Where and When
Lectures are given in
Uris Hall auditorium
Tuesday and Thursdays
11:40am–12:55pm.
Discussion sections meet on
Wednesdays.

Instructor
John Hale
217 Morrill Hall
office hour:
Thursday 2:30–3:30pm

Teaching Assistants
Nan Li nl294 dis201 9:05-9:55a 215 Morrill
Michelle Tong tt389 dis202 10:10-11:00a 215 Morrill
Neil Ashton nma38 dis203 11:15-12:05a 201 Uris
Justine Lewis jll293 dis204 12:20-1:10p 201 Uris
Ayse Candan ac885 dis205 1:25-2:10p 201 Uris
David Lutz del182 dis206 2:30-3:20p 201 Uris

1 What is this course about?

Introduction to Cognitive Science, COGST1101, deals with some of humanity’s deepest questions about ourselves:

- what is it that makes us intelligent compared to rocks, trees, books...or robots?
- how could your thoughts, in all their glory, be sustained by 3 lbs of stuff in your head?
- does your mind or brain have pieces? or is it all interchangeable?
- what kind of “imitation” would account for children’s language-learning?
- do we really see what’s out there? is sight “faithful”?
- does our behavior reflect optimal adaptation to our (information) environment?
- does the language that you speak restrict or promote certain kinds of thinking?

These sorts of “big questions” are characteristic of cognitive science, and responses to them typically point to some kind of theory about how the mind works. Students in COGST1101 learn to distinguish between these theories. They learn how to critique the relation between evidence and theory in cognitive science, and they gain an ability to interpret work in traditional subdisciplines such as philosophy, psychology, artificial intelligence, linguistics and neuroscience in terms of the broader project of understanding the human mind.

These capabilities are important, in part, because of the great promise that Cognitive Science holds for society. To cite just a few examples:

- revolutionize medicine If we knew more about normal human abilities in vision, language or reasoning, perhaps we could return these abilities to the injured.

- lead to new technology Could artificial minds become our tools, our helpers?

- improve education A model of cognition at school would pinpoint where learners go astray, guiding targeted remediation and making practice more effective.

- speed up justice By formalizing concepts like ‘obligation’ and ‘statute’, perhaps less litigation would go to trial

The premise of cognitive science is that minds are information-processors. But what type of information-processing do they do? We will pursue this question throughout the course in various ways. We will take up experimental methods of observing the mind’s activity, debate theories about what information-processing actually is, and raise controversial questions about how the mind works. A tentative schedule of topics is given on page 5. These topics are conceptually related in ways that are partially diagrammed on page 6. The bracketed topic tags also serve to organize E-reserved readings at the library.
2 What’s my part?

Right now

Buy the textbook Our textbook this semester is: Cognitive Science: An introduction to the Science of the Mind by José Luis Bermúdez, published by Cambridge University Press isbn 978-0-521-88200-2. The book will also be available on Reserve for 2 hours at a time in Uris Library.

Buy the CogLab booklet The CogLab booklet was misprinted without the access codes, so once you have the booklet, see your TA to obtain your access code. Then follow the directions posted on Blackboard and enter your access code in order to get signed-up for the CogLab online service.

Self-enroll in blackboard The Blackboard course management system will give you access to required readings, assignments and essential handouts. Using your NetID, enroll yourself in COGST1101-Hale-Fall2011 using http://blackboard.cornell.edu Click on the “Contacts” button and find out more about your course staff!

Sign up for a discussion section Within Blackboard there is a Course Group corresponding to each TA/discussion section. Pick one that works with your schedule. If your desired section is full, find someone to swap with or pick another section. Indicate officially to the Registrar that you are enrolled in that particular discussion section using http://studentcenter.cornell.edu

On a regular basis

Discussion section

We strongly recommend that you enroll in one of the six discussion sections, 201–206. These sections meet at various times on Wednesday, and are each led by one of the TAs. By signing up, you receive an additional course credit. But more importantly, you’ll be able to get a better handle on the course content by talking about the material with your fellow students and your TA. Because TAs do not hold regular office hours, section is the best way to verify, in a fun group setting, that your understanding of the course material is sufficiently deep.

It is possible to take the course without the discussion section. However, skipping section means you miss out on the camaraderie, the intellectual discourse, and the feedback you could have had from a TA.

Think Pieces

A “think piece” is a short piece of writing (perhaps 300 words) that you turn in, via Blackboard, in response to a specific question posed in class. These think pieces typically ask you, the student, to re-explain some key concept in your own words. Or they may prompt you to write up your reflections on some question that has come up in class. Only students signed up for discussion sections need to do think pieces, but they have a definite due date, usually 5pm the day before your section meeting. This allows your TA to get an idea of how much their section is understanding. If you so choose, you may use your think piece as a basis for contributing to discussion in section. Think pieces’ quality is graded on a ✓, ✓+, ✓− basis.

Blackboard quizzes

You will get ready for multiple-choice exam questions by taking short (3-5 question) online quizzes using Blackboard. These are graded on a complete/incomplete basis; whether you got the question correct or incorrect doesn’t matter on quizzes. However, they serve as practice for the exams and prompts for discussion in section. Participation in quizzes is part of everyone’s grade, discussion section or not.

