Phonological Occurrences: Relations and Copying

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1. ⋆Introduction

- **The fundamental role of *precedence*:** Phonological representations must encode the order of segments. Following Raimy (2000), we propose that segments are in primitive, binary, intransitive *immediate precedence* (ImmP) relations. Segments may be in *multiple* ImmP relations.
- **The source of multiple precedence:** Morphology may add ImmP relations as *readjustment rules* (RRs) that accompany affixation. Thus there is no Red morpheme, empty skeletal affix, or B-R correspondence. Reduplication is accounted for without recourse to process-specific mechanisms.
- **Precedence relations as the source of *non-reduplicative copying*:** Phonology may add a more specific precedence relation, the *onset* relation (Ω), in *repair* operations driven by well-formedness (see Appendix B).
- **Precedence derives locality:** Apparently non-local relations crucial in the derivation of "avoidance phenomena" in reduplication are shown to be local and derivable from the basic *immediate precedence* relation. These derived relations are *coprecedence* and *cosuccession*.
- **Economy constraints on the grammar:** Ineffability effects arise from economy conditions on precedence representations.
- Representations with multiple precedence "loops" are not interpretable to phonetics. ⇒ A linearization procedure applies to such a representation, deriving a total linear order. This linearization algorithm may be formalized as an optimization of competing constraints.
- With no surface base or reduplicant, how are *the emergence of the unmarked* (tetu) generalizations accounted for? ⇒ tetu is not a homogeneous phenomenon. Each type of TETU we examine has different underlying sources.

A Roadmap of the Talk

Section 2 Introduction of immediate precedence relations as a Readjustment Rule.
Focus: demonstration of the dissociation of exponence and readjustment

Section 3 Fixed Segment Reduplication and local relations.
Focus: an account of dissimilation and ineffability in Hindi echo, Turkish partial, and Turkish echo reduplication.

Section 4 Principles of Linearization.
Focus: demonstration of the linearization algorithm and cyclic phenomena within Lushootseed multiple reduplication.

Section 5 Emergence of the Unmarked without Base and Reduplicant.
Focus: a typology of heterogeneous tetu as distinct phenomena.

Appendix A Segmental tetu without BR Correspondence.
Focus: stress-driven epenthesis in Lushootseed diminutive reduplication.

Appendix B Onset Relations as Phonological Repair.
Focus: demonstration that Onset well-formedness drives nonreduplicative copying in Spokane, Temiar, and Yoruba.

2. ⋆Exponence vs. Readjustment

- **Syntax precedes morphology precedes phonology** (Halle and Marantz (1993) et seq.).
- The syntax assembles morphosyntactic features into hierarchical relationships.
- The morphology is *realizational*; it cyclically inserts Vocabulary Items that are the phonological exponents (PEs) of those features. Once a morphosyntactic feature has been traded for phonological content it is *spelled-out.*
- Exponents are contextually sensitive (e.g., *ox**en*** vs. *cow**s***) and can be phonologically null (e.g., *deer, fish*).
- Insertion of an exponent can trigger a readjustment rule (phonological process, e.g. ablaut) on already spelled-out material.
- **Contentful/null exponence and presence/absence of readjustment rule are logically and empirically independent.**

(1) English past tense shows dissociation of exponent and RR.

Exponent(Past)	Readjustment Rule	Example
/d/	none	*played*
∅	none	*hit*
/d/	ablaut	*sold*
∅	ablaut	*ran*

Precedence Relations

(2) Every phonological representation implicitly or explicitly encodes the order of segments with respect to one another. **A rule of the form** `A → B / __ C` **depends on the information that A immediately precedes C.**[1]

(3) Raimy (2000): lexical representation includes start symbol (#) and end symbol (%). Thus 'cat' is represented as #→k→æ→t→%.[2]

(4) Raimy's novel proposal: a segment can be in more than one precedence relation. In such as case we say a segment has *multiple occurrences*. Nothing in the I-phonology conceivably disallows representations of this sort.[3] Indeed, we ask for what principled reason multiple precedence is ruled out in most theories.

(5) Reduplication is simply a readjustment rule that adds a new precedence relation.

(6) Total reduplication, for example, is the addition of a new precedence relation from the final segment to the initial segment, triggered by the (null) exponent of the relevant realized feature (e.g., PLURAL):

→ k → æ → t → % **Linearized as [kætkæt]**

(7) The readjustment rule has introduced multiple precedence: [k] immediately follows both # and [t], and [t] immediately precedes both % and [k].

(8) **Exponence of a morpheme and its precedence-introducing readjustment are empirically dissociated:**

Exponent	RR	Example
/-i/ ↔ DIMINUTIVE	a→q	qa-qayt-i (little toadstool, *Bella Coola*)
/man-/ ↔ OCCUPATIONAL-N	a→s	man-la-laroʔ (player, *Tagalog*)
/ʔag-/ ↔ PROGRESSIVE	s→b	ʔag-bas-basa (be reading, *Ilokano*)
∅↔ PLURAL	u→b	buku-buku (books,*Indonesian*)

(9) Since these are phonological representations, they are not themselves pronounced. We present below a linearization algorithm that produces forms that are phonetically interpretable (cf. *bare output conditions*, Chomsky (1995)).

Assuming the linearization algorithm outlined below, (6) underlies the surface string [kætkæt], in which there are two *copies* of [k], [æ], and [t][4]

[1] For current discussion we assume this ordering is among timing slots. Thus b→a is a shorthand for "the timing slot linked to the features comprising [b] immediately precedes the timing slot linked to the features comprising [a]." At present there does not seem to be a need for precedence relations among features, though see our discussion of Turkish emphatic reduplication.

[2] Since we do not focus initially on the important distinction between the IMMP relation and the more specific Ω relation, we will use → with systematic ambiguity to denote generalized immediate precedence, whether IMMP or Ω. The reader is encouraged to examine Appendix B for the role of Ω in the present theory.

