

# **Reduplication without a base: An argument from the typology of multiple reduplication**

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What can multiple reduplication tell us about the theoretical account of reduplication and the phonology-morphology interface?

(1) *Multiple Reduplication*

The presence of more than one reduplicative morpheme in a word.

## Concrete question: What is the 'base' for reduplication?

The string immediately adjacent to the reduplicant.

(e.g. Broselow and McCarthy, 1983)

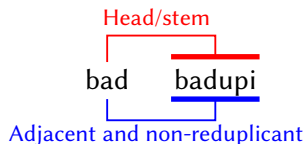
Everything in the output that is not the reduplicant. (e.g. Riggle, 2003)

Determined by phonological & semantic criteria.

(e.g. Urbanczyk, 2000; Shaw, 2005)

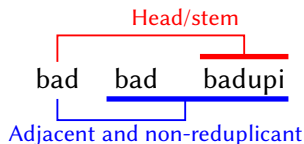
(2) *Single reduplication*

<Red<sub>1</sub>> /badupi/



(3) *Multiple reduplication*

<Red<sub>2</sub>> <Red<sub>1</sub>> /badupi/



## Main Claim

- the typology of multiple reduplication strengthens the argument that **languages differ** in what the ‘base’ for reduplication is (cf. Urbanczyk, 2000; Shaw, 2005) specific differences
  - vs. Morphological Doubling Theory for reduplication (Inkelas and Zoll, 2005; Inkelas, 2008)
- a **purely phonological account** predicts this variation without a concept of ‘base’ and allows a (more) modular theory where phonology only sees morphological affiliation
  - the choice between the adjacent string or the stem are epiphenomenal and follow from the preferences to **copy locally** and to **copy full contiguous morphemes**

1. The typology of multiple reduplication
2. Theoretical question: What is the base for reduplication?
3. A phonological account of reduplication
  - 3.1 Theoretical background
  - 3.2 Deriving the typology
  - 3.3 Further predictions
4. Conclusion

# The typology of multiple reduplication

## Multiple reduplication: Tagalog example

- /CV-/ reduplication marks the imperfective and full reduplication of the stem plural in (4-a)
- a verb can be marked for both plural (actor) and imperfective by combining both reduplications (4-b+c)

### (4) *Reduplication in Tagalog (Mattes, 2007, 126)*

- a. nag-**du**~duman          siya    **bulan**~bulan  
 BEG.AV-IPFV~DEM.DIST 3.SG.AF PL~month  
 ‘S/he goes there every month’
- b. ini          an **ha**~**hanap**~hanap-on  
 DEM.PROX PB IPFV~PL~look.for-UG  
 ‘here (they are) continuously searching’

## Excluded (for now): Multiple full reduplication

- intensifying reduplication in Taiwanese affects only monosyllabic adjectives

(5) *Taiwanese, Sino-Tibetan (Zhang and Lai, 2007, 34)*

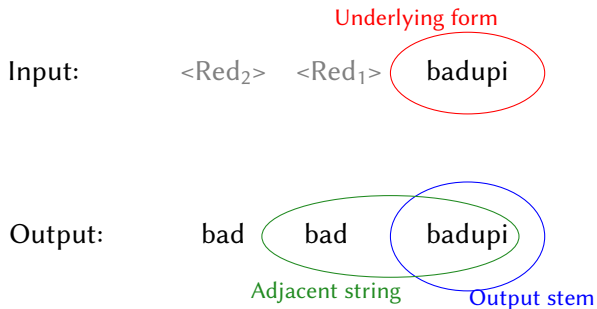
	‘somewhat A’	‘very A’	
$p^h oŋ^{21}$	$p^h oŋ^{51} \sim p^h oŋ^{21}$	$p^h oŋ^{51} \sim p^h oŋ^{51} \sim p^h oŋ^{21}$	‘blown-up’
$sin^{55}$	$sin^{33} \sim sin^{55}$	$sin^{35} \sim sin^{33} \sim sin^{55}$	‘new’
$kaw^{33}$	$kaw^{21} \sim kaw^{33}$	$kaw^{35} \sim kaw^{21} \sim kaw^{33}$	‘thick’