Reading

The tentative schedule laid out in section 5 specifies reading assignments. The ones taken from the Bermúdez textbook are marked with a “B” and a section (§) number. The others are available online as library E-reserves. They are tagged by topic. For instance, the readings for the first day are tagged [firstday]. Within Blackboard, it’s convenient to filter these E-reserves to only show readings matching a particular tag.
It is normal to have to re-read these reading assignments more than once. The strategy we recommend is to read the assigned reading once in preparation for class, and then again after hearing the lecture. This second reading often solidifies concepts that were difficult the first time. It also helps uncover specific questions that can guide discussions with course staff.

**Studying**

If you’re coming straight out of high school, you may be unfamiliar with some of the study skills needed in college. This is totally normal but it’s also something that needs to be dealt with right away so that you can learn effectively. To that end, I recommend Ron Fry’s *How to Study* which has sections on “How to Read and Remember”, “Technical Texts” and “Increasing Comprehension.” You can read the E-book online. Fry has a great passage which applies directly to COGST1101:

> Some teachers...use the text merely as a jumping-off point — their lectures might cover numerous points that aren’t in your text at all. Preparing for this latter kind of class will require much more than rote memorization of facts and figures — you’ll have to be ready to give examples, explain concepts in context and more. (page 105)

For help dealing with time management, stress, and procrastination, visit Cornell’s [Learning Strategies Center](http://www.lsc.cornell.edu). Michael Chen of the LSC is offering a Study Skills Workshop called “Keys to Academic Success” on Wednesday August 31st at 4:30pm in the [Tatron Center](http://www.tatroncenter.cornell.edu). 3058 S. Balch Hall on North Campus.

**Homework**

As a COGST1101 student, you get to play with cognitive models and watch professional cognitive scientists explain their research. One kind of homework allows you to get your hands dirty using cognitive models that — while slightly simplified — nevertheless reflect current scientific proposals about how the mind works. These theories are implemented as software that is typically installed in CIT labs or can be downloaded onto your own computer. Turn in your answers via Blackboard. Don’t worry, you do not need to be a professional computer programmer to do these assignments! Another kind of homework prompts you to watch a film and respond in writing. These experiences outside lecture are meant to prompt reflection, and will take time. A reasonable estimate is four or five afternoons throughout the semester.

### 3 What determines my course grade?

Your learning will be evaluated using two preliminary exams and a final. Prelims are taken in class. COGST1101 is in Exam Group P, so the final will be administered on December 14\textsuperscript{th} from 7-9:30pm in a room that will be determined later by the Registrar. The Cornell Faculty Handbook specifies that “No final examinations can be given at a time other than the time appearing on the official examination schedule promulgated by the Registrar’s Office without prior written permission of the dean of faculty” (page 81) and the Registrar itself requires that students must present their requests for a make-up exam to their instructor on or before September 2\textsuperscript{nd}. So please approach a member of the course staff as soon as possible if you must schedule a make-up exam.

The final exam is cumulative whereas the two prelims are not. There is no curve; COGST1101 is meant to foster the education of an individual, rather than competition.

The grading breaks down differently, depending on whether you are signed up for a discussion section or not:

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<th>Discussion Section Omitted</th>
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<td>prelim 1</td>
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<td>prelim 2</td>
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<td>final</td>
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<td>think pieces</td>
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<td>section participation</td>
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What constitutes Participation?

At the end of the semester, the course staff collectively estimates your level of participation. We use this estimate to push up borderline grades. We try to assess the degree to which you seemed engaged during lecture, or in separate interactions with course staff. Asking questions in class can be a sign of engagement, but only when the questions originate in a sincere desire to learn. There is no need to change your personality to appear more extroverted! However, we do notice people who come prepared and enrich class meetings with thoughtful questions. We remember students who took the time to wrestle with intellectual ideas that are new to them. Students whose involvement with cognitive science is more limited will receive a mark that directly reflects their weighted exam grades.

4 Policies

Academic Ethics

I expect everyone to adhere to the Cornell Code of Academic Integrity. While it is perfectly all right to discuss Cognitive Science with your classmates, copying someone else’s test, plagiarizing essays or falsifying homework is wrong. The instructor and teaching assistants will refer all cases of academic dishonesty to the relevant Dean. Cheaters will fail the course. There are no second chances because academic honesty is the foundation of intellectual life in the university.

Mutual respect

The course staff strives to treat you with the respect you deserve as a serious student of cognitive science. Please give the staff and your fellows a similar level of respect. In particular:

- consider our time when emailing us. Questions about course material will almost certainly receive a more satisfying treatment in the context of a section meeting.
- turn off your cell phone during lecture. If your device disrupts class, I will point to one of the TAs who will escort you out.
- arrive and depart on schedule. As an instructor, I am expected to show up on time and I expect the same of you. Please refrain from making noise at the end of class before being explicitly dismissed.

