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Reduplication as fission: The argument from multiple reduplication

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Main Claim

- The many **different reduplication patterns** in Nuuchahnulth follow from an account solely based on **affixation of prosodic affix-nodes and segmental fission**.
- **Avoidance of multiple reduplicants** is a straightforward consequence of standard faithfulness-constraints.

➛ An OT-account based on RED and BR-faithfulness is less economic than this **purely phonological account** and fails to predict the typology of multiple reduplication.

Data I: Different reduplicants

- Nuuchahnulth employs **different monosyllabic reduplication patterns** (Kim, 2003, 2008; Stonham, 2004, 2007; Pulleyblank, 2016)

1. MaxT (e.g. /-ʃ/ 'continually')
   - tuːħ — tuːħ-tuːħ-ʃʔiʃʔaɬ
   - watq — watq-watq-ʃʔiʃ
2. MinT (e.g. /-ʔaɬuk/ 'to look after')
   - tʃapχ — tʃa-tʃapχ-ʔaɬuk
   - nuːk^w — nuː-nuːk^w-ʔaɬuk
3. MinL (e.g. /-ʔiːk/ 'so. always doing sth.')
   - ʔuːwa — ʔuː-ʔuːwa-ʔiːk
   - jaqtɬ — jaː-jaqtɬ-st'aɬʔiːk
4. MinS (e.g. /-juk^w/ 'to cry'
   - wik — wi-wik-jukʔiʃ
   - ʔuːʃ — ʔu-ʔuːʃ-juk'^{w}ap'atɬ'i
5. MaxL+L (e.g. /-(j)a/ 'continuously')
   - w'asaq — w'aː-w'aːsaq-aʔiʃ
   - tsuts — tsuːts-tsuːts-aʔiʃ
6. MinS+S (e.g. /-k'uk^w/ 'to resemble')
   - tɬ'iːx^w — tɬ'i-tɬix^w-ak'uk
   - q^{w}iː — q^{w}i-q^{w}i-qk'uk^{w}iː
7. MinL+S (e.g. /-itj'ak/ 'afraid/fear')
   - wik — wiː-wik-itj'ak
   - siːts — siː-sits-itj'aksiʃ
8. MaxS+L (e.g. /-n'uk/ 'on the hand')
   - tupk — tupk-tuːpk-n'uk
   - tɬ'aːq — tɬ'aq-tɬ'aːq-n'uk
9. MinS+L (e.g. /-sapi/ 'to depend on')
   - wik — wi-wiːk-sapiʔiʃ
   - ʔuːʃ — ʔu-ʔuːʃ-sapiʔiʃ

Distinguishing the different reduplicants		
Min	=	only CV copied
Max	=	coda copied as well
L	=	Red-V is long
S	=	Red-V is short
T	=	Red-V copies length of base-V
+L	=	base-V long
+S	=	base-V short

Data II: Adjacent reduplicants?

- multiple reduplication-triggers in one word=only **one reduplicant** surfaces (if affixes on same (stem/word) level (Stonham, 2004, 2007))

Underlying				*Reduplicated*	
Red$_{\text{Min+L}}$	+ Red$_{\text{MinL+L}}$		+ tɬ'uk	tɬ'uː-tɬ'uːk	(=MinL+L)
Red$_{\text{Min}}$	+ Red$_{\text{MinL+L}}$		+ m'aɬ	m'aː-m'aːɬ	(=MinL+L)
Red$_{\text{MinL}}$	+ Red$_{\text{Min}}$	+ Red$_{\text{Min+L}}$	+ hin	hiː-hin	(=MinL+L)

'The result is always a single copy that reflects the features required by all of the suffixes that appear.' (Stonham, 2007, 121)

Analysis I: Different reduplicants=different prosodic affixes

(1)