## Languages with multiple reduplication

<b>Tigre</b>	Afro-Asiatic	Semitic	(Rose, 2003)
<b>Arapaho</b>	Algic	Algonquian	(Cowell and Moss, 2008)
<b>Fox</b>	Algic	Algonquian	(Dahlstrom, 1997)
<b>Plains Cree</b>	Algic	Algonquian	(Ahenakew and Wolfart, 1983)
<b>Bikol</b>	Austronesian	Malayo-Polynesian	(Donner, 2012)
<b>Mokilese</b>	Austronesian	Malayo-Polynesian	(Harrison, 1974)
<b>Nukuoro</b>	Austronesian	Malayo-Polynesian	(Carroll, 1965)
<b>Papapana</b>	Austronesian	Malayo-Polynesian	(Smith, 2016)
<b>Sikaiana</b>	Austronesian	Malayo-Polynesian	(Donner, 2012)
<b>Tagalog</b>	Austronesian	Malayo-Polynesian	(Blake, 1917)
<b>Thao</b>	Austronesian	Western Plains	(Blust, 2001)
<b>Klamath</b>	Klamath-Modoc		(Barker, 1964; Zoll, 2002)
<b>Colville</b>	Salishan	Interior Salish	(Mattina, 1973)
<b>Lillooet</b>	Salishan	Interior Salish	(van Eijk, 1997)
<b>Shuswap</b>	Salishan	Interior Salish	(Kuipers, 1974)
<b>Spokane</b>	Salishan	Interior Salish	(Bates and Carlson, 1998)
<b>Thompson</b>	Salishan	Interior Salish	(Thompson and Thompson, 1992)
<b>Lushootseed</b>	Salishan	Central Salish	(Urbanczyk, 2001)
<b>Mainland Comox</b>	Salishan	Central Salish	(Watanabe, 1994)
<b>Kyuoquot*</b>	Wakashan	S. Wakashan	(Rose, 1981)
<b>Makah*</b>	Wakashan	S. Wakashan	(Davidson, 2002)
<b>Ditidaht*</b>	Wakashan	S. Wakashan	(Stonham, 1994)
<b>Tsishaath*</b>	Wakashan	S. Wakashan	(Stonham, 2004)

# What is the base for reduplication?



## The base for reduplication: Impossible to tell

- if R1 is not smaller than R2 and R1 copies faithfully

(6) e=ta~tamu~tamu  
 3.SG=HAB~CONT~eat  
 ‘he always eats’

Papapana, Austronesian (Smith, 2016, 539)

(7) k<sup>w</sup>a~k<sup>w</sup>a~k<sup>w</sup>atɬ-i:h  
 PL~look.for~sea.otter-look.for  
 ‘sea-otter-hunters’

Nuuchahnulth, Wakashan (Stonham, 2007, 122)

ta    tamu    **tamu**

or

ta    **tamu**    tamu

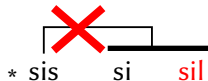
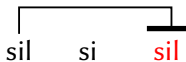
## The base for reduplication: The stem I (Shaw, 2005)

- /CV-/ reduplication for the diminutive (8-a), /CVC-/ reduplication for the distributive (8-b), and both can cooccur (8-c)

(8) *Thompson, Salishan (Haeberlin, 1918, 157)*

- sil~sí 'a little piece of calico'
- sil~síl 'patches of calico'
- sil~sí~sil 'small patches of calico'

→ R2 is larger than R1 and does not copy the string R1+stem



## The base for reduplication: The stem II (Urbanczyk, 2000)

- syllable-reduplication (9-a), and infixing /C/-reduplication (9-b), and both can cooccur (9-c)

(9) *Lillooet, Salishan* (van Eijk, 1997, 56+57)

