Hixkaryana Prefix Deletion is Gradual

Millie Hacker
Michigan State University

Language Data

- Hixkaryana is a Southern Cariban language
- 500-1,000 speakers in the Nhamundá-Mapuera Indigenous Land in the Amazon rainforest
- Data is from Desmond Derbyshire's grammar (1985)

Roadmap

1. Pre-nasal processes fed by syncope

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2. Syncope-blocking and the need for serial derivation

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5. Debuccalization: why [ʔ] and not [h]?

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1. Pre-nasal processes fed by syncope
2. Syncope-blocking and the need for serial derivation
3. Stratal approach
4. Gradual deletion (Harmonic Serialism)
5. Debuccalization: why [ʔ] and not [h]?
6. Unifying full and partial deletion

Weak vowel syncope

- High vowels, usually /ɨ/, typically syncopate at morpheme boundaries:

/n**ɨ**-**a**he-no/	→ [naheno]	*he touched it*
/k**i**-**ɾ**ata-no/	→ [kɾatano]	*I wept*
/k**i**-**h**ananɨh**i**-**j**atʃkonɨ/	→ [khananɨhjatʃkonɨ]	*he used to teach us*

Syncope creates illicit clusters

- When the resulting cluster is **stop-nasal** (*KN*), it must be resolved

/tɨ-manho-no/	→ |tmanhono|	→ [manhono]	*we danced*
/kɨ-nɨkɨ-no/	→ |knɨkno|	→ [niʔno]	*I slept*
/kɨ-momokɨ-no/	→ |kmomokno|	→ [momoʔno]	*I was waiting for you*
/kɨ-ɲake-jatʃhe/	→ |kɲakejatʃhe|	→ [ɲakejatʃhe]	*he will send us*

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- In prefixes, the **prefixal consonant is lost**, resulting in a *fully deleted prefix*

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Syncope creates illicit clusters

- When the resulting cluster is **stop-nasal** (*KN*), it must be resolved
- In prefixes, the **prefixal consonant is lost**, resulting in a *fully deleted prefix*
- Stem-internally, the oral stop is (optionally) **debuccalized**

/tɨ-manho-no/	→ |tmanhono|	→ [manhono]	*we danced*
/kɨ-nɨkɨ-no/	→ |knɨkno|	→ [niʔno]	*I slept*
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- Pre-nasal loss of place is the *only* regular source of ʔ in Hixkaryana
- A regular rule of pre-obstruent /k/-reduction consistently produces [h]:

/omok-toho/	→ [omo**h**toho]	*the time of his coming*
/w-esnok-su/	→ [wesno**h**su]	*let me smell it*

Syncope-blocking

- When syncope would result in a tautosyllabic coronal cluster or oral stop cluster in the intermediate form, syncope ***cannot*** occur

/ti-niki-no/	→ [tiniʔno]	*[tniʔno]	*[niʔno]
/ti-ɲake-jatʃhe/	→ [tiɲakejatʃhe]	*[tɲakejatʃhe]	*[ɲakejatʃhe]
/ki-kita-no/	→ [kikitano]	*[kkitano]	*[kitano]
/ki-tajma-no/	→ [kitajmano]	*[ktajmano]	*[tajmano]

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/ti-niki-no/	→ [tinɨʔno]	*[tnɨʔno]	*[nɨʔno]
/ti-ɲake-jatʃhe/	→ [tiɲakejatʃhe]	*[tɲakejatʃhe]	*[ɲakejatʃhe]
/ki-kita-no/	→ [kɨkitano]	*[kkitano]	*[kitano]
/ki-tajma-no/	→ [kɨtajmano]	*[ktajmano]	*[tajmano]

- These forms do *not* have the opportunity to undergo consonant deletion to resolve the illicit cluster *c.f. /ti-manho-no/ → [Ø-manhono] 'we danced'*

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/ki-kita-no/	→ [kɨkitano]	*[kkitano]	*[kitano]
/ki-tajma-no/	→ [kɨtajmano]	*[ktajmano]	*[tajmano]

