

Spectral balance and spectral emphasis in accented, stressed and unstressed syllables in Standard Austrian German read speech

One of the most intriguing questions concerning the phonetic correlates of stress/accent is whether *word-level* stress has phonetic correlates or whether it is merely a structural position as suggested by Bolinger (1958). One promising area of recent research is the investigation of spectral balance and spectral emphasis as correlates of metrical prominence in the abstraction from the effect of intonational pitch accent. Whereas some studies (e.g., Sluiter & van Heuven, 1996 for Dutch; Astruc & Prieto, 2006 for Catalan; Ortega-Llebaria & Prieto, 2006 for Spanish and Catalan; Gordon & Nafi, 2012 for Tashelhiyt Berber) came to the conclusion that spectral tilt or balance is a correlate of word stress, others found no difference in spectral tilt between stressed and unstressed vowels in the absence of pitch accent (e.g., Campbell & Beckman, 1997 for American English and Sadeqhi, 2011 for Persian).

So far, all studies used an experimental design with target words under narrow focus versus deaccentuation conditions. However, narrow focus and deaccentuation are two extreme prominence conditions that may yield effects that differ from ‘neutral’ articulation. The ultimate goal of our work is the investigation of phonetic correlates of stress and accent in spontaneous speech. As an intermediate step between controlled production data and spontaneous speech, our present study draws on a large corpus of read sentences of Standard Austrian German as pronounced by 38 speakers from the eastern provinces of Austria. We examine spectral composition, duration, spectral balance and spectral emphasis in comparable syllables containing the vowel /a/ and a sonorant onset in different positions and stress/accent conditions, using different factors as independent variables in a mixed effects logistic regression analysis. Annotations are phonological (GToBI) as well as phonetic (actual tonal contour) and perceptual (judgment of three prominence levels by four listeners). Moreover, we explore different methods of measuring spectral tilt or balance (H1-H2, H1-A1, H1-A2, A1-A2, H1-A3) and spectral emphasis (Traunmüller & Eriksson, 2000).

Our preliminary results suggest that word stress and pitch accent can be predicted by the spectral tilt measures (involving A1 and A2), duration, F1 and F2. Effects on word stress remain significant in the absence of a pitch accent, except for duration. In open syllables, however, we find duration to be the only predictor for word stress. Our next step will be the calculation of spectral emphasis and its incorporation into a mixed effect logistic regression model that contains all different parameters.

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