The Short Lifespan of Laryngeal Sonorants in Korean

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INTERACTION OF
GRAMMATICAL
BUILDING BLOCKS

Overview

- A class of **sonorant/vowel final verb roots, “Fairy Roots”,** shows seemingly disparate quirky patterns

- This pattern can be captured in a unified way with assuming underlying **floating features** and stratal OT
- The floating feature creates a laryngeal sonorant that is present only **at an intermediate level** of the derivation (Duke-of-York)
- Accounts with simpler representations face severe problems

Data

Laryngeal contrasts

- Korean has a three-way distinction in terms of laryngeal contrast in obstruents
- This contrast is neutralised in coda position

(1)

a.	/kal/	[**k**al]	'Zacco platypus (which turns red when it is about to lay eggs)'
b.	/k^{h}al/	[**k^{h}**al]	'knife'
c.	/k'al/	[**k'**al]	'color'

(2)

a.	/pjək/	[pjə**k**]	'wall'
b.	/puək^{h}/	[pu.ə**k**]	'kitchen'
c.	/pak'/	[pa**k**]	'outside'

- Vowels and sonorants do not show such contrasts on the surface!

Vowel Fairy Roots

- Vowel final roots generally do not affect the plain obstruent initial suffixes (3-a) (4-a)
- Fairy roots  idiosyncratically induce laryngeal contrasts onto these suffixes (3-b,c) (4-b,c)

(3)

a.	/na-ta/	→	[na.**t**a]	‘occur’
b.	/na^{ʔ}-ta/	→	[na.**t’**a]	‘get.better’ 
c.	/na^{h}-ta/	→	[na.**t^{h}**a]	‘give.birth’ 

(4)

a.	/na-ko/	→	[na.**k**o]	‘occur’
b.	/na^{ʔ}-ko/	→	[na.**k’**o]	‘get.better’ 
c.	/na^{h}-ko/	→	[na.**k^{h}**o]	‘give.birth’ 

Sonorant Fairy Roots

- Sonorant-final roots may be fairy roots  , as well.
- However, they are more restricted (cf. Albright & Kang 2009):

(5) a. /al-ta/ → [al.**t**a] 'know'
b. /al^{h}-ta/ → [al.**t**$^{\mathbf{h}}$a] 'suffer' 

(6) a. /an^{ʔ}-ta/ → [an.**t'**a] 'hug' 
b. /an^{h}-ta/ → [an.**t**$^{\mathbf{h}}$a] 'do.not' 

(7) /kam^{ʔ}-ta/ → [kam.**t'**a] 'wind' 

Puzzles

Gliding and coaleascence

- The inflectional affix -ə/-a/-jə optionally coalesces/ induces gliding with a preceding vowel (cf. Jun & Albright 2017)

(8)

a.	/o-a/	→	[wa]	'come.INFL'
b.	/p^hi-ə/	→	[p^hjə]	'blossom.INFL'
c.	/na-a/	→	[na]	'occur.INFL'

Blocking of gliding and coalescence

- If this affix attaches to a fairy root  , gliding and coalescence are blocked

(9)

a.	/co^{h}-a/	→	[co.a]	*[cwa]	‘good.INFL’
b.	/i^{ʔ}-ə/	→	[i.ə]	*[jə]	‘tie.INFL’
c.	/na^{ʔ}-a/	→	[na.a]	*[na]	‘get.better.INFL’
d.	/na^{h}-a/	→	[na.a]	*[na]	‘give.birth.INFL’

Gemination

- Allomorph-less sonorant-initial affixes geminate, if attached to a fairy root 

(10)

a.	/po-ni/	→	[po.ni]	‘see.Q’
b.	/mək-ni/	→	[mək.ni]	‘eat.Q’

(11)

a.	/co^{h}-ni/	→	[con.ni]	‘be.goodQ’	
b.	/na^{ʔ}-ni/	→	[nan.ni]	‘get.better.Q’	
c.	/na^{h}-ni/	→	[nan.ni]	‘give.birth.Q’	