- |    |                  |        |                                       |                   |
|----|------------------|--------|---------------------------------------|-------------------|
| a. | s-xap            | 'tree' | s-xəp-xáp                             | 'trees'           |
| b. | pálaʔ            |        | pá~p-laʔ                              | 'one person'      |
| c. | ciq <sup>w</sup> |        | cək <sup>w</sup> ~cá~c~k <sup>w</sup> | 'little red ones' |

→ R1 is an infix but R2 ignores it and only copies stem segments



## The base for reduplication: The adjacent string I (Urbanczyk, 2000)

- /CV-/ reduplication in the diminutive (10-b), /CVC-/ reduplication in the distributive (10-c), both can be combined in the order DIM-DIST
- default segment /i/ to avoid a stressed /ə/ in the DIM

(10) *Mainland Comox, Salishan* (Watanabe, 1994, 322,327,330)

- |    |                   |                        |
|----|-------------------|------------------------|
| a. | q'əsnay'          | 'small shirts/dresses' |
| b. | q'i~q'snay'       | 'small shirt/dress'    |
| c. | q'əs~q'əsnay'     | 'shirts/dresses'       |
| d. | q'i~q'əs~q'əsnay' | 'small shirts/dresses' |
|    | t'i~t'əł~t'ułəł   | 'small beds'           |

→ the (full) stem-V is not available for R2, only the adjacent R1-V

\* tú    təł    tułəł

tí    təł    tułəł

## The base for reduplication: The adjacent string II

- /Curu-/ reduplication marks plurality or continuation, /CV-/ reduplication imperfective aspect, and both can be combined (11-c)

(11) *Bikol, Austronesian (Mattes, 2007, 133,157)*

- |    |                    |                        |
|----|--------------------|------------------------|
| a. | buru~balyo         | CONT~change            |
|    | suru~sopsop        | CONT~suck              |
| b. | i-di~diretsyö      | CV-IPFV~continue       |
| c. | pig-su~suru~sikwat | BEG.AV-IPFV~PL-prod    |
|    | pig-pu~puru~pildit | BEG.AV-IPFV~PL-squeeze |
|    | pig-hu~huru~hapros | BEG.AV-IPFV~PL-caress  |

→ R2 copies the fixed segments that are part of R1



## The base for reduplication: The adjacent string III

- /Ca:/Ce:-/ reduplication marks the continuative (12-b), bisyllabic reduplication the continuative (12-c), and both can be combined (12-d)

(12) *Fox, Algic (Dahlstrom, 1997, 206+207)*

- |    |                         |                                      |
|----|-------------------------|--------------------------------------|
| a. | wi:tamaw-e:wa           | ‘he tells him’                       |
| b. | wa:~wi:tamaw-e:wa       | ‘he tells him over and over’         |
| c. | wi:ta~wi:tamaw-e:wa     | ‘he keeps telling him’               |
| d. | wa:wi~wa:~wi:tamaw-e:wa | ‘he keeps telling him over and over’ |

→ R2 is larger than R1 and copies the string resulting from R1+stem

\* wi:ta    wa:    ~~wi:tamaw~~

wa:wi    wa:    wi:tamaw



## Summary: Impossible to tell , Adjacent string , Stem

<b>Tigre</b>	Afro-Asiatic	Semitic	(Rose, 2003)
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<b>Tsishaath*</b>	Wakashan	S. Wakashan	(Stonham, 2004)

Theoretical question: What is the  
base for reduplication?

## Morphological Doubling Theory

(=MDT; Inkelas and Zoll, 2005; Inkelas, 2008)

- reduplication=morpho-syntactic features **realized more than once**
  - partial reduplication: associating morphological nodes with **different cophonologies** (Orgun, 1996; Anttila, 2002; Inkelas et al., 2004; Inkelas and Zoll, 2005, 2007); partial reduplicative morpheme is subject to some truncatory phonology
- reference to an output string (=result of another reduplication process) is impossible

			Underlying form
Input:	<Red <sub>2</sub> >	<Red <sub>1</sub> >	badupi
Output:	bad	bad	badupi

## Red and Base-Reduplicant Faithfulness

(=BRCT; McCarthy and Prince, 1995, and subsequent work)

