

Research Group Prof. Dr. Markus Werning

1. Master Theses related to Language Processing

Related projects:

- DFG project: *The evaluation of empathy related linguistic performance in large language models: Comparing surprisal values for next-word prediction in human EEG and LLMs in the SPP LaSTing* (<https://www.lasting-spp.org/>)
- The evaluation of Probabilistic Language Models with EEG Methods (Former DFG project in the SPP xprag.de.) More info: https://www.xprag.de/?page_id=4817
- DFG project “Situating Linguistic Meaning” in the RTG “Situating Cognition” (More information at <https://situated-cognition.com/>)

In the context of the above mentioned DFG-projects, we offer a number of master theses on language comprehension:

- a) Master theses that are largely experimental and based on EEG experiments on language comprehension
- b) Master theses with a more theoretical focus on probabilistic models on language comprehension.
- c) Master theses with an ethical/practical evaluation of LLMs and AIs (e.g., in Education, Business, Law)

Exemplary topics:

- LLM and emotions/empathy
- Context effects on lexical meaning
- Compositionality
- Communication with gestures
- Humor, irony, metaphors, etc.
- Logical operators (Negation, Conjunction, Disjunction, Quantifiers, etc.)
- Pragmatics
- Etc.

Exemplary Publications of Prof. Werning's Group:

- Cosentino, E., Baggio, G., Kontinen, J., & Werning, M. (2017). The time-course of sentence meaning composition. N400 effects of the interaction between context-induced and lexically stored affordances. *Frontiers in Psychology*, 8(818). doi: 10.3389/fpsyg.2017.00813
- Keim, P., Oster, C., & Werning, M. (2025). Investigating Humor in EEG: Pun-Based Jokes Elicit Anterior N400 and Posterior P600 Effects. *Proceedings of the Annual Conference of the Cognitive Science Society*, 47, in press.
- Reimer, L., Spychalska, M., & Werning, M. (2024). Integrating Co Speech Gestures into Sentence Meaning Comprehension. *Proceedings of the Annual Meeting of the Cognitive Science Society*, 46, 5025–5032.
- Spychalska, M., Haase, V., & Werning, M. (accepted). To predict or not to predict: The role of context constraint and truth-value in negation processing. *Neuropsychologia*. Retrieved from <https://osf.io/gtme6>
- Spychalska, M., Kontinen, J., & Werning, M. (2016). Investigating scalar implicatures in a truth-value judgement task: Evidence from event-related brain potentials. *Language, Cognition and Neuroscience*, 31(6), 817–840. doi: 10.1080/23273798.2016.1161806

- Spychalska, M., Kontinen, J., Noveck, I., Reimer, L., & Werning, M. (2018). When Numbers Are Not Exact: Ambiguity and Prediction in the Processing of Sentences With Bare Numerals. *Journal of Experimental Psychology: Learning Memory and Cognition*, 45(7), 1177–1204. doi: 10.1037/xlm0000644
- Werning, M. (2005a). Neuronal Synchronization, Covariation, and Compositional Representation. In E. Machery, M. Werning, & G. Schurz (Eds.), *The Compositionality of Meaning and Content: Vol. II* (pp. 283–312). Frankfurt: Ontos Verlag.
- Werning, M. (2005b). Right and wrong reasons for compositionality. In M. Werning, E. Machery, & G. Schurz (Eds.), *The Compositionality of Meaning and Content: Vol. I* (pp. 285–309). Frankfurt: Ontos Verlag.
- Werning, M., Hinzen, W., & Machery, E. (Eds.). (2012). *The Oxford Handbook of Compositionality*. Oxford: Oxford University Press. Retrieved from doi.org/10.1093/oxfordhb/9780199541072.001.0001
- Werning, M., Unterhuber, M., & Wiedemann, G. (2019). Bayesian Pragmatics Provides the Best Quantitative Model of Context Effects on Word Meaning in EEG and Cloze Data. *Proceedings of the Annual Conference of the Cognitive Science Society*, 41, 3085–3091.

