A Correspondence-theoretic Account of Fixed Segmentism Reduplication

ConSOLE XVI
12th of January
(Université Paris Diderot)

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Goal
In (morphological) fixed-Segmentism reduplication (FSR), reduplication is accompanied by addition of an affix which partially overwrites the reduplicant. I will argue, that FSR is best captured by a correspondence-theoretic analysis without facing any problems pointed out by Nevins (2005).

1 Fixed-segmentism reduplication

1.1 Introduction

(1) English /schm/-reduplication

a. table	table-schmable
b. plan	plan-schman
c. string	string-schming
d. apple	apple-schmapple

A standard analysis for fixed segmentism reduplication is the OT-approach based on correspondence theory presented in Alderete et al. (1999). Nevins (2005) claims that this analysis of FSR faces three serious problems:

1. it predicts the existence of unattested FSR systems where the FSR affix is backcopied to the base

2. it predicts unattested FSR systems where the realization of the FSR affix depends on its relative size with respect to the portion of the reduplicant it strives to overwrite

3. it cannot account for cases in which no phonotactic constraint forces overwriting

Claim
FSR is captured best by a correspondence-theoretic analysis:

⇨ 1. FSR patterns involving backcopying of the FSR affix to the base is clearly a possibility in the languages of the world

⇨ 2. unattested segment-counting FSR is excluded by correspondence theory using independently motivated parametrization of optimality-theoretic constraints

1.2 Alderete et al.: 1999

(2) Correspondence Theory (McCarthy and Prince (1995))

Input:	$\mathrm{Af}_{\mathrm{RED}}$	+	Stem	
				IO-FAITHFULNESS
Output:	Reduplicant		Base	
		BR-IDENTITY		

The input for the OT-grammar consists of the root, the affix /schm/ and the abstract formant RED which consists of no phonological material of its own but whose "content [...] is determined by the base" (Nelson (2002), p.321).
Combining the affix /schm/ and consonant-initial bases leads to clusters such as */ʃmt/ which are excluded in English. Either /schm/ or the onset of the reduplicant must be deleted, and hence compete for realization – a competition which is resolved by $\textsc{Max}_{\mathrm{IO}}$ and $\textsc{Max}_{\mathrm{BR}}$.

(3) English: $\textsc{Max}_{\mathrm{IO}} \gg \textsc{Max}_{\mathrm{BR}}$

	$t_1a_2b_3l_4e_5$-sch_6m_7-RED	$\textsc{Max}_{\mathrm{IO}}$	$\textsc{Max}_{\mathrm{BR}}$
☞	a. $t_1a_2b_3l_4e_5$- $sch_6m_7a_2b_3l_4e_5$		*
	b. $sch_6m_7a_2b_3l_4e_5$- $sch_6m_7a_2b_3l_4e_5$	*!	
	c. $sch_6m_7a_2b_3l_4e_5$-$t_1a_2b_3l_4e_5$	*!	* *
	d. $t_1a_2b_3l_4e_5$-$t_1a_2b_3l_4e_5$	*!*	

2 Backcopying

2.1 Morphological Backcopying as typological misprediction?

The system predicts cases of *morphological backcopying* – the FSR affix "backcopies" from the reduplicant to the base (cf. (4)). Since it is one of the foundational tenets of Optimality Theory that constraints can be freely reranked, this combination of FSR and backcopying should be attested in some language.

(4) English': $\textsc{Max}_{\mathrm{BR}} \gg \textsc{Max}_{\mathrm{IO}}$

	$t_1a_2b_3l_4e_5$-sch_6m_7-RED	$\textsc{Max}_{\mathrm{BR}}$	$\textsc{Max}_{\mathrm{IO}}$
	a. $t_1a_2b_3l_4e_5$-$sch_6m_7a_2b_3l_4e_5$	*!	
☞	b. $sch_6m_7a_2b_3l_4e_5$-$sch_6m_7a_2b_3l_4e_5$		*
	c. $sch_6m_7a_2b_3l_4e_5$-$t_1a_2b_3l_4e_5$	*!*	*
	d. $t_1a_2b_3l_4e_5$-$t_1a_2b_3l_4e_5$		* *!