[3] Note similarities with Blevins (1990) et seq. for multiple dominance relations in a chain-free theory of syntax, Chomsky (1955, 2001) for proposal that each instance in a relation is an *occurrence*.

[4] Similarly: in the representation (ia) underlying the sentence (ib), we cannot point to *the* syntactic object 'John'. Rather, there are two occurrences of 'John'.

(10) **Application of a rule in the environment of one occurrence affects the object itself (in its other occurrence as well); putative overapplication effects are the result of a phonological process operating on the single segment that is in two relations.**

(11) Indonesian case of nasal coalescence in which /məN/ prefixed to /potoŋ/,'cut' yields [mə-**m**otoŋ-**m**otoŋ], 'to cut intensively' (coalescing the placeless nasal **N** and the following voiceless stop into one segment; Uhrbach (1987)):

Prefixation: #→m→ə→N→p→o→t→o→ŋ→%

Readjustment: #→p→o→t→o→ŋ→%

Coalescence: #→m→ə→m→o→t→o→ŋ→%

Linearization: mə**m**otoŋ**m**otoŋ

(12) The /p/ in two precedence relations that happens to undergo nasal coalescence is literally the same segment,[5] one occurrence of which meets the structural description for the coalescence rule. (*Transparent application occurs when a phonological process applies to a linearized form.*)

(13) This treatment of overapplication meets the challenge posed since Wilbur (1973) for an analysis within a serial derivation (not even the proposal of Mester (1988) could capture this kind of overapplication) and reiterated by BR-Correspondence advocates (cf. Nevins (to appear) for discussion). Moreover, the ordering of linearization following all cyclic rules makes falsifiable predictions.

Two clarificatory points: •(1) Substrings labelled "base" and "reduplicant" play no role in the phonological computation. There is no RED morpheme to be aligned or given phonological content, only the introduction of a new precedence relation to a segment, which, upon linearization, gives the appearance of distinct copies.
• (2) While are pursuing a new representational vocabulary, there is nothing in this *precedence-based* approach that is inherently "anti-OT". These representations can be easily incorporated into an OT grammar, which is at its core simply a well-articulated theory of constraint interaction and violability.[6]

Summary: Phonological segments are in (possibly multiple) immediate precedence relations. Readjustment rules can accompany affixation. Reduplication is the result of a readjustment rule that adds a "looping" precedence relation.

(i) a. {John,{T,{arrived,John}}}
b. John arrived.

[5] See also, e.g., structural case-assignment in only one occurrence of the same syntactic object. Movement is simply the addition of a syntactic relation (sisterhood) to a syntactic object that is already in at least one such relation, resulting in a single syntactic object in multiple structural positions; no need for a "Xerox copy" approach to movement (see Fitzpatrick (to appear) for discussion).

[6] Note however, that the existence of both multiple-precedent and linearized representations would require at least two strata of constraint evaluation (cf. Booij (1997); Kiparsky (2000) among many predecessors and successors).

⋆SIDEBAR: REPRESENTATION OF AFFIXES

(14) The representation of vocabulary items as prefixes or suffixes can be encoded in the precedence relationships stored in the listed form. Let the presence of a variable α (and lack of either # or %) indicate a "bound" morpheme, where α is a placeholder.

(15) The segment in IMMP with α will be in IMMP with a segment of the root, replacing α; this is what constitutes affixation.

(16) The segment replacing α is determined either (a) by optimal linearization considerations (affixing a suffix to the first segment of a stem would be difficult or impossible to linearize), or (b) by convention.

(17) Representations formed through affixation contain multiple beginning or end symbols. The *linearization* algorithm outlined below ensures that these representations are linearized as expected. In most cases the root's start/end symbol will be left unparsed in order to satisfy COMPLETENESS with respect to the affix.

(18) Thus $\alpha \rightarrow$ e $\rightarrow$ r $\rightarrow$ % is the vocabulary item exposing the morphosyntactic feature AGENT. Affixation to *eat* is the replacement of α with `t`. After erasure of the root's % through linearization, the form derived is # $\rightarrow$ e $\rightarrow$ a $\rightarrow$ t $\rightarrow$ e $\rightarrow$ r $\rightarrow$ %

(19) The explicit representation of prefixes in terms of precedence would seem to replace (categorial) ALIGN.

(20) The empirical payoff: representation of prefixes such as *su-* and *a-* as in *suggest* and *accede* contain a "copy" consonant, as proposed in Chomsky and Halle (1968).

(21) English contains a well-known process of velar softening, exemplified by pairs such as *electric-electricity, placate-placid*, and *critic-criticize*, which turns [g] to [dʒ] and [k] to [s].

(22) If we assume 'su-' is concatenated with 'gest' we would expect [sədʒɛst] rather than [səgdʒɛst] and [asɛpt] rather than [aksɛpt]. However, we propose that the prefix has the following listed form: $\begin{tikzcd} \# \arrow[r] & s \arrow[r] & u \arrow[r] & \alpha \arrow[loop below] \end{tikzcd}$

Following *alpha*-substitution, the new set of precedence relations obtains:

$$\begin{tikzcd} \# \arrow[r] & s \arrow[r] & u \arrow[r] & g \arrow[r] \arrow[loop below] & \varepsilon \arrow[r] & s \arrow[r] & t \arrow[r] & \% \end{tikzcd}$$

Linearized as: #→s→u→g→g→ɛ→s→t→%

Following linearization, velar softening applies transparently:
Velar softening: #→s→u→g→dʒ→ɛ→s→t→%

A similar derivation holds for [aksɛpt].

Summary: A vocabulary item's status as a prefix or suffix is explicitly represented in its precedence relations by a variable. Linearization and ordering interact to yield opacity phenomena in affixation.

3. ⋆Interprecedence Relations and FixSeg

(23) Beyond attractive analyses of overapplication and the "de-diacriticization" of affixes: **Interprecedence relations can be derived from precedence.** Such relations seem to have no existing notational or structural analogue in other frameworks (even those similar in spirit to an occurrence theory, e.g. Frampton (2001)).

