

## Reference values for vowel formant frequencies in adult vocally healthy Swedish speakers: Comparison of text reading and carrier phrases

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### Abstract

Vowel formant frequencies are utilized in various domains of speech-language pathology. Reference values from vocally healthy speakers are needed to enable comparison with values from patients. This study adds to the current body of research on Swedish formant frequencies (Fant, 1966; Eklund & Traunmüller, 1997; Persson & Jaeger, 2023). The purpose of the study was to present formant frequency data for Swedish vocally healthy female and male speakers and to compare results from different speaking tasks. This study is part of an ongoing research project at the Division of Speech and Language Pathology at Karolinska Institutet, “Svensk röstbank för referensdata”. Participants were 51 women and 23 men over the age of 18, recorded in a sound-treated booth using a standardized procedure. Formant frequencies F<sub>1</sub>, F<sub>2</sub>, F<sub>3</sub> and F<sub>4</sub> were analysed in the vowels /i:/, /i/, /a:/ and /a/ from a reading passage and carrier phrases (with and without hVd-context) using the Praat software and recommendations by Kent and Vorperian (2018). Results of inter- and intra-rater reliability indicated strong reliability (average ICC(2) was 0.91 and 0.95 respectively). The results showed a statistically significant difference in formant frequencies between men and women, as expected, with an average of 16.5% higher values for women. Furthermore, several differences associated with formant analysis were observed between the two speaking tasks based on both a quantitative and qualitative approach. In the reading passage, greater influence from complicating factors such as coarticulation, speaking rate and word stress was noted compared to the carrier phrases. Correlation between values from the two tasks was moderate (average ICC(2) was 0.56). Based on the results, carrier phrases are recommended for use in research studies and clinical application as they provide increased reliability in formant analysis compared to reading passages.

### References

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