⇨ **Nevins classifies these patterns as generally unattested**

2.2 Morphological backcopying in Siroi

In FSR in Siroi, the fixed segmentism /g/ replaces the onset of the second syllable in disyllabic words (5-a,b) and is infixed in monosyllabic words (5-c).
This fixed segment does not only appear in the reduplicant, but *also in the base:*

(5) Reduplication in Siroi (Wells (1979))

a.	maye	ma**g**e-ma**g**e	'good'
b.	sungo	su**g**o-su**g**o	'big'
c.	kuen	ku**g**en-ku**g**en	'tall'

2.3 Morphological backcopying in Seereer-Siin

In Seerer, noun class prefixes trigger mutation of the initial consonant.

1. voicing mutation (changing a voiced into a voiceless stop (6-a,b))
2. continuancy mutation (changing a continuant into a stop, (6-c,d))

(6) Consonant mutation in Seereer-Siin (McLaughlin (2000))

	Sg	Pl		
a.	o-**c**ir	**ɟ**ir	'sick person'	*Voicing mutation*
b.	o-**k**awul	**g**awul	'griot'	
c.	o-**p**ad	**f**ad	'slave'	*Continuancy mutation*
d.	o-**t**ew	**r**ew	'woman'	

Consonant mutation interacts with a second process, derivation of agent nouns through reduplication where the reduplicative prefix is truncated to a CV: template (7). In contrast to voicing mutation, continuancy mutation affects the initial consonant of the root and applies optionally also to the reduplicant

(7) Reduplication in Seerer-Siin: No featural transfer

a. bind	'write'	o-pii-bind	'writer'
b. dap	'launder'	o-taa-dap	'launderer'
c. gim	'sing'	o-kii-gim	'singer'

(8) Reduplication in Seerer-Siin: Optional featural transfer

d. xoox	'cultivate'	o-qoo-xoox	o-qoo-**q**oox	'farmer'
e. fec	'dance'	o-pee-fec	o-pee-**p**ec	'dancer'
f. war	'kill'	o-baa-war	o-baa-**b**ar	'killer'
g. riw	'weave'	o-tii-riw	o-tii-**t**iw	'weaver'

Mutation in Seerer is analysed as featural affixation of the features [–cont] and [–voice]. In the continuancy mutation, this (featural) affix overwrites the feature specification of the reduplicant *and* this change optionally is copied back to the base.

⇨ **morphological backcopying (in FSR and more generally) is attested.**

3 Root-and-Pattern Morphology

Nevins (2005) sees a fundamental problem with the implementation of overwriting through constraint evaluation and extends his critique to another case of nonconcatenative morphology: Semitic root-and-pattern morphology.

3.1 Hebrew Denominal formation (Ussishkin (1999)

The affixal melody /i – e/ has to be realized inside the base, but since the size of the resulting structure is restricted to bisyllabicity, not all vowels can be parsed and competition arises.

(9) Hebrew Denominal Verb Formation (Ussishkin (1999))

a. dam	'blood'	dimem	'to bleed'
b. xam	'hot'	ximem	'to heat'
c. xad	'sharp'	xided	'to sharpen'
d. cad	'side'	cided	'to side with'

Two separate faithfulness constraints for stem and affix vowels – MAX-VOWEL-AF and MAX-VOWEL-STEM – implement this preference for the realization of affix vowels.

- this parametrization of faithfulness constraints to the domains affix and stem goes back to the original formulation of Correspondence Theory in McCarthy and Prince (1995):

  "It must be, then, that correspondence constraints are tied not only to specific dimensions (B-R, I-O, [...]), but also, in some cases at least, to specific morphemes or morpheme classes. Thus, the full schema for a faithfulness constraint may include such specifics as these: [...] the morphological domain (root, affix, or even specific morpheme) to which the constraint is relevant".
  (McCarthy and Prince (1995), p.17)

(10) Correspondence Theory – stem and affix faithfulness

Input: Affix + Stem

IO-AFFIX IO-STEM

Output: Affix Base

(11) Denominal Verb Formation from Biconsonantal Base (Ussishkin (1999))

$d_1a_2m_3$ + i_4 - e_5	MINWD	MAX-V_{Af}	MAX-V_S	INTEGRITY
a. $d_1a_2m_3e_5m_3$		*!		*
b. $d_1i_4m_3a_2m_3$		*!		*
c. $d_1a_2m_3i_4m_3e_5$	*!			*
☞ d. $d_1i_4m_3e_5m_3$			*	*

In roots with a high vowel, base *and* affix vowels can maintained with employing the base vowel as the featurally equivalent glide /j/.

