AN407: Neuroanthropology **Spring 2011**

Instructor: Ben Campbell
Office: Sabin Hall; 125C; tel. 229-6250; email: campbelb@uwm.edu
Office Hours: MW 2:00-3:00
Class: TBD

COURSE DESCRIPTION:

The origin and development of our large brain remains one of the fundamental questions of human evolution. While the fossil record remains the only way of documenting evolutionary changes, recent advances in comparative biology, genomics, and neuroimaging help provide an understanding of the causes and consequences of human brain evolution. Specific topics covered include the adaptive basis for large brains, primate sociality and brain size, the human fossil record, evolutionary genetics of the human brain, as well as neuroimaging of complex human traits, including language, tool manufacture, emotion and religious experience. Intended for graduate students and advanced undergraduates.

LEARNING OUTCOMES:

Upon completing this course students will:

- be able to describe the functions of the major parts of the human brain;
- demonstrate which parts have changed over the course of human evolution and;
- understand the evolutionary forces behind the origins of modern human behavior.

GRADING:

Grades will be determined based on a quiz, a midterm, weekly reading summaries, a class presentation and a final exam. Graduate students will also be required to prepare an annotated bibliography on the readings for the course.

These requirements will be weighted as follows:

	Undergrads	Grads
Quiz	10%	5%
Midterm exam	20%	15%
Weekly reading summaries	30%	20%
Class presentation	10%	10%
Final exam	30%	20%
*Annotated bibliography	N/A	30%

In class exercises (quiz, midterm and final) are listed on the syllabus.

Weekly reading summaries for undergraduates should be 2 pages in length and will be based on required readings from the text and one of the journal articles. Graduate

students should prepare 3- to 4-page summaries that are based on the text readings and at least two additional related articles. Detailed guidelines will be provided on the D2L site.

Class presentations will be on topics approved by the instructor. Undergraduate presentations will be 8-10 minutes long and will be based on at least five references outside the required readings. Graduate students will give 12-15 minute presentations based on at least ten different sources. Detailed guidelines for oral presentation will be provided on the D2L site.

The Annotated Bibliography will be based on compiling the weekly reading summaries and adding commentary to integrate each of summaries with each other and the overarching themes of the course. Detailed guidelines for oral presentation will be provided on the D2L site.

Grades will be assigned according to the following grading scale:

A	95-100	C+	77-79
A-	90-94	C	76- 73
B+	87-89	C-	65 -72
B	83-86	D	50 > <65
B-	80-82	F	<50

REQUIRED TEXT:

The Rise of Homo Sapiens: The Evolution of Modern Thinking. Frederick Coolidge and Thomas Wynn. Wiley-Blackwell. 2008.

A Colorful Introduction to the Anatomy of the Brain: A Brain and Psychology Coloring Book (2nd. Ed.) John Pinel and Maggie Edwards. Allyn & Bacon 2007.

Required journal articles are listed at the end of the syllabus. These articles will be made available on the course D2L website.

CLASSROOM POLICIES: You should always feel free to ask questions, share ideas, and express your opinions. At the same time, I expect all students to be courteous and respectful at all times. Behavior that may be distracting to other students in the class will not be tolerated. All noise-making electronic devices should be turned off in class. Laptops are acceptable, but only to take notes—NOT to surf the web, check your email, etc. Please refrain from reading the paper, chatting with your neighbors, or coming late or leaving early (unless you notify me ahead of time that this will be necessary). If you miss a class meeting, it is your responsibility to borrow notes from another student.

Cheating, plagiarism, or any other form of academic dishonesty will not be tolerated. No exceptions. The last page of the syllabus provides more information about policies. Also, please contact me as soon as possible if you require any special accommodations in order to complete the requirements for this course.

