Introduction to Cognitive Science  (Fall 2020)

(Somehow I don’t think this is exactly what our class is going to look like this year...)

**What, When, & Where**

**Course #s**: Cognitive Science 110, Psychology 130  
**When**: Fall 2020, Tuesdays & Thursdays, 2:30 - 3:45 pm  
**Where**: Online, mostly via Zoom (see below)  
**Pre-Reqs**: None!  
**Capped?**: Unlikely, unless we exceed Zoom meeting limits (= ~ 300 students)  

To download readings, recorded lectures, and other materials, you must be logged in to Canvas via CAS.

**Who**

**Instructor**: Brian Scholl  (Professor, Dept. of Psychology; Chair, Cognitive Science program)  
**Email**: brian.scholl@yale.edu  
**Web**: [http://perception.yale.edu/](http://perception.yale.edu/)  
**Phone**: 432 - 4629 (but email is strongly preferred, and I forget that I even have voicemail for weeks at a time)  
**Office Hours**: Mondays 5:30-6:30pm, just after most classes, or by appointment

**Teaching Fellows**

Note: This list may change as the semester begins. Check the class webpage for up-to-date information!

- **Pinar Aldan**: pinar.aldan@yale.edu  *(Social Cognitive Development Lab)*  
  OHs = Weds 12-1p

- **Robert Walter**: robert.walter@yale.edu  *(Perception & Cognition Lab)*  
  OHs = Mon 11a-12p

- **Kim Wong**: kimberly.wong@yale.edu  *(Perception & Cognition Lab)*  
  OHs = Fri 3-4p
Course Description

Welcome! The goal of cognitive science — and of this course — is to understand how the mind works. Trying to understand our own minds is perhaps the most ambitious and exciting (and difficult) project in all of science, and this project requires tools drawn from fields including experimental psychology, computer science and artificial intelligence, linguistics, vision science, philosophy, anthropology, behavioral economics, and several varieties of neuroscience (among others). This course will introduce you to the major tools and theories from these areas, as they relate to the study of the mind. We will employ these perspectives while exploring the nature of mental processes such as perception, reasoning, memory, attention, imagery, language, intelligence, decision-making, morality — and even attraction and love. In sum, this course will expose you to cognitive science, the assumptions on which it rests, and many of the most important and fascinating results obtained so far. By the end of our semester together, you should have gained important new insights into what you are and how you work!

Pandemic-Inspired Remote Participation Details

Our class will obviously be run a bit differently this year, due to the pandemic and its related challenges. In particular:

“Synchronous” lectures: To help ensure some spontaneity, interactivity, and embarrassing gaffes, the lectures will not be pre-recorded. Instead, they’ll be delivered ‘live’ on Zoom during our scheduled class times.

(A bit of) interactivity: But we are told that college students can’t (or don’t want to) focus on a Zoom lecture for 75 minutes straight, so most lectures will also be broken up with at least some interactive components — e.g. student questions, or small-group work in breakout rooms. (This is one small feature that will be an improvement on the ‘live’ experience: trying to sort hundreds of students into small groups for short intimate discussions can be done with a few clicks online, but would trigger chaos in an actual live classroom!)

Lecture recording: The lectures will be recorded and posted on our class webpage (generally within 48 hours), but they will include only the lecture itself (and shorter student interactions) — without any extended question/answer periods.

Your face: Let’s try to be present for each other: please plan to virtually attend class with your camera on (but your microphone generally off except when interacting). It’s no problem if you need to hide behind an avatar once or twice, but please only enroll if you’ll be able to be visually present for most of the lectures. (Virtual backgrounds are discouraged.)

(Probably no) enrollment limits: This is typically a large lecture course, with no pre-requisites, and its enrollment limited only by the size of the room that we are able to find. That’s true for this year too, except that the “room” is a Zoom meeting. So we’ll have to limit ourselves to ~ 300 students — but we are unlikely to meet that limit, and so you can assume that the course will be uncapped.

Open-book + open-notes exams: Because it will be impossible to perfectly monitor test-taking behavior, we won’t even try — and both exams (see below) will be “open book” and “open notes”. (This is necessary in order to be fair to everyone, since otherwise malicious actors can readily cheat.) But don’t get too excited: the exams will also be completed ‘live’ (online) — with a limited amount of time — so that you won’t really have time to repeatedly scan through your notes.

Sections: There aren’t any. (Alas, we don’t have enough Teaching Fellows for that).
Instructor’s office hours: My office hours will occur in three formats. First, I will plan to stick around after class for an informal group discussion after most lectures (in the same Zoom channel). I won’t present any new material, but will answer questions from (and engage in discussion with) the group over Zoom (much like students would previously come up to the front of the classroom to chat after class — except that now we won’t be kicked out of the lecture hall by roving bands of economists or art historians!). Second, I will also hold a weekly one-on-one office hour on Mondays from 5:30-6:30 pm. These will also occur via Zoom, with individual students let “in” from the virtual waiting room, on a first-come/first-served basis. Third, I will be available by appointment for other meetings as needed. Email for details!

