

**Phonetic and phonological adaptation
of loanwords:
Mandarin falling diphthongs
in Heritage Korean in China**

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Loanword adaptation

- There are two different views on the role of input language phonetics in loanword phonology:
 - (1) The phonological stance model
(Paradis & LaCharité 1997, LaCharité & Paradis 2005, Paradis & Tremblay 2009)
 - (2) The perceptual stance model
(Silverman 1992, Yip 1993, Kenstowicz 200, Y. Kang 2003, 2010a)
- The current paper examines the interaction between the phonological and phonetic factors in loanword adaptation.

Introduction

- This study investigates how Mandarin words containing falling diphthongs are adapted by bilingual borrowers in Heritage Korean in China (= **Chinese Korean**).
- **Table1. Diphthongs in MA and CK**

Mandarin	Four falling diphthongs /ai, au, ei, ou/
Chinese Korean	No falling diphthongs



Overview

- **Adaptation patterns of Mandarin (MA) falling diphthong into Chinese Korean (CK)**
 - **(1) Monophthongal adaptation:** Two segments of a diphthong coalesce into a monophthong to obey the restriction of the Korean phonological structure.
 - MA /zao³caⁿ¹/ 早餐 ‘breakfast’
 - CK /c*o.c^han/
 - **(2) Diphthongal adaptation:** MA falling diphthongs are realized as diphthongs, retaining the Mandarin phonological structure, not obeying the Korean phonological structure.
 - MA /tao³mei²/ 倒霉 ‘bad luck’
 - CK /t*o.mei/

Goals

1. To examine the role of the phonetics of the input language in diphthong adaptation.
2. To examine to what extent the input language phonetic effects are productively extended to novel adaptations.

Goals

1. **To examine the role of input language phonetics in adaptation.**

The longer the duration of the input syllable, the higher the rate of diphthongal adaptation.

(1) Tone effect (Xu 1997, Serno et al 2015, Wu & Kenstowicz 2015)

(2) Word position effect (Barnes 2006, Chen 2006)

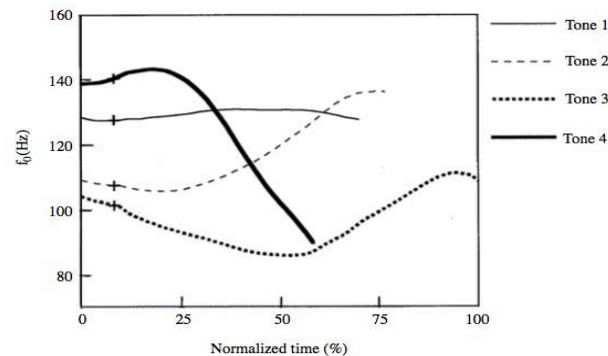
(3) Tone-position interaction effect (Xu 1994; Yip 2002; Wu & Kenstowicz 2015).)

Goals: (1) Tone effect

1. To examine the role of input language phonetics in adaptation

The longer the duration of the input syllable, the higher the rate of diphthongal adaptation.

(1) Tone effect (Xu 1997, Serno et al 2015, Wu & Kenstowicz 2015)



-Phonetics: Duration Tone 3 > Tone 2 ~ Tone 1 > Tone 4

-Prediction: The longer the tones, the higher the rate of diphthongal adaptation.

Goals: (2) Word Position effect

1. To examine the role of input language phonetics in adaptation

The longer the duration of the input syllable, the higher the rate of diphthongal adaptation.

(2) Word position effect (Barnes 2006, Chen 2006)

- **Phonetics:** Syllables are lengthened in word-final position.
- **Prediction:** Diphthongal adaptations are more likely to appear in non-initial position than in word-initial position.

Goals:

(3) Tone & Position interaction

1. To examine the role of input language phonetics in adaptation

The longer the duration of the input syllable, the higher the rate of diphthongal adaptation.

(3) Tone-position interaction effect

(Xu 1994; Yip 2002; Wu & Kenstowicz 2015)

- **Phonetics:** Tone 3 is shortened in non-final position.
- **Prediction:** Tone effect depends on the word-position.