(24) We turn our attention to cases of "marked" fixed segmentism[7] in which there is an overt morphological exponent (FIXSEG) and a readjustment rule:

a.	table-shmable	eel-shmeel	English, FIXSEG = [ʃm-]
b.	paanii-vaanii	aam-vaam	Hindi, FIXSEG = [v-]
c.	kitap-mitap	attila-mattila	Turkish, FIXSEG = [m-]

First, the exponents and readjustment rules of the morphosyntactic features in question[8]:

(25)

Exponent	Readjustment Rule
DERISIVE (English) ↔ α→ʃ→m→%	m→first vowel
REPRESENTATIVE PLURALITY (Hindi) ↔ α→v→%	v→first vowel
REPRESENTATIVE PLURALITY (Turkish) ↔ α→m→%	m→first vowel
EMPHATIC (Turkish) ↔ #→p→α	first vowel→p

Hindi is perhaps the most illustrative case; the FIXSEG is [v] **except when the base starts with [v], in which case it is [ʃ]**:

(26) vakil-ʃakil, 'lawyers and such' (*vakil-vakil)

(27) Precedence-Based Representations:

$$\begin{tikzcd} \# \arrow[r] & p \arrow[r] & a \arrow[r] & a \arrow[r] & n \arrow[r] & i \arrow[r] & i \arrow[r] \arrow[dll] & \% \\ & & & & v \arrow[ull] & & & \end{tikzcd}$$

$$\begin{tikzcd} \# \arrow[r] & v \arrow[r] & a \arrow[r] & k \arrow[r] & i \arrow[r] & l \arrow[r] \arrow[dll] & \% \\ & & & \int \arrow[ul] & & & \end{tikzcd}$$

A formal mechanism for capturing this alternation is hard to come by. ANTIFAITHFULNESS will not account for why it is **precisely the FixSeg** that is compromised and no other (e.g. why not **vakil-vaki**t***). Moreover, no ranking of non-identity with respect to RHYME will not explain dissimilation in Turkish partial reduplication[9] in (28) and (29):

[7]Alderete et al. (1999) make the distinction between morphological fixed segmentism and phonological fixed segmentism based on the markedness/epenthetic-predictability of the putative fixed segment; we limit this section to the former. See Nevins and Wagner (2001) for an extensive discussion of the paradoxical need for FIXSEG to be included in BR correspondence in order to capture base-conditioned sensitivity, while at the same time the inclusion of such a relation predicts typologically unattested backcopying of FIXSEG onto the base.

[8]The correct formulation of the some reduplicative RRs involves the Ω relation. As this is a special case of IMMP, the imprecision will suffice for the current illustration.

[9]Distinct in form and meaning from Turkish echo reduplication shown in (24).

Turkish CVF reduplication (Kelepir (1999)): FIXSEG = [p]:

(28) ciliz 'alive', ci**p**-ci**l**iz, 'alive (emphatic)'
yeni 'new', ye**p**-ye**n**i, 'new (emphatic)'

A nonlocal dissimilation effect obtains: if the "corresponding" segment in the base is an obstruent, the FIXSEG surfaces as [m]:

(29) boʃ 'empty', bo**m**-bo**ʃ**, 'empty (emphatic)'
dik 'steep', di**m**-di**k**, 'steep (emphatic)'

Most dissimilation effects are local. Can a natural relation be derived from precedence to make these two segments in an anti-identity relationship more local?

(30) Precedence-Based Representation for Turkish emphatic reduplication:

$\# \rightarrow c \rightarrow i \rightarrow l \rightarrow i \rightarrow z \rightarrow \%$ $\quad$ $\# \rightarrow d \rightarrow i \rightarrow k \rightarrow \%$

p $\quad$ m

Avoidance Phenomena: Locality via Co-precedence and Co-succession

Both types of reduplication exhibit *avoidance* phenomena, in which (FIXSEG) surfaces as a different segment, depending on the identity of a certain segment in the root. Let us define two natural irreflexive relationships: *coprecedence* and *cosuccession*:

(31) $\trianglerighteq$(x, y) (**x and y are coprecedent**) iff x→a and y→a.
$\trianglelefteq$(x, y) (**x and y are cosuccessors**) iff a→x and a→y.

Now, cases such as vakil-ʃakil (*vakil-vakil) and dim-dik (*dip-dik) are readily captured through "rewrite rules" that change the affix's segmental content under *locally* defined structural conditions:

(32) v ⇒ ʃ / $\trianglerighteq$(v, _)
p ⇒ m / $\trianglelefteq$(_, [+obstruent]) (or "ʔ", in GP)

The derived interprecedence relation *explains* why the dissimilating segment is always the FIXSEG; it is the only segment eligible for asymmetric membership in the $\trianglerighteq$ or $\trianglelefteq$ relation.[10] (*vakil-vakit* would never be a candidate for dissimilation since the segment *l* is not in an interprecedence relation.) *Economy and Ineffability*

(33) Unlike Hindi echo reduplication, Turkish echo reduplication shows no avoidance allomorphy.

a. kitap kitap-mitap, 'books and so forth'
b. masa *masa-masa (no allomorphy), 'tables and so forth'

[10]Note that an addition conjunction in the structural description, namely v $\trianglelefteq$ % ensures that it is the second [v] that dissimilates.

(34) Here FIXSEG = /m/ and we see a pattern much like Hindi /v/ reduplication. However, reduplication is impossible with [m]-initial forms like (34b). They are simply ineffable and their meaning must be expressed periphrastically.

(35) Under the assumption that negative evidence is not available in language learning, this is an interesting problem. Primary linguistic data such as [kitap-mitap] or [mez-vez] would presumably lead the Turkish or Hindi learner, respectively, to posit the following (set of) processes.

a. *Affixation*: Insert a new precedence relation between the final segment of the stem and FIXSEG.
b. *Readjustment Rule*: Insert a new precedence relations between FIXSEG and the first vowel of the stem.