Allomorph selection 1

- Fairy roots  unexpectedly select the elsewhere allomorph ‘sɨmnita’

(12) a. /po/- {mnita, sɨmnita} → [pom.ni.ta] ‘see.FORM’
b. /mək/-{mnita, sɨmnita} → [mək.sɨm.ni.ta] ‘eat.FORM’

(13) a. /co^{h}/-{mnita, sɨmnita} → [co.sɨm.ni.ta] ‘be.good.FORM’ 
b. /na^{ʔ}/-{mnita, sɨmnita} → [na.sɨm.ni.ta] ‘get.better.FORM’ 

Allomorph selection 2

- More unexpected allomorph selection by fairy roots  can be observed with the elsewhere allomorph *‘ɨn’*

(14)

a.	/po/-{n, ɨn}	→	[pon]	‘seen’
b.	/mək/-{n, ɨn}	→	[mə.kɨn]	‘eaten’

(15)

a.	/co^{h}/-{n, ɨn}	→	[co.ɨn]	‘been.good’	
b.	/na^{ʔ}/-{n, ɨn}	→	[na.ɨn]	‘got.better’	

Interim Summary

(16)

Roots	-C	coalescence	allomorphy	gemination
V	-C	✓	✓	✗
 V^h	$-C^h$	✗	✗	✓
 $V^ʔ$	-C’	✗	✗	✓
I	-C	—	✓	—
 I^h	$-C^h$	—	✗	—
 $n^ʔ$	-C’	—	✓	—
 n^h	$-C^h$	—	✓	—
 $m^ʔ$	-C’	—	✓	—
C	-C’	—	✓	—

Proposal

Assumptions

- Statal OT (Kiparsky 2000, Bermúdez-Otero 2011)
- Floating Features (Zoll 1993, 1996)
- Morphological Colour (Revithiadou 2007, van Oostendorp 2006, Trommer 2011, Zimmermann 2017)

Representation

- We propose that a floating laryngeal feature (+F) is a part of the underlying representation of fairy roots 

(17) /na(+sg)/ ‘give.birth’

(18) /na(+cg)/ ‘get.better’

