

## The role of prosodic prominence in processing German past participles

Ulrike Domahs, Christina Kauschke and Frank Domahs

*University of Marburg*

The present study aims at investigating the impact that prosodic feet have on the processing of inflected words. Such inflectional conditions have been proposed in the framework of Prosodic Morphology (e.g. McCarthy & Prince, 1994) which formalizes language-specific processes in which morphological and prosodic characteristics of linguistic forms interact. One example for such an interface phenomenon is the Standard German past participle paradigm, in which affixation of the prefix *ge-* fulfills the requirement of participles to begin with a weak syllable that precedes the dominant trochaic foot of the verbal stem: *ge-* attaches only to verbs with a strong stem-initial trochee (e.g. Wiese, 2000). Accordingly, the past participle of the verb stem *'baendig-* (Engl. 'to tame') surfaces as *ge-'baendig-t*, while the participle of the verb stem *stu'dier-* (Engl. "to study") as *stu'dier-t*. It is to say that specific prosodic prominence relations surfacing in a trochaic foot are to some extent grammaticalized, when aligned with a stem or a complex word boundary (e.g. Eisenberg, 2006). We hypothesize that a pretonic weak syllable preceding a trochee establish the grammaticalized pattern of German past participles.

To test the function of the pretonic syllable in German participles, we recorded electrophysiological responses while eighteen German participants listened to sentences including past participles with differing prosodic stem templates. Participles were either correct (e.g., *ge'baendigt*, 'tamed' and *stu'diert*, 'studied') or prosodically incorrect in terms of omitted *ge-* prefixation, leading to a prominent initial syllable (e.g., *\*'baendigt*) or prosodically incorrect in terms of added *ge-*, resulting in two weak initial syllables (e.g., *\*gestu'diert*). The goal was to disentangle prosodic from morphological aspects of word processing by means of event-related potentials. It was tested whether violations of *ge-* prefixation yielded components that are indicative of enhanced costs in morpho-syntactic processing indexed by a left-anterior negativity (e.g. Weyerts et al., 1997, Günter et al., 2000), in morpho-lexical processing indexed by an N400 effect (e.g. Weyerts et al., 1997; Janssen et al., 2006), or in prosodic processing yielding a bilateral early negativity (e.g. Rothermich et al., 2010) or a P200 effect (Friedrich et al., 2001).

ERP-analyses yielded a bilateral early anterior negativity in response to participles with omitted *ge-* prefix (*\*'baendigt*, see Figure 1 a)) and a parietal P200 for words with incorrect prefixation of *ge-* (*\*gestu'diert*, see Figure 1 b)). Both components have been proposed to reflect sensitivity to metrical irregularities in language processing, as is evident when unexpected sequences of strong and weak syllables or unexpected pitch contours are encountered. In addition to the "prosodic" components, we found an N400-like centro-parietally distributed negativity and a parietal late positive component (see Figure 1b)). These later components indicate that prefixation errors also lead to enhanced lexico-semantic integration costs and to re-analysis-processes due to the fact that the prefixation violations lead to morphological errors or non-lexicalized forms.

We conclude that the occurrence of brain responses to both prosodic and lexico-semantic violations support the view that *ge-* prefixation in German is prosodically conditioned, fulfilling the prosodic requirement for past participles to begin weak.

(1)

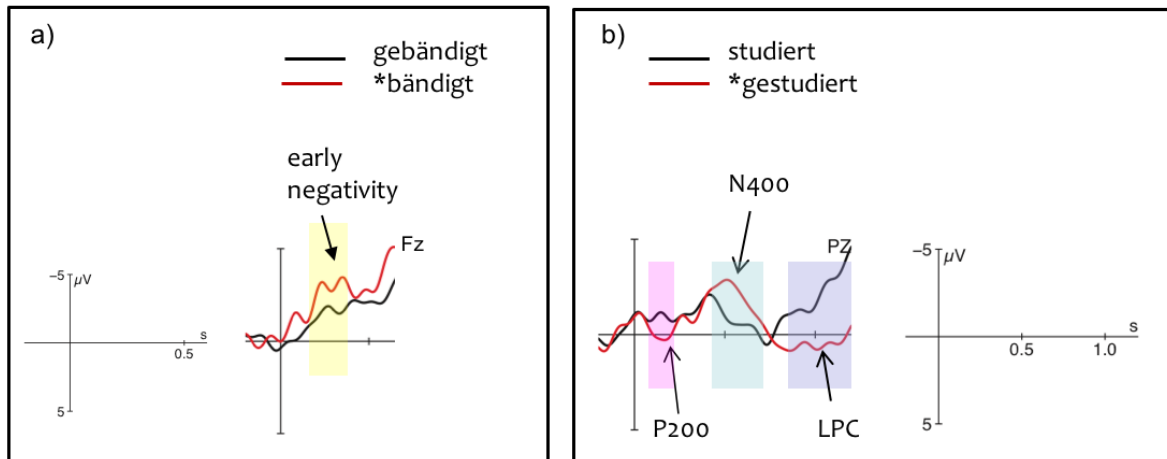


Figure 1. a) early frontal negativity for omissions of the prefix *ge-* (at the Fz electrode); b) P200 for incorrect addition of *ge-*, followed by an N400 and a late positive component (LPC) observed for both violation types (at the Pz electrode).

### References

- Eisenberg, P. (2006): *Grundriss der deutschen Grammatik: Das Wort*. Stuttgart: J.B. Metzler
- Friedrich, C., Alter, K., & Kotz, S.A. (2001): An electrophysiological response to different pitch contours in words. *NeuroReport* 12, 3189-3191.
- Günter, T., Friederici, A. D., & Schriefers, H. (2000): Syntactic gender and semantic expectancy: ERPs reveal early autonomy and late interaction. *Journal of Cognitive Neuroscience* 12, 556-568.
- Janssen, U., Wiese, R., & Schlesewsky, M. (2006): Electrophysiological responses to violations of morphosyntactic and prosodic features in derived German nouns. *Journal of Neurolinguistics* 19, 466-482.
- McCarthy, J. & Prince, A. (1994): Prosodic morphology. In Goldsmith, John (ed.): *A Handbook of Phonological Theory*, 318-366. Oxford: Oxford University Press.
- Weyerts, H., Penke, M., Dohrn, U., Clahsen, H. & Münte, T. F. (1997): *Brain potentials indicate differences between regular and irregular German plurals*. *NeuroReport* 8, 957-962.
- Wiese, R. (2000): *The Phonology of German*. Oxford: Oxford University Press.