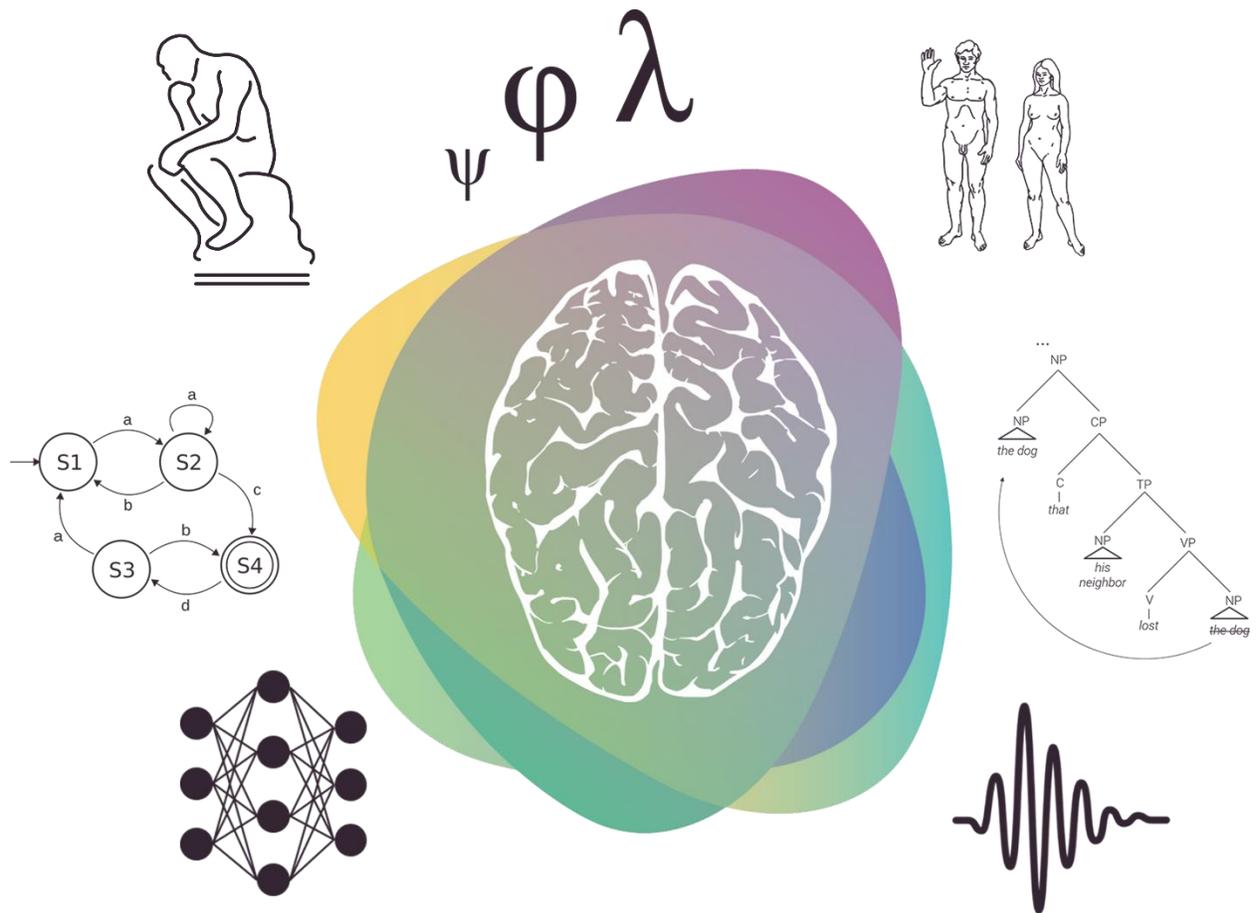


Cognitive Science: A Multidisciplinary Introduction

185:201



Cognitive Science: A Multidisciplinary Introduction

Instructor: Ryan Rhodes (ryan.rhodes@rutgers.edu)

Meets: Tuesday 10:20am-1:20pm

Location: Lucy Stone Hall Auditorium, Livingston Campus

Office Hours: Wednesday 1-3pm (or by appointment). RuCCS, Room A111.

Course Site: <https://rutgers.instructure.com/courses/186903>

Section Instructor: Preston Lennon (jpl214@ruccs.rutgers.edu)

Office Hours: TBD. RuCCS, Room A108.

