Dialectal variation in Korean verbal vowel harmony and the emergent locality effect

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Overview

1. Introduction
2. Background on Korean vowel harmony
3. The corpus
4. Morphological analyzer for Korean vowel harmony
5. Results
6. Discussion

1. Introduction

Korean vowel harmony

- **Korean exhibits two types of vowel harmony**
  (Kim-Renaud 1976, Park 1990, Sohn 1999)

(1) Verbal suffix harmony
(2) Sound-symbolic vowel harmony

- **Vowel harmony has gradually weakened in Korean due to several linguistic changes.**
  (S.-N. Lee 1947, W. Kim 1967, K.-M. Lee 1972)

Dialect variation

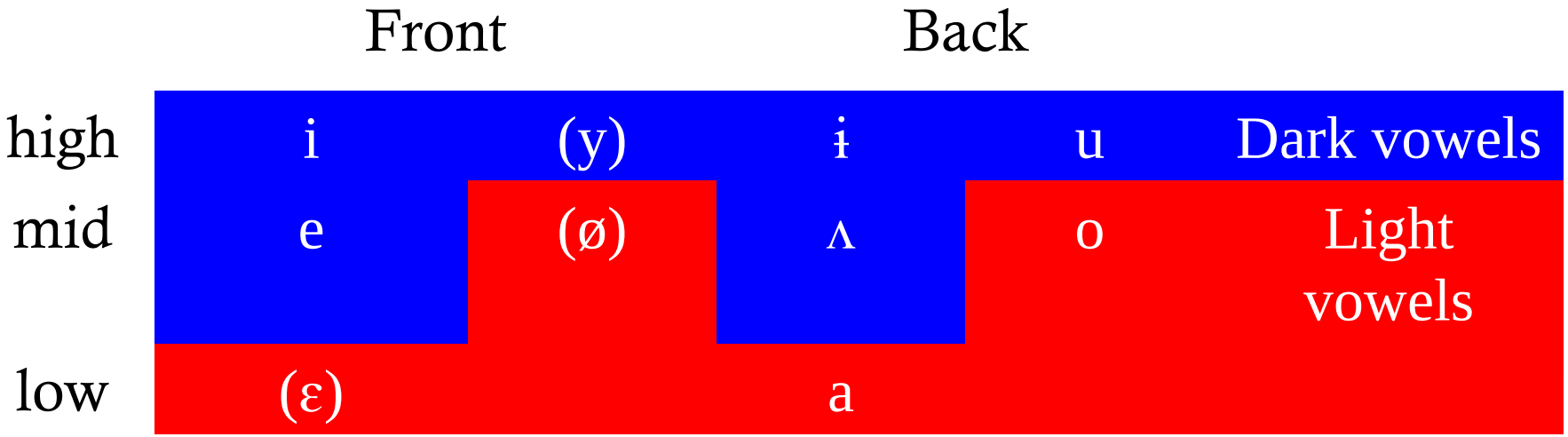
- A study of **variation** in vowel harmony across **dialects**, where a range of degrees of attrition is represented.
- Korean dialect speech corpus (NAKL 2004-2010).

Verbal suffix harmony

- **A series of verbal inflectional suffixes that begin with [a] or [ʌ] depending on the stem vowel quality.**

Light [a]				Dark [ʌ]			
Root	**Suffix**	**Derivation**	**Gloss**	**Root**	**Suffix**	**Derivation**	**Gloss**
cak-	-a	caka	‘small’	**kil-**	**-ʌ**	kilʌ	‘long’
sok-	-a	soka	‘be fooled’	**cuk-**	**-ʌ**	cukʌ	‘to die’
				se-	**-ʌ**	seʌ	‘to count’
				mʌk-	**-ʌ**	mʌkʌ	‘to eat’

Light vs. Dark



- **Last stem vowel determines the suffix vowel**
  - Light → Light allomorph [a] (ex: c**a**k**a** **'small')**
  - Dark → Dark allomorph [ʌ] (ex: k**i**l**ʌ** **'long')**

Attrition of vowel harmony

- Light vowel stems optionally take the dark allomorph [ʌ]. (Hong 2008, HS Kang 1996, HJ Kang 2012)

mɑk-ɑ	**~**	**mɑk-ʌ**	**‘to block’**
sɛrow-ɑ	**~**	**sɛrow-ʌ**	**‘new’**

Locality effect

- Harmony is more likely to be retained/obeyed when the trigger and the target vowels are strictly (surface) adjacent.

- Attrition shows sensitivity to intervening consonants.
  (Kim-Renaud 1975, HS Kang 1996, Oh 2007, HJ Kang 2012)

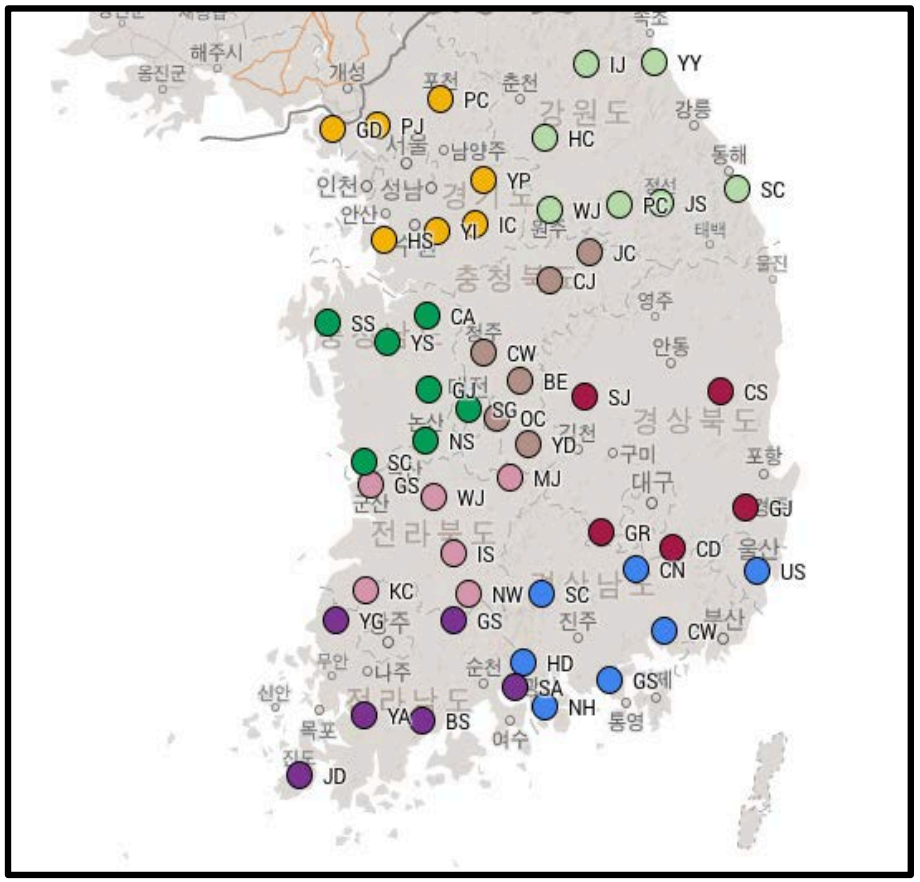
2. The corpus

The corpus

- **The Korean Dialect Speech Corpus**
  (The National Institute of the Korean Language 2004-2010)
- Sociolinguistic interviews and elicited lexical and sentential productions.
- Over 60 towns in Korea and abroad.
- Conjugations of around 350 verbs/ adjectives.
- **Extracted over 18,000 verb forms that exhibit vowel harmony.**