Goals

2. To examine to what extent the input language phonetic effects are productively extended to novel adaptations.

- Do bilingual adapters accurately internalize the effects of **subtle phonetic details** in established loans and productively extend them to online adaptations (wug test)?
- Do bilingual speakers internalize the adaptation patterns through the lens of their **L2 phonological knowledge** such that the input phonetic effects are under-projected?

Experiment I

Tonal durations of Mandarin diphthongs

Experiment II

Established loans and online adaptations (wug-test)

Experiment I: Method

- **Purpose:** To confirm and determine whether there are significant durational differences among the four tones across Mandarin *diphthongs*.
- **Subject:** 8 monolingual Mandarin speakers residing in Dandong, China (4 females, 4 males, aged 23-62)
- **Stimuli:** 56 words (16 monosyllable words * 4 diphthongs)
- **Procedure:** The Mandarin stimuli were presented on a screen in Chinese characters in a random order.

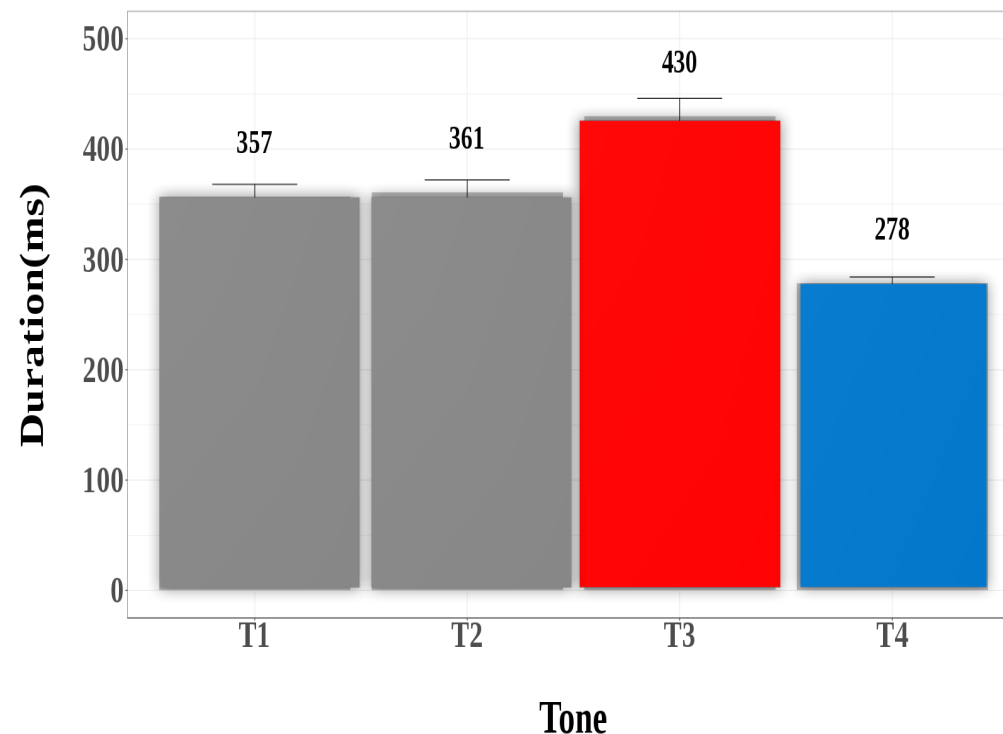
Experiment I: Analysis

- **Duration measurement:** A total of 244 tokens of the four diphthongs /ai, au, ei, ou/ were analyzed, using Praat (Boersma and Weenink, 2015).
- **Statistical analysis:** Linear mixed effects models (*lme4* package, Bates et al. 2011) with post-hoc tests using *phia* package (Helios et al. 2015) were conducted in the R statistical environment (R Development Core Team, 2015) .