Recitation 01: Wednesday 8:45-9:40am, TIL-127 (LIV)

Recitation 02: Wednesday 4:05-5:00pm, BRR-5109 (LIV)

Recitation 03: Thursday 12:25-1:20pm, TIL-252 (LIV)

Recitation 04: Thursday 4:05-5:00pm, TIL-103B (LIV)

Recitation 05: Thursday 5:55-6:50pm, TIL-105 (LIV)

Course Materials

Readings: *Readings will be supplied on Canvas. You do not need to buy a textbook!*

Lecture slides: pdfs of slides will be uploaded to Canvas under the relevant modules.

All relevant materials can be found on the course canvas site (see above).

Course Description

This course is an introduction to the nascent field of Cognitive Science. To capture the interdisciplinary nature of this field, we will address a range of topics and research programs from a variety of disciplines, including philosophy, computer science, cognitive psychology, neuroscience, linguistics, and artificial intelligence. The goals of this course are to introduce you to the foundations of Cognitive Science, help you appreciate the development of this field over the years, and allow you to explore the investigations and lively debates that have taken place within and across the disciplines that make up the field.

After completing this course students should:

- Appreciate the interdisciplinary nature of cognitive science, the diversity of viewpoints, the controversies, and the areas of emerging consensus.

- Know various definitions of the foundational concepts of computation and representation and be able to discuss them from multiple points of view.
- Have basic familiarity with brain anatomy and physiology.
- Understand how the cognitive architecture of perception, memory, language, and so forth come together to produce behavior.

All course materials will be available on Canvas, organized into weekly modules. You will find all relevant materials there, including: readings, assignments, (optional, just for fun) links to cool videos or outside articles, etc.

This course has no required textbook (save your money for the weekend). Instead, all materials including readings will be posted on Canvas. Our course readings are a pretty even split between textbook chapters, academic book chapters, journal articles, and articles from non-academic publications like newspapers and magazines. Some of these readings are challenging, but it's important to grapple with real academic writing on these complex, interdisciplinary topics.

Grading

Attendance – 10%

Attendance will be scored in lecture and recitation through small participation quizzes, roll call, or other means. Please come to class and recitation! Getting a good grade in any class is 90% just showing up!

Weekly Responses – 30%

There will be one response assigned per week (12 total). You will be required to complete six responses total – three responses from the first half of the course (before the midterm), and three from the second half of the course (after the midterm). Which responses you complete is up to you!

Peer Reviews – 20%

For each weekly response you complete, you will be required to review and comment on two (2) of your classmates' responses. You only have to do peer review for responses that you complete, meaning you will be required to do peer review for six responses (12 reviews total).

These reviews will be anonymized (you will not know whose paper you are reviewing, and you will not know who is reviewing your paper). Your review should be substantive with the aim of improving your classmate's response. You should draw from the readings, lectures, and any outside material to add insights or raise new questions.

Exams – 40%

There will be 2 exams (Midterm Exam and Final Exam), each worth 20% of your final grade. Each exam will consist of two portions: an in-class portion consisting of multiple choice and short answer questions; and an essay-based take-home portion. The multiple choice/short answer portion will be taken in class and will not be open-book. The take-home portion will be open-book, and you will have several days to complete it.

Honors

Honors students are held to a higher standard. For the honors version of this course, the attendance grade includes an additional requirement. Each honors student will lead one recitation during the semester. During our first week, each honors student will select a module. All students who selected that module will be responsible (as a group) for leading class discussion on that topic for the week of that module. This will include giving the class a brief overview of the topic and crafting a set of discussion questions. The student moderators will then lead class discussion on their chosen discussion questions.

Course Schedule

1/17	Module 1 – <i>What is Cognitive Science?</i> Reading: Friedenberg & Silverman (2016), Ch. 1
1/24	Module 2 – <i>Foundations of Cog Sci</i> Reading: Marr (1982)
1/31	Module 3 – <i>A Brief History of the Mind</i> Reading: Friedenberg & Silverman (2016), Ch. 2; Miller (2003)
2/7	Module 4 – <i>Computational Theory of Mind</i> Reading: Clark (2000)
2/14	Module 5 – <i>Connectionism</i> Reading: Bruckner & Garson (2019); Hinton (1992)
2/21	Module 6 – <i>The Brain</i> Reading: Kanwisher (2017), Beres (2017)
2/28	<i>Midterm Exam</i>
3/7	Module 7 – <i>Language</i> Reading: Everaert et al. (2015)
3/21	Module 8 – <i>Sensation and Perception</i> Reading: Beaumont & Rogers (1988); Miller (1990)
3/28	Module 9 – <i>Memory</i> Reading: Nairne & Neath (2012)
4/4	Module 10 – <i>Cognitive Development</i> Reading: Talbot (2006); Stahl & Feigenson (2015)
4/11	Module 11 – <i>Decision and Reason</i> Reading: Tversky & Kahneman (1974); Gigerenzer & Hug (1992)
4/18	Module 12 – <i>Evolution of Cognition</i> Reading: Tooby & Cosmides (1997)
4/25	<i>Final Exam Review</i>

Note: this schedule is subject to change.

