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### ANTY 553.01: Evolutionary Archaeology

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## **ANTY 553 EVOLUTIONARY ARCHAEOLOGY**

**ANTY 553, Evolutionary Archaeology** is a graduate seminar designed to expose students to the fast-growing world of Darwinian evolutionary archaeology. The seminar will have two specific goals. First, students will gain a basic understanding of the major trends in current archaeological evolutionary thinking with a focus on cultural transmission theory, human behavioral ecology, and macroevolutionary approaches to archaeology. Second, students will gain experience in applying the tenets of Darwinian evolutionary theory to the development and analysis of archaeological data. Students will emerge from the course with enhanced abilities to link theoretical problems to strategies for collection and analysis of archaeological data within an evolutionary framework.

*Professor:* Dr. Anna M. Prentiss; Office: Social Sciences 205; Message Telephone (Anthropology Department) 243-2693; email: anna.prentiss@umontana.edu; Office hours: Monday, Wednesday, Friday, 9-11, or by appointment.

### **Text/Readings:**

Broughton, Jack and Michael D. Cannon

2009 *Evolutionary Ecology and Archaeology*. University of Utah Press, Salt Lake City.

Jordan, Peter

2015 *Technology as Human Social Tradition: Cultural Transmission among Hunter-Gatherers*. University of California Press, Berkeley.

Mesoudi, Alex

2011 *Cultural Evolution: How Darwinian Theory can Explain Human Culture And Synthesize the Social Sciences*. University of Chicago Press, Chicago.

Richerson, Peter J. and Robert Boyd

2005 *Not By Our Genes Alone*. University of Chicago Press, Chicago.

### **Learning Outcomes:**

1. Knowledge of fundamental concepts and debates in evolutionary archaeology
2. Ability to develop and complete a research project in evolutionary archaeology.
3. Expansion of skills in data collection and analysis within an evolutionary framework.
4. Improvement in writing and speaking skills.

## Grade Determination:

Seminar assignments are designed to develop student skills in reading and understanding the literature in Darwinian archaeology and designing and implementing research projects within this framework. Assignments are as follows:

1. Each student will develop a 5-10 page research plan or design for their seminar project (see below). This will include a discussion of the research problem, hypotheses to be tested and proposed methods. This paper also provides you a chance to review and cite the literature relevant to your research problem. The paper should be approximately five to ten pages in length and written using *American Antiquity* style. Due date for the paper: October 22. It is worth 100 points.

2. Each student is required to write a 20 page research paper (again using *American Antiquity* style). The research paper will present results of a study that will include an explicit analysis of archaeological data developed in an evolutionary framework (cultural transmission theory, cultural macroevolution, human behavioral ecology, etc.). The paper will include an introduction to the problem, a discussion of theoretical background and previous research, methods, analysis, and final discussion. The goal is to stimulate each student to explore in depth one evolutionary model by developing it as a research tool for a context of your choice. The research paper is due December 14. It is worth 250 points.

Assignments must be well written with minimal grammatical problems, spelling issues, etc. If you have writing problems you should seriously consider visiting the university writing center for extra help. Assignments must demonstrate an attempt by you to obtain and cite the critical anthropological literature associated with your research topic. Assignments with minimal citation of the literature will be scored low (that is also what will happen to you in the "real world").

3. All students will participate in seminar activities. Participation will include presentation of readings and research results. Participation is worth 50 points.

Grades will be determined on the basis of total points achieved:

|                         |            |
|-------------------------|------------|
| Assignments (see below) | 350 Points |
| Seminar Participation   | 50 Points  |
| Total                   | 400 Points |

Students with 90% (360 points) or more will receive an "A," etc. Deadlines are extended only in cases of illness (with a doctor's note) or an emergency. The professor retains the option to use + and – grades when final scores are close (within a point on a 0-100 scale) to an up or down transition.

## Reading List and Schedule

### **AUGUST 27 INTRODUCTION AND BACKGROUND**

#### **Reading:**

Mesoudi, Chapters 1, 2, and 10

### **SEPTEMBER 3 HOLIDAY**

### **SEPTEMBER 10 CULTURAL MICROEVOLUTION: MODELING CULTURE AS AN INHERITANCE SYSTEM**

#### **Reading:**

Richerson and Boyd, All chapters  
Mesoudi, Chapters 3 and 6

### **SEPTEMBER 17 CULTURAL TRANSMISSION AND PHYLOGENETIC ANALYSIS: A CASE STUDY**

#### **Reading:**

Jordan, All Chapters

### **SEPTEMBER 24 MICROECONOMICS, EVOLUTION, AND HUMAN BEHAVIOR: INTRODUCTION TO HUMAN BEHAVIORAL ECOLOGY; PLIO-PLEISTOCENE ADAPTATIONS; POST- GLACIAL ADAPTATIONS**