(36) But this set of operations generates *[vakil-vakil] for reduplication of /vakil/ and, *mutatis mutandis*, *[masa-masa] for /masa/. **How does the learner *know* this form is not available?**

(37) Note that for the linearized form [vakil-vakil] there is an underlying representation (38b) containing fewer symbols than (38a).

(38) Two alternative pre-linearization forms for [vakil-vakil]:

a. $\# \rightarrow v \rightarrow a \rightarrow k \rightarrow i \rightarrow l \rightarrow \%$ $\quad$ v
b. $\# \rightarrow v \rightarrow a \rightarrow k \rightarrow i \rightarrow l \rightarrow \%$

(39) An adaptation of the proposals of Fox (2000) regarding economy and interpretation may be warranted here. In such a system, **operations apply only if they have some designated interpretive effect.** For example, a semantically vacuous quantifier raising operation is impossible.

(40) Though we do not provide a specific implementation here of Fox's interpretive economy, the intuition is that in *[vakil-vakil] and *[masa-masa], **there is no evidence of the readjustment rule**, and so the forms are ungrammatical.[11]

(41) Since this fact cannot be learned from positive evidence, we assume it arises from an innate property of human language, the nature of which is the focus of ongoing research.

Summary: Apparent long-distance conditioned allomorphy is difficult to capture in many theories. Our approach allows the derivation of simple and natural local relations that explain why the FIXSEG dissimilates. Moreover, cases of ineffability are understood as failure of recoverability due to economy of derivation.

[11]PLD such as [vakil-ʃakil] will give the Hindi learner a way to avoid the effects of economy through allomorphy.

4. ⋆Principles of Linearization

We fulfill our promissory note to explicate how multiple precedence is resolved in the interest of phonetic interpretability:[12]

(42) ***Linearization*** defines a path through the representation that both crosses links *completely* (i.e., leaves as few links as possible unparsed), while at the same time *minimizing* the total links crossed (i.e., not crossing links multiple times if this can be avoided). This path must be constructed from relations in the input (i.e., linearization cannot add precedence relations). In the case of "choice points", one of the links is *preferred*. Here we take this preference to be governed by *locality*.

(43) **Linearization is simply *re-concatenation* of a form as constrained by the input representation, as well as interpretability and economy constraints.**

Completeness can be thought of as Max(ImmP)
Minimality can be thought of as *Struc
No New Relations amounts to Dep(ImmP).
Priority is not directly comparable to familiar phonological constraints.

(44) A remaining question: *where in the grammar does linearization apply?* This seems to be a purely empirical question. Some possibilities can be ruled out:

1. Is the representation linearized after application of each morpheme? No: the presence of these loops is crucial for the derivation of over- and under-application effects as in Raimy (2000) and the Indonesian case discussed above.
2. Does linearization apply only once, at the "end" of the phonological derivation? No: *transparent* phonological rules must apply *after* linearization.
3. We propose below that linearization applies at the end of cyclic and non-cyclic blocks/strata.[13]

Linearization in Action: Multiple reduplication in Lushootseed

(45) We illustrate linearization, formalized as the optimization of competing constraints with examples from Lushootseed. Lushootseed contains various reduplication patterns that can appear independently, or simultaneously in the same form (Broselow (1983), Urbanczyk (2001)), crucially in different semantic scopes.

We discuss three types of reduplication in Lushootseed:
The *diminutive* (dim), *distributive* (dist), and *out-of-control* (oc) patterns (all data are from Bates et al. (1994)):

[12] Many of the principles below have precedents (no pun intended) in Raimy (2001). Their implementation, evaluation, and especially empirical verification in multiple reduplication presented here mark points of departure.

[13] This is the proposal advanced with respect to dual-prosodic structures by Mester (1988).

(46)	a.	Root:	ʔíbəʃ	'walk, travel'
	b.	Diminutive (dim):	ʔí-ʔi-bəʃ	'walk a bit'
	c.	Distributive (dist):	ʔíb-ʔib-əʃ	'walk all about'
	d.	Out-of-control (oc):	ʔ-íb-ib-əʃ	'pace back and forth'

As above, these are the result of RRs applying in the presence of null morphemes:[14]:

(47) Diminutive Readjustment (SD = 'structural description' and SC = 'structural change')
a. SD: #→C_1 →V→C_2
b. SC: add relation V→C_1. (Dim-rr-a)
c. Elsewhere: Add relation C_1→C_1. (Dim-rr-b)

(48) [ʔíbəʃ] 'walk' [ʔí-ʔi-bəʃ] 'walk a bit'
[č'ƛ'aʔ] 'stone' [č'-č'ƛ'aʔ] → [čí-č'ƛ'aʔ] 'little stones'

The dist pattern adds a relation between the second and first consonants of the root:

(49) Distributive Readjustment: Add link C_2 →C_1, where C_1 is the first and C_2 the second consonant of the stem.

(50) [ʔíbəʃ] 'walk' [ʔíb-ʔib-əʃ] 'walk all about'

oc results from a relation added between the post-tonic consonant and the stressed vowel.[15]

(51) Out-of-control Readjustment: SD: V́→C
SC: Add link from C→V́

(52) [ʔíbəʃ] 'walk' [ʔíb-ib-əʃ] 'pace back and forth'

The interaction of these RRs when more than one morpheme is present will test whether this linearization algorithm on the right track.

(53) Consider the following four patterns of multiple reduplication:
a. [dist [oc root]]
b. [dim [oc root]]
c. [dist [dim root]]
d. [dim [dist root]]

[14] Note that we assume that stress assignment occurs before these affixations.

[15] One might wonder what elements can properly be included in SDs. This important question is not addressed here.