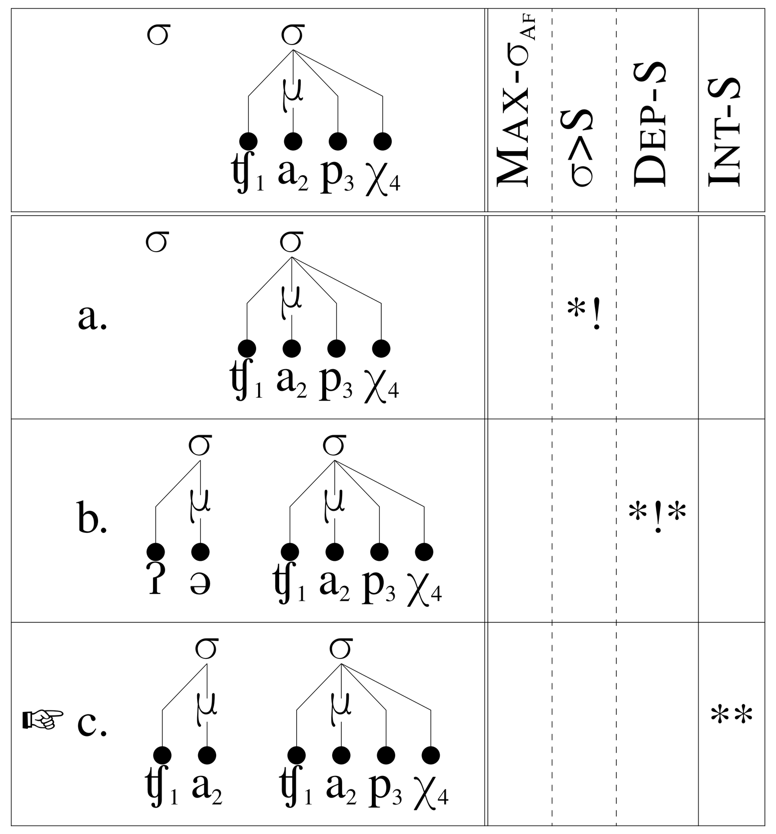
- **purely phonological account** where copying is a general phonological repair process to avoid, for example, empty prosodic nodes (=Minimal Reduplication Theory, Saba Kirchner, 2007, 2010)

➛ only IO-faithfulness constraints and **affixation of prosodic material** that must be filled with material, due to e.g.

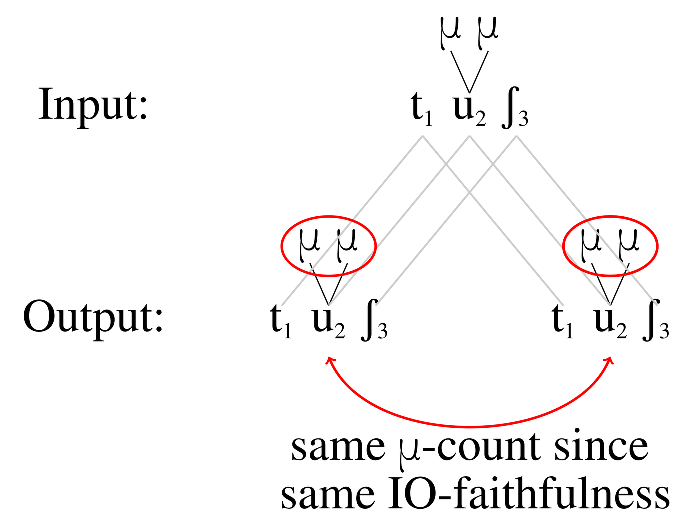
❦ σ>S: Assign * to every σ not dominating a segment.

- 'copying' is **fission**: one input element corresponds to two output elements violating INTEGRITY (Struijke, 2000; Gafos, 2003; Nelson, 2003)

(2) *Basic copying mechanism*



(3) *Collateral IO-faithfulness after fission*



- additional **elements provided via fission are subject to IO-Faith**: the smaller/less specified the prosodic affix is, the more similar it gets to the 'copied' base syllable

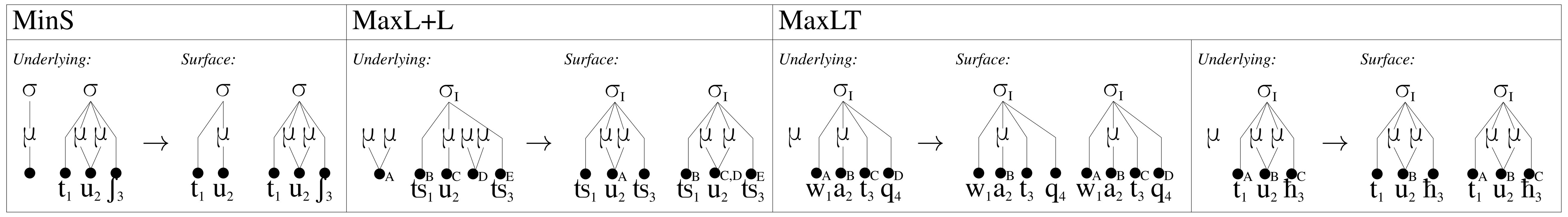
(4) *Affixed prosodic nodes and their consequence for the base in Nuuchahnulth*

