Revolutions in Conceptualizing the Mind: 1950s to the Present

KHC PS 101

Fall 2012
Monday/Wednesday
3:00 PM – 4:30 PM
Room: KHC 107

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Office hrs: Tues 3-4, Thurs, 4-5, Fri 1-2

Course Description

The 1950s was the origin of the Cognitive Revolution, when the mind was first viewed as a computational, symbol-processing machine. Techniques for building and programming computers flourished while information-processing models of mental abilities led to an explosion of research in diverse fields, from linguistics to cognitive behavioral therapy. By the 1990s, computers were omnipresent in daily life and no longer appeared the ideal model of mind; the rise of new technology for studying the brain's mental activity allowed the brain itself to be the model for understanding the mind.

This seminar examines the recent intellectual history of new conceptualizations in understanding the mind, beginning with the first computer metaphor in the 1950s, which was followed by a second computer metaphor in the 1980s (artificial neural networks). We consider the emotion revolution of the 1990s, and the field of cognitive neuroscience which is the dominant paradigm in the current day. Along the way we examine changing perspectives on enduring questions during the 2nd half of the 20th century: How do adult information processing abilities emerge during infancy, childhood and the teen years? Is there an innate basis for language acquisition (and if so, what is it)? Are cognition and emotion separate mental abilities? Students will be able to choose their own question of interest for focused exploration while the class broadly studies this explosive half-century of intellectual evolution.

Required Texts

Gardner, H. (1985). The mind's new science: A history of the cognitive revolution. Basic Books.
Available from BU Barnes & Noble and on reserve at Mugar Library. Please do all reading before class.

Overview of class topics

The class will be broadly divided into two historical periods, 1955-1985 (first four weeks of class)

and the last 25 years, 1985-present (weeks 5-12).

- The first four weeks will be devoted to gaining a broad understanding of the foundational events from 1955 to 1985. Howard Gardner's (1984) book The mind's new science: A history of the cognitive revolution will be our guide during these weeks, along with historical readings and other overviews.
- The second third of the class will be devoted to the revolutions in thinking that have occurred since 1985. Students will be in charge of identifying readings (note that the syllabus lists provisional readings), including articles from popular sciences sources (such as Scientific American, Discover Magazine) that explain and comment on scholarly developments. Each student will write a short paper characterizing intellectual evolution in the last quarter century. These will be discussed and debated in class. The edited collection from 1997, The future of the cognitive revolution, will be provide useful overview, commentaries, and opinion pieces.
- In the last third of the class, students will focus on particular questions and identify readings that will help them prepare their final paper, which is to be a focused argument about a particular topic chosen from one of three broad areas of: cognitive development, language acquisition, and the emotion/cognition split (see topic ideas under assignments).

Grading and Assignments

Class participation 20%
Four writing assignments (approximately 30 pages total). All together: 50% of grade

All of your papers will be read and discussed by both the instructor and your classmates, in small group and whole-class format, with opportunity for revision. Sources can include scholarly sources from the time period, contemporary sources, and popular science articles. Your topic should be a specific question or issue within one of the three broad topics of cognitive development, language acquisition, and the emotion/cognition split.

Some of your papers will be read and discussed by both the instructor and your classmates, in small group format. Sources can include scholarly sources from the time period, contemporary sources, and popular science articles. The basic final plan will be for you to write three 5-page papers, writing each after you have submitted and received feedback on your outline (length of outline: 1-3 pages).

Paper 1. 4-5 pages. "The cognitive revolution." Essay about a specific intellectual development during the 1955-1985 period. Length: 5 pages. Outline handed in a week before paper due.
Paper 2. 4-5 pages. Outline due Nov 10. Paper due Nov 17. "The last quarter century." This is your assessment of a particular development within the cognitive sciences from 1985-present.
Paper 3. 5-8 pages. Outline due Dec 8. Full paper due one week later, Mon, Dec 14. Choose a different topic from what you have written about before. Of, if you wish to build on a prior topic, please aim for a longer paper (8-10 pages).
Review and discuss final papers in small groups during final exam slot, Dec 17, 6-8pm. Short

oral presentations to the class

- Two 10-minute oral presentations to the class explaining an aspect of the assigned readings, distributed across the semester (collaboration allowed, see below). 10% of grade
Regular discussion board postings
- Your reading list (your suggested popular articles and scholarly readings, including chapters from Future of the cognitive revolution) 10% of grade
- Your comments on classmates' presentations, papers and reading lists: 10% of grade

Grading procedure. Points will be given for each assignment, and added together to calculate final grades. Penalty for late work will be discussed on a case-by-case basis with the instructor.

