

A Cross-dialectal Comparison of *Er*-suffixation in Beijing Mandarin and Northeastern Mandarin: An Electromagnetic Articulography Study

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This study explores articulatory differences of *Er*-suffixation (*Erhua*; diminutive suffixation) between Beijing Mandarin (BJM) (see [1], among many others) and Northeastern Mandarin (NEM). With the help of an NDI Wave, we compared temporal changes of the tongue configuration at different duration deciles of *Er*-suffixed monophthongs (represented with ten solid lines for each stem: t1-t10; the tongue postures of corresponding unsuffixed monophthongs are represented with a green dashed line throughout). Six speakers (BJM=3; NEM=3) participated in the experiments and 10 tokens (5 *Er*-suffixed and 5 unsuffixed) were analyzed for each stem. Only representative results from one BJM speaker (BJ-01) and one NEM speaker (NE-01) are provided here since the results are highly consistent within each dialect group.

High front vowels /i, y, ɿ, ʅ/: We can see from Figs. 1-2 that although tongue root retraction is attested in both BJM and NEM speakers when a high front vowel is being *Er*-suffixed, one significant cross-dialectal difference emerges, namely that BJM speakers employ a “curling-up” posture (negative Tongue Tip Angle (TTA); see [2]) to produce the *Er*-suffix, whereas the curling-up posture is completely absent in NEM. Instead, NEM speakers opt for a downward tongue tip (positive TTA) in *Er*-suffixation. Taken together, it is evident that *Er*-suffixation involves tongue root retraction in both BJM and NEM, while BJM features an “additional” gesture of tongue tip curling. This cross-dialectal difference also leads to that the temporal lingual changes (solid lines) are of much greater magnitude in BJM *Er*-suffixation. Interestingly enough, regarding the “retroflex” apical vowel /ɿ/, no obvious change is found, especially in NEM *Er*-suffixation ([3]).

Back vowels /a, u/: We can see in Figs. 3-4 that BJM also shows a significant tongue shape change in *Er*-suffixation, whereas NEM’s tongue postures are kept “stable” throughout.

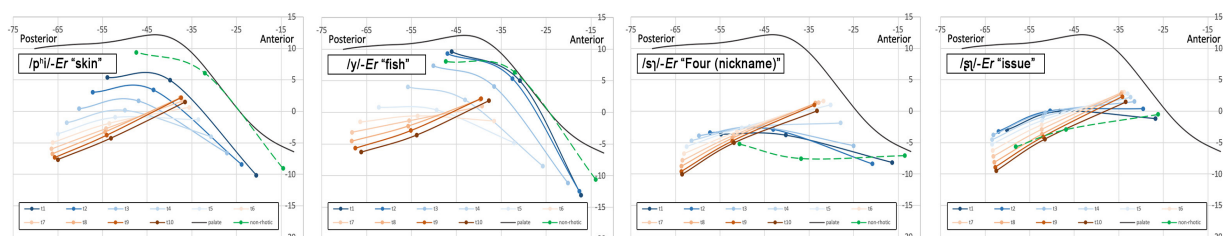


Figure 1 Temporal lingual changes of BJ-01 (Front vowels)

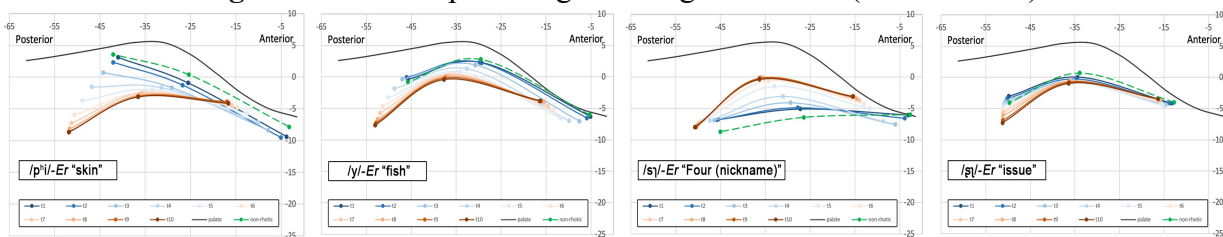


Figure 2 Temporal lingual changes of NE-01 (Front vowels)