- phonologically empty **RED** is the trigger for reduplication: a BR-faithfulness relation between base and reduplicant is established
- crucial: every reduplicative morpheme establishes its own **BR-relation**

(13)

	MAX-BR <sub>DIM</sub>	*CODA	MAX-BR <sub>DIS</sub>
RED <sub>DIS</sub> -sil'			
a. sil		*	**!*
☞ b. si~sil'		*	*
c. sil~sil'		**!	
RED <sub>DIM</sub> -sil'			
a. sil	*! **	*	
b. si~sil'	*!	*	
☞ c. sil~sil'		**	

## The 'base' in BR-accounts

### Constituent Base Hypothesis (Shaw, 2005)

=a morphological or prosodic constituent. Formally modelled with ANCHOR constraints.

→ ANCHOR constraints for prosodic constituents overgenerate!

### Different Conditions Hypothesis (Urbanczyk, 2000)

=determined based on phonological and semantic criteria. Formally modelled with ANCHOR (=adjacency) and  $MCAT \leq Hd(STEM)$  (=STEM).

Input:            <Red<sub>2</sub>>   <Red<sub>1</sub>>   badupi


Output:            bad   bad   badupi

Adjacent string            Morph.Hd

## Argument for a phonological alternative

- BR-Faith can predict both attested ‘base’ concepts but
  - relies on reduplication- and morpheme-specific constraints
  - relies on an abstract notion ‘base’ which mediates between BR-Faith and the phonological structure
- a phonological account based on prosodic affixation can predict the attested base concepts from standard faithfulness and without reference to a ‘base’

Input:            <Red<sub>2</sub>>   <Red<sub>1</sub>>   badupi

Output:            bad    badupi

Closest segments                      Cont.Morph

# A phonological account of reduplication

## Theoretical background



## Reduplication and prosodic affixation (=PA)

(Marantz, 1982; Pulleyblank, 2009; Saba Kirchner, 2010, 2013*a,b*; Bye and Svenonius, 2012; Bermúdez-Otero, 2012)

reduplicative morpheme = a **segmentally empty prosodic affix** that is filled with ‘copied’ elements of the base it is added to

- not substantially different from segmental affixes: they simply lack segmental content
- a **purely phonological account** without reduplication-specific mechanism or entities like RED or Faith<sub>BR</sub> (McCarthy and Prince, 1995, and subsequent work)
- strong argument for such an approach: **phonologically predictable allomorphy** between reduplication and other non-concatenative strategies like vowel lengthening (Saba Kirchner, 2010, 2013*a,b*; Zimmermann, 2013)

## Reduplication and prosodic affixation

- copying is a general phonological repair, modeled as segmental **fission** violating (14-a) (Spaelti, 1997; Struijke, 2000; Gafos, 2003; Nelson, 2003)
- that the otherwise prosodic node is filled with segmental material is ensured by constraints ensuring proper prosodic parsing (14-b)
- alternative strategies to realize the prosodic affix: for example epenthesis, penalized by DEP<sub>S</sub> (14-c)

- (14)
- a. INT<sub>S</sub>: Assign \* to every pair of output segments that correspond to the same input segment.
  - b.  $\mu > S$ : Assign \* to every  $\mu$  not dominating a segment.
  - c. DEP<sub>S</sub>: Assign \* to every output-segment without an input correspondent.

## Copying as fission: The basic mechanism

(15)

	$\mu$	$\mu$		$\mu > S$	DEPS	*V:	INTS
		$s_1$	$i_2$	$l'_3$			
a.	$\mu$		$\mu$				
		$s_1$	$i_2$	$l'_3$	*!		
b.	$\mu$	$\mu$					
	?	$\emptyset$	$s_1$	$i_2$	$l'_3$	*!*	
c.	$\mu$	$\mu$					
		$s_1$	$i_2$	$l'_3$		*!	
d.	$\mu$	$\mu$					**
	$s_1$	$i_2$	$s_1$	$i_2$	$l'_3$		

