LING 4230: Language and the Brain

Instructor: Chandan Narayan (https://ch-narayan.github.io)

Office hours: Mondays noon-1 or Wednesdays on Zoom (email to set up appt) Zoom link (https://yorku.zoom.us/j/97755816919?pwd=L1krNjJlUm9TL2RWWE1HWnZwNXZLQT09)

Course Outline and Schedule

Course description:

This course is a seminar surveying various topics in Language and the Brain (or neurolinguistics more broadly). We examine questions like: What are the mental processes that underlie language and what are their behavioral correlates? What brain structures are associated with language? We will read a text book as well as primary research articles, both "classic" and current, that address various problems and issues in linguistic functions and their neurological underpinnings. The course follows the speech chain beginning with basic audition, speech perception and phonological processing, into higher levels of syntactic and semantic processing. The course also addresses research in bi-/multilingualism as well as language disorders, such as aphasia.

Course prerequisites:

You must have taken LING 2120 (Phonology), LING 2140 (Syntax 1) and LING 3220/PSYC 3290 (Psycholinguistics) with grades of C+ or better; and at least three additional credits in linguistics (AP/LING) at the 3000 level with grades of C+ or better. **I will be checking these prerequisites and you'll be asked to drop the course if you do not have them.**

Evaluation

Your grade in the course will be determined by your performance on the following:

- Article questions (4 x 5% each)
- Article presentations (15%)
- Participation (10%)
- Annotated bibliography (25%)
- Final paper (30%)

Course text and readings

The course follows closely the materials and discussion in:

> Brennan, Jonathan R. (2022) Language and the Brain: A slim guide to neurolinguistics. (Oxford)

eClass

All lectures (videos), lecture slides, assignments, discussion boards, online Quizzes and Tests, and assignment submission will happen on the eClass (http://eclass.yorku.ca) site for the course. Lecture slides will be posted the evening after the lecture happens.

Class structure

We will go over the day's lecture and discuss issues and problems presented in the chapter for the day. For the most part, the topics discussed each week will follow closely the order of material presented in the textbook, with additional readings discussed in conjunction with the theme of the textbook chapter. It is critical that you do the readings as they will surely

illuminate what is discussed in the lecture. Additionally, I ask that you forward me any interesting news stories related to language which you might come across. It is always nice to keep lectures and class content current with the zeitgeist.

1. I will present for about an hour during each meeting. The materials I will present will come directly from the textbook, with some supplemental materials added

2. After my presentation there will be two to three student presentations of primary research articles associated with each chapter. For example, if the chapter is about word structure representation in the brain, we will read a few articles directly reporting results of experiments dealing with word structure. **These articles will then be presented by students.** Each student will be responsible for one presentation of an article during the term. The presentation should be roughly 10-12 minutes long and MUST INCLUDE: the **question* the article is addressing, the** method** the researchers use to answer the question, the **results** of the experiment, and the author's **interpretation** of the results. The presentation must conclude with at least two discussion questions you might have about the article. The articles themselves will be linked below. Students will be randomly assigned to a particular article.

Article questions

Students are responsible for submitting four sets of questions for articles we read during the term. Any four articles can be chosen by the student. Students should offer at least 2 (though more questions the better for your mark) questions about the article. The questions should be informed and thoughtful. **Do not give me questions like "What about bilinguals?"** or questions that are extremely broad and scope. They can be questions about methodology, previous research, interpretation of the data or the conclusions drawn.

Questions must be submitted in **hard copy** on the day when we are discussing the particular article at the beginning of class. For example, if you choose to provide questions for a paper in week 5, submit them at the start of week 5's class. Questions must be typed or **neatly** handwritten and must include your name, the question set (i.e., "Set #2" if it's the second set of questions you're submitting), and the article name and author in the heading.

You must have submitted questions for two (2) articles by October 28th's class.

Structure of journal article presentations

As explained above, student's are responsible for one article presentation during the term. The presentation should last around 20mins, which means it shouldn't exceed 20 slides. Ideally you will use slides.google.com to compose your presentation so that we can access it seamlessly in class. The general structure of the presentation should be:

- Introduce the problem/question asked by the article
- Provide some background on what the article says has already been done regarding this topic
- Breifly explain the methodology used in the experiment
- Explain the results of the experiment(s), using visuals like graphs and plots, along with your own explanations
- What does this mean for the original question being asked?
- Any questions you might have about the research

Annotated bibliography and Final paper

The final paper consists of two pieces of work: an annotated bibliography and the paper itself. Students, in consultation with the me (please talk with me about your ideas a few weeks into the course), will come up with a paper topic. The paper can be either 1) A state-of-the-art report on a particular topic, or 2) a faux experimental paper that addresses a particular question in-line with the readings done in class. The paper should clearly articulate the history of the particular line of thinking and approach to the topic. Sample topics include: The genetic basis for speech (FOXP2); Cochlear implantation and language processing; Neural correlates of categorical perception; etc. Some sample papers will be posted on line.

The Annotated bibliography is due, via eClass portal anytime during Week 12 The final paper is due by December 11.

