

The development of vowel space in German speaking children

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Vowel acquisition involves establishing static articulatory configurations (paradigmatic aspect) and their integration into coarticulated speech (syntagmatic aspect). There is broad consent that children by the age of three are capable of producing adult-like isolated vowels suggesting that the paradigmatic aspect is mastered by this age (James et al., 2001). Although vowel productions may be perceptually intelligible there is still refinement on the level of syntagmatic aspects due to maturational processes of speech motor control and anatomical growth leading to variability in vowel production (Ménard et al., 2007; Vorperian & Kent, 2007). This study examines the maturation of the vowel space in a cross-sectional survey of German children aged 3y, 4y, 5y, 7y and adults.

Rounded and unrounded tense long vowels (/i/, /y/, /u/, /a/, /e/, /o/) were collected in non-words of the structure C₁VC₂ə. We recorded both the acoustic speech signal and movement of the tongue with ultrasound imaging. Our sample included data from boys and girls to account for both age related changes and sexual dimorphism. The main first three formants were extracted at the midpoint of the vowel semi-automatically using Praat script (Ménard et al. 2007) and compared with manual inspection.

The 3-year olds are expected to show the greatest within and between-speaker variability for all three formants. With increasing age and development of speech motor control, both variability and formant frequency should decrease. We expect to observe effects from sexual dimorphism by the age of 4 years. The data are currently analyzed.

References:

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