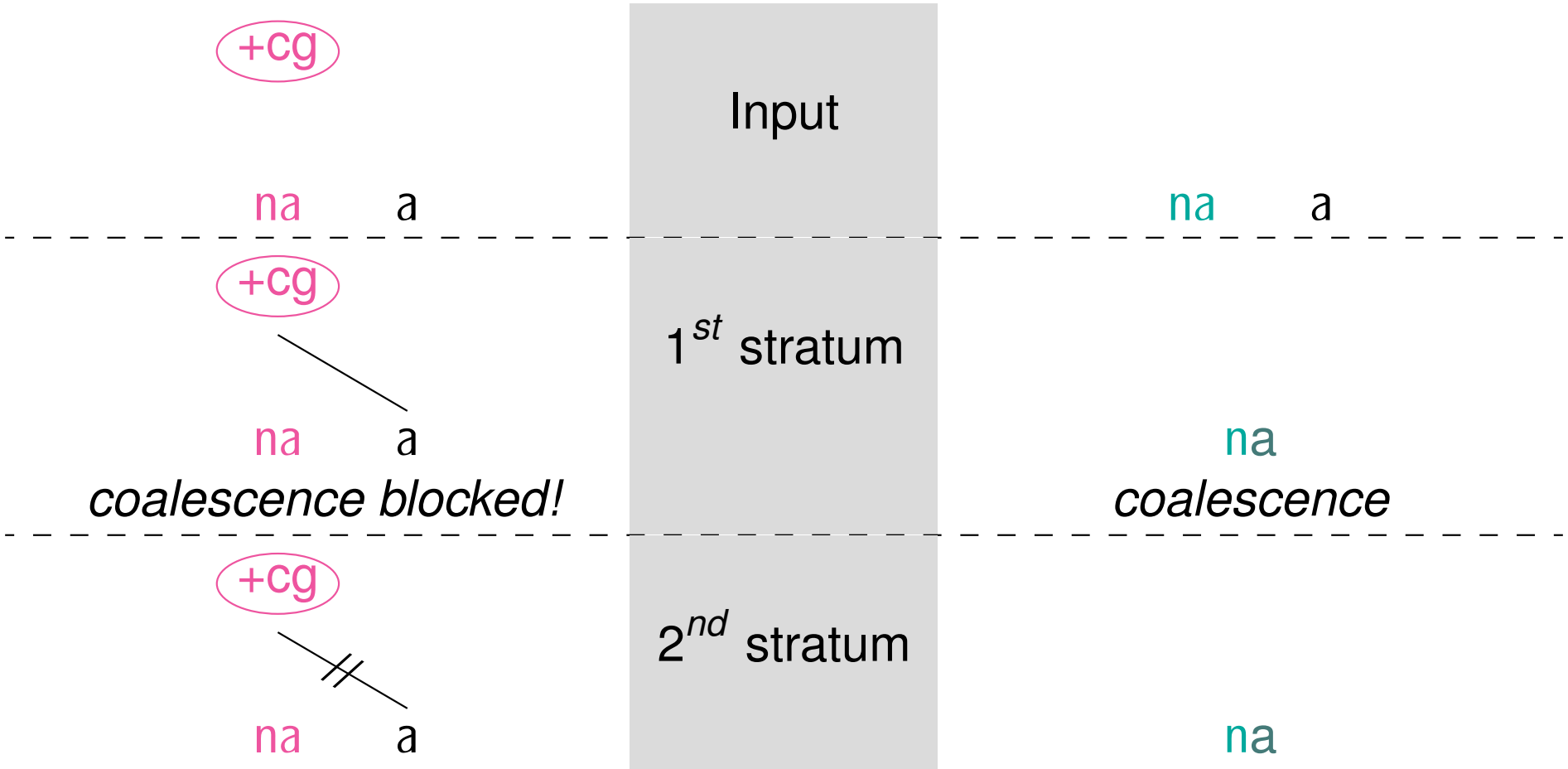
(19) /na/ ‘occur’

Derivation

- We derive the three puzzles with a feeding/bleeding Duke-of-York gambit (Bermúdez-Otero 2001).

- in the first stratum the floating feature
  - docks to any affix
  - influences allomorph selection
  - blocks coalescences/gliding
  - induces gemination
- in the next stratum
  - the laryngeal specification is neutralised

Sample Illustration



Analysis

Constraints

- *FLOAT
  Assign * to every feature F that is not linked to a root node •
- ALTER
  Assign * to every epenthetic association line between elements having the same morphological color
- DEP •
  Assign * to every epenthetic root node
- *V^{ʔ}
  Assign * to every vowel root node linked to [+cg]
- *V^{h}
  Assign * to every vowel root node linked to [+sg]

Stem-level Optimization

T_1. Stem-level,

MAXF, *FLOAT ≫ *V^h

I: co (+sg) – a	MAXF	*FLOAT	DEP •	ALTER	*ν([+sg][-sg])	*V.V	*V^h
O^1: co (+sg) a		*!				*	
☞ O^2: co.a^h						*	*
O^3: cwa	*!						*
O^4: co.ha			*!				
O^5: $cw^h a^h$				*!			**
O^6: cwa^h					*!		*

- *ν([+sg][-sg])
  Assign * to every nucleus linked to opposite values of [±sg]
  (cf. Kehrein & Golston 2004)
- *V.V
  Assign * to adjacent heterosyllabic vowels

Stem-level Optimization

T_1. Stem-level,

MaxF, *Float ≫ *V^h

I: co (+sg) – a	MaxF	*Float	Dep •	Alter	*ν([+sg][-sg])	*V.V	*V^h
O^1: co (+sg) a		*!				*	
☞ O^2: co.a^h						*	*
O^3: cwa	*!						*
O^4: co.ha			*!				
O^5: $cw^h a^h$				*!			**
O^6: cwa^h					*!		*

At the stem level the laryngeal contrast can survive on any suffixes, even if they are Vowel/Sonorant.

