

Too much is too much... in the phonology!

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- a **purely phonological prosodic affixation account of reduplication** predicts the typology of multiple reduplication:
 - Faithful multiple reduplication
 - Avoidance of multiple reduplication
 - Subtraction for one reduplicant
- morphological accounts to reduplication cannot predict this typology and/or rely on mechanisms without any independent motivation

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The Typology of Multiple Reduplication

Multiple Reduplication: Introductory Example

(1) *Multiple Reduplication*

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

(excluded for now: multiple full reduplication)

(2) *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’

Languages with Multiple Reduplication (=MR)

Tigre	Afro-Asiatic	Semitic	(Rose, 2003)
Arapaho	Algic	Algonquian	(Cowell and Moss, 2008)
Fox	Algic	Algonquian	(Dahlstrom, 1997)
Plains Cree	Algic	Algonquian	(Ahenakew and Wolfart, 1983)
Bikol	Austronesian	Malayo-Polynesian	(Donner, 2012)
Mokilese	Austronesian	Malayo-Polynesian	(Harrison, 1974)
Nukuoro	Austronesian	Malayo-Polynesian	(Carroll, 1965)
Papapana	Austronesian	Malayo-Polynesian	(Smith, 2016)
Sikaiana	Austronesian	Malayo-Polynesian	(Donner, 2012)
Southern Paiwan	Austronesian	Malayo-Polynesian	(Blust, 2013)
Tagalog	Austronesian	Malayo-Polynesian	(Blake, 1917)
Thao	Austronesian	Western Plains	(Blust, 2001)
Klamath	Klamath-Modoc		(Barker, 1964; Zoll, 2002)
Colville	Salishan	Interior Salish	(Mattina, 1973)
Lillooet	Salishan	Interior Salish	(van Eijk, 1997)
Shuswap	Salishan	Interior Salish	(Kuipers, 1974)
Spokane	Salishan	Interior Salish	(Bates and Carlson, 1998)
Thompson	Salishan	Interior Salish	(Thompson and Thompson, 1992)
hélqəméyləm	Salishan	Central Salish	(Galloway, 1993)
hənqəmínəṃ	Salishan	Central Salish	(Suttles, 2004)
Lushootseed	Salishan	Central Salish	(Urbanczyk, 2001)
ʔayʔajuθəm	Salishan	Central Salish	(Watanabe, 1994; Blake, 2000)
Ahousaht	Wakashan	S. Wakashan	(Kim, 2003b)
Ditidaht	Wakashan	S. Wakashan	(Stonham, 1994)
Kyuoquot	Wakashan	S. Wakashan	(Rose, 1981)
Makah	Wakashan	S. Wakashan	(Davidson, 2002)
Tsishaath	Wakashan	S. Wakashan	(Stonham, 2004)

A. Faithful MR

	stem+morpheme:
tu~turoga	R1
turo~turoga	R2
tu~turo~turoga	R2 + R1

Faithful MR

- (3) Both R1 and R2 surface in exactly the form in which they surface in isolation.

A. Faithful MR in Thompson

(4) *Multiple reduplication in Thompson (Broselow, 1983, 162)*

- R1. sí~sil'
 DIM-calico
 'a little piece of calico'
- R2. sil~síl
 DISTR-calico
 'patches of calico'
- R1+R2. sil~sí~sil'
 DIM-DISTR-calico
 'small patches of calico'

B. Avoidance of MR

	stem+morpheme:
tu~turoga	R1
turo~turoga	R2
turo~turoga	R2 + R1

Avoidance of MR

- (5) Only a single reduplicant surfaces although R1 and R2 are present.

Additional complication: independent evidence that R1 is indeed present!

B. Avoidance in Kyuquot (Rose, 1981; Stonham, 2004)

- two reduplication-triggering suffixes in a word = a single reduplicant surfaces

(6) *Kyuquot*

R.	tʰuk-' <u>as</u>	tʰu:~tʰuk' ^w as	'He has wide wrists'
	mitx ^w - <u>ʃi(tʰ)-<u>apa</u></u>	mi:~mi:txʃitʰap	'He turned too much'
	ʔu- <u>ħw'aʔ-<u>apa</u></u>	ʔu:~ʔu:ħw'aʔap	'He used it too much'
R+R.	m'aʔ-' <u>as-<u>apa</u></u>	m'a:~m'a:ʔʔasap	'He has really cold wrists'
		*m'a:~m'a:~m'a:ʔʔasap	
	tʰ'uk- <u>a:n'uʔ-<u>apa</u></u>	tʰ'u:~tʰ'u:k ^w an'ʔap	'His legs are really big'
	pumaʔ- <u>suʔ-<u>apa</u></u>	pu:c-pu:maʔ-suʔ-ap	'He has really itchy eyes'
	mitx ^w -' <u>as-<u>st'aʔ</u></u>	mi:~mitw'isst'aʔ	'They were twisting each others wrists'