Prefixed µ	=	Segment **fission** to fill the prosodic node
Infixed µ	=	**Lengthening of base V** to avoid base-internal fission (=CONTIGUITY)
σ-node	=	**Minimal** copying of CV: INTEGRITY-violations kept to a minimum
No σ-node	=	**Maximal** copying: underlying σ-node undergoes fission & FAITHS(σ)
Root node	=	Reduplicant-V has **length specified** in prosodic affix
No root node	=	**length transfer**: vocalic root node undergoes fission & FAITHµ(S)

❦ FAITHS(σ): Assign * for every output syllable not dominating the same segments that the corresponding input syllable dominates.

❦ FAITHµ(S): Assign * for every output segment that is not dominated by the same number of moras as the corresponding input segment.

(5) *Examples: some reduplicative affixes in Nuuchahnulth*



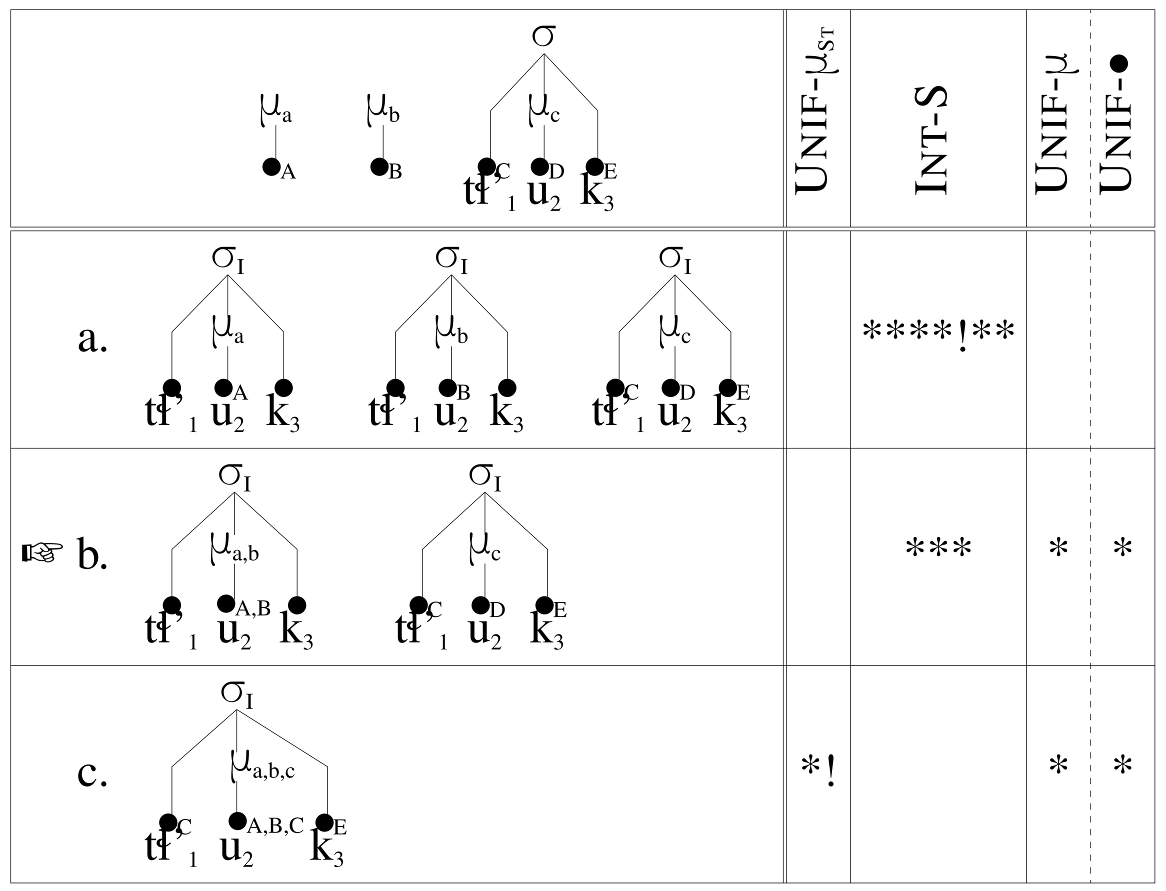
Analysis II: Avoidance of multiple reduplicants=avoidance of segment fission

