Utterance-final high vowel diphthongization in Chongqing Mandarin

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Phonology of Chongqing Mandarin

Chongqing Mandarin (a dialect of Mandarin spoken in Southwestern China)

Syllable template: (C)(G)V(X)

C: consonant onset

G: glide [i̯], [u̯], [y̯]

V: vowel nucleus

X: ending sound; nasal or [i, u]

Falling sonority in VX

(G)V(X) in Chongqing Mandarin

V	GV	VX	GVX
i ɻ̩		in	
u ʊ			
y		yn	
e	i̯e u̯e y̯e	ei ən	u̯ei u̯ən
o	i̯o u̯o	əʊ oŋ	i̯əʊ i̯oŋ
a	i̯a u̯a	ai au an ɑŋ	u̯ai i̯au i̯ɛn y̯ɛn u̯an i̯aŋ u̯aŋ

Phonology of Chongqing Mandarin

- Non-moraic:

    (C)

    (G): glide [i̯], [u̯], [y̯]

- Moraic:

    V: vowel nucleus – all short

    (X): ending sound; nasal or [i, u]

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i ɿ		in	
u ʊ			
y		yn	
e	i̯e u̯e y̯e	ei ən	u̯ei u̯ən
o	i̯o u̯o	əu oŋ	i̯əu i̯oŋ
a	i̯a u̯a	ai au an ɑŋ	u̯ai i̯au i̯ɛn y̯ɛn u̯an i̯ɑŋ u̯ɑŋ

Vowel inventory

- Six vowel phonemes: /i/, /y/, /u/, /e/, /o/, /a/
- a minimal 'sextuple':

  li^{31} 'pear'   ly^{31} 'donkey'   lu^{31} 'six'   le^{31} 'rib'   lo^{31} 'to fall'   la^{31} 'spicy'

- High vowels:

  /i/:   [i]

  [ɹ̩] after /ts/, /tsʰ/, /s/, /z/

  /y/:   [y]

  /u/:   [u]

  [ʊ]~[ʋ̩] after /f/, /v/

On the apical vowel ɻ̩

[tsɻ̩³⁵.tɕin³³]   'funds'   [tʰəu̯³³.tsɻ̩e̯³⁵]   'to invest'

- A vowel, syllabic, despite its transcription
- [sɻ̩] sounds like [sz̩] but less friction
- Allophone of /i/ after /ts/, /tsʰ/, /s/, /z/
- Orthography: [ɻ̩]<i>, identical to [i]<i>   [sɻ̩.miɪ] <simi> 'Smith'
- Phonologically high

Today's topic

(1)

Utterance-medial

[pi³³.xo³¹]	'pen case'	
[ly³⁴.zən³¹]	'female'	
[ts̩͡ɻ³⁵.t͡ɕin³³]	'funds'	
[fʊ²².muo̧⁴²]	'parents'	
[su³⁵.t͡sə̧u³³]	'Suzhou (city)'	

Utterance-final **diphthongized**

[mau³³.piɪ³¹]	'writing brush'
[mei³⁴.lyɪ⁴²]	'beauty'
[tʰə̧u³³.t͡s̩ɻȩ³⁵]	'to invest'
[i̯aŋ³⁴.fʊo̧²¹]	'foster father'
[t͡ɕi̯aŋ³⁵.suo̧³³]	'Jiangsu (province)'

Utterances are sentences

(2)

fʊ.mu   tʰə̣u.ts̩ɹ̩ḙ.