Results

Experiment I: Results

Figure 1. Average mean duration of Mandarin diphthongs by tone



There are significant durational differences on MA diphthongs.
The Post-hoc comparisons: **T3 > T1=T2 > T4**

Experiment 2: Method

- **Purpose:** To investigate how bilingual speakers produce MA loanwords in two different tasks (**established loanwords vs. online adaptations**) and how input phonetic factors affect adaptation.
- **Participants:** Seven bilingual speakers of Korean and Mandarin who reside in Dandong, China (three males, four females, age range: 26-69 years old).

Experiment 2: Method

- **Stimuli:**

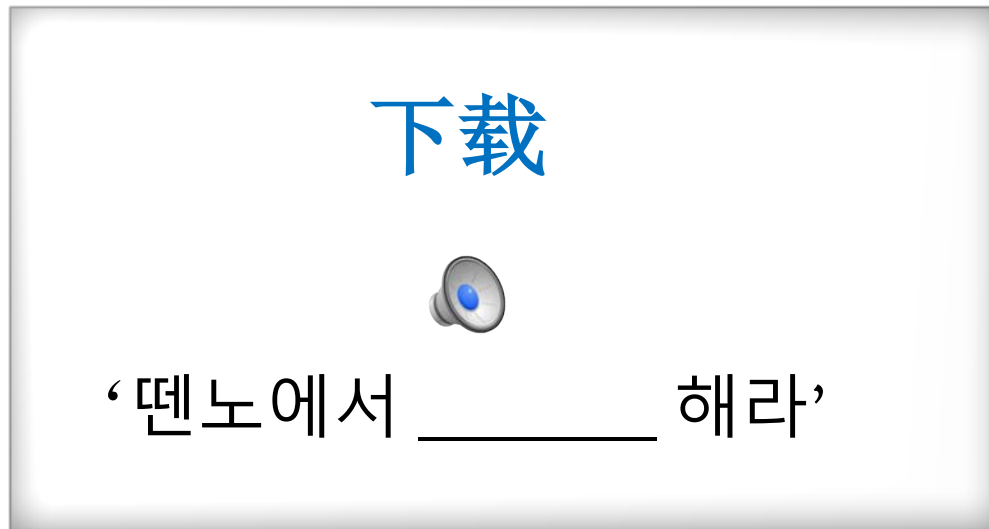
(1) **Established loanwords:** 128 Mandarin words, mostly disyllabic, which are commonly used as loan forms in Chinese Korean.

The words contain **48 instances** of target diphthongs /ai, au, ei, ou/.

(2) **Online adaptation:** **92** disyllabic Mandarin words, which are **not** used as loan forms in Chinese Korean.

Experiment 2

- **Procedure:**



Participants were asked to produce the appropriate corresponding Korean forms embedded in the carrier sentence twice.

