

# Exploring the link between perception and imitation of Mandarin flat-falling tonal contrast at individual level

Wei Zhang<sup>1</sup>, Meghan Clayards<sup>1,2</sup>, Morgan Sonderegger<sup>1</sup>

<sup>1</sup>Department of Linguistics, McGill University (Canada), <sup>2</sup>School of Communication Sciences & Disorders, McGill University (Canada)

Phonological categorization patterns have been found to mediate phonetic imitation [1]. However, such a close link between perception and imitation is mainly evident by group-level results (e.g. [2]), and studies have observed substantial individual-level variations in phonetic imitation [3-5]. This study further explores the extent to which perception and imitation behavior are correlated across individuals, using the case of a Mandarin tonal contrast.

We created flat-falling tonal continua by manipulating the F0 fall range (an important cue to the contrast) and the tone duration (a weak cue) orthogonally (5 steps per cue). 40 participants completed a 2AFC categorization task and an explicit imitation task. The categorization results were analyzed using a mixed-effect logistic Bayesian regression, and F0 and duration imitation were analyzed by two separate mixed-effect Bayesian mixture models (as in [2]). F0 range and duration in the stimuli were used as the predictors for the responded tone type in the categorization model, and for the mixing probability in both mixture models. The by-participant random estimates of F0 range and duration, which correspond to the importance of each cue to each task (6 parameters), were then extracted from the three models and analyzed for predictive relationships.

Results showed that for individuals who relied more on F0 in the categorization, F0 had higher importance for F0 imitation ( $\beta=0.33$ , 95% CI=[0.02, 0.64], Fig. 1A). There was a non-significant trend suggesting that F0 reliance in categorization correlates with F0 importance for duration imitation ( $\beta=0.32$ , 95% CI=[-0.26, 0.9], Fig. 1C). Duration reliance in categorization did not meaningfully correlate with the importance of either F0 for F0 imitation ( $\beta=0.21$ , 95% CI=[-1.34, 1.75], Fig. 1B) or of duration for duration imitation ( $\beta=0.09$ , 95% CI=[-2.07, 2.28], Fig. 1D). Furthermore, we found that the categoricalness of F0 imitation correlates with that of duration imitation ( $\beta=0.25$ , 95% CI=[-0.06, 0.56], Fig. 1E). Taken together, these results suggest that a positive correlation between the utilization of the important cue in categorization and the utilization of both cues in imitation, highlighting the significant role of phonological contrast in mediating phonetic imitation.

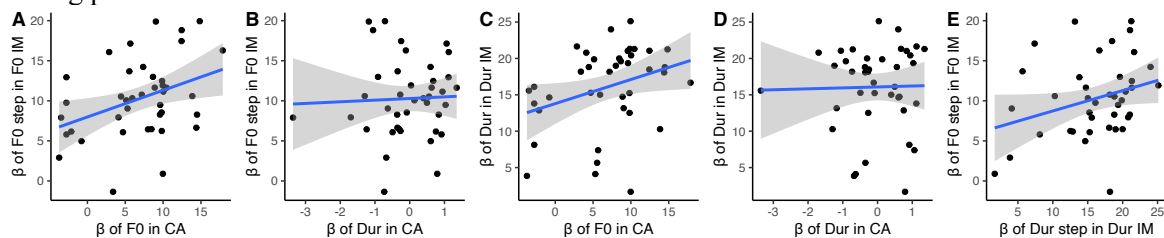


Figure 1: Correlations between categorization and imitation results. (Abbreviations: ‘IM’ for imitation, ‘CA’ for categorization, ‘Dur’ for duration)

## References

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