Language Mechanisms and the Brain / Sprachmechanismen und Gehirn

(Lecture Series on Language Theory)

Introduction

The symbols, rules and representations underlying language describe aspects of human actions. The mechanisms supporting these actions and necessary for them are, without any doubt, realized in the brain. Language descriptions can be considered to be appropriate if they adequately describe human actions, but linguistic descriptions can also aim at being accurate formulations of the underlying mechanisms making these actions possible. With this latter focus, the question about the nature of language is therefore, realistically, a question about brain circuits. This lecture series will address questions about language at different levels, highlight important linguistic concepts and distinctions, and discuss their mechanistic basis in the human brain. In addition, the lectures will address brain activation patterns that index specific linguistic processes and patterns of linguistic deficits that arise from brain lesion or other focal functional impairment. Lectures cover the linguistic hierarchy, from words and speech sounds, to morphemes, phrases, sentences, grammar and communicative interaction. A main focus will be on semantics and questions about pragmatics will be touched upon. The relationship between language mechanisms and those of memory and attention will be discussed. Translational research will also be highlighted, addressing the field of language therapy after stroke, where linguistic theories led to new successful methods for clinical neurorehabilitation. The lectures will give an overview of current research in the new field of the neurobiology of language.

The lectures will be given in English, with discussion sections in both English and German.

Technicalities

The lecture series is part of the MA study programme “Languages of Europe – Structure and Usage”. The lectures are open to students of all departments and to post-graduates in the Excellence Cluster Languages of Emotion. Students of the MSc programme “Cognitive, Social, and Affective Neurosciences (SCAN)” can cover the language part of their module “Language and Music” by actively participating in this lecture series.

To actively participate and therefore obtain a certificate of attendance for the lecture series, it is necessary to
Prof Dr Dr Friedemann Pulvermüller  
Freie Universität Berlin  
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Language Mechanisms and the Brain  
Lecture Series on Language Theory 16909  
Tue. 6-8 pm, Room JK 29/118

- attend most of the lectures (maximum misses: three),
- prepare and reprocess the lecture content by reading the recommended key papers, and
- perform well at the final exam.

**Preparation and reprocessing:** To pre- and reprocess the lecture content, it is necessary to read the key paper recommended for each lecture. Please see the list below for the sequence of topics and related key papers. Key papers and books relevant in the lecture context are given in the reference list below; additional references will be provided in the lectures. Some of the reference texts and additional materials will be made available on the lecture’s home page (see below). You should also be able to retrieve the key papers through “google scholar”.

The **final exam** will take place in the last week of the semester, in the last lecture slot. It will take 60 min and will cover the content of all lectures in this series, plus that of any student presentations.

**Student presentations:** Students with a special interest in the neurobiology of language are welcome to prepare a plenary presentation, which can be given within the lecture series context. If you are interested, please speak to the lecturer. In this case, a cutting-edge research paper (to be agreed upon with the lecturer) should be presented to the lecture audience. The presentation should be 10 min in length and supported by up to 10 powerpoint slides. Well-readable (font size >10point) on-paper handouts should be distributed to all participants before the presentation. If you are interested in this latter option, please contact FP directly (in the Sprechstunde, Wednesdays, 12-1pm, room JK 31/232). Suggestions of papers whose presentation would benefit the lectures are listed at the end of this document.

To register for the lecture series, please go online and use the “Campus Management” system of the Freie Universität Berlin.

**Website:** Material and latest news about the course are collected and on the homepage of the Brain Language Laboratory ([www.brainlang.fu-berlin.de](http://www.brainlang.fu-berlin.de)) under “Teaching” (alternatively: [http://www.geisteswissenschaften.fu-berlin.de/v/brainlang/teaching/index.html](http://www.geisteswissenschaften.fu-berlin.de/v/brainlang/teaching/index.html)). The username is **fub** and the password will be announced in the lectures. All information is also accessible through a link on the university’s e-learning system called “Blackboard”.

For any technical questions related to this lecture series, please contact FP’s secretary, Ms. Sabina Mollenhauer [Sabina.mollenhauer@fu-berlin.de](mailto:Sabina.mollenhauer@fu-berlin.de), room JK 31/234. For questions related to the lecture contents or your scheduled presentation, please speak to FP in his “Sprechstunde” Wed 12noon-1pm, room JK 31/232, or after the lecture.
Dates and Topics

All lectures will take place Tuesdays at 18:15h in room JK 29/118 of the Freie Universität’s main building, Habelschwerdterallee 45.

15.10. Introduction to the lecture series

Brain mechanisms and their significance for linguistics. Basic neuroscience background

22.10. Words, word recognition, and comprehension


29.10. Speech sounds


05.11. Language laterality and language learning


12.11. Language, memory and decisions

19.11. Language and attention


26.11. GUEST LECTURE

Prof Dr Markus Kiefer, University of Ulm: The brain basis of meaning and concepts


03.12. Word types in mind and brain


10.12. Sentences


17.12. Rules of grammar


Possible additional lectures:

Speech acts in mind and brain

The temporal orchestration of phonological, lexical, syntactic, and semantic processing.


Christmas break

07.01. 12:00 h, HS2: GUEST LECTURE:

Prof Dr Dr Horst Müller, University of Bielefeld: Repräsentation von Sprache: Wie untersucht man Sprache im Gehirn?


14.01. From semantic theory to semantic word types and neuroscience research


21.01. Proving semantic category specificity: Language and the motor system


28.01. Abstract and combinatorial semantics

04.02. From brain-language research to neurorehabilitation: Speech-language therapy in patients with chronic aphasia


11.02. Final exam/Abschlussklausur

**Key References:**

Please find below some suggestions for general preparatory texts. Essential readings are indexed by asterisks. Note again that recommended readings for individual lectures are given above:


**Special Readings Imaging Methods (EEG, MEG and fMRI)**

EEG and MEG: [http://www.mrc-cbu.cam.ac.uk/research/eeg/eeg_intro.html](http://www.mrc-cbu.cam.ac.uk/research/eeg/eeg_intro.html)


**Papers for possible presentation in the lecture series:**


McClelland, J. L., Botvinick, M. M., Noelle, D. C., Plaut, D. C., Rogers, T. T., Seidenberg, M. S., & Smith, L. B. (2010). Letting structure emerge: connectionist and dynamical systems approaches to cognition. Trends Cogn Sci, 14(8), 348-356. doi: 10.1016/j.tics.2010.06.002


