

### **Colloquium/Seminar *Progress in Brain Language Research***

This research seminar focuses on reviewing and discussing recent progress in the cognitive neuroscience of language. It has three main strands. 1) Invited guest speakers from different disciplines will introduce to cutting edge international research and will set the stage for focused discussions of linguistic mechanisms. 2) In depth reviews of recently published research articles will provide insights into current progress in specific research areas in brain language research. 3) Researchers at the FU Berlin's Brain Language Laboratory and seminar participants interested in semantics, pragmatics and/or their cognitive and brain basis will present their own research plans and aspects of their ongoing work to open discussion of future perspectives. In this context, MA and BA students may present work relevant for their theses.

Hot seminar topics in the new semester include recent experimental findings from the new excellence cluster *Matters of Activity* and from ongoing research projects funded by the DFG, which address experimental pragmatics (*Brain Signatures of Communication*), neurosemantics (*The Sound of Meaning*), neurophonology (*Phonological Networks in Speech Production and Comprehension*) and speech language rehabilitation (*Intensive Language Action Therapy 1 & 2*).

Recent publications relevant for the seminar:

Dreyer, F. R., & Pulvermüller, F. (2018). Abstract semantics in the motor system? - An event-related fMRI study on passive reading of semantic word categories carrying abstract emotional and mental meaning. *Cortex*, 100, 52-70. doi:10.1016/j.cortex.2017.10.021

Grechuta, K., Bellaster, B. R., Espín Munne, R., Usabiaga Bernal, T., Molina Hervás, B., Mohr, B., Pulvermüller, F., San Segundo, R., & Verschure, P. F. M. J. (2019). Augmented dyadic therapy boosts recovery of language in patients with non-fluent aphasia: a randomised controlled trial *Stroke*, in press.

Heikkinen, P. H., Pulvermüller, F., Mäkelä, J. P., Ilmoniemi, R. J., Lioumis, P., Kujala, T., Manninen, R.L., Ahvenainen, A., & Klippi, A. (2019). Combining rTMS with intensive Language-Action Therapy in chronic aphasia: A randomized controlled trial. *Front. Neurosci*, 12, 1036.

Miller, T. M., Schmidt, T. T., Blankenburg, F., & Pulvermüller, F. (2018). Verbal labels facilitate tactile perception. *Cognition*, 171, 172-179. doi:10.1016/j.cognition.2017.10.010

Pulvermüller, F. (2018). Neural reuse of action perception circuits for language, concepts and communication. *Prog Neurobiol*, 160, 1-44. doi:10.1016/j.pneurobio.2017.07.001

Pulvermüller, F. (2018). The case of CAUSE: neurobiological mechanisms for grounding an abstract concept. *Philos Trans R Soc Lond B Biol Sci*, 373(1752). doi:10.1098/rstb.2017.0129

Pulvermüller, F. (2018). Neurobiological mechanisms for semantic feature extraction and conceptual flexibility. *Top Cogn Sci*, 10(3), 590-620. doi:10.1111/tops.12367

Schmidt, T. T., Miller, T. M., Blankenburg, F., & Pulvermüller, F. (2019). Neuronal correlates of label facilitated tactile perception. *Sci Rep*, 9(1), 1606. doi:10.1038/s41598-018-37877-w

Tomasello, R., Garagnani, M., Wennekers, T., & Pulvermüller, F. (2018). A neurobiologically constrained cortex model of semantic grounding with spiking neurons and brain-like connectivity. *Front Comput Neurosci*, 12, 88. doi:10.3389/fncom.2018.00088

Tomasello, R., Wennekers, T., Garagnani, M., & Pulvermüller, F. (2019). Visual cortex recruitment during language processing in blind individuals is explained by Hebbian learning. *Sci Rep*, in press.

