Word accents in a neurocognitive perspective

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We have found that word accent tones have a clear function in facilitating rapid word processing in Swedish. Thus, native speakers unconsciously use word accent tones to predict word structure, in particular which suffix a stem will have. Accent 1 is a stronger suffix-predictor than Accent 2, since it is associated with a well-defined set of suffixes, whereas Accent 2 is also used in compound words, e.g. *fisksoppa* 'fish soup.' Accordingly, validly cued Accent 1 suffixes have yielded shorter response times than Accent 2 suffixes when participants decided whether target words were singular or plural. In brain imaging studies, we have identified a temporofrontal network underlying the tone-suffix association. Using electroencephalographic (EEG), Accent 1 has produced a negative potential as compared to Accent 2, starting at ~150 ms following tone exposure. This effect is absent in delexicalized speech. Activity in this time frame is assumed to reflect analysis of changes in the sound environment and selection of relevant information, e.g. phonemic analysis, in the superior temporal gyrus (STG). In a study involving both EEG and functional magnetic resonance imaging (fMRI), the negativity for Accent 1 correlated with activity in the left STG and inferior frontal gyrus (IFG). The STG activity probably reflects the phonological tone processing, whereas the IFG, known for grammatical processing, indexes activation of the suffix. Activation of the suffix within 150 ms is just enough for prediction to be useful at fast speech rates in disyllabic words, where each syllable can be pronounced in ~150 ms.