- These forms do *not* have the opportunity to undergo consonant deletion to resolve the illicit cluster *c.f. /ti-manho-no/ → [Ø-manhono] 'we danced'*
- Asymmetry: syncope is blocked to prevent some illicit clusters (*KK, *TN) but *not* to prevent other illicit clusters (*KN)

	Word-initial (prefix)	Word-medial
/K(ɨ) + N/	**ØN**	**ʔN**
/K(ɨ) + K/	**KɨK**	**hK**
/T(ɨ) + {n ɲ}/	**Tɨ{n ɲ}**	

Capturing an apparently serial process

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- Max(μ) prevents complete C deletion word-medially *and* regulates vowel deletion

/kɨ-nɨkɨ-no/	*Weak-V	*KN	Max(μ)
kɨnɨkɨno	**!		
kɨnɨkno	*!	*	*
knɨkno		*!*	**
nɨkno		*!	**
☞ nɨʔno			**
nino			***!

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- Evidence for Max(μ):
  - Predictable secondary stress on closed syllables (codas are weightful)

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knɨkno		*!*	**
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nino			***!

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- Evidence for Max(μ):
  - Predictable secondary stress on closed syllables (codas are weightful)
  - Related languages undergo compensatory lengthening in this context

/kɨ-nɨkɨ-no/	*Weak-V	*KN	Max(μ)
kɨnɨkɨno	**!		
kɨnɨkno	*!	*	*
knɨkno		*!*	**
nɨkno		*!	**
☞ nɨʔno			**
nino			***!

Syncope-blocking creates a ranking paradox

- Prefixal consonant deletion is a valid solution in some forms, but not in others

/**kɨ-**ɲake-jatʃhe/ → [ɲakejatʃhe] /**tɨ-**ɲake-jatʃhe/ → [**tɨ**ɲakejatʃhe]

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- No ranking can produce the desired blocking effect because blocking is via an intermediate form

/tɨ-ɲake-jatʃhe/	***Weak-V**	**Max-μ**	*KN
☹ tɨ-ɲake-jatʃhe	*!		
💣 t-ɲake-jatʃhe		*	*!
ɲake-jatʃhe		*	

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☹ tɨ-ɲake-jatʃhe	*!		
💣 t-ɲake-jatʃhe		*	*!
ɲake-jatʃhe		*	

/tɨ-ɲake-jatʃhe/	**Max-μ**	***Weak-V**	*KN
☞ tɨ-ɲake-jatʃhe		*	
t-ɲake-jatʃhe	*!		*
ɲake-jatʃhe	*!	*	

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☹ tɨ-ɲake-jatʃhe	*!		
💣 t-ɲake-jatʃhe		*	*!
ɲake-jatʃhe		*	

/tɨ-ɲake-jatʃhe/	**Max-μ**	***Weak-V**	*KN
☞ tɨ-ɲake-jatʃhe		*	
t-ɲake-jatʃhe	*!		*
ɲake-jatʃhe	*!	*	

/kɨ-ɲake-jatʃhe/	**Max-μ**	***Weak-V**	*KN
💣 kɨ-ɲake-jatʃhe		*	
t-ɲake-jatʃhe	*!		*
☹ ɲake-jatʃhe	*!	*	

Stratal approach

- /kɨ/ and /tɨ/ *cannot* be part of different strata. They each have deletion and preservation conditions:

  /kɨ-kɨtano/ → [kɨkɨtano] /kɨ-momokɨno/ → [momoʔno]

  /tɨ-nɨkɨno/ → [tɨnɨʔno] /tɨ-manhono/ → [manhono]

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- Weak vowel deletion becomes impossible in later strata; existing illicit clusters can now be resolved, but new ones can't be created

Stratal approach

Stratum 1: no syncope blocker present

/kɨ-nɨkɨ-no/	Max(C)	*Weak	Max-μ	*KN
kɨnɨkɨno		*!*		
☞ **knikno**			**	**
nɨʔno	*!		*	
nino	*!		**	

Stratal approach

Stratum 1: no syncope blocker present

/ki-niki-no/	Max(C)	*Weak	Max-μ	*KN
kinikino		*!*		
☞ **kniʔno**			**	*
niʔno	*!		*	
nino	*!		***	