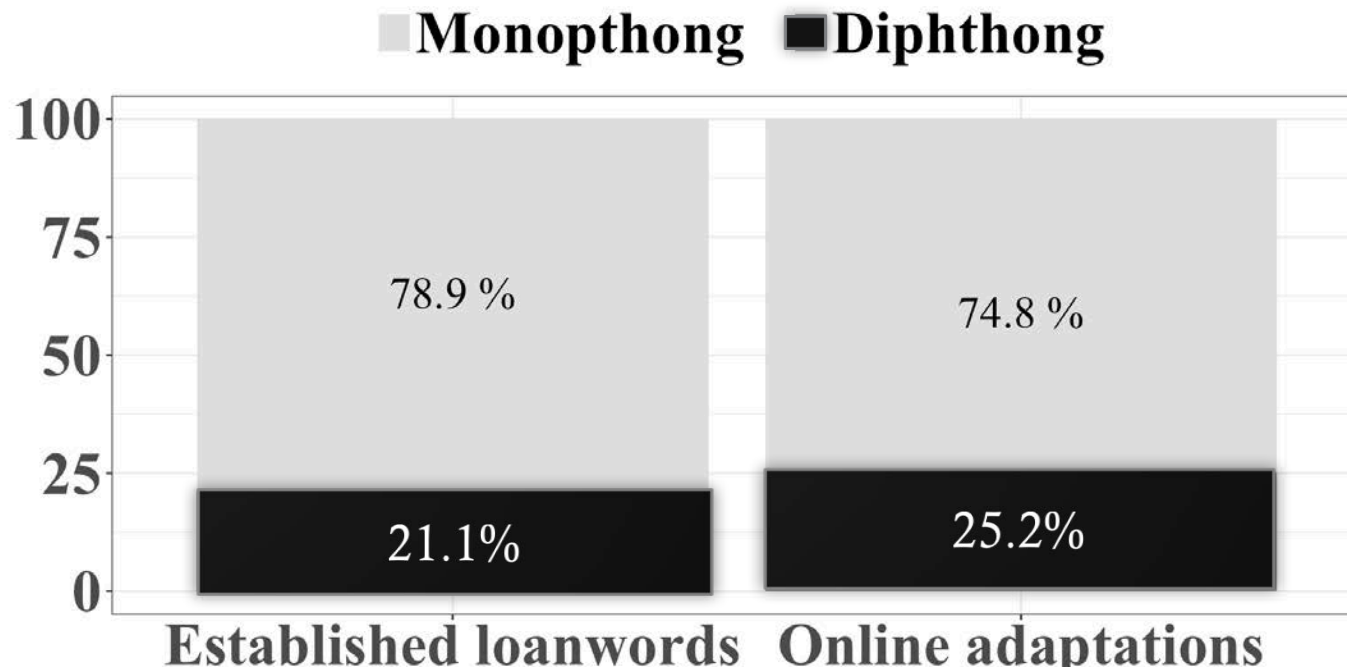
Experiment 2: Analysis

- **Transcription:** Manual transcriptions of the recordings were conducted by the first author, a native speaker of Korean and were verified by a native Korean speaker who has knowledge of Mandarin (over 90% inter-transcriber agreements).
- **Statistical Analysis:** A logistic mixed-effects model.
 - **Fixed effects predictors:**
 - (1) Tone (T1~T4)
 - (2) Word position (initial vs. final)
 - (3) Task (established loanwords vs. wug-test)
 - (4) Interactions of tone, word position and task
 - (5) Diphthong type
 - **Random effects:** Speaker (intercept and slope), word

