

# Cultural Evolution, Cognition, and the Baldwin Effect

Fall, 2018

## 1 Course Description

Advanced seminar in philosophy of biology. In this seminar we will discuss the theoretical foundation and concepts of the major approaches in the field of cultural evolution, and gene-culture coevolution - fields that apply the tools of evolutionary theory to the study of human culture. Among the topics we will discuss are: learning biases, such as conformism and prestige bias; memes *versus* genes; gene-culture coevolution; history *versus* evolution; and more.

The second part of the semester will be dedicated to discussion of central debates about the evolution of cognition, with emphasis on the role of social/cultural context in the evolution of cognition and the role of social learning. We will pay special attention to locating various views in their intellectual context.

We will explore two related case-studies: the evolution of learning biases and the evolution of norm psychology.

In the last part of the seminar we will discuss the Baldwin Effect, which is an attempt to explain how learning, and acquired traits more generally, can become innate or genetic. We will examine critically the discussion and models of these phenomena as well as new models.

A central cross-cutting concern throughout the semester will be the attention paid by various thinkers to the role of power relations, social institutions, and material culture.

## 2 Prerequisites

Prior exposure to evolutionary theory is required. Familiarity with central notions of philosophy of biology and with the use of formal models and

simulations in philosophical discussion will make the discussions (especially in the last third of the semester) easier to follow and participate in. If you want to prepare, please ask for suggested background readings before the semester begins.

## 3 Course outline

### 3.1 Introduction

To put the discussion in wider context we will review issues related to human evolution, the brain, and (time permitting) studies of heritability. We will talk about how culture and cognitive evolution can interact and discuss the notion of plasticity more broadly. We will also briefly discuss the over-asked question: Has human genetic evolution stopped?

Reading: Sterelny (2012), chp. 1

#### 3.1.1 Overview of Human Evolution

Hawks, Human Evolution (from *How Evolution Shapes Our Lives* ed. by Losos and Lenski, 2016)

#### 3.1.2 Overview of evolution of brains

Videos by Daniel Toker.

Not required but quite interesting:

- Schneider, Gerald E. Brain Structure and Its Origins: In Development and in Evolution of Behavior and the Mind. Cambridge, Massachusetts: The MIT Press, 2014.
- Kristan, William B. “Early Evolution of Neurons.” *Current Biology* 26, no. 20 (October 24, 2016): R949–54. 10.1016/j.cub.2016.05.030.

#### 3.1.3 Genetics and Heritability

- Schaffner, Kenneth F. *Behaving: What’s Genetic, What’s Not, and Why Should We Care?* New York, NY:

Oxford University Press, 2016. Chapters 1+2.

- Mitchell, Kevin J., ed. *The Genetics of Neurodevelopmental Disorders*. 1 edition. Hoboken, New

Jersey: Wiley-Blackwell, 2015. Chapter 1: The Genetic Architecture of Neurodevelopmental Disorders (by Kevin Mitchell).

## **3.2 Cultural Evolution**

### **3.2.1 What is culture? Does culture evolve via Natural Selection?**

Including: Memetics.

### **3.2.2 Different Schools, Different Goals**

Explanatory projects: Understanding Culture, Understanding Human Nature.

### **3.2.3 Cumulative culture**

The ratchet effect: Tomasello (1999), "Human Cultural Evolution" (p. 37)

### **3.2.4 Models**

Henrich, Joseph. "Cultural Transmission and the Diffusion of Innovations: Adoption Dynamics Indicate That Biased Cultural Transmission Is the Predominate Force in Behavioral Change." *American Anthropologist* 103, no. 4 (December 1, 2001): 992–1013. 10.1525/aa.2001.103.4.992.

### **3.2.5 Research Methods**

Social transmission experiments

Mesoudi (2011), chp. 6

### **3.2.6 Reading**

- Lewens, Chp 1 & 2.
- Scott-Phillips, Thomas C. "Can Cultural Evolution Bridge Scientific Continents?" *Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences* 57 (June 2016): 170–73. 10.1016/j.shpsc.2016.02.001.
- Scott-Phillips, T., Stefaan Blancke, and Christophe Heintz. 2018. "Four Misunderstandings about Cultural Attraction." *Evolutionary Anthropology: Issues, News, and Reviews*, August. <https://doi.org/10.1002/evan.21716>.