Stratum 2: consonant deletion

/kniʔno/	Max-μ	*Weak	*KN	Max(C)
kniʔno			*!*	
☞ **niʔno**				*
nino	*!			*

Stratal approach

Stratum 1: no syncope blocker present

/ki-nɨki-no/	Max(C)	*Weak	Max-μ	*KN
kɨnɨkɨno		*!*		
☞ **kniʔno**			**	*
niʔno	*!		*	
nino	*!		***	

Stratum 2: consonant deletion

/kniʔno/	Max-μ	*Weak	*KN	Max(C)
kniʔno			*!*	
☞ **niʔno**				*
nino	*!			*

Stratum 1: syncope blocked

/ti-nɨki-no/	*CorCor	Max(C)	*Weak	Max-μ	*KN
tɨnɨkɨno			**!		
tnɨkno	*!			**	**
☞ **tiniʔno**			*	*	
niʔno		*!		**	

Stratal approach

Stratum 1: no syncope blocker present

/ki-nɨki-no/	Max(C)	*Weak	Max-μ	*KN
kɨnɨkɨno		*!*		
☞ **kniʔno**			**	*
niʔno	*!		*	
nino	*!		***	

Stratum 2: consonant deletion

/kniʔno/	Max-μ	*Weak	*KN	Max(C)
kniʔno			*!*	
☞ **niʔno**				*
nino	*!			*

Stratum 1: syncope blocked

/ti-nɨki-no/	*CorCor	Max(C)	*Weak	Max-μ	*KN
tɨnɨkɨno			**!		
tnɨkno	*!			**	**
☞ **tiniʔno**			*	*	
niʔno		*!		**	

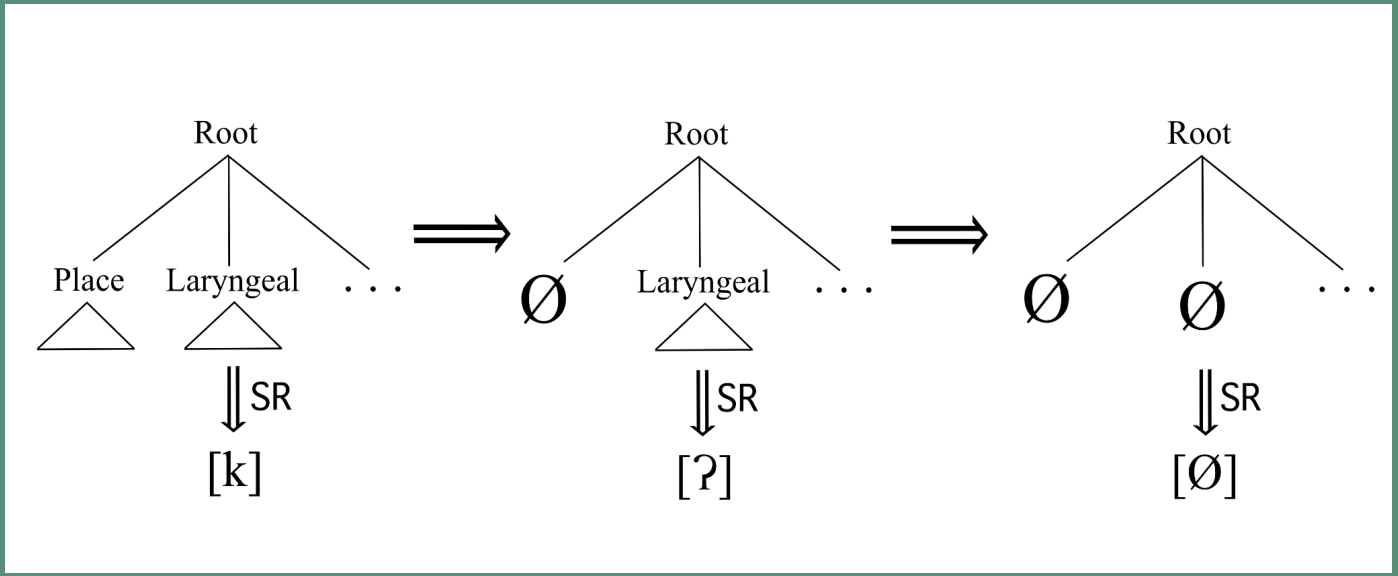
Stratum 2

/tɨniʔno/	*CorCor	Max-μ	*Weak	*KN	Max(C)
☞ **tiniʔno**			*		
tniʔno	*!	*		*	
niʔno		*!			*!
nino		*!*			*!

