Course Name and Number

185:360 Origins of Cognition

Course Canvas site:

Requirement: 185:201 Intro to Cog Sci

Semester
Fall 2021

Meeting Days, Times, and Place(s)
Mixed Synchronous and Asynchronous
(details on Canvas site)

Instructor's Name

Prof. Jenny Wang

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Office Hours: day, time and location TBD

Learning Goals

Where does human knowledge come from? In this course we will explore the origins of human knowledge through the lens of cognitive developmental science, and link it to ideas from other academic fields, such as philosophy, behavioral biology, neuroscience, and anthropology. The topics may include: depth, space, number, language, music, social understanding and learning & plasticity. We will examine findings and ideas from developmental science, broadly construed. Most importantly, we will learn about these findings and ideas both through readings and lectures, and through doing in-class experiments ourselves!

We aim to attain more insight into what it means to be a human thinker. Along the way, you will:

- Learn the central concepts and theoretical foundations of cognitive developmental science
- Learn to find resources and to think for yourselves about issues regarding the origins of mind
- Acquire and apply contemporary and interdisciplinary research methods
- Develop analytical thinking skills and communicate complex ideas effectively in writing and in oral presentation

Current Academic Integrity Policy:

Summary: http://academicintegrity.rutgers.edu/academic-integrity-at-rutgers/

Violations include: cheating, fabrication, plagiarism, denying others access to information or material, having someone else complete your course work, and facilitating violations of academic integrity by others.

Resources for Students: http://academicintegrity.rutgers.edu/resources-for-students/

List of Required Books &/or Materials

No required textbook.
All readings will be articles or book chapters available in PDF format, posted on Canvas.

Self-Reporting Absence Application:

Lecture attendance is mandatory as lectures will cover material that is not presented in your readings. If you miss a lecture, it is your responsibility to obtain the notes. You should plan to do all of the assigned reading because the material in the readings may not be covered in lecture.

Students are expected to attend all classes; if you expect to miss one or two classes, please use the University absence reporting website https://sims.rutgers.edu/ssra/ to indicate the date and reason for your absence. An email is automatically sent to me.

Course Structure and Requirements

Quizzes: 50%

You will receive 6 quizzes throughout the course (roughly after every topic). Your highest 5 grades will be counted towards your final grade.

Poster Presentations: 50%

For 3 of the topics that we explore, there will be a corresponding data collection session. All of your data will be analyzed together and posted online. For each of the topics, you will make a conference-style poster, addressing key points about the experiment (following the QALMRI structure; see the end of the syllabus for details). Your posters will be made in Google Slides, and your final submission will be PDFs submitted through Turnitin. You will also present your posters during scheduled presentation sessions. Your presentation should be ~ 3 minutes. Feedback will be provided on a group basis in class. The earlier posters are weighed less than the later ones for room of improvement (10% for first poster, 15% for the second, 25% for the third).

Extra Credits:

You may design your own experiments to receive up to 10% of extra credits.