(12) Denominal Verb Formation from Glide-medial Base (Ussishkin (1999))

$t_1i_2k_3$ + i_4 - e_5	MinWd	Max-V_{Af}	Max-V_S	Integrity
a. $t_1i_2i_4e_5k_3$	*!			
b. $t_1i_4k_3e_5k_3$			*!	*
☞ c. $t_1i_4j_2e_5k_3$				

⇨ **This solution (maintain base *and* affix vowels) should be available for /dam/ as well!**

(13) Problematic Candidate with Biconsonantal Base (Nevins (2005))

$d_1a_2m_3$ + i_4 - e_5	MinWd	Max-V_{Af}	Max-V_S	Integrity
a. $d_1a_2m_3e_5m_3$		*!		*
b. $d_1i_4m_3a_2m_3$		*!		*
c. $d_1a_2m_3i_4m_3e_5$	*!			*
☛ d. $d_1i_4m_3e_5m_3$			*!	*
☞ e. $d_1a_2j_4e_5m_3$				

3.2 Parametrising of faithfulness constraints I

1. replacing /i/ with /j/ implies deletion of a mora
2. parametrisation of faithfulness constraints is applied to all faithfulness constraints, namely Max-μ

(14) Max-μ: Input moras should have correspondent moras in the output.

(15) Analysis of Glide-medial Base under Constraint Parametrization

$t_1i_2k_3$ + i_4 - e_5	Max-V_{Af}	Int$_{Af}$	Max-μ_{Af}	Max-V_S	Int$_S$	Max-μ_S
a. $t_1i_4e_5k_3$				*!		*
b. $t_1i_4k_3e_5k_3$					*!	
☞ c. $t_1i_4j_2e_5k_3$						*

(16) Analysis of Biconsonantal Base under Constraint Parametrization

$d_1a_2m_3$ + i_4 - e_5	Max-V_{Af}	Int$_{Af}$	Max-μ_{Af}	Max-V_S	Int$_S$	Max-μ_S
a. $d_1a_2m_3e_5m_3$	*!		*		*	
b. $d_1i_4m_3a_2m_3$	*!		*		*	
☞ c. $d_1i_4m_3e_5m_3$				*	*	*
d. $d_1a_2j_4e_5m_3$			*!			

➤ This analysis systematically violates the RAFM[1].

(17) *Root-Affix Faithfulness Metaconstraint, RAFM* (McCarthy and Prince (1995)
RootFaith ≫ AffixFaith

➤ The MAX constraints relativized to specific morphological domains seem to be ranked "in blocks", i.e. all constraints relativized to affix material are ranked above the corresponding constraints relativized to stems

⇨ **The RAFM might be replaced by the metacondition (18)**

(18) MAX-DEP *Adjacency:*
Let α and β be different morphological domains (e.g root, affix, base-reduplicant), and $\{C_1, \ldots, C_n\}$ the set of MAX and DEP constraints, then either
$\{C_1\alpha \ldots C_n\alpha\} \gg \{C_1\beta \ldots C_n\beta\}$ or $\{C_1\beta \ldots C_n\beta\} \gg \{C_1\alpha \ldots C_n\alpha\}$.

MAX-DEP Adjacency licenses the ranking in a. (cf. the analysis of Hebrew) but systematically excludes rankings where stem and affix MAX constraints alternate in their ranking:

(19) a. MAX-V_{Af} $\gg \ldots \gg$ MAX-μ_{Af} $\gg \ldots \gg$ MAX-V_S $\gg \ldots \gg$ MAX-μ_S
b. MAX-V_{Af} $\gg \ldots \gg$ MAX-μ_S $\gg \ldots \gg$ MAX-V_S $\gg \ldots \gg$ MAX-μ_{Af}

4 Segment-counting Fixed-Segment Reduplication

> "Faithfulness constraints that are evaluated on the basis of segment counting predict a typology of languages in which (a) optimization dictates that the relative *size* of the affixal material determines whether it will win out and "overwrite" the base"[.] (Nevins (2005), p.275.)

4.1 Another typological misprediction?

Varying the size of the root onset could yield different FSR patterns since MAX-IO prefers realization of more input segments and therefore it effectively compares whether root onset or the affix (fixed segment) is longer. Therefore, the analysis of Alderete et al. (1999) predicts inconsistent patterns depending on the size of the base onset[2]:

(20) *Wrong prediction for English*

apple-schm-RED	MAX_{IO}	MAX_{BR}
☞ a. $a_1pp_2l_3e_4$-schm$a_1pp_2l_3e_4$		
☞ b. $sch_1m_2a_3pp_4l_5e_6$-$sch_1m_2a_3pp_4l_5e_6$		
c. schm$a_1pp_2l_3e_4$-$a_1pp_2l_3e_4$		*!*
d. $a_1pp_2l_3e_4$-$a_1pp_2l_3e_4$	*!*	

[1]There are a number of cases where the RAFM is systematically violated, e.g. affix controlled vowel harmony in Pulaar (Krämer (2002))

[2]Cf. the Appendix (24)) for the detailled tables for the English'ranking for more possible underlying roots.