Results

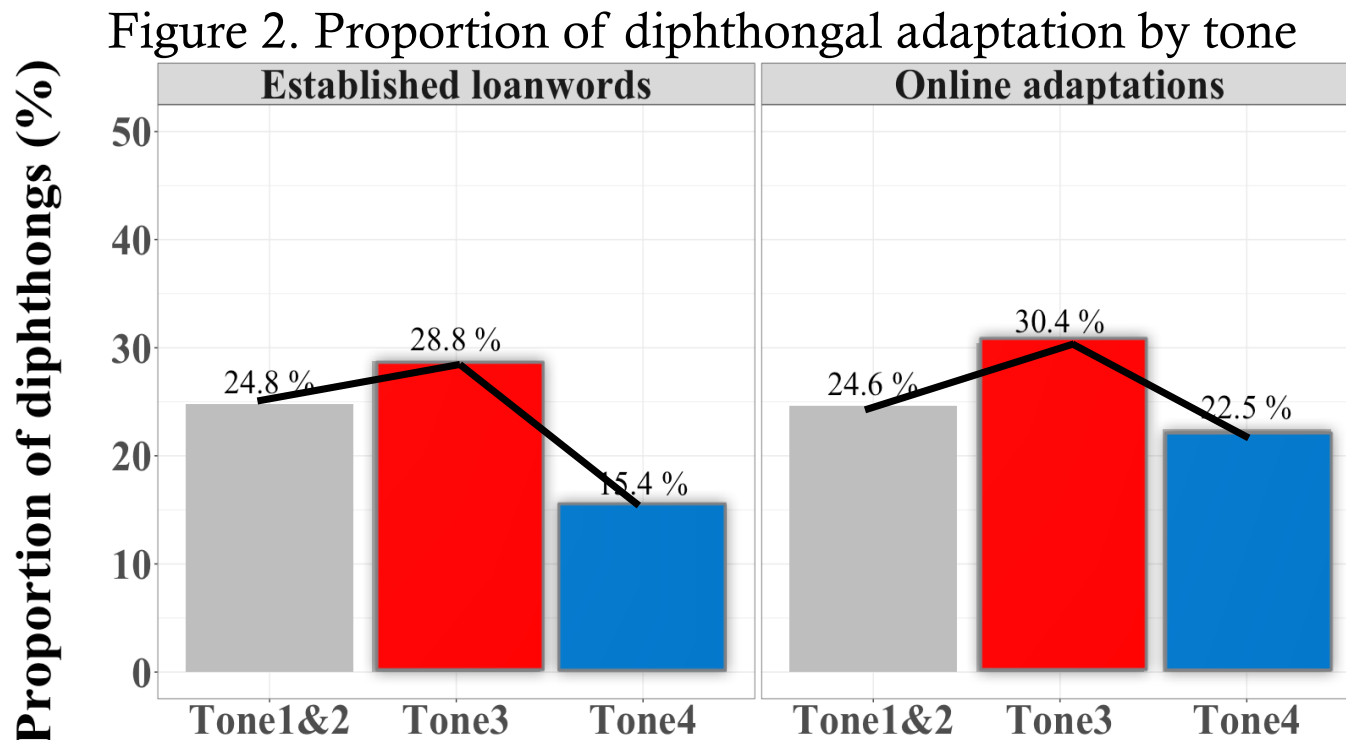
Overview

Two adaptation patterns emerge: **monophthong > diphthong**



There is **no** significant difference in adaptation patterns between established loanwords and online adaptations, indicating that their adaptation patterns are similar in both tasks.

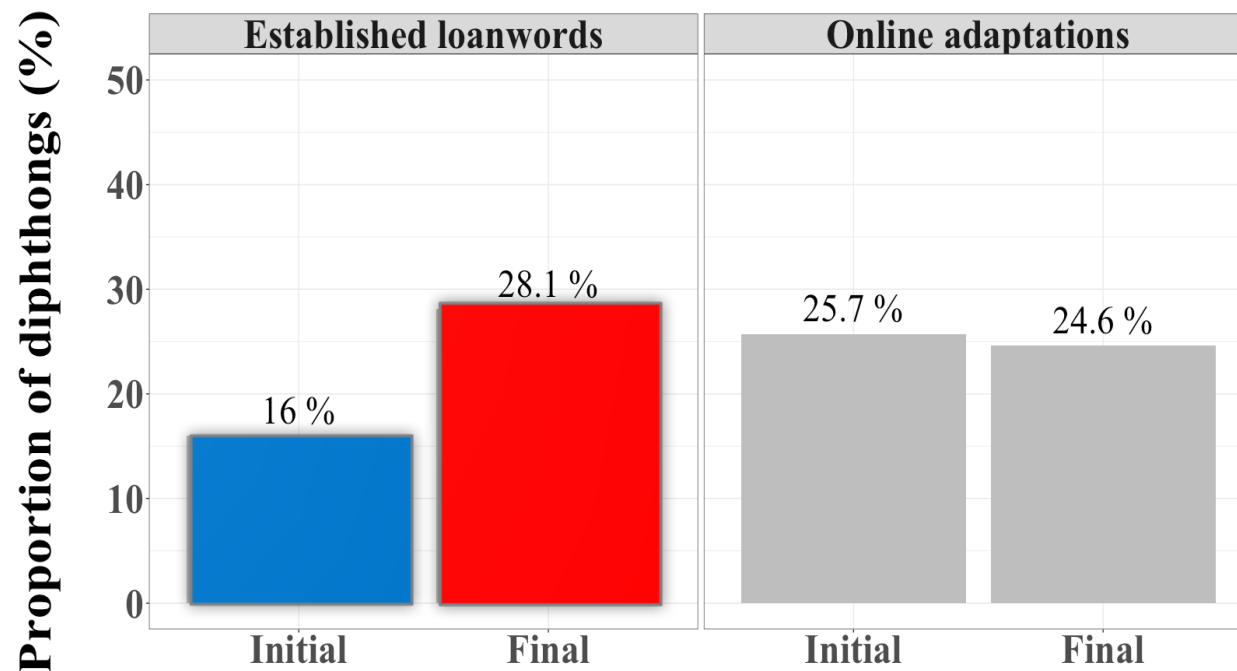
(1) Tone



- There is a significant main effect of *tone* in loanword adaptation, showing that MA diphthongs with Tone 3, the longest tone, are more likely to be adapted into diphthongs than those with Tone 4, the shortest tone in CK.
- No interaction of tone * task.