Collaborations. You may collaborate with one other student on any of the writing assignments, short oral presentations, or reading lists. Collaborative projects should be more intellectually ambitious than solo projects, but page lengths are the same. Collaborative teams are encouraged to discuss their planned collaboration with the instructor, and will also write a short paragraph on what was contributed by each collaborator.

Academic Conduct

Students are expected to abide by both KHC and BU's Undergraduate Academic Conduct Code. The Academic Conduct Code can be found at Suspected academic misconduct will be reported to the Director. The instructor will provide guidance on rules of citation and attribution.

Ideas for exploration in the three topics

Cognitive development.The currently vibrant, important field of cognitive development had an origin separate from the cognitive revolution, in the work of Jean Piaget. When American scholars read translations of Piaget in the 1960s, the ideas seemed a good fit to the "information processing" approach that was becoming dominant in psychology departments across the country. Like Chomsky, Piaget drew on concepts of logic for his foundational ideas, and proposed that children acquire context-independent mental operations (compare this to Chomsky's proposal that grammar is autonomous and independent of meaning). But Piaget opposed Chomsky on innate mental abilities, viewing the child as a scientist who discovers environmental regularities through active exploration. What is the contemporary view on this debate? Twenty years ago, the neo-Piagetian synthesis, put forward by Robbie Case, argued that the Piagetian stages must be conquered anew as learners develop expertise in specific domains. But this creative idea has been ignored -- why? What elements of Piagetian theory have been retained, and which have been replaced?

Explaining critical periods for language acquisition. Chomsky argued that language is a type of

mental algebra and that knowledge of language is too complicated and intricate to be learned without specific innate knowledge. These were exciting, novel views that were widely embraced in the
1950s-1970s and launched new departments of linguistics across the country. Today the idea of an "innate language acquisition device" is regarded as quaint or at least dated. Still, for many scholars, the innate basis of cognitive abilities is more vibrant than ever. What consensus exists today, and where/how are battle lines drawn?

Emotion and cognition were separate abilities to Aristotle as well as to the inventors of the Star Trek creations, the Vulcan Spock and robot Data. In the 1950-70s, when computers were the model of the mind, the study of emotion was all but disallowed. Following the "emotion revolution" of the
1990s that was spurred by the rise of cognitive neuroscience, emotion is newly understood as crucial for the cognitive sciences. In the 21st century, roboticists build-in "emotion" to reduce their machines' scheduling conflicts. Where do psychologists stand today on this age-old debate, and how did they get to their current positions?

Course schedule and readings

Sept 3 Course introduction. Gardner, chapter 1
Gain familiarity with Thomas Kuhn's Structure of Scientific Revolutions by finding internet sources such as: http://www.des.emory.edu/mfp/kuhnsyn.html; Wikepedia site is good; or this excerpt: http://philosophyfaculty.ucsd.edu/faculty/rarneson/Courses/kuhn1.pdf

