The adaptation of Mandarin falling diphthongs in Heritage Korean in China: The interaction of linguistic and sociolinguistic factors
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Introduction: Korean does not have a falling diphthong except for /iːj/ which has a marginal status (H. Kang 1997). Therefore, when foreign words with a falling diphthong are borrowed into (Homeland) Korean, the diphthong undergoes adaptation and is most often realized as a heterosyllabic vowel sequence (e.g., Mandarin /cao.mi/ → /sja.o.mi/ ‘Shaomi’; English /saj/ → /sa.i-ci/ ‘size’). This adaptation satisfies the native phonological restriction against falling diphthongs (*FALLDIPH) at the expense of altering the prosodic structure of the input (DEP-SYL). In this paper, we examine how falling diphthongs of Mandarin are adapted to a heritage Korean dialect spoken in the Chinese city of Dandong, where the level of bilingualism is high unlike the Homeland variety of Korean.

Goals: The study has two general goals. The first goal is to examine if and how the conflicting demands of prosodic faithfulness and native phonology may be resolved differently depending on the sociolinguistic context of borrowing. Specifically, we hypothesize that the faithfulness to the input prosodic structure (syllable count, in this case) will be more important in the context of high than low bilingualism (Y. Kang 2010a) and we also expect that the importation of novel foreign structure will be more common in the context of high than low bilingualism (Haugen 1950, Paradis & LaCharité 2008). The second goal of the paper is to examine to what extent phonetic conditioning attested in extant loanwords is accurately internalized by the speakers and productively extended in an on-line adaptation task. We hypothesize that in this bilingual population, generalizations speakers draw about adaptation patterns are mediated by their knowledge of input language phonological categories and as a result, speakers may “underlearn” subtle phonetic effects (Y. Kang 2010b).

Methodology: Loanword data are collected from seven ethnic Koreans (age: 26~69) in Dandong, China, who are bilingual speakers of Mandarin and Korean but consider Korean as their native language. The data are collected in two experiments designed to examine (i) the adaptation pattern of established loanwords and (ii) the on-line adaptation, respectively. Based on published sources and with the help of a native speaker informant, two lists of Mandarin target words that contain one of four falling diphthongs (/ai, ei, ao, ou/) were created; one list consists of Mandarin words that have corresponding established loanforms in the dialectal Korean (n=128) and another list consists of Mandarin words without an established loanform (n=92). The word lists were balanced for a number of phonological factors, such as the type of diphthongs, the Mandarin tone on the target diphthong (T1, T2, T3, and T4) and the position (initial vs. final) of the target syllable within the word. These conditions also allow us to examine how the adaptation is affected by the phonetic duration of the input vowel, conditioned by the tone (T3 > T1, T2 > T4) and the word position (final > initial). The Mandarin words were presented to the speakers aurally along with the Chinese orthography and the speakers were asked to use the appropriate corresponding Korean forms embedded in a contextually appropriate Korean carrier sentence. The speakers’ production was recorded and transcribed by the first author and verified by another native Korean speaker. The analysis below is based on 1,207 instances of diphthong adaptation in disyllabic words in the corpus.

Results: Two major patterns emerge in the corpus: coalescence into a monophthong (“substitution”) and retention of the diphthong (“importation”). The monophthongal adaptation, where the two parts of the diphthong coalesce into a monophthong, obeys the constraint against falling diphthongs in native phonology and is the dominant pattern. In contrast to the disyllabic adaptation in Homeland Korean, the coalesced monophthong preserves the syllable count of the input. The diphthongal adaptation retains the foreign structure and preserves the syllable count at the expense of violating a native constraint.