  *muu̞

Parents   invest
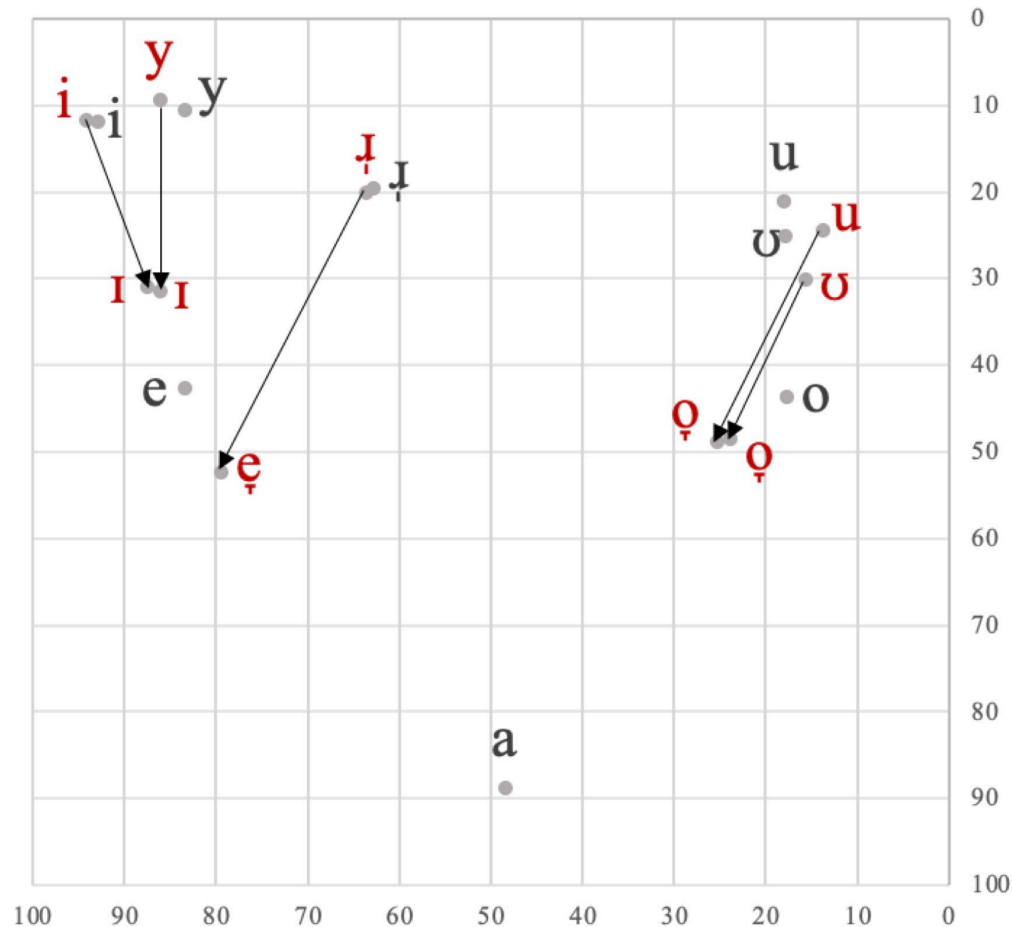
Parents invest.

Where diphthongization does not apply

(3)
- Non-high monophthongs

  [pe³¹] 'white'; [kʰo²¹³] 'class'; [pa³¹] 'eight'

- a vowel in a closed syllable

  [ɕin³⁵] 'heart'

- the second part of an underlying diphthong

  [pai²¹³] 'failure'

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o	i̯o u̯o	ɤu oŋ	i̯ɤu i̯oŋ
a	i̯a u̯a	ai au an ɑŋ	u̯ai i̯au i̯ɛn y̯ɛn u̯an i̯ɑŋ u̯ɑŋ

Acoustics

- high vowels: [i, y, ɨ, ʊ, u] as monophthongs
- second part of the diphthongized vowel

    lower than the high vowels acoustically

    → phonologically [-high]

    centralized towards [ə]

    → least sonorous in the V inventory

red: 5 diphthongized vowels

black: monophthongs (5 non-final high vowels & 3 non-high vowels)

Summary

i → iɪ

y → yɪ

ɹ → ɹẹ

ʊ → ʊọ

u → uọ

/ (C)___]_{utterance}
         ↑
      nucleus

Analysis
1. boundary floating moras make them bimoraic

- Fission, rather than epenthesis
- a floating mora at the right edge of every utterance, which needs association

