The Lookahead Effect in the Reduplication-Phonology Interaction

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Overview

- Parallel Optimality Theory, with the potential for **multiple simultaneous** (**fell-swoop**) changes, predicts the possibility of **lookahead effects** in the reduplication-phonology interaction.
- In contrast, lookahead effects are **not predicted** in Serial Template Satisfaction (STS), a theory of reduplication framed in Harmonic Serialism, a serial version of OT with **gradual** change.

Our claims:

- A lookahead effect is found in **Mbe** reduplicative affixations.
- A straightforward account is available in parallel OT but not STS.
- Mbe patterns provide support for **fell-swoop** changes in the theory of reduplication, where copy and change of the material occur in a single input-output mapping.

Contents

1. Background: Non-gradual vs. Gradual OT

1. Background: *Non-gradual vs. Gradual OT*

Classic Non-Gradual OT (Prince & Smolensky 1993/2004)

- Non-serial, also referred to in some work as "Parallel OT."
- GEN can introduce multiple changes simultaneously to the input.
- A single pass from GEN to EVAL;

Gradual-OT (Harmonic Serialism)

(McCarthy 2000, 2002, 2007, 2008a, b, 2010a, 2010b)

- A serial version of OT
- GEN is limited to making **no more than one change** in each step; e.g., deletion, insertion, assimilation.
- GEN→EVAL loops (gradualness)

x= input; op(x)=output of one change applied to x
Gen(x) = {x, $op_1(x)$, $op_2(x)$, ...}
*$op_2(op_1(x))$

1. Background: *Reduplication*

Non-gradual approach: BR Correspondence Theory

(McCarthy & Prince 1995)

a. All operations, including reduplication, are applied and evaluated **in one fell swoop**.
b. Reduplicant shape is derived from constraint interactions.
c. Base-reduplicant identity drives reduplication.

Gradual approach: Serial Template Satisfaction (STS)

(McCarthy, Kimper & Mullin 2012)

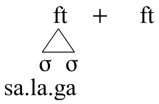
1. Background: *Serial Template Satisfaction*

- Reduplicative affixes are in the form of a prosodic template.

Manam :

sa.la.ga-la.ga ‘long (sg.)’

ʔu.lan-lan ‘desirable’



- A family of Headedness constraints, Hd(X), drive reduplication.

Hd(X): Assign a violation mark for every prosodic category X that does not contain a category of type X-1 as its head.

- Operations: **Copy(X)** & **Insert(X)**

***Copy(X)**: Assign a violation mark for copying a string of elements of type X.

1. Background: *STS exemplification*

Syllable copy in Manam

Step 1 of *sa.la.ga-la.ga*

ft + ft σ σ σ sa.la.ga	Ft-Bin	Hd(ft)	Hd(σ)	*Copy(σ)
a. → ft + ft σ σ σ σ σ sa.la.ga la.ga				1
b. ft + ft σ σ σ sa.la.ga	1W	1W		L
c. ft + ft σ σ σ σ sa.la.ga	1W		1W	L
d. ft + ft σ σ σ σ sa.la.ga la	1W			1

Step 2: convergence

1. Background: *STS exemplification*

Segment copy in Balangao

ma-tay.na-tay.nan ‘repeatedly be left behind’

Step 1 of *ma-tay.na-tay.nan*

ft + ft σ σ tay.nan	*Copy(σ)	Hd(ft)	Ft-Bin(σ)	Hd(σ)	*Copy(seg)
a. → ft + ft σ σ tay.nan			1	1	
b. ft + ft σ σ tay.nan		1W	1	L	
c. ft + ft σ σ σ σ tay.nan tay.nan	1W		L	L	

1. Background: *STS exemplification*

Step 2: repeat **Insert(σ)**

ft + ft σ σ tay.nan	*Copy(σ)	Hd(ft)	Ft-Bin(σ)	Hd(σ)	*Copy(seg)
a. → ft + ft σ σ σ σ tay.nan				2	
b. ft + ft σ σ σ tay.nan			1W	1L	
c. ft + ft σ σ σ ta tay.nan			1W	L	1W
d. ft + ft σ σ σ tay tay.nan			1W	L	1W

Step 3: segment copying

To recap…

Gradual OT, as in Harmonic Serialism

“One change”: *deletion, insertion, assimilation,* ***copy(X), insert(X)***

Non-gradual OT

The effects of all changes are applied and evaluated in **one fell swoop**.

