Attention & the Brain
PSYC 768: Advanced Topics in Cognitive Science

Instructor: Matt Peterson
2058 David King Hall
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Email: mpeters2@gmu.edu
Office Hours: Tuesday. 1-2pm

Time: 1:30 – 4:10pm Thursdays

Classroom: David King ArchLab Conference Room

Text: None – I will provide downloadable readings on the course web site.

Prerequisites: Psychology 530, 701, or consent of instructor.

Objectives: In this course we will be exploring cognitive neuroscience of attention. Topics will include

- Neurophysiology and computation in early vision (retina through V4)
- The effects of attention on higher-level vision
- Orienting/switching
- Attention and eye movements
- Crossmodal attention
- Working Memory
- Cognitive Control
- Conflict Resolution
- Development and Aging
- Brain Training and Stimulation
- Disorders of Attention

This course will be taught in a combined lecture and seminar format -- the classes will be largely discussion, with two (or more students) leading a discussion of one of the papers each week. At times, I will lead the discussion or lecture on background topics (e.g. explaining steady-state visual evoked potentials, fMRI, or neuroanatomy). I expect everyone (especially the discussion leaders!) to read the assigned articles before class.

Attendance Policy: Although I do not grade on attendance, this is a graduate level course and I expect (barring unforeseen circumstances) to see you in class each week.

GMU Honor Code: George Mason University has a code of Honor that each of you accept by enrolling as a student. My expectation is that all of the work you do for me in this class will be the work of one individual. Having said that, I fully encourage you to discuss the readings and topics raised in this class with your fellow students.

Disabilities: If you are a student with a disability and you need academic accommodations, please see me and contact the Disability Resource Center (DRC) at 703-993-2474. All academic accommodations must be arranged through that office.

Exam Make-up Policy: You may take a test after (or before) the scheduled date only if you (a) receive my permission before the day of the test, or (b) have a valid excuse (note from a doctor, judge, sergeant, etc.). Papers will not be accepted beyond the due date. Homework assignments will not be accepted late.
Anatomy Quiz (5%): There will be a short quiz the second class meeting on naming conventions and brain anatomy.

Presentations (30%): The majority of class time will be spent discussing the readings. Each student will be responsible for leading 3-4 discussions throughout the semester. Because some readings are very short, the short readings (marked by an asterisk) count as half a discussion.

Participation (20%): Part of the class time will be spent having lively discussions about the papers covered in class.

Summaries (20%): Students are required to write a 2-page summary of a week's readings. Two summaries will be due – it is your choice of which weeks you wish to summarize.

Paper (25%): Your grade for this class will be based in part on a paper in which you will either write a literature review or propose a(n) experiment(s) investigating the cognitive neuroscience of attention.

Calendar:
Note: The schedule below is tentative, and though I will try to follow it as closely as possible changes may occasionally be necessary.

Note that February 9th is the last day to add this class and February 19th is the last day to drop this class.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Assignment due</th>
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<tbody>
<tr>
<td>28-Aug</td>
<td>Introduction</td>
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<tr>
<td>4-Sep</td>
<td>In the beginning...</td>
<td>Anatomy Quiz</td>
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<tr>
<td>11-Sep</td>
<td>Early Visual Attention</td>
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<tr>
<td>18-Sep</td>
<td>Higher-level Visual Attention</td>
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<tr>
<td>25-Sep</td>
<td>Orienting, Switching, and Eye movements</td>
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<tr>
<td>2-Oct</td>
<td>Multimodal Attention</td>
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<tr>
<td>9-Oct</td>
<td>Working Memory</td>
<td></td>
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<tr>
<td>16-Oct</td>
<td>Multitasking and Cognitive Control</td>
<td></td>
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<tr>
<td>23-Oct</td>
<td>Cognitive Control and Conflict</td>
<td></td>
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<td>30-Oct</td>
<td>HFES</td>
<td>no class</td>
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<tr>
<td>6-Nov</td>
<td>Attention across the lifespan</td>
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<tr>
<td>13-Nov</td>
<td>ADHD and Attention Disorders</td>
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<tr>
<td>20-Nov</td>
<td>Training and brain stimulation</td>
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<tr>
<td>27-Nov</td>
<td>Thanksgiving</td>
<td>no class</td>
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<tr>
<td>4-Dec</td>
<td>Presentations...</td>
<td>Paper Due</td>
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Extra readings(too high level for the beginning)

- Russel Barkley on ADHD

In the beginning...


Early Vision


Higher Vision


Orienting / switching / Eye movements


Multimodal

When dividing attention in space. NeuroImage, 49(3), 2717-2727.


**Working Memory**


**Multitasking and Cognitive Control**


**Cognitive control and Conflict Resolution**


**Attention across the lifespan**

- Luna, B., Padmanabhan, A., & O’Hearn, K. (2010). What has fMRI told us about the development of cognitive control through adolescence?. Brain and cognition, 72(1),

**Attention disorders**

Brain Training and Stimulation

