

Tonal Variation: A Quantitative Study of Jianyang Min Chinese

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Abstract

Uncovering the magnitude and range of lawful variation in speech ranks as one of the major goals of linguistic science in general and instrumental phonetics in particular (Ohala 2003, 670). However, the wealth of phonetic variation revealed by instrumental phonetics presents linguists with an as-yet-unsolved problem: how should this variation be understood in phonology? Over the past few decades, as the study of variation has become increasingly important in phonology (Coetzee & Pater, 2011; Kügler, Féry, & Vijver, 2009), the explanatory power of experimental methods to address these issues has been well established (Hayes, 1999; Kingston, 2007; Ohala, 1974, 1984; Pierrehumbert, 2000a). The present study contributes to this body of research with a case study on the tonal variation of Jianyang Min Chinese and related phonological issues.

First, I propose a new model that represents tonal variation and quantifies its external and internal dispersion. This "tonal acoustic space" model has three advantages over earlier acoustic models on tones. First, this model is able to show the relative location of each tone as well as the distance between any two tones. Second, the range and density of each tone can be shown by plotting all the tokens. Third, by measuring external and internal dispersion values, the model provides a quantitative way to test the effect of adaptive dispersion (Liljencrants & Lindblom, 1972).

Second, I present a detailed description of tonal variation in Jianyang Min Chinese, a

'dense' tone system with eight tones. I present two case studies conducted on Jianyang Min using both experiment and corpus methods. Chapter 5 reports on a controlled experiment of sentence prosodic variation; Chapter 6 uses a lexical corpus of Jianyang to investigate word positional variation. The goal of these two studies is to separate and compare the effects of sentence prosody and word position on tonal variation.

Finally, the theoretical implications of the empirical data from Jianyang Min tonal variation are summarized. The results of these studies show that the predictions of derivational phonology do not hold for empirical data drawn from Jianyang tonal variation. Analysis of external dispersion values provide evidence for the role that perceptual distinctiveness plays in shaping the tonal variation. To deal with these findings, I propose an exemplar-based Tonal Acoustic Space representation of Jianyang Min tones, which is radically different from earlier reductionist tonal representations. I also show how the "Tonal Acoustic Space" model can be applied to and benefit studies of tonal evolution and cross-language tonal comparison.

Keyword Northern Min, tone, quantitative model, adaptive dispersion, emergent phonology