Introduction to Cognitive Science  (Fall 2021)

This is an early + highly provisional syllabus, as of 4/21!

(Is this what our class will look like again this year?  I hope so — even if we have to wear masks with our 3D glasses!)

What, When, & Where

Course #s  :  Cognitive Science 110, Psychology 130  
When        :  Fall 2021, Tuesdays & Thursdays, 2:30 - 3:45 pm  
Where       :  In a Yale classroom? Online via Zoom? As of 4/21, we don’t know yet...  
Pre-Reqs    :  None!  
Capped?     :  Unlikely  
Webpage     :  http://perception.yale.edu/IntroCogSci/ 

To download readings 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/  
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!

(To be added in late summer, 2021!)
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 modeling and artificial intelligence, neuroscience, philosophy, linguistics, anthropology, and behavioral economics (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 ... you — focusing on parts of you such as perception, reasoning, memory, attention, imagery, language, intelligence, decision-making, morality — and even sexual attraction. In sum, this course will expose you to cognitive science, the assumptions on which it rests, and many of the most important and fascinating discoveries that the field has made so far. By the end of our semester together, you should have gained important new insights into what you are and how you work!

 Hopefully Not Necessary: Remote Participation Details

As of 4/21 (when this proto-syllabus is being prepared for our new and absurdly early course registration period), we don’t yet know if we’ll be back to normal in a real Yale classroom, or if we’ll be together on Zoom. Let’s hope for the former! But if the latter, here are a few details of how things will work:

“Synchronous” lectures: To help ensure some spontaneity, interactivity, daring questions, 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: 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 can be an improvement on the in-person 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! But don’t worry: the exercises that we can do when we’re actually in a classroom together are even cooler...)

Lecture recording: If we’re not with each other in person, then the lectures will be recorded and posted on our class webpage (generally within 48 hours) — but they will generally include only the lecture itself — without many interactive class discussions, exercises, or question/answer periods. So to make the class worth it, you’ll need to attend each class at the scheduled time: recordings may be helpful for studying later on (or in emergencies), but they won’t be substitute for the real thing, and by themselves they won’t allow to you do well in the course. So if we’re virtual again, then you should only take this course if you can attend ‘synchronously’.

Your face: If we have to meet virtually again, then 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
occasionally for brief durations, but please only enroll if you’ll be able to be visually present for most of the lectures. (Virtual backgrounds are discouraged unless they’re hilarious.)

**Open-book + open-notes exams:** If we’re together virtually, then it will be impossible to perfectly monitor test-taking behavior, and so 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 still 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:** If virtual, then 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 meeting). 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:** If virtual, then your 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.

### 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 during 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 19th*, and will cover material from September 2nd through October 14th. The second exam will be on *Thursday, December 9th* (= our last class meeting), and will cover material from October 21st through December 7th. 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 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 18th** (= our last class before the November 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 seem like 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 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 scientific 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 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, the 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 this semester. 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 (= the glue that will tie the course together, despite so much breadth!), 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 challenging. Please interact with me regarding the course: if there are topics you would like to add, or cover in more depth, let me know!

**Thu 9/2: An Introduction to Your Mind**
[No Readings]

**Tue 9/7: 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*)
Carandini (2012), “From circuits to behavior: A bridge too far?”
Thu 9/9: Crossed Wires (Brain Damage and the Architecture of the Mind)
Sacks (2004), “Speed” (New Yorker)

Tue 9/14: 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”

Thu 9/16: Pieces of Mind (Modularity and ‘Mental Organs’)
Gallistel (2000), selection from “The replacement of general-purpose learning models with adaptively specialized learning modules”

Tue 9/21: Mental Circuitry (Computation and Cognitive Science)
Pinker (1997), selection from “Standard equipment”
Pylyshyn (1999), “What’s in your mind?”
Cowell (2019), “Overlooked no more: Alan Turing…”
Watch this strange movie: http://www.youtube.com/watch?v=E3keLeMwfHY

Thu 9/23: Two Mysteries of the Mind (Evolution and Consciousness)
Churchland (2013), Chapter 2 of Matter and Consciousness (3rd Ed.)

Tue 9/28: Mid-semester Catch-up/Extras #1…
[The chances that we’ll be on schedule by this point are slim; we’ll use this day to catch up, and/or to explore other topics that are especially engaging or challenging this year!]

Thu 9/30: My Brain Made Me Do It (Cognitive Neuroscience)
Buckholtz & Fagman (2014), “Promises, promises for neuroscience and law”

Tue 10/5: Brain Scanning and Mind Reading
Skim: Nishimoto et al. (2011), “Reconstructing visual experiences from brain activity…”
Iacobini and various unhappy people (2007), “This is your brain on politics” (NYTimes)
Jonas & Kording (2017), “Could a neuroscientist understand a microprocessor?”

Thu 10/7: I, Robot (AI & and Social Robotics) [Guest Lecture: Scasz]
Yang et al. (2018), “The grand challenges of Science Robotics”

Tue 10/12: “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”
Kinzler et al. (2007), “The native language of social cognition”

Thu 10/14: Mid-semester Catch-up/Extras #2…
[Another day to catch up, and/or to cover other interesting topics that are especially engaging this year!]

Tue 10/19: MIDTERM EXAMINATION!
Oh, how I hope we’re back to live classes and actual breaks!

**Tue 10/26: 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*
Cunningham (2017), “The case for Black English”

**Thu 10/28: Colorless Green Ideas Sleep Furiously (Syntactic Theory)**
Stillings et al. (1995), “Syntax” and “Universals”

**Tue 11/2: Deep Thought (Roles of Philosophy in CogSci)** [Guest Lecture: Josh Knobe]

**Thu 11/4: Seeing: It’s Not What You Think (Perception)**
Marr (1982), “The philosophy of the approach” (a selection from *Vision*)
Firestone & Scholl (2016), “selection from “Cognition does not affect perception...””

**Tue 11/9: She Blinded Me With Science (Visual Cognition)**
Watch this music video: https://www.youtube.com/watch?v=m86ae_e_ptU

**Thu 11/11: Bringing Cognitive Science into Focus (Attention)**
Most et al. (2001), “How not to be seen”
Simons & Levin (1998), “Failure to detect changes to people in a real-world interaction”

**Tue 11/16: Monkeying Around (Comparative Cognition)** [Guest Lecture: Laurie Santos]
Hare & Tomasello (2005), “Human-like social skills in dogs?”

**Thu 11/18: Elementary, My Dear Watson (Rationality)** <PAPERS DUE!>
Ariely (2010), “Lessons from our irrationalities”

(Tue 11/23 & Thu 11/25: No Class: November Recess)
https://tofurky.com/faqs/

Fischhoff & Broomell (2020), “Judgment and decision making”

**Thu 12/2: Ooh la la! (The Cognitive Science of Sex and Attraction)**
Berglund & Rosenqvist (1993), “Selective males and ardent females in pipefishes”
Butler et al. (2017), “Physical attraction to reliable, low variability nervous systems...”
Graves (2014), “How our genes could make us gay or straight”

**Tue 12/7: The Past, Present, and Future of Cognitive Science**
[No readings]

**Thu 12/9: FINAL EXAMINATION!**
Assigned Paper Topic: CogSci and Everyday Life

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 also 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 11th (aka a week before the paper is due).

Full References for Readings
