Structured Suprasegmental Variation: Marking Prominence in Australian Languages

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Recent work has investigated patterns of phonetic variation with respect to phenomena that are not phonologically contrastive in a language, finding structure even in areas that were once thought below the control of the speaker [1]. Speakers have been observed to converge on patterns of phonetic variation that are consistent within languages but variable cross-linguistically for the same phonological phenomenon. One area where principled phonetic variation is well-established and expected is the domain of prosody and stress, which may have one or more phonetic cues, commonly including features such as duration, pitch, and intensity, although the exact correlates of something like lexical stress is highly language specific and may vary substantially [3].

The present study considers variation in acoustic features, particularly in reference to word-level stress marking, in sixteen Australian languages. The results of this study support the claim that the phonetic markers of a prosodic phenomenon such as lexical stress varies in structured ways that indicate these markers vary and change in a principled way, and thus can be studied similarly to linguistic studies of segmental change. Even though the acoustic correlates to stress– phonetic factors such as duration, intensity, f0– all serve to mark the same type of phonological event, the phonetic variation in this marking is still structured in the way that a phonologized factor such as phonemic stop voicing might be. This talk explores the structure in this variation, finding evidence for historical links between related languages, as well as sociolinguistic variation within languages that further support the claim that speakers are in control of suprasegmental cues just as they are for segmental phenomena.

While the position of word-level prominence marking in most Australian languages is phonologically stable at the beginning of each word, the phonetic factors used to mark this prominence varies widely [4,5]. Past studies of the largest family on the continent, Pama-Nyungan, have stated that the primary correlate of stress in these languages is usually pitch [6,7,8]; while this study does find pitch to be a common correlate of stress, duration is about equally as common, and in some languages neither of these correlates highly with word-initial prominence. Within languages, however, speakers usually are consistent in which phonetic cues they use to mark word prominence, suggesting language-internal consensus on these cues. The question that remains is how this variation arises over time. What I propose in this talk is that phonetic correlates of prosodic phenomena are both stable and variable – there is often a primary correlate or set of correlates that speakers are very consistent on, in addition to 'secondary' correlates that are more variable across speakers and may serve as the catalysts of change in many situations.

The study presented here is an investigation into structured variation of the acoustic correlates of stress and prosody in sixteen Indigenous languages of Australia that all have consistent initial stress placement, with a focus on the source(s) of variation in these factors cross-linguistically. The data used in this dissertation are narrative speech recordings sourced from language archives, collected in varying field settings. Natural speech data, along with being the only available data sources for some languages that are no longer spoken, also have the advantage of showing more variation than careful lab speech and revealing the multidimensionality and variation inherent in language and in prosody more specifically. Original audio and transcripts were time-aligned using the Montreal Forced Aligner with manual correction, and subsequent phonetic measurements were extracted with Praat and analyzed in R.

The acoustic correlates of stress show significant cross-linguistic variation, both in the presence or absence of a particular cue to stress and the size of these effects, despite the phonological uniformity present in these languages with respect to initial stress placement. The phonological uniformity of stress assignment allows for a more controlled comparison of the acoustic correlates of stress across these languages, since the placement of stress marking remains constant. Acoustic

correlates investigated are vowel duration, pre-tonic and post-tonic consonant duration, intensity, f0 (maximum and range), and vowel peripherality. These cues are identified using a series of mixed effects linear regression models, and the sources of variation are identified using Analysis of Molecular Variance [9] (AMOVA).

Almost all the languages in this study have multiple acoustic factors that correlate with lexical stress. Likewise, in all languages that have more than one speaker, at least one of these factors showed interspeaker variation. These results show that stress is often marked by multiple cues, and not all these cues are only doing the work of marking the stress contrast. Some factors that show interspeaker variation are additionally conveying some information about the speaker, be it age, gender, or social status. This sociolinguistic variation could potentially be an example of change in progress, where one group has taken up the change and another has not yet, or it could be stable social variation within a community, in line with recent work on socio-prosodic variation in other languages [10].

Speakers are evidently sensitive to the patterns of prosodic marking in their language, and they learn this phonetic variation in a consistent way. Furthermore, the systematicity of this variation suggests that these patterns should change over time systematically as well. The results of this study indicate that the phonetic correlates of stress are shared among related languages in some cases, while in other cases cross-linguistic variation is substantial. I argue that the changes that give rise to this variation come from either regular sound change or contact situations, similarly to many types of segmental change. Changes in the phonetics of prosody can also occur within subpopulations of a language, creating variation along sociolinguistic lines. Such observations speak to the nature of the language faculty and the cognitive organization of language, even below the abstract level of the phoneme, and to our theories of phonetic change and the phonetic precursors to phonological change.

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