Geographical distribution of the harmony patterns

- Extracted 51 towns from 8 provinces in South Korea

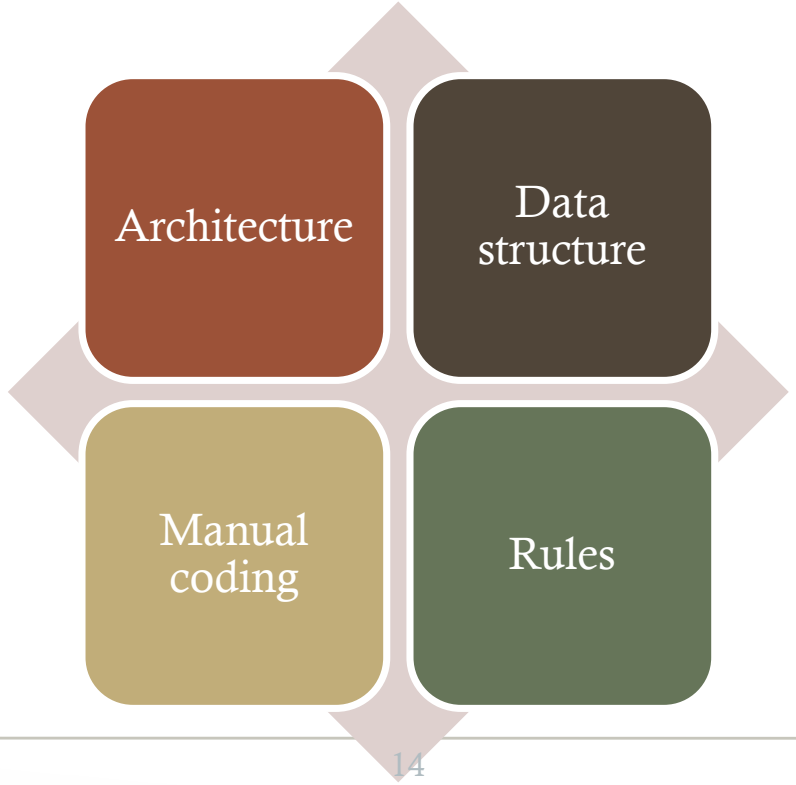


3. Morphological analyzer for Korean vowel harmony

Methods

1) UR analysis

2) KVH (Korean Vowel Harmony) morphological analyzer



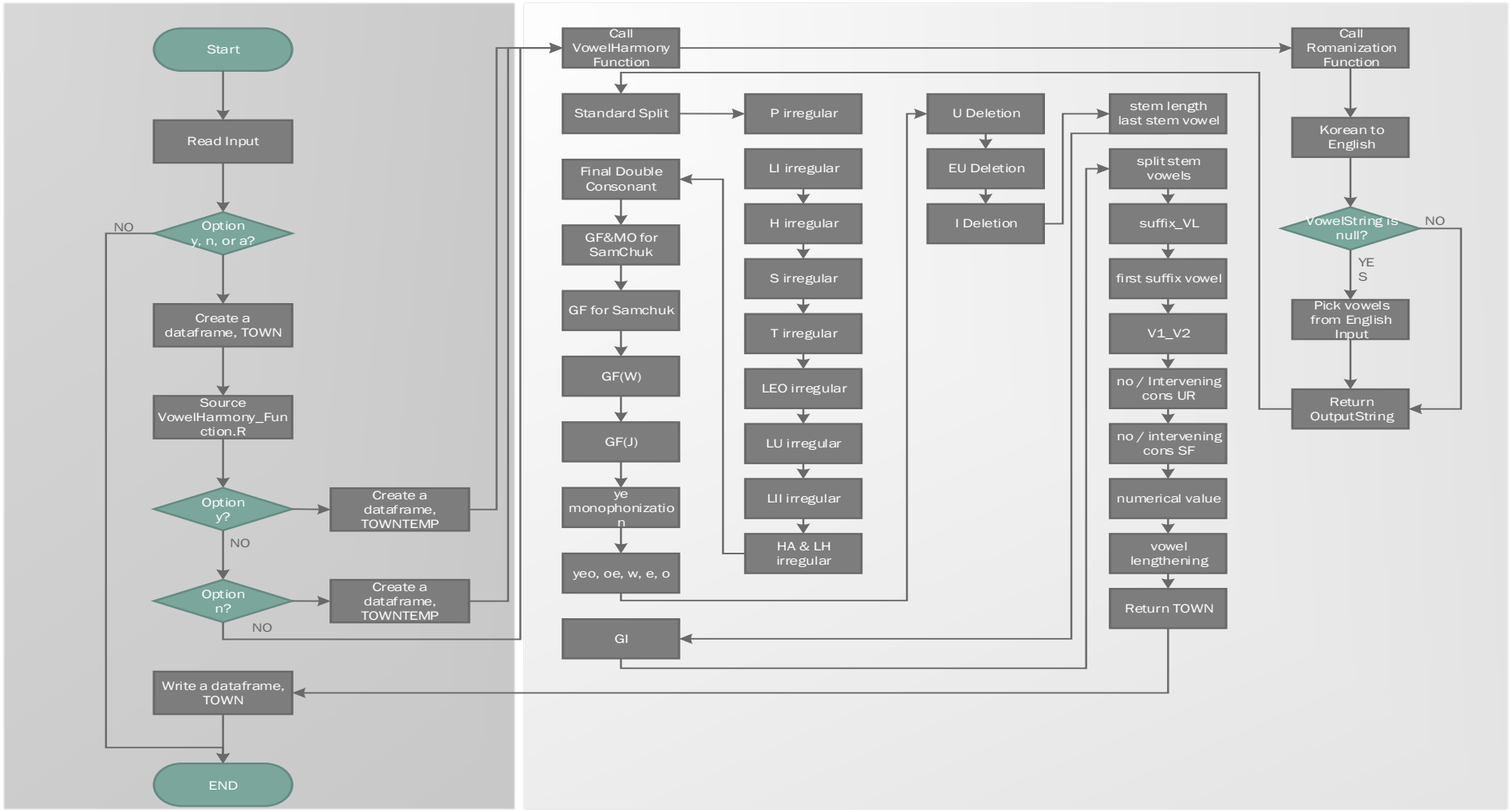
UR of stem

- Based on the full paradigm of a given verb produced by the speakers, **the correct underlying stem of each verb form is manually coded**.
- The inflected form of the verb (with harmonizing suffix) and the manually coded stem form the input to the KVH analyzer.

