

Language variation in the lab: sociolinguistic differences between Standard Dutch and Flemish are reflected in brain responses in a mismatch- negativity paradigm

Netherlandic Dutch and Flemish Dutch differ in phonetics (van der Harst, 2011), morphology (Vandekerckhove, 2005), syntax (Hendriks, 2014), and phonology. Concerning the latter, specific differences can be identified in the allophones of /r/ (FD only has [r], ND additionally has [ɾ]; Sebregts, 2015) and of the tense mid vowels /e:,ø:,o:/ (diphthongal and monophthongal allophones in ND, monophthongal-only in FD). Inspired by experimental studies such as Steinberg, Truckenbrodt, and Jacobsen (2010b, 2010a, 2011), this talk investigates whether sensitivity to these differences can be electrophysiologically measured in the lab.

Participants in the study were 10 FD speakers who migrated to the Netherlands for study purposes, and 10 ND speakers. To test for possible longitudinal adaptation, participants were tested two times with four months in between. The task was a standard passive-oddball paradigm, with varying standards to disentangle phonological from low-level acoustic effects (Hestvik & Durvasula, 2016). Stimuli consisted of [ər]~[əɪ], [e:]~[ei], and [e:ɫ]~[eiɫ]. For each of these three conditions, the two sounds were presented both as standards (85%) and as deviants (15%).

Results for the FD participants show asymmetrical mismatch negativities for each of the three conditions: the [ər] → [əɪ] switch is a violation, but the reverse switch is not (see Figure 1). Respectively, the same holds for [ei] → [e:] and [eiɫ] → [e:ɫ]. The data from the Belgian participants show no mismatch negativities (nor longitudinal adaptation), providing experimental evidence that the regional differences are represented at even the deepest, neurobiological, level. This demonstrates that EEG is a successful method for detecting sociolinguistic differences.

References

- van der Harst, S. (2011). *The vowel space paradox: A sociophonetic study on Dutch*. Utrecht: LOT.
- Hendriks, L. (2014). Variation in verb cluster interruption. *Linguistics in the Netherlands*, 31(1), 53–65.
- Hestvik, A. & Durvasula, K. (2016). Neurobiological evidence for voicing underspecification in english. *Brain and language*, 152, 28–43.
- Sebregts, K. (2015). *The sociophonetics and phonology of Dutch /r/*. Utrecht: LOT.
- Steinberg, J., Truckenbrodt, H., & Jacobsen, T. (2010a). Activation and application of an obligatory phonotactic constraint in german during automatic speech processing is revealed by human event-related potentials. *International Journal of Psychophysiology*, 77(1), 13–20.
- Steinberg, J., Truckenbrodt, H., & Jacobsen, T. (2010b). Preattentive phonotactic processing as indexed by the mismatch negativity. *Journal of Cognitive Neuroscience*, 22(10), 2174–2185.
- Steinberg, J., Truckenbrodt, H., & Jacobsen, T. (2011). Phonotactic constraint violations in german grammar are detected automatically in auditory speech processing: A human event-related potentials study. *Psychophysiology*, 48(9), 1208–1216.
- Vandekerckhove, R. (2005). Belgian Dutch versus Netherlandic Dutch: New patterns of divergence? on pronouns of address and diminutives. *Multilingua*, 24(4), 379–397.