

Acoustic cues to vowel identification: The case of /ɪ i i:/ and /ʊ u u:/ in Saterland Frisian

Saterland Frisian has a complete set of closed short tense vowels: /i y u/ (Sjölin 1969, Fort 1980). Together with the short lax vowels /ɪ ʊ ʊ/ and the long tense vowels /i: y: u:/ they constitute series of phonemes that only differ by length and/or tenseness. For /ɪ i i:/ and /ʊ u u:/ even minimal triples are available, such as f[ʊ]l 'full', f[u]l 'rotten', and f[u:]l 'much'. Previous research suggests that besides spectral features and vowel duration the timing and scaling of f₀ may contribute to vowel identification (cf. Lehnert-LeHouillier 2010, Yu 2010, Cumming 2011, van Hoof & Verhoeven 2011). To identify the phonetic parameters that Saterland speakers use to keep /ɪ i i:/ and /ʊ u u:/ distinct we carried out two production tests that were designed to elicit 'normal speech' and 'clear speech'. In the 'normal speech' condition speakers read the target words in random order with intervening filler words. In the 'clear speech' condition speakers were asked to make the word forms identifiable for a listener sitting opposite the speakers but lacking eye contact. Results show that in 'clear speech' short tense vowels were kept distinct from both short lax and long tense vowels. In 'normal speech' short and long tense vowels were merged. Our data also suggest that Saterland speakers use f₀ variation to enhance the contrast between short and long tense vowels. These results are discussed in light of current theories of phonetic enhancement (cf. Kingston & Diehl 1994, Stevens & Keyser 2010) and hyper- and hypoarticulation (cf. Lindblom 1990).

References

- Cumming, R. E. (2011). "The effects of dynamic fundamental frequency on the perception of duration". *Journal of Phonetics* 39, 375-387.
- Fort, M. C. (1980). *Saterfriesisches Wörterbuch mit einer grammatischen Übersicht*. Hamburg: Buske.
- Hillenbrand, J. M., Clark, M. J., & Houde, R. A. (2000). "Some effects of duration on vowel recognition". *Journal of the Acoustical Society of America* 108, 3013-3022.
- Hoof, S. v. & Verhoeven, J. (2011). "Intrinsic vowel F₀, the size of vowel inventories and second language acquisition". *Journal of Phonetics* 39, 168-177.
- Kingston, J. & R. L. Diehl (1994). Phonetic knowledge. *Language* 70, 419-454.
- Lehnert-LeHouillier, H. (2010). "A cross-linguistic investigation of cues to vowel length perception". *Journal of Phonetics* 38, 472-482.
- Lindblom, B. (1990). Explaining phonetic variation: a sketch of the H & H theory. In W. J. Hardcastle, & A. Marchal (Eds.), *Speech production and speech modelling*. Kluwer: Dordrecht, 403-439.
- Sjölin, B. (1969). *Einführung in das Friesische*. Stuttgart: Metzler.
- Stevens, K. N. & S. J. Keyser (2010). Quantal theory, enhancement and overlap. *Journal of Phonetics* 38, 10-19.
- Yu, A. C. L. (2010). "Tonal effects on perceived vowel duration". In C. Fougeron, B. Kühnert, M. D'Imperio & N. Vallée (eds.), *Laboratory phonology 10*. Berlin etc.: de Gruyter, 151-168.