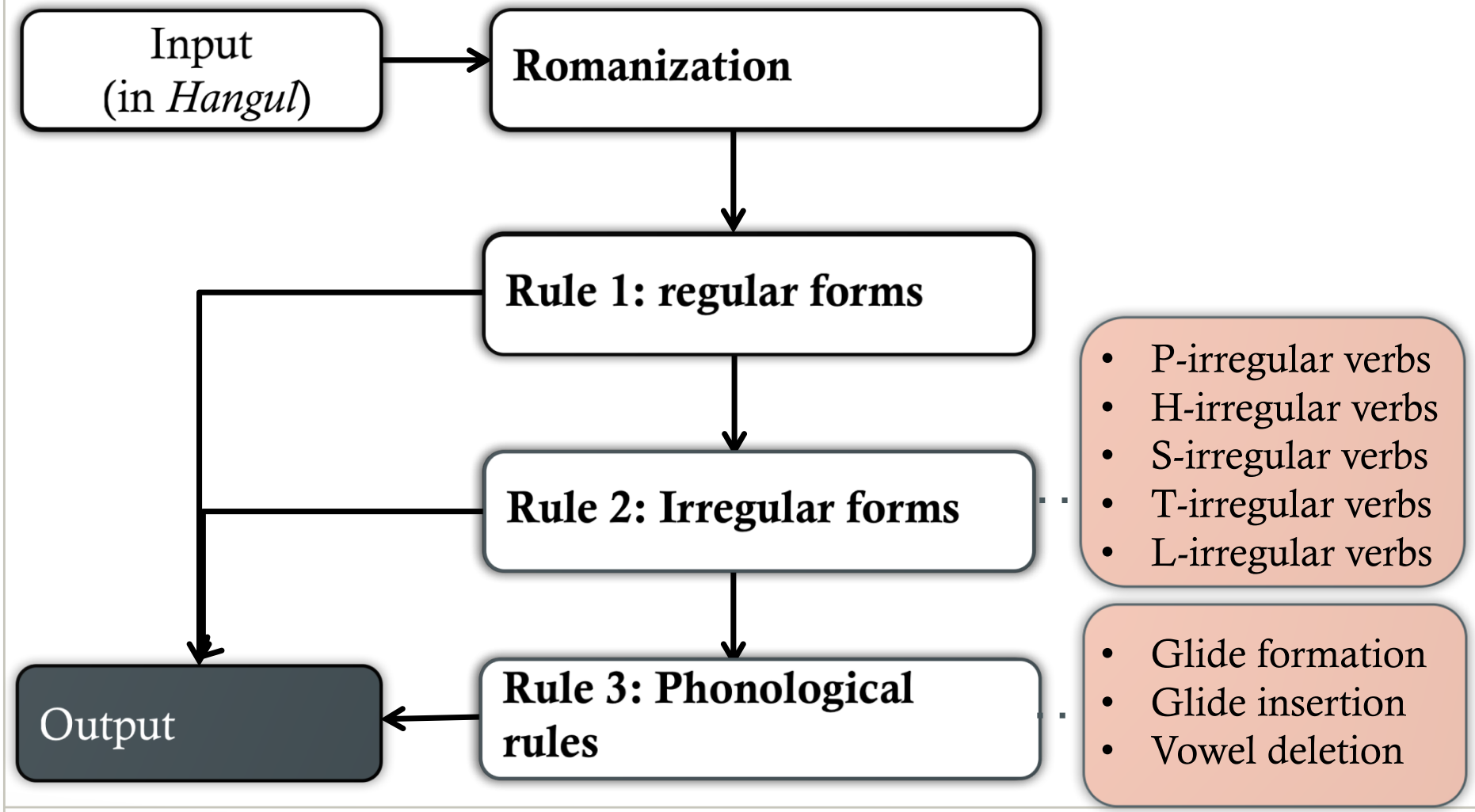
KVH morphological analyzer

- The **KVH** (**K**orean **V**owel **H**armony) morphological analyzer was designed to decompose verbs into **stems** and **suffixes**.
- It is built on **a rule-based system**.
- It was developed using the **R** programming language.
  (R Development Core Team (2012).
- Over **18,000 verbs** ending in either [a] or [ʌ] from the Korean dialect speech corpus are analyzed by the KVH morphological parser.