B. Avoidance in S. Wakashan: The superset effect for the survivor

‘the effects on the final form are those that are required by *all* the triggers, with the proviso that only a single copy occurs’ (Stonham, 2004, 137)

- multiple reduplicant avoidance = surfacing reduplicant **has the maximal shape that combines the shape requirements of both reduplicative morphemes**

(7) *Tsishaat Nuuchahnult* (Stonham, 2004, 137)

a.	tʰuk-a:n'uʔ- <u>apa</u>	R+L & RL+L		tʰu:-tʰu:k ^w an'ʔap	RL+L
b.	m'aʔ- <u>as-apa</u>	RL & RL+L		m'a:-m'a:ʔʔasap	RL+L
c.	pumaʔ- <u>suʔ-apa</u>	Rc+L & RL+L		pu:c-pu:maʔ-suʔ-ap	RLc+L
d.	hin- <u>as-tʃ</u> 'ap-ajuk	RL & R		hi:~hinʔastʃpajk	RL

(Caveat: Apparent counterexamples in Kyuquot; all involve the same RcL suffix.)

C. Subtracting MR

	stem+morpheme:
tu~turoga	R1
turo~turoga	R2
tu~tu~turoga	R2 + R1

Subtracting MR

- (8) One of the reduplicants is smaller than its form in isolation.

C. Subtracting MR in Lushootseed

- distributive /CVC/-reduplication and diminutive /CV/-reduplication with fixed segment /i/ in case the stem-V is epenthetic/reduced /ə/
- in DIST≫DIM contexts*, the distributive is unexpectedly only /CV/

(9) *Lushootseed* (Urbanczyk, 1999, 2001)

R1.	bədə́ʔ	‘child’	bəd~bədə́ʔ	‘children’	9:209
	júbil	‘die, starve’	júb~jubil	‘they are starving’	9:221
R2.	χáhəb	‘cry’	χá~χahəb	‘an infant crying’	9:205
	s-túbʃ	‘man’	s-tú~tubʃ	‘boy’	9:204
	bədə́ʔ	‘child’	bí~bədə́ʔ	‘young child’	1:192
R1+R2.	pástəd	‘white person’	pá~pa~pstəd	‘many white children’	9:226
			*pás~pa~pstəd		
	píʃpis	‘cat’	pí~pi~pʃpis	‘kittens’	9:226
	bədə́ʔ	‘child’	bí~bi~bədə́ʔ	‘small children’	9:225
	ləg ^w əb	‘youth’	lí~li~l’g ^w əb	‘little fellows’	9:226

C. Subtracting MR in Sikaiana

- /CV-/ reduplication for plural can optionally be reduced to /C-/
- if combined with bisyllabic reduplication, it is obligatorily /C-/

(10) *Sikaiana* (Donner, 2012, 23)

R1.	sopo	sopo~sopo		REP~'jump'
	sepu	sepu~sepu		REP~'dive'
	motu	motu~motu		REP~'snap'
R2.	sopo	so~sopo	s~sopo	PL~'jump'
	sepu	se~sepu	s~sepu	PL~'dive'
	moe	mo~moe	m~moe	PL~'sleep'
R1+R2.	sopo	*sopo~so~sopo	sopo~s~sopo	PL~REP~'jump'
	sepu	*sepu~se~sepu	sepu~s~sepu	PL~REP~'dive'

Summary: The Unfaithful Patterns **Avoidance** and **Subtraction**

(11)

Kyuoquot	Wakashan	S. Wakashan	(Rose, 1981)
Makah	Wakashan	S. Wakashan	(Davidson, 2002)
Ditidaht	Wakashan	S. Wakashan	(Stonham, 1994)
Tsishaath	Wakashan	S. Wakashan	(Stonham, 2004)
Ahousaht	Wakashan	S. Wakashan	(Kim, 2003 <i>b</i>)
Sikaiana	Austronesian	Malayo-Polynesian	(Donner, 2012)
Lushootseed	Salishan	Central Salish	(Urbanczyk, 2001)

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_{BR} (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 (12-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 (12-b)
- alternative strategies to realize the prosodic affix: for example epenthesis, penalized by DEP_S (12-c)

- (12)
- a. INT_S
Assign * to every pair of output segments that correspond to the same input segment.
 - b. $\mu > S$
Assign * to every μ not dominating a segment.
 - c. DEP_S
Assign * to every output-segment without an input correspondent.

