

INTRO TO COGNITIVE SCIENCE

Professor

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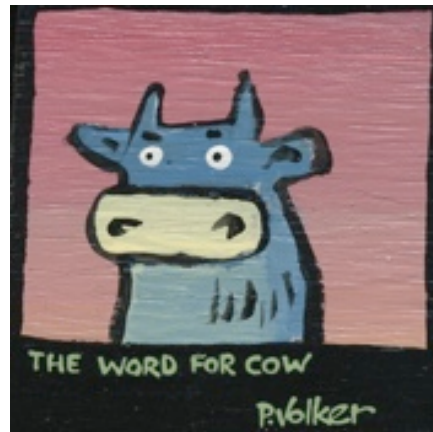
Office hours by appointment. Website - <http://learn.skidmore.edu>

Introduction

What are the critical components of ‘mind’, ‘consciousness’, ‘knowledge’ and ‘thought’? In this class, we survey philosophical, psychological, neuroscientific, anthropological, and computational approaches to understanding this question – an interdisciplinary field of study known as cognitive science.

Cognitive Science defines itself through the types of questions it asks and the methods used to answer them. One fundamental approach to developing our hypotheses and theories involves the development of models – testable representations of these processes and ideas. These models are constantly tested and refined against the array of low-level physiological processes, individual behaviors, and group and global systems that define our cognitive world. As we iterate this modeling – testing loop we hope to come closer to understanding the foundations of thought and mind.

The following *gedankenexperiment* serves as one of the primary touchstones of the course: If we design a machine that takes ‘inputs’ (information from the senses), transforms them precisely in the same mechanical way the brain’s neurons do, and generates ‘outputs’ (behaviors), can that machine be said to have a ‘mind’ or is it just a ‘zombie’? If you answered “yes! wait! no! wait ahhhh! Zombies!” to this question you are ready for this class.



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The Plan

We will plot a course through this material via several disciplines that should inform our quest, roughly in this order:

- Philosophy
- Psychology
- Computer Science
- Neuroscience

These may only seem loosely related, but we'll tie them together by comparing, contrasting, and discovering the intersections and relative influences of each field's the notion of 'mind'.

More concretely, philosophy will almost certainly have much to say, but lacks the perspective (and most probably the desire) to 'implement'. Computer science focuses on 'implementation' but doesn't always base these implementations on empirically valid ideas. Psychology attempts to develop and empirically validate these ideas but sometimes lacks the philosophical perspective, implementation and modeling sophistication of other fields. Neuroscience has a lot of explanatory power from the mechanical / functional perspective but, thus far, lacks the power to tie its functionalist ideas into the teleological realm.

The Goals

This course will introduce students to disciplinary and interdisciplinary perspectives on the science of mind. We'll focus on three main questions

- What are the fields that make up Cognitive Science and what parts of these fields are most relevant to its study?
- Where are the intersections in these fields? For example, how does philosophy inform psychology and what parts of psychology are adopted by computer science in their quest for "artificial intelligence"?
- Finally, what are the methods that cognitive scientists use to advance our understanding of the mind and brain?

In addition, this is a course about *knowing*, particularly about ways to identify problems, formulate productive questions, and go about answering those questions. Students in this course will demonstrate the ability to:

- Formulate appropriate questions that address issues within and between Cognitive Science's associated disciplines.
- Read critically, and gather and interpret evidence.
- Present their ideas orally and in writing.

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Materials

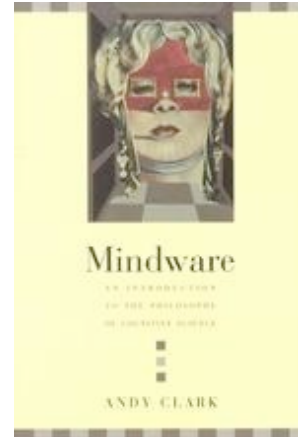
As you might imagine, with so many fields coming into play there are a variety of perspectives. Honestly, I find most of the books to leave me ‘wanting’ a bit. We’ll switch things up this semester with a new book + readings.

Mindware – An Introduction to the Philosophy of Cognitive Science

Andy Clark, Oxford University Press, USA.