Course Outline

Section I: Introduction	**Reading**
1/24 What is Neuroanthropology?	Syllabus
1/26 Neuroanthropological Approaches	*Text Chap. 1*
1/31 Evol. Anatomy, Physiology & Function	*Rilling 2008*
2/01 Neuroanatomy & Function	*Text Chap 2*; *Brain Coloring Bk exercise*
2/07 Neurophysiology & Function	*Text Chap 3; Brain Coloring Bk exercise*
2/09 Development & Function	*Brain Coloring Bk exercise*
2/14 ***Quiz: Brain Basics***	
Section II: Comparative Perspective	***Text Chaps. 4, 5***
2/16 Mammalian Comparison	*Hart et al. 2008, Marino et al. 2004*
2/21 Primate Brains	*Dobson 2009, Williams et al. 2010*
2/23 Brain/Social Organization	*Dunbar 1998, McClean et al. 2009*
2/28 Great Ape Brains	*Rilling et al. 2007, Schnecker et al. 2005*
3/02 Great Ape Brains	*Burki & Kaess 2004, Nimchimsky 1999*
Section III: Human Evolution	***Text Chaps. 6, 7, 8, 9***
3/07 Australopithecines	*Falk et al. 2000, DeSilva & Lesnik 2008*
3/09 Early Homo	*Aiello & Wheeler 1995, Leonard 2007*
3/14 Archiac Homo	*Coqueugniot et al. 2004, Stout et al. 2008*
3/16 Florensis	*Falk et al. 2007, Obendorf et al. 2008*
3/28 Neanderthals	*Bruner et al. 2003, Bruner & Holloway*
3/30 Modern Human Origins	*Lewis-Williams & Townson 1998*
4/04 ***Exam: Great Apes and Hominid Brains***	
Section IV: Modern Humans	***Text Chaps. 10,11***
4/06 Genetics	*Mekel-Bobrov 2005, Wang et al. 2004*

4/011 Development	*Gogtay et al. 2004, Shaw et al. 2006*
4/13 Brain and Language	*Krause et al. 2007, Christiansen & Kirby 2003*
4/18 Executive Function	*Ardila 2008, Text Chap. 3*
4/20 Brain and Emotion	*Aaron et al. 2005, Hu et al. 2008*
4/25 Brain and Morality	*Woodward & Allman 2007, Parris et al. 2009*
4/27 Brain and Culture	*Dehaene & Cohen 2005, Freeman et al. 2009*
5/02 Cultural Practices	*Lazar et al. 2005, Lutz et al. 2009*
5/04 Cultural Practices	*Riba et al. 2006, Bronson and Merryman 2010*

5/09 **Student Presentations**

5/11 **Student Presentations**

Final TBA

Reading List

Aiello, L., Wheeler, P. 1995. The expensive-tissue hypothesis; the brain and digestive system in human and primate evolution. Current Anthropology 36:199-221.

Ardila A. 2008. On the evolutionary origins of executive functions. Brain Cogn. 68:92-9.

Aron A, Fisher H, Mashek DJ, Strong G, Li H, Brown LL. 2005. Reward, motivation, and emotion systems associated with early-stage intense romantic love. J Neurophysiol. 94:327-37.

Bronson P, Merryman A. 2010. The Creativity Crisis. http://www.newsweek.com /2010/07/10/the-creativity-crisis.html

Bruner E, Holloway RL. 2010. A bivariate approach to the widening of the frontal lobe in the genus Homo. J Hum Evol 58:138-46.

Bruner E, Manzi G, Aruaga JL. 2003. Encephalization and allometric trajectories in the genus *Homo*: evidence from the Neanderthal and modern lineages. Proc Nat Acad Sci U S A 100:15335-40.

Bruner E, Holloway RL. 2010. A bivariate approach to the widening of the frontal lobe in the genus Homo. J Hum Evol 58:138-46.

Burki F, Kaessmann H. 2004. Birth and adaptive evolution of a hominoid gene that supports high neurotransmitter flux. Nature Genetics 36:1061-3.

Christiansen MH, Kriby S. 2003. Language evolution: Consensus and Contraversies. Trends Cogn Sci. 7:300-307.

Coqueugniot H, Hublin J-J, Veillon F, Houet F, Jacob T. 2004. Early brain growth in Homo erectus and implications for cognitive ability. Nature 431: 299-302.

Dehaene S, Cohen L: Cultural recycling of cortical maps. Neuron 2005, 56:384-398

DeSilva JM, Lesnik JJ. 2008. Brain size at birth throughout human evolution: a new method for estimating neonatal brain size in hominins. J Hum Evol. 55:1064-74.

Dobson , SD. 2009. Allometry of Facial Mobility in Anthropoid Primates: Implications for the Evolution of Facial Expression 12338:70-81.

Dunbar RIM. 1998. The social brain hypothesis. Evol Anthropol 6:178-190.

Falk D, Redmond JC jr., GuyerJ, Conroy, C, Recheis W, Weber GW, Seidler H. 2000. Early hominid brain evolution: a new look at old endocasts. J Hum Evol 38:695-717.

Falk D, Hildebolt C, Smith K, Morwood MJ, Sutikna T, Jatmiko, Saptomo EW,Imhof H, Seidler H, Prior F. 2007. Brain shape in human microcephalics and Homo floresiensis. Proc Natl Acad Sci U S A 104:2513-8.

.

Freeman JB, Rule NO, Adams RB Jr, Ambady N. 2009. Culture shapes a mesolimbic response to signals of dominance and subordination that associates with behavior. Neuroimage. 47:353-9.

