

NEUROPSYCHOLOGY 830:310 SUMMER SESSION I, 2012

Mon-Thur, 10:10 AM – 12:05; SEC-210

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Course Description

Neuropsychology is the study of brain-behavior relationships in which the focus is entirely on the human brain. It is a branch of neuroscience that traditionally has relied more on clinical case studies as a source of information for identifying the functional significance of various regions of the brain, than basic laboratory research using animal models, which in and of themselves have provided (and continue to provide) a wealth of information that has been extrapolated to human brain function. In recent years, the ascendance of cognitive neuroscience, a branch of cognitive science that correlates brain activity with normal psychological processes in healthy, unimpaired human subjects, has served to extend the domain of neuropsychological investigation. In essence, whether it's called neuropsychology, behavioral neurology, or cognitive neuroscience, the ultimate goal is prediction and understanding of what parts of the brain serve as the basic substrates for measureable ongoing behavior. And as such, this information serves to aid the diagnosis and treatment of many different behavioral disorders ranging from acquired or inherited deficits in language and cognition, to severe neuropsychiatric conditions such as Alzheimer's dementia and schizophrenia. The course will provide the basis for appreciating the many different ways in which behavior has been related to specific regions of the human brain, and will cover basic neuroanatomy, neuropsychological testing, the newer methodologies used by cognitive neuroscience, such as neuroimaging, and proceed to a more detailed description of how the brain allows for the expression and processing of emotion, language, thought, and memory.

Learning Goals

After taking this course, students should be familiar with:

1. Methods for assessing normal and abnormal brain function at the structural and physiological level in human and non-human primates
2. Neuropsychological approaches to assessing the consequences of brain damage

3. The functional properties of of the cerebral cortex in human and non-human primates
4. Functional differences between the left and right cerebral hemispheres
5. The relationship of neuropsychology to cognitive neuroscience approaches to understanding
 - a. Sensation and Perception
 - b. Goal-directed actions
 - c. Attention
 - d. Learning and memory
 - e. Emotion
 - f. Language
6. The neurocognitive basis of psychiatric disorders

Assessment

There will be three exams. Each exam will be a mixture of written and multiple choice questions. The first exam will account for 25% of the total grade. Exam 2 will also account for 35% of the total grade. The Final Exam (or 3rd Exam) will be worth 40% of the total grade (note, in this final exam I will be testing you on your knowledge of the required reading – see below). The final exam is not cumulative.

Makeups: If an exam is missed for a legitimate and verifiable reason, the student must sit for the makeup within three weekdays of the scheduled date for the missed exam. Written and signed documentation will be required, and since the makeup will allow for more study time, the written component of the exam will look for evidence of greater and more precise understanding. Rutgers athletic obligations, religious events, weddings etc that are going to interfere with taking the scheduled exams will require that you take the exam earlier than scheduled. It is up to you to anticipate the conflict, and let me know about these upcoming events so I can administer the exam earlier.

Class Rules: READ THIS CLOSELY TO AVOID EMBARRASSMENT. Over the years, and given that as I get older my audience gets younger, as well as the intrusion of technological advances into the classroom (some of which make my life easier), I have come to feel that the assumptions of common civility are fast disappearing. So here are some ground rules: (i) *you can record the lecture* if you so wish – but I am not responsible for the accuracy of your translation and interpretation of what I “say” in the transcript (any doubts you have about interpretation and transcribing, you should clear up with me before you take an exam); (ii) you are allowed to use a laptop in class, but only to take notes, not to check email, chat on facebook, and surf the internet – you did not pay the registration fee to do what you could do at home! And if I suspect you are not using the laptop for academic reasons, I will ask you to use pen and paper (which is the smarter thing to do anyway . . .), or even quiz you on what I have been saying; (iii) put your cell phones on VIBRATE! And if you check a message, don’t enter into a text-messaging conversation; let those important to you know that you are in class respecting the right of the professor to have your undivided attention, since he is giving you HIS undivided

attention (if you have to make an important call or get into some vigorous text-messaging duel, please do it OUTSIDE the class); (iv) DO NOT CHIT-CHAT with your neighbors – this is rudeness, which will only lead me to make fun of you; and finally (v) DO NOT FALL ASLEEP in class!

Required Reading

Phantoms in the Brain: Probing the Mysteries of the Human Mind; by V.S. Ramachandran, 1999.

The above book should be read by students in order to appreciate certain clinical aspects of neurological disorders. It is an award-winning book, and based on feedback, universally “loved” by hundreds of students who have taken my Neuropsychology class. (NOTE: Ramachandran has a BBC documentary on the book, which you can watch on YouTube – just go to the site and type in the name of the book). The book does not provide a formal, textbook style description of how neuropsychology as a discipline is conducted. However, it does leave the reader appreciative of the intriguing nature of the brain, as well as being knowledgeable of some clinical conditions that will be covered in class.

Note: Take-home questions will be provided to help prepare students for questions in the Third Exam based on the book. Material in the book that is not addressed in lecture will be the student’s responsibility (but the take-home questions should not leave you stranded thinking “what do I need to know?”).

Optional Reading

Purchase of a formal textbook on neuropsychology is not required, since the lectures and lecture outlines (that will be posted on sakai) will be sufficient to get through the course. There is a wealth of information on the internet, such that a student merely needs to type in a keyword (eg., ataxia or apraxia) to get a host of links defining these terms.

However, if a student wants to know more about specific terms encountered in the course, she/he may benefit from having a copy of the following:

Beaumont, J. G., Kenealy, P.M., & Rogers, M.J.C. (1999). *The Blackwell Dictionary of Neuropsychology*. Malden, Massachusetts, Blackwell Publishers.

Further, if a student definitely must have a textbook on neuropsychology (and few fit my approach), then the following is worth purchasing (there is a more expensive 6th edition out now, but not necessary if you are purchasing to obtain a secondary source to the lectures):

Kolb, B., & Wishaw, I.Q. (2003). *Fundamentals of Human Neuropsychology* (5th edition). Freeman.

Finally, any textbook (completely optional) on physiological psychology or biological psychology should alleviate concerns about understanding the neurobiology (eg., that used for Physiological Psychology [830:313] at Rutgers is *Physiology of Behavior* by Neil Carlson).

Topics and Schedule of Classes (I have omitted days and times, since topics invariably end up overlapping; BUT TAKE NOTE OF THE EXAM DATES)

1. Intro/History
2. The Nervous System: Focus on the Brain
3. Neuroanatomy
4. Clinical Categories of Brain Damage
5. Assessment of Brain Function/Neuroimaging
6. Assessment of Brain Function/Neuropsychological Testing

Thur 7-June Exam 1

7. Occipital Cortex: Anatomy and Visual Function
8. Disorders of Visual Perception
9. Parietal Cortex: Anatomy/Somatosensation/Spatial Perception
10. Disorders of Parietal Cortex
11. Temporal Cortex: Anatomy and Function
12. Disorders of Temporal Cortex
13. Frontal Cortex: Anatomy and Role in Controlling Behavior

Thur 21-June Exam 2

14. Control of Voluntary Behavior
15. Executive Functions: Planning and Executing Behavior
16. Disorders of Frontal Lobe: Relevance to Psychiatric Disorders
17. HBO Documentary: Alzheimer's Disease (will involve in-class assignment)

18. Attention and Working Memory

19. Language and Thought

NOTE! July 4 - NO CLASS

Thur 5-July Exam 3