ISBN 0195138570

Andy Clark has a nice way of thinking about humans as embodied cognitive things- *meat machines* I believe is the thought. But, of course, we have to ask if we’re a bit more complicated than just machines, if consciousness and the mind are special things or just emergent phenomena of our main meat-part, the brain (or even our big toe?) We’ll dig through this in an attempt to get a grounding in how we think about thinking – what the mind is mindful of.

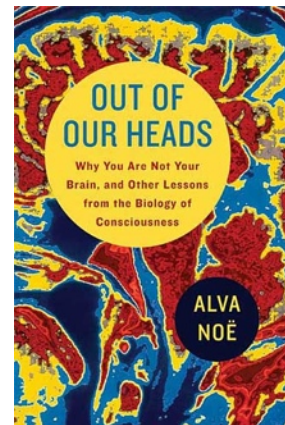


Out of Our Heads

Alva Noë, Hill & Wang, USA.

ISBN 9780809016488

Like Clark, Noë does a wonderful job making sense of some of the real problems with cognition – most importantly those involved with consciousness. Like Clark, Noë has been influenced by Gibson and other Ecological Psychologists as well as some of the newer breed of dynamical systems theories advanced by Turvey and friends, and the new movement of “Radical Embodied Cognition”. His position is reasonably strong and well-put, basically that, if we’re looking only to the brain itself to understand consciousness and cognition we’re making a huge mistake.



Primary Source Reading

We will supplement each week’s reading with primary source material. This will range from material introduced in the secondary readings to material chosen by the students.



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Attendance and Class Format

We'll do this class in a 'mostly-seminar' format. There will be a little lecturing by me, once a week or two, to outline the subjects and questions. Then, we're onto the seminar / discussion portion. These classes will take the presentation / discussion format where one or more of you will be responsible for preparing a presentation of the week's readings. Usually, this will evoke spirited discussion, but if the class remains 'shy' I will not hesitate to request your participation.

Bottom line — be prepared and pay attention, you will be tested and evaluated by your participation.

As a policy, if you miss 5 or more classes I reserve the right to fail you for the course.

Writing / Presentation Projects

Each week's reading will require a 1-2 paragraph 'reaction' to be shared with the class. The student presenting the week's work will also prepare a simple outline to be shared with the class. These will be required to be posted on the class website or emailed to me the *day before* the first class of the week. Penalties for slacking on this step include public humiliation and ridicule. The last week of class is reserved for discussion / presentation of student-driven topics.

Grading

Exams	75% (date/format TBD)
Discussion	10%
Written Projects	15%

Honor Code

You are expected to adhere to the *Skidmore Honor Code* as stated in the student handbook:

I hereby accept membership in the Skidmore College community and, with full realization of the responsibilities inherent in membership, do agree to adhere to honesty and integrity in all relationships, to be considerate of the rights of others, and to abide by the college regulations.

Violations, such as, but not limited to, plagiarism, unauthorized collaboration, and deception / cheating, will be handled according to College policy. Please realize that punishments generally *start* at failure in the course and increase from there. Remind me to tell you about some of the papers some friends and I have 'planted' on paper sharing sites sometime.

Cellphones, Texting, Computers, Missing Class

You get to hear this a lot, I'm certain, but we're all roughly adults here. Courtesy reigns supreme in my universe. Turn off your ringer, don't text your BFF, if you are using a computer in class I reserve the right to have you show whatever is on your screen to everyone, at any time, so try to limit the facebooking. Remember, 25% of your class score is 'discussion' and it's hard to do a good job when you're reading TMZ.com for the latest LiLo saga or are fumbling with your Blackberry even if you're texting "OMG COGSCI ROX".

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As a policy, late and missed work receives no credit. If the circumstances seem reasonable and are documented, preferably before-the-fact, I reserve the right to modify this policy. I am a reasonable and rational person, even compassionate. But please do not try to take advantage of this weakness, as I typically react poorly to it.

General Strategy

The 'computational theory of mind' (CTM) has been firmly established as the primary model for the investigation of the mind and cognition. In this class, we will spend the first half of the semester surveying the CTM and the second half poking various holes in its tenets. Should be a blast.

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Schedule

Part	Subject	Notes
I	We are Meat Machines	
II	Connectionism	
III	PandA	
IV	Robots	Exam I
V	Dynamical Systems	
VI	Consciousness	
VII	Embodiment	
VIII	Social Phenomena	Exam II

Disclaimer

This document is subject to whimsical change without much notification but, as policy, all changes will be announced in class.