Accommodations for disabilities

An accommodation is the modification, adjustment, or elimination of a barrier to a program or service that enables an individual with a disability to participate on an equal basis. Extended time for test taking, providing print material in alternate formats, sign language interpreting, and using FM listening devices are examples of accommodations frequently provided for Cornell students. Please obtain a Faculty Notification Letter from Student Disability Services as soon as possible; the COGST1101 staff will be happy to accommodate you as best we can.

Firm due dates

The goal of the course is to promote learning about cognitive science, whether it happens on schedule or not. However, we cannot devote staff time to grading homeworks that are turned in late. Due dates are firm. Hand-ins that come after a stated deadline can serve as the basis of discussion with TAs or the instructor but cannot count towards your grade.

Office hours

TAs hold office hours by appointment. If your question cannot be handled in section or you are not enrolled in a section, request an appointment with one of them.
5 Tentative Schedule

Due dates for Think Pieces and Homework are indicated in the Blackboard calendar for COGST1101.

August 25th what is cognitive science? [firstday]
required B§1.1 pp5-13
August 30th what's inside? [cognitive-maps]
optional Tinbergen (1958)
September 1st measuring cognition [attention]
required B§1.4 pp19-23
optional article 27 on RT Bechtel et al. (1998)
additional why bother with theory? McBurney (1996b)
September 6th parallel vs serial [visualsearch]
required (Wolfe, 2009, pages 193–199)
optional Treisman (1986)
September 8th what are the sub-functions of [memory]
required Baddeley (1999, ch 2)
recommended Baddeley (1999, ch 3)
September 13th what is seeing? [unconsciousinference]
optional Winston (1984, ch 3)
September 15th the theoretical notion of [computation]
required Crane (2003) excerpt from ch 3
optional Greene and Holloway (1978)
September 20th nailing down this notion [turingmachine]
required Turing (1950)
September 22th Brandon Roy, MIT [speechome]
required Bruner (1985)
September 27th a formal system [generativegrammar]
required Larson and Ryokai (2010) part II
September 29th how would a grammar be used? [parsing]
required Stenning et al. (2006)
recommended Marr (1982) pages 19–29
September 30th Colin Phillips 3:30pm Uris 202
October 4th PRELIM #1
October 6th a grim window into the mind [amnesia]
required Jansari (2005)
October 11th (fall break)
October 13th what can each half do? [splitbrain]
required B§3.2 on Ungerleider & Mishkin
optional Gazzaniga (2005)
October 18th mind’s degree of [modularity]
required B pages 293-299 on Fodor
optional Hole and Bourne (2010)
October 20th nature of cognitive [architecture]
required B§6.1 pages145-156
recommended Sharples (1989) ch 7
optional Anderson (1996)
October 25th syntax vs semantics in [deduction]
required B§6.2 pages 156–165
required Haugeland (1985) pages 99–106
optional predicate logic Luger (2009, ch 2)
October 27th neural nets [pdp1]
required B§8.1 pages 216–222
required Rumelhart (1998)
November 1st and how they work [pdp2]
required review the same readings
November 3rd how they learn [perceptrons]
required B§8.2 pages 222–233
November 8th the problem posed by the [pasttense1]
required O’Grady (2005) pages 18–26
November 10th alternative accounts of [pasttense2]
required B§9.2 pages 254–262
November 15th implications of aphasia for [pasttense3]
required Dronkers/Baldo on aphasia (to be posted)
optional Ullman et al. (2005)
November 17th PRELIM #2
November 22nd Sam Tilsen, Cornell [concepts]
Readings To Be Announced.
November 24th (Thanksgiving)
November 29th the mind vs the community [whorf]
required Regier et al. (2010)
optional article 25 in Bechtel et al. (1998)
December 1st the best thing to do [rationalanalysis]
required B§10.4 pages 314–320
required Pirolli (2007)
December 14th FINAL EXAM
what is cog sci?

reaction time

vision

language

memory

cognition is [computation]

characteristic methods:

typical questions:

theoretical ideas:

formalizable as a [turingmachine]

are both "syntactic"

over representations such as [cognitive-maps]

raises questions:

what do we know? [generativegrammar]

how do we use it? [parsing]

acquire it in the first place [speechome]

prelim #1

[amnesia] [splitbrain]

brain damage

bears on modularity of

types of computational cognitive [architecture]

cognition is symbol-manipulation

production systems

[pdp] neural nets

cognition is spreading activation

could constrain the design of

prelim #2

[rationalanalysis]

[attention] [visualsearch]

[unconscious inference]

answer

answer

the challenge of unified cog sci

does

logical [deduction]

all of the above presents:

[concepts]: do we know them? share them? [whorf]

[rationalanalysis]

[yield alternative accounts of [pasttense]]
References

Donald McBurney. But can we really understand behavior until we know its biological basis? In How to think like a psychologist: critical thinking in psychology (McBurney 1996d), chapter 17.


Donald McBurney. Why don’t you skip the theories and give us more facts? In How to think like a psychologist: critical thinking in psychology (McBurney 1996d), chapter 3.


Donald McBurney. But people aren’t machines! In How to think like a psychologist: critical thinking in psychology (McBurney 1996d), chapter 20.


7


