

Foundations of Mind
Dept. of Psychological and Brain Sciences
Course # 200.206
101 Remsen Hall, Johns Hopkins University
Lectures Mon, Tues, Weds 2:00-2:50

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Course Description:

Where does human knowledge come from? In this course, we will explore the origins and development of human knowledge across three different time scales: ontological development (the development of the individual child), evolutionary development, and historical/cultural change. We focus on 7 case studies of knowledge in the domains of depth perception, object representation, number, space, language, understanding other minds, and morality. For each of these case studies we will examine evidence from multiple disciplines, including developmental psychology, cognitive neuroscience, anthropology, and the history of science. This evidence will be brought to bear on questions including: How does knowledge change over the human lifespan? How does experience shape knowledge? How variable is human knowledge across different cultures? What aspects of knowledge are unique to our species, and what aspects are shared with other animals?

Course Materials:

There is no textbook. All readings will be primary sources and chapters available in PDF format on the library website under "Halberda and Feigenson":
<http://reserves.library.jhu.edu/access/reserves/findit/articles/index.php>

Course Website:

At the end of each week, lecture slides will be posted on the course website.
The website will also contain postings of the data collected in section, which you will need in order to complete the 5 written assignments (see below).
The URL is: http://www.psy.jhu.edu/~spring200_206/
To view the lecture slides, use the password **foundations**

Depth Perception

- 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. Anscombe & P.T. Geach, Philosophical Writings. Bobbs-Merril Publishers.
- Gibson, E.J. & Walk, R.D. (1960). The visual cliff. Scientific American, 65-69.
- Kellman, P.J. & Arterberry, M.E. (1998). Space perception. The Cradle of Knowledge: Development of Perception in Infancy, 79-109.

Object Representation

- Mill, J.S. On the permanent possibilities of sensation. In R.J. Herrnstein & E.G. Boring, Eds. (1965). A Source Book in the History of Psychology, Harvard University Press.
- Spelke, E.S. (1998). Nativism, empiricism, and the origins of knowledge. Infant Behavior and Development, 21(2), 181-200.
- Spelke, E.S. (1990). Origins of visual knowledge. In D.N. Osherson, S.M. Kosslyn, & J.M. Hollerbach, Eds., Visual Cognition and Action: An Invitation to Cognitive Science (vol. 2). MIT Press.
- Baillargeon, R. (1994). How do infants learn about the physical world? Current Directions in Psychological Science, 3(5), 133-140.
- McCloskey, M. (1983). Intuitive physics. Scientific American, 248(4), 122-131.

Number

- Dehaene, S. (1997). Talented and gifted animals. (pgs. 13-40) In Number Sense: How the Mind Creates Mathematics. Oxford University Press.
- Matsuzawa, T. (1985). Use of numbers by a chimpanzee. Nature, 315, 57-59.
- Dehaene, S. (1997). The adult number line (pgs. 64-88) In Number Sense: How the Mind Creates Mathematics. Oxford University Press.
- Nieder, A., Freedman, D.J., & Miller, E.K. (2002). Representation of the quantity of visual items in the primate prefrontal cortex. Science, 297, 1708-1711.
- Feigenson, L., Dehaene, S., & Spelke, E.S. (2004). Core systems of number. Trends in Cognitive Sciences, 8, 7, 307-314.
- Dehaene, S. (1997). The language of numbers (pgs. 91-117) In Number Sense: How the Mind Creates Mathematics. Oxford University Press.
- Gordon, P. (2004). Numerical cognition without words: Evidence from Amazonia. Science, 15, 496-199.
- Carey, S. (2004). Bootstrapping and the origin of concepts. Daedalus, 133(1), 59-68.

Space

- 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.
- Ekstrom, A.D., Kahana, M.J., Caplan, J.B., Fields, T.A., Isham, E.A., Newman, E.L. & Fried, I. (2003). Cellular networks underlying human spatial navigation. Nature, 425, 184-187.
- Hermer, L. & Spelke, E.S. (1994). A geometric process for spatial reorientation in young children. Nature, 370, 57-59.
- Epstein, R. & Kanwisher, N. (1998). A cortical representation of the local visual environment. Nature, 392, 598-601.

Language

- Pinker, S. (1994) How language works (pgs. 83-125). In The Language Instinct, William Morrow & Company.
- Marcus, G., Vijayan, S., Bandi Rao, S. & Vishton, P. (1999). Rule learning by 7-month old infants. Science, 283, 77-80.
- Pinker, S. (1994) Words, words, words (pgs. 126-157). In The Language Instinct, William Morrow & Company.