(21) *Inconsistent prediction for English'*

	MAX$_{BR}$	MAX$_{IO}$
string-schm-RED		
a. stri$_1$ng$_2$-schmi$_1$ng$_2$	*!**	
b. sch$_1$m$_2$i$_3$ng$_4$-sch$_1$m$_2$i$_3$ng$_4$		***!
☞ c. s$_1$t$_2$r$_3$i$_4$ng$_5$-s$_1$t$_2$r$_3$i$_4$ng$_5$		**

4.2 Parametrising faithfulness constraints II

This does not point to any fundamental problem of OT or CC and those patterns are excluded by standard means of parametrizing faithfulness constraints to the domains affix and stem (cf. the analysis of Hebrew sketched above).

(22)
a. MAX-S: Every segment of the stem in the input has a correspondent in the base in the output.
b. DEP-S: Every segment of the root in the output has a correspondent in the base in the input.
c. MAX-AF: Every segment of an affix in the input has a correspondent in an affix in the output.
d. DEP-AF: Every segment of an affix in the output has a correspondent in an affix in the input
e. MAX-BR: Every segment in the base has a correspondent in the reduplicant.
f. DEP-BR: Every segment in the reduplicant has a correspondent in the base.

The constraint system in (22) systematically excludes FSR systems where realization and backcopying of the FSR affix varies with the phonological size of the base:

(23) *Predictions*

{FAITH$_S$, FAITH$_{AF}$} ≫ ...	the English pattern (cf. Appendix: (25))
{FAITH$_{AF}$, FAITH$_{BR}$} ≫ ...	Backcopying (cf. Appendix: (26))
{FAITH$_S$, FAITH$_{BR}$} ≫ ...	complete suppression of the FSR affix (cf. Appendix: (27))

➤ Outlook:

1. the concept of comparative markedness (McCarthy: 2003) solves the final problem: forcing overwriting in languages where realisation of FSR affix and reduplicants onset does not violate any high ranked markedness constraint

2. the approach Nevins favors:

   - predicts the very same unattested cases of segment counting FSR
   - is actually less restrictive than the OT approach in Alderete and is clearly capable to capture specific types of segment-counting FSR (cf. Zimmermann and Trommer (2007))

5 Conclusion

FSR involving backcopying of the FSR affix is clearly a formal possibility employed in human language, while segment-counting FSR is so far unattested.
A correspondence-theoretic account of reduplication captures these facts and the problems Nevins (2005) pointed out for the analysis in Alderete et al. (1999) are either empirically flawed or find a straightforward solution in independently motivated parametrization for faithfulness constraints.

6 Appendix

(24) *Inconsistent FSR in English'*

	Max-BR	Max-IO
1: apple-schm-RED		
☞ a. $a_1pp_2l_3e_4$-$schma_1pp_2l_3e_4$		
☞ b. $sch_1m_2a_3pp_4l_5e_6$-$sch_1m_2a_3pp_4l_5e_6$		
c. $a_1pp_2l_3e_4$-$a_1pp_2l_3e_4$		*!*
2: table-schm-RED		
a. $ta_1b_2l_3e_4$-$schma_1b_2l_3e_4$	*!	
☞ b. $sch_1m_2a_3b_4l_5e_6$-$sch_1m_2a_3b_4l_5e_6$		*
c. $t_1a_2b_3l_4e_5$-$t_1a_2b_3l_4e_5$		**!
3: plan-schm-RED		
a. pla_1n_2-$schma_1n_2$	*!*	
☞ b. $sch_1m_2a_3n_4$-$sch_1m_2a_3n_4$		**
☞ c. $p_1l_2a_3n_4$-$p_1l_2a_3n_4$		**
4: string-schm-RED		
a. $stri_1ng_2$-$schmi_1ng_2$	*!**	
b. $sch_1m_2i_3ng_4$-$sch_1m_2i_3ng_4$		***!
☞ c. $s_1t_2r_3i_4ng_5$-$s_1t_2r_3i_4ng_5$		**