- In the presence of multiple prosodic nodes (in one stratum), these affix-nodes can undergo **fusion to keep 'copying' (=fission) to a minimum**

❦ UNIF-µ
Assign * for every output-µ that corresponds to more than one µ in the input.

❦ UNIF-µ$_{St}$
Assign * for every output-µ that corresponds to more than one µ in the input and one is a stem-µ.

❦ UNIF-µ$_{(Mα)}$
Assign * for every output-µ that corresponds to more than one µ in the input and both are affiliated with the same morpheme.



Multiple reduplication: Typology

Two adjacent reduplication-triggering affixes and…

…**two reduplicants** surface.	…**one reduplicant** surfaces. (*in some contexts)
Lushootseed (Salish) (Broselow, 1983; Urbanczyk, 2001)	Nuuchahnulth (Wakashan) (Stonham, 2004, 2007)
Tigrinya (Ethio-Semitic) (Rose, 1997)	Amharic (Ethio-Semitic) (Rose, 1997)
Chaha (Ethio-Semitic) (Rose, 1997)	Manam (Austronesian) (Buckley, 1997)

Multiple reduplication and BR-faithfulness accounts

A. Different reduplicants

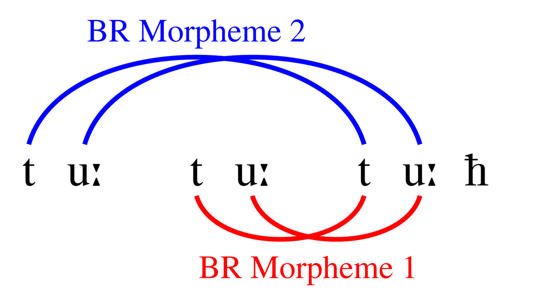
– BR-faithfulness constraints for different morphemes are ranked differently; e.g. Min vs. Max:

	MAX-BR$_{ʃ}$	*CODA	MAX-BR$_{ʔaɬuk}$
RED$_{\text{/ʃ/ 'continually'}}$ - tuːħ			
a. tuː-tuːħ	*!	*	
☞ b. tuːħ-tuːħ		**	
RED$_{\text{/ʔaɬuk/ 'look after'}}$ - tʃapχ			
☞ a. tʃa-tʃapχ		*	**
b. tʃapχ-tʃapχ		**!	

B. Avoidance of multiple reduplicants

① **Unified indexation** (Rose, 1997; Buckley, 1997)

- INTEGRITY-BR penalizes multiple BR-correspondents (=one reduplicant per word)
- MORPH-EXPR ensures morpheme realization (=one reduplicant per reduplicative morpheme)



② *DUPDUP or *REDRED (Stonham, 2004, 2007)

➛ constraints/mechanisms specific to reduplication

➛ *In contrast:* the present account implements the insight that every reduplicative affix selects one **template** (Stonham (2004, 2007); Kim (2008)) **without assuming morpheme-specific BR-relations**; prosodic specifications are a consequence of prosodic affixes.

Appendix I: The OT analysis in detail

(1) *Basic constraints*

a. INT-S: Assign * for every input segment with multiple output correspondents
b. MAX-σ_{AF}: Assign * for every input affix-σ without an output correspondent.
c. σ>S: Assign * for every σ not dominating any segmental material.
d. DEP-S: Assign * for every output segment without an input correspondent.