Email policy

If you cannot attend the scheduled office hour, contact me to arrange another time. I will do my best to answer your phone and email messages promptly. I do not, generally, answer email on the weekend. Please email me from your yorku.ca account and put 'LING 4230' in the subject line. Emails sent from non-York accounts will be ignored. Please sign your emails; I will not reply to anonymous messages. My response to your email may be brief and may not come within 48 hours. **Please be patient**.

Grading

York University uses a grading system detailed here (http://calendars.registrar.yorku.ca/2012-2013/academic/grades/). Please familiarize yourself with it.

Academic Honesty and Integrity

York students are required to maintain high standards of academic integrity and are subject to the Senate Policy on Academic Honesty. Please review the documents available here (https://www.yorku.ca/secretariat/policies/policies/academic-honesty-senate-policy-on/). Academic offences are treated very seriously, and the disciplinary procedures are described there as well. Please consult the code if you have any question about the nature of academic offences and their penalties.

Course Withdrawal (W) option

In the period between the last day to drop a course without receiving a grade and the final day of classes in a term, undergraduate students are permitted to withdraw from a course with the condition that the course enrolment remains on a student's transcript, denoted by a "W" in the University's records and on the student's transcript as the grade decision. No credit value will be retained for the course and no value will be included in the calculation of a student's grade point average (GPA). Please go here (https://myacademicrecord.students.yorku.ca/course-withdrawal) for details.

Schedule

Week	Date	Topic	Chapter	Articles
1	9/09	Intro-Scope and History	Ch.1	
2	9/16	Brain structures	Ch.2	-
3	9/23	Sounds 1	Ch.3	Kubanek et al.(2013) (https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0053398); Mes al. (2014) (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4350233/)
4	9/30	Sounds 2	Ch.3	Saoud et al. (2012) (https://www.jneurosci.org/content/jneuro/32/1/275.full.pdf); van Wassenhove et al. (https://www.utdallas.edu/~assmann/hcs6367/van_wassenhove_grant_poeppel07.pdf); Sohoglu et al.(2 (https://www.jneurosci.org/content/jneuro/32/25/8443.full.pdf)
5	10/7	Phonemes 1	Ch.4	Scharinger et al. (2011) (https://www.researchgate.net/profile/William-Idsardi/publication/51123294_A_Comprehensive_Three-dimensional_Cortical_Map_of_Vowel_Space/links/565232c708ae4988a7aef7ca/A-Comprehensive-Three-dimensional-Cortical-Map-of-Vowel-Space.pdf); Arsenault and Buchsbaum (2015) (https://www.jneurosci.org/content/jneuro/35/2/634.full.pdf);Virtala et al. (2023) (https://www.sciencedirect.com/science/article/pii/S0278262623000313/pdfft?md5=931540977f2e3a1b9cfa15d66ec0dd87&pid=1-s2.0-S0278262623000313-main.pdf)
	10/14	READING WEEK	—	

Week	Date	Topic	Chapter	Articles
6	10/21	Phonemes 2	Ch.4	Maffei et al.(2017) (https://www-sciencedirect-com.ezproxy.library.yorku.ca/science/article/pii/S0010945217303404); Möttönen and Watkins (2009) (https://www.jneurosci.org/content/jneuro/29/31/9819.full.pdf); Jochaut et al. (2015) (https://www.frontiersin.org/articles/10.3389/fnhum.2015.00171/full)
7	10/28	Words	Ch.5	Davis and Johnsrude (2003) (https://www.jneurosci.org/content/jneuro/23/8/3423.full.pdf);Marinkovic e (https://www.cell.com/neuron/pdf/S0896-6273(03)00197-1.pdf);MacGregor et al. (2012) (https://www.nature.com/articles/ncomms1715)
8	11/4	Semantics	Ch.6	Huth and Gallant (2016) (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4852309/);Pobric et al. (2007) (https://www.pnas.org/doi/full/10.1073/pnas.0707383104); Pulvermüller et al.(2005) (https://sci-hub.se/10.1111/j.1460-9568.2005.03900.x)
9	11/11	Prediction 1	Ch.7	Federmeier and Kutas (1999) (https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=8aec17d667f5b58fe2d9473a94553b13c6fd63a7); van Berkum et al.(2003) (https://pure.mpg.de/rest/items/item_59347/component/file_59348/content)
10	11/18	Prediction 2	Ch.7	Gouvea et al. (2010) (https://www.researchgate.net/profile/Colin-Phillips-3/publication/228641799_The_linguistic_processes_underlying_the_P600/links/0912f5097c882409cc0 linguistic-processes-underlying-the-P600.pdf);Klimovich-Gray et al. (2019) (https://www.jneurosci.org/content/jneuro/39/3/519.full.pdf)
11	11/25	Sentences 1	Ch.8	Pallier et al.(2011) (https://www.pnas.org/doi/full/10.1073/pnas.1018711108);Bemis and Pylkkänen (20 (https://www.jneurosci.org/content/jneuro/31/8/2801.full.pdf);Frankland and Greene (2015) (https://www.pnas.org/doi/full/10.1073/pnas.1421236112)
12	12/2	Sentences 2	Ch.8	Matchin et al.(2014) (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4252493/);Amici et al.(2007) (https://www.jneurosci.org/content/jneuro/27/23/6282.full.pdf)