NEUROLINGUISTICS GRADUATE SEMINAR (16:830:513)
SPRING 2014
(Last revised: 4/26/2014)

Instructor: Karin Stromswold
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Office hours: Thursday mornings 9:45- 11:45 am, in Busch Psych Building, Room 233
Course Time: Thursdays from 1 – 3:40 pm
Course Location: Busch Psych 301
Sakai site: Neurolinguistics: Spring 2014

CONTENT OF COURSE: This course explores the cognitive & neural bases of the production, comprehension and acquisition of human language. Together we will explore questions like: What do people with acquired and developmental disorders reveal about the cognitive neuroscience of language? What do neuroimaging studies of "normal" adults and children reveal about the cognitive neuroscience of language?

By the end of the course, you will have developed a solid understanding of the cognitive and neural bases of the core aspects of language (phonology, lexicon, morphology, syntax, discourse/pragmatics).

SCHEDULE (Tentative)

Week 1: Intro to course/beginning concepts

Weeks 2: Intro to neuroimaging

Weeks 3: Speech production

Week 4: Speech perception

Week 5: Bilingualism

Weeks 6-7: Lexicon

Weeks 8: Morphology

Week 9 – 10: Syntax

Week 11-12: Discourse/pragmatics

Week 13: Genetics

Week 14: Wrap-up

READINGS

Textbook (chapters available on sakai)

Selected chapters from: Stemmer, B., & Whitaker, H., eds. (2008) *Handbook of the Neuroscience of Language*. Academic Press.

Recommended background psycholinguistics textbook

Traxler, M. 2011. *Introduction to Psycholinguistics: Understanding Language Science*, 1st edition. Wiley-Blackwell.

- Print: ISBN-10 1405198621, ISBN-13 9781405198622. New $50 +S/H. Used from $45
- eText: ISBN-10 1118296885, ISBN-13 9781118296882
  - Kindle version: available for $69.
  - Course-smart rental (iPad, Mac or PC): 360 day rental for $75

A couple of cheap (and fun!) books:

Neuro: Goldberg, S. 2010. *Clinical Neuroanatomy Made Ridiculously Simple* (Any edition is fine, but the more recent ones come with nice supplementary AV materials)

Language: Pinker, S. 1994. *The Language Instinct.* (Any edition is fine)

READING

(All readings are available on sakai)

Week 0: Background readings

Neuro

Language Files 9.1 (Language & the brain)

Fernandez, EM. & Cairns, HS, 2010. *Fundamental of psycholinguistics,* chapters 3, John Wiley & Sons.

Linguistics/Psycholinguistics

Fernandez, EM. & Cairns, HS, 2010. *Fundamental of psycholinguistics,* chapters 1-2, John Wiley & Sons.

Week 1: Intro to neurolinguistics:

Hickok, G (2009). Functional Neuroanatomy of Language. *Physics of Life Reviews 6,*121–143
http://www.ccs.fau.edu/~bressler/EDU/AdvCogNeuro/pdf/anpopo.pdf

Friederici, AD (2011). The Brain Basis of Language Processing: From Structure to Function. *Physiol Rev* 91:1357-1392, 2011
http://www.ehu.es/HEB/KEPA/Advanced_2012/2011_Friederici_The%20brain%20basis%20of%20language%20processing%20From%20structure%20to%20function.pdf

Week 2: Intro to neuroimaging techniques

Stemmer & Whitaker (S&W), chapter 6

Peter A. Bandettini, Ph.D. What's new in neuroimaging methods? *Annals of the NY Academy of Science* 1156, 260-93. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2716071/

Week 3 (2/6): Speech production: Human & Animal (Efe Soyman)

S &W chapter12. Phonological disorders

Wohlgemuth MJ, Sober SJ, Brainard MS. (2010) Linked control of syllable sequence and phonology in birdsong. J Neurosci. 2010 Sep 29;30(39):12936-49. doi: 10.1523/JNEUROSCI.2690-10.2010.

Hickok G.(2012). Computational neuroanatomy of speech production. Nat Rev Neurosci. 2012 Jan 5;13(2):135-45. doi: 10.1038/nrn3158.

Week 4 (2/13): SNOW DAY

Week 5 (2/20): Speech perception & critical periods: (Lilian Yang)

K. M. Bieszczad, N. M. Weinberger (2010). Representational gain in cortical area underlies increase of memory strength. *Proceedings of The National Academy of Sciences - PNAS* , vol. 107, no. 8, pp. 3793-3798, 2010

Petitto LA, Berens MS, Kovelman I, Dubins MH, Jasinska K, Shalinsky M. (2012). The "Perceptual Wedge Hypothesis" as the basis for bilingual babies' phonetic processing advantage: new insights from fNIRS brain imaging. *Brain and Language.* 2012 May;121(2):130-43. doi: 10.1016/j.bandl.2011.05.003.