#### **Reading:**

Broughton and Cannon, Chapters 1-15

### **OCTOBER 1 ARCHAEOLOGICAL CASE STUDIES IN HUMAN BEHAVIORAL ECOLOGY: TECHNOLOGICAL ORGANIZATION, FOOD PRODUCTION STRATEGIES; COOPERATION AND COMPETITION**

#### **Reading:**

Broughton and Cannon, Chapters 15-25

**OCTOBER 8**  
**CULTURAL MACROEVOLUTION: INTRODUCTION AND ARTIFACT CENTERED**  
**MACROEVOLUTION**

Mesoudi, Chapter 4

Prentiss, Anna Marie

2011 Introduction to this Special Issue on Evolution of Material Culture. *Evolution: Education and Outreach* 4:374-378.

Prentiss, Anna Marie, Randall R. Skelton, Niles Eldredge, and Colin P. Quinn

2011 Get Rad! The Evolution of the Skateboard Deck. *Evolution: Education and Outreach* 4:379-389.

Prentiss, Anna Marie, Matthew J. Walsh, Randall R. Skelton, and Matt Mattes

2016 Mosaic Evolution in Cultural Frameworks: Skateboard Decks and Projectile Points. In *Cultural Phylogenetics: Concepts and Applications in Archaeology*, edited by L. Mendoza Straffon, pp. 113-130. Interdisciplinary Evolution Research, Springer International Publishing, Switzerland.

Tehrani, Jamshid

2011 Patterns of Evolution on Iranian Tribal Textiles. *Evolution: Education and Outreach* 4:390-396.

Goodale, Nathan, George T. Jones, and Charlotte Beck

2011 Natural Selection and Human Behavior. *Evolution: Education and Outreach* 4:427-434.

Mesoudi, A., and M.J. O'Brien

2008a The Cultural transmission of Great Basin Projectile-Point technology: An Experimental Simulation. *American Antiquity* 73:3-28.

Mesoudi, A., and M.J. O'Brien

2008 The Cultural transmission of Great Basin Projectile-Point technology II: An Agent-Based Computer Simulation. *American Antiquity* 73:627-644.

O'Brien, Michael J., Matthew T. Boulanger, Briggs Buchanan, Mark Collard, R. Lee Lyman, John Darwent

2014 Innovation and Cultural transmission in the American Paleolithic: Phylogenetic Analysis of Eastern Paleoindian Projectile Point Classes. *Journal of Anthropological Archaeology* 34:100-119.

Lycett, Stephen

- 2009 Understanding Ancient Hominin Dispersals Using Artefactual Data: A Phylogeographic Analysis of Acheulian Handaxes. *Plos One* 4(10)e7404.

## **OCTOBER 15**

### **CULTURAL MACROEVOLUTION: COMPLEX CULTURAL UNITS**

#### **Reading:**

Mesoudi, Chapters 4 and 5

#### **Evolution of Socio-Economic Strategies**

Prentiss, Anna Marie, Ian Kuijt, and James C. Chatters

- 2009 Introduction: Macroevolution in Human Prehistory: Evolutionary Theory and Processual Archaeology. In *Macroevolution in Human Prehistory: Evolutionary Theory and Processual Archaeology*, edited by A.M. Prentiss, I. Kuijt and J.C. Chatters, pp. 1-22. Springer, New York.

Prentiss, Anna Marie, James C. Chatters, Matthew J. Walsh, and Randall R. Skelton

- 2014 Cultural Macroevolution in the Pacific Northwest: A Phylogenetic Test of the Diversification and Decimation Model. *Journal of Archaeological Science* 41:29-43.

Prentiss, Anna Marie, Matthew J. Walsh, Thomas A. Foor, and Kristen D. Barnett

- 2015 Cultural Macroevolution among High Latitude Hunter-Gatherers: A Phylogenetic Study of the Arctic Small Tool Tradition. *Journal of Archaeological Science* 59:64-79.

Barton, Loukas, P. Jeffrey Brantingham, and Duxue Ji

- 2007 Late Pleistocene Climate Change and Paleolithic Cultural Evolution in Northern China: Implications from the Last Glacial Maximum. *Developments in the Quaternary Sciences* 9:105-128.

Coward, Fiona, Stephen Shennan, Sue Colledge, James Conolly, and Mark Collard

- 2008 The Spread of Neolithic Plant Economies from the Near East to Northwest Europe: A Phylogenetic Analysis. *Journal of Archaeological Science* 35:42-56.