Copying as Fission: The Basic Mechanism

(13)

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

Avoidance and Subtraction in a PA Account

- ‘too much’ reduplication is avoided to minimize violations of INT_S (in spirit similar to an account based on unified indexation (Buckley, 1997; Rose, 1997))
- two possible repairs:
 1. **coalescence of prosodic nodes on the same tier**, under violation of UNIFORMITY (Saba Kirchner, 2010, 65)

(14) UNF- μ
Assign * to every pair of input μ 's corresponding to the same output μ .

2. **prosodic affixes on different tiers dominate each other**, under violation of DEPAL(X-Y), e.g. (15)

(15) DEP(σ - μ)
Assign * for every colourless association line between a coloured σ and a coloured μ .

Deriving the Typology of MR

Deriving the Typology

(16)

PA on same tier	PA on different tiers
A. Multiple reduplication	
Thompson	Fox
B. Avoidance	
Ahousaht	Kyuoqot
C. Subtraction	
Lushootseed	Sikaiana

A. Faithful MR in Thompson: PA's on the Same Tier

(17)

	μ_1 μ_2 μ_3	μ_4 μ_5	$\mu > S$	DEPS	UNF- μ	INTS
		s_1 i_2 l'_3				
a.	μ_1 μ_2 s_1 i_2 l_3	μ_3 s_1 i_2	μ_4 μ_5 s_1 i_2 l'_3			7*
b.	μ_1 $\mu_{2,3}$ s_1 i_2 l'_3	μ_4 μ_5 s_1 i_2 l'_3			*!	3*

B. Avoidance in Ahousaht: PA's on the Same Tier

(18)

	μ_1	μ_2	μ_3	μ_4	$\mu > S$	DEPS	INTS	UNF- μ
			n_1	a_2	$?_3$	a_4		
a.	μ_1	μ_2	μ_3	μ_4			6^*	
	n_1	a_2	n_1	a_2	n_1	a_2	$?_3$	a_4
b.	$\mu_{1,2}$	μ_3	μ_4				2^*	*
	n_1	a_2	n_1	a_2	$?_3$	a_4		

Footnote: Only Heteromorphemic Coalescence

(19) UNF- $\mu(M\alpha)$

Assign * to every pair of input μ 's affiliated with the same morpheme that correspond to the same output μ .

(20)

	$\mu > S$	DEPS	UNF- $\mu(M\alpha)$	INTS	UNF- μ
$\mu_1 \mu_2$					
a.				2*	
b.			#!	2*	*

A. Faithful MR in Fox: PA's on Different Tiers

(21)

	ω	σ	σ	σ	σ	$\omega > \sigma$	$\sigma > \sigma$	DEPS	DEP(ω - σ)	INTs
	ω	σ	σ	σ	σ					
		$a:8$	$w_1 i:2$	$t_3 a_4$	$m_5 a_6 w_7$					
a.	ω	σ	σ	ω	σ	σ	σ	σ		8^*
		$w_1 a:8$	$w_1 i_2$	$w_1 a:8$	$w_1 i:2$	$t_3 a_4$	$m_5 a_6 w_7$			
b.	ω	σ	σ	ω	σ	σ	σ		*!	4^*
		$w_1 a:8$	$w_1 a:8$	$w_1 i:2$	$t_3 a_4$	$m_5 a_6 w_7$				

(Simplification: φ excluded; fixed segment is only an underspecified V)

Recall: DEPAL only penalizes associations between morph. coloured nodes!

B. Avoidance in Kyuquot: PA's on Different Tiers

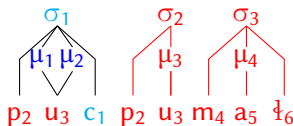
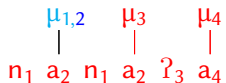
(22)

		$\sigma > \mu$	$\mu > S$	DEPS	INTS	DEP($\sigma - \mu$)
a.					6*!	
b.					2*	**

(Simplification: only showing the stem and the PA triggering reduplication)

B. Avoidance in S. Wakashan: The Superset Effect of the Survivor

- follows automatically in a PA account: **No element gets lost**; only identical elements from different morphemes can be subsumed



If Avoidance of MR, why not avoiding reduplication altogether?

