

Exploring spectral overlap in L1 Polish, L2 English and L3 Norwegian vowels

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As part of a larger project investigating multilingual acquisition in L1 Polish – L2 English – L3 Norwegian learners, this study provides a preliminary exploration of cross-linguistic interactions in their vowel systems. Fifteen Polish students of Norwegian (aged 21) read sentences and wordlists in the three languages eliciting all the vowel phonemes. Due to Covid-19 restrictions, the participants read slides presented remotely and used their smartphones to record themselves. The recordings of selected nine females were force-aligned using WebMAUS (Kisler et al. 2017), and target vowel boundaries were manually corrected by three phoneticians. Averages of the first three formants were measured in the central portion of each vowel, along with vowel durations. We aimed to assess overlap between pairs of cross-linguistically adjacent vowels by means of Pillai scores (Nycz and Hall-Lew 2013). The results indicate overlap between the three vowel systems and significant interactions between the L2 and L3 as well as L1 and L2. Despite that, there were cases of clear separation of categories, e.g. we found that the front and central rounded Norwegian vowels /ɤ(:)/ and /ø(:)/ formed categories separate from neighbouring Polish vowels (Fig. 1). In line with standard descriptions of Norwegian (Kristoffersen 2000), pairs of vowels with similar spectral characteristics are distinguished through other means, most probably duration (Fig. 2). There is some inter-speaker variation, e.g. in one speaker all L2 and L3 vowels cluster spectrally with her L1 Polish vowels. Interestingly, the L2 English systems seem to be more varied, possibly due to the greater reliance in English on spectral characteristics, resulting in richer systems. An ongoing analysis of the remaining participants will provide further insights into dynamic interactions in the three phonological systems of multilingual learners.

References

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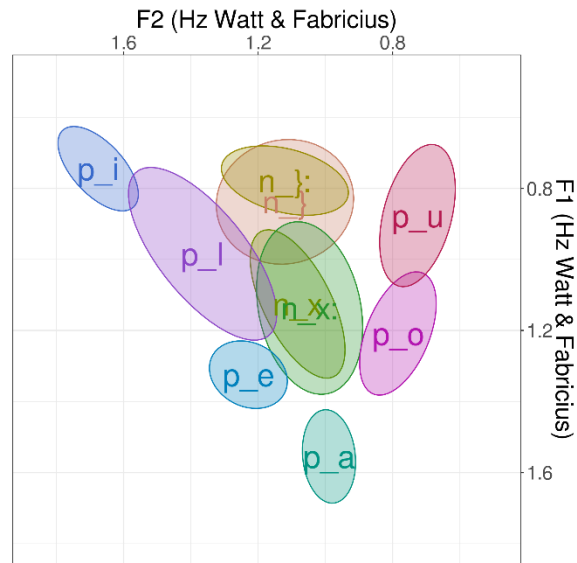


Figure 1. Group averages for the Polish vowels and Norwegian /u(:)/ (shown as } using SAMPA) and /ø(:)/ (shown as x using modified SAMPA). Good separation between the Norwegian and Polish vowels is visible.

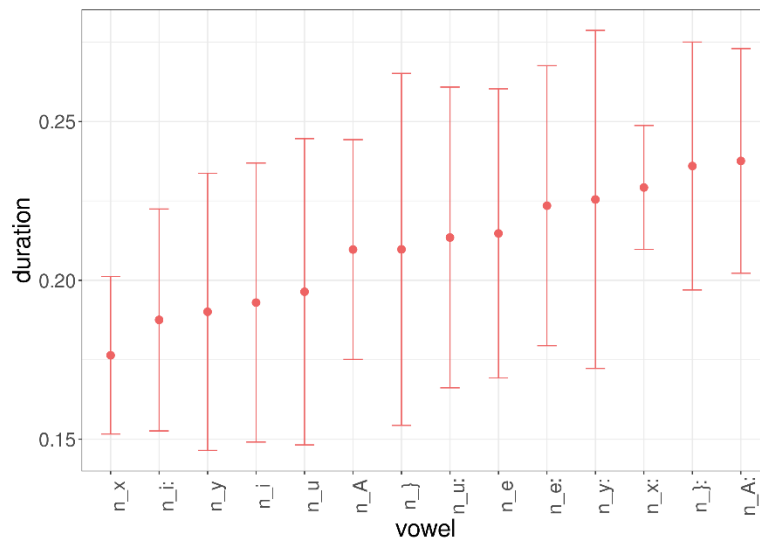


Figure 2. Duration averages for all Norwegian vowels except /ɔ(:)/, which was anomalous.