Psychology 6013
Biopsychology
Fall 2016
Mondays 9:05-11:55
150 Coon

Instructor: Audrey Duarte, 124 Coon, 404 894-2349, audrey.duarte@psych.gatech.edu.

Credit: 3

General Information: The overarching goal of this course is to examine the biological basis of behavior. Biopsychology is an interdisciplinary science that aims to investigate the interaction between brain and behavior. We will study some of the important research findings over the past century that have elucidated the structure and function of the nervous system, and the relationship between the nervous system and high order cognition. Hopefully, upon completing this course, you will have a fundamental understanding of neuronal communication, neuroanatomy, and the underlying mechanisms supporting cognitive phenomena such as memory and emotion. Even if you do not conduct neuroscience research, you will better understand the issues, methods and exciting discoveries that neuroscience methods have enabled.

Class meetings: Each week will be a combination of lecture material and discussion of between 2-4 readings centered on a particular topic. These readings include important historical articles, reviews, and more recent empirical studies. All readings will be made available to you in advance. One person will lead the discussion of the readings for each week. That person is responsible for a clear, concise (under 20 min) presentation of the articles including the research questions, the methods, the findings and the conclusions, and the historical importance of the work where relevant. As discussion leader, you will tell us your take on the papers, and provide a few questions to discuss. Doing a good job in leading a discussion requires that you (a) understand the paper and its issues and findings and (b) practice your presentation ahead of time. To help you be successful, you will also receive discussion questions/interesting observations from your classmates in advance of class. Our discussions will focus on what we learned from the readings, how the findings advanced the field of biopsychology, criticisms of the method or conclusions, and future research questions.

Attendance: Required. Email me a.s.a.p. if you expect to miss a class due to an emergency. 2 or more unexcused absences will result in an automatic failure.

Grades: Your course grade will be determined by three components:

(1) Discussion questions for each week's papers (1/3). Each week you will prepare 2 or more discussion questions from the readings. Good discussion questions will make it clear that you read the papers. The questions can be points of confusion, likes/dislikes, follow up research questions, etc. **You should upload these questions to TSquare no later than Friday at midnight.** Each week's questions are graded pass/fail. If they are late or inadequate, they fail.

(2) Class participation (1/3) You need to participate in the class discussions. Ask questions. Answer questions.

(3) Presentation (1/3). You will serve as discussion leader for a topic/s of your choice from the syllabus. As discussion leader you will present and discuss the readings for the topic of your choosing. You should give a brief intro to the questions in the papers. You will want to go over the methods, findings and conclusions. The presentation should be around 20 min. To help you prepare, you will also receive discussion questions from your classmates ahead of time.

Students with Disabilities: Any student with a documented disability needing academic adjustments or accommodations is requested to speak to me in the first week of class. All discussions will remain confidential, although ADAPTS may be consulted to verify the documentation of the disability.

Academic Honor: I expect all members of the class to abide by the Honor Code. This means that all students are expected to submit their own, original work, including preparation of discussion questions. Don't cheat.

All instances of plagiarism or other violations academic honor will be dealt with according to the procedures described in the GT Academic Honor Code. If you have any questions regarding the Honor Code, please feel free to contact me or or visit www.honor.gatech.edu.

SCHEDULE

Week 1. Aug 22nd.
Organizational meeting. Pick topic assignments.

Week 2. Aug 29th. From neurons to regions.

1-4, 53 pages

Week 3. Sept 5th. NO CLASS. LABOR DAY

Week 4. Sept 12th. Neural communication

5-7, 48 pages

Week 5. Sept 19th. Drug abuse

8-11, 58 pages

Week 6. Sept 26th . Neuroscience methods: EEG.,

12-14, 66 pages

Week 7. October 3rd. Neuroscience methods: fMRI

15-17, 45 pages

Week 8. October 10th. NO CLASS. FALL BREAK

Week 9. October 17th. Consciousness.

18-20, 71 pages

Week 10. October 24th. Vision.

21-24, 46 pages

Week 11. October 31st. Neural plasticity.

25-28, 79 pages

Week 12. November 7th. Memory systems and disorders

29-31, 59 pages

Week 13. November 14th. Acute and chronic stress

32-35, 109 pages

Week 14. November 21st. Emotion.