Gogtay N, Giedd JN, Lusk L, Hayashi KM, Greenstein D, Vaituzis AC, Nugent TF 3rd, Herman DH, Clasen LS, Toga AW, Rapoport JL, Thompson PM. 2004. Dynamic mapping of human cortical development during childhood through early adulthood. Proc Natl Acad Sci U S A. 101:8174-9.

Hart BL, Hart LA, Pinter-Wollman N. 2008. Large brains and cognition: where do elephants fit in? Neurosci Biobehav Rev. 32:86-98.

Hu SW, Wei N, Wang QD, Yan LQ, Wei QQ, Zhang MM, Hu JB, Huang ML, Zhou WH, Xu Y. 2008. Patterns of brain activation during visually evoked sexual arousal differs between homosexual and heterosexual men. Am J Neuroradiol. 29:1890-6.

Krause J, Lalueza-Fox C, Orlando L, Enard W, Green RE, Burbano HA, Hublin JJ, Hänni C, Fortea J, de la Rasilla M, Bertranpetit J, Rosas A, Pääbo S. 2007. The derived FOXP2 variant of modern humans was shared with Neandertals. Curr Biol. 17:1908-12.

Lazar SW, Kerr CE, Wasserman RH, Gray JR, Greve DN, Treadway MT, McGarvey M,Quinn BT, Dusek JA, Benson H, Rauch SL, Moore CI, Fischl B: 2005. Meditation experience is associated with increased cortical thickness. Neuroreport 16:1893-7.

Leonard WR, Snodgrass JJ, Robertson ML. 2007. Effects of brain evolution on human nutrition and metabolism. Annu Rev Nutr. 27:311-27.

Lutz A, Greischar LL, Perlman DM, Davidson RJ. 2009. BOLD signal in insula is differentially related to cardiac function during compassion meditation in experts vs. novices. Neuroimage.

MacLean EL, Barrickman NL, Johnson EM, Wall CE. 2009 Sociality, ecology, and relative brain size in lemurs. J Hum Evol. 56:471-8.

Marino L, McShea DW, Uhen MD. 2004. Origin and evolution of large brains in toothed whales. Anat Rec A Disco Mol Cell Evol Biol 281:1247-55.

Mekel-Bobrov N, Gilbert SL, Evans PD, Vallender EJ, Anderson JR, Hudson RR, Tishkoff SA, Lahn BT. 2005. Ongoing adaptive evolution of ASPM, a brain size determinant in Homo sapiens. Science. 309:1720-22.

Nimchinsky EA, Gilissen E, Allman JM, Perl DP, Erwin JM, Hof PR. 1999. A neuronal morphologic type unique to humans and great apes. Proc Natl Acad Sci U S A 96:5268-73.

Obendorf PJ, Oxnard CE, Kefford BJ. 2008. Are the small human-like fossils found on Flores human endemic cretins? Proc Biol Sci 275:1287-96.

Onoda K, Okamoto Y, Nakashima K, Nittono H, Ura M, Yamawaki S. 2009. Decreased ventral anterior cingulate cortex activity is associated with reduced social pain during emotional support. Soc Neurosci. 26:1-12.

Parris BA, Kuhn G, Mizon GA, Benattayallah A, Hodgson TL. 2009. Imaging the impossible: an fMRI study of impossible causal relationships in magic tricks. Neuroimage. 45:1033-9.

Riba J, Romero S, Grasa E, Mena E, Carrió I, Barbanoj MJ. 2006. Increased frontal and paralimbic activation following ayahuasca, the pan-Amazonian inebriant. Psychopharmacology (Berl). 186:93-8.

Rilling JK. 2008. Neuroscientific approaches and applications within anthropology. Am J Phys Anthropol. Suppl 47:2-32.

Rilling JK, Barks SK, Parr LA, Preuss TM, Faber TL, Pagnoni G, Bremner JD, Votaw JR. 2007. A comparison of resting-state brain activity in humans and chimpanzees.Proc Natl Acad Sci U S A. 104:17146-51.

Ruff CB, Trinkaus E, Holliday TW. Body mass and encephalization in Pleistocene Homo. Nature. 1997 387:173-6.

Schenker NM, Desgouttes AM, Semendeferi K. 2005. Neural connectivity and cortical substrates of cognition in hominoids. J Hum Evol 49:547-469.

Shaw P, Greenstein D, Lerch J, Clasen L, Lenroot K, Gogtay N, Evans A, Rapoport J, Giedd J. 2006. Intellectual ability and cortical development in children and adolescents. Nature 440:676-9.