Turning to the first combination of reduplication:
• [DIST [OC ROOT]] double reduplication of /bali/ is [bál-al-bali], 'suddenly forgetting'. Application of (49) and (51) above to this root results in (54):

(54) #→b→á→l→i→%

Linearization follows:

(55)

	Input: (54)	PRIORITY	COMPLETENESS	MINIMALITY
☞	a. bal-al-bali			a-lb-a-l
	b. bal-bal-ali	*!		b-a-la-l
	c. bal-ali		(l-b)!	a-l
	d. bal-al-al-bali			a-l-a-lb-!a-l

To explain candidate evaluation: (55b) is ruled out since (54) is linearized by crossing the l→b loop first, rather than the shorter l→a loop. (55c) does not cross the l→b loop at all, and so is ruled out by COMPLETENESS. Finally, (55d) is ruled out by MINIMALITY:[16] since l→a is unnecessarily crossed twice in linearization.

• [DIM [OC ROOT]] double reduplication of /dayʔ/ yields [dá-day-ayʔ]:[17] First, application of both DIM and OC to the root results in (56):

(56) #→d→a→y→ʔ→%

The properties of the linearization algorithm again make the correct prediction, generating [dá-day-ayʔ]:

(57)

	Input: (56)	PRIORITY	COMPLETENESS	MINIMALITY
☞	a. dá-day-ayʔ			d-aa-y
	b. dá-dayʔ		(y-a)!	a-y
	c. dá-da-day-ayʔ			d-a-d-aa!-y

Here (57b) is ruled out by COMPLETENESS since y→a is not parsed. (57c) violates MINIMALITY more than the other forms since it gratuitously reparses the a→d loop. Note that PRIORITY is not directly relevant in evaluation as (56) contains only loops of equal length.
• [DIM [DIST ROOT]] of /bdaʔ/ is [bbdbdaʔ] (surface form [bí-bəd-bədaʔ][18]:

(58) #→b→d→a→ʔ→%

[16] Note that one violation of MINIMALITY is incurred for the 2nd, 3rd, ... crossing of each precedence relation.
[17] The surface form differs with respect to vowel quality: [dá-diy-əyʔ]. We do not provide an analysis for these changes.
[18] Following Bates and many Salishanists we assume that schwa is inserted postcyclically. As we show in Appendix A, the stress-requirement on the leftmost syllable forces *i*-epenthesis in stressed position.

Linearization of the representation in (58) is shown:

(59)

	Input: (58)	PRIORITY	COMPLETENESS	MINIMALITY
☞	a. bbdbdaʔ			bb-d
	b. bdbbdaʔ	*!		bb-d
	c. bbdaʔ		(d-b)!	b
	d. bbbdbdaʔ			b-bb-!d

(60) Here (60c) and (60d) are ruled out by COMPLETENESS and MINIMALITY, respectively, for similar reasons as in the previous examples.

(61) (61b) provides evidence that PRIORITY is globally evaluated, or that this constraint is better viewed as a topological INSIDE LOOPS FIRST or a morphologically-sensitive MOST RECENTLY ADDED LOOPS FIRST. Any will capture that (61b) is suboptimal since the d→b loop is parsed before the shorter b→b loop.

Multiple Linearization

(62) Thus far we have seen interactions of multiple loops that require only one application of the linearization algorithm. However, the theoretical possibility of *multiple linearization* is made evident in [DIST [DIM ROOT]] reduplication in Lushootseed.

(63) [DIST [DIM ROOT]] contains the same morphemes as [DIM [DIST ROOT]] shown above, and so application of both morphemes *should result in the same form*, namely (58), **unless linearization intervenes between the two RRs**.

(64) The [DIST [DIM ROOT]] form of /bdaʔ/ = [bíbibədaʔ] ***rather than*** *[bíbədbədaʔ].

(65) The [$C_1VC_1VC_1V$...] pattern is observed in numerous other forms:

	Root	[DIST [DIM $\sqrt{\text{root}}$]]
a.	χay	χa-χa-χay
b.	pastəd	pa-pa-pstəd
c.	duukʷ	dí-di-duukʷ

Taking into account what is known DIM and Salish morphology in general (e.g., Czaykowska-Higgins (1993)), we argue that the morpheme triggering the DIM pattern is cyclic while DIST and OC are non-cylic. Only with DIM is [i]-epenthesis possible, allowing the leftmost element to be stressed.

(66) Comparison of (non-)Epenthesis in Affixed-Forms:

a.	DIM /bədaʔ/	[bíbədaʔ]	*[bəbədáʔ]
b.	DIST /bədaʔ/	*[bídbədaʔ]	[bədbədáʔ]
c.	DIM/č'λ'aʔ/	[č'íλ'č'λ'áʔ]	*[č'íλ'č'λ'áʔ]
d.	DIST /č'λ'aʔ/	*[č'íλ'č'λ'áʔ]	[č'λ'č'λ'áʔ]

(67) **The diminutive is a cyclic affix; the others are non-cyclic. Linearization**

applies between these blocks of morphemes[19].

Derivation of the $\boxed{\text{[DIST [DIM ROOT]]}}$ **form** [bíbibədaʔ]:

(68) #→b→d→a→ʔ→%

(69) Linearized as: [bbdaʔ]

(70) Schwa-epenthesis, stress assignment, *i*-epenthesis apply: bíbədaʔ

(71) DIST applies: #→b→i→b→ə→d→a→ʔ→%

(72) Linearized as: [bibbibədaʔ]

(73) Degemination applies:[20] [bíbibədaʔ]

(74) **The difference between dist-dim and dim-dist is the hierarchical arrangement of morphemes as in (75), coupled with the fact that linearization applies after dim.**
a. DIST-DIM: [DIST [DIM [√root]]]
b. DIM-DIST: [DIM [DIST [√root]]]

The distinction is attested in consideration of the semantic scope of forms such as:

(75)

Surface forms	Morph Structure	Meaning
[bíbibədaʔ]	[DIST [DIM √child]]	'small children'
[bíbədaʔ]	[DIM √child]	'small child'
[bíbədbədaʔ]	[DIM [DIST √child]]	'litter'
[bədbədáʔ]	[DIST √child]]	'(group of) children'

Summary: The linearization algorithm, constrained by principles of Completeness and Economy, makes correct predictions in complicated multiple reduplications, providing further empirical support that it is a natural and optimal procedure.

