



Developmental aspects of Greek vowel production

Polychronia Christodoulidou

PhD thesis supervised by Prof. Katerina Nicolaidis

Aristotle University of Thessaloniki

This thesis investigates the developmental trajectory of vowel production in Greek, with a focus on pinpointing the age at which adult-like patterns in the acoustic characteristics of vowels and their variability emerge. Special emphasis is placed on vowel reduction, exploring the models proposed by Lindblom (1963) and Moon and Lindblom (1994), which, among others, suggest a shift of vowels within the acoustic vowel space as their duration decreases.

For this aim, the research recruited 72 Greek-speaking participants with typical development, spanning from three-year-olds to adults. They were evenly distributed across 9 gender-balanced age brackets, each with a two-year interval. Through a delayed repetition task, participants produced both pseudo-words and real words of the form CV.CV(.CV). The study examined the five vowels of the Greek language, [i, ε, ς, o, u], across various prosodic conditions (i.e., stressed, pre-stressed, and post-stressed vowels) and two foot types (i.e., trochee and iamb), investigating all their acoustic characteristics, including duration, formant frequencies, fundamental frequency, intensity, and vowel space areas, utilizing both normalized and non-normalized measurements.

The analysis of the findings took into consideration age-related anatomical changes in the vocal tract, advancements in speech motor control skills, and physiological as well as sociophonetic influences. The study's establishment of norms for vowel production across various age groups provides valuable insights for clinical intervention and applications in speech technology, such as automatic speech recognition and synthesis.

References

- Moon, S. J. & Lindblom, B. (1994). Interaction between duration, context, and speaking style in English stressed vowels. *The Journal of Acoustical Society of America*, Vol 96 (No 1), 40-55.
- Lindblom, B. (1963). Spectrographic study of vowel reduction. *The Journal of Acoustical Society of America*, Vol 35, 1773-1781.