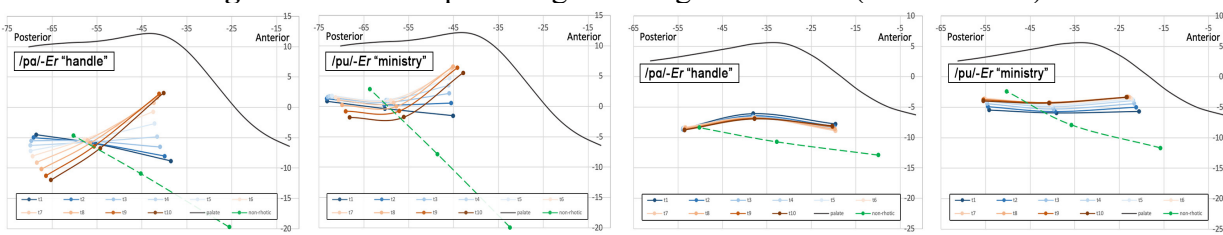


Figure 3 Temporal lingual changes of BJ-01 (Back vowels)

Figure 4 Temporal lingual changes of NE-01 (Back vowels)

It is also important to note that, throughout the entire syllable, an *Er*-suffixed back vowel (solid lines) is substantially different from its corresponding unsuffixed back vowel (green dashed line) in terms of tongue configuration in both BJM and NEM (Figs. 3-4). However, the onset of an *Er*-suffixed front vowel (t1) is similar to its corresponding unsuffixed front vowel in this regard (Figs. 1-2), again in both BJM and NEM. The result also confirms previous impressionistic observations according to which some instances of *Er*-suffixation are “absorbed” into the stem when the stem contains a back vowel, especially in NEM, whereby no tongue tip raising is found.

For the sake of completeness, we further compared the tongue postures of the last decile (offset) of the *Er*-suffix across all tokens (see Figs. 5-6). Boxplot of TTA (Fig. 7) and results of an ANOVA test show a significant difference on Tongue Tip Angle (TTA) between BJM and NEM ($F=400.32$, $p<0.001$), confirming that BJM speakers use a curling-up tongue tip (negative TTA), while NEM speakers opt for a downward tongue tip (positive TTA) in *Er*-suffixation.

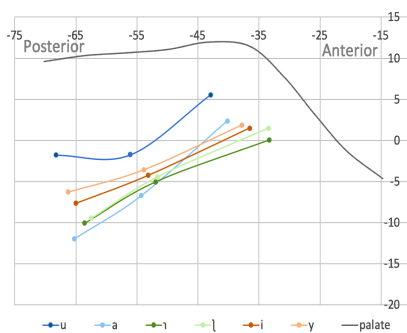


Figure 5 Offsets of *Er*-suffix (BJ-01)

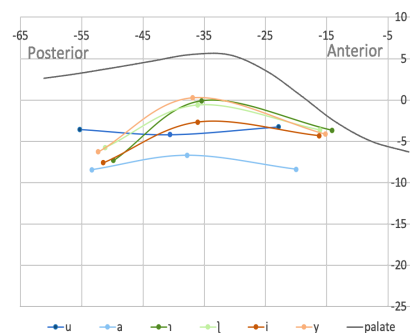


Figure 6 Offsets of *Er*-suffix (NE-01)

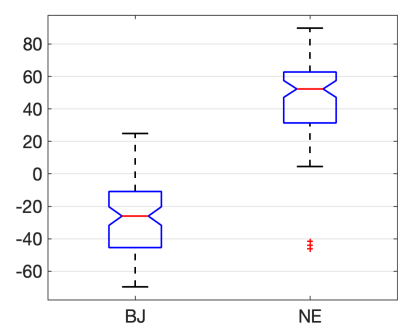


Figure 7 Boxplot of TTA of BJM and NEM speakers

Discussion: The EMA results confirm that *Er*-suffixation may involve both tongue tip raising and tongue root retraction in Mandarin Chinese, too, just like the well-established “retroflex” and “bunched” configurations found in the production of /ɹ/ in American English ([4], [5], among many others). More importantly, our results further reveal that there is an unprecedented cross-dialectal difference between BJM and NEM in *Er*-suffixation, at least in terms of tongue configuration. In addition, we shall report results of the acoustic data in the conference to see if there is any cross-dialectal difference as well.

Conclusion: We have shown in this study that *Er*-suffixation may not be homogenous as previously thought, since BJM and NEM are closely related dialects of Mandarin Chinese. It is worth exploring the sociophonetic or diachronic source of the cross-dialectal difference. Last but not least, for a more comprehensive understanding of the phenomenon in question, our next step is to investigate other cases of which stems are a closed syllable and/or a diphthong/triphthong, whereby incomplete neutralization has been reported to occur (e.g., [3]).

References

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