

PhD Project Outline: Investigating the Modality (In-)dependence of Syntactic Processing

Patrick C. Trettenbrein^{*1}

^{*}Corresponding Author: trettenbrein@cbs.mpg.de

¹Department of Neuropsychology, Max Planck Institute for Human Cognitive & Brain Sciences, Leipzig, Germany

Linguistic theory stipulates syntactic computations as independent of the modality of language use. In my PhD project (starting January 2018), I will investigate the modality (in-)dependence of syntactic processing and, consecutively, Merge as a core linguistic computation by relying on native signers and German Sign Language (DGS) stimuli. This poster presentation will discuss the theoretical framework and possible designs for fMRI studies that I am currently preparing. My first study and paradigm will aim at disentangling syntactic and semantic information in processing of DGS, seeking to determine whether prior characterisations of the syntactic network using spoken and written language (Zaccarella & Friederici, 2016) hold regardless of the modality in which language is being used. My second study will build on prior results concerning the tentative localisation of Merge (Zaccarella & Friederici, 2015) and aim for a more fine-grained analysis of the role of BA44 and IFG in general during sign language processing. Lastly, against the background of recent stipulations that BA44 computes sequential structures as opposed to hierarchy in the linguistic domain (and quite possibly beyond; e.g., Bornkessel-Schlesewsky, Schlesewsky, Small, & Rauschecker, 2015), a third paradigm relying on the simultaneity of production possible in DGS will seek to clarify some of the specifics of the computational operation(s) in which BA44 is involved.

Bornkessel-Schlesewsky, I., Schlesewsky, M., Small, S. L., & Rauschecker, J. P. (2015).

Neurobiological roots of language in primate audition: Common computational properties.

Trends in Cognitive Sciences, 19(3), 142–150. <https://doi.org/10.1016/j.tics.2014.12.008>

Zaccarella, E., & Friederici, A. D. (2015). Merge in the human brain: A sub-region based functional investigation in the left pars opercularis. *Frontiers in Psychology*, 1818.

<https://doi.org/10.3389/fpsyg.2015.01818>

Zaccarella, E., & Friederici, A. D. (2016). The neurobiological nature of syntactic hierarchies.

Neuroscience & Biobehavioral Reviews. <https://doi.org/10.1016/j.neubiorev.2016.07.038>