- segment fission to 'fill' empty prosodic nodes since epenthesis is more costly: MAX-σ_{AF}, σ>S, DEP-S ≫ INT-S

1. Reduplicants with different sizes

Minimal vs. maximal copying

(2) *Minimal copying for σ-affixation*

σ + σ [ʧ$_1$ a$_2$ p$_3$ χ$_4$]	ONS!	INT-S	DEP-μ
a. a$_2$ ʧ$_1$ a$_2$ p$_3$ χ$_4$	*!	*	*
b. ʧ$_1$ a$_2$ p$_3$ χ$_4$ ʧ$_1$ a$_2$ p$_3$ χ$_4$		***!*	*
☞ c. ʧ$_1$ a$_2$ ʧ$_1$ a$_2$ p$_3$ χ$_4$		**	*

- missing σ is provided via fission (DEP-σ ≫ INT-σ) and due to collateral faithfulness (3)

(3) FAITHS(σ): Assign * for every output syllable not dominating the same segments that the corresponding input syllable dominates.

(4) *Coda copying for μ-affixation*

μ + σ_I [w$_1$ a$_2$ t$_3$ q$_4$]	ONS!	DEP-σ	FAITHS(σ)	INT-S	INT-σ
a. σ[w$_1$ a$_2$] σ_I[w$_1$ a$_2$ t$_3$ q$_4$]		*!		**	
b. σ_I[w$_1$ a$_2$] σ_I[w$_1$ a$_2$ t$_3$ q$_4$]			*!*	**	*
☞ c. σ_I[w$_1$ a$_2$ t$_3$ q$_4$] σ_I[w$_1$ a$_2$ t$_3$ q$_4$]				****	*

Short vs. long. vs. length-transferred reduplicant

- Avant: to 'fill' affix-μ's and affix-σ's with segmental material, not only fission of underlying segments is necessary but also additional root nodes (abstract timing slots or a phonological feature in itself (Hyman, 1982; Clements, 1985; Clements and Hume, 1995; McCarthy, 1988)

➙ different strategies to provide them: fission for vocalic segmental root nodes but epenthesis for consonantal root nodes (DEP-$\bullet_V$, INT-$\bullet_C$ ≫ INT-$\bullet_V$, DEP-$\bullet_C$)

(5) FAITHμ(S): Assign * for every output segment that is dominated by a different number of moras than the corresponding input segment.

(6) *Length transfer from the base: Short base-V*

σ + σ [ʧ$_1$ a$_2$ p$_3$ χ$_4$]	FAITHμ(S)	DEP-μ	INT-S
☞ a. ʧ$_1$ a$_2$ ʧ$_1$ a$_2$ p$_3$ χ$_4$		*	**
b. ʧ$_1$ a$_2$ (two μ) ʧ$_1$ a$_2$ p$_3$ χ$_4$	*!	**	**

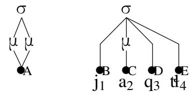
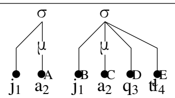
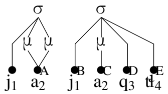
(7) *Length transfer from the base: Long base-V*

σ + σ [n$_1$ u$_2$ k$^w_3$]	FAITHμ(S)	DEP-μ	INT-S
a. n$_1$ u$_2$ n$_1$ u$_2$ k$^w_3$	*!	*	**
☞ b. n$_1$ u$_2$ (two μ) n$_1$ u$_2$ k$^w_3$		**	**

(8) *Short V in the reduplicant: one μ dominating a segmental root node*

σ–μ–A + σ [t$_1$ u$_2$ ʃ$_3$]	MAX-μ_{AF}	FAITHμ(S)	DEP-μ	INT-S
a. t$_1$ u$_2$ (two μ) t$_1$ u$_2$ ʃ$_3$		*!	*	**
☞ b. t$_1$ u$_2$ t$_1$ u$_2$ ʃ$_3$				**

(9) *Long V in the reduplicant: two μ's dominating a segmental root node*

	MAX-μ_{AF}	FAITHμ(S)	DEP-μ	INT-S
				
a. 	*!	*!		**
☞ b. 				**

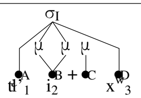
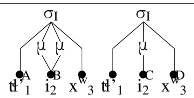
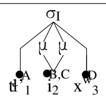
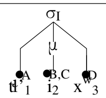
1.1. Affixes affecting the length of the base vowel

