

A Harmonic Layer Account of Levantine Arabic Syncope

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Introduction

Processes

- ▶ **Stress Assignment:** Stress penultimate σ if heavy
(or if $\neg \exists$ antepenultimate σ)

- ▶ **Syncope:** Delete a non-final high vowel in an open syllable

Data

(Brame 1974, Kiparsky 2000)

/fihim-na/ → [fhím-na] 'we understand'

/fihim/ → [fíhim] 'he understood'

/fihim-na/ → [fihím-na] 'he understands us'

Classical Stratal-OT Analysis (Kiparsky 2000)

- ▶ Syncope only applies at a later stratum, but
- ▶ vowels stressed at the earlier stratum are preserved
- ▶ ⇒ crucially requires constraint reranking to postpone syncope

Central Goal of this Talk

Derive opacity without constraint reranking

by gradient representational changes

Analysis

Harmonic Layer Theory

- ▶ **Gradiance:** Harmonic Grammar (Smolensky and Legendre 2006, Potts et al. 2010) with Gradient Symbolic Representations (Smolensky and Goldrick 2016)
- ▶ **Layers:** Morphological Strata (Stem Layer, Word Layer, ...) as in Lexical Phonology (Kiparsky 1982) and Stratal OT (Kiparsky 2000, Bermúdez-Otero 2012), but **without** stratum-specific constraint ranking/weighting

Gist of the Analysis

- ▶ Gradient representations can **mature** or **decay** across layers
- ▶ Early Affixation leads to **constancy of environments** and hence fosters both processes alike
- ▶ Syncope is a cumulative effect of iterative weakening

Overview

Stem

Word

$/fi_{0.5}.hi_{0.5}m/ \oplus na_{0.5} \rightarrow fi_{0.4}.hí_{0.6}m-na_{0.5} \rightarrow fi_{0.3}.hí_{0.7}m-na_{0.5} [fihímna]$

$/fi_{0.5}.hi_{0.5}m/ \rightarrow fí_{0.6}.hi_{0.5}m \oplus na_{0.5} \rightarrow fi_{0.5}.hí_{0.6}m-na_{0.5} [fihímna]$

$/fi_{0.5}.hi_{0.5}m/ \rightarrow fí_{0.6}.hi_{0.5}m \rightarrow fí_{0.7}.hi_{0.5}m [fíhim]$

Pronunciation Threshold

- ▶ $0 \leq \text{Segmental strength} \leq 1$
- ▶ All segments enter the derivation with **medium strength (= 0.5)**
- ▶ Segments with final strength ≤ 0.5 are not pronounced (**deleted**)

Constraints

- $\acute{\sigma}$ Assign -1 to every PWord without penultimate stress
- $S(\acute{V}) = 1$ Assign 1-s to every stressed vowel with strength s
- $S(\check{V}]_{\sigma}) = 0$ Assign s to every unstressed non-final open-syllable vowel of strength s
- $|\Delta S| \leq 0.1$ Assign -1 to every segmental output strength which differs from the corresponding input strength by more than 0.1

Subject-na: Optimization

Stem Layer:

Input: = $fi_{0.5}.hi_{0.5}m-na_{0.5}$	$\acute{\sigma}$ $w=\infty$	$ \Delta S \leq 0.1$ $w=\infty$	$S(\acute{V}) = 1$ $w=1$	$S(\acute{V}]_{\sigma}) = 0$ $w=1$	\mathcal{H}
☞ a. $fi_{0.4}.h\acute{i}_{0.6}m-na_{0.5}$			-0.4	-0.4	-0.8
b. $fi_0.h\acute{i}_1m-na_{0.5}$		-2			∞
c. $fi_{0.5}.h\acute{i}_{0.5}m-na_{0.5}$			-0.5	-0.5	-1.0
d. $fi_{0.5}.hi_{0.5}m-na_{0.5}$	-1		-0.5	-0.5	∞

Word Layer:

Input: = $fi_{0.4}.h\acute{i}_{0.6}m-na_{0.5}$	$\acute{\sigma}$ $w=\infty$	$ \Delta S \leq 0.1$ $w=\infty$	$S(\acute{V}) = 1$ $w=1$	$S(\acute{V}]_{\sigma}) = 0$ $w=1$	\mathcal{H}
☞ a. $fi_{0.3}.h\acute{i}_{0.7}m-na_{0.5}$			-0.3	-0.3	-0.6
b. $fi_0.h\acute{i}_1m-na_{0.5}$		-2			∞
c. $fi_{0.4}.h\acute{i}_{0.6}m-na_{0.5}$			-0.4	-0.4	-0.8
d. $fi_{0.4}.hi_{0.6}m-na_{0.5}$	-1		-0.5	-0.5	∞

Output: Subject-*na* Optimization

fi_{0.3}.hí_{0.7}m-na_{0.5} = [fhímna]

Object-na: Optimization

Stem Layer:

Input: = $fi_{0.5}.hi_{0.5}m$	$\acute{\sigma}$ W= ∞	$ \Delta S \leq 0.1$ W= ∞	$S(\acute{V}) = 1$ w=1.0	$S(\acute{V}]_{\sigma}) = 0$ w=1	\mathcal{H}
☞ a. $fi_{0.6}.hi_{0.5}m$			-0.4		-0.4
b. $fi_1.hi_{0.5}m$		-2			∞
c. $fi_{0.5}.hi_{0.5}m$			-0.5		-0.5
d. $fi_{0.5}.hi_{0.5}m$	-1		-0.5		∞

Word Layer:

Input: = $fi_{0.6}.hi_{0.5}m-na_{0.5}$	$\acute{\sigma}$ W= ∞	$ \Delta S \leq 0.1$ W= ∞	$S(\acute{V}) = 1$ w=1.0	$S(\acute{V}]_{\sigma}) = 0$ w=1	\mathcal{H}
☞ a. $fi_{0.5}.hi_{0.6}m-na_{0.5}$			-0.4	-0.5	-0.9
b. $fi_0.hi_1m-na_{0.5}$		-2			∞
c. $fi_{0.6}.hi_{0.5}m-na_{0.5}$			-0.5	-0.6	-1.1
d. $fi_{0.6}.hi_{0.5}m-na_{0.5}$	-1		-0.5	-0.5	∞

Output: Object-*na* Optimization

fi_{0.5}.hí_{0.6} m-na_{0.5} = [fihímna]

Summary

Stem

Word

$/fi_{0.5}.hi_{0.5}m/ \oplus na_{0.5} \rightarrow fi_{0.4}.hí_{0.6}m-na_{0.5} \rightarrow fi_{0.3}.hí_{0.7}m-na_{0.5} [f'hímna]$

$/fi_{0.5}.hi_{0.5}m/ \rightarrow fí_{0.6}.hi_{0.5}m \oplus na_{0.5} \rightarrow fi_{0.5}.hí_{0.6}m-na_{0.5} [f'ihímna]$

$/fi_{0.5}.hi_{0.5}m/ \rightarrow fí_{0.6}.hi_{0.5}m \rightarrow fí_{0.7}.hi_{0.5}m [f'ihim]$

Outlook

Other processes which show Layer Effects

- ▶ Vowel harmony in Tommo So (McPherson and Hayes 2016)
- ▶ English Final Stop Deletion (Guy 1991)
- ▶ Chamorro umlaut and vowel lowering (Chung 1983)

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