LING 290: Language and Cognition
M-W 3:10-4:30pm, Eliot 126
Fall 2013

Syllabus

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Prerequisites
There are no prerequisites for this course, and the course aims to bring together students from a diversity of interests.

Course description
“Think about your last conversation with your friend. Your friend had an idea that she wanted to convey to you. For this purpose she sent volleys of commands to scores of muscles in her abdomen, chest, throat, tongue, and lips. The resulting oral gymnastics had the effect of vibrating the air molecules around her. Ultimately the vibrations in the air cause corresponding vibrations at your eardrum. These vibrations were passed along in attenuated form through bones, fluids, and tissues in your ear until they resulted in a volley of sensory discharges then acted in such a way as to cause some counterpart of your friend’s idea to be formed in your brain...The intricacy of this process is astounding...How does this marvelous communication system work?” (Osherson & Lasnik, xii).

Now think about vision, and object recognition. To recognize your friend in the hallway, light had to reflect off of your friend, travel across the room and across the retinas of your eyes, setting off processes in the nervous system that allow you to recognize your friend as a distinct object, as a human, as someone you have seen before.

What about music? Like language, it involves sound production and vibration of air molecules, which arrive, through the same physical process, at your eardrum and are then perceived by your brain. But is that the extent of the similarity between music and language? Or are there similarities in the structure of music and language, in the way that we understand and process both?

Lastly, think about language from a biological perspective. Is there a biological grammar shared by language and other cognitive/biological systems? How can we characterize these systems, and what do they say about our ability to perceive the world around us both auditorily, as well as through other media?

These questions all center around the generative capacity of language, and this course aims to take a broad look at cognition and the faculty of language; in particular
comparing the cognitive faculty of language to properties of vision, music, mathematics, biology, and computation.

We will explore basic theories of mind and language, and discuss the interaction of the language faculty with other cognitive systems. We will use a variety of readings, including book chapters and journal articles, which look at general cognition and the cognitive faculties of language, vision, music, and computation. We will also read papers and study theories that both compare and contrast language with other cognitive faculties. Students will come away with a broad comparison of the language faculty with other cognitive systems, opening the door to further questions and study in linguistics as well as vision science, musical perception, neuroscience, biology, mathematics and computation.

Course Requirements & Policies

Problem Sets & Labs – 55%
Eight problem set-labs will be given throughout the semester. Problem sets will be handed out in class and posted electronically on the Moodle course page.

Due Dates

<table>
<thead>
<tr>
<th>PS/Lab</th>
<th>Topic</th>
<th>Due</th>
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<tbody>
<tr>
<td>PS/Lab 1</td>
<td>Cognition; Experimental Design</td>
<td>9/16</td>
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<tr>
<td>PS/Lab 2</td>
<td>Speech Perception; Phonetics/Phonology</td>
<td>9/23</td>
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<tr>
<td>PS/Lab 3</td>
<td>Sentence Processing; Syntax/Semantics</td>
<td>10/2 (Wed)</td>
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<tr>
<td>PS/Lab 4</td>
<td>Visual Perception; Eye &amp; Brain</td>
<td>10/14</td>
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<td>PS/Lab 5</td>
<td>Illusions; Visual Narratives</td>
<td>10/30 (Wed)</td>
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<tr>
<td>PS/Lab 6</td>
<td>Generative Syntax and Music</td>
<td>11/11</td>
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<tr>
<td>PS/Lab 7</td>
<td>Musical Processing</td>
<td>11/25</td>
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<tr>
<td>PS/Lab 8</td>
<td>Computation, Biolinguistics</td>
<td>12/11 (Wed)</td>
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Final Project – 25%
Students will propose and complete a final research project that demonstrates a critical grasp of the course material and identifies a research question/hypothesis. Crucially, the project should involve (at least) two of the cognitive faculties which we have been comparing throughout the semester, and may be either (a) a more in-depth study of a topic which we have covered, or (b) another topic involving the interaction of language with vision, music, or computation. Each student will give a short (15-minute) presentation of the progress of their final project in the last week of classes. More details on the project will be discussed in the week prior to Fall Break. One-page project proposals are due in class on November 5, and the final project is due Tuesday, December 17.

Participation – 20%
Students are expected to attend all classes and participate on a regular basis in discussions, group problem-solving, and online discussion forums.
Course Tools

Textbooks:

Course Reserves: As this course is inherently interdisciplinary, much of our reading will be selections from textbooks, books, and journals. All required readings are available through the library, either on 2-hour print reserve and/or on e-reserve, or through Moodle. A link to our e-reserve course page is available on Moodle as well. *If you have trouble locating any of the readings, please contact me in advance of the class discussion for that reading.*

Moodle: I will update the Moodle page regularly with additional readings, handouts/slides, problem set-labs, forum discussions, and any changes to the readings/syllabus. Announcements will also be sent via Moodle.