- assumption: exponents are prefixed/suffixed to certain pivots (e.g. onset; Yu, 2007)
- only prefixed prosodic nodes result in copying; infixed prosodic nodes replace base structure since (10) excludes base-internal fission

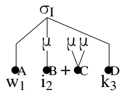
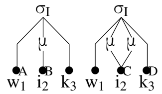
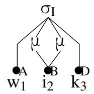
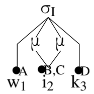
(10) a. CONTIG
Given the representation of a morpheme a that consists of the contiguous string of phonological elements A…Z in the input:
Assign * if there is no contiguous string of elements A…Z in the output
(=sequence A…Z with no intervening element not affiliated with morpheme a)

b. $\text{DEP}(\mu\text{-S})_{ST}$: Assign * for every output association line between a stem-μ and a root node that was not present in the input.

(11) *Shortening of a base-V: infixing root node with one μ*

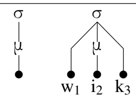
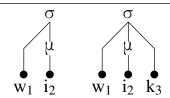
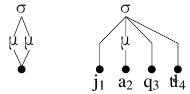
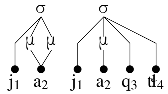
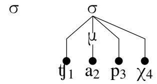
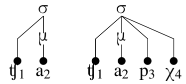
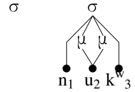
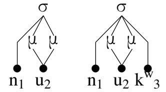
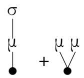
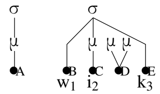
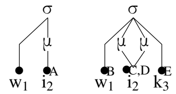
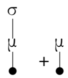
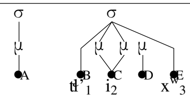
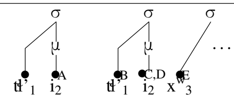
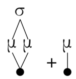
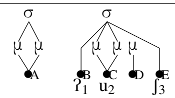
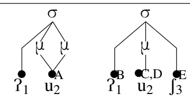
	CONTIG	MAX-μ_{AF}	MAX-●	DEP$(\mu$-S$)_{ST}$	FAITHμ(S)	MAX-μ_{ST}	UNIF-●
							
a. 	*!						
b. 				*!	*		*
☞ c. 					*	**	*

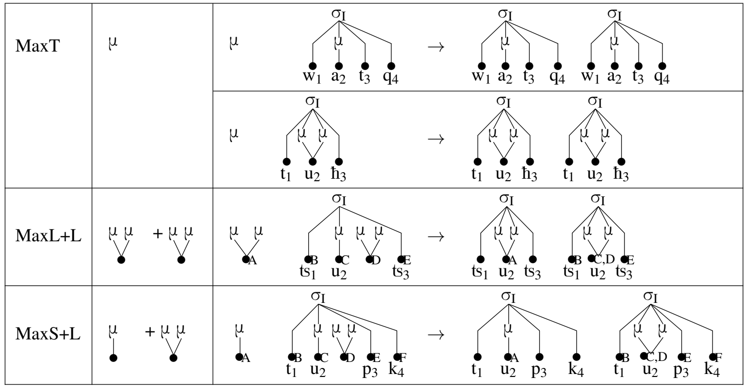
(12) *Lengthening of a base-V: infixing root node with two μ's*

	CONTIG	MAX-μ_{AF}	MAX-●	DEP$(\mu$-S$)_{ST}$	FAITHμ(S)	MAX-μ_{ST}	UNIF-●
							
a. 	*!						
b. 		*!	*!		*		
☞ c. 					*	*	*

1.2. Summary

(13) *All reduplication-triggering suffixes and their representation*

Pattern	Affix	Underlying	→	Surface
MinS			→	
MinL			→	
MinT	σ		→	
			→	
MinS+L			→	
MinS+S			→	
MinL+S			→	



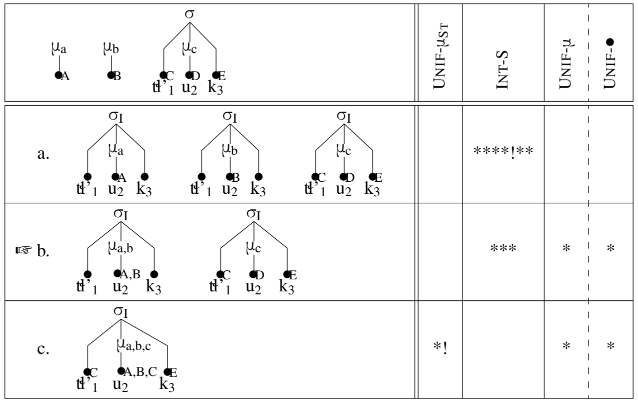
1.3. The unification effect in multiple reduplication contexts

(14) a. UNIF-μ: Assign * for every output-μ that corresponds to more than one μ in the input.