[19] Multiple linearization has also been proposed by Halle (2001 Ms.) in the analysis of Tohono O'odham plurals.

[20] Urbanczyk (1996:283) keenly notes that, contra Broselow (1983), a degemination process such as (73) is well-motivated empirically since single DIST forms that would create geminates (e.g. C_1VC_2 forms where $C_1{=}C_2$) generally surface as CV rather than CVC: [t'it'-əb] 'bathe', [t'i**t'**it'-əb] 'bathe for a while' (but *[t'i**t't'**it'-əb]).

5. ⋆TETU without B-R Correspondence

As stated, the present account does not feature B-R Correspondence. The immediate question that arises is how "the emergence of the unmarked" (TETU) effects are captured.

(76) At first blush TETU is a generalization that perhaps *cannot* be captured by any theory that does not recognize a surface base and reduplicant. TETU is commonly found in analyses of reduplication with the ranking:

IO-Faith ≫ PhonCon ≫ BR-Faith.

(77) In order to address this problem, we must ask what "unmarked" means. A review of the literature shows that TETU is not a homogeneous category. On the contrary, quite disparate phenomena are often grouped under this rubric.

(78) Separation of "TETU effects" into a clear typology shows that when taken on a type-by-type and case-by-case basis, these phenomena may find some natural analyses in a precedence-based approach.

⋄Unmarked = Less

(79) If unmarked simply means "less", then the precedence-based representation need not be challenged. Reduplicating readjustment is a new precedence relation that is *maximally* as long as the entire word, and minimally one segment. Unmarked-qualess happens when the loop is short.

(80) Of course, the prosodic morphologist doth protest: why is "less" usually CV, or CVC. Usualness may be correlated with naturalness of rules, but unnaturalness need not be markedness: consider Mangarrayi, in which the repeated substring is a VC(C) sequence, is that "unmarked"?

(81)

Vocabulary Item	Plural Form	Gloss
g**ab**uji	gababuji	'old persons'
y**ir**ag	yirirag	'fathers'
jimgan	jimgimgan	'knowledgeable ones'

⋄Non-Reduplicative Copying

(82) In cases of CV prefixation in which an "epenthetic" segment is preceded by a copy of the first vowel, the analysis need not be one of reduplication with replacement of the base vowel by a more unmarked nucleus.

(83) The case of Yoruba gerundive affixation has been analyzed by Kawu (1999) as prefixation of a high-toned vowel (or just a high tone), followed by a non-reduplicative repair copying. (See also Bissell (2002) for Miya):

jo Prefixation→ íjo Onset Repair→íjíjo

See Appendix B for an analysis for Temiar and Spokane Salish "reduplication" as vowel prefixation followed by non-reduplicative copying.

⋄**Post-Reduplicative Repair**
Some cases of purported TETU in fixed segment reduplication (Alderete et al. (1999)) can be fruitfully analyzed in such a way that the fixed segment is not part of the reduplicant at all, but arises through post-reduplication processes.

(84) For example, one straightforward analysis of the Lushootseed *i*-epenthesis is the following
- The DIM prefix is a null morpheme accompanied by readjustment.
- In addition, the prefix adds a `Left (` to the metrical grid, requiring stress on the initial syllable.
- Schwa-insertion to provide nuclei for unsyllabified segments occurs; however, *ə triggers a repair operation, inserting stressable *i* in place of the schwa.
- The epenthesis is thus stress-driven and has nothing to do with the "reduplicant".

⋄**Fission: Existential Faithfulness**

(85) Struijke (2000) suggests that reduplication results in *fission* of segments. That is, one segment in the input is forced to appear as two copies in the output. **One underlying segment with two occurrences appears on the surface as two copies. One of these copies can satisfy faithfulness while the other satisfies markedness.**

(86) We give an example of such an analysis for Lushootseed [i] epenthesis in Appendix A, strictly for illustrative purposes (since it is a familiar data set). However, we belive the evidence favors the stress-driven repair analysis sketched above.

Summary: Cases of "prosodic" TETU are by no means precluded in multiple precedence. Cases of segmental TETU fall into a heterogeneous class, some instances of which may not be reduplication-related at all, and are accounted for under the present assumptions through fundamental precedence and onset relations.

Contributions

⇒**Following Raimy's proposals, primitive and necessary phonological relations (*immediate precedence* and *onset*) and morphological operations (*affixation* and *readjustment*) form the basis of "reduplication".**

⇒**The derived relations of *coprecedence* and *cosuccession* as natural sources of non-local allomorphy in fixed segment reduplication.**

⇒**Economy conditions constrain morphological operations and may be at work in cases of ineffability.**

⇒**Linearization allows representations with precedence loops to be successfully converted to forms legible at the articulatory interface. Further evidence for this algorithm comes from multiple reduplication.**

⇒**Emergence of the unmarked effects perhaps need not require base-reduplicant correspondence. Several TETU effects can be accounted for without reference to a surface "base" or "reduplicant".**

Appendix A: Segmental TETU in Lushootseed

We mentioned above that an analysis of segmental TETU along the lines of Raimy and Idsardi (1997) is possible in the present model. Urbanczyk (2001) proposes that the Lushootseed diminutive is TETU. Since the reader is already familiar with Lushootseed reduplication, we offer here an existence proof that these effects can be captured. The diminutive readjustment rule is repeated here.

(87) Diminutive Readjustment:
a. SD: $\# \rightarrow C_1 \rightarrow V \rightarrow C_2$
b. SC: add relation $V \rightarrow C_1$. (Dim-rr-a)
c. Elsewhere: Add relation $C_1 \rightarrow C_1$. (Dim-rr-b)

As noted above, we believe schwa insertion is a late process in Lushootseed. However, we include schwas in the input forms here to facilitate maximal comparability with Urbanczyk's account.