<table>
<thead>
<tr>
<th>Heritage Korean in China</th>
<th>cf. Homeland Korean</th>
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</thead>
<tbody>
<tr>
<td>monophthong (75.8%)</td>
<td>diphthong (24.2%)</td>
</tr>
<tr>
<td>disyllabic sequence</td>
<td></td>
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<tr>
<td>雪糕 [xue3 gao1];&gt; swe.k<em>o/ 彩票 [cai3piao4]&gt;tsai.p</em>jio/ 毛泽东[mao2ze2dong1]&gt;/ma.o.z*a.tun/</td>
<td></td>
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A logistic mixed-effects regression was used for statistical analyses. The dependent variable was the adaptation pattern (monophthong vs. diphthong) and the independent factors included DIPHTHONG TYPE (front diphthong /ai, ei/ vs. back diphthong /ao, ou/), WORD POSITION (initial vs. final), MANDARIN TONE (T1, T2, T3, and T4), SPEAKER AGE (older, mid, and younger), EXPERIMENTAL BLOCK (established loan vs. on-line adaptation), and their interactions.

DIPHTHONG TYPE: Diphthongal realization is more likely for the front unrounded diphthongs /ai, ei/ than for the back rounded diphthongs /ao, ou/ (Figure 1). A similar asymmetry is reported for English loanwords in Korean (Kenstowicz & Sohn 2001). We conjecture that this is related to the fact that Korean has a front-falling diphthong, /ij/, a remnant of a robust system of front-falling diphthongs from Late Middle Korean (Lee & Ramsey 2011). In contrast, back-falling diphthongs are completely absent in Korean both synchronically and historically.

WORD POSITION: Diphthongal adaptation is more likely when the vowel occurs in word-final syllable than in non-final syllable. We attribute this difference to the longer duration of vowels in word-final than non-final syllables in Mandarin (Chen 2006) with longer duration inducing more diphthongal adaptation. Interestingly however, there was a significant interaction of word position and experimental block and the strong effect of word position found in the established loans went away in the on-line adaptation block (Figure 2). This suggests that the position effect, i.e., the phonetic duration effect stemming from the word position, is not productively projected to new adaptation. Rather, speakers seem to internalize the adaptation pattern abstracting away from this context-dependent phonetic variation.

MANDARIN TONE: The duration of Mandarin vowels also differ depending on the tone (Xu 1997, Wu and Kenstowicz 2015). This duration difference affects the adaptation of Mandarin diphthongs, with a longer tone inducing more diphthongal adaptations. Specifically, T3, a falling-rising contour tone has the longest duration in Mandarin and induces the highest rate of diphthongal adaptation while T4, a high-falling tone, has the shortest duration in Mandarin and induces the lowest rate of diphthongal adaptation. However, these tonal effects are found not only in word-final position but the effects persists in word-initial position, where the T3 shortens to a length comparable to that of other vowels (Yang 2015) (Figure 3). This indicates that while the tonal effect may have originated from the phonetic durational asymmetry, the learners have internalized the diphthongal preference of T3 as a phonological generalization which persists even in contexts where the phonetic duration is no longer there to condition the different adaptation strategy.

SPEAKER AGE: While the small number of speakers makes any conclusion tentative, we found that the younger speakers, who are generally more proficient in Mandarin, produced more diphthongal realization (i.e., importation) than middle-age speakers. (The older speakers did not differ significantly from either of the other age groups.) However, this age effect is mainly carried by the on-line adaptation results and there was no significant age effect in the established loans. This is as expected given that established loanwords are in shared use by the community of speakers while the on-line adaptation is free from the existing usage pattern and reveal the productive generalization projected by speakers.

Conclusion: The Mandarin falling diphthongs are adapted differently under two different sociolinguistic contexts, with prosodic preservation and importation favored in the bilingual context (Dandong) compared to in the context of remote contact (Homeland). We found that phonetic duration of input vowel affects adaptation (i.e., longer vowels induce more diphthongs) but we also found that these phonetic effects make their way into the lexicon (established loans) and the grammar (on-line adaptation) through the sieves of Mandarin phonological categories, leading to elimination of subtler phonetic effects.