Word-level Optimization

T_2. Word-level

I: co.a^h	*V^h	MAX(σ)	*V.V	MAXF
O^1: co.a^h	*!			
☞ O^2: co.a			*	*
O^3: cwa		*!		*

*V^h ≫ MAXF

➢ MAX(σ): Assign * to every input syllable which is not present in the output

At the word level the laryngeal specification is neutralised.

Duke-of-York Gambit

(20)

co$^{\text{(+sg)}}$a	UR	AB**C**
coa$^{\text{h}}$	Feature Docking	AB**D**
cannot apply	Gliding	–
coa	Feature Deletion	AB**C**

Stem level: Gemination

T_3. Stem-level,

I: co (+sg) -ni	$S^h \rightarrow \mu$	DEP μ	$^*S^h$
O^1: co.n^{h}i	*!		*
☞ O^2: con$^h_\mu$i		*	**

- $S^h \rightarrow \mu$: Assign * to every laryngeally specified sonorant node which is not moraic
- Assumption: Geminates are moraic, whereas coda consonants are not moraic (There is no evidence for moraicity of codas).

Stem level: Gemination

T_3. Stem-level,

I: co +sg -ni	$S^h \rightarrow \mu$	DEP μ	$*S^h$
O^1: co.n^{h}i	*!		*
☞ O^2: con$^h_\mu$i		*	*

At the stem level, a geminate with laryngeal specification is optimal

Stem level: Allomorph selection {ɨn, n}

T_4. Stem-level, allomorph selection

I: co +sg {ɨn, n}	$S^h \rightarrow \mu$	DEP μ	*V.V	*V^h	*S^h
☞ O^1: co.ɨ^{h}n			*	*	
O^2: con^h	*!				*
O^3: con$^h_\mu$		*!			**

Stem level: Allomorph selection {mnita, s+mnita}

T_5. Stem-level, allomorph selection

I: co +sg {mnita, s+mnita}	$S^h \rightarrow \mu$	DEP μ	*V.V	*V^h	*S^h
☞ O^1: co.s^h+m.ni.ta					
O^2: com^h.ni.ta	*!				*
O^3: com^h_μni.ta		*!			**

Could we be any simpler?

Argument for floating features

- Our representation:

(21) /na[+sg]/ 'give.birth'

(22) /na[+cg]/ 'get.better'

(23) /na/ 'occur'

Argument for floating features

- Our representation:

(21) /na[+sg]/ 'give.birth'

(22) /na[+cg]/ 'get.better'

(23) /na/ 'occur'

- Alternative representation:

(24) /nah/ 'give.birth'

(25) /naʔ/ 'get.better'

(26) /na/ 'occur'

Argument for floating features

- However, Korean has no intervocalic /h/-deletion:

(27)	a.	/ihon/	→	[i.**h**on]	'divorce'
				*[i.**o**n]	
	b.	/co**h**-a-hæ/	→	[co.**a**.hæ]	'like.TR'
				*[co.**h**a.hæ]	
				*[co.**a**.æ]	

Argument against indexed constraints

- In this approach, morpheme specific phonology is derived by lexically indexed constraints (e.g. Benua 1997a,b)

- Alternative Representation:

(28) /na^{1}/ 'give.birth'

(29) /na^{2}/ 'get.better'

(30) /na^{3}/ 'occur'

Argument against indexed constraints

- Alternative Representation:

(31)	/na^{1}/	(32)	/na^{2}/	(33)	/na^{3}/
	'give.birth'		'get.better'		'occur'