2. The Lookahead Effect in Reduplication-Phonology Interaction

2. The Lookahead Effect: *definition*

Lookahead effect in reduplication/phonology interactions

- The amount of material copied is sensitive to availability of a phonological change in the derived context.
- In STS, this would require the operation of **Copy(X)** to depend on the results of a **subsequent** phonological operation, an interaction that is not predicted

2. The Lookahead Effect: *exemplification*

A hypothetical case (McCarthy et al. 2012)

- A language allows a coda only if it is a nasal homorganic with a following onset (CODA-COND).
- A reduplicative pattern:
  - a. pa.ta pa-pa.ta (RED=/CV/, *pat-pa.ta)
  - b. pa.na pam-pa.na (RED=/CVC/)

Copy(X) **looks ahead** to the result of place assimilation (i.e. whether the coda condition is respected after assimilation)

3. A lookahead effect in Mbe reduplication

3. A lookahead effect in Mbe reduplication: *data*

Mbe: A Benue-Congo language, spoken in Nigeria
(Bamgboṣe 1966, 1967a, b, c, 1971, Walker 2000)

Class 2 verb: reduplicative imperative singular

a. rû	rû-rû	'pull'
b. jú.bò	jû-jú.bò	'go out'
c. só.rò	sə̂-só.rò	descend'
d. tá.rò	tə̂-tá.rò	'throw'

Imperative Cl. 2 prefix shape:
- When the stem contains only oral consonants (a-d), the reduplicant shape is CV.

3. A lookahead effect in Mbe reduplication: *data*

Class 2 verb: reduplicative imperative singular

e. tâŋ	tə̂n-tâŋ	'teach'
f. ɠɓé.nò	ɠɓə̂ŋ̃m-ɠɓé.nò	'collide'
g. pûɔ.nì	pûm-pûɔ.nì	'mix'
h. ɗʒûɔŋ	ɗʒûn-ɗʒûɔŋ	'be higher'
i. lúo.nî	lûn-lûo.nì	'repair'
j. jíɔ.nî	jîn-jîɔ.nì	'forget'

Imperative Cl. 2 prefix shape:
- When the stem contains a post-vocalic nasal (e-j), the reduplicant shape is CVN.
- The coda nasal in the reduplicant is homorganic with the place of the following onset.

Two vocalic simplifications:
- The vowel in the reduplicant is [ə] when the stem vowel is non-high (c-f).
- When the stem contains a diphthong, only the first vowel is copied (g-j).

3. A lookahead effect in Mbe reduplication: *Non-gradual OT*

CODA-COND >> MAX-BR >> IDENT-BR(PLACE)
- Only nasals are copied, and copied nasals respect CODA-COND.

- [tá.rò] 'throw (CLASS2.IMP.SG)'

RED + tárò	CODA-COND	MAX-BR	IDENT-BR(PLACE)
→ a. tə̂-tá.rò		2	
b. tə̂r-tá.rò	1W	1L	

- [pûɔ.nì] 'mix (CLASS2.IMP.SG)'

RED + pûɔnì	CODA-COND	MAX-BR	IDENT-BR(PLACE)
→ a. pûm-pûɔ.nì		2	1
b. pû-pûɔ.nì		3W	L
c. pûn-pûɔ.nì	1W	2	L

3. A lookahead effect in Mbe reduplication: *Non-gradual OT*

Analysis for the reduplication imperative prefix:

Further details (after Walker 2000)

- Reduplicant as one-syllable in size
  MAX-IO >> *STRUC-σ >> MAX-BR
- Diphthong avoidance in the reduplicative affix
  MAX-IO >> NODIPH >> MAX-BR
- Non-high peripheral vowel avoidance
  IDENT-IO[color] >> *NONHIGHFULLV >> IDENT-BR[color].

3. A lookahead effect in Mbe reduplication: *Problem for STS*

Step1 Copy(seg)

σ + σ σ gb̄é.nò	HD(σ)	CODA-COND	*COPY(seg)
a. σ + σ σ gb̄én gb̄é.nò		1W	1
☹ b. σ + σ σ gb̄é gb̄é.nò			1
c. σ + σ σ gb̄é.nò	1W		L

1. [gb̄ân**ŋm**-gb̄é.nò] cannot be generated because it requires **two changes**.
2. Selection of the intermediate candidate (a) is impossible because it is less harmonic than (b). With a σ template, copying CV is preferred over copying CVC.

3. A lookahead effect in Mbe reduplication:

Additional reduplication patterns in Mbe that show similar lookahead effects with copy and place-assimilation of coda nasals:

- Diminutive reduplication
- Reduplication in inchoative verbs

4. Alternative Accounts in STS

- CV and CVC allomorphs
- 'Copy+Deletion'

4. Alternative accounts: CV and CVC allomorphs

- Southern Paiute (McCarthy 2002, Sapir 1930, McDonough 1987)
- Unpredictability of CV and CVC reduplicant shape

a. **pin.wa** **pi-vin.wa** 'wife' → σ template

b. **pin.ti** **pim-pin.ti** 'to hang onto' → *ft* template

- The copy or non-copy of a coda is not determined by the coda condition, but results from two lexically determined allomorphic templates of the reduplicative affix. (McCarthy et al. 2012)

- However, in Mbe, it is fully predictable whether a given verb root will reduplicate as CV or CVC.
- The surface shape variation is **phonologically predictable** and conditioned by CODA-COND.
- Therefore, an account of Mbe nasal copy as lexically determined allomorphy lacks support.