- background assumption that the stem is **fully prosodified** at the point where affixes are added: a stratal model (Kiparsky, 2011; Bermúdez-Otero, in preparation) with an evaluation prior to concatenation (Trommer, 2011)
- avoidance of any reduplication would hence imply **integration of underlying (affix) prosody under underlying (stem) prosody** which is excluded by constraints like DEP(σ - μ)

B. Ahousaht: Avoidance of MR but not of Reduplication

(23)

	μ_1	μ_2	σ μ_3 n_1 a_2 \int_3 a_4	σ μ_4 n_1 a_2 \int_3 a_4	MAX_σ	$\mu > S$	DEPS	DEP(σ - μ)	INTS	UNF- μ
a.	σ μ_1 n_1 a_2	σ μ_2 n_1 a_2	σ μ_3 n_1 a_2 \int_3 a_4	σ μ_4 n_1 a_2 \int_3 a_4					6^* !	
b.	σ $\mu_{1,2}$ n_1 a_2	σ μ_3 n_1 a_2	σ μ_4 n_1 a_2 \int_3 a_4						2^*	*
c.	σ $\mu_{1,2,3}$ n_1 a_2	σ μ_4 n_1 a_2 \int_3 a_4						*!		**

Intermediate Summary: Avoidance vs. Faithful MR

Multiple Prosodic Affixes on the Same Tier

Multiple reduplication	Avoidance
e.g. Thompson	e.g. Ahousaht
All μ 's filled with segments	Coalescence of μ 's
$UNF-\mu \gg INT_S$	$INT_S \gg UNF-\mu$

Multiple Prosodic Affixes on Different Tiers

Multiple reduplication	Avoidance
e.g. Fox	e.g. Kyuoquot
All PA's must be filled with segments	PA's dominate each other
$DEP(\omega-\sigma) \gg INT_S$	$INT_S \gg DEP(\sigma-\mu)$


Deriving the Typology: Subtracting MR

- exactly the same mechanism as for avoidance: Can affix prosody ‘fuse’ or not?
- additional constraints ensure **morpheme contiguity for prosodic dominance relations**
 - ensure that there is no complete subsumption between affix prosody

(24) ${}^*_{\mu\alpha}\sigma_{\mu\beta}$:
 Assign * to every coloured σ dominating μ 's of different morphological colours.

C. Subtracting MR in Lushootseed: PA's on the Same Tier

(25)

	μ_1 μ_2 μ_3 μ_4 μ_5 μ_6 μ_7 p_1 a_2 s_3 t_4 \emptyset_5 d_6	$\mu > S$	* $\mu\alpha\sigma\mu\beta$	DEPC	INTS	UNF- μ
a.	μ_1 μ_2 μ_3 μ_4 μ_5 μ_6 μ_7 p_1 a_2 p_1 a_2 s_3 p_1 a_2 s_3 t_4 \emptyset_5 d_6				7*!	
 b.	$\mu_{1,2}$ μ_3 μ_4 μ_5 μ_6 μ_7 p_1 a_2 p_1 a_2 p_1 a_2 s_3 t_4 \emptyset_5 d_6				6*	*
c.	$\mu_{1,2}$ μ_3 μ_4 μ_5 μ_6 μ_7 p_1 a_2 s_3 p_1 a_2 s_3 t_4 \emptyset_5 d_6		*!		3*	*

C. Subtracting MR in Lushootseed: PA's on the Same Tier Footnotes

- additional complexity that default /i/ is inserted if an open /ə/-syllable would result in the reduplicant otherwise
- follows from a markedness constraint as (26) and implies that only DEP_C is high-ranked but vowels can indeed be inserted
- in addition, CONTIGUITY ensures that discontinuous copying /**bid~bədaʔ*/ is excluded

- (26) *PL_{sμ}
Assign a violation mark for every μ that only dominates placeless segments.
(similar to *PI-lessσ (Kurusu, 2001; Urbanczyk, 1998))

Extension to Pseudoreduplication

B. Avoidance for Pseudoreduplication in Ahousaht

- some words are apparently reduplicated but the stem alone does not exist without reduplication
- pseudoreduced stems (found in many loans) block reduplication

(27) *Ahousaht* (Kim, 2003b, 137+138)

PR.	kakaw'in	'killer whale'
	pi:ʃpiʃ	'cat'
	mu:smu:s	'cow'
	ma:ma:ti	'bird'

PR+R.	kakaw'ink'ukʔijʃ	'It looks like a killer whale'	*ka~kakaw'ink'ukʔijʃ
	pi:ʃpiʃk'ukʔijʃ	'It looks like a cat'	*pi~pi:ʃpiʃk'ukʔijʃ
	ma:ma:tik'ukʔijʃ	'It looks like a bird'	*ma~ma:maati

C. Subtracting Pseudoreduplication in Manam

- if the base already ends in two identical syllables, the usually φ -sized reduplicant is only one syllable (Buckley, 1997)
- (similar pattern in Samoan (de Lacy, 1999; Nevins, 2012))