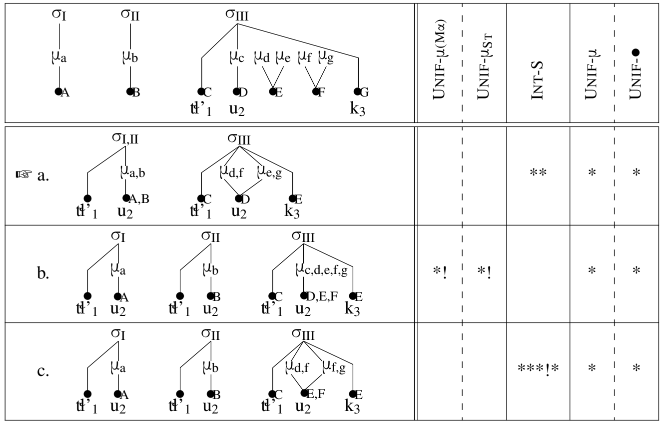
b. UNIF-μ_{ST}: Assign * for every output-μ that corresponds to more than one μ in the input and one is a stem-μ.

c. UNIF-μ(Mα): Assign * for every output-μ that corresponds to more than one μ in the input and both are affiliated with the same morpheme.

(15) *Multiple reduplication-triggers: The unification effect (simplified!)*



(16) *Multiple reduplication-triggers: The unification effect for MinS+L and a MinL+L*



- avoidance of multiple reduplicants is hence a simple consequence from general faithfulness (=fission is costly) and re-ranking of UNIF-●, UNIF-μ, and INT-S easily predicts a system where multiple reduplicants are tolerated

➙ the typology of multiple reduplicants favors exactly such a view: some languages employ multiple reduplicants, others avoid them (Broselow, 1983; Rose, 1997; Buckley, 1997; Urbanczyk, 1999, 2001)

Appendix II: The data

- Kim (2003*a*,*b*, 2008): fieldwork by Eun-Sook Kim 1998-2003 on the Ahousaht dialect
- Stonham (1999, 2004, 2007): based on Sapir's fieldwork (1910-1914), mainly Tsishaath speakers

References

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', *Proceedings of NELS 28* pp. 59–67.

Clements, George N. (1985), 'The geometry of phonological features', *Phonology Yearbook* **2**, 225–252.

Clements, George N. and Beth Hume (1995), The internal organization of speech sounds, *in* J.Goldsmith, ed., 'The Handbook of Phonological Theory', Cambridge: Blackwell, pp. 245–306.

Hyman, Larry (1982), The representation of length in Gokana, *in* 'Proceedings of WCCFL 1', Cascadilla Press, pp. 198–206.

Kim, Eun-Sook (2003*a*), Foot structure in Nuu-chah-nulth: Reconsidering foot typology within OT, *in* K.Moulton and M.Wolf, eds, 'Proceedings of NELS 34', GLSA, pp. 311–318.

Kim, Eun-Sook (2003*b*), 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.

McCarthy, John (1988), 'Feature geometry and dependency: A review', *Phonetica* **43**, 84–108.

Rose, Sharon (1997), 'Multiple correspondence in reduplication', *BLS 23* **23**.

Stonham, John (1999), *Aspects of Tsishaath Nootka phonetics & (and) phonology*, LINCOM.

Stonham, John (2004), *Linguistic Theory and Complex Words*, palgrave macmillan.

Stonham, John (2007), 'Nuuchahnulth double reduplication and stratal optimality theory', *Canadian Journal of Linguistics* **52**, 105–130.

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, pp. 390–428.

Urbanczyk, Suzanne (2001), *Patterns of reduplication in Lushootseed*, Garland, New York.

Yu, Alan C. L. (2007), *A Natural History of Infixation*, Oxford University Press, Oxford.

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