## Background assumption

- **morphological colours** (=morphological affiliation) allows the phonology to identify whether material is epenthetic (=colourless) and whether two elements belong to the same or different morphemes (van Oostendorp, 2003, 2008, 2007; Revithiadou, 2007; Trommer, 2011; Trommer and Zimmermann, 2014; Zimmermann, 2017)

## Deriving the typology

## The two crucial constraints

- $LIN_S$  preserves the **linear order or segments** inside one morpheme
- $CONT_M$  prefers **contiguous morphemes**

(16)  $LIN_S$

For every pair of output segments  $O_1$  and  $O_2$  corresponding to the input segments  $I_1$  and  $I_2$  affiliated with the same morpheme:

Assign \* for every  $O_1$  that follows  $O_2$  if  $I_1$  precedes  $I_2$ .

(17)  $CONT_M$

For every pair of output elements  $O_1$  and  $O_2$  corresponding to input elements  $I_1$  and  $I_2$  that belong to the same morpheme and  $I_1$  directly precedes  $I_2$ :

Assign \* for every  $O_1$  that is not directly followed by  $O_2$  and for every  $O_2$  that is not directly preceded by  $O_1$ .

CONT<sub>M</sub> VS. CONTIGUITY

- a non-existential version demanding **contiguous linear order for all instances of an element** and hence subsumes (18-a+b)

(18) CONTIGUITY (McCarthy and Prince, 1995, 123)

a. I-CONTIG ('No skipping')

The portion of  $S_1$  standing in correspondence forms a contiguous string.

b. O-CONTIG ('No intrusion')

The portion of  $S_2$  standing in correspondence forms a contiguous string.

LINS vs. CONT<sub>M</sub>

	$s_1i_2k_3w_4a_5t_6$	LINS	CONT <sub>M</sub>
a. Metathesis	$i_2s_1k_3w_4a_5t_6$	1	2
b. Full R.	$s_1i_2k_3w_4a_5t_6 \sim s_1i_2k_3w_4a_5t_6$	15	
c. Partial single R.	$s_1i_2 \sim s_1i_2k_3w_4a_5t_6$	1	1
d. Multiple R.: Adj	$s_1i_2s_1 \sim s_1i_2 \sim s_1i_2k_3w_4a_5t_6$	3	3
e. Multiple R.: Stem	$s_1i_2k_3 \sim s_1i_2 \sim s_1i_2k_3w_4a_5t_6$	7	2



## Copying of the stem in Thompson

(19) *Thompson: Copying across R1*

	$\mu$ $\mu$ $\mu$ $\mu$ $\mu$		
		$s_1$ $i_2$ $l'_3$	CONTM LINS
a.	$\mu$ $\mu$ $\mu$ $\mu$ $\mu$	$s_1$ $i_2$ $l_3$ $s_1$ $i_2$ $s_1$ $i_2$ $l'_3$	1    6
b.	$\mu$ $\mu$ $\mu$ $\mu$ $\mu$	$s_1$ $i_2$ $s_1$ $s_1$ $i_2$ $s_1$ $i_2$ $l'_3$	3!    4

## Copying of the adjacent string in Thompson'

(20) *Thompson': Copying R1+stem*

	$\mu$ $\mu$ $\mu$ $\mu$ $\mu$	LINS	CONTM
	$s_1$ $i_2$ $l'_3$		
a.	$\mu$ $\mu$ $\mu$ $\mu$ $\mu$	6!	1
	$s_1$ $i_2$ $l_3$ $s_1$ $i_2$ $s_1$ $i_2$ $l'_3$		
b.	$\mu$ $\mu$ $\mu$ $\mu$ $\mu$	4	3
	$s_1$ $i_2$ $s_1$ $s_1$ $i_2$ $s_1$ $i_2$ $l'_3$		

## Ambiguous case in Papapana

(21) *Papapana: Copying the stem*

			CONTM	LINS
☞ a.		1	8	

(Footnote: Additional assumption in a PA account is a constraint ensuring that elements of different morphological affiliations preferably don't dominate each other: excludes that different reduplication-triggering morphemes dominate each other)