TFs’ office hours: TFs will also hold both regular weekly virtual office hours and by-appointment office hours — probably in a mix of individual and group-based formats.

Grading: The grading scheme for the course is listed below. But of course it is challenging to take courses in this new and unfamiliar format — especially amidst the economic devastation and medical tragedy of a global pandemic. So I will just also gently suggest that I don’t expect the grading of this course to be especially harsh.

Expected Work and Grading

1. (20%) Questions on Daily Readings
   To get the most out of this course, it is essential that you carefully and critically study the readings associated with each lecture. To encourage this — and to give the instructor feedback as to what you thought of the material — you will be asked to respond to a brief question concerning most readings. A sample (if boring) question might be: “Which of the two theories discussed in this article do you think is right, and why?” Your answers to each question — which you must email to your specified TF no later than one hour before the start of the class in which that reading will be discussed — need be no longer than 1 or 2 paragraphs, and should take no longer than 20 minutes to write after you have read the material. The questions due for each class will be assigned by the end of the previous class. I will use these comments to gauge your reactions to (and understanding of) the ideas we’ll discuss, and I will occasionally spend the first part of the following class responding to some of the issues you raise in these comments. Note that a significant portion of your grade (20%) will be based on these questions, and that late submissions will not be accepted for any reason.

2. (60%) Two Exams
   60% of your course grade will be determined by two exams. The first exam will be on Tuesday, October 13th, and will cover material from September 1st through October 8th. The second exam will be on Thursday, December 3rd (= our last class meeting), and will cover material from October 15th through December 1st. The exam on which you do the best will count for 35% of your grade; the other will count for 25%. There will be no exam during the final exam period. The nature of these exams will be described more fully in class. Make-up exams will be given only in exceptional circumstances, and in all cases may involve completely new questions, possibly in other formats. (Advice: you really want to avoid having to take a make-up exam.) To do well on these exams, you’ll have to virtually attend the lectures — especially since our readings and lectures will rarely overlap by more than ~ 20% (since just rehearsing the readings during our class time together wouldn’t be much fun).

3. (20%) Short Paper
   You will be required to write one short (7 - 8 page) paper for this course, on an assigned topic that is discussed near the end of this syllabus. This paper is due no later than one hour before class on Thursday, November 19th (= our last class before the break).
Readings

I have a low opinion of all extant introductory cognitive science textbooks. But even if there was a good one, I still wouldn’t like it — since textbooks strike me as easily the most unexciting and watered-down ways to discover and explore a new field. As a result, the readings for this course have been drawn from many different sources, including textbook excerpts, selections from popular books, articles from popular-press venues such as the New Yorker, and many articles from the primary scientific literature (plus the occasional OK Go music video). All of the readings will be posted on our class webpage, for you to view or print as you wish. (There is nothing to buy!) Using readings from the primary literature will help us to capture the vitality and excitement of scientific discovery. (This includes work that hasn’t yet filtered into textbooks, including readings that were only published very recently!) These readings will also be challenging, though: they will use terms and refer to ideas with which you are unfamiliar, and they’ll sometimes leave you with more questions than answers. This is okay! Though the readings have been carefully chosen to be accessible, I don’t expect you to fully understand every aspect of them, and I will frequently provide guidance about what you should try to get out of especially challenging readings. In the end, these challenges will pay off, as you get a direct look at the science of mind in the making.

Preliminary Course Outline

Here’s a preliminary outline of the material that we’ll cover together. The full references for these readings are listed at the very end of the syllabus. We’ll start out by spending a few weeks on the key themes of cognitive science as a whole, after which we’ll branch out to a representative selection of the various tools cognitive scientists use, and the aspects of the mind that we study. The exact timing of these lectures (and the exact readings that we end up using) are subject to change. We may end up spending more time than is listed here on topics that strike you as especially interesting or difficult. Please interact with me regarding the course: if there are topics you would like to add, or cover in more depth, let me know!

Tue 9/1: An Introduction to Your Mind
[No Readings]

Thu 9/3: Foundations of Cognitive Science
Bisson (1991), “They’re Made Out of Meat” (Omni)
Marcus et al. (2014), “How to Study the Brain” (Chronicle of Higher Education)

Tue 9/8: Crossed Wires (The Architecture of the Mind)
Rafal (2001), “Bálint’s Syndrome”
Sacks (2004), “Speed” (New Yorker)

Thu 9/10: What’s Within? (How Nature Supports Nurture)
Bouchard (2008), selection from “Genes and Human Psychological Traits”
Gandhi et al. (2015), “Immediate Susceptibility to Visual Illusions After Sight Onset”
Sugita (2008), “Face Perception in Monkeys Reared with No Exposure to Faces”

Tue 9/15: Pieces of Mind (Modularity and Mental Organs’)
Gallistel (2000), selection from “The Replacement of General-Purpose Learning Models with Adaptively Specialized Learning Modules”

Thu 9/17: Mental Circuitry (Computation and Cognitive Science)
Pinker (1997), selection from “Standard Equipment”
Pylyshyn (1999), “What’s In Your Mind?”
Watch this strange movie: http://www.youtube.com/watch?v=E3keLeMwfHY
Tue 9/22: Two Mysteries of the Mind (Evolution and Consciousness)
Churchland (2013), Chapter 2 of Matter and Consciousness (3rd Ed.)