Why do pre-nasal codas debuccalize to [ʔ] and not [h]?

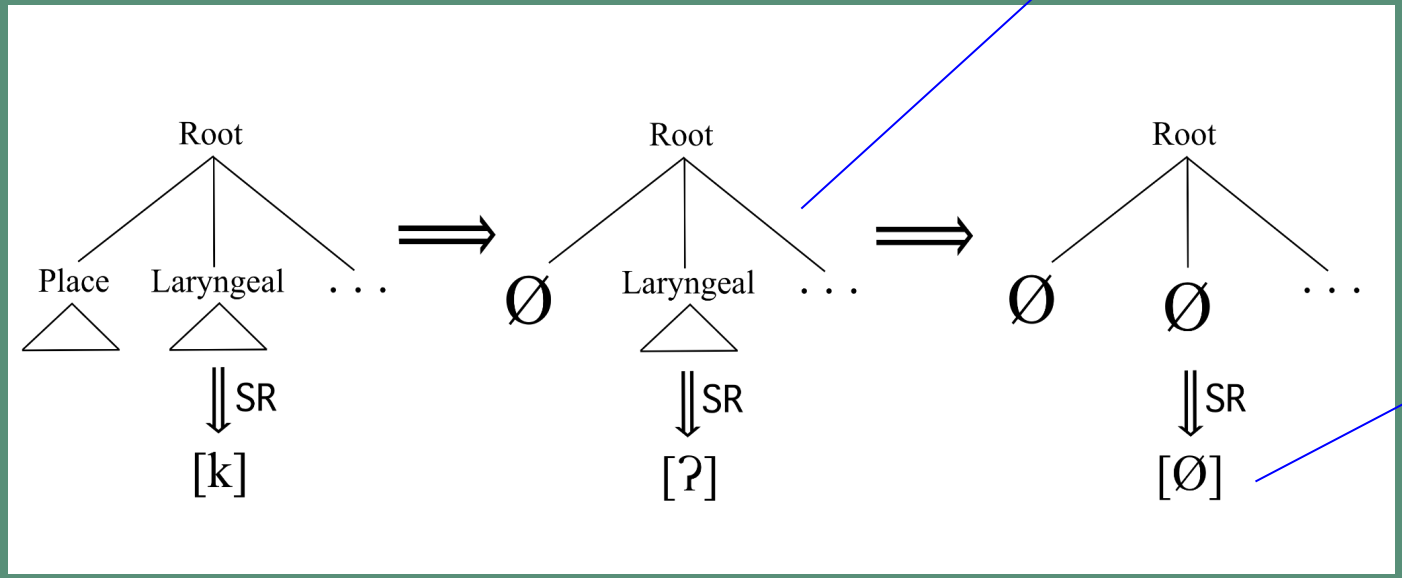
	Word-initial (prefix)	Word-medial
/K(ɨ) + N/	**ØN**	**ʔN**
/K(ɨ) + K/	**KɨK**	**hK**
/T(ɨ) + {n ɲ}/	**Tɨ{n ɲ}**	

Gradual Deletion



Gradual Deletion

/wɪtmano/ → [wɪʔmano]



/tɨ-manho-no/
→ [Ø-manhono]

Harmonic Serialism (HS)

- In HS, changes are gradual/monotonic. Only one change can be made during each evaluation, then the output is fed into the next evaluation
- The process iterates until the faithful candidate is the most harmonic candidate, which ends the derivation

/A-B-C/	*B	*A-C
A-B-C	*!	
☞ A-C		*

|A-C|	*B	*A-C
A-C		*!
☞ C		

|C|	*B	*A-C
☞ C		
B-C	*!	

