"Epenthetic" vowels are not all equal: Gradient Representation in Yokuts roots and suffixes

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This talk

Following Zimmermann (2019):

The behaviour of Yokuts ghost segments is effectively captured through Gradient Symbolic Representation (Smolensky & Goldrick 2016, Rosen 2016)

New claims:

This approach has consequences for the analysis of segments that are not typically thought of as "exceptional".

The class of alternating vowels is not homogeneous.

Roadmap

- Ghost vowels in Yokuts and Gradient Symbolic Representations
- Alternating suffix and root vowels in Yokuts
- Challenges for categorical analyses
- Not all alternating vowels are equal in the UR
- Interactions with vowel shortening
- Conclusion

Ghost segments

Alternating segments whose:
- (non-)appearance is governed by phonological considerations
- quality and/or position is lexically determined

  (e.g., Hyman 1985, Archangeli 1988, 1993, Zoll 1993, Zimmermann 2019)

English *a* vs. *a**n***
- appears in contexts where hiatus would otherwise exist
- selection of [n] is specific to the indefinite article

Ghost vowels in Chukchansi Yokuts

Data from Guekguezian (2011), Adisasmito-Smith (2016), Collord (1968)

Appearing ghosts triggered by **CVX maximum syllable shape**.

(1) Ghost vowel appearance vs. non-appearance

			'arrive'	'eat'	
a.	Imperative	[-k**a**]	[pʰa.na**k**]	[xatʰ.**ka**]	*[xatʰ**k**]
b.	Hortative	[-x**a**]	[pʰa.na**x**]	[xatʰ.**xa**]	*[xatʰ**x**]
c.	Consequent Gerundial	[-m**i**]	[pʰa.na**m**]	[xatʰ.**mi**]	*[xatʰ**m**]

Gradient Symbolic Representations

In the UR, segments can be gradiently represented (Smolensky & Goldrick 2016, Rosen 2016)

- Segments differ in their degree of underlying activation
- **Appearing ghosts** surface when markedness pressures are high enough; **disappearing ghosts** surface except when markedness pressures are too great (Zimmermann 2019)

Intuition: The cost of deletion / insertion is reduced for segments that some underlying activation

(2) Non-gradient analysis

		UR	Output	Faithfulness violation
a.	**Faithful**	/ xatʰ-ka /	[xatʰ.ka]	--
b.	**Deletion**	/ pʰanaː-ka /	[pʰa.nak]	MAX
c.	**Epenthesis**	/ xatʰ-k /	[xatʰ.ka]	DEP

(3) Additional possibilities with GSR

		UR	Output	Faithfulness violation
a.	**Realization of ghost**	/ xatʰ-k$a_{0.3}$ /	[xatʰ.ka]	DEP × 0.7
b.	**Non-realization of ghost**	/ pʰanaː-k$a_{0.3}$ /	[pʰa.nak]	MAX × 0.3

Yokuts ghost vowels in GSR

Here: Ghost vowels have 0.3 activation in the UR

(4) (Non-)appearance of ghost vowels

a.

/pʰanaː-ka$_{0.3}$/	*COMPLEX $w = 6$	DEP $w = 5$	MAX $w = 1$	H
pʰa.naː.ka		−0.7		−3.5
☞ pʰa.nak			−0.3	−0.3

b.

/xatʰ-ka$_{0.3}$/	*COMPLEX	DEP	MAX	H
☞ xatʰ.ka		−0.7		−3.5
xatʰk	−1		−0.3	−6.3

Other alternating suffix vowels

(5)   Other alternating suffix vowels

    a. Potential   [xa.tʰ**al**]   'eat-POT'

                              [pʰa.na**l**]   'arrive.POT'

    b. Recent past   [xa.tʰ**itʰ**]   'eat-REC.PST'

                              [pʰa.na**tʰ**]   'arrive.REC.PST'

    c. Non-active   [t'u.l**un**.tʰaʔ]   'burn-N.ACT-REM.PST'

                              [t'ul.**n**utʰ]   'burn-N.ACT-REC.PST'

    d. Reflexive   [t'ul.**wuʃ**.tʰaʔ] 'burn-REFL-REM.PAST'

                              [kos.neː.no**w.ʃ**al] 'cook-REFL-POT'