We show that TETU arises because *fission* of one underlying segment with multiple occurrences into two surface copies allows satisfaction of faithfulness by one occurrence and satisfaction of PhonCon by the other. If there is no reduplication, there is no TETU since IO-Faith forces the output segment to match the input segment.

In fact, the reduplication–TETU correlation is not so perfect in Lushootseed; further investigation shows that if there is no *diminutive* reduplication, there is no TETU. While the context for TETU [i]-epenthesis exists in dist and oc forms, no such epenthesis applies. We show that this further empirical result follows from our assumptions regarding the status of dim as a cyclic affix that triggers linearization at a particular stratum of the grammar (here evaluation by Con-Cyclic).

Con-Cyclic contains the constraints Max$_{IO}$, Dep$_{IO}$, StressLeft, and *ə́, ranked as shown below due to the given ranking arguments.

(88) Ranking: Max$_{IO}$, *ə́ $\gg$ StressLeft $\gg$ Dep$_{IO}$

(89) Ranking arguments

a.	*ə́ $\gg$ StressLeft	bədáʔ, *bə́daʔ	stress the leftmost non-ə
b.	Max$_{IO}$ $\gg$ StressLeft	bədáʔ, *bídaʔ	" "
c.	StressLeft $\gg$ Dep$_{IO}$	bíbədaʔ, *bəbədáʔ	epenthesize a non-ə for stress
d.	*ə́ $\gg$ Dep$_{IO}$	bíbədaʔ, *bə́bədaʔ	" "

This ranking gives us the correct output form for (90) (the underlying form of the diminutive of /bədáʔ/. Note that we are assuming that the linearization algorithm given above is simply a correct characterization of Gen (i.e. Gen gives only linearization-consistent candidate outputs).[21]

[21] We also assume that other constraints assume that [i] is the epenthetic vowel in Lushootseed. Since the language has only three underlying vowels /a i u/ (the distribution of ə is predictable), calling [i] epenthesis TETU might be questionable. However, our purpose here is to show that PBP *can* accommodate this phenomenon within OT, not to argue that this is a case of TETU.

(90) Input form provided by morphology

$\# \rightarrow b \rightarrow ə \rightarrow d \rightarrow a \rightarrow ʔ \rightarrow \%$

(91)

	Input: (90)	Max$_{IO}$	*ə́	StressLeft	Dep$_{IO}$
☞	bíbədaʔ				*
	bə́bədaʔ		*!		
	bəbə́daʔ		*!	*	
	bəbədáʔ			*!	*

Here epenthesis of [i] (or alternatively introduction of place features) allows stress to fall on the left-most element, satisfying all but low-ranked Dep$_{IO}$.[22]

But why don't we observe [i] showing up in non-reduplicative contexts? Simple: with an input /bədaʔ/, output [bídaʔ] would violate high-ranked IO-Faith. However, in reduplication Max$_{IO}$ is satisfied by one occurrence of [ə], while the other occurrence position surfaces as [i].

(92)

	/bədaʔ/	Max$_{IO}$	*ə́	StressLeft	Dep$_{IO}$
☞	bədáʔ			*	
	bə́daʔ		*!		
	bídaʔ	*!			*

But [i] also shows up in reduplicated forms with stem shape #CVVX and #CCX. How can we account for this fact? First note that these forms trigger the *elsewhere* form of the dim RR (87), which doubles the first consonant. Therefore we simply add a (set of) constraint(s) PhonCon that force(s) epenthesis to break up onset clusters. This derives the correct forms for inputs (93) and (95)

(93) A CVV stem

$\# \longrightarrow d \longrightarrow u \longrightarrow u \longrightarrow k^w \longrightarrow \%$

(94)

		Input: (93)	PhonCon	*ə́	StressLeft	Dep$_{IO}$
	a.	ddúuk^w	*!			
☞	b.	díduuk^w				*
	c.	dədúuk^w			*!	
	d.	də́duuk^w		*!		

Here (94a) is the output of linearization with no structural change. However, this violates PhonCon. In (94c,d) we see that [ə] epenthesis is sub-optimal. An identical situation arises for #CCV stems.

[22] Note that Lushootseed stress and [i] epenthesis are readily accounted for in a Halle and Idsardi (1995) representation; dim projects a left-parenthesis; feet are left-headed; a repair operation changes ə to [i] to allow stress to fall on the initial vowel; we present the surface-oriented Stress-Left for ease of exposition.

(95) A CCV stem

$$\begin{tikzcd} \# \arrow[r] & \text{č'} \arrow[r] \arrow[loop below] & \lambda\text{'} \arrow[r] & a \arrow[r] & \text{ʔ} \arrow[r] & \% \end{tikzcd}$$

(96)

		INPUT: (95)	PhonCon	*ə́	StressLeft	Dep_{IO}
	a.	č’č’λ’áʔ	*!			
☞	b.	č’íč’λ’aʔ				*
	c.	č’əč’λ’áʔ			*!	
	d.	č’ə́č’λ’aʔ		*!		

So why don’t we observe [i] in all forms of reduplication? That is, why do we observe the following asymmetries in epenthesis, repeated from above:

(97)
a. DIM /bədaʔ/ [bíbədaʔ] *[bəbədáʔ]
b. DIST /bədaʔ/ *[bídbədaʔ] [bədbədáʔ]
c. DIM/č’λ’aʔ/ [č’íλ’č’λ’áʔ] *[č’íλ’č’λ’áʔ]
d. DIST /č’λ’aʔ/ *[č’íλ’č’λ’áʔ] [č’λ’č’λ’áʔ]

We argued above that DIM was special among the reduplicants in that it triggers linearization (here application of Gen and evaluation by Con-Cyclic). We can exploit this difference by saying that the grammar contains several strata of constraints, with cyclic and non-cyclic morphemes triggering (or failing to trigger) Gen and evaluation by different constraint rankings (strata). Thus the non-cyclic morphemes do not trigger evaluation by Con-Cyclic, but rather at the end of affixation the form is subjected to Con-Noncyclic. This ranking differs in that minimally Dep_{IO} is ranked above *ə́, yielding

(98) Ranking:[23] Max_{IO}, $\text{Dep}_{IO} \gg$ *ə́ $\gg$ StressLeft

This analysis accounts [i] epenthesis in the regular single and multiple reduplication patterns of Lushootseed.[24]

[23] We still do not know the ranking of Max_{IO} and *ə́. If this is the same ranking as gives us vowel reduction and syncope, these might be ranked differently than is shown here.