Course Schedule
This schedule lists topics, readings, and assignment deadlines. Readings may be added, dropped, or shifted around as we go along, and the syllabus is subject to change.

Module 1: Cognition and Language

Week 1: Wednesday, September 4
Introduction to Language as a Cognitive Faculty

Reading:
- Byrd & Mintz, *Discovering Speech, Words and Mind*: Chapter 1

Week 2: Monday, September 9 – Wednesday, September 11
More on Language as a Cognitive Faculty; Experimental Design

Reading:
- Anderson & Lightfoot, *The Language Organ*: Chapter 1
- Block, Ned. *The Mind as the Software of the Brain*. In Invitation to Cognitive Science, Vol 3., eds. Osherson & Smith [N.B. We will return to this in Unit 4]
- Byrd & Mintz: Chapter 4
Week 3: Monday, September 16 – Wednesday, September 18
Phonetics & Phonology; Speech Perception

**Reading:**
- Byrd & Mintz: Chapter 2, Sections 1-2 (p. 23-64)
- Anderson & Lightfoot: Chapter 6
- Byrd & Mintz: Chapter 5

**Homework:**
- Problem Set/Lab 1 due in class on 9/16

Week 4: Monday, September 23 – Wednesday, September 25
Morphology and Word Recognition; Syntax

**Reading:**
- Byrd & Mintz: Chapter 6, Chapter 8
- Anderson & Lightfoot: Chapter 2; Chapter 3

**Homework:**
- Problem Set/Lab 2 due in class on 9/23

Week 5: Monday, September 30
Sentence Processing; Semantics

**Reading:**
- Portner, What is Meaning? Chapter 1

**Module 2: Vision and Language**

Wednesday, October 2
The Visual System

**Reading:**
- Palmer, Stephen. *Vision: From Photons to Phenomenology*: Chapter 11 (p. 519-571)

**Homework:**
- Problem Set/Lab 3 due in class on 10/2
Week 6: Monday, October 7 – Wednesday, October 9  
Eye-tracking; Visual-World Paradigm; Brain Methods

Reading:

Week 7: Monday, October 14 – Wednesday, October 16  
Visual and Grammatical Illusions; Comparing Eye-tracking and Brain Methods

Reading:
  You will each select one type of illusion (chapter of 5a-5g) to read and prepare.

Homework:
- Problem Set/Lab 4 due in class on 10/14

Fall Break

Week 8: Monday, October 28  
Visual Narratives (in Silent Comics)

Reading:
- Tanaka, Masashi. Gon. Kodansha Limited. Pages TBA.
- Abusch, Dorit. 2012. Applying Discourse Semantics and Pragmatics to Co-reference in picture sequences. [N.B. DRT: “Discourse Representation Theory”; a theory that can handle meaning across sentences. Here, we are looking at discourse across images in a comic.]
Module 3: Music and Language

Wednesday, October 30
What properties does music share with language? The Skeptics’ View vs. the Identity Thesis.

Reading:

Homework:
• Problem Set/Lab 5 due in class on 10/30

Week 9: Monday, November 4 – Wednesday, November 6
Generative Theory of Tonal Music; Arguments for the Identity Thesis.

Reading:
• Katz & Pesetsky. The Identity Thesis for Language and Music. Section 3-end.

Week 10: Monday, November 11 – Wednesday, November 13
Music Processing: Structural Integration in Language and Music; Tonal Languages and Music

Reading:

Homework:
• Problem Set/Lab 6 due in class on 11/11

Week 11: Monday, November 18 – Wednesday, November 20
Atypical Language and Music: Williams’ Syndrome

Reading:
Module 4: Computation and Language

Week 12: Monday, November 25 – Wednesday, November 27
What is computation? What is a grammar? Grammars of biology and language; Turing Machines, Animal Navigation; The Chomsky Hierarchy

Reading:
- Lecture Notes: Terminology (pre-requisite to G&K, below)
- Gallistel & King. Chapter 7; Chapter 11 p. 196-203

Homework:
- Problem Set/Lab 7 due in class on 11/25

Week 13: Monday, December 2 – Wednesday, December 4
Formal Grammars continued; Numerosity and Quantification: “self-paced counting”

Reading:

Week 14: Monday, December 9 – Wednesday, December 11
Biolinguistics, continued: “Growing a Language”, Universal Grammar, Language and Evolution. *Class Presentations on Wednesday, 12/11*

Reading:
- Anderson and Lightfoot, *The Language Organ*: Chapters 9-10

Homework:
- Problem Set/Lab 8 due in class on 12/11