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Beitragstitel: Localizing semantic competition effects in speech production: An fMRI study.
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Beitragstyp: Poster
Titel der Dissertation: Competition in language production: Information retrieval and response selection in the human cognitive system.
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Keywords: speech production, competition, interference, fMRI, lexicon, lexical retrieval

One of the core questions in word production research is whether retrieving a word from the mental lexicon is a competitive process or not. One of the tasks used most often in this domain is the Picture-Word Interference (PWI) task in which speakers name a picture while attempting to ignore a superimposed word. Semantically related distractors typically slow the speaker's response times. Different theoretical accounts locate this effect at a lexical level (e.g., Levelt, Roelofs, Meyer, 1999) or at a post-lexical level (e.g., Janssen et al., 2008).

Recently, this question has also been investigated using fMRI and testing hypotheses about where in the brain a lexical or a post-lexical interference effect should be located (c.f., De Zubicaray et al., 2012). We proceeded somewhat differently by temporally teasing apart lexical retrieval and response selection and modeling the brain activation associated with either of these stages.

Twenty-two right-handed native speakers of German participated. Thirty-three pictures were presented, each of them with two semantically related (e.g. picture: "pineapple", distractor: "mango" or "kiwi"), two unrelated ("cushion/boat") and one identical distractor ("pineapple"). Stimuli were followed by a blank screen, followed by a cue. Depending on the cue, participants had to produce the picture name or the distractor word. The latter condition was modeled in the GLM but not analyzed.

We reasoned that competition-related brain activation should be captured by the Related > Unrelated contrast. We found significant activation for this contrast both following stimulus presentation (lexical retrieval) and following cue presentation (response selection). The competition-related brain activation at the early processing stage shows that lexical retrieval is affected by the activation of semantically related competitors, supporting accounts of competitive lexical selection. The fact that competition persisted into the late processing stage suggests that selecting the correct response from a number of alternatives (here: two) is also subject to interference processes if the response alternatives share some of their meaning.

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