SPRING 2021 SEMESTER

Cognitive Science: A Multidisciplinary Introduction (185:201)

Instructor: Dr. Austin A. Baker (austin.baker@rutgers.edu)

Teaching Assistants: Dr. Ryan Rhodes (ryan.rhodes@rutgers.edu) & Andrew Rubner (ar1505@philosophy.rutgers.edu), Michelle Rosenthal (mika@psych.rutgers.edu)

Delivery Method: Asynchronous lectures and synchronous recitations

Recitations (Starting Week 2):

Section **01**: Tuesday 10:35 am (Rubner), *Zoom Link*:

Section **02**: Wednesday 1:55 pm (Rosenthal), *Zoom Link*:

Section **03**: Wednesday 12:15 pm (Rubner), *Zoom Link*:

Section **04**: Wednesday 12:15 am (Rhodes), *Zoom Link*:

Section **05**: Wednesday 3:35 pm (Rosenthal), *Zoom Link*:

Section **06**: Thursday 1:55 pm (Baker), *Zoom Link*:

Section **H1**: Wednesday 10:35 pm (Rhodes), *Zoom Link*:

Section **H2**: Wednesday 10:35 pm (Baker), *Zoom Link*:

Office Hours (Starting Week 2):

Baker: Thursday from 3-5 pm, *Zoom Link*:

Rhodes: TBD, *Zoom Link*:

Rubner: TBD, *Zoom Link*:

Rosenthal: TBS, *Zoom Link*:

Course Objectives

This course is an introduction to cognitive science. To capture the interdisciplinary nature of this field, we will review a range of topics and research programs from philosophy, computer science, psychology, neuroscience, and linguistics. As such, this course aims to introduce students to the foundations of cognitive science and give them a sense of the contemporary debates that are currently taking place within and across the disciplines that make up the field.

After completing this course students should:

- Appreciate the interdisciplinarity of cognitive science—in particular the diversity of viewpoints, the controversies, and the areas of emerging consensus.
- Be able to make appropriate connections and comparisons in research fields across disciplines.
- Know how to read and substantively engage with scholarly articles.
- Be able to define and discuss foundational concepts in cognitive science (e.g., computation, mental representation, and information processing).
- Understand how perception, memory, language, and decision making come together to produce behavior and shape how we see and understand the world.
- Have basic familiarity with brain anatomy and neuroimaging techniques.

Lectures & Recitations

The lecture portion of this course will be run *asynchronously*. I will upload lectures to Canvas by Sunday night (for what would have been the Monday class) and Tuesday night (for what would have been the Wednesday class). Research coming out over the last few months suggests that college students learn better through watching multiple shorter videos (rather than one longer video). Thus, I will be splitting lectures up into multiple videos, which you can watch on your own time. Videos will be labeled by week number, lecture number, and part number. So, the video labeled 'W1/L1/P1' would be the first part of the first lecture from week 1.

Recitations will be run by Ryan, Andrew, Chelsea and I *synchronously* through Canvas. Students must *only* attend their assigned recitation sections. We aim to record all recitations and upload them to Canvas for students who have to miss a recitation here and there. However, please try to attend recitations as much as you can—recitations are your opportunity to review the material with our TAs and get your questions answered. Any questions about recitations should be directed towards *your particular TA*.

Reading

There is no required textbook for this course. The weekly readings are listed on the syllabus and can be found as PDFs on the course's Canvas site. Be sure to keep up with your reading—anything in the assigned readings is fair game on the exams.

Note: Even though required readings were chosen to be more-or-less accessible to an introductory audience, some of the readings are harder than others. One of the aims of this course is to ease you into reading scientific articles. When approaching a difficult reading, I suggest going slowly and looking up phrases you are unfamiliar with. By this point you will have discerned one thing that makes cognitive science different (but perhaps more exciting!) than other fields—it's interdisciplinarity! But this means that even if you are very comfortable reading, say, psychology articles you might find yourself struggling with philosophy or artificial intelligence articles if these are new fields for you. This feeling is entirely *normal*—reading papers for the first time in a new field feels dauting for everyone (we want to avoid feelings of *impostor syndrome*). So, take a deep breath, read slowly, (virtually) attend all lectures, and ask Ryan, Andrew, and I for help during office hours.

Assessment

30% Weekly Reactions

Each Monday I will post two questions at 9 am EST, which relate to the material in the reading and lecture. Through Canvas (under the 'assignments' tab) you will submit a response to **one** of the

questions before 5 pm EST on Friday. Responses need not be long (shoot for a couple paragraphs or so) but should engage with the material beyond mere summery. The lowest two weekly responses will be dropped. Late grades will not be accepted for any reason.