(2) Word position

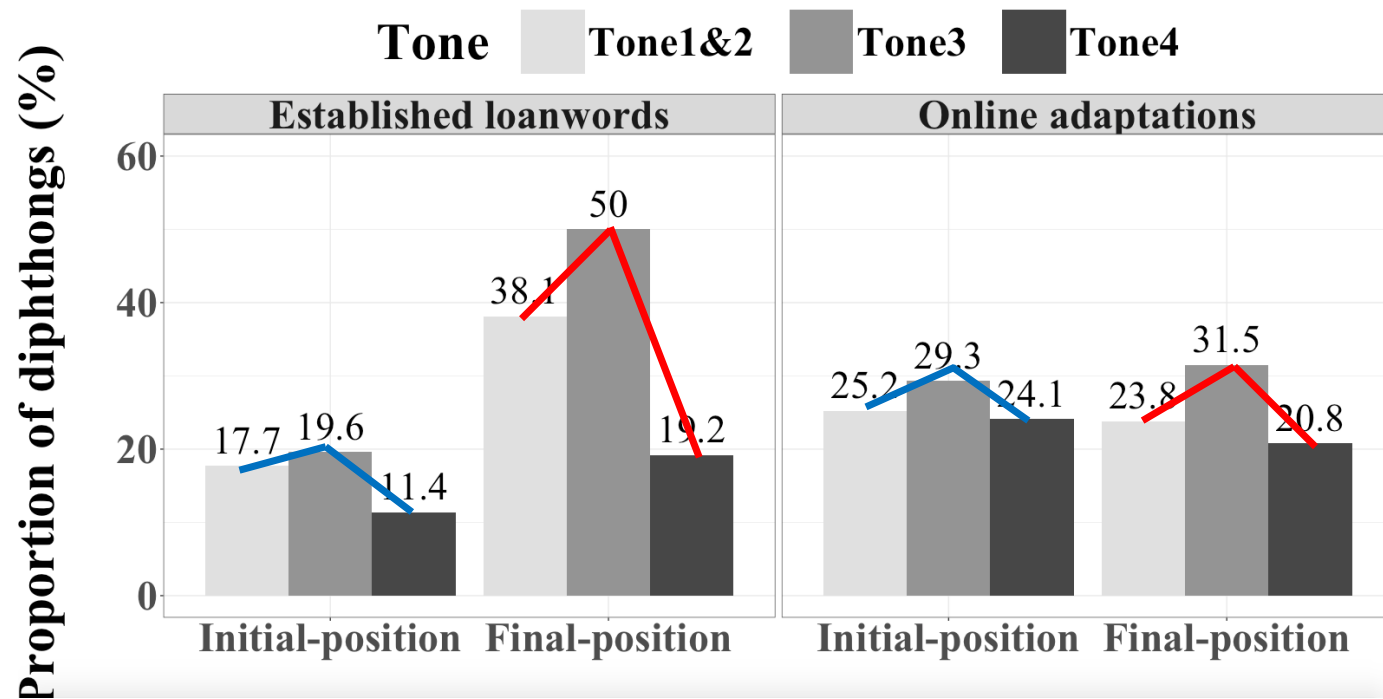
Figure 3. Proportion of diphthongal adaptation by word position



- There is a main effect of *word position* in adaptation.
- But, a significant interaction of position * task
 - Position effect is marginally significant only in established loans
 - Under-learning of position effect in online adaptation.

