NEUROPSYCHOLOGY 830:310:02 FALL 2012

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Course Description

Neuropsychology is the study of brain-behavior relationships in which the focus is 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. However, basic laboratory research using animal models, has provided (and continues 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 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. Exams 1 and 2 will be a mixture of written and multiple choice questions. The first exam will account for 25% of the total grade. Exam 2 will account for 35% of the total grade. The Final Exam will be all multiple choice and worth 40% of the total grade. NOTE: In addition to lecture content, Exam 2 and the final exam will also test knowledge of the required reading.

Grading System: Students will need to achieve predetermined cut-off points for grades of A, B+, and so on. Cut-off points will be as follows:

A 90-100 B+ 86-89.9 B 75-85.9 C+ 71-74.9 C 60-70.9 D 50-59.9 F <50

Extra Credit:

Students can choose to undertake additional work in order to receive extra credit. The extra credit will be earned by answering additional questions in the Final Exam. These questions will pertain to target articles that will be posted through Sakai once Exam 2 has been taken and graded. Reading these articles is not mandatory, but if you have fallen behind, you may wish to read the articles and answer relevant questions in the Final Exam. Answering all extra credit questions correctly will earn 5% extra credit. This can be added to whatever percentage score is received based on the three exams testing lecture material and the required reading. If the regular overall score for a student was, say, 86%, then an extra 5% (assuming all extra credit questions are correct) will boost a student to 91, and a grade of A. By the same principle, the extra credit questions can improve on other potential grades that you find yourself facing.

Makeup*s*:

I religiously verify all excuses for missing an exam. So please DO NOT TRY to pull the wool over my eyes. If you do miss an exam, it will be a different exam that you will be asked to take. If the 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.

IMPORTANT: Failure to take the makeup within three weekdays of the scheduled exam will mean that you will have to take it during the reading period between the final class and the final exam. This will be the only opportunity to take a missed exam prior to the final exam. THERE ARE NO MAKEUP EXAMS AFTER THE FINAL EXAM (unless you have a conflict with another class, and which is acknowledged on the SAS website for exam schedules and rules concerning conflicts).

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. If you don't take the exam, then you will either (i) fail to receive any points, or (ii) have the option to take the missed exam during the reading period between the final class and the final exam.

Required Reading

There is no assigned textbook that supplements the lecture notes. However, there are two books that will be assigned as private, examinable reading.

Students will be expected to read the two books listed below, and a series of questions on the content of these books will be given in Second and Final Exams. These books provide perspectives on the clinical practice of neuropsychology and behavioral neurology. Knowledge of subject matter in these books will be examined during the third exam. Lectures will touch on some of the topics covered in these books, *but I will not lecture from the books*. Therefore, consider the books as examinable private study.

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

Into the Silent Land: *Travels in Neuropsychology;* by Paul Broks. 2004.

Optional Reading

Purchase of a formal textbook on neuropsychology is not required, since the lectures and lecture outlines (to be posted on sakai) will be sufficient to get you 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 you wish to know more (especially if planning a career along these lines) about specific terms encountered in the course, you will benefit from having a copy of the following (but this is optional, since I will define terms for you :
Beaumont, J. G., Kenealy, P.M., & Rogers, M.J.C. (1999). *The Blackwell Dictionary of Neuropsychology*. Malden, Massachusetts,Blackwell Publishers.

Further, if you definitely must have a textbook on neuropsychology (and few fit my approach for an introductory course), then the following is worth purchasing (there is a more expensive 6th edition out now - about $95). It is written at a graduate level, but considered the top textbook. Purchase only if you are having trouble with 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 that we will cover (eg., that used for Physiological Psychology [830:313] at Rutgers is *Physiology of Behavior* by Neil Carlson; this book will be placed on reserve at the library, since it covers the neuroanatomy and some other physiological aspects that students may find difficult; many used copies are available through your favorite vendor, and 8th through 10th editions of the book will be fine).

Outline of Course Lectures and Dates of Exams

Section I: History, Neuroanatomy and Methodology

Lecture #			Topic
1	Wed	5-Sept	Introduction and History
2	Mon	10-Sept	The Nervous System: Central vs Peripheral Nervous System

3	Wed	12-Sept	Brain Structure and Anatomy
4	Mon	17-Sept	Methodology: Clinical Conditions (eg., Strokes, Infection, Trauma)
5	Wed	19-Sept	Methodology: Clinical Conditions (eg., Strokes, Infection, Trauma)
6	Mon	24-Sept	Methodology: Measurement of Brain Function (eg., Neuroimaging; EEG)
7.	Wed	26-Sept	Methodology: Neuropsychological Assessment
8.	**Mon**	**1-Oct**	**EXAM 1 (25% of total grade)**

Section II: Cognitive, Perceptual and Motor Functions of the Cerebral Cortex

This section will address each of the four lobes of the cerebral cortex and discuss their unique and overlapping functional properties. It will become apparent that discussion of the various lobes of the cerebral cortex is a matter of convenience, revealing that all forms of behavior are a product of interactions between different regions of the brain. This is the basis of 'systems neuroscience.'

Specific behavioral topics that will be covered in this section will include: Disorders of sensation and perception; epilepsy; hallucinations; phantom limbs; impulsivity and response inhibition; planning & judgement; attention; empathy and social perception.

Lecture #			**Topic**
9.	Wed	3-Oct	The Occipital Lobe
10	Mon	8-Oct	The Occipital Lobe
11	Wed	10-Oct	Parietal Lobe
12	Mon	15-Oct	Parietal Lobe
13	Wed	17-Oct	Temporal Lobe
14	Mon	22-Oct	Temporal Lobe
15	Wed	24-Oct	Frontal Lobe
16	Mon	29-Oct	Frontal Lobe
17	Wed	31-Oct	Frontal Lobe
18	**Mon**	**5-Nov**	**EXAM 2 – 35% (tests lectures 9-17 AND 'Into The Silent Land')**

Section III: Special Topics in Neuropsychology

In this section, information gathered about the various functions of the cerebral cortical lobes is integrated in the context of discussing specific topics relevant to cognitive neuroscience and psychiatry

Lecture #			**Topic**
19	Wed	7-Nov	Learning and Memory
20	Mon	12-Nov	Learning and Memory
21	Wed	14-Nov	Film: Alzheimer's Dementia (students will be expected to answer questions in class, and submit the forms prior to leaving)
22	Mon	19-Nov	Dementia

No Class Wed Due To Thanksgiving Break (i.e. Wed classes are designated Friday Classes)

23	Mon	26-Nov	Psychiatric Disorders
24	Wed	28-Nov	Psychiatric Disorders
25	Mon	3-Dec	Hemispheric Specialization
26	Wed	5-Dec	Hemispheric Specialization
27	Mon	10-Dec	The Neurobiology of Language
28	Wed	12-Dec	The Neurobiology of Language

FINAL EXAM (date to be announced) – 40% (Lectures 19-28 AND 'Phantoms in the Brain')