36-41, 104 pages

Week 15. November 28th. Mood disorders

42-47, 56 pages

Week 16. December 5th. Schizophrenia

48-51, 55 pages

READING LIST (pdf filename in boldface)

1. **Broca 1865.** Translation of Broca's 1865 report.
2. **History of Broca's area.** History of neuroscience: Broca's area.
3. **Guillery2005NDcurrentstatus_Neuron doctrine.** Observations of synaptic structures: origins of the neuron doctrine and its current status
4. **Glickstein2006ND_Neuron Doctrine.** Golgi and Cajal: The neuron doctrine and the 100th anniversary of the 1906 Nobel Prize.
5. **Eccles1982rev_synapse**. The synapse: from electrical to chemical transmission.
6. **Valenstein2002**. The discovery of chemical neurotransmitters.
7. **Lee2007.** Solanaceae IV: Atropa belladonna, Deadly Nightshade
8. **Adinoff2004.** Neurobiologic processes in drug reward and addiction
9. **Baumann et al 2014.** Bath Salts, Spice, and Related Designer Drugs: The Science Behind the Headlines
10. **Ciccarone2011.** Stimulant abuse: pharmacology, cocaine, methamphetamine, treatment, attempts at pharmacotherapy
11. **Moeller2008.** Use of stimulants to treat cocaine and methamphetamine abuse
12. **Millett2001**. Hans Berger: from psychic energy to the EEG.
13. **Kuperberg_PsychNeuroimage_2004_EEGreview**. Electroencephalography, event-related potentials, and magnetoencephalography.
14. **Mukamel_Fried_2012.** Human intracranial recordings and cognitive neuroscience.
15. **Van_den_Heuvel**. Exploring the brain network: A review on resting-state fMRI functional connectivity
16. **NikosNatureJune2008_fMRI review**. What we can do and what we cannot do with fMRI
17. **Poldrack_2012**. The role of fMRI in Cognitive Neuroscience: where do we stand?
18. **Coleman_2009.** Towards the routine use of brain imaging to aid the clinical diagnosis of disorders of consciousness
19. **Coleman_2009_multimodal.** A multimodal approach to the assessment of patients with disorders of consciousness
20. **Gazzaniga_autobiography.**
21. **Ungerleider_Haxby_1994.** What and where in the human brain.
22. **deHaan_Cowey_2011**. On the usefulness of 'what' and 'where' pathways in vision
23. **Atkinson_Adolphs_2012.** The neuropsychology of face perception: beyond simple dissociations and functional selectivity
24. **Jacobs_2012.** Neglect: a multisensory deficit?
25. **Bliss Lomo_1973**. Long-lasting potentiation of synaptic transmission in the dentate area of the anaesthetized rabbit following stimulation of the perforant pathway.
26. **Bliss_Cooke_2011.** Long-term potentiation and long-term depression: a clinical perspective
27. **Edwardson2012.** New modalities of brain stimulation for stroke rehabilitation
28. **Kelly and Castellanos 2014.** Strengthening Connections: Functional Connectivity and Brain Plasticity
29. **Scoville_milner_1957.** Loss of recent memory after bilateral hippocampal lesions.
30. **Korsakoff_translation_1955**. Psychic disorder in conjunction with peripheral neuritis.
31. **Milner_autobiography_1998.**

32. **Roozendaal_McGaugh_2011.** Memory modulation.
33. **Conrad2008.** Chronic Stress-Induced Hippocampal Vulnerability: The Glucocorticoid Vulnerability Hypothesis
34. **McEwen2008**. Central effects of stress hormones in health and disease: understanding the protective and damaging effects of stress and stress mediators
35. **Koenigs2009**. Post-traumatic stress disorder: The role of medial prefrontal cortex and amygdala
36. **Papez1937**. A proposed mechanism of emotion.
37. **Adolphs2010.** What does the amygdala contribute to social cognition?
38. **Harlow1848**. Passage of an iron rod through the head.
39. **Murray2007.** What we know and do not know about the functions of the orbitofrontal cortex after 20 years of cross-species studies
40. **Anderson_Kiehl_2012.** The psychopath magnetized: insights from brain imaging.
41. **Eslinger_etal_2004**. Developmental outcomes after early prefrontal cortex damage
42. **Foland-Ross2012.** Cognitive and neural aspects of information processing in major depressive disorder: an integrative perspective
43. **Pringle2011**. A cognitive neuropsychological model of antidepressant drug action
44. **Cowen2008.** Serotonin and depression: pathophysiological mechanism or marketing myth?
45. **Lacasse2005.** Serotonin and depression: a disconnect between the advertisements and the scientific literature
46. **Duman_2014**. Neurobiology of stress, depression, and rapid acting antidepressants: remodeling synaptic connections
47. **Blond_2012.** Functional neuroanatomy of bipolar disorder: structure, function, and connectivity in an amygdala–anterior paralimbic neural system
48. **Lewandowski_2012.**Evolution of neuropsychological dysfunction during the course of schizophrenia and bipolar disorder
49. **Howes2009.** The dopamine hypothesis of schizophrenia: version III—the final common pathway
50. **Rapoport2011.** Childhood onset schizophrenia: support for a progressive neurodevelopmental disorder
51. **Fazel2009.** Schizophrenia and Violence: Systematic Review and Meta-Analysis