**From a Syllable System to a Phoneme System**

Hezao Ke, University of Michigan, Ann Arbor

Some current studies on the immigration history and origin of human beings rely upon the statistical analysis of the phoneme size in modern languages, and many concerns arise regarding how the phoneme inventories are obtained (Atkinson, 2011b; Cysouw, Dediu, & Moran, 2012; Hay & Bauer, 2007; Wang, Ding, Tao, & Li, 2012). Although the basic assumptions of studies such as Atkinson’s (2011b), which assumes there is a correlation between population size and phoneme inventory size, is challenged by some recent studies (Moran, McCloy, & Wright, 2012), the necessity to obtain the phoneme inventory size in a standard way could not be undermined, because Moran and colleages’s research also base on their data of language phoneme inventories. As is suggested by Atkinson (2011a), a standard method is needed to determine the phoneme inventory size of languages. This paper counts itself as a part of the effort to establish a standardized procedure to create the phoneme inventories of Chinese dialects.

I argue that such a standard procedure is significant for Chinese dialects, and possibly for other Asian languages as well, where syllabic analysis is prevailing in traditional phonology studies (and thus linguists do not pay much attention to these languages’ phoneme systems). This work therefore serves as a bridge between the Eastern syllabic analysis tradition and the Western phonemic analysis tradition, by finding a method to derive a phoneme system based on the data of the syllable system.

In this paper, we input all the syllables in one of the Wu Dialects, Songjiang Dialect (Zhang, 2003), to Microsoft Office Excel 2007, and then divide them into environments. Then we executed two kinds of standardized procedures to obtain the phonemes. Both of these two standardized procedures are based on the classical definition of phonemes that phonemes are contrastive sounds in a certain language. We thus need to find the environments of sounds in order to ascertain if any sounds are in contrastive distribution in those environments. For example, if we list all the sounds occurring in an environment such as b\_t in a language, where “\_” is the position of the sounds we are interested in, we are able to identify these sounds as phonemes.

In the first procedure, we list all the sounds which occur in the same environments, by which we can find the contrastive sounds, i.e. phonemes. In the second procedure, we reconstructed all the possible environments in Songjiang Dialect with the light from CGVX theory of Chinese syllable pattern, where C, G, V, X represent a consonant, a glide, a vowel, and either a consonant or a vowel, respectively, and then find all the contrastive sounds. By the second method we reduce the size of the phoneme in the Songjiang Dialect from 32 consonants and 17 vowels to 26 consonants and 11 vowels. With the new phoneme system obtained through the second method, the Songjiang Dialect has 3744 potential syllables, and it actually has 650 syllables, which means it uses up 17.4% of all the possibility, whereas according to the first method and Qian (1992, 1994)’s system, the language only uses up 10% of the possibility. We conclude that the second method is more promising, given Duanmu’s (2008) study on English syllable system shows English also uses up about 20% of the possibility.

**References**

Atkinson, Q. D. (2011a). Linking spatial patterns of language variation to ancient demography and population migrations. *Linguistic Typology, 15*(2), 321-332.

Atkinson, Q. D. (2011b). Phonemic diversity supports a serial founder effect model of language expansion from Africa. *Science, 332*(6027), 346-349.

Cysouw, M., Dediu, D., & Moran, S. (2012). Comment on “Phonemic Diversity Supports a Serial Founder Effect Model of Language Expansion from Africa”. *Science, 335*(6069). doi: 10.1126/science.1208841

Duanmu, S. (2008). *Syllable structure: The limits of variation*. Oxford: Oxford University Press.

Hay, J., & Bauer, L. (2007). Phoneme inventory size and population size. *Language, 83*(2), 388-400.

Moran, S., McCloy, D., & Wright, R. (2012). Revisiting population size vs. phoneme inventory size. *Language, 88*(4), 877-893.

Qian, N. (1992). *Dangdai Wuyu Yanjiu "Contemporary study of Wu dialect"*. Shanghai, China: Shanghai Educational Publishing House.

Qian, N. (1994). Shanghai shijiao yixian de yuyin kaocha: Fengxian yuyin de neibu chayi "Phonological study of dialects spoken in the suburbs of Shanghai City: the phonological differences inside Fengxian dialect". *Kaipian (开篇）, 12*.

Wang, C.-C., Ding, Q.-L., Tao, H., & Li, H. (2012). Comment on “Phonemic Diversity Supports a Serial Founder Effect Model of Language Expansion from Africa”. *Science, 335*(6069).

Zhang, Y. (Ed.). (2003). *A Survey of Songjiang dialects "Songjiang Fangyan Zhi"*. Shanghai, China: Shanghai Lexicographic Publishing House "Shanghai Cishu Chubanshe".