Thu 9/24: Goo goo, ga ga (The Minds of Babies)
Topál et al. (2008), “Infants’ Perseverative Search Errors are Induced by Pragmatic Misinterpretation”
Talbot (2006), “The Baby Lab” (New Yorker)

Tue 9/29: My Brain Made Me Do It (Cognitive Neuroscience)

Thu 10/1: Brain Scanning and Mind Reading
Iacobini and various unhappy people (2007), “This is Your Brain on Politics” (NYTimes)
Optional: Jonas & Kording (2017), “Could a Neuroscientist Understand a Microprocessor?”

Tue 10/6: “Goo goo, ga ga” (Acquiring Language)
Jackendoff (1994). Chapters 8 - 10 of Patterns in the Mind
Skim: Enard et al. (2002), “Molecular Evolution of FOXP2, a Gene Involved in Speech and Language”

Thu 10/8: Mid-semester Catch-up…
[The chances that we’ll be on schedule by this point are slim; we’ll use this day to catch up!]

Tue 10/13: MIDTERM EXAMINATION!

Thu 10/15: Now Hear This! (Linguistics)
Everaert et al. (2015), “Structures, not Strings: Linguistics as a Part of the Cognitive Sciences”
Optional gentler introduction: Pinker (1994), chapters 4 - 5 of The Language Instinct

Tue 10/20: Colorless Green Ideas Sleep Furiously (Syntactic Theory)
Stillings et al. (1995), “Syntax” and “Universals”

Thu 10/22: Seeing: It’s Not What You Think (Perception)
Firestone & Scholl (2016), selection from “Cognition Does Not Affect Perception…”

Tue 10/27: Monkeying Around (Comparative Cognition) [Guest Lecture: Laurie Santos]
Tomasello et al. (2003), “Chimpanzees Understand Psychological States…”
Hare & Tomasello (2005), “Human-like Social Skills in Dogs?”

Thu 10/29: Deep Thought (Roles of Philosophy in CogSci) [Guest Lecture: Joshua Knobe]
[Readings TBA]

Tue 11/3: She Blinded Me With Science (Visual Cognition)
New & Scholl (2008), “Perceptual Scotomas: A Functional Account of Motion-Induced Blindness”
Watch this music video: https://www.youtube.com/watch?v=m86ae_e_ptU
Thu 11/5: Bringing Cognitive Science into Focus (Attention)
Most et al. (2001), “How Not to Be Seen”

Tue 11/10: I, Robot (AI & and Social Robotics) [Guest Lecture: Scasz]

Thu 11/12: Elementary, My Dear Watson (Reasoning and Rationality)
Ariely (2010), “Thoughts about the Subprime Mortgage Crisis and its Consequences”


Thu 11/19: Ooh la la! (The CogSci of Love, Sex, & Attraction)
Butler et al. (2017), “Physical Attraction to Reliable, Low Variability Nervous Systems…”

(Tue 11/24 & Thu 11/26: No Class: November Recess)
https://tofurky.com/faqs/

Tue 12/1: The Past, Present, and Future of Cognitive Science
[No readings]

Thu 12/3: FINAL EXAMINATION!


In this short (7-8 page) thought paper, you’ll choose a part of cognitive science that we’ve covered in class, and you’ll discuss how the research in that area should (or should not!) impact the real world, and everyday life. In essence, you’ll be asking: Who cares? Why should (or shouldn’t) the ‘person on the street’ care about this research? This will be a ‘thought paper’ in part because our readings and lectures will not always discuss these themes explicitly, but I hope that you’ll be thinking about them throughout our course. This topic and our expectations for the paper will be described in glorious detail as the due date approaches.

Note also that although this is the ‘assigned topic’ for the paper, I am open to letting you write on another topic of your own choosing, if you are particularly engaged by some other idea. The only strict constraint is that this must be a ‘thought paper’, to be graded primarily on the degree of interesting and careful thought it conveys involving themes from our course. (In contrast, this paper is not meant to be a research paper or a ‘book report’, in which you summarize others’ already-published ideas. Indeed, you needn’t read any new source material at all for this assignment, beyond what is already required for class!) To write on an independent topic, you must get it approved by me, no later than Thursday, November 12th (aka a week before the paper is due).