- Henrich, J., R. Boyd, and P. J. Richerson. 2008. "Five misunderstandings about cultural evolution". *Human Nature* 19, no. 2: 119-137.
- Fracchia, J. and Lewontin, R. 1999. "Does Culture Evolve?" *History and Theory*, 8: 52–78.
- Fracchia, J. and Lewontin, R.. 2005. "The Price of Metaphor." *History and Theory* 44 (1): 14–29. <https://doi.org/10.1111/j.1468-2303.2005.00305.x>.
- Ingold, Tim. "The Trouble with 'evolutionary Biology.'" *Anthropology Today* 23, no. 2 (April 1, 2007): 13–17. [10.1111/j.1467-8322.2007.00497.x](https://doi.org/10.1111/j.1467-8322.2007.00497.x).
- Mesoudi, Alex, and Alex Thornton. 2018. "What Is Cumulative Cultural Evolution?" *Proc. R. Soc. B* 285 (1880): 20180712. <https://doi.org/10.1098/rspb.2018.0712>.

More technical discussion of the California-Paris debate can be found in: Henrich, Joseph, and Robert Boyd. "On Modeling Cognition and Culture: Why Cultural Evolution Does Not Require Replication of Representations." *Journal of Cognition and Culture* 2, no. 2 (June 1, 2002): 87–112. [10.1163/156853702320281836](https://doi.org/10.1163/156853702320281836).

### **3.3 Gene-Culture Co-Evolution, Cultural Group Selection**

- Henrich (2016), chp. 11.
- Richerson, Peter, Ryan Baldini, Adrian V. Bell, Kathryn Demps, Karl Frost, Vicken Hillis, Sarah Mathew, et al. "Cultural Group Selection Plays an Essential Role in Explaining Human Cooperation: A Sketch of the Evidence." *Behavioral and Brain Sciences* 39 (January 2016). [10.1017/S0140525X1400106X](https://doi.org/10.1017/S0140525X1400106X).

#### **3.3.1 Alternative accounts on evolution of cognition and its relation to culture**

Individual selection (for both culture and genetic evolution) e.g. Pinker; intergroup competition (group selection) on genetic traits, e.g. Bowles; Cultural Group Selection.

For a summary of the debate from a CGS perspective, see Henrich (2016), Chapter 10, footnote 34 (p. 356).

### **3.4 How mental adaptations evolve**

#### **3.4.1 Types of evidence used in studying evo of cognition.**

#### **3.4.2 What's known about genetics and heritability of behavioral/cognitive traits?**

Read chapter 1 of Mitchell (2015).

- Schaffner, Kenneth F. *Behaving: What's Genetic, What's Not, and Why Should We Care?* New York, NY: Oxford University Press, 2016.
- Mitchell, Kevin J., ed. *The Genetics of Neurodevelopmental Disorders*. Hoboken, New Jersey: Wiley-Blackwell, 2015.

#### **3.4.3 Domain specificity, social cognition hypotheses, EP**

#### **3.4.4 Modularity**

#### **3.4.5 Reading**

- Barrett, H. Clark. *The Shape of Thought: How Mental Adaptations Evolve*. New York: Oxford University

Press, 2015. Please read (at least) the Introduction and Chp. 12.

- Brown, Gillian R., and Peter J. Richerson. 2014. "Applying Evolutionary Theory to Human Behaviour: Past Differences and Current Debates." *Journal of Bioeconomics* 16 (2): 105–28. <https://doi.org/10.1007/s10818-013-9166-4>.

### **3.5 Case study one: learning biases**

Heyes, Cecilia. "Blackboxing: Social Learning Strategies and Cultural Evolution." *Phil. Trans. R. Soc. B* 371, no. 1693 (May 5, 2016): 20150369. [10.1098/rstb.2015.0369](https://doi.org/10.1098/rstb.2015.0369).