CONT<sub>M</sub> and fixed input segments: Bikol

- (22)
- |                    |                        |
|--------------------|------------------------|
| pig-su~suru~sikwat | BEG.AV-IPFV~PL-prod    |
| pig-pu~puru~pildit | BEG.AV-IPFV~PL-squeeze |
| pig-hu~huru~hapros | BEG.AV-IPFV~PL-caress  |

## Sidenote

- in PA, ‘reduplication’ is fission and hence **simply one phonological operation available to repair** a marked structure
  - the trigger for morphological reduplication (=empty prosodic node) and phonological copying (e.g. marked syllable structure) are hence different, the repair operation is not
- fixed segment reduplication in Bikol is triggered by ONSET

CONT<sub>M</sub> and fixed input segments(23) *Bikol: Copying of R1+fixed segments*

						ONSET	LINS	CONT <sub>M</sub>					
	μ	μ	μ	μ	μ								
		u <sub>1</sub>	r <sub>2</sub>	u <sub>3</sub>	s <sub>4</sub>	i <sub>5</sub>	k <sub>6</sub>	w <sub>7</sub>	a <sub>8</sub>	t <sub>9</sub>			
a.		μ	μ	μ	μ	μ						8!	2
		s <sub>4</sub>	i <sub>5</sub>	s <sub>4</sub>	u <sub>1</sub>	r <sub>2</sub>	u <sub>3</sub>	s <sub>4</sub>	i <sub>5</sub>	k <sub>6</sub>	w <sub>7</sub>	a <sub>8</sub>	t <sub>9</sub>
b.		μ	μ	μ	μ	μ							
		s <sub>4</sub>	u <sub>1</sub>	s <sub>4</sub>	u <sub>1</sub>	r <sub>2</sub>	u <sub>3</sub>	s <sub>4</sub>	i <sub>5</sub>	k <sub>6</sub>	w <sub>7</sub>	a <sub>8</sub>	t <sub>9</sub>

## Further predictions

Evidence for CONT<sub>M</sub>: Copying of only the adjacent morpheme

- in Gapapaiwa, **foot-sized reduplication** marks the imperfective (24-a+b)
- if a derivational prefix precedes the stem, only this (**monosyllabic prefix is copied**) and the reduplicant is unexpectedly smaller

(24) *Gapapaiwa, Austronesian (McGuckin, 2011)*

- i-pana~panana  
3.SG.PST-IPFV~encounter  
'he was encountering'
- siya i-tava~tava  
meat 3-IPFV~cook  
'The meat is/was cooking'
- siya a-vi~vi-tav-i  
meat 1SG-IPFV~CAUS-cook-3SG  
'I was cooking the meat'

## Further evidence

- evidence for  $\text{CONT}_M$ : copying of a morphological unit (=person marker) in Kwazá (van der Voort, 2009)?
- evidence for  $\text{LINS}$ : a / $\text{C}_1\text{eC}_1\text{V-}$ / reduplication pattern in Palauan (Blust, 2013): multiple copying of the same segment to avoid  $\text{LINS}$  violations



# Conclusion

## Summary

- the ‘typology’ of multiple reduplication strengthens the claim in Urbanczyk (2000) and Shaw (2005) that the base for reduplication is language-specific: adjacency-based copying or stem-based copying
- this variation is a strong argument against a morphological doubling account
- a purely phonological account without BR-Faithfulness and a concept of ‘base’ can predict this typology from the simple interaction of  $LIN_S$  and  $CONT_M$  preferring contiguous morphemes

## Open questions

- all cases treated based on their surface order: What about order of affixation/infixation?
- non-local reduplication (Riggle, 2003) – an effect from INTEGRITY preferring copying of edge-material?
- Emergence of the Unmarked (McCarthy and Prince, 1994) – markedness over  $\text{CONT}_M$ ?
- Stanton and Zukoff (2016) argue for correspondence effects even in phonological copying – impossible in this account

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