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*:
https://rutgers.zoom.us/j/92942010291?pwd=NTBseC9ZSDJvTVJpVDBQc2ZlVUcwUT09

Section **02**: Wednesday 1:55 pm (Rosenthal), *Zoom Link*:
https://rutgers.zoom.us/j/94331186579?pwd=d3dyMjh4UTJCMFZoNG9TSldCc3NhQT09

Section **03**: Tuesday 8:55 am (Rubner), *Zoom Link*:
https://rutgers.zoom.us/j/98163110597?pwd=bjZDcUNvMC9Jam1PekNZYWhhbVRDUT09

Section **04**: Wednesday 12:15 am (Rhodes), *Zoom Link*: https://rutgers.zoom.us/j/98620130323?pwd=VUI5bG5MVGlUT05JMnAxcmdkWHo1Zz09

Section **05**: Wednesday 3:35 pm (Rosenthal), *Zoom Link*: https://rutgers.zoom.us/j/97880567214?pwd=S0JIS0NtU01vVUVMeVhxZ202YS9YQT09

Section **06**: Thursday 1:55 pm (Baker), *Zoom Link*:
https://rutgers.zoom.us/j/98842044485?pwd=YlJaQThTSGRPaEd5OU5jNDlBV2VDdz09

Section **H1**: Wednesday 10:35 am (Rhodes), *Zoom Link*: https://rutgers.zoom.us/j/97403443867?pwd=Y2J3NVptcTJ1VFQwc1V1aHpkZTZKZz09

Section **H2**: Wednesday 10:35 am (Baker), *Zoom Link*: https://rutgers.zoom.us/j/91574348340?pwd=TXg5bFVBa0puKzZjVUpFNVpTNHoyQT09

Office Hours (Starting Week 2):

Baker: Thursday from 3-5 pm, *Zoom Link*:
https://rutgers.zoom.us/j/97588224173?pwd=QTY5Q0RDak5PRmpGSzY4MndSWmswUT09

Rhodes: Mondays 1-3 pm, *Zoom Link*:
https://rutgers.zoom.us/j/93924123881?pwd=dis3dnc4VG9tRGZLQlQ4MWlXY2FOQT09

Rubner: Thursday 11am-1 pm, *Zoom Link*:
https://rutgers.zoom.us/j/97851503712?pwd=WUxQWGxjUER1ZE9rbjRTYndTUDJxdz09

Rosenthal: Thursday 10-11 am (Section 02), Thursday 11-12 am (Section 05), *Zoom Link*:
(Section 02)
https://rutgers.zoom.us/j/96026478161?pwd=cmVibEs1WlhQYzg2aGpaZWx2RHJhZz09

(Section 05)
https://rutgers.zoom.us/j/95404234016?pwd=b0JLWEFoSkUzMjM2VFVxRkFXN1RYQT09

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. 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, Michelle 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 12 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 11:59 pm EST on Friday. Responses need not be long (aim 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 March 1st at 12 am EST and due on Sunday March the 7th at 11:59 pm EST. The date and time of the second exam is 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 (Take home midterm, March 1ˢᵗ – 7ᵗʰ)</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: **Exam 2 Review (Exam date TBD)**