- Utterance-medial $\quad$ μ …μ#
$$\text{pi}_1 \,\ldots$$

- Utterance-final $\qquad$ μ μ#
$$\text{pi}_1\text{ɪ}_1$$

Analysis

High vowels fission

*F$_{\text{LOAT}}$: assign one violation to unassociated moras

I$_{\text{NTEGRITY}}$: assign one violation to fission

μ μ# pi$_1$	*F$_{\text{LOAT}}$	I$_{\text{NTEGRITY}}$
μ μ# pi$_1$	*!	
μ μ# ☞pi$_1$I$_1$		*

Analysis

2. OCP motivates quality change

- Chongqing Mandarin does not allow [+high][+high]

- bans other [+high][+high]:

  [li̯əu i̯o] *[li̯u i̯o] 'New York'

  *i̯u *u̯i *y̯u *y̯i *ui *iu

- bans identical high vowels

  *ii *yy *ɻ̩ɻ̩ *ʊʊ, *uu

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Analysis

2. OCP motivates quality change

μ μ# pi_1	*[+hi][+hi]	IDENT(high)	*FLOAT	INTEGRITY
μ μ# pi_1 i_1	*!			*
μ μ# ☞$pi_1$$I_1$		*		*

Analysis

3. deriving quality of boundary moras

i → iɪ

y → yɪ

ɯ → ɯə

ʊ → ʊo̞

u → uo̞

- Minimally different: [+high] → [-high]

- Evidence for fission, rather than epenthesis

μ μ#	Ident(low)	Ident(high)
pi$_1$		
μ μ# pi$_1$ a$_1$	*!	*
μ μ# ☞pi$_1$ɪ$_1$		*

VX must fall in sonority

- Why [iɪ]#, not *[ɪi]# ?
- Reduce the second part, not the first

- prominence alignment (Crosswhite 2004)

Scale 1: Syllabic prominence

    peak > margin

Scale 2: Segmental prominence (sonority)

    a > e, o > i, u, y, ɹ, ʊ > ɪ, o̞, e̞ > r > n, m, ŋ > etc.

        [ə] as the least sonorous vowel

        [ɪ, o̞, e] are all centralized

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o	i̯o u̯o	ou oŋ	i̯ou i̯oŋ
a	i̯a u̯a	ai au an ɑŋ	u̯ai i̯au i̯ɛn y̯ɛn u̯an i̯ɑŋ u̯ɑŋ

VX must fall in sonority (cont.)

- Why [iɪ]#, not *[ɪi]# ?
- Reduce the second part, not the first

Falling sonority in VX, modelled by a set of 'prominence alignment (PA)' constraints:

PA (informally): assign one violation when VX rises in sonority

μ μ# pi$_1$	PA	*F$_{LOAT}$	I$_{NTEGRITY}$
μ μ# pɪ$_1$ i$_1$	*!		*
☞ μ μ# pi$_1$ɪ$_1$			*

Non-high vowels do not fission

- High vowels undergo diphthongization utterance-finally
- non-high vowels do not

μ μ# pa$_1$	INT(–hi)	*FLOAT	INT(+hi)
μ μ# ☞pa$_1$		*	
μ μ# pa$_1$V$_1$	*!		

No superheavy syllables

- Syllables that are underlyingly bimoraic like [pai] and [ɕin] cannot host floating moras

$\mu\mu$ μ# $\varsigma i_1 n_2$	*superheavy	*FLOAT	INTEGRITY
$\mu\mu$ μ# ☞$\varsigma i_1 n_2$		*	
$\mu\mu$ μ# $\varsigma i_1 n_2 X_2$	*!		*

No superheavy syllables (cont.)

- Syllables that are underlyingly bimoraic like [pai] and [ɕin] cannot host floating moras

μμ μ# pa_1i_2	*superheavy	*FLOAT	INTEGRITY
μμ μ# ☞pa_1i_2		*	
μμ μ# pa_1i_2 V_2	*!		*

Conclusion: /pi/# → [piɪ]#

- Boundary floating moras are associated

    *pi #

- OCP constraint bans [+high][+high] sequences

    *pii #

- Only minimal difference is tolerable

    *pie #   *pię̦ #   *pin #

- Prominence alignment leaves the lowered part at the less prominent position

    *pɪi #

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Thank you!