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Language-specific prosodic parsing: a window into the nature of phonological and phonetic category learning

Abstract

Many prosodic accounts within the Autosegmental-Metrical framework (Arvaniti, to appear) are couched entirely (or almost entirely) in terms of discrete and symbolic labels, which in most cases (e.g., Jun 2005) refer to units (or categories) such as pitch accents, boundary tones, or prosodic phrases. These units are taken to be the phonological forms that bridge between the intrinsic variability of the speech signal (substance) and other levels of grammar, such as syntax, information structure and pragmatic meaning. But this mapping from phonetic substance to phonological form is complex, hence it needs to be parsed (Beckman, 1996). Moreover, prosodic categories cannot be reduced to one dimension of phonetic substance. For instance, the temporal alignment of melodic targets (tonal alignment) is an important aspect of intonation when it comes to defining pitch accent category, as shown by perception studies of question/statement tunes in Italian (D'Imperio & House 1996, D'Imperio 2000). Recent work, though, has shown tradeoffs between peak alignment and other parameters such as peak scaling or pitch shape, for a variety of languages, and across individuals within the same variety (Niebuhr et al. 2011, Cangemi and D'Imperio 2015, Cangemi and Grice 2016).

Therefore, just as for consonant and vowel categories, prosodic categories of the world languages can present only broad analogies, given that their quantitative reflexes are extremely diverse, both at the community and the individual level. These extremely detailed and varied phonetic dimensions have to be mastered by native speakers since they have consequences for the production and perception not only of strictly prosodic but also of segmental contrasts (as in the case of stress-induced lengthening being modulated by contrastive vowel length). They also must be accurately reproduced to successfully achieve a native accent in second language (L2) or second dialect (D2) production and convey socio-indexical information. Finally, these phonetic dimensions and their organization must also be learned by children in order to successfully parse both the prosodic structure of their own language and, only later, bootstrap other levels of the grammar such as syntax and pragmatic meaning.

In this talk I will review three sets of studies carried out with my collaborators and students at the LPL revealing: 1. language-specificity in signaling morphosyntactic structure through local and global prosodic boundary cues (D'Imperio and Michelas 2014, Michelas and D'Imperio, 2015); 2. variability in the perception of intonation cues to contrastive focus as a function of individual empathy skills (Estève-Gibert et al. 2016, in preparation); 3. rapid adaptation and imitation of structural and phonetic detail of L2/D2 tonal alignment and scaling as a function of language exposure (German and D'Imperio 2015, D'Imperio and German 2016). The first set of results, while strengthening the idea that syntax-prosody interface cannot rest on universally specified prosodic categories, show that cue clustering is specific to the boundary level being projected. The second study, supports the claim that mapping dynamic intonation cues to other levels of the grammar, such as pragmatic meaning, cannot be separated from domain-general cognitive skills. Finally, results from the imitation study challenge the notion that plasticity in prosodic category

learning is limited to child grammars, by showing fast remapping of both phonological and phonetic structure for intonation targets.

Together, these results argue for a reconceptualization of prosody as a robust dynamical system interacting with different grammatical representations in production and perception, requiring a combined approach complementing abstract symbolic representations with the quantification of continuous parameters (see also Grice et al. 2017). This is in line with hybrid, neo-generative models of segmental phonology (Pierrehumbert 2003, 2016) and of segmental mastery in phonological acquisition (Munson, Beckman & Edwards 2011).