- Necessary Constraints:

Argument against indexed constraints

- Alternative Representation:

(31)	/na^{1}/	(32)	/na^{2}/	(33)	/na^{3}/
	'give.birth'		'get.better'		'occur'

- Necessary Constraints:
  - *VC^{1,2}: No plain obstruent in this context

Argument against indexed constraints

- Alternative Representation:

(31)	/na^{1}/	(32)	/na^{2}/	(33)	/na^{3}/
	'give.birth'		'get.better'		'occur'

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  - *VC^{1,2}: No plain obstruent in this context
  - *VC'^{1}: No glottalised obstruent in this context

Argument against indexed constraints

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(31)	/na^{1}/	(32)	/na^{2}/	(33)	/na^{3}/
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- Necessary Constraints:
  - *VC^{1,2}: No plain obstruent in this context
  - *VC'^{1}: No glottalised obstruent in this context
  - *VC^{h2}: No aspirated obstruent in this context

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	'give.birth'		'get.better'		'occur'

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  - *VC'^{1}: No glottalised obstruent in this context
  - *VC^{h2}: No aspirated obstruent in this context
  - UNIFORMITY^{1,2}: No gliding/coalescence in this context

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  - *VC'^{1}: No glottalised obstruent in this context
  - *VC^{h2}: No aspirated obstruent in this context
  - UNIFORMITY^{1,2}: No gliding/coalescence in this context
  - S $\rightarrow$ μ ^{1,2}: Gemination of sonorants in this context

Argument against indexed constraints

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- Necessary Constraints:
  - *VC^{1,2}: No plain obstruent in this context
  - *VC'^{1}: No glottalised obstruent in this context
  - *VC^{h2}: No aspirated obstruent in this context
  - UNIFORMITY^{1,2}: No gliding/coalescence in this context
  - S $\rightarrow$ μ ^{1,2}: Gemination of sonorants in this context
  - ...

- In addition, allomorph selection should be able to have an access to the indices.

Argument against cophonology

- In this approach, morpheme specific phonology is derived by morpheme specific rankings (e.g. Orgun 1996, 1998, Inkelas 1998)

- Alternative Representation:

(34)	/nah/	(35)	/naʔ/	(36)	/na/
	'give.birth'		'get.better'		'occur'

Problem for cophonology

- Default Constraints ranking: MAX ≫*VhV
- Constraints ranking for A: *VhV ≫MAX

(37)

Input		Output	Ranking
co**h**-A	→	co.A	*VhV ≫MAX
co.a-ha	→	co.a.ha	MAX ≫*VhV
co.a.**h**a-A	→	*co.a.a.æ	*VhV ≫MAX

Problem for cophonology

- Default Constraints ranking: MAX ≫*VhV
- Constraints ranking for A: *VhV ≫MAX

(37)

Input		Output	Ranking
co**h**-A	→	co.A	*VhV ≫MAX
co.a-ha	→	co.a.ha	MAX ≫*VhV
co.a.**h**a-A	→	*co.a.a.æ	*VhV ≫MAX

- Still, bleeding of coalescence remains mysterious.

Conclusion

Summary

- We found a new generalisation on how laryngeal contrast of Korean S/V verbal roots affects the paradigm

- We provided the evidence for a floating feature that in combination with strata accounts for the observed opacity
  - The floating feature docks to the affixes, which changes the laryngeal specification
  - The laryngealised S/V behaves differently for some processes and allomorph selection.
  - At the next level, this contrast is neutralised, unlike on the obstruents, rendering the previous processes opaque

Implications

- Our work contributes to the discussion of whether Duke-of-York derivations are parts of human language capacity (Bermúdez Otero 2001, Rubach 2003, Gleim 2018, Rasin 2019)

- Our analysis is also compatible with Yun (2008)'s proposal of stata in Korean and extends the noun-verb asymmetries observed by her

Contact Information

Thank you!

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