(28) *Pseudoreuplicated stems in Manam (Lichtenberk, 1983, 599-602)*

R.	laba	‘be big’	laba~laba	‘older person’	
	salaga	‘be long’	salaga~laga	‘long’	Sc
	sapara	‘branch’	sapara~para	‘having branches’	
	ʔulan	‘desire’ (V)	ʔulan~lan	‘desirable’	
PR+R.	ragogo	‘be warm’	ragogo~go	‘warm’	*ragogo~gogo
	ʔoʔo	‘be plentiful’	ʔoʔo~ʔo	‘many, much’	*ʔoʔo~ʔoʔo
	rere	‘like’	rere~re	‘like’	*rere~rere
	lele	‘look for’	lele~le	‘look for’	*lele~lele

Summary: The Unfaithful Patterns **Avoidance** and **Subtraction**(29) *True multiple reduplication*

Kyuoquot	Wakashan	S. Wakashan	(Rose, 1981)
Makah	Wakashan	S. Wakashan	(Davidson, 2002)
Ditidaht	Wakashan	S. Wakashan	(Stonham, 1994)
Tsishaath	Wakashan	S. Wakashan	(Stonham, 2004)
Ahousaht	Wakashan	S. Wakashan	(Kim, 2003b)
Sikaiana	Austronesian	Malayo-Polynesian	(Donner, 2012)
Lushootseed	Salishan	Central Salish	(Urbanczyk, 2001)

(30) *Pseudoreuplicated stems*

Ahousaht	Wakashan	S. Wakashan	(Kim, 2003b)
Ditidaht*	Wakashan	S. Wakashan	(Stonham, 1994)
Manam	Austronesian	Malayo-Polynesian	(Donner, 2012)
Samoaan	Austronesian	Malayo-Polynesian	(de Lacy, 1999)

(*some)

A PA Account of Pseudoreduplication

- the pseudoreuplicated portion behaves ‘affix-like’: it is **not properly prosodified** and ‘fusion’ is hence possible
- the pseudoreuplicated structure is ‘not really there’ and maybe even added later/after the stem stratum

Pseudoreplication: Avoidance in Ahousaht

(31)

	$\mu > S$	DEPS	DEP(σ - μ)	INTS	UNF- μ
a.				*!*	
b.					*
c.			*!		**

Pseudoreplication: Subtraction in Manam

(32)

	φ	$\varphi > \sigma$	FTBIN	DEP($\varphi - \sigma$)	INTS
a.				*!*	
b.					2*
c.					4*!

Morphological Alternatives

BR-Faith

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**

(33)

	MAX-BR _{DIM}	*CODA	MAX-BR _{DIS}
RED _{DIS} -sil'			
a. sil		*	**!*
☞ b. si~sil'		*	*
c. sil~sil'		**!	
RED _{DIM} -sil'			
a. sil	*!***	*	
b. si~sil'	*!	*	
☞ c. sil~sil'		**	

BRCT and Avoidance of Multiple Reduplication

- multiple reduplication avoidance follows from a constraint *DUPDUP (or *REDRED) that ‘disallow[s] multiple copies’ (Stonham, 2004, 172)

(34) *No multiple reduplicants in Ahousaht*

RED _{Der} -RED _{resbl} -naʔa	RED _{DER} =μ	*DUPDUP	RED _{RESBL} =μ
a. naʔa	*!		*
☞ b. na~naʔa			*
c. na~na~naʔa		*!	

- it refers to **exponence type** and sees more than phonological structure
- **Excludes the Superset Effect** of the Survivor since one RED remains unrealized)
- **Subtractive MR unexpected**

Morphological Doubling

Morphological Doubling Theory (=MDT; Inkelas and Zoll, 2005; Inkelas, 2008)

- certain **morpho-syntactic features are realized more than once**
 - partial reduplication follows from associating morphological nodes with different cophologies (Orgun, 1996; Anttila, 2002; Inkelas et al., 2004; Inkelas and Zoll, 2005, 2007)
- Avoidance and Subtraction imply that realization of a morpho-syntactic node depends on the **exponence type** of an embedded morpheme (=anticyclic) or a morpheme that is not yet in the structure (=Look-Ahead) which is impossible in the standard MD theory

Conclusion

Summary

- the typology found in multiple reduplication patterns
 - Faithful MR
 - Avoidance of MR
 - Subtractive MR

follows under a **purely phonological account based on prosodic affixation**

- the factorial typology – different affixed prosodic nodes can ‘fuse’ (=coalescence or prosodic integration) or not – is ensured by re-ranking of standard faithfulness constraints