(3) Tone * position

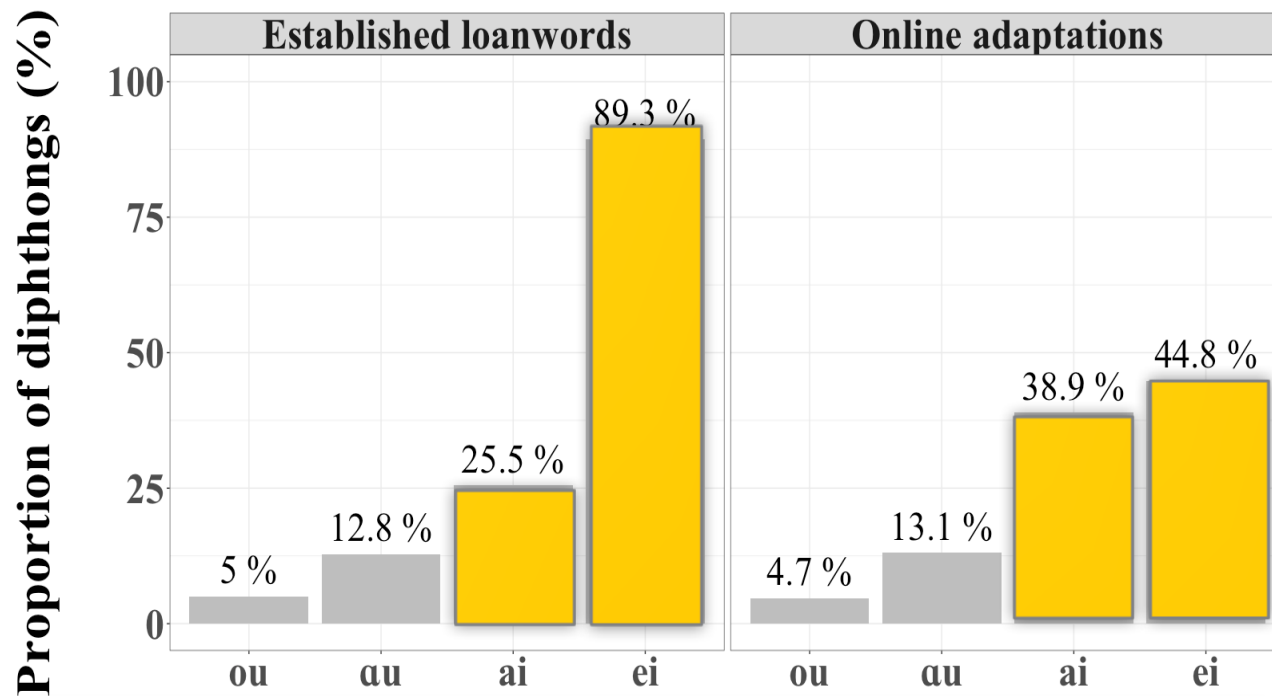
Figure 4. Proportion of diphthongal adaptation: tone & word position



- There is **no** significant interaction of *tone* and *word position*, indicating that tone effects in loanword adaptation do not differ significantly depending on word position.
- **Over-learning**

(4) Diphthong type

Figure 5. Adaptation patterns of MA diphthongs in CK by diphthong type



- MA /ei/ is adapted as a diphthong most often in about 90% of the cases in the established loanwords, followed by /ai/, /au/ and /ou/.
- The rate of diphthong/monophthong choice differs by diphthong type.

Conclusions

- When MA diphthongs are borrowed into CK, two major adaptation strategies emerge: **monophthongal adaptation** and **diphthongal importation**.
- **Experiment 1:** Durational differences among the four tones of Mandarin diphthongs
- **Experiment 2:**
 - Main effects of *tone, word-position, diphthong types* in adaptation from MA into CK.
 - Adaptation shows sensitivity to the phonetic duration of input syllables, providing support for the perceptual model of adaptation.
 - However, **not** all phonetic details of the input language are accurately reflected in adaptation, especially in online adaptation.
 - **Adaptation is perceptual but mediated by L2 phonological knowledge.**

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Diphthong type