Week 6 (2/27): Bilingualism (Patricia Darriba Gonzales)
Optional: S&W, chapter 33 bilingualism

Bowden HW1, Steinhauer K, Sanz C, Ullman MT. (2013) Native-like brain processing of syntax can be attained by university foreign language learners. *Neuropsychologia.* 2013 Nov;51(13):2492-511

Week 7 (3/6): Words: Nouns (Nora Isacoff)
Optional: S&W, chapter 14

Arielle Borovsky, Jeffrey L. Elman, and Marta Kutas (2012). Once is Enough: N400 Indexes Semantic Integration of Novel Word Meanings from a Single Exposure in Context . *Language Learning & Development* 8(3): 278–302

Week 8 (3/13): Words: Verbs (Gwen Rehrig)
Aya Meltzer-Asscher, Julia Schuchard, Dirk-Bart den Ouden & CynthiaK. Thompson (2013) The neural substrates of complex argument structure representations: Processing “alternating transitivity” verbs, *Language and Cognitive Processes*, 28:8, 1154-1168, DOI: 10.1080/01690965.2012.672754

Week 9 (3/27): Morphology (Yagmur Sag)
Optional: S&W, chapter 13

Yarbay Duman T, Bastiaanse R. (2009) Time reference through verb inflection in Turkish agrammatic aphasia. *Brain and Language.* 108(1):30-9.

Week 10 (4/3): Syntax (Diti Bhadra)
S&W, chapter 15

Meltzer, JA., McArdle, JJ, Schafer, RJ, Braun, AR. 2010. Neural Aspects of Sentence Comprehension: Syntactic Complexity, Reversibility, and Reanalysis. *Cerebral Cortex.* 20(8): 1853–1864.

Week 10 (4/10): Syntax (Gaurav Kharkwal)

Fedorenko, E., Nieto-Castañon, A. & Kanwisher, N. (2012). Lexical and syntactic representations in the bran: An fMRI investigation with multi-voxel pattern analyses. *Neuropsychologia,* 50, 499-513.

Week 11 (4/17): Discourse/pragmatics: Gala Stojnic
S&W, chapter 16-17

Mason RA, Williams DL, Kana RK, Minshew N, Just MA.(2008). Theory of Mind disruption and recruitment of the right hemisphere during narrative comprehension in autism. *Neuropsychologia 46(1)*:269-80

Week 12 (4/24): Discourse/pragmatics (Meng Zhang)
S&W, chapter 17

Cardillo ER, Watson CE, Schmidt GL, Kranjec A, Chatterjee A. (2012) From novel to familiar: tuning the brain for metaphors. *Neuroimage.* 59(4):3212-21

Bambini V; Gentili C; Ricciardi E; Bertinetto PM; Pietrini P. 2011. Decomposing metaphor processing at the cognitive and neural level through functional magnetic resonance imaging. **Brain Res Bull. 2011; 86(3-4):203-16**

Benedek M, Beaty R, Jauk E, Koschutnig K, Fink A, Silvia PJ, Dunst B, Neubauer AC. 2014. **Creating metaphors: the neural basis of figurative language production.** Neuroimage. 2014 Apr 15;90:99-106. doi: 10.1016/j.neuroimage.2013.12.046.

Optional: Cardillo ER, Schmidt GL, Kranjec A, Chatterjee A. (2010) Stimulus design is an obstacle course: 560 matched literal and metaphorical sentences for testing neural hypotheses about metaphor. *Behav Res Methods.* 42(3):651-64.

Week 13 (5/1): Genetics (Cassandra Burdziak)

Kos M, van den Brink D, Snijders TM, Rijpkema M, Franke B, Fernandez G, Hagoort P. 2012. CNTNAP2 and language processing in healthy individuals as measured with ERPs. PLoS One. 2012;7(10):e46995. doi: 10.1371/journal.pone.0046995.

Stromswold, K. 2005. Genetic specificity of linguistic heritability. In A. Cutler (Ed.), *Twenty-First Century Psycholinguistics: Four Cornerstones*. Mahwah NJ: Lawrence Erlbaum Associates

Grading/Requirements

Class participation: ~80-85% of grade
This is a seminar and, thus, participation of every person in each class is a critical component of the class, and class participation will be a large portion of your grade. I expect you to come to class having really read the papers carefully and thoughtfully and ready to discuss.