References

- Ahenakew, Freda and H. C. Wolfart (1983), Productive reduplication in Plains Cree, in W.Cowan, ed., 'Papers from the Fourteenth Algonquian Conference', Carleton University, Ottawa, pp. 369–377.
- Anttila, Arto (2002), 'Morphologically conditioned phonological alternations', *Natural Language and Linguistic Theory* **20**, 1–42.
- Barker, M. A. R. (1964), *Klamath grammar*, University of California Press, Berkeley and Los Angeles.
- Bates, Dawn and Barry F. Carlson (1998), Spokane syllable structure, in E.Czaykowska-Higgins and M. D.Kinkade, eds, 'Salish languages and linguistics: theoretical and descriptive perspectives', Mouton de Gruyter, Berlin, New York, pp. 99–123.
- Bermúdez-Otero, Ricardo (2012), The architecture of grammar and the division of labour in exponence, in J.Trommer, ed., 'The morphology and phonology of exponence: The state of the art', Oxford University Press, Oxford, pp. 8–83.
- Bermúdez-Otero, Ricardo (in preparation), *Stratal Optimality Theory*, Oxford University Press, Oxford.
- Blake, Frank R. (1917), 'Reduplication in Tagalog', *The American journal of philology* **38**, 425–431.
- Blake, Susan Jane (2000), On the distribution and representation of schwa in Sliammon (Salish): Descriptive and theoretical perspectives, Master's thesis, University of British Columbia.
- Blust, R. A. (2001), 'Thao triplication', *Oceanic Linguistics* **40**, 324–335.
- Blust, Robert (2013), *The Austronesian languages*, Asia-Pacific Linguistics, Canberra.
- Broselow, Ellen (1983), 'Salish double reduplications: Subjacency in morphology', *Natural Language and Linguistic Theory* **1**, 317–346.
- Buckley, Eugene (1997), Integrity and correspondence in Manam reduplication, in P. N.Tamanji and K.Kusumoto, eds, 'Proceedings of NELS 28', GLSA, Amherst, pp. 59–67.

- Bye, Patrick and Peter Svenonius (2012), Non-concatenative morphology as epiphenomenon, in J.Trommer, ed., 'The morphology and phonology of exponence: The state of the art', Oxford University Press, Oxford, pp. 426–495.
- Carroll, Vern (1965), 'An outline of the structure of the language of Nukuoro', *The journal of the Polynesian Society* **74**, 192–226.
- Cowell, Andrew and Alonzo Moss (2008), *The Arapaho language*, University of Colorado Press.
- Dahlstrom, Amy (1997), 'Fox (Mesquakie) reduplication', *International Journal of American Linguistics* **63**, 205–226.
- Davidson, Matthew (2002), Studies in Southern Wakashan (Nootka) grammar, PhD thesis, University of New York at Buffalo.
- de Lacy, Paul (1999), Morphological haplology and correspondence, in P.de Lacy and A.Nowak, eds, 'University of Massachusetts Occasional Papers in Linguistics 25: Papers from the 25th Anniversary', GLSA, pp. 51–88.
- Donner, Wiliam W. (2012), 'Sikaiana dictionary', Ms., online available at the sikaianaarchives.
- Gafos, Adamantios I. (2003), 'Greenberg's asymmetry in Arabic: a consequence of stems in paradigms', *Language* **79**, 317–355.
- Galloway, Brent (1993), *A Grammar of Upriver Halkomelem*, University of California Press, Berkeley.
- Harrison, Sheldon (1974), 'Reduplication in Micronesian languages', *Oceanic Linguistics* **12**, 407–454.
- Inkelas, Sharon (2008), 'The dual theory of reduplication', *Linguistics* **46**, 351–401.
- Inkelas, Sharon, C. Orhan Orgun and Cheryl Zoll (2004), The implications of lexical exceptions for the nature of grammar, in J.McCarthy, ed., 'Optimality Theory in Phonology: A Book of Readings', Blackwell, Oxford, pp. 542–551.
- Inkelas, Sharon and Cheryl Zoll (2005), *Reduplication: Doubling in Morphology*, Cambridge University Press, Cambridge.