HS can handle blocking

a.

/ti-niki-no/	*CorCor	*WeakV	Max-μ	*KN
ti-niki-no		**!		
☞ ti-nik-no		*	*	*
t-niki-no	*!	*	*	*

HS can handle blocking

a.

/ti-niki-no/	*CorCor	*WeakV	Max-μ	*KN
ti-niki-no		**!		
☞ ti-nik-no		*	*	*
t-niki-no	*!	*	*	*

b.

|ti-nik-no|	*CorCor	*WeakV	Max-μ	*KN
ti-nik-no		*		*!
☞ ti-niʔ-no		*		
t-nik-no	*!			*

HS can handle blocking

a.

/tɨ-nɨkɨ-no/	*CorCor	*WeakV	Max-μ	*KN
tɨ-nɨkɨ-no		**!		
☞ tɨ-nɨk-no		*	*	*
t-nɨkɨ-no	*!	*	*	*

b.

|tɨ-nɨk-no|	*CorCor	*WeakV	Max-μ	*KN
tɨ-nɨk-no		*		*!
☞ tɨ-nɨʔ-no		*		
t-nɨk-no	*!			*

c.

|tɨ-nɨʔ-no|	*CorCor	*WeakV	Max-μ	*KN
☞ tɨ-nɨʔ-no		*		
t-nɨk-no	*!			

HS is compatible with *non-blocking*

a.

/ti-manho-no/	*Weak-V	Max-μ	*KN
ti-manho-no	*!		
☞ t-manho-no		*	*

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/ti-manho-no/	*Weak-V	Max-μ	*KN
ti-manho-no	*!		
☞ t-manho-no		*	*

b.

|t-manho-no|	*Weak-V	Max-μ	*KN	HavePlace
t-manho-no			*!	
☞ ʔ-manho-no				*

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a.

/ti-manho-no/	*Weak-V	Max-μ	*KN
ti-manho-no	*!		
☞ t-manho-no		*	*

b.

|t-manho-no|	*Weak-V	Max-μ	*KN	HavePlace
t-manho-no			*!	
☞ ʔ-manho-no				*

c.

|ʔ-manho-no|	*Weak-V	Max-μ	*KN	HavePlace
ʔ-manho-no				*!
☞ manho-no				

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a.

/ti-manho-no/	*Weak-V	Max-μ	*KN
ti-manho-no	*!		
☞ t-manho-no		*	*

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|t-manho-no|	*Weak-V	Max-μ	*KN	HavePlace
t-manho-no			*!	
☞ ʔ-manho-no				*

c.

|ʔ-manho-no|	*Weak-V	Max-μ	*KN	HavePlace
ʔ-manho-no				*!
☞ manho-no				

d.

|manho-no|	*Weak-V	Max-μ	*KN	HavePlace
☞ manhono				

*KN

- Removal of PLACE allows vacuous satisfaction of a lot of markedness considerations

/kɨ-nɨkɨ-no/	*Weak-V	*KN	Max(μ)
kɨnɨkɨno	**!		
kɨnɨkno	*!	*	*
knɨkno		*!*	**
nɨkno		*!	**
☞ **nɨʔno**			**
nino			***!

*KN

- Removal of PLACE allows vacuous satisfaction of a lot of markedness considerations

  - [ʔ] and [h] pattern as transparent, so can't violate *KN

/kɨ-nɨkɨ-no/	*Weak-V	*KN	Max(μ)
kɨnɨkɨno	**!		
kɨnɨkno	*!	*	*
knɨkno		*!*	**
nɨkno		*!	**
☞ **nɨʔno**			**
nino			***!