Werker, J. (1989). Becoming a native listener. American Scientist, 77, 54-59.
Saffran, J., Aslin, R., & Newport, E. (1996). Statistical learning by 8-month old infants. Science, 274, 1926-1928.
Marlsen-Wilson, D. & Tyler, L.K. (1997). Dissociating types of mental computation. Nature, 387, 592-594.

Understanding Other Minds

Gergeley, G., Bekkering, H., & Király, J. (2002). Rational imitation in preverbal infants. Nature, 415, 755.
Johnson, S.C. (2000). The recognition of mentalistic agents in infancy. Trends in Cognitive Sciences, 4(1), 22-28.
Baron-Cohen, S. (1995). Developing mindreading: The four steps. (ps. 31-58) In Mindblindness: An Essay on Autism and Theory of Mind. MIT Press.
Baron-Cohen, S. (1995). Autism and mindblindness (ps. 59-84) In Mindblindness: An Essay on Autism and Theory of Mind. MIT Press.

Morality

Ekman, P. (1992). An argument for basic emotions. Cognition and Emotion, 6(3 & 4), 169-200.
Rozin, P., Haidt, J. & McCauley, C.R. (2000). Disgust. In M. Lewis & J.M. Haviland-Jones (Eds.), Handbook of Emotions, 2nd Edition, pgs 637-753. New York: Guilford Press.
Blair, R.J.R. (1995). A cognitive developmental approach to morality: Investigating the psychopath. Cognition, 7, 1-29.

Requirements:

Attendance: Lecture attendance is mandatory, since lectures will cover material that is not presented in your readings, and this information will appear on your exams. 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. Section attendance is also mandatory (see grading breakdown below).

Exams: You will take **3 mandatory exams: 2 midterms and a final exam**. These will test for major concepts and general research methods covered throughout the course, and will be in multiple-choice format. Research findings specific to particular topics will only appear on the relevant exam, and in this sense exams are not cumulative.

Written Assignments: For 5 of the 7 case studies there will be a corresponding data collection conducted in your weekly section meeting. At the end of the week, data will be pooled across sections and posted online. You will turn in a brief written assignment (maximum = 3 pages, double-spaced) interpreting these class data and discussing how they bear on the issues covered in lecture and in your readings. In section you will use the QALMRI format described on the last page of this syllabus to guide your discussion of the data collection. This, in turn, will help you with your assignment, which will focus on just the Results and Inferences portions of the QALMRI. More details for each assignment will be discussed in your section meeting.

From the 5 assignments you turn in, your 4 highest grades will be counted.

Missed/Late Papers and Exams: You must turn in all 3 exams and at least 4 of the 5 writing assignments. **There are no make-up exams or assignments.** If you must miss an exam due to a medical or family emergency, you must provide official documentation. In this case, either a make-up exam will be scheduled or your grade will be calculated without the missed exam/paper, at the instructors' discretion. Writing assignments are to be turned in during class on the day they are due (see schedule). **If they are neither turned in during class nor in Professor Feigenson's mailbox in Ames Hall by 5:00PM on that same day, 25% will be deducted from your score for each day late.**

If, after seeing your graded exam or paper, you would like your work re-graded you may see the instructor or your TA. But **be advised that the entire exam or paper will be re-graded, and that your score may go up or down.** In general, re-grades result in a score lower than the original about 50% of the time. In asking for a re-grade, students agree to accept the re-grade as final, whether lower or higher than the original.

Grading:

The expected breakdown of the grades is as follows.

Your 4 highest grades on the data collection write-ups:	10% each
Section attendance & participation	10%
Midterm 1:	16.67%
Midterm 2:	16.67%
Final Exam:	16.67%

Participating in Research for Extra Credit:

You can earn extra credit for participating in psychology experiments during the semester. You can earn 1 percentage point for each unit of research participation you complete, up to 3 points maximum. (1 unit of research participation= about 30-60 minutes of your time) These points will raise your final percentage in the course (e.g., from an 88 to a 91) **with two exceptions:**

- 1) A failing grade based on your exam scores and writing assignments cannot be changed through research participation.**
- 2) A grade of A+ will only be awarded for truly outstanding performance on exams and written assignments. A grade of A will not be changed to an A+ via extra research credit.**

To sign up to participate, use the Psychological & Brain Sciences Experimentrix program. This allows you to sign up on-line (<http://experimentrix2.com/jhu>), and an electronic file of your participation will be stored and delivered to the instructors at the end of the semester.