Class schedule **subject to change*

1. **Introduction**
   Pinker, S. (2004). Why nature & nurture won't go away. Daedalus, 133(4), 5-17.
   Pain, E. (2016). How to (seriously) read a scientific paper.
   https://www.sciencemag.org/careers/2016/03/how-seriously-read-scientific-paper#
2. **Depth I**
   Berkeley, G. “An essay towards a new theory of vision.” In E. Rhys, A New Theory of Vision and Other Select Philosophical Writings, pgs 13-19.
   Descartes, R. pages 248-253 of The Optics, VI. In E. Anscome & P.T. Geach, Philosophical Writings. Bobbs-Merril Publishers.
3. **Depth II**
   Gibson, E.J. & Walk, R.D. (1960). The visual cliff. Scientific American, 65-69.
4. **In-class experiment for Space or Depth (group data will be posted after class).**
5. **Space I *(tent. guest lecture)***
   Gallistel, C.R. (1989). Animal cognition: The representation of space, time, and number. In Rosenzweig, M.R. & Porter, L.W. (Eds) Annual Review of Psychology, 155-178.
6. **Space II**
   Hermer, L. & Spelke, E.S. (1994). A geometric process for spatial reorientation in young children. Nature, 370, 57-59.
   Baillargeon, R. (2004). Infants' physical world. *Current directions in psychological science*, *13*(3), 89-94.
7. **Presentation of Space/Depth QALMRI and discussion**
8. **Presentation of Space/Depth QALMRI and discussion cont.**
9. **In-class experiment for Number or Music.**
10. **Number I**
    Dehaene, S. (1997). Talented and gifted animals. (pgs. 13-40) In Number Sense: How the Mind Creates Mathematics. Oxford University Press.
    Gordon, P. (2004). Numerical cognition without words: Evidence from Amazonia. Science, 15, 496-499.
11. **Number II**
    Carey, S. (2004). Bootstrapping and the origin of concepts. Daedalus, 133(1), 59-68.
12. **Music *(tent. guest lecture)***
    Weinberger, N. M. (2004). Music and the brain. Scientific American, 291(5), 88-95.
13. **Presentation of Number/Music QALMRI**
14. **Presentation of Number/Music QALMRI cont.**
15. **Social I**
    Warneken, & Tomasello (2006). Altruistic helping in human infants and young chimpanzees. Science
16. **Social II**
    Kovács, A. (2009). Early bilingualism enhances mechanisms of false-belief reasoning. Developmental Science, 12(1), 48-54.
17. **In-class experiment for Language/Learning.**
18. **Language I**
    Werker, J. F., Yeung, H. H., & Yoshida, K. A. (2012). How do infants become experts at native-speech perception?. *Current Directions in Psychological Science*, *21*(4), 221-226.
19. **Language II**
    Boroditsky, L. (2011). How language shapes thought. *Scientific American*, *304*(2), 62-65.

Pyers, J.E., Shusterman, A., Senghas, A., Spelke, E.S., & Emmory, K. (2010). Evidence from an emerging sign language reveals that language supports spatial cognition. Proceedings of the National Academy of Sciences, 107(27), 12116-12120.

20. **Learning I *(tent. guest lecture)***
    Kass, M. D., Rosenthal, M. C., Pottackal, J., & McGann, J. P. (2013). Fear learning enhances neural responses to threat-predictive sensory stimuli. *Science*, *342*(6164), 1389-1392.
21. **Learning II**
    Gergeley, G., Bekkering, H., & Király, J. (2002). Rational imitation in preverbal infants. Nature, 415, 755.
22. **Presentation of Language/Learning QALMRI**
23. **Presentation of Language/Learning QALMRI cont.**
24. **Conclusions**
    Gallistel, C. R., Brown, A. L., Carey, S., Gelman, R., & Keil, F. (1991). Lessons from animal learning for the study of cognitive development. The epigenesis of mind: Essays on biology and cognition, 3-36.

QALMRI guidelines

When reading a primary journal article it is sometimes hard to see the forest for the trees.

Sometimes the details of how the experiment was conducted or how the data were analyzed make it difficult to focus on the central questions: WHY did the authors perform these experiments, HOW did they run them, and WHAT did they find?

On the next page are some guidelines† to help you read and interpret the articles assigned for this class, as well as any empirical articles you may read in other classes or disciplines. After you have finished reading an article, make sure you are able to address each of these points in a clear and succinct manner.

These guidelines will also help you to craft thorough discussions in the presentations for each of your 3 data collections. One goal of these assignments is to learn to convey an idea clearly but briefly. As such, please limit your response to each point to a few minutes.

† Adapted from Steve Kosslyn, Harvard University

Question: All research begins with a question, and the point of the research is to answer it. Usually, the first few paragraphs of an article's Introduction section tell the reader what question the article is addressing. In addition, the context provided by the literature review should explain why the question is important and why anybody should care about answering it. Questions fall into two categories: broad and specific. Broad questions are typically too general to answer in a single experiment. For example, a broad question might be "Does language influence perception?" This sort of broad question provides the general topic for a paper, but can only be resolved by compiling many experimental results across many different journal articles. The specific question can typically be addressed, at least in part, by a single experiment or set of experiments. A specific question might be "If one language has a certain term for a color and another language does not, will speakers of those two languages perceive the color differently?" In describing the question of an experiment, you MUST identify both the broad and the specific questions being addressed.