Final project: 15-20%
Your final project can be a poster, short presentation (10-15 min) or short paper (7-10 pages). The content is VERY open. For students who are writing qualifying papers, theses, dissertations, etc., I urge you to think of a topic related to them. Another approach is to design an experiment you would like to conduct.

SOME RESOURCES FROM THE WEB

Author: Keith Johnson & J. Alex Becker
Institution: Harvard Medical School
The Whole Brain Atlas: Images, scans, movies etc. of normal & disordered brains
http://www.med.harvard.edu/AANLIB/home.html

Author: John W. Sundsten
Institution: University of Washington, Seattle.
2-D and 3-D views of the brain from cadaver sections, MRI scans, and computer reconstructions.
http://www9.biostr.washington.edu/cgi-bin/DA/PageMaster?atlas:Neuroanatomy+ffpathIndex:Splash^Page+2

Sundsten & Mulligan's interactive neuroanatomy syllabus:
http://www9.biostr.washington.edu/cgi-bin/DA/PageMaster?atlas:NeuroSyllabus+ffpathIndex:Splash^Page^Syllabus+2

Talking Brains blog
http://www.talkingbrains.org/

National Institute of Deafness and Other Communication Disorders

http://www.nidcd.nih.gov/Pages/default.aspx

National Institute of Neurological Disorders and Stroke
http://www.ninds.nih.gov/

American Speech and Hearing Association
http://www.asha.org/

Linguistic Society of America
http://www.lsadc.org/info/ling-index.cfm

Language log
http://languagelog.ldc.upenn.edu/nll/

Cognitive Neuroscience Arena (click tab on top of page, and then go to bottom of page to see the results)
http://www.cognitiveneurosciencearena.com/

Handbook of Neuroscience for the Behavioral Sciences
http://onlinelibrary.wiley.com.proxy.libraries.rutgers.edu/book/10.1002/9780470478509

Brain Facts:
http://www.brainfacts.org/brain-basics/neuroanatomy/

Bernal B and Perdomo P. Brodmann's Interactive Atlas.
http://www.fmriconsulting.com/brodmann/Introduction.html

FINDING READINGS FOR YOUR WEEK

[You can get an overview on how to find an article at RU, by going to the following URL]
http://www.libraries.rutgers.edu/rul/how_do_i/find_an_article.shtml

1) Do a search of the library's indexes and database.

1. Go to the following URL:
   http://www.libraries.rutgers.edu/find_articles
2. Go to the link that says "Indexes and Databases"
   http://www.libraries.rutgers.edu/indexes
   This lists all of the indexes and databases that RU subscribes to in alphabetic order and by subject.
3. For most of you, the most relevant databases probably are:
   PsycInfo: http://www.libraries.rutgers.edu/indexes/psycinfo
   Medline: http://www.libraries.rutgers.edu/indexes/medline_ovid
   Neuroscience abstracts: http://www.libraries.rutgers.edu/indexes/neurosciabstracts
   Linguistics and language behavior abstracts: http://www.libraries.rutgers.edu/indexes/llba
   It is also not a bad idea to check the "by subject" to see if there are any additional or more specialized databases you should search.
4. Once you have found a reference for something that appears in a journal, see if Rutgers has an electronic version of the journal by going to the following URL:
   http://atoz.ebsco.com.proxy.libraries.rutgers.edu/Titles/1729?lang=en&lang.menu=en&lang.subject=en
   Most of the time you will be interested in electronic journals, not electronic government journals.
5. Even if the RU Library does not have the electronic version of the journal, they may have a hard copy version of the journal. You can check this by going to:
   http://www.libraries.rutgers.edu/rul/how_do_i/subscribes.shtml
6. A good summary of databases available to Rutgers students can be found at the following URL and its links: http://libguides.rutgers.edu/referencecontents

2) Searchlight. Another way to find articles is Searchlight: http://www.libraries.rutgers.edu/searchlight Searchlight allows you to search Academic Search Premiere, Web of Science and WilsonWeb simultaneously. However, I have noticed that it seems to miss articles.

3) Google. Plain old googling is often the fastest way to find unpublished works, tech reports etc,

4) Google Scholar/Citation Index. Look through the reference section of the textbook. Find an older, "classic" source, and then find more recent articles that have cited it using "Google Scholar" or RU's Science Citation Index

Google scholar: http://www.libraries.rutgers.edu/indexes/google_scholar
Science citation index: http://www.libraries.rutgers.edu/indexes/science_citation_index

5) Wikipedia. Check out the papers cited in the Wikipedia pages. Remember, you must read the papers Wikipedia article cites and not just the Wikipedia page.