4. Alternative accounts: 'Copy + Deletion'

- *ft*-template
- Step 1 of [pûm-pûɔ.nì]

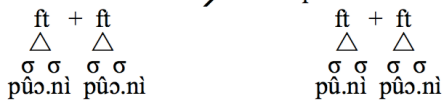
ft + ft △ σ σ pûɔ.nì	FT-BIN(σ)	*COPY(σ)
a. → ft + ft △ △ σ σ σ σ pûɔ.nì pûɔ.nì		1
b. ft + ft | △ σ σ σ pûɔ pûɔ.nì	1W	1
c. ft + ft △ σ σ pûɔ.nì	1W	L

4. Alternative accounts: 'Copy + Deletion'

• Step 2: diphthong reduction

MAX$_{root}$ >> NODIPH >> MAX

Input: → Output:



4. Alternative accounts: 'Copy + Deletion'

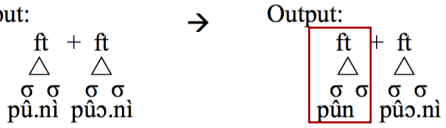
• Step 3: affix size reduction

• AFFIX≤σ: Assign one violation mark to any affix whose phonological exponent is larger than a syllable.

(McCarthy & Prince 1994)

AFFIX≤σ >> MAX, CODA-COND, HD(σ)

Input: → Output:



4. Alternative accounts: 'Copy + Deletion'

a. "**FT-BIN(σ) >> AFF≤σ**" is necessary to trigger the copying of two σs in Step 1.

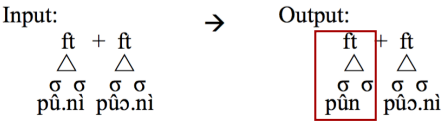
b. AFF≤σ must assess ***only*** the prosodic structure that has segmental realization.

c. If FT-BIN(σ) also consistently evaluates *only* the prosodic structure with segmental realization, then it would be violated by the output in Step 3.

d. To make the 'deletion' step possible, FT-BIN(σ) must be evaluated on the basis of prosodic structure *without* reference to its segmental realization.

Step 3: affix size reduction

Input: → Output:

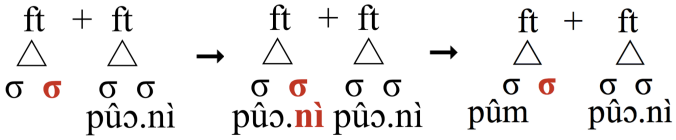


4. Alternative accounts: 'Copy + Deletion'

Problems for 'Copy + Deletion' path:

• It requires opposing stipulations about the evaluation of FT-BIN(σ) and AFF≤σ.

• The segmental level of the second σ exists only at the intermediate stage, rendering the derivation opaque with the form of A→B→A.
('the Duke of York gambit' Pullum 1975)



5. Conclusion: summary

• Gradual, serial OT stipulates stepwise derivation and therefore makes a strong prediction about the impossibility of lookahead effects.

• The reduplicative patterns in Mbe imperative and diminutive affixation plausibly show irreducible parallelism.

• The lookahead effect in reduplication-phonology interactions is captured naturally by a non-gradual version of OT but not a gradual version, as instantiated in Serial Template Satisfaction.

5. Conclusion: implication & discussion

Another lookahead effect in the reduplication of Maragoli

(Adler & Zymet 2016)

The copy operation looks ahead to the result of hiatus repair

(i.e. whether an onsetless syllable / complex onset is created in the reduplicants created).

5. Conclusion: implication & discussion

- If we keep a gradual approach to reduplication, we need to define 'operation' and the inventory of operations in GEN.
  - Rethink 'Copy(X)' as an independent operation.

- The issue of what counts as an operation is further complicated by works on non-reduplicative phenomena that appear to involve fell-swoop changes

  (Walker 2010, Kaplan 2011, Kurisu 2012, Adler & Zymet 2016)

5. Conclusion: implication & discussion

- STS undergenerates for lookahead effects
- STS does not actually restrict medial-coda skipping as claimed (Zukoff 2017)

However, in view of the lookahead effects in this study and Zukoff (2017), it is not clear how strong the residual evidence is for a gradual approach to **reduplication**, calling the motivation for STS into question, even in revised form.

THANK YOU!

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