Stout D, Toth N, Schick K, Chaminade T. 2008. Neural correlates of Early Stone Age toolmaking: technology, language and cognition in human evolution. Philos Trans R Soc Lond B Biol Sci 363:1939-49.

Wang E, Ding YC, Flodman P, Kidd JR, Kidd KK, Grady DL, Ryder OA, Spence MA, Swanson JM, Moyzis RK. 2004. The genetic architecture of selection at the human dopamine receptor D4 (DRD4)gene locus. Am J Hum Genet 74:931-44.

Williams BA, Kay RF, Kirk EC. 2010. New perspectives on anthropoid origins. Proc Natl Acad Sci U S A. 107:4797-804.

Woodward J, Allman J. 2007. Moral Intuition: its neural substrates and normative significance. Journal of Physiology (Paris) 101:179-202.

Quidelines For Paper Summaries and Presentations

Paper Summaries

There are many ways to write summary papers. No single way is correct one. However, all posses the same objective; to convey the critical information in the paper to reader provide an evaluation of its argument and relate it to a larger context. In terms of style it can be useful to learn a simple standard format first, before learning how to try variants of that format. In this class I will ask you to use the standard format outlined below. By learning a standard format and sticking with it, you will be able to concentrate on sharpening you writing skills.

Summaries will be graded on both content and clarity of writing. The quality of the content will be judged by having the facts of the article correct and being able to discern the most important points of the article. The quality of the writing is critical if the reader is to understand the content. Quality of writing will be judged on fit to the expected format, clearly sentence structure, and the existence of paragraphs.

Undergraduates

Standard format – Section 1) Introductory paragraph framing the content of the reading, and introducing the article's main thesis. Section 2) 2-3-4 paragraphs devoted to each of the important points in the reading. Section 3) 1-2 paragraphs devoted to evaluating how well the authors supported their overall argument Section 4) 1-2 paragraphs relating the reading to material covered in lecture. Section 5) One paragraph summarizing the main points of your summary.

Graduate Students

Standard format – Section 1) Introductory paragraph framing the content of the reading, and introducing the article's main thesis. Section 2) 1-2 paragraphs devoted to the important points in each of the readings. Section 3) 1-2 paragraphs devoted to evaluating how well the authors for each of the article supported their overall argument Section 4) 4-5 paragraphs synthesizing the different article Section 5) 3-4 paragraphs relating the reading to material covered in lecture. Section 6) One paragraph summarizing the main points of your summary.

Presentations

A oral presentation is not simply a written version of a paper, but should take advantage of A-V material as well. Thus I will ask you to make a power-point presentation on your topic. The format of the talk is similar to the paper. It should include an introduction to the topic that explains why it is important and orients the audience to what you will be talking about, a body of the talk should p[resents the key points and evaluates them, and a summary that wraps up what you have said.

Presentations will be evaluated both on the quality of the content and on the quality of the oral presentation, including clarity of speech and the relevance and effectiveness of A-V material.

University Policies

1. *Students with disabilities.* Verification of disability, class standards, the policy on the use of alternate materials and test accommodations can be found at the following: http*://www.uwm.edu/Dept/DSAD/SAC/SACltr.pdf*
2. *Religious observances.* Policies regarding accommodations for absences due to religious observance are found at the following: http://www.uwm.edu/Dept/SecU/acad%2Badmin_policies/S1.5.htm
3. *Students called to active military duty.* Accommodations for absences due to call-up of reserves to active military duty should be noted. http://www3.uwm.edu/des/web/registration/militarycallup.cfm
4. *Incompletes***.** The conditions for awarding an incomplete to graduate and undergraduate students can be found at the following: http://www.uwm.edu/Dept/SecU/acad%2Badmin_policies/S31.pdf
5. *Discriminatory conduct (such as sexual harassment*). Definitions of discrimination. Harassment, abuse of power, and the reporting requirements of discriminatory conduct are found at the following: http://www.uwm.edu/Dept/SecU/acad%2Badmin_policies/S47.pdf
6. *Academic misconduct.* Policies for addressing students cheating on exams or plagiarism can be found at the following: http://www.uwm.edu/Dept/OSL/DOS/conduct.html
7. *Complaint procedures.* Students may direct complaints to the head of the academic unit or department in which the complaint occurs. If the complaint allegedly violates a specific university policy, it may be directed to the head of the department or academic unit in which the complaint occurred or to the appropriate university office responsible for enforcing the policy.
8. *Grade appeal procedures*. Procedures for student grade appeal appear at the following: http://www.uwm.edu/Dept/SecU/acad%2Badmin_policies/S28.htm
9. *Final examination policy.* Policies regarding final examinations can be found at the following: http://www.uwm.edu/Dept/SecU/acad%2Badmin_policies/S22.htm