Supervision: Prof. Dr. Markus Werning/Dr. Maria Spychalska

2. Master Theses related to Memory and Imagination

Related projects:

- Projects P3, P6 and P10 of the DFG research group "Constructing Scenarios of the Past: A New Framework of Episodic Memory" (More information on P3, P6, P10: <https://for2812.rub.de/>)
- DFG project "Situating Imagination" in the RTG "Situated Cognition" (More information at <https://situated-cognition.com/>)

Exemplary topics:

- Memory Traces
- Memory and Imagination
- Scenario Construction
- Episodic memory as natural kind
- Trace Minimalism, Simulation Theory, Causal Theory
- The Role of Episodic Memory for Causal Cognition and Instruction Imagination
- Reference and Accuracy in memory
- Etc.

Exemplary Publications of Prof. Werning's Group:

- Cheng, S., & Werning, M. (2016). What is Episodic Memory if it is a Natural Kind? *Synthese*, 193(5), 1345–1385. doi: 10.1007/s11229-014-0628-6
- Cheng, S., Werning, M., & Suddendorf, T. (2016). Dissociating memory traces and scenario construction in mental time travel. *Neuroscience and Biobehavioral Reviews*, 60, 82–89. doi: 10.1016/j.neubiorev.2015.11.011
- Fayyaz, Z., Righetti, F., Wiskott, L., & Werning, M. (accepted). Remembering without (representational) memory: A neuro-computational study on regaining categoricity and compositionality from minimal traces. *Philosophical Psychology*. doi: 10.31219/osf.io/zjprq_v1
- Werning, M. (2020). Predicting the Past from Minimal Traces: Episodic Memory and its Distinction from Imagination and Preservation. *Review of Philosophy and Psychology*, 11, 301–333. doi: 10.1007/s13164-020-00471-z
- Werning, M., & Cheng, S. (2017). Taxonomy and unity of memory. In S. Bernecker & K. Michaelian (Eds.), *The Routledge Handbook of Philosophy of Memory* (pp. 7–20). New York: Routledge. Retrieved from doi.org/10.4324/9781315687315-2
- Werning, M., & Liefke, K. (2024). Remembering Dreams: Parasitic Reference by Minimal Traces in Memories from Non-veridical Experiences. In D. Gregory & K. Michaelian (Eds.), *Dreaming and Memory: Philosophical Issues* (pp. 119–154). Cham: Springer International Publishing. doi: 10.1007/978-3-031-68204-9_6
- Werning, M., & Liefke, K. (2025). Reference in memories from perceptual and non-perceptual experiences: A non-disjunctivist account including vicarious, oneiric and fictional remembering. *Synthese*, 205(5), 186. doi: 10.1007/s11229-025-04936-5

Supervision: Prof. Dr. Markus Werning

3. Master Theses related to Mental Concepts, Theory of Mind, Emotions, Intentionality, and Consciousness

Exemplary Topics:

- Concepts
- Emotions
- Pain
- Theory of Mind
- Self-Awareness
- Consciousness
- Intentionality
- Etc.

Master Theses may have a more theoretical focus, but are informed by empirical studies.

Exemplary Publications of Prof. Werning's Group:

- Abraham, A., Rakoczy, H., Werning, M., von Cramon, D. Y., & Schubotz, R. I. (2010). Matching mind to world and vice versa: Functional dissociations between belief and desire mental state processing. *Social Neuroscience*, 5(1), 1–18. doi: 10.1080/17470910903166853
- Abraham, A., Werning, M., Rakoczy, H., von Cramon, D. Y., & Schubotz, R. I. (2008). Minds, persons, and space: An fMRI investigation into the relational complexity of higher-order intentionality. *Consciousness and Cognition*, 17(2), 438–450.
- Reuter, K., Werning, M., Kuchinke, L., & Cosentino, E. (2017). Reading words hurts: The impact of pain sensitivity on people's ratings of pain-related words. *Language and Cognition*, 9(3). doi: 10.1017/langcog.2016.29
- Werning, M. (2008). Die logische Intransparenz intentionaler Zustände—Eine Einführung für Einsteiger. In R. I. Schubotz (Ed.), *Other Minds: Die {Gedanken und Gefühle Anderer}* (pp. 191–196). Paderborn: Mentis.
- Werning, M. (2010). Descartes discarded? Introspective self-awareness and the problems of transparency and compositionality. *Consciousness and Cognition*, 19(3), 751–761. doi: 10.1016/j.concog.2010.07.003

Supervision: Prof. Dr. Markus Werning