### **3.6 Case study two: norm psychology (2-3 weeks)**

- Sripada, C., and S. Stich. "A Framework for the Psychology of Norms." *The Innate Mind: Culture and Cognition*, 2006, 280–301.
- Chudek, Maciej, and Joseph Henrich. "Culture-Gene Coevolution, Norm-Psychology and the Emergence of Human Prosociality." *Trends in Cognitive Sciences* 15, no. 5 (May 2011): 218–26. [10.1016/j.tics.2011.03.003](https://doi.org/10.1016/j.tics.2011.03.003).

- Henrich chp. 11
- Churchland (2011), chp. 7
- Olstrom (discussion in DS Wilson, 2016)

### **3.7 Case study three (independent study): population size**

## **3.8 The Baldwin Effect and Genetic Assimilation**

### **3.8.1 Plasticity and its role in evolution**

Sultan, S. “Evolutionary Implications of Individual Plasticity.” *Transformations of Lamarckism: From Subtle Fluids to Molecular Biology*, 2011, 193–204.

### **3.8.2 Baldwin Effect and Genetic Assimilation (and Stabilizing Selection)**

- Ancel, Lauren W. “A Quantitative Model of the Simpson–Baldwin Effect.” *Journal of Theoretical Biology* 196, no. 2 (January 21, 1999): 197–209. [10.1006/jtbi.1998.0833](#).
- ———. “Undermining the Baldwin Expediting Effect: Does Phenotypic Plasticity Accelerate Evolution?” *Theoretical Population Biology* 58, no. 4 (December 1, 2000): 307–19. [10.1006/tpbi.2000.1484](#).
- Crispo, Erika. “The Baldwin Effect and Genetic Assimilation: Revisiting Two Mechanisms of Evolutionary Change Mediated by Phenotypic Plasticity.” *Evolution* 61, no. 11 (November 1, 2007): 2469–79. [10.1111/j.1558-5646.2007.00203.x](#).
- Pigliucci, Massimo, Courtney J. Murren, and Carl D. Schlichting. “Phenotypic Plasticity and Evolution by Genetic Assimilation.” *Journal of Experimental Biology* 209, no. 12 (June 15, 2006): 2362–67. [10.1242/jeb.02070](#).
- Griffiths, Paul E. “The Baldwin Effect and Genetic Assimilation.” *The Innate Mind: Culture and Cognition* 2 (2006): 91.
- Papineau, David. “Social Learning and the Baldwin Effect.” *Evolution, Rationality and Cognition: A Cognitive Science for the Twenty-First Century*, 2006, 40.

- ———. “The Baldwin Effect and Genetic Assimilation: A Reply to Griffiths.” *The Innate Mind: Culture and Cognition* 2 (2006): 91.
- Scheiner, Samuel M. “The Baldwin Effect: Neglected and Misunderstood.” *The American Naturalist* 184, no. 4 (October 2014): ii–iii. 10.1086/677944.

#### 1. Classic papers

- Baldwin JM. A New Factor in Evolution. *Am Nat.* 1896;30(354):441–51.
- Waddington CH. Canalization of development and genetic assimilation of acquired characters. *Nature.* 1959;183(4676):1654–5.
- Simpson, George Gaylord. “The Baldwin Effect.” *Evolution* 7, no. 2 (June 1953): 110–17.
- Schmalhausen, Ivan I. *Factors of Evolution: The Theory of Stabilizing Selection.* Oxford, England: Blakiston, 1949.

#### 2. The Hinton-Nowlan / Santos et al. debate (independent study)

- Hinton, Geoffrey E., and Steven J. Nowlan. “How Learning Can Guide Evolution.” *Complex Systems* 1, no. 3 (1987): 495–502.
- Santos, Mauro, Eörs Szathmáry, and José F. Fontanari. “Phenotypic Plasticity, the Baldwin Effect, and the Speeding up of Evolution: The Computational Roots of an Illusion.” *Journal of Theoretical Biology* 371 (April 2015): 127–36. 10.1016/j.jtbi.2015.02.012.