Alternatives/Logic: All experiments must be designed to distinguish among different possible answers to the specific question being addressed. Consider possible answers to the specific question (for example, one possibility is that speakers of different languages will perceive colors differently, because top-down factors often affect perception). How is the study designed to test these alternatives? What are the independent and dependent variables being tested? If relevant, describe the different experimental conditions being compared.

Method: Who participated in the experiment, and how many participants were there? What did these participants do? What materials were used as stimuli?

Results: What was the outcome of the experiment(s)? Although most psychological experiments are analyzed using statistical techniques, you need not describe the results at this level. Rather, state in a commonsense way what the most important findings were. Did the results differ by population tested, or by experimental condition? What was the overall pattern of the data within each presented experiment?

Inferences: It is important not only to understand the How and Why of the experiment, but also to consider your own reaction to it. What do these results tell us about the question that originally motivated the experiment(s)? Do the results support or rule out one of the possible answers to that question? Are there alternative interpretations of the results? Were there any confounds in the experimental design, such that the results could have been caused by a factor other than the ones the experimenters were trying to test? Importantly, what was your impression of the experiment(s)? What follow-up experiments could either eliminate experimental confounds (if any exist), or address further questions? If you were the experimenter, what would your next step be-- What would you test next, and how would you go about doing it? You do not have to address ALL of the above Inference questions in your response, but you should address some subset of them. Importantly, use your writing to demonstrate that you have understood the article thoroughly enough to present some of your own unique thoughts, questions, or insights on this set of ideas. Be creative.

- Students with disabilities requesting accommodations must follow the procedures outlined at https://ods.rutgers.edu/students/registration-form.
- Full disability policies and procedures are at **https://ods.rutgers.edu/**

Cheating and Plagiarism
Short version: Don't cheat. Don't plagiarize.

Longer version: Cheating on tests or plagiarizing materials in your papers deprives you of the educational benefits of preparing these materials appropriately. It is personally dishonest to cheat on a test or to hand in a paper based on unacknowledged words or ideas that someone else originated. It is also unfair, since it gives you an undeserved advantage over your fellow students who are graded on the basis of their own work. In this class we will take cheating very seriously. All suspected cases of cheating and plagiarism will be automatically referred to the Office of Student Conduct,[1] and we will recommend penalties appropriate to the gravity of the infraction. The university's policy on Academic Integrity is available at **http://academicintegrity.rutgers.edu/academic-integrity-policy** [2] I strongly advise you to familiarize yourself with this document, both for this class and for your other classes and future work. To help protect you, and future students, from plagiarism, we require all papers to be submitted through Turnitin.com.

[1] Nomenclature updated Aug. 29, 2019. S. Lawrence
[2] This web link was corrected on Sept. 13, 2015. S. Lawrence

Since what counts as plagiarism is not always clear, I quote the definition given in Rutgers' policy:

Plagiarism: Plagiarism is the use of another person's words, ideas, or results without giving that person appropriate credit. To avoid plagiarism, every direct quotation must be identified by quotation marks or appropriate indentation and both direct quotation and paraphrasing must be cited properly according to the accepted format for the particular discipline or as required by the instructor in a course. Some common examples of plagiarism are:

- **Copying word for word (i.e. quoting directly) from an oral, printed, or electronic source without proper attribution.**
- **Paraphrasing without proper attribution, i.e., presenting in one's own words another person's written words or ideas as if they were one's own.**
- **Submitting a purchased or downloaded term paper or other materials to satisfy a course requirement.**
- **Incorporating into one's work graphs, drawings, photographs, diagrams, tables, spreadsheets, computer programs, or other nontextual material from other sources without proper attribution.**[3]

A SPECIAL NOTE: Students often assume that because information is available on the Web it is public information, does not need to be formally referenced, and can be used without attribution. This is a mistake. ***All*** information and ideas that you derive from other sources, whether written, spoken, or electronic, must be attributed to their original source. Such sources include not just written or electronic materials, but people with whom you may discuss your ideas, such as your roommate, friends, or family members. They deserve credit for their contributions too!

Judgments about plagiarism can be subtle. If you have any questions, please feel free to ask for guidance from your Professor.

[3] http://academicintegrity.rutgers.edu/academic-integrity-policy/ Updated with the University's current language on July 13, 2012 and web link was corrected on Sept. 13, 2015. S. Lawrence.