Architecture of KVH analyzer



The process of the KVH morphological analyzer



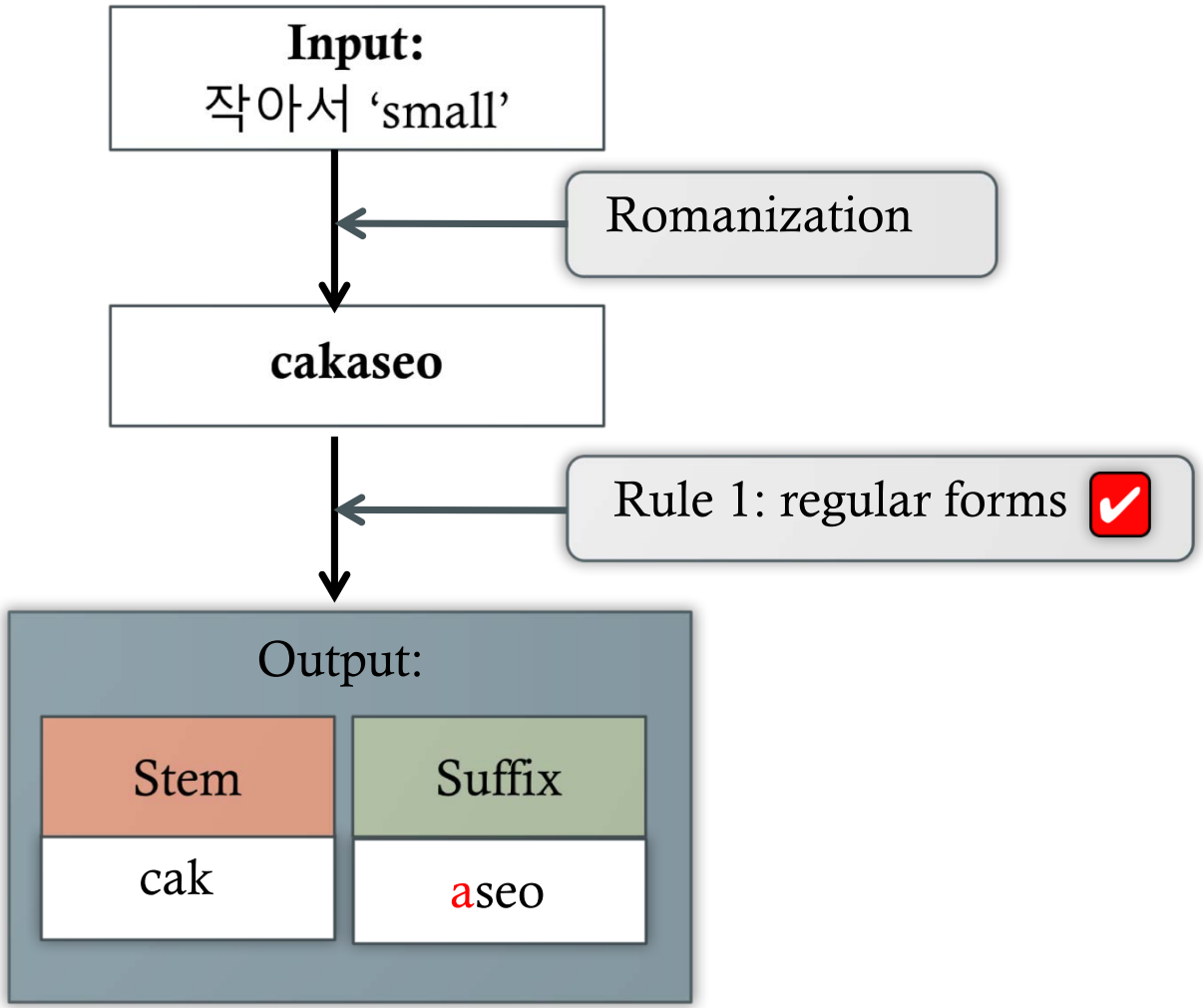
Data Structure

C1	C2	C3	C4	C5	C6	C7	C8
Item.id	**item**	**standard**	**Input_data**	**Underlying _stem**	**Romanization**	**stem_en**	**suffix_en**
		놓- 앓 까다롭-	놔두 아라두 까다로워서	놓 앓 까다롭	awadu aladu kkadalowoseo	aoh alh kkadolop	aue adu eoseo

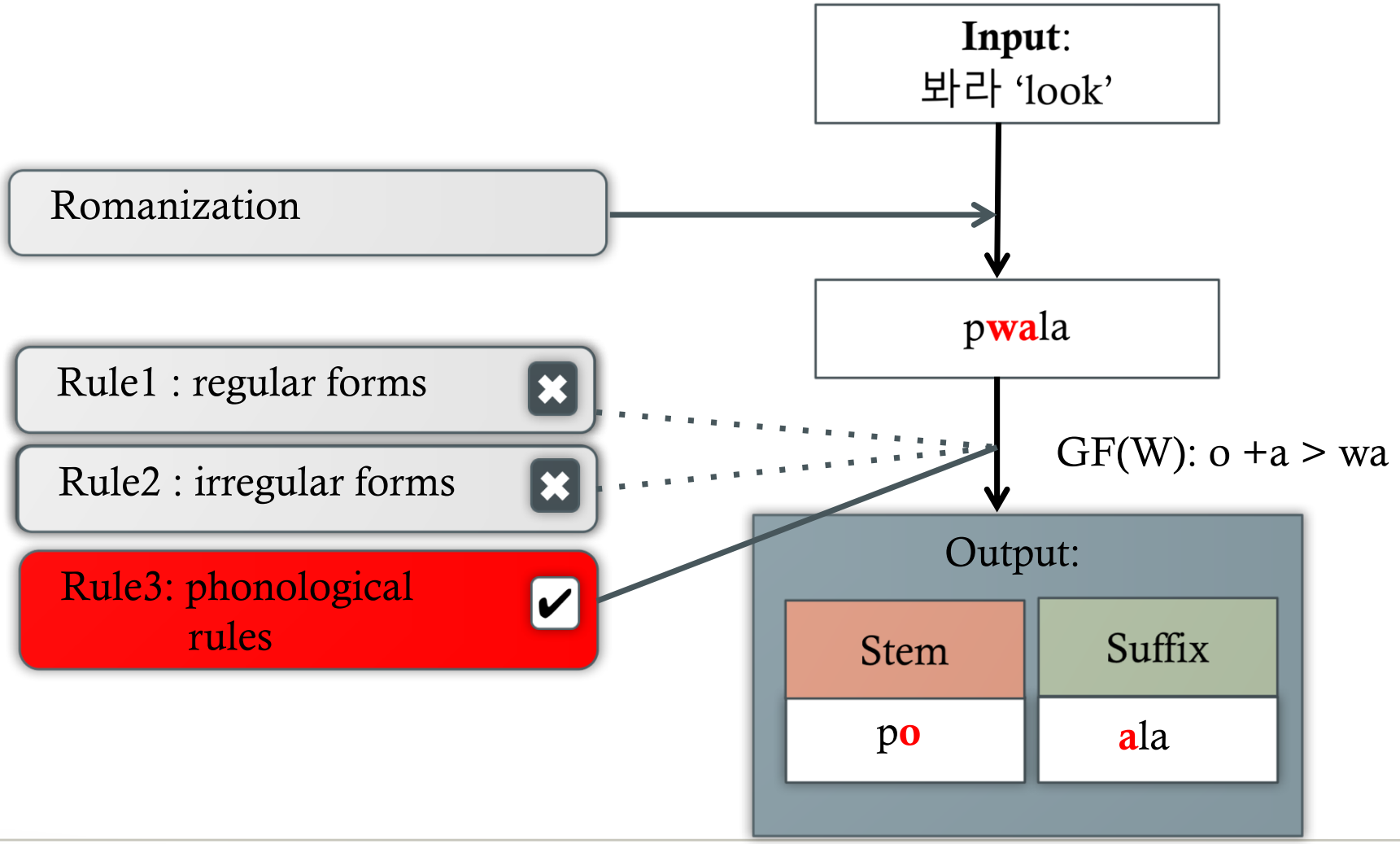
C9	C10	c11	C12	C13	C14	C15	C16
irregular	**phonological_ process**	**stem_vowel**	**stem_length**	**last_stem_ vowel**	**first_suffix_vowel**	**V1_V2**	**harmony**
H	GF(W)	o	1	0	a	Light-Light(LL)	Harmony
		a	1	a	a	Light-Light(LL)	Harmony
P		a a o	3	0	eo	Light-Dark(LD)	Disharmony

C17	C18	C19	C20	C21	C22	C23	C24
intervening _cons_ UR	**intervening _cons _SF**	**no_Intervening _cons_UR**	**no_intervening -cons_SF**	**vowel _lenghening**	**variation**	**town**	**Province**
h		1	0	N		SGG_YI	SGG
Lh	l	2	1	N	variation	SGG_YI	SGG
p	w	1	0	N		SGG_HS	SGG

Rule1 (regular forms)

