Faithfulness-based opacity in Harmonic Serialism

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Introduction

- Harmonic Serialism (HS), a serial derivative of Optimality Theory, captures some aspects of rule ordering. Processes can apply before others through constraint ranking.
- Some previous work has analyzed opacity in HS (McCarthy 2000, Elfner 2009, Jarosz 2014), but many aspects of opacity have continued to prove problematic.
- **Proposal:** New classes of faithfulness constraints within HS which reference the underlying representation (UR) of forms and/or add a specific context of application to account for opacity.
  - Counterbleeding: Contextual Faithfulness
  - Counterfeeding: Faith$_{UO}$
- In our paper, we argue that these constraints are induced on a language-specific basis

Harmonic Serialism

- In HS, Gen is limited to candidates that differ from the input by at most one change.
- The output of Eval at one step is the input to the following step.
- The derivation converges when the fully faithful candidate is optimal (no further change is more harmonic)

Intro: Counterbleeding Opacity

- Counterbleeding opacity results in surface overapplication
- A rule has applied on the surface, but the context for its application is not present

(1) **Counterbleeding in Arabic:** Sibilants palatalize before high vowels, high vowels delete in open syllables; deleted high vowels remove context for palatalization

	/ʃaribat/	/ħa:kim/	/ħa:kim-in/
Palatalization		ħa:kʲim	ħa:kʲimin
Deletion	ʃarbat		ħa:kʲmin
	[ʃarbat]	[ħa:kʲim]	[ħa:kʲmin]

Intro: Counterfeeding Opacity

- Counterfeeding opacity results in surface underapplication (Kiparsky ????)
- A rule has not applied on the surface, even though the context for its application is present

(2) **Counterfeeding in Basque:** Low vowels become mid before vowels, mid become high, low do not become high. (Bakovic 2010)

a. /alab**a̲**-a/ → alab**e̲**-a ↛ *alab**i̲**-a
b. /sem**e̲**-e/ → sem**i̲**-e

(3) In rules:

a. **Mid to high raising:** e → i / _V
b. **Low to mid raising:** a → e / _V

Analyzing Counterbleeding with Contextual Faithfulness

- **Contextual Faithfulness:** Like positional faithfulness, but define an input context, and not limited to prosodically prominent positions

(4) **Ident(F)/*Context***
If an input segment is [αF] and in context *C*, then its corresponding output segment must be [αF].

(5) **Max(*A*)/*Context***
An input segment *A* in context *C* must have an output correspondent.

- **Example:** For Arabic,

(6) **Max(i)/k_:** Assign one * if [i] is deleted when preceded by a non-palatalized voiceless consonant in the input.

- The context specified by the constraint ceases to exist at some point in the derivation
- The constraint serves to protect the feature value or segment until some other process has applied

(7) **General constraint ranking for counterbleeding**:
Contextual Faithfulness >> Markedness >> Faith-IO

Analysis: Arabic

- **Arabic: Deletion counterbleeds Palatalization**
  /ha:kim-in/ → ha:kʲimin → [ha:kʲmin]

(8) **Step 1:** Palatalization occurs

/ha:kim-in/	Max(i)/k_	*iCV	*ki	Ident[back]	Max
→ 1. ha:kʲimin		*		*	
2. ha:kmin	*W	L		L	*W
3. ha:kimin		*	*W	L	

(9) **Step 2:** Deletion occurs

ha:kʲimin	Max(i)/k_	*iCV	*ki	Ident[back]	Max
→ 1. ha:kʲmin					*
2. ha:kʲimin		*W			L

- The contextual faithfulness constraint prevents the [i] from deleting until its context is no longer met; i.e. until after palatalization has applied

Analyzing Counterfeeding with Faith-UO (Hauser et al. 2014)

- **Faith-UO:** a set of constraints demanding faithfulness between UR and output.

(10) **ID-UO(*F*)/[α*G*]**
Do not change the value of *F* for segments that are [α*G*] in the UR.

(11) **ID-UO(*F*)/_[α*G*]**
Do not change the value of *F* for segments that are **in the environment of** [α*G*] in the UR.

- **Example:** For Basque,

(12) **ID-UO(hi)/[+low]:** Do not change the value of [α hi] for segments that are [+low] in the UR.

- Referring to the UR at every step of the derivation captures the idea that speakers have access to the lexicon throughout the stages of a phonological derivation.
- *F* and *G* cannot be identical – this is true for any OT-based analysis of counterfeeding.

(13) **General constraint ranking for counterfeeding**:
Faith-UO >> Markedness >> Faith-IO

Analysis: Basque chain shift

- **Basque: Low becomes mid, mid doesn't become high:**
  /alab**a̲**-a/ → alab**e̲**-a ↛ *alab**i̲**-a

(14) **Step 1:** /alab**a̲**-a/ → alab**e̲**-a

/alaba-a/	ID-UO(hi)/[+low]	*low/_V	*mid/_V	ID-IO(hi)
→ alabe-a				*
alaba-a		* !		

(15) **Step 2:** alab**e̲**-a ↛ *alab**i̲**-a

/alaba-a/ alabe-a	ID-UO(hi)/[+low]	*low/_V	*mid/_V	ID-IO(hi)
→ alabe-a			*	
alabi-a	* !			

- **Can analyze all known examples of counterfeeding, including counterfeeding on environment and multi-step counterfeeding derivations** (these incorporate multiple Faith-UO constraints)