

PSYD60S 1996
COGNITIVE AND ANALYTICAL NEUROSCIENCE

Instructor:
N. W. Milgram

Tuesday 11:00 - 1:00 Room R4226

Course topics. The first part of this course focuses on the neurobiology of thought, language and attention. We'll start with a discussion of thought. What is it? How can we study it? How does thought change over the course of evolution? We'll also take a detailed look at the neurobiological basis of thought.

The section on language will contrast the classical connectionist model of language processes with the more recent approach that emphasizes modularity and parallel distributed processing.

The second part of the course is concerned with the development of computational models that can either be applied to understanding neural function or, alternatively, neural models that can be applied to various behavioral processes.

Grading Scheme

1. Class participation	15%
2. Class presentations	15%
3. Term paper	35%
4. Quizzes (5 @ 7%)	35%

Course material

Students will be responsible for:

1. Assigned readings
2. Material covered in classroom discussions
3. Presentations given by other students

Student presentations.

Each student will give a short (up to half hour seminar) selected from one of the following topics. The seminar should focus on characterizing the disorder from both a cognitive and neurobiological perspective.

Amusia
Autism
Downs syndrome
Dyslexia

Hemispatial neglect
Infantile amnesia
Schizophrenia
Stuttering and Stammering
Synesthesia
Williams disorder

Term paper.

The term paper will be a review article on a topic of your choice on a topic that relates the content of this course. (The topics presented for the student seminars are acceptable.) Prior approval must be obtained, however.

The term paper must be based on reading of original research and should follow the format of the Publication Manual of the American Psychological Association. The length excluding references must not exceed 15 double spaced pages.

Grading will be based on organization, clarity, thoroughness of literature search, and originality of the content.

Required Reading: The following is a partial list of assigned readings. Additional readings will be assigned later in the course.

Calvin, W.H. (1994). The emergence of intelligence. Scientific American, 271, 100-108.

Gevins, A., Leong, H., Smith, M.E., Le, J., & Du, R. (1995). Trends in Neurosciences, 18, 429-436.

Goldman-Rakic, P.S. (1988). Topography of cognition: parallel distributed networks in primate association cortex. Annual Review of Neuroscience, 11, 137-156.

Moran, J., & Desimone, R. (1985). Selective attention gates visual processing in the extrastriate cortex. Science, 229, 782-784.

Ojemann, G.A. (1991). Cortical organization of language. Journal of Neuroscience, 11, 2281-2287.

Petersen, S.E., & Fiez, J.A. (1993). The processing of single words studied with positron emission tomography. Annual Review of Neuroscience, 16, 509-530.

Povinelli, D.J., & Preuss, T.M. (1995). Theory of mind: evolutionary history of a cognitive specialization. Trends in Neurosciences, 18, 418-424.

Sergeant, J. (1994). Brain-imaging studies of cognitive functions. Trends in Neurosciences, 17, 221-227.

Singer, W. (1993). Synchronization of cortical activity and its putative role in information processing and learning. Annual Review of Physiology, 55, 349-374.

Strogatz, S.H., & Stewart, I. (1993). Coupled oscillators and biological synchronization. Scientific American, 269, 102-109.

Posner, M.I., & Dehaene, S. (1994). Attentional networks. Trends in Neurosciences,

Schedule:

January 8 - Introduction -

January 15-

Presentation: Pam Heighway - infantile amnesia

Assigned readings - Povinelli & Preuss & Calvin

Discussion topics: Representational processes, Theory of mind

January 23-

QUIZ #1 - On material covered in weeks 1, 2 and assigned readings by Povinelli & Preuss, Goldman-Rakic.

Discussion topic: Neurobiology of thought:

Presentation: Renee Dunkley - autism

Assigned reading - Goldman-Rakic

January 30-

Discussion topics: Neurobiological of thought; coherent oscillations

Presentations: Alyea Butt - Downs syndrome

Assigned readings - Singer; Strogatz & Stewart

February 6 -

QUIZ #2 - On material discussed on January 23rd and 30; readings by Goldman-Rakic, Singer, Strogatz & Stewart, Gevins et al., and Sergeant; on readings assigned by A. Butt and R. Dunkley.

Discussion topics: Neurobiology of language (Techniques)

Presentation: Damian Holsinger - Williams disorder

Assigned readings; Gevins et al. Sergeant

February 13 -

Discussion topics: Neurobiology of language

Presentation: Shawna Scales - Dyslexia

Assigned readings: Ojemann

February 27 -

QUIZ 3

Discussion topics: Attention

Presentation: Juliana Abdo - Amusia

Assigned readings: Leiner

March 5

Discussion topic: Attention

Presentations - Stewart - Hemispatial neglect

Assigned readings: Posner

March 12

QUIZ 4

Discussion topic: Analytical neuroscience

Presentation: Shannon Walsh - Schizophrenia

March 19

Discussion topic: Analytical neuroscience

Presentation: Jillian Fecteau

March 26

Discussion topic: Analytical neuroscience

April 2

QUIZ 5