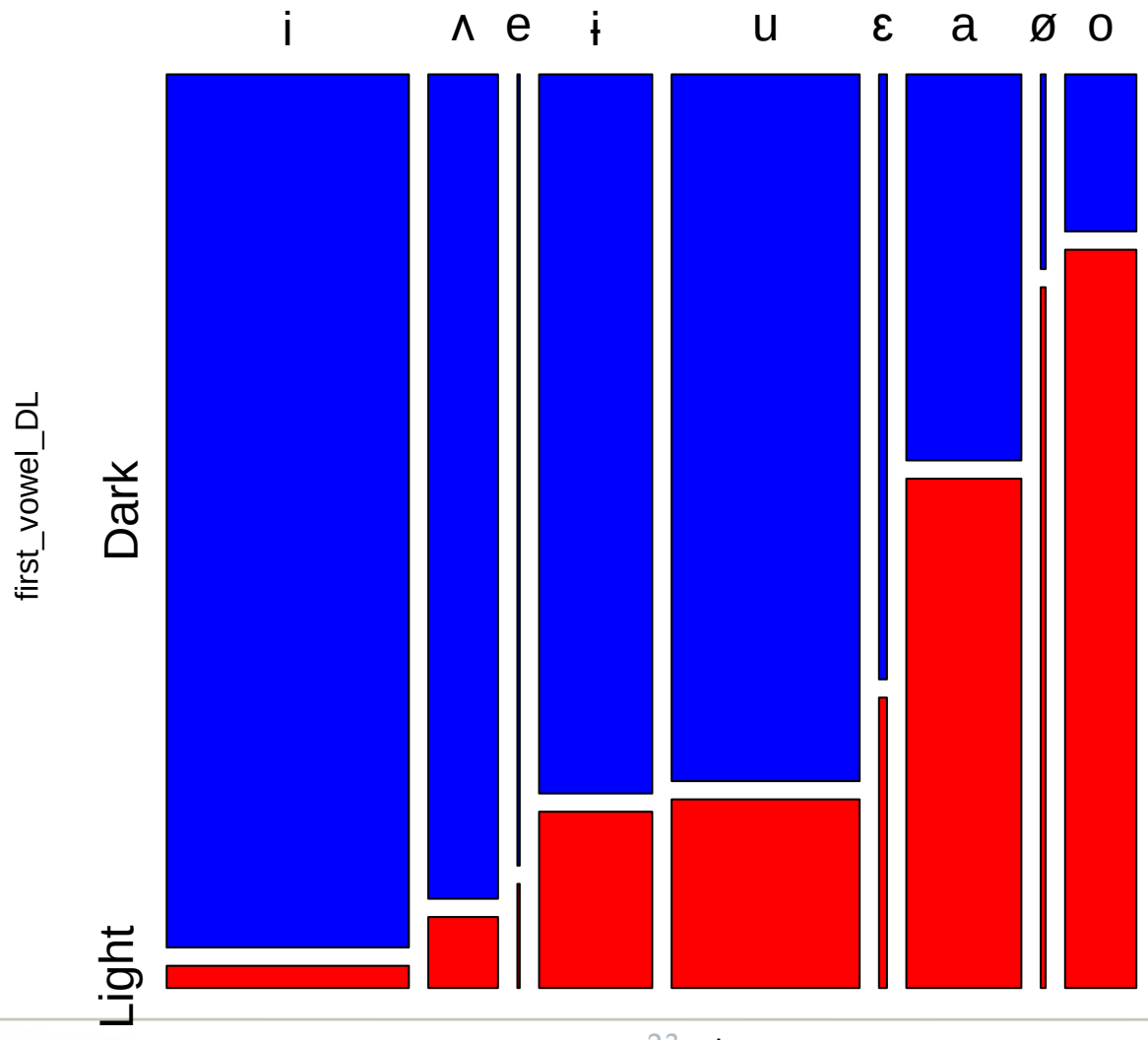


Rule3 (Glide formation)



5. Results

Suffix harmony by last stem vowel



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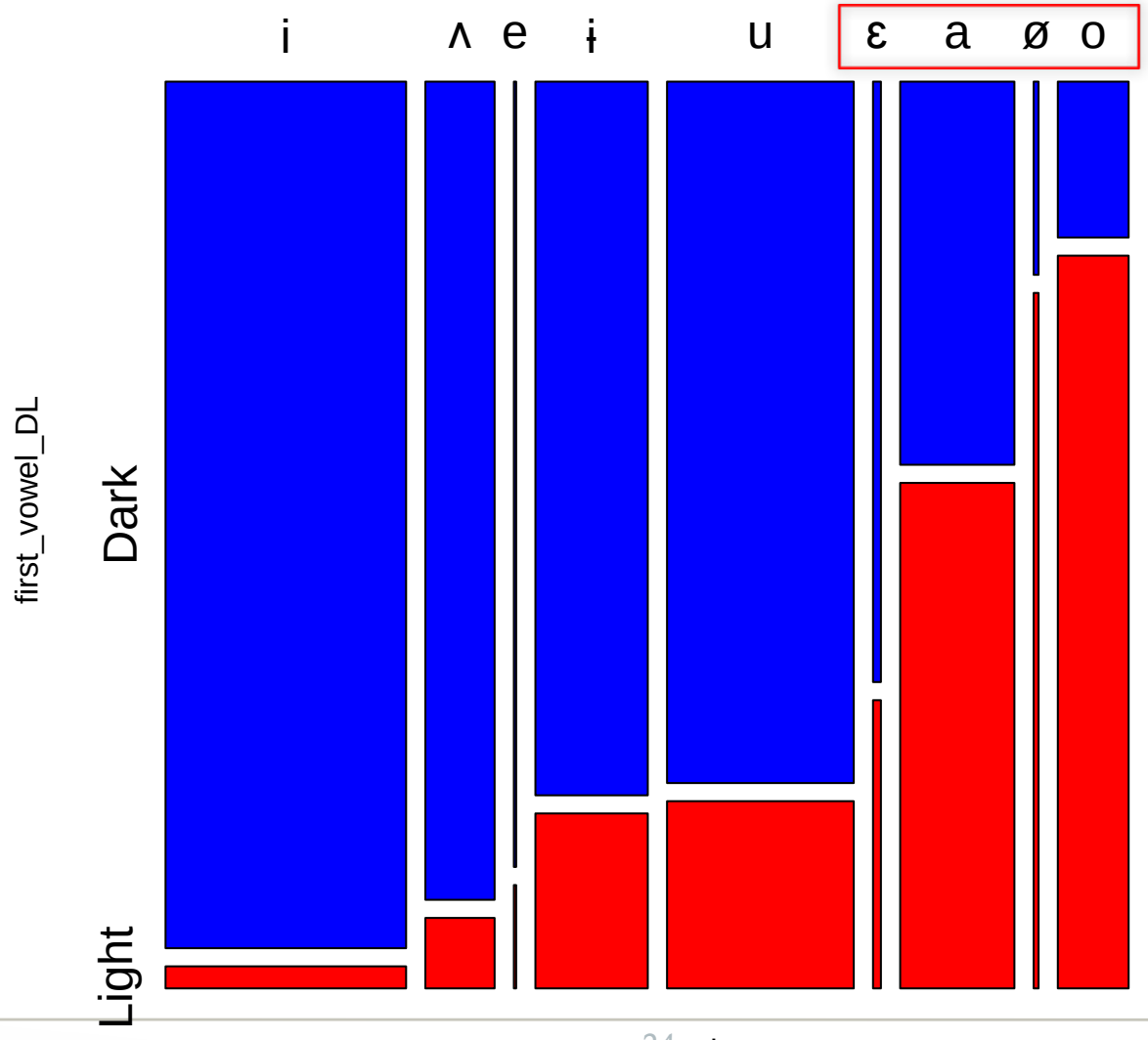

