Vowel merger in spoken Standard German? Production and perception of /eː/ and /ɛː/

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The merger of the phonemes /eː/ (as in *Beeren* 'berries') and /ɛː/ (as in *Bären* 'bears') in spoken Standard German and especially in Northern Standard German is frequently discussed in the literature (Mangold, 1966; Stiel, 2020). The hypothesis of a merger is largely based on impressionistic data or transcriptions of speech samples. However, the acoustic analyses that have been conducted up until now show differences in the pronunciation of the two vowels (for a summary cf. Frank, 2020). In my dissertation, I am investigating the production and perception of /eː/ and /ɛː/ in the German-speaking area.

To investigate this vowel merger in detail, we conducted an acoustic analysis of the corpus *German Today* (Kleiner, 2011ff.). The corpus consists of data from 827 speakers from the German language area. We find larger differences between the two vowels for speakers from southern Germany and smaller differences for speakers from northern and eastern Germany. When the vowels are elicited in minimal pair context the distance between the two vowels is greater than in other elicitation contexts. If the vowels occur in the context before /r/ they are more similar than in other phonetic contexts. The results from this study offer a comprehensive account of the phonetic variation of the two vowels.

Based on the results of the acoustic study, we designed a perception experiment to address the correlation between production and perception. Fifty-one subjects from Northern Germany participated in this study. The subjects were first asked to read aloud an extensive word list, which contained items with /eː/ and /ɛː/ as well as distractor items. Minimal pairs were specifically asked at the end of the word list. For the perceptual experiment, two minimal pairs were used as stimuli (*Beeren-Bären*; *Segen-sägen*). The formant values of F1 and F2 were manipulated over 11 equidistant steps to create a continuum between the two vowels. In a two-alternative forced choice perception task, participants had to decide whether they heard the word with /eː/ or /ɛː/. The decision as well as the reaction time was recorded. Data were statistically analyzed using R (R Core Team, 2022), and Generalized Additive Mixed Models (GAMMs) were used for the analysis. The subjects' own pronunciation was operationalized using the pillai score, which is a common measure for calculating vowel mergers (Nycz & Hall-Lew, 2013). The results suggest a relationship between production and perception, although this differs by item. Overall, the results indicate that the present phenomenon is best described as an overlapping near-merger.

References

Frank, M. (2020). *Merger, near-merger oder merger reversal? /eː/ und /ɛː/ im Deutschen aus dialektologischer und experimentalphonetischer Sicht*. Marburg: Unpublished Master Thesis.

Kleiner, S. (2011ff). *Atlas zur Aussprache des deutschen Gebrauchsstandards (AADG)*. Mannheim: Leibniz-Institut für Deutsche Sprache. http://prowiki.ids-mannheim.de/bin/view/AADG/ (18.10.2023).

Mangold, M. (1966). Homophone durch den Zusammenfall von äh und eh im Deutschen. *Die wissenschaftliche Redaktion*, 2, 37–50.

Nycz, J. & Hall-Lew, L. (2013). Best practices in measuring vowel merger. *Proceedings of Meetings on Acoustics*, (San Francisco), 20, 1–19.

R Core Team (2022). *R: A language and environment for statistical computing*. Wien: R Foundation for Statistical Computing.

Stiel, R. (2020). *Phonemwandel im gesprochenen Standard. Dynamik des /ɛː/-Phonems im Deutschen*. Marburg: Philipps-Universität Marburg.