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## **Progress in Brain Language Research**

Friedemann Pulvermüller

2 SWS, Seminar/Colloquium

Zeit/Time: Mi/Wed 16-18 h

Ort/Location: JK 31/122 Geschäftszimmer (Habelschwerdter Allee 45)

### **Technicalities**

The course is part of the teaching offered by the Freie Universität's FB Philosophy and Humanities and by the Berlin School of Mind and Brain at the Humboldt Universität. It is open to interested students from all departments. It will be chaired by Friedemann Pulvermüller under the admin support of Verena Arndt.

To obtain a certificate of attendance, it is necessary to

- attend most of the sessions (maximum misses: three),
- pre- and reprocess the session content by reading the recommended key papers, and
- present a key paper, own research or a research plan addressing language related topics.

Contact and more information:

Verena Arndt (Sekretariat), rm JK 31/234; phone: +49 (0)30 838 58140 E-mail: [verena.arndt@fu-berlin.de](mailto:verena.arndt@fu-berlin.de)

Friedemann Pulvermüller, rm JK 31/232; Office hour: Wed 12-13 h For more information and updates, please visit:

<http://www.brainlang.fu-berlin.de/teaching>

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

### **Seminar Program**

Unless otherwise noted, the Seminar will be held on Wednesdays, from 16:15 – 17:45 h in room JK 31/122 of the main building of the Freie Universität Berlin, Habelschwerdter Allee 45, 14195 Berlin.

#### **10.04. Introduction, Seminar Planning**

Friedemann Pulvermüller: This semester's colloquium program and current research at the Brain Language Laboratory

#### **17.04. Guest Lecture**

**Dr. Patrick Krauss, Universität Erlangen-Nürnberg**

**Analysis of language processing in artificial neural networks and the human brain**

#### **24.04. Guest lecture**

**Dr. Martin Maier, Humboldt-Universität zu Berlin**

**I see something you don't say: How language and knowledge shape perception**

#### **01.05. No seminar**

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**08.05. Guest lecture**

**Dr. Olaf Hauk, University of Cambridge**

**Dynamic brain networks of semantics studied using EEG/MEG**

**Tue, 14.05., 14.15h, JK 31/102, Guest lecture:**

**Prof Anu Klippi, University of Helsinki**

**Intensive Language Action Therapy and repetitive Transcranial Magnetic Stimulation for treating chronic post-stroke aphasia**

**15.05. Guest lecture**

**Prof Wolfram Hinzen, University of Barcelona**

**Language disintegration across mental diseases**

**22.05. Research talk practice for the Clinical Aphasiology Congress, Whitefish, MT, USA**

Presentations by Dr. Felix Dreyer, Lea Doppelbauer and Vivian Dittmer:

**29.05. Research talk**

Dr Luigi Grisoni: Semantic prediction

**05.06. Guest lecture**

**Dr Kristof Strijkers, CNRS and University of Aix**

**Do different language behaviours rely on the same mental representations? Comparing phonological networks between speech production and perception**

**11.06. Guest lecture, 14:30h, JK 31/102:**

**Angela Cream & Deborah West, Speech Pathology Department, Osborne Park Hospital, Perth, Western Australia: TBA**

**12.06. Research plan presentation**

Isabella Boux: Indirect speech act experiments

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**19.06. Research talk**

**Prof Dr Günther Palm, Neuroinformatik, Universität Ulm**

**TBC, TBA**

**26.06. Paper Club – discussion of recent publications on deep neural networks**

By Dr Malte Henningsen & Rosario Tomasello

- LeCun, Y., Bengio, Y., & Hinton, G. (2015). Deep learning. *Nature*, 521(7553), 436.
- Kriegeskorte, N., & Golan, T. (2019). Neural network models and deep learning. *Current Biology*, 29(7), R231-R236.

**03.07. Progress report and research talk**

Sonja Paulus & Dr Felix Dreyer: tba

Natasha Janzen Ulbricht: tba

**10.07. Research talk, seminar evaluation and outlook**

Laura Potisch & Isabella Boux: tba

If there is time: Planning of program for the semester break and winter term