Foley, R.A. and M.M. Lahr

- 2011 The Evolution of Diversity among Cultures. *Philosophical Transactions of the Royal Society B Biological Sciences* 36:1080-1089.

#### **Evolution of Folktales**

Tehrani, Jamshid J.  
2013 The Phylogeny of Little Red Riding Hood. *PLOS ONE* 8(11):e78871.

Ross, Robert M. and Quentin D. Atkinson  
2016 Folktale Transmission in the Arctic Provides Evidence for High Bandwidth Social Learning among Hunter-gatherer Groups. *Evolution and Human Behavior* 37:47-53.

**OCTOBER 22**  
**FIRST ASSIGNMENT PRESENTATIONS AND DISCUSSIONS**

**OCTOBER 29**  
**COOPERATION THEORY AND CULTURAL EVOLUTION**

**Cooperation in Theory**

Hardin, Garrett  
1968 The Tragedy of the Commons. *Science* 162(3859):1243-1248.

Axelrod, Robert and W.D. Hamilton  
1981 The Evolution of Cooperation. *Science* 211(4489):1390-1396.

Henrich, Joseph, R. Boyd, J. Ensminger, R. McElreath, A. Barr, C. Barrett  
Bolyanatz, J.C. Cardenas et al.  
2010 Markets, Religion, Community Size, and the Evolution of Fairness and Punishment. *Science* 327(5972):1480-1484.

Carballo, David M., Paul Roscoe, and Gary M. Feinman  
2014 Cooperation and Collective Action in the Cultural Evolution of Complex Societies. *Journal of Archaeological Method and Theory* 21:98-133.

Boyd, Robert and Peter J. Richerson  
1992 Punishment allows the evolution of Cooperation (or anything else) in Sizable Groups. *Ethology and Sociobiology* 13(3):171-195.

Matthew, Sarah and Robert Boyd  
2011 Punishment Sustains Large-Scale Cooperation in Prestate Warfare. *Proceedings of the National Academy of Sciences* 108(28):11375-11380.

**Cooperation in the Archaeological Record (Some Diverse Perspectives)**

Eerkens, Jelmer W.  
2004 Privatization, Small Seed Intensification, and the Origins of Pottery in the Western Great basin. *American Antiquity* 69(4):653-670.

Hayden, Brian

1990 Nimrods, Piscators, Pluckers, and Planters: The Emergence of Food Production. *Journal of Anthropological Archaeology* 9:31-69.

Munro, Natalie D. and Leore Grosman

2010 Early Evidence (ca. 12,000 B.P.) for Feasting at a Burial Cave in Israel. *Proceedings of the National Academy of Sciences* 107(35):15362-15366.

Spencer, Charles S. and Elsa M. Redmond

2001 Multilevel Selection and Political Evolution in the Valley of Oaxaca 500-100 B.C. *Journal of Anthropological Archaeology* 20:195-229.

## **NOVEMBER 5**

### **SIGNALING THEORY AND CULTURAL EVOLUTION**

#### **Reading:**

Hawkes, Kristen

1993 Why Hunter-Gatherers Work: An Ancient Version of the Problem of Public Goods. *Current Anthropology* 34:341-362.

Wiessner, Polly

2002 Hunting, Healing, and hxaro exchange A Long-term Perspective on !Kung (Ju/'hoansi) Large-Game Hunting. *Evolution and Human Behavior* 23:407-436.

Bird, R.B. and E.A. Smith

2005 Signaling Theory, Strategic Interaction and Symbolic Capital. *Current Anthropology* 46:221-248.

McGuir, K.R. and W.R. Hildebrandt

2005 Re-thinking Great Basin Foragers: Prestige Hunting and Costly Signaling During the Middle Archaic Period. *American Antiquity* 70:695-712.

Bowles, Samuel

2006 Group Competition, Reproductive Leveling, and the Evolution of Human Altruism. *Science* 314: 1569-1572.

Boone, James L.

1998 The Evolution of Magnanimity: When is it better to give than Receive? *Human Nature* 9:1-21.

Henrich, Joseph and Francisco J. Gil-White

2001 The Evolution of Prestige Freely Conferred Deference as a Mechanism for Enhancing the Benefits of Cultural Transmission. *Evolution and Human*



*Behavior* 22:165-196.

Roscoe, Paul

2009 Social Signaling and the Organization of Small-Scale Society: The case of Contact-Era New Guinea. *Journal of Archaeological Method and Theory* 16:69-116.

Borgerhoff Mulder, Monique et al. (25 co-authors)

2009 Intergenerational Wealth Transmission and the Dynamics of Inequality in Small Scale Societies. *Science* 326:682-688.