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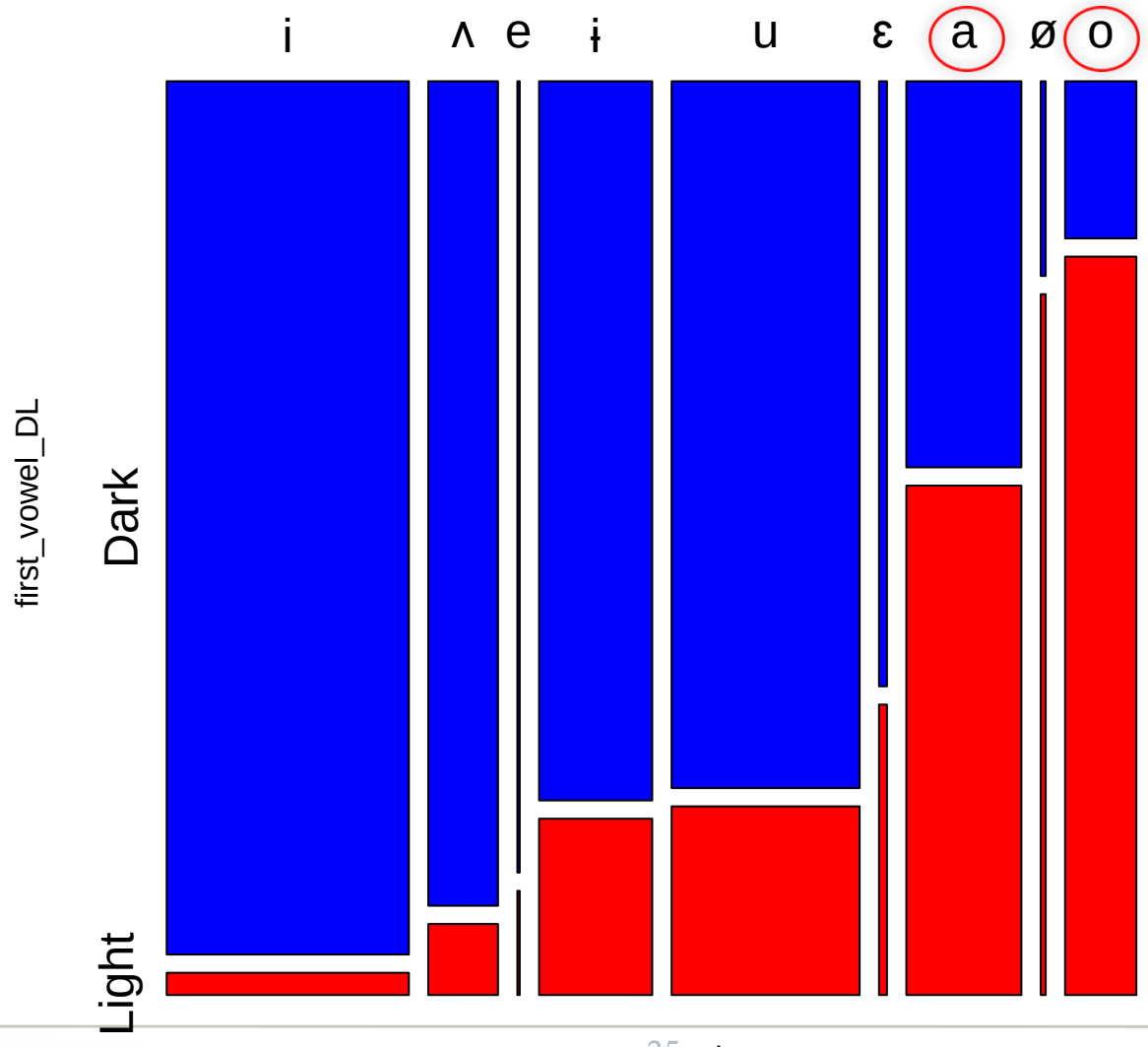

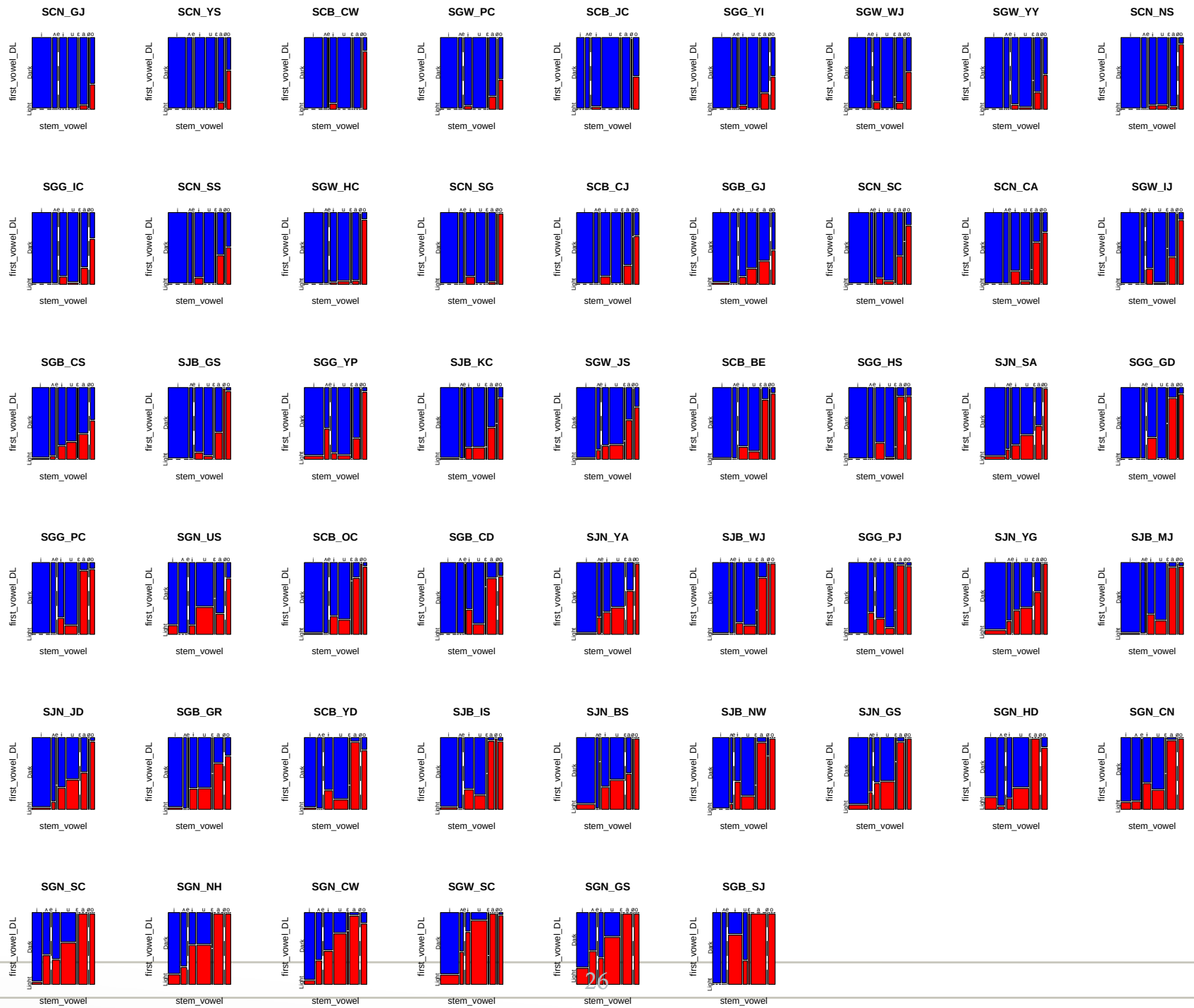
SCN_GJ
SCN_YS
SCB_CW
SGW_PC
SCB_JC
SGG_YI
SGW_WJ
SGW_YY
SCN_NS
SGG_IC
SCN_SS
SGW_HC
SCN_SG
SCB_CJ
SGB_GJ
SCN_SC
SCN_CA
SGW_IJ
SGB_CS
SJB_GS
SGG_YP
SJB_KC
SGW_JS
SCB_BE
SGG_HS
SJN_SA
SGG_GD
SGG_PC
SGN_US
SCB_OC
SGB_CD
SJN_YA
SJB_WJ
SGG_PJ
SJN_YG
SJB_MJ
SJN_JD
SGB_GR
SCB_YD
SJB_IS
SJN_BS
SJB_NW
SJN_GS
SGN_HD
SGN_CN
SGN_SC
SGN_NH
SGN_CW
SGW_SC
SGN_GS
SGB_SJ
first_vowel_DL
Dark
Light
stem_vowel