Academic Ethics:

From the JHU Ethics Policy Statement:

"The strength of the university depends on academic and personal integrity. In this course, you must be honest and truthful. Ethical violations include cheating on exams, plagiarism, reuse of assignments, improper use of the Internet and electronic devices, unauthorized collaboration, alteration of graded assignments, forgery and falsification, lying, facilitating academic dishonesty, and unfair competition. Violations can lead to failure of an examination, failure of the course, a notation on the student's transcript, and/or other actions.

"Report any violations you witness to the instructor. You may consult the associate dean of students and/or the chairman of the Ethics Board beforehand. Please consult the Academic Ethics for Undergraduates guide and the Ethics Board website for more information."

Instructor Availability:

Your professors and TAs want to help you learn from and enjoy this course! We encourage you to ask questions during class, to email us with questions and/or comments, to come talk to us during our office hours, or to schedule appointments with us if our office hours are not convenient for you. No question is too big or too small.

Course Schedule
(subject to change, which will be announced in lecture)

MONDAY

TUESDAY

WEDNESDAY

1/30 Course introduction	1/31 Depth perception Reading: Berkeley	2/1 Depth perception Reading: Descartes
1/30-2/3: Introductions & depth data collection		
2/6 Depth perception Reading: Gibson & Walk	2/7 Depth perception Reading: Kellman & Arterberry	2/8 Object concept Reading: Spelke (1998)
2/6-2/10: IN SECTION: Discussion of depth readings & depth QALMRI		
2/13 Object concept Reading: Mill; Spelke (1990)	2/14 Object concept Reading: Baillargeon	2/15 Object concept Reading: McCloskey
2/13-2/17: IN SECTION: Number data collection; Depth QALMRI due in section		
2/20 Number Reading: Dehaene (ch 1)	2/21 Number Reading: Dehaene (ch 3)	2/22 Number Reading: Matsuzawa
2/20-2/24: IN SECTION: Discussion of number readings & number QALMRI		
2/27 Midterm 1 (Depth & Objects; does NOT cover Number)	2/28 Number Reading: Feigenson, Dehaene, & Spelke	3/1 Number: Reading: Nieder, Freedman, & Miller
2/27-3/3: IN SECTION: Midterms returned, discussion		

MONDAY**TUESDAY****WEDNESDAY**

3/6 Number Reading: Dehaene (ch. 4)	3/7 Number Reading: Gordon	3/8 Number Reading: Carey
3/6-3/10: IN SECTION: Space data collection; Number QALMRI due in section		
3/13 Space Reading: Gallistel	3/14 Space Reading: Hermer & Spelke	3/15 Space Reading: Eckstrom et al., Epstein & Kanwisher
3/13-3/17: IN SECTION: Discussion of space readings & space QALMRI		
3/20 SPRING BREAK: NO CLASS	3/21 SPRING BREAK: NO CLASS	3/22 SPRING BREAK: NO CLASS
3/27 NO LECTURE	3/28 Space Reading: Kanwisher	3/29 Space Reading: McCloskey
3/27-3/31: IN SECTION: Language data collection; Space QALMRI due in section		
4/3 Midterm 2 (Number & Space)	4/4 Language Reading: Pinker (ch 4: How Language Works)	4/5 Language Reading: Werker
4/3-4/7: IN SECTION: Discussion of language readings; language QALMRI		

MONDAY**TUESDAY****WEDNESDAY**

4/10 Language Reading: Pinker (ch. 5: Wrods, Words, Words)	4/11 Language Reading: Marcus et al., Saffran et al.	4/12 Language Reading: Marlsen-Wilson & Tyler
4/10-4/14: IN SECTION: Intentionality data collection; Language QALMRI due in section		
4/17 NO LECTURE	4/18 Other Minds Reading: Gergeley et al.	4/19 Other Minds Reading: Johnson
4/17-4/21: IN SECTION: Discussion of intentionality readings; Intentionality QALMRI		
4/24 Other Minds Reading: Baron Cohen (both chapters)	4/25 Morality Reading: Ekman	4/26 Morality Reading: Rozin et al.
4/24-4/28: IN SECTION: Discussion of morality readings Intentionality QALMRI due in section		
5/1 Morality	5/2 Morality Reading: Blair	5/3 Wrap-Up
5/1-5/5: IN SECTION: Review for Final Exam		

Final Exam: Time & Location TBA
(Other Minds & Morality)