Prentiss, Anna Marie, Thomas A. Foor, Guy Cross, Lucille E. Harris, and Michael Wanzenried

2012 The Cultural Evolution of Material Wealth Based Inequality at Bridge River, British Columbia. *American Antiquity* 77:542-564.

## **NOVEMBER 12**

### **DEMOGRAPHIC THEORY AND CULTURAL EVOLUTION**

#### **Demography and Cultural Variation**

Steele, James and Stephen Shennan

2009 Introduction: Demography and Macroevolution. *Human Biology* 81:105-119.

Shennan, Stephen

2001 Demography and Cultural Innovation: A Model and its Implications for the Emergence of Modern Culture. *Cambridge Archaeological Journal* 11:5-16.

Henrich, J.

2004 Demography and Cultural Evolution: Why Adaptive Cultural Processes Produced Maladaptive Losses in Tasmania. *American Antiquity* 69, 197-218.

Richerson, Peter J., Robert Boyd, and Robert L. Bettinger

2009 Cultural Innovations and Demographic Change. *Human Biology* 81:211-235.

Shennan, Stephen

2009 Evolutionary Demography and the Population History of the European Early Neolithic. *Human Biology* 81:339-355.

Collard, Mark, Krist Vaesen, Richard Cosgrove, and Wil Roebroeks

2016 The empirical case against the 'demographic turn' in Palaeolithic archaeology. *Phil. Trans. R. Soc. B.* 371(1698): 2015-0242.

### **Demography, Storage, and Social Change**

Puleston, C., S. Tuljapurkar, B. Winterhalder

2014 The Invisible Cliff: Abrupt Imposition of Malthusian Equilibrium in a Natural-Fertility, Agrarian Society. *PLOS ONE* 9, e87541.

Winterhalder, Bruce, Cedric Puleston, and Cody Ross

2015 Production Risk, Inter-Annual Food Storage by Households and Population-Level Consequences in Seasonal Prehistoric Agrarian Societies. *Environmental Archaeology* 20:337-348.

Prentiss, Anna Marie, Hannah S. Cail, and Lisa M. Smith

2014 At the Malthusian Ceiling: Subsistence and Inequality at Bridge River, British Columbia. *Journal of Anthropological Archaeology* 33:34-48.

Prentiss, Anna Marie, Thomas A. Foor, Ashley Hampton, Ethan Ryan, and Matthew J. Walsh

2018 The Evolution of Material Wealth-Based Inequality: The Evidence from Housepit 54, Bridge River, British Columbia. *American Antiquity* 83(4) (in press).

### **NOVEMBER 19**

### **CULTURE AND THE EXTENDED EVOLUTIONARY SYNTHESIS**

#### **The Extended Synthesis in Evolutionary Biology, Anthropology, and Psychology**

Laland, K.N., T. Uller, M.W. Feldman, K. Sterelny, G.B. Müller, A. Moczek, E. Jablonka, and J. Odling-Smee

2015 The Extended Evolutionary Synthesis: Its Structure, Assumptions, and Predictions. *Proceedings of the Royal Society B* 282, 20151019.

Fuentes, Augustin

2017 Human Niche, Human Behavior, Human Nature. *Interface Focus* 7:20160136.

Whiten, Andrew

2017 A Second Inheritance System: The Extension of Biology through Culture. *Interface Focus* 7:20160142.

#### **The Extended Synthesis and Archaeology**

Zeder, Melinda A.

2017 Domestication as a Model System for the Extended Evolutionary Synthesis. *Interface Focus* 7:20160133.

Zeder, Melinda A.

2016 Domestication as a Model System for Niche Construction Theory. *Evolutionary Ecology* 30:325-348.

**NOVEMBER 26**

**STUDENT RESEARCH PRESENTATIONS**

**DECEMBER 3**

**STUDENT RESEARCH PRESENTATIONS**

**DECEMBER 10**

**STUDENT RESEARCH PRESENTATIONS**

**DECEMBER 14**

**RESEARCH PAPERS DUE (5:00 PM)**

Key Terms to research:

adaptation  
analogous  
homologous  
character  
clade  
culture  
cultural virus  
cultural trait  
descent  
drift  
Darwinian population  
essentialism  
evolutionary individual  
extrasomatic  
exaptation  
ecological hierarchy  
genealogical hierarchy  
genotype  
fitness, inclusive fitness  
individualism  
interactor  
meme  
model  
neutral and nearly neutral models  
pathway  
phenotype  
reductionism  
selection (natural, artificial, cultural, stabilizing, group)  
“selfish” gene, meme  
species  
stasis  
structural design (*Bauplan*)  
trend (driven, passive)  
transmission