- Inkelas, Sharon and Cheryl Zoll (2007), 'Is grammar dependence real? A comparison between cophological and indexed constraint approaches to morphologically conditioned phonology', *Linguistics* **45**(1), 133–171.
- Kim, Eun Sook (2003a), 'Patterns of reduplication in Nuu-chah-nulth', *Proceedings of NELS 33* pp. 127–146.
- Kim, Eun-Sook (2003b), Theoretical issues in Nuu-chah-nulth phonology and morphology (British Columbia), PhD thesis, The University of British Columbia.
- Kim, Eun-Sook (2008), 'Multiple patterns of reduplication in Nuuchahnulth: A templatic approach', *Language Research* **44**, 63–94.
- Kiparsky, Paul (2011), Compensatory lengthening, in C.Cairns and E.Raimy, eds, 'Handbook on the Syllable', Brill, Leiden, pp. 33–69.
- Kuipers, Aert H. (1974), *The Shuswap language : grammar, texts, dictionary*, Mouton, The Hague.
- Kurusu, Kazutaka (2001), The Phonology of Morpheme Realization, PhD thesis, UC Santa Cruz.
- Lichtenberk, Frantisek (1983), *A Grammar of Manam*, University of Hawaii Press, Honolulu.
- Marantz, Alec (1982), 'Re reduplication', *Linguistic Inquiry* **13**, 483–545.
- Mattes, Veronika (2007), Types of reduplication: a case study of Bikol, PhD thesis, University Graz.
- Mattina, Anthony (1973), Colville grammatical structure, Master's thesis, Hawaii University.
- McCarthy, John and Alan Prince (1995), Faithfulness and reduplicative identity, in J.Beckman, L.Dickey and S.Urbanczyk, eds, 'UMOP', GLSA, Amherst, MA, pp. 249–384.
- Nelson, Nicole Alice (2003), Asymmetric Anchoring, PhD thesis, Rutgers University.
- Nevins, Andrew (2012), Haplological dissimilation at distinct stages of exponence, in J.Trommer, ed., 'The morphology and phonology of exponence: The state of the art', Oxford University Press, Oxford, pp. 84–116.

- Orgun, Cemil Orhan (1996), *Sign-based Morphology and Phonology with Special Attention to Optimality Theory*, PhD thesis, UC Berkeley.
- Pulleyblank, Douglas (2009), Patterns of reduplication in Yoruba, *in* K.Hanson and S.Inkelas, eds, 'The nature of the word: Studies in honor of Paul Kiparsky', MIT Press, pp. 311–357.
- Rose, Sharon (1997), Multiple correspondence in reduplication, *in* M. L.Juge and J. L.Moxley, eds, 'Proceedings of BLS 23', BLS, Berkeley.
- Rose, Sharon (2003), Triple take: Tigre and the case of internal reduplication, *in* 'San Diego Linguistics Papers', Oxford University Press, pp. 109–128.
- Rose, Suzanne Maria (1981), *Kyuguot grammar*, PhD thesis, University of Victoria.
- Saba Kirchner, Jesse (2010), *Minimal Reduplication*, PhD thesis, UC Santa Cruz.
- Saba Kirchner, Jesse (2013*a*), 'Minimal reduplication and reduplicative exponence', *Morphology* 23, 227–243.
- Saba Kirchner, Jesse (2013*b*), Reduplicative exponence and minimal reduplication, *in* J.Trommer, ed., 'New theoretical tools in the modeling of morphological exponence', Special issue of *Morphology*, pp. 227–243.
- Smith, Ellen (2016), 'Papapana re-redu-reduplicates: multiple reduplication in an endangered Northwest Solomonian language', *Oceanic Linguistics* 55, 522–560.
- Spaelti, Phillip (1997), *Dimensions of variation in multi-pattern reduplication*, PhD thesis, UC Santa Cruz.
- Stonham, John (1994), *Combinatorial morphology*, John Benjamin, Amsterdam.
- Stonham, John (2004), *Linguistic Theory and Complex Words*, Palgrave Macmillan, New York.
- Stonham, John (2007), 'Nuuchahnulth double reduplication and stratal optimality theory', *Canadian Journal of Linguistics* 52, 105–130.

- Struijke, Caro (2000), *Existential Faithfulness. A Study of Reduplicative TETU, Feature Movement, and Dissimilation*, PhD thesis, University of Maryland at College Park.
- Suttles, Wayne (2004), *Musqueam Reference Grammar*, UBC Press, Vancouver.
- Thompson, Laurence C. and M. Terry Thompson (1992), *The Thompson language*, UMOPL, Missoula.
- Trommer, Jochen (2011), 'Phonological aspects of Western Nilotic mutation morphology', Habil. University of Leipzig.
- Urbanczyk, Susanne (1998), A-templatic reduplication in Halq'eméylem, in K.Shahin, S.Blake and E.Kim, eds, 'WCCFL 17', CSLI Publications, Stanford, CA, pp. 655–669.
- Urbanczyk, Suzanne (1999), Double reduplications in parallel, in R.Kager, H.van der Hulst and W.Zonneveld, eds, 'The Prosody Morphology Interface', Cambridge University Press, Cambridge, pp. 390–428.
- Urbanczyk, Suzanne (2001), *Patterns of reduplication in Lushootseed*, Garland, New York.
- van Eijk, Jan (1997), *The Lillooet Language*, UBC Press, Vancouver.
- Watanabe, Honoré (1994), A report on Sliammon (Mainland Comox) reduplication, in O.Miyaoka, ed., 'Languages of the North Pacific Rim', Hokkaido University, Sapporo, pp. 217–262.
- Zimmermann, Eva (2013), 'Non-concatenative allomorphy is generalized prosodic affixation: The case of Upriver Halkomelem', *Lingua* 134, 1–26.
- Zoll, Cheryl (2002), 'Vowel reduction and reduplication in Klamath', *Linguistic Inquiry* 33, 520–527.