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/K(ɨ) + N/	**ØN**	**ʔN**
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/K(ɨ) + N/	**ØN**	**ʔN**
/K(ɨ) + K/	**KɨK**	**hK**

- If pre-nasal and pre-obstruent codas were evaluated the same, they should produce the same output from a given input

Additional evidence for *KN

- **Denasalization** is another attested variant: **KN → KD**

/ti-manho-no/	→ [**b**anhono]	*he will send us*
/ki-niki-no/	→ [**d**ik**d**o]	*I slept*
/ki-momoki-no/	→ [**b**omok**d**o]	*I was waiting for you*
/ki-ɲake-jatʃhe/	→ [**d**^{j}akejatʃhe]	*he will send us*

[h] vs. [ʔ]

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- Because [h] seems to be the language's default laryngeal, it is reasonable to assume that [h] surfaces when [PLACE] and [s.g.] are both deleted (*everything besides the root node)*
  - ➢ Different degrees of faithfulness can be understood as corresponding to different degrees of markedness – **KK** is worse than **KN**, and is therefore able to force more reduction:

***[-s.g.]K >> Max(s.g.) >> *KN >> Max(Place)**

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  - **Pre-nasal prefix deletion is an accidental consequence of pre-nasal debuccalization**

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- Nasal onsets tolerate preceding consonants, which facilitates syncope in all positions
- The easiest way to satisfy *KN is debuccalization
- Placeless segments are marked, so they delete if non-moraic
  - ➢ **Pre-nasal prefix deletion is an accidental consequence of pre-nasal debuccalization**
- The pre-stop environment is restrictive → more-reduced [h]

Gradual deletion explains pre-nasal behaviors

- Nasal onsets tolerate preceding consonants, which facilitates syncope in all positions
- The easiest way to satisfy *KN is debuccalization
- Placeless segments are marked, so they delete if non-moraic
  - ➢ **Pre-nasal prefix deletion is an accidental consequence of pre-nasal debuccalization**
- The pre-stop environment is restrictive → more-reduced [h]
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  - ➢ **Pre-nasal [ʔ] arises because this is the only position where laryngealization takes place *BUT* [-s.g.] is permitted**

a.

/kɨ-nɨkɨ-no/	*Weak-V	*KN	Max(μ)
kɨnɨkɨno	**!		
☞ kɨnɨkno	*	*	*
☞ knɨkɨno	*	*	*

a.

/kɨ-nɨkɨ-no/	*Weak-V	*KN	Max(μ)
kɨnɨkɨno	**!		
☞ kɨnɨkno	*	*	*
☞ knɨkɨno	*	*	*

b.

|kɨnɨkno|	*Weak-V	*KN	Max(μ)
kɨnɨkno	*!*	*	
☞ knɨkno		**	*
kɨnɨʔno	*!		

a.

/kɨ-nɨkɨ-no/	*Weak-V	*KN	Max(μ)
kɨnɨkɨno	**!		
☞ kɨnɨkno	*	*	*
☞ knɨkɨno	*	*	*

b.

|kɨnɨkno|	*Weak-V	*KN	Max(μ)
kɨnɨkno	*!*	*	
☞ knɨkno		**	*
kɨnɨʔno	*!		

c.

|knɨkno|	*Weak-V	*KN	Max(μ)	HavePlace
knɨkno		**!		
☞ knɨʔno		*		*
☞ ʔnɨkno		*		*

a.

/kɨ-nɨkɨ-no/	*Weak-V	*KN	Max(μ)
kɨnɨkɨno	**!		
☞ kɨnɨkno	*	*	*
☞ knɨkɨno	*	*	*

b.

|kɨnɨkno|	*Weak-V	*KN	Max(μ)
kɨnɨkno	*!*	*	
☞ knɨkno		**	*
kɨnɨʔno	*!		

c.

|knɨkno|	*Weak-V	*KN	Max(μ)	HavePlace
knɨkno		**!		
☞ knɨʔno		*		*
☞ ʔnɨkno		*		*

d.

|knɨʔno|	*Weak-V	*KN	Max(μ)	HavePlace
knɨʔno		*!		*
☞ ʔnɨʔno				**
knɨno		*!	*	*

a.