Root vowels

(6) a.   Alternating roots

		Remote past	Recent past
run	/lihm/	[**li.him**.tʰaʔ]	[**lih.m**itʰ]
open	/ʔotp/	[**ʔo.tip**.tʰaʔ]	[**ʔot.p**itʰ]
shake	/junʃ/	[**ju.nuʃ**.tʰaʔ]	[**jun.ʃ**utʰ]

b.   Non-alternating roots

		Remote past	Recent past
burn	/t'ul/	[**t'ul**.tʰaʔ]	[**t'u.l**utʰ]
arrive	/pʰanaː/	[**pʰa.naː**.tʰaʔ]	[**pʰa.na**tʰ]
cook	/kosneːno/	[**kos.neː.no**.tʰaʔ]	[**kos.neː.no**tʰ]

Categorical analyses

Alternating vowels in Yokuts are present in the UR and sometimes deleted

- Suffixes with alternating non-high vowels: /-**a**l/, /-x**a**/

    (Kuroda 1967, Kenstowicz & Kisseberth 1977, Archangeli 1991)

- (Some) suffixes with alternating high vowels: /-**i**t^h/

    (Collord 1968, McGrew 2015)

- Roots with alternating high vowels: /lih**i**m/

    (Collord 1968, McGrew 2015)

Alternating vowels in Yokuts are absent from the UR and sometimes epenthesized

- Suffixes with alternating high vowels: /-**i**tʰ/, /-w**i**ʃ-/

    (Kuroda 1967, Kenstowicz & Kisseberth 1977, Archangeli 1991, Zoll 1993)

- Root vowels: /lih**i**m/

    (Kuroda 1967, Kenstowicz & Kisseberth 1977, Archangeli 1983, 1991, Zoll 1993, Guekguezian 2011)

Epenthetic vowel position

Kenstowicz & Kisseberth (1977): $\emptyset \rightarrow V_{[+high]} / C_1 \underline{\quad} C_2 C_3$

(7) a. Epenthesis between C_2 and C_3
   /lihm-t^h/ $\rightarrow$ [lih.m**i**t^h]

   b. Minimization of epenthesis
   /t'ul-wʃ-t^{h}aʔ/ $\rightarrow$ [t'ul.w**u**ʃ.t^{h}aʔ]

Zoll (1993)

ALIGN(Morpheme, R, σ, R): The right edge of each morpheme aligns with the right edge of a syllable

(8)   Partially-correct predictions of ALIGN-M

a.

/lihm-tʰaʔ/	DEP	ALIGN-M
☞ li.h**i**m.tʰaʔ	−1	
lih.m**i**.tʰaʔ	−1	−1

b.

/ʔotp-n-tʰ/	DEP	ALIGN-M
☹ ʔot.p**i**.n**i**tʰ	−2	−1
💣 ʔo.t**i**p.n**i**tʰ	−2	

(9) Simple constraint set

MAX	*HIATUS	ALIGN-M
DEP	*COMPLEX	

No "all epenthesis" or "all deletion" analysis – or "some epenthesis / some deletion" analysis – is possible with the constraint set in (9) – checked with OT-Help2 (Staubs et al. 2010).

These problems are **not** solved by:

• constraint weighting alone

• adding further general constraints to the inventory

Claim: A consistent analysis of the full data is available in GSR.   This requires:

• At least three degrees of activation for alternating vowels

There is no set of weights such that only 1.0 and 0.0 underlying activations work.

• Some degree of activation for alternating <u>root</u> vowels, even though these are largely predictable.

Relative strength of alternating vowels

(10)

Morpheme		Activation
Recent past	/-it^h/	
Potential	/-al/	1.0
Non-active	/-in/	
Imperative	/-ka/	
Hortative	/-xa/	
Consequent	/-mi/	0.3
Root	/lihim/	
Reflexive	/-wiʃ-/	0.0

Weak UR vowels are needed in roots

(11) 0.3 activation in roots ensures vowels surface with ghost V suffixes

/lih$\mathbf{i}_{0.3}$m-k$\mathbf{a}_{0.3}$/	DEP $w = 5$	ALIGN-M $w = 3$	MAX $w = 1$	H
☞ li.h**i**m.k**a**	−1.4			−7.0
lih.m**i**.k**a**	−1.7	−1	−0.3	−11.8
lih.m**i**k	−1	−1	−0.6	−8.6

(12) No activation of root vowel in yields incorrect result

/lihm-k$\mathbf{a}_{0.3}$/	DEP $w = 5$	ALIGN-M $w = 3$	MAX $w = 1$	H
li.h**i**m.k**a**	−1.7			−8.5
lih.m**i**.k**a**	−1.7	−1		−11.5
💣 lih.m**i**k	−1	−1	−0.3	−8.3