Sept 8-10 Overview of the cognitive revolution. Gardner, chapters 2-5 (see Gardner reading notes below)
Miller, G. A. (2003). The cognitive revolution: A historical perspective. Trends in Cognitive Sciences,7, 141-144. Available from sciencedirect.com
Sept 15-17 Linguistics, Gardner, chapter 7
Skinner, B.F. (1957). Verbal behavior. Copley Publishing Group. (Selections).
The Case Against B. F. Skinner 45 years Later: An Encounter with N. Chomsky. Available from;
http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2223151.
Chomsky, N. (1959). A review of B. F. Skinner's Verbal Behavior. Reprinted in Leon A. Jakobovits and Murray S. Miron (eds.), Readings in the psychology of language, Prentice-Hall.Available from http://www.chomsky.info/articles/1967----.htm
Chomsky, N. (1965). Aspects of the theory of syntax. MIT Press. (Selections to be determined) Hockett, C. (1968). The state of the art. Mouton. (This is a critique of Chomskyan linguistics). Read selections from:
http://www.bu.edu/psych/faculty/charris/papers/hockett.html
If desired, you may read ahead to developments in the 1990s by sampling material for Oct. 15
Sept 22-25 Artificial intelligence, anthropology and neuroscience. Gardner, chapter 6, 8 9.
Sept 29-Oct 1 Piaget: a separate but complementary approach to cognition?
Gardner, p. 111-118. Case, R. (1987). Neo-Piagetian theory: Retrospect and prospect. International Journal of Psychology,22, 773-791.

Students will choose chapters/topics from the Gardner's chapters 11-13 (Part III) to read and discuss. **Due: Outline for Paper 1, "The cognitive revolution."** To gain some modern perspective; read chapters from Part One of Future of the cognitive revolution (chapters 1-8).

Oct 6-8 1985: The connectionist revolution.
Start with: Gardner, chapter 14, Epilogue
Film on Artificial Intelligence and the rise of the "neurally inspired computers metaphor" (40 min). Rumelhart, D.E. & McClelland, J.L. (1985). Parallel distributed processing: Explorations in the microstructure of cognition. MIT Press. Read chapter1. All chapters available from:
http://waldron.stanford.edu/~jlm/papers/PDP/Chapter1.pdf
Read Part Two (chapters 12-18) of Future of the cognitive revolution (pick and choose).

Due: Paper 1, "The cognitive revolution."

Thurs Oct 15 (No class Tuesday, Monday schedule on Tues)

Continue discussing Gardner, chapter 14, Epilogue; and PDP chapter. Oct 20-22 Back to linguistics; more Cognitive Development

Tues Oct 20: could Chomsky be wrong?

Chapters 9-11 of Future of the cognitive revolution. Other resources to consult:

Gardner, H. (1995). Green Ideas Sleeping Furiously. New York Review of Books, 23 March, 32-38. http://cogweb.ucla.edu/Abstracts/Gardner_95.html

Webpage: http://www.timothyjpmason.com/WebPages/LangTeach/CounterChomsky.htm

Examples of contemporary linguists who are "antichomsky"

http://www.guardian.co.uk/science/2003/jun/26/scienceinterviews.artsandhumanities

How Chomskyan linguistics is viewed by contemporary "cognitive linguistics":

http://cogweb.ucla.edu/Abstracts/Fauconnier_99.html

http://www.seelrc.org/glossos/issues/8/janda.pdf

Thurs Oct 22: Contrasting views of cognitive development

Case, R., & Bruchkowsky, M. (1992). The Mind's staircase: Exploring the conceptual underpinnings of children's thought and knowledge. (Selections)

Carey, S. (1995). Continuity and discontinuity in cognitive development. In D.N. Osherson (ed.), An invitation to cognitive science, Vol. 3: Thinking. Cambridge, MA: MIT Press, 101-129.

Students will look for additional contemporary reading to uncover the major splits in the field.

Oct 27-29 Modularity and its critics

Fodor, J. (1983). The modularity of mind. MIT Press. (Selections)

Karmiloff-Smith, A. 1994. Precis of Beyond modularity: A developmental perspective on cognitive

science. Behavioral and Brain Sciences 17, 693-745.

Rapaport, William J. (2000), Review of Steven Pinker, How the mind works. Minds and Machines, 10,381-389.

Barrett, H. C., & Kurzban, R. (2006). Modularity in cognition: Framing the debate. Psychological

Review, 113, 628-647

Nov 3-5 Critics of nativism

Elman, J. L., Bates, E. A., Johnson, M. H., Karmiloff-Smith, A., Parisi, D. & Plunkett, K. (1996).

Rethinking innateness. A connectionist perspective on development. The MIT Press. (Selections.)

Caldwell-Harris, C.L., Staroselsky, M., Smashnaya, S., Vasilyeva, N. (under review). Age of

arrival organizes immigrants' language learning environment. Applied Psycholinguistics.