(25) *Possible Rankings for English*

	Faith-S[3]	Faith-Af	...
1: $a_1pp_2l_3e_4$-sch_5m_6-RED			
☞ a. $a_1pp_2l_3e_4$-$sch_5m_6a_1pp_2l_3e_4$			
b. $sch_5m_6a_1pp_2l_3e_4$-$sch_5m_6a_1pp_2l_3e_4$	dd!		
c. $a_1pp_2l_3e_4$-$a_1pp_2l_3e_4$		mm!	
2: $t_1a_2b_3l_4e_5$-sch_6m_7-RED			
☞ a. $t_1a_2b_3l_4e_5$-$sch_6m_7a_2b_3l_4e_5$			
b. $sch_6m_7a_2b_3l_4e_5$-$sch_6m_7a_2b_3l_4e_5$	mdd!		
c. $t_1a_2b_3l_4e_5$-$t_1a_2b_3l_4e_5$		mm!	
3: $p_1l_2a_3n_4$-sch_5m_6-RED			
☞ a. $p_1l_2a_3n_4$-$sch_5m_6a_3n_4$			
b. $sch_5m_6a_3n_4$-$sch_5m_6a_3n_4$	mmdd!		
c. $p_1l_2a_3n_4$-$p_1l_2a_3n_4$		mm!	
4: $s_1t_2r_3i_4ng_5$-sch_6m_7-RED			
☞ a. $s_1t_2r_3i_4ng_5$-$sch_6m_7i_4ng_5$			
b. $sch_6m_7i_4ng_5$-$sch_6m_7i_4ng_5$	mmmdd!		
c. $s_1t_2r_3i_4ng_5$-$s_1t_2r_3i_4ng_5$		mm!	

(26) *Backcopying*

	FAITH-A	FAITH-BR	…
apple-schm-RED			
a. $a_1pp_2l_3e_4$-schm$a_1pp_2l_3e_4$		dd!	
☞ b. $sch_1m_2a_3pp_4l_5e_6$-$sch_1m_2a_3pp_4l_5e_6$			
c. $a_1pp_2l_3e_4$-$a_1pp_2l_3e_4$	dd!		
table-schm-RED			
a. $ta_1b_2l_3e_4$-schm$a_1b_2l_3e_4$		mdd!	
☞ b. $sch_1m_2a_3b_4l_5e_6$-$sch_1m_2a_3b_4l_5e_6$			
c. $t_1a_2b_3l_4e_5$-$t_1a_2b_3l_4e_5$	mm!		
plan-schm-RED			
a. pla_1n_2-schma_1n_2		m!mdd	
☞ b. $sch_1m_2a_3n_4$-$sch_1m_2a_3n_4$			
c. $p_1l_2a_3n_4$-$p_1l_2a_3n_4$	mm!		
string-schm-RED			
a. $stri_1ng_2$-schmi_1ng_2		mmmdd!	
☞ b. $sch_1m_2i_3ng_4$-$sch_1m_2i_3ng_4$			
c. $s_1t_2r_3i_4ng_5$-$s_1t_2r_3i_4ng_5$	mm!		

(27) *Suppression of FSR Affix*

	FAITH-S	FAITH-BR	…
apple-schm-RED/			
a. $a_1pp_2l_3e_4$-schm$a_1pp_2l_3e_4$		dd!	
b. $sch_1m_2a_3pp_4l_5e_6$-$sch_1m_2a_3pp_4l_5e_6$	dd!		
☞ c. $a_1pp_2l_3e_4$-$a_1pp_2l_3e_4$			
table-schm-RED			
a. $ta_1b_2l_3e_4$-schm$a_1b_2l_3e_4$		mdd!	
b. $sch_1m_2a_3b_4l_5e_6$-$sch_1m_2a_3b_4l_5e_6$	mdd!		
☞ c. $t_1a_2b_3l_4e_5$-$t_1a_2b_3l_4e_5$			
plan-schm-RED			
a. pla_1n_2-schma_1n_2		m!mdd	
b. $sch_1m_2a_3n_4$-$sch_1m_2a_3n_4$	m!mdd		
☞ c. $p_1l_2a_3n_4$-$p_1l_2a_3n_4$			
string-schm-RED			
a. $stri_1ng_2$-schmi_1ng_2		mmmdd!	
b. $sch_1m_2i_3ng_4$-$sch_1m_2i_3ng_4$	mmmdd!		
☞ c. $s_1t_2r_3i_4ng_5$-$s_1t_2r_3i_4ng_5$			

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