60% Exams
There will be two take home exams, which will cover material in the required reading and lectures. The first exam will be available on Canvas on Monday October the 12th at 9 am EST and due on Friday October the 16th at 5 pm EST. The date and time of the second exam are TBD.

10% Recitation Discussion
You will be responsible for contributing to recitations and posting on the Canvas recitation message forms each week. Students in honors sections will also have an honors-specific component of their recitation assessment. All expectations regarding recitations discussion and posts will be reviewed in the first recitation and may differ somewhat by instructor.

Grades

All your grades will be available through the gradebook feature on Canvas. It is *your* responsibility to monitor your grades and follow your progress during the course. Note that we will not change or curve your grades on any assignment unless you notice that one of the graders has made a mathematical error.

Plagiarism

Plagiarism will not be tolerated. Familiarize yourself with the University's extensive academic integrity policy at academicintegrity.rutgers.edu. All instances of plagiarism will be reported to the Office of Student Judicial Affairs.

Disability Services

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where they are officially enrolled, participate in an intake interview, and provide documentation. For more information visit the Rutgers Office of Disability Services: https://ods.rutgers.edu.

Join the Rutgers Cognitive Science Club!

The Rutgers Cognitive Science Club hosts a guest speaker series, socials, and movie nights. To find out more information go to: rucogsciclub.com

Schedule

Week 1: Intro to Cog Sci and Types of Representation

Reading: Friedenberg, Jay & Silverman, Gordon (2006). "(Chapter 1) Introduction: Exploring Inner Space," In *Cognitive Science: An Introduction to the Study of Mind*, London: Sage Publications, pp. 1-27.

Week 2: Marr and Explanatory Levels of Representation

Reading: Marr, David (1982). "(Chapter 1) The Philosophy and the Approach (**ONLY PAGES 19-29**)," In *Vision*, Cambridge: MIT Press, pp. 19-29.

Week 3: Computation

Reading: Clark, Andy (2001). "(Chapter 1) Meat Machines: Mindware as Software," In *Mindware*.

Week 4: Connectionism

Reading: Bruckner, Cameron & Garson, James (2019). "Connectionism," In *The Stanford Encyclopedia of Philosophy*, (ed.) E. Zalta.

Week 5: Neuroimaging: fMRI & EEG

Reading: Kanwisher, Nancy (2017). "The Quest for the FFA and Where it Led," *The Journal of Neuroscience*, 37(5), 1056-1061.

Week 6: Vision

Reading: Beaumont, J. (1988). "Sensation and Perception", In *Understanding Neuropsychology*, (ed.) J. Beaumont & G. Rogers, London: Blackwells.

Week 7: <u>Exam 1</u>

Week 8: Development

Readings: Talbot, Margaret (2006). "The Baby Lab: How Elizabeth Spelke Peers into the Infant Mind," *The New Yorker*, September 4, 2006.

Stahl, Aimee & Feigenson, Lisa (2015). "Cognitive Development: Observing the Unexpected Enhances Infants' Learning and Exploration," *Science*, 348(6230), 91-94.

Week 9: Memory

Reading: Brady, Tim, Konkle, Talia, & Alvarez George. (2011). "A Review of Visual Memory Capacity: Beyond Individual Items and Toward Structured Representations," 11(4), 1-34.

Week 10: Phonology with **Ryan Rhodes**

Reading: Jackendoff, Ray. (1994). "Phonological Structure" in *Patterns in the Mind: Language and Human Nature*, New York: Basic Books, pp. 53-65.

Week 11: Syntax & Semantics with **Ryan Rhodes**

Reading: Everaert, Martin et al. (2015). "Structure, Not Strings: Linguistics as Part of the Cognitive Sciences," *Trends in Cognitive Science*, 19(12), P729-743.

Week 12: Bias & Social Cognition

Reading: Dovidio, John, Hewstone, Miles, Glick, Peter, & Esses Victoria (2010). "Stereotyping and Discrimination: Theoretical and Empirical Overview," In *The SAGE Handbook of Prejudice, Stereotyping and Discrimination*, London: SAGE Publications Ltd., 3-28.

Week 13: Decision Making

Reading: Tversky, Amos & Kahneman, Daniel (1974). "Judgment under Uncertainty: Heuristics and Bias," *Science*, 165(4157), 1124-1131.

Week 14: **<u>Exam 2 Review (Exam date TBD)</u>**