Intervening consonant effects

- VH attrition in /a/ and /o/ stems
- The light vowel harmony is more likely to be retained when the stem is V-final or laryngeal-final
  - **V-V, VH-V**: Null, Laryngeal /h, ʔ/
  - **VC-V**: Other consonant(s) *

Laryngeal finals

- "H-irregular"
  - C-initial suffix: aspiration or gemination

    /noh-ko/ [nok^{h}o] /noh-ni/ [nonni] 'to put down'
  - V-initial suffix: deletion

    /noh-asʌ/[noasʌ] /noh-ɨni/ [noɨni]
- "S-irregular"
  - C-initial suffix: tensification or gemination

    /naʔ-ko/ [nak'o] /naʔ-ni/ [nanni] 'to improve'
  - V-initial suffix: deletion

    /naʔ-asʌ/[naasʌ]/naʔ-ɨni/ [naɨni]

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    /naʔ-asʌ/[naasʌ]/naʔ-ɨni/ [naɨni]

Overall pattern

- /a/ stems

VV:	(/ka-Ø/	[ka])
VHV	/nah-A/	[naa] ~ *[naʌ]
	/naʔ-A/	[naa] ~ *[naʌ]
VCV:	/cak-A/	[caka] ~ [cakʌ]

- /o/ stems

VV:	/po-A/	[poa] ~ *[poʌ]
VHV:	/noh-A/	[noa] ~ *[noʌ]
VCV:	/k'oc-A/	[k'oca] ~ [k'ocʌ]

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VCV:	/cak-A/	[caka] ~ [cakʌ]

- /o/ stems

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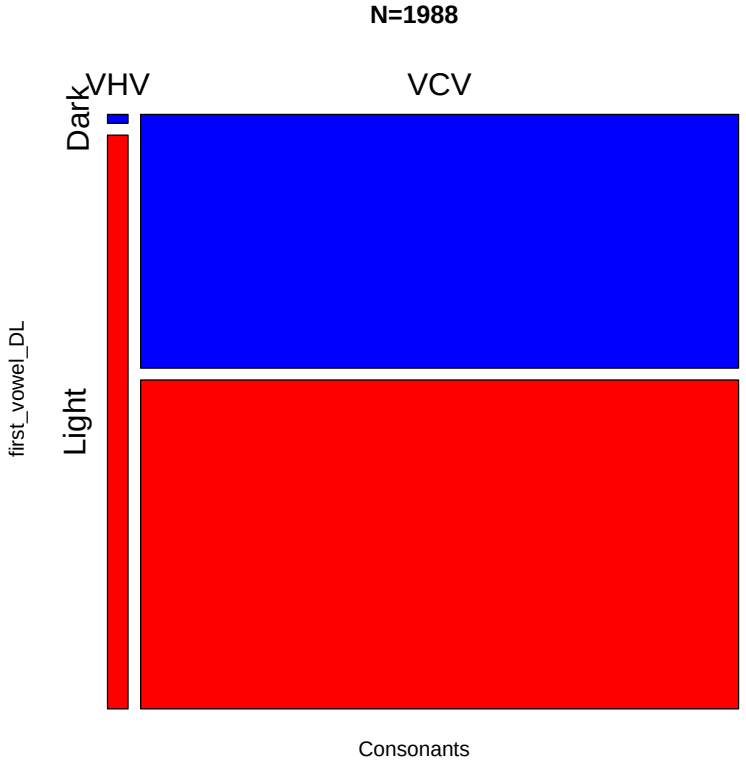
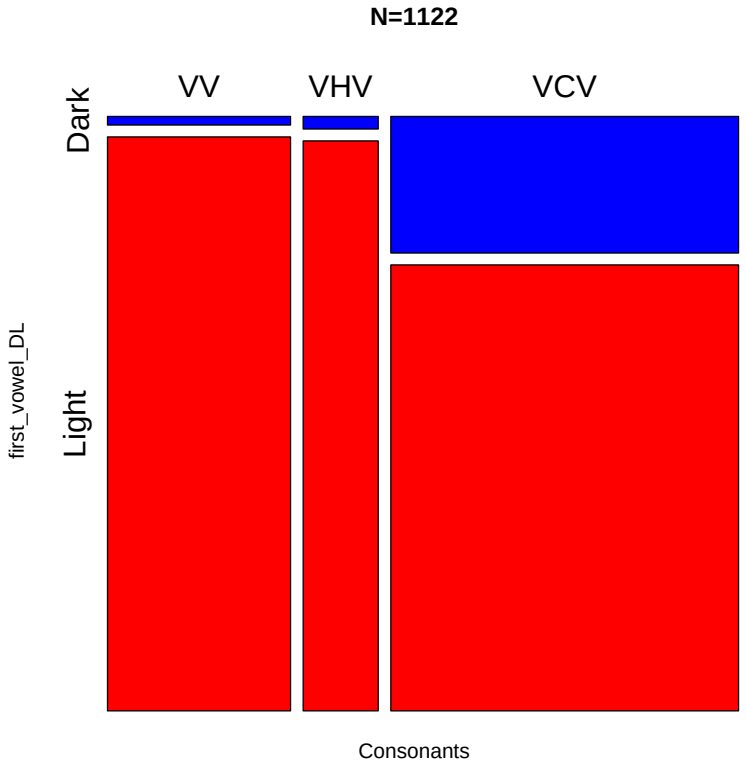
VCV:	/k'oc-A/	[k'oca] ~ [k'ocʌ]

/a/ stems



/o/ stems



/a/ and /o/ stems

	100 % Light	Variation	0 % Light
/o/ stems	25 dialects	26 dialects	0 dialects
/a/ stems	7 dialects	42 dialects	2 dialects

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/a/ and /o/ stems*

	100 % Light	**Variation**	**0 % Light**
/o/ stems	25 dialects	26 dialects **VV, VHV > VCV**	0 dialects
/a/ stems	7 dialects	24 dialects only **VCV** 18 dialects **VHV > VCV**	2 dialects

Summary

- The attrition of light vowel harmony is affecting the majority of Korean dialects. Light vowel suffixes is variably replaced with dark vowel suffixes.
- But, despite the wide variation, in almost all dialects, light vowel harmony is consistently preserved when there is no intervening consonant (other than laryngeals).