Mueller, Ralph-Axel (1996). Innateness, autonomy, universality? Neurobiological approaches to language. Behavioral and Brain Sciences, 19, 611-675.

Nov 10-12 The emotion revolution

Part Five Future of the cognitive revolution (chapters 19-23; pick and choose)

Damasio, A. (1992). Descartes' error: Emotion, reason, and the human brain. (Selections.)

Caldwell-Harris, C.L. (2008). Language research needs an "emotion revolution" AND distributed models of the lexicon. Bilingualism: Language and Cognition, 11, 169-171.

Due Tues Nov 10: Outline for Paper 2. "The last quarter century."

Thurs Nov 12: Discuss paper outlines in class

Nov 17-19 Emotional cognition; Contemporary views on the emotion-cognition interface.

Due: Tues Nov 17 Paper 2 "The last quarter century."

Wagar, B. M., & Thagard, P. (2004). Spiking Phineas Gage: A neurocomputational theory of cognitive-affective integration in decision making. Psychological Review, 111, 67-79.

Eder, A.B., Hommel, B., & Houwer, J.D. (2007, Eds). How distinctive is affective processing? A special issue of Cognition and Emotion. Psychology Press.

Nov 24-26 Class canceled for Thanksgiving, but website assignment is due

Due: Tues Nov 24 Post to Blackboard suggested papers for the class to read for final week of class

Reading lists. You will construct and post to Blackboard a reading list with two parts. The first part is a small set of 2-3 articles that you would like the class to read as a whole. Include links or electronic pdfs because we want to have quick access to them. These can include popular articles and scholarly readings, and also chapters from Future of the cognitive revolution). Provide a sentence or two justification about why this is a must-read paper (or at least a fun, valuable, informative paper). The second part is a set of papers (2-5) that you may consult for your final class paper. Include a paragraph describing some ideas for your final paper (you can change your mind/topic; this is just provisional).

The instructor will select 6-10 papers from the student recommendations to read during the final two weeks of class.

Dec 1-3 Read student-recommended papers

Dec 8-10 Continue reading student-recommended papers; Discuss outline for final paper in class.

Due Tues Dec 8: Proposal/Outline for Paper 3.

Due Tues Dec 15 (last day of study period): Paper 3 (Post to discussion board); we will decide together how to assign papers so that you will read 3 of your peers' papers for discussion during final exam slot.

Friday Dec 18 6-8pm (final exam slot). Review and discuss final papers in small groups; Make-up slot to be determined.

Useful background reading

Margolis, H. (1993). Paradigms and barriers: How habits of mind govern scientific beliefs. University of Chicago Press.
Simon, H.E. (1969). The sciences of the artificial. MIT Press. (See also third edition, published in 1996).
S.J. Derry, C.D. Schunn & M. A. Gernsbacher (Eds.), Interdisciplinary collaboration: An emerging cognitive science (pp. 317-339). Mahwah, N.J.: Erlbaum.

(additional books and website resources will be listed)

"Revolutions in Conceptualizing the Mind" and You at BU and Beyond

The freshman seminar provides you with a foundation for excelling in many fields of study at BU
and in your career beyond BU.

The seminar is most obviously relevant to psychology and its neighboring disciplines. Nativism, modularity and the emotion/cognition split are crucial topics in contemporary neuroscience and medicine. Sociology and anthropology have been influenced by the cognitive revolution, leading to cognitive sociology and cognitive anthropology. The field of economics is currently benefiting from psychologists' analysis of the role of emotion (and rationality vs. nonrationality) in decision making. The emotion-cognition split is also an important issue in psychotherapy. What periods are critical in language acquisition has been a dominant question in linguistics, and a third of the syllabus readings would not be out of place in a linguistics class. Broad questions of history of science and intellectual evolution are key topics in philosophy. Re-analyses of Piaget are important to the field of education, as are critical periods, and the questions of nativism and whether cognitive function have a modular organization. The cognitive revolution and its aftermath is part of the history of the fields of computer science, artificial intelligence, and biological engineering. The theme of the role of cognition vs. emotion in motivated action is important in robotics.