Tonal targets in language and music

Stephen Matthews
The University of Hong Kong

Linguists such as Jones & Woo (1913) and Chao (1949) have used musical notation to represent Cantonese tones. Is this more than an analogy? "Musical approaches" to teaching Cantonese suggest that the keys to mastering tone lie in musical analogies, while popular belief suggests that musicians have an advantage in learning languages with complex tone such as Cantonese. But what, if any, is the basis for these notions? Recent work shows that both native and non-native speakers with musical training do have an advantage, not only for tonal but also for segmental perception (Pang 2012). Such behavioral results suggest that the mental resources used for tonal and musical processing overlap (Mok & Zuo 2012).

An aspect of the equivalence between linguistic tone and musical pitch which can be confirmed empirically involves intervals (Chow 2012, Yiu 2013). While the F0 interval between tone 1 [55] and tone 3 [33] is two to three semitones, the interval between the level tones 6 [22] and 3 [33] corresponds to a semitone, just as in Jones and Woo's notation.

These patterns have implications for the representation of tone. Chan (1987) showed that tone pairs 25/55 and 23/33 are interchangeable, suggesting that tonal offsets are relevant to tone-melody mapping. Yet this fact is not captured by analyses positing tonal registers and features such as [+/-raised] (Yip 2001). The equivalences between musical and tonal intervals are reflected in the in tone-melody mapping at cadences, where particular tones serve as tonal targets at the end of a melody. As shown by Ho (2010), in Canto-pop major key songs end on either tone 3 [33] or tone 5 [23]; given that melodies typically end on the keynote, the choice of tonal target at the ending reflects the placement of the semitone between the keynote and the leading note, which may be sounded either in the melody or the accompanying harmony. We show that this pattern is highly consistent for major keys songs ending on the keynote, which consistently end on 23 or 33 tones. The patterns for minor key melodies are more variable, reflecting the differing placement of semitones in the various forms of minor scale.

This evidence calls for a representation in which tonal offsets are explicitly represented, in order for them to be targeted by rules of tone-melody mapping and to serve as targets at cadences. This conclusion supports an analysis proposed for independent reasons in Lee (2014), in which both onsets and offsets are specified.