#### 3. Reverse-Baldwin Effect (independent study)

Deacon, T. W. “Colloquium Paper: A Role for Relaxed Selection in the Evolution of the Language Capacity.” *Proceedings of the National Academy of Sciences* 107, no. Supplement<sub>2</sub> (May 2010): 9000–9006. 10.1073/pnas.0914624107.

### 3.9 Connecting the dots: What do we know (and don’t) about how human cognition evolved?

- Richerson et al 2016
- Tomasello stages model
- Sterelny’s model

## 4 Recommended texts

In addition to class readings, the following books are recommended.

- Barrett, H. Clark. *The Shape of Thought: How Mental Adaptations Evolve*. New York: Oxford University Press, 2015.
- Henrich, Joseph. *The Secret of Our Success: How Culture Is Driving Human Evolution, Domesticating Our Species, and Making Us Smarter*. Princeton: Princeton University Press, 2015.
- Lewens, Tim. *Cultural Evolution: Conceptual Challenges*. Oxford, United Kingdom: Oxford University Press, 2015.
- Mesoudi, Alex. *Cultural Evolution: How Darwinian Theory Can Explain Human Culture and Synthesize the Social Sciences*. University of Chicago Press, 2011.
- Tomasello, Michael. *The Cultural Origins of Human Cognition*. Reprint edition. Cambridge, Mass.: Harvard University Press, 2001.
- Tomasello, Michael. *Why We Cooperate*. MIT Press, 2009.
- Tomasello, Michael. *A Natural History of Human Thinking*. Cambridge, Massachusetts; London, England: Harvard University Press, 2014.
- Sterelny, Kim. *The Evolved Apprentice*. The MIT Press, 2012.

## 5 Credit

To receive credit for the seminar you must:

- Prepare two referats. At least one of them must be presented in class.
- If you want to write a seminar paper, you need to prepare a proposal and get it approved (see 7), in *addition* to presenting *one* referat in class.



## 6 Class Accessibility and Inclusion

If you have any kind of disability, whether apparent or non-apparent, learning, emotional, physical, or cognitive, and you need some accommodations or alternatives to lectures, assignments, or exams, please feel free to contact me. If you need a reasonable (or even unreasonable) accommodation, please let me know and I'll try make it happen. This goes triply for folks with non-visible disabilities or who pass or mask or compensate. No need to do that here.

## 7 Policies

- Communication: If you need to communicate with me, set up a meeting etc. **please use email**. My email is ehud.lamm@gmail.com . **Do not contact me through the moodle messaging system** - I will not get these messages and will not respond. Likewise trying to call me at the office.
- Attendance: to receive credit you must attend at least 2/3 of the meetings of the seminar (i.e., you can miss at most four meetings). Attendance means being present for the entire meeting.
- You are expected to read the reading materials, think about them, and prepare notes/questions for discussion before class. Evidence that you failed to do this will be considered when determining final grades.
- Participation in class discussions will be considered when determining final grades.
- Presentation in class: for your presentation to count toward credit for the seminar, your written referat (based on template on course website) plus whatever presentation you use (powerpoint etc.) must be submitted to Ehud at least **two full days (48 hours)** prior class presentation. It is recommended you discuss your presentation earlier so you can incorporate feedback on your plan. After approved by Ehud, and prior to class, you must upload your presentation materials to the course website.
- Up to four days after your presentation you must submit to Ehud the final version of referat.

- If you wish to write a seminar paper, your topic + outline + initial bibliography must be approved **by the end of the semester**. Seminar papers that were not thus approved will not be checked.
- Coming in late to class or leaving before the meeting ends is rude to students who are presenting and affects their ability to concentrate. Please do your best to minimize this.
- Guests: Non-participating students are not allowed. If you want to sit in class, whether enrolled or not, you **must** do the assigned readings and participate like any student. There are no exceptions to this rule.
- Recording: Please do not record in class without prior permission. If you record, you must provide me with a copy of the recording.