

Dr Jeff Hanna
Freie Universität Berlin
WS 2013/2014
Seminar: Introduction to Neurolinguistics
BA Aufbaumodul Sprachfunktion 16640/16641
Mo 14:00-16:00/Di 12:00-14:00, JK 29/124

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Introduction to Neurolinguistics

This seminar gives an introduction to the study of language as realised by the brain. We provide a history of the discipline, a basic overview of the relevant tools, and discuss most major neurolinguistic theories.

The seminar is 'hands-on' and empirically focussed, and so most weeks we will approach the topic with actual articles from the field of neurolinguistics. These may sometimes be challenging, but allow the student to see the state of the art for himself.

Requirements

To receive credit for this course you must meet three requirements:

- 1) Attend regularly; you may miss no more than three seminars.
- 2) Give a presentation.
- 3) Submit an essay of approximately 2000 words on a psycho/neurolinguistic topic.

A note on language

The field of neurolinguistics is conducted almost exclusively in English, and so all the texts will be in English. I will also lecture mostly in English. Students are welcome however to discuss and ask questions in German, give their required presentations in German, and write their essays in German.

Articles

The required reading can be found on our lab website:

<http://www.geisteswissenschaften.fu-berlin.de/v/brainlang/teaching/index.html>

Because the materials are copyrighted and cannot be freely distributed on the internet, it requires a username ('fub'), and a password, which will be given to you in class.

Programme

Week 1: Introduction

Week 2: Aphasias and the clinical method

Texts: Broca (1861) 'Remarks on the seat of spoken language' and Broca (1865) 'On the site of the faculty of articulated speech'

Introduction to the early years of brain-language research methods, and the foundational neurolinguistic theories of Broca, Wernicke, and Geschwind.

Week 3: A brief introduction to neuroimaging tools and methods

No text

The mechanical bases of EEG, MEG, MRI (MRT), and TMS are introduced, as well as the Event-Related Potential (ERP) technique.

Week 4: Functional vs distributed processing

Text: Kanwisher (2010) 'Functional specificity in the human brain'

Are specific areas of the brain devoted to specific tasks, or are psychological functions distributed broadly throughout the brain?

Week 5: Single word processing, part 1

Text: Marslen-Wilson (1994) 'Morphology and meaning in the English lexicon', pp. 3-10

When do we understand a word? How do we build complex words out of simpler parts? Can we measure this happening in 'real time'? We cover some classic behavioural experiments which made important contributions to this subject.

Week 6: Single word processing, part 2

Text: Marslen-Wilson (1994) 'Morphology and meaning in the English lexicon', pp. 10-31

Continued from previous week

Week 7: Inflection and the brain

Text: Marslen-Wilson & Tyler (2007) 'Morphology, language, and the brain: the decompositional substrate for language comprehension'

How do we recognise the inflectional status of verbs? How does the brain break apart inflectionally complex words into meaningful units?

Week 8: Semantic processing and the N400

Text: Kutas & Hillyard (1980) Reading senseless sentences: Brain potentials reflect semantic incongruity

This classic paper demonstrates how the human brain response to words which don't fit their context can be reliably measured with EEG.

Week 9: Temporal theories of language processing: serial models.

Text: Friederici (1995) 'The time course of syntactic activation during language processing'

We explore here the idea that language processing proceeds in discrete stages, i.e. that when a word is encountered its various levels of linguistic meaning - syntactic, semantic, etc - are performed in a row, like in a factory assembly line.

Week 10: Lab demonstration

No Text

Visit to Brain Language Laboratory for practical EEG demonstration

Week 11: Temporal theories of language processing: parallel models

Text Pulvermuller & Shtyrov (2006) 'Language outside the focus of attention, the mismatch negativity as a tool for studying higher cognitive processes'

Here we explore an alternative theory: that all aspects of language processing are underway immediately and simultaneously (or perhaps near simultaneously).

Week 12: Language and distributed brain networks

Text: Hickok & Poeppel (2007) 'The cortical organization of speech processing'

A specific model here is proposed where the various functions of language are realised by distributed brain networks, with special emphasis on laterality differences and the dorsal and ventral streams.

Week 13: Second language acquisition

Text: Morgan-Short & Ullman (2012) 'The neurocognition of second language'

How is acquiring a second language different than acquiring a first language? Is it actually different? Why does it seem to become more difficult the older you are?

Week 14: Embodied cognition

Text: Pulvermuller & Fadiga (2010) 'Active perception: sensorimotor circuits as a cortical basis for language'

Where does motor/sensory processing end and cognitive processing begin? Do they begin and end?

Week 15: Mirror neurons and language evolution

Text: Corballis (2010) 'Mirror neurons and the evolution of language'

Mirror neurons have lately become a hot topic in cognitive neuroscience. What are mirror neurons, and can they tell us anything about the nature of language?

Week 16: Brain circuits and language

Text: Pulvermuller (2010) 'Brain embodiment of syntax and grammar: Discrete combinatorial mechanisms spelt out in neuronal circuits'

So much research is focussed on where and when in the brain. What about how? How can a language actually be built, at the neuronal level?