/kɨ-nɨkɨ-no/	*Weak-V	*KN	Max(μ)
kɨnɨkɨno	**!		
☞ kɨnɨkno	*	*	*
☞ knɨkɨno	*	*	*

b.

|kɨnɨkno|	*Weak-V	*KN	Max(μ)
kɨnɨkno	*!*	*	
☞ knɨkno		**	*
kɨnɨʔno	*!		

c.

|knɨkno|	*Weak-V	*KN	Max(μ)	HavePlace
knɨkno		**!		
☞ knɨʔno		*		*
☞ ʔnɨkno		*		*

d.

|knɨʔno|	*Weak-V	*KN	Max(μ)	HavePlace
knɨʔno		*!		*
☞ ʔnɨʔno				**
knɨno		*!	*	*

e.

|ʔnɨʔno|	*Weak-V	*KN	Max(μ)	HavePlace
ʔnɨʔno				**!
☞ nɨʔno				*
ʔnɨno			*!	*

a.

/kɨ-nɨkɨ-no/	*Weak-V	*KN	Max(μ)
kɨnɨkɨno	**!		
☞ kɨnɨkno	*	*	*
☞ knɨkɨno	*	*	*

b.

|kɨnɨkno|	*Weak-V	*KN	Max(μ)
kɨnɨkno	*!*	*	
☞ knɨkno		**	*
kɨnɨʔno	*!		

c.

|knɨkno|	*Weak-V	*KN	Max(μ)	HavePlace
knɨkno		**!		
☞ knɨʔno		*		*
☞ ʔnɨkno		*		*

d.

|knɨʔno|	*Weak-V	*KN	Max(μ)	HavePlace
knɨʔno		*!		*
☞ ʔnɨʔno				**
knɨno		*!	*	*

e.

|ʔnɨʔno|	*Weak-V	*KN	Max(μ)	HavePlace
ʔnɨʔno				**!
☞ nɨʔno				*
ʔnɨno			*!	*

f.

|nɨʔno|	*Weak-V	*KN	Max(μ)	HavePlace
☞ nɨʔno				*
nɨno			*!	

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- *Takeaway: the gradual approach to deletion reveals interesting relationships between seemingly unrelated processes that are not otherwise apparent*

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Thank you!

Questions? Comments? Thoughts?

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External evidence for gradual deletion (McCarthy 2019)

- Certain Arabic varieties show contextual variation in the extent to which syncope occurs
- High vowels typically syncopate interconsonantally (i → Ø)
- However, if the surrounding consonants match (C_{α} i C_{α}) syncope is avoided so as not to force illicit gemination
- In this context, high vowels instead reduce to [ə] *(delete PLACE)*
- Much like consonant reduction in Hixkaryana, deletion seems to be occurring to the furthest extent permitted by higher constraints

Person/number-marking prefixes in Hixkaryana

S \ O	I+II	II	I	III	Intrans. S only	Copula S only
I+II				ẗ-	ẗ-	t-
I		k̈-		ẗ-	k̈-	w-
I+III		o-		n̈-	n̈-	n-
III	k̈-	o-	ro-	(-0) n̈- (+0) y-	n̈-	n-
II			m̈-	m̈-	m̈-, o-, ow-	man-, m-

Another reduction-to-[h] process

- [h] also materializes in codas from a rule that prevents coronal+/j/ sequences:

/w-aho**si-j**ako/	→ [waho**hs**ako]	'I caught it'
/w-e**ʃe-j**aha/	→ [we**hʃ**aha]	'I am'
/n-eka**t-j**aha/	→ [neka**ht**aha]	'he flees'

Phonologically-conditioned suppletive allomorphy?

- Difficult to say because there is not a lot of data
- The /tɨ, kɨ/ prefixes seem to be the only ones that satisfy the requirements for full prefix deletion
- However, cases where *only* the vowel is deleted from the prefix (before approximant and transparent segments) points toward phonological regularity:

/n**ɨ-a**he-no/	→ [naheno]	*he touched it*
/k**ɨ-ɾ**ata-no/	→ [kɾatano]	*I wept*
/k**ɨ-h**ananɨh**ɨ-j**atʃkonɨ/	→ [khananɨhjatʃkonɨ]	*he used to teach us*