Academic Integrity

Cheating or plagiarism of any kind will not be tolerated. All violations will be reported to the Office of Student Conduct without exception. If you are unsure what constitutes a violation, please consult academicintegrity.rutgers.edu.

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 you are officially enrolled, participate in an intake interview, and provide documentation. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible.

Join the Rutgers Cognitive Science Club!

The Rutgers Cognitive Science Club hosts a guest speaker series, socials, and movie nights.

For more information visit:

<http://ruccs.rutgers.edu/ruccs/index.php/opportunities/cogsci-club>.

Readings

- Beaumont, J. G. (1988). Sensation and Perception. In J. G. Beaumont & E. F. Rogers (Eds.), *Understanding Neuropsychology* (pp. 37–63). Basil Blackwell.
- Beres, A. M. (2017). Time is of the Essence: A Review of Electroencephalography (EEG) and Event-Related Brain Potentials (ERPs) in Language Research. *Applied Psychophysiology Biofeedback*, 42(4), 247–255. <https://doi.org/10.1007/s10484-017-9371-3>
- Buckner, C., & Garson, J. (2019). Connectionism. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy*. <https://doi.org/10.1145/544317.544327>
- Clark, A. (2000). Meat Machines: Mindware as Software. In *Mindware: An introduction to the philosophy of cognitive science* (pp. 7–27). Oxford University Press.
- Cosmides, L., & Tooby, J. (1997). *Evolutionary Psychology: A Primer Evolutionary Psychology: A Primer*.
- Everaert, M. B. H., Huybregts, M. A. C., Chomsky, N., Berwick, R. C., & Bolhuis, J. J. (2015). Structures, Not Strings: Linguistics as Part of the Cognitive Sciences. *Trends in Cognitive Sciences*, 19(12), 729–743. <https://doi.org/10.1016/j.tics.2015.09.008>
- Friedenberg, J., & Silverman, G. (2016). *Cognitive science: an introduction to the study of mind* (3rd ed.). Sage.
- Gigerenzer, G., & Hug, K. (1992). Domain-specific reasoning: Social contracts, cheating, and perspective change. *Cognition*, 43(2), 127–171. [https://doi.org/10.1016/0010-0277\(92\)90060-U](https://doi.org/10.1016/0010-0277(92)90060-U)
- Hinton, G. (1992, September). How neural networks learn from experience. *Scientific American*, 145–151.
- Kanwisher, N. (2017). The quest for the FFA and where it led. *Journal of Neuroscience*, 37(5), 1056–1061. <https://doi.org/10.1523/JNEUROSCI.1706-16.2016>
- Marr, D. (1982). Understanding complex information-processing systems. In Marr, D. (1982). *Vision: A computational investigation into the human representation and processing of visual information* (pp. 19–29).
- Miller, G. A. (2003). The cognitive revolution: A historical perspective. *Trends in Cognitive Sciences*, 7(3), 141–144. [https://doi.org/10.1016/S1364-6613\(03\)00029-9](https://doi.org/10.1016/S1364-6613(03)00029-9)
- Miller, J. L. (1990). Speech Perception. In D. N. Osherson & H. Lasnik (Eds.), *Language: An invitation to cognitive science* (pp. 69–93). MIT Press.
- Nairne, J. S., & Neath, I. (2012). Sensory and Working Memory. In *Handbook of Psychology* (Second Edi, pp. 419–446).
- Stahl, A. E., & Feigenson, L. (2015). Observing the unexpected enhances infants' learning and exploration. *Science*, 348(6230), 91–94. <https://doi.org/10.1126/science.aaa3799>
- Talbot, M. (2006). Cognitive Psychology. *New Yorker*, 82(27), 90–101. <https://doi.org/10.5040/9781472596178-bed-c065b>
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, 185(4157), 1124–1131. <https://doi.org/10.4324/9781912282562>