

## Expressivity and autosegmental structure

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What role does representation play in phonological complexity? This talk introduces a notion of computationally restrictive autosegmental grammars, as well as a method for directly comparing the expressivity of these grammars to that of string grammars. It is then argued that the class of patterns describable with these autosegmental grammars provides a better fit to the typology of tone patterns than purely string-based complexity classes.

Research into the computational nature of phonological patterns has found that the complexity of phonology is extremely restricted, falling in the sub-classes of the Regular class of string patterns (Heinz, 2007, 2009, 2010; Graf, 2010; Rogers et al., 2013). These classes are characterized according to computation over strings lacking the usual structure used by phonologists to explain phonological patterns, such as autosegmental representations (Goldsmith 1977, Clements 1981). Drawing on patterns from dialects of Japanese and Bantu languages, this talk shows that patterns in tonal phonology do not fit well into string-based complexity classes. Instead, we can extend the notion of Strictly Local string patterns (McNaughton and Papert, 1971; Rogers et al., 2013), which can be characterized in terms of *banned substrings*, to autosegmental representations through the use of *banned subgraph grammars*. It will be argued that these autosegmental grammars provide a unified and sufficiently expressive, yet still sub-Regular, characterization of the complexity of tone patterns.

This comparison of string patterns to autosegmental patterns is made possible by a function that relates strings to autosegmental structures, distinct from, but not unlike, the tier-projection function that forms the basis of Tier-based Strictly Local grammars (Heinz et al., 2011; McMullin 2016; Heinz and Jardine, 2016). It is briefly discussed how the complexity of these ‘structure-building’ functions can be studied, and why they grant greater expressivity to computationally simple grammars. It is also briefly discussed how they can be applied to the problem of learning non-local phonological patterns.