Appendix: A. Faithful multiple reduplication in Fox

- /Ca:/Ce:~/ reduplication marks the continuative (35-b), bisyllabic reduplication the continuative (35-c), and both can be combined (35-d)

(35) *Fox (Dahlstrom, 1997, 206+207)*

	wi:tamaw-e:wa	‘he tells him’
R1.	wa:~wi:tamaw-e:wa	‘he tells him over and over’
R2.	wi:ta~wi:tamaw-e:wa	‘he keeps telling him’
R1+R2.	wa:wi~wa:~wi:tamaw-e:wa	‘he keeps telling him over and over’

Appendix: B. Avoidance of MR in Ahousaht (Kim, 2003a,b, 2008)

- some meanings are expressed by reduplication alone and many suffixes trigger prefixing reduplication (=underlined>)
- in combinations, only a single reduplicant surfaces

(36) *Ahousaht* (Kim, 2003b, 136+138)

R1. maḥti: ‘house’ ma~maḥti: ‘houses’
 naʔa ‘to hear’ na~naʔa ‘to understand’

R2. mi~miḥk’ukʔicu:ʃ
 miḥ-k’uk’-ʔiḥu:ʃ
 same-to.resemble-2PL.IND
 ‘both of you look alike’

R1+R2. na~naʔak’ukʔiʃ (*na~na~naʔak’ukʔiʃ)
 DER-naʔa-k’uk’-ʔiʃ
 DER-to.hear-to.resemble-3SG.IND
 ‘s/he seems to be knowledgeable’

Appendix: B. Avoidance in Wakashan (Stonham, 1994, 2004, 2007)

- multiple reduplication surfaces if derivational/inflectional reduplicative morphemes are combined
- follows in a **stratal** model of grammar: multiple reduplication is only avoided within one stratum
- additional phonological evidence for different strata based on behaviour of affixes with respect to lenition, glottalization, ...

Appendix: Lushootseed MR: DIM>>DIST

(37)

bədəʔ	‘child’	bíbədbədəʔ	‘dolls, litter’	1:225
s-q ^w əbáy	‘dog’	q ^w i q ^w əb q ^w əbáyʔ-cut	‘make self (sound) like a dog’	1:225
ləx	‘light’	líləxləx-ʃad	‘flashlight’	1:225
			(lit: ‘little flashing light’)	

CV – CVC – stem
 Ci – CVC – stem

Appendix: Lushootseed MR: **DIST**»»**DIM**

(38)

bədəʔ	‘child’	bíbibədaʔ	‘small children’	9:225
pástəd	‘white person’	pápapstəd	‘many white children’	9:U226
tʃʔtʃʔaʔ	‘rock’	tʃʔítʃʔ itʃtʃʔaʔ	‘gravel’	9:U226
læg ^w əb	‘youth’	lílil’g ^w əb	‘little fellows’	9:U226
píʃpis	‘cat’	pípipʃpis	‘kittens’	9:226
g ^w ədíl	‘sit’	g ^w íg ^w íg ^w ədíl	‘children sitting’	B8:326

CV – CV – stem
 Ci – Ci – stem

Appendix: Normal Reduplication or Gemination in Sikaiana

(39) $^*\sigma\alpha\mu\beta$
Assign * to every coloured σ only dominating μ 's of another morphological colour.

(40)

		$\mu > S$	$^*\sigma\alpha\mu\beta$	$^* \text{INGEM}$	INTS
					**
				*	
			*!		

Appendix: C. Subtracting MR in Sikaiana: PA's on different tiers

(41)

	σ_1 σ_2	μ_1	σ_3	σ_4	μ_2	μ_3	s_1	o_2	p_3	o_4	$\mu > S$	$*\sigma_{\mu\beta}$	$*INGEM$	$INTS$
a.	σ_1	σ_2	σ_3	σ_4	μ_2	μ_3	s_1	o_2	p_3	o_4		!		4*
b.	σ_1	σ_2	σ_3	σ_4	μ_1	μ_2	s_1	o_2	p_3	o_4				4*
c.	σ_1	σ_2	σ	σ_3	σ_4	μ_2	μ_3	s_1	o_2	p_3	o_4			6*!