Strong suffixes trigger root non-alignment

(13) 1.0 activation of vowel in /-**i**n-/ triggers correct root non-alignment

/ʔot**i**$_{0.3}$p-**i**$_{1.0}$n-**i**$_{1.0}$tʰ/	DEP $w = 5$	ALIGN-M $w = 3$	MAX $w = 1$	H
☞ ʔot.p**i**.n**i**tʰ		−1	−0.3	−3.3
ʔo.t**i**p.n**i**tʰ	−0.7		−1	−4.5

(14) No activation of vowel in /-**i**n-/ yields incorrect result

/ʔot**i**$_{0.3}$p-n-**i**$_{1.0}$tʰ/	DEP $w = 5$	ALIGN-M $w = 3$	MAX $w = 1$	H
ʔot.p**i**.n**i**tʰ	−1	−1	−0.3	−8.3
💣 ʔo.t**i**p.n**i**tʰ	−0.7		−1	−4.5

No UR vowels are needed in some suffixes

(15) Some alternating vowels are "purely epenthetic"

/t'ul-wʃ-tʰaʔ/	DEP $w = 5$	ALIGN-M $w = 3$	MAX $w = 1$	H
☞ t'ul.w**u**ʃ.tʰaʔ	−1			−5
t'u.l**u**w.ʃ**u**.tʰaʔ	−2	−2		−16

(16) Epenthesis is minimized

/kosneːno-wʃ-**a**$_{1.0}$l/	DEP $w = 5$	ALIGN-M $w = 3$	MAX $w = 1$	H
kos.neː.no.w**i**.ʃ**a**l	−1	−1		−8
☞ kos.neː.now.ʃ**a**l		−2		−6

(20) Minimization of epenthesis

/lihi$_{0.3}$m-wʃ-i$_{1.0}$tʰ/	DEP $w = 5$	ALIGN-M $w = 3$	MAX $w = 1$	H
li.h**im**.w**i**.ʃitʰ	−1.7	−1		−11.5
☞ lih.m**i**w.ʃitʰ	−1	−2	−0.3	−11.3

N.B. Increasing activation on this suffix leads to selection of the other form.

[li.h**im**.w**i**.ʃitʰ]   – attested in current fieldwork

[lih.m**i**w.ʃitʰ]   – attested in Collord 1968 and current fieldwork

Interactions with vowel shortening

Kenstowicz & Kisseberth note that epenthesis **bleeds** vowel shortening in Yokuts.

(17)

		Remote past	Recent past
help	/ʔaːm**i**$_{0.3}$l/	[**ʔaː.mil**.tʰaʔ]	[**ʔam.li**tʰ]
sew	/peːw**i**$_{0.3}$n/	[**peː.win**.tʰaʔ]	[**pew.ni**tʰ]

It is is "cheaper" to shorten a vowel than to realize a weakly activated alternating segment if this is sufficient to meet phonotactic requirements.

(18) Better to shorten a vowel than to realize a ghost vowel.

/pʰanaː-ka$_{0.3}$/	DEP $w = 5$	ALIGN-M $w = 3$	MAX $w = 1$	IDENTLONG $w = 0.1$	H
pʰa.naː.ka	−0.7				−3.5
☞ pʰa.nak		−1	−0.3	−1	−3.4

(19) Better to shorten a vowel than to violate *HIATUS

/pʰanaː-i$_{1.0}$tʰ /	*HIATUS $w = 8$	ALIGN-M $w = 3$	MAX $w = 1$	IDENTLONG $w = 0.1$	H
pʰa.naː.itʰ	−1				−8.0
☞ pʰa.natʰ		−1	−1	−1	−4.1

Discussion

Even "predictable" vowels in Chukchansi Yokuts have some degree of underlying activation.

- This approach allows a consistent analysis with simple constraints

"We must give up the assumption that two or more conflicting analyses cannot be simultaneously correct for a given phenomenon"
(Smolensky & Goldrick 2016, citing Hankamer 1977)

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Further directions

Why are most alternating vowels [+high] in Yokuts?

• Possibility: The underlying vowel in these cases is a bare root node

Are there additional degrees of underlying activation?

• What does this mean for the set of contrasts found in the language?

How do these alternating vowels relate to those in templatic forms?

• Templatic forms have alternating vowels that are morphologically triggered, but in the same places as those seen here.

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THANK YOU!

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