. Each year my lab includes 7-10 undergraduate students (who receive independent study credit) and 3 graduate students. Undergraduate students come from a variety of majors (e.g., psychology, human development, biology and society, chemistry, and engineering). All students are expected to attend and participate in weekly lab meetings. Although I have several goals for these meetings, the most important is to promote a better understanding of the research problems we are investigating, and to foster creative approaches to addressing those problems within my lab. I view lab meetings as an ideal place for undergraduates to get a sense for research in cognitive neuroscience broadly, and attention, memory, and perception more specifically. For graduate students, lab meetings are a place to gain experience speaking about their research and how it fits within the field, explaining complex ideas, and exploring deeper questions about the theoretical and empirical bases of our research. Because I value student input and participation, I sometimes change the format of lab meetings to find new ways to encourage students to contribute. To help overcome concerns about "not knowing enough" and integrate new students into the lab, I often have lab meetings in which everyone makes a pitch for discussing a recent journal article paper that they found. More advanced undergraduate students may be asked to present their own projects, or, with a graduate student, present the methods and results of a study that they worked on.

I also participate in several journal clubs that involve undergraduate and graduate students. I attend the Cognitive Neural Systems journal club (formerly Behavioral Computational and Systems Neuroscience) run by Thom Cleland and David Smith. This group meets to discuss original research articles that span a range of topics, such as computational approaches to odor representations in mice, the coding of social information in hippocampus, human neuroscience of attention, and bird caching behaviors. These meetings are attended primarily by other faculty, graduate students and postdocs in the department's Behavioral and Evolutionary Neuroscience area as well as some graduate students from my lab. To help develop a functional magnetic resonance imaging and neuroscience community at Cornell, I also participate in journal clubs and meetings with faculty in Human Development, where we meet with our labs to discuss big ideas in neuroscience, as well as issues related to the imaging facilities, research proposals, analysis methods, and results. The groups consist of graduate students, postdocs, and faculty.

Course Development

I would like to develop at least two new courses in the next several years. Of greatest interest is a course covering topics on event cognition. Although much of my research examines attention, nearly all of it is based on an interest in understanding the processes involved in perceiving and representing dynamic, everyday events, as they are experienced. A course in event cognition would be an exciting way to share this interest with students while introducing them to a variety of topics in perception, cognition, and social cognition (e.g., goals, cognitive control, semantic and episodic memory, working memory, spatial cognition, multi-modal perceptual processing, and attention). I would also like to develop a course on human memory, which would more broadly cover the cognitive and neural mechanisms involved in learning and representing information about episodes (from extremely simple visual and auditory information to multi-modal and temporally extended events) and environmental and conceptual regularities, and then using this information for planning and performing tasks (e.g., future-thinking and goal-based processing.

I am sincerely committed to continuing to develop as a teacher and to improve the courses that I teach. In the next two years I would like to rework parts of Introduction to Cognitive Science to find new ways for students to be the driving force behind their own learning. To do this I would like to improve the relevance of some of the material to students and find new ways to actively engage with the material during class. I also expect to continue to make use of the resources available at the Cornell Center for Teaching Innovation. Since joining Cornell, I have participated in workshops on diversity in the classroom, attended the New Faculty Institute, which focused on integrating active learning techniques into the classroom, have had several individual meetings with experts at the Center, and have sought and received feedback on my teaching from several individuals. I hope to continue my development and growth as a teacher, mentor, and advisor through additional interactions with the Cornell Center for Teaching Innovation.