6. Discussion

Analysis

- Emergence of Implicational hierarchy

AGREE VV >> AGREE VCV
(VV strictly adjacent) (VV not strictly adjacent)

- This "subterranean" hierarchy reveals itself in the process of gradual erosion of harmony.
- Preference for default [ʌ] suffix form (SUFFIX=[ʌ]) moves up the hierarchy as attrition progresses.
  - AGREE VV >> AGREE V(C)V >> SUFFIX=[ʌ]
  - AGREE VV >> SUFFIX=[ʌ] >> AGREE V(C)V
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Emergent Locality Effect

- Where does this locality hierarchy come from?
  - **Phonological universal**: preference for strictly local vs. non-local phonological interaction (**TETU,** The Emergence of the Unmarked)
  - **Phonetic grounding**: pressure for assimilation higher in VV than VCV
  - **Functional motivation**: VV sequence subject to further phonological processes that obscure the original stem quality and retention of original harmony aid in recover of correct UR (H. Kang 2012)

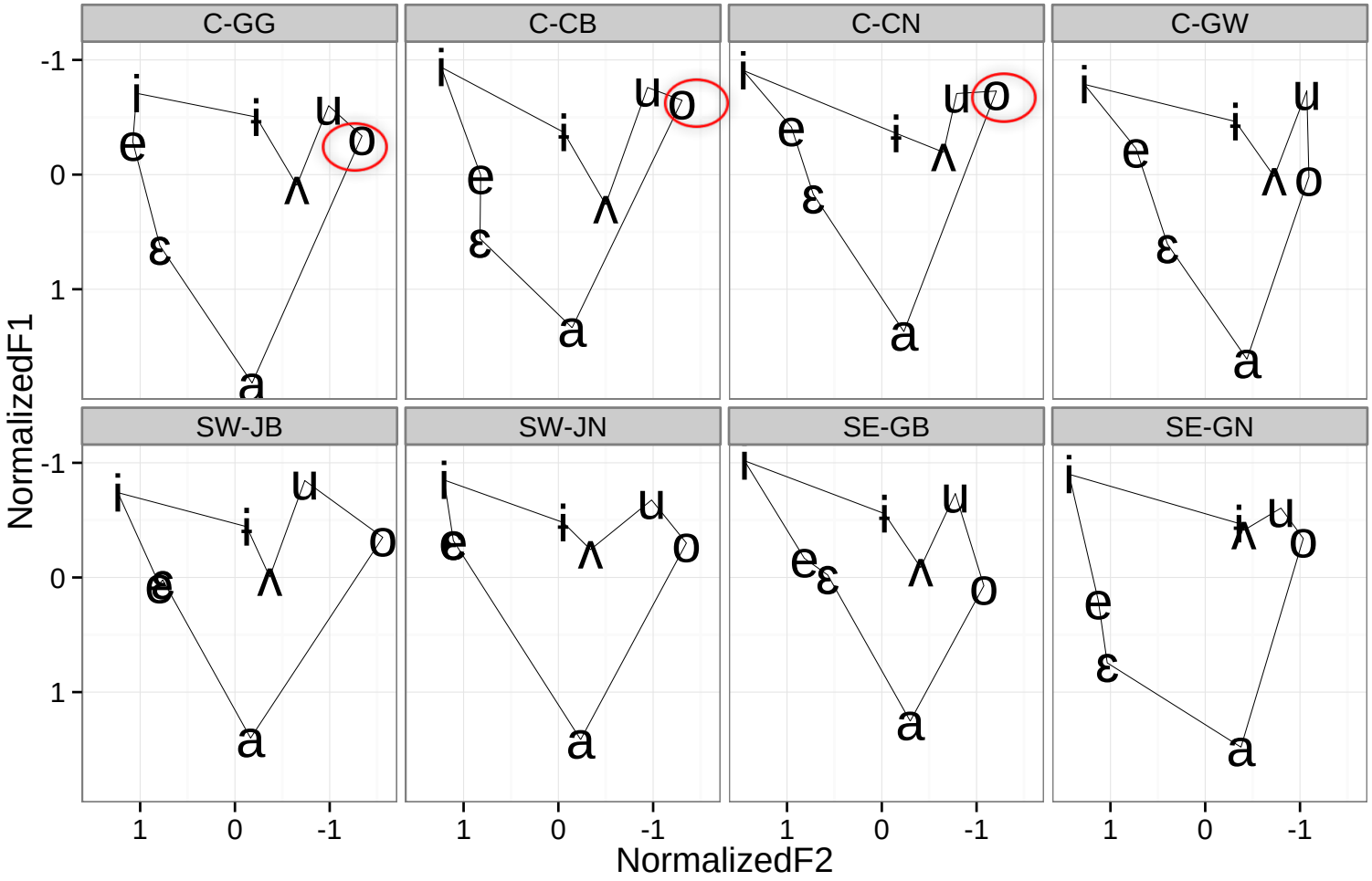
    /s'o-a/ > [s'wa]

    /s'u-ʌ/ > [s'wʌ]

Phonetic Grounding?

- This explanation makes sense for /a/ stems as harmonic [a-a] sequence is phonetically more similar than disharmonic [a-ʌ] sequence.
- But, the original harmonic feature ([RTR] cf. S. Ko 2012) is synchronically opaque and the phonetic ground is harder to identify for /o/ stems.
- In many central dialects, /o/ is raised to a high vowel position.
- Phonetic similarity with [a] is more tenuous.

Phonetic distribution of vowels in the same corpus



From Yoon, Kang, and Han (submitted)

Functional motivation?

- Unlike /o/, stem-final /a/ is not subject to reduction before a vowel initial suffix. So, there is no functional motivation for /a/ to preferentially retain Light vowel harmony.
- Even for /o/ stems, in a number of southern dialects laryngeal final stems do not undergo the glide formation (opacity effect). But, they pattern nevertheless the same in harmony.
  - /po-a/ [poa] ~ [pwa]
  - /noh-a/ [noa] ~ *[nwa]

Conclusion

- The Emergence of The Unmarked in attrition of a phonological process
- Phonological variation as a fertile ground for discovery of emergent phonological properties
- Future studies
  - Dialectal variation in vowel inventory and its effect on overall harmony pattern
  - Positional effect (initial vs. non-initial)
  - Neutral vowel effect

Thanks to

- The National Institute of the Korean Language
- SSHRC Partnership Development Grant

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