[24] In fact, vowel reduction and syncope make surface forms significantly more complex. We do not present a full analysis here.

Appendix B: Onset Relations

One issue that arises in Raimy’s (2000) and Frampton’s (2001) frameworks is the precise interaction of precedence relations and linearization (in the former) and truncation/duplication (in the latter) with syllabification. In both approaches, syllabification is independent from these processes, both ontologically and derivationally. But it seems that there is perhaps some redundancy: knowing that M is an onset to A already encodes the information that M precedes A. Suppose that a new binary, intransitive, and irreflexive relation is defined, namely the *Onset* relation, Ω . An Onset relation is a special case of a Precedence relation, $\rightarrow$. Namely, $M\,\Omega\,A$ implies $M \rightarrow A$.

Much like the precedence relation, the Ω relation must be one-to-one at the interface; at present it seems that multiple onsethood is repaired during linearization, though further empirical pursuit may yield a more definitive answer.

The question is, is any other relation needed in the computation of prosodic constituency? The answer seems to be no[25]. Consonants that are not in a Ω relation with a vowel appear in the following contexts:

(99) a. The second member of a branching onset (e.g., the *r* in *trap.*)
b. The sole coda consonant (e.g., the *p* in *trap*).

The immediate question that arises for some readers may be “*sole* coda consonant?”. Here we follow Kaye (1990); Rice (1992); Harris (1994) in analyzing putative branching codas as instances of coda-onset sequences, including such sequences at the end of the morphological word. As Harris notes, the two theory-internal tasks that the constituent Coda is supposed to achieve, namely predicting stress and phonotactic sequencing, can be derived from precedence relations alone. Word-final “coda clusters” (morphologically simplex) behave exactly like word-internal coda-onset clusters with respect to sonority sequencing. We thus adopt the sonority principles defined strictly on linear adjacency of Rice (1992).

However, if the two elements in (99) are to be assimilated strictly under the rubric of ImmP relations, they require a licensing condition. At present, (100) seems to be a sufficient statement of the condition:

(100) **Immediately Preceding Onset (IPO) Condition**
A consonant must be in an Ω relation or must be immediately preceded by a segment that is.

Languages that do not allow “codas” simply lack the licensing condition in (100). In English, on the other hand, note that both elements in (99) satisfy the licensing condition in (100). Two more questions arise. With what segment is the final consonant of words like *apt* in an Ω relation? With what segment is the initial vowel of *apt* in an Ω relation? We assume the following parametrically variable properties of these positions[26]:

[25] We do not treat branching nuclei here, mainly due to insufficient knowledge. The introduction of an additional relation holding between a vowel and an offglide may or may not be necessary (a licensing condition may be sufficient instead). As the discussion herein will not depend on this matter we leave it open.

[26] Note that at present, the licensing relation defined for onsetless word-initial syllables does not arise

(101) **Start Provides Onset (SPO) Condition**
and a vowel may be in an Ω relation.

(102) **Onset-to-End (OTE) Condition**
A consonant and % may be in an Ω relation.

Note that (101),(102) are a language-varying licensing conditions; languages that disallow final clusters lack the OTE while those that require onsets lack the SPO.

It seems that "less stringent" licensing conditions may exist; in languages such as Salish and Temiar, where it seems that many segments remain "unsyllabified" throughout the phonology, the licensing conditions permit basically any consonant not in an onset relation to persist (subject to sequencing constraints not to be discussed here).

The syllable need not exist as a theoretical primitive; it appears that the Ω relation between a consonant and vowel is all that is needed, with additional phonotactic restrictions on licit sequences of consonants in immediate precedence relations. We note that, given that languages' apparent syllabic differences are a result of different licensing conditions for consonants not in an onset relation (as well as perhaps tolerance for diphthongs), the following partial typology obtains:

(103)

	Licensing of Non-Ω C	"Syllabic" Consequences	Examples
SPO	# and V in Ω	"Onsetless" initial	English
IPO	→by a vowel in Ω	"Codas"' allowed	English
IPO	→by a consonant in Ω	"Complex Onsets" allowed	English
ANY	Pretonic syllables (?)	"unsyllabified" Cs	Temiar, Salish
-	Disallowed	CV only	Hawaiian (?)
OTE	Ω with %	Final CCs	English

Multiple Onsets

One Vowel, two Ω : Levantine Arabic

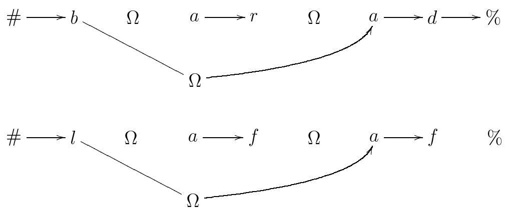
Raimy's breakthrough was allowing a segment to have multiple precedents or multiple successors. Suppose we allow a vowel to be in multiple Onset relations, though this must be 'linearized' as well. This is what happens in Levantine Arabic, it seems.

(104) a. barad, barbad 'shave'/'shave unevenly'
b. lafaf, laflaf 'wrap'/'wrap intensively'

Assume Arabic has the standard licensing conditions IPO and OTE. The pejorative is formed by apparent copying of the first consonant. Assuming as do Broselow and McCarthy (1983) that this is the result of the same RR triggered by the (pluractional) morpheme, the suggestion here is that the same process occurs:

(105) Introduce a new Ω relation between C1 and the 2nd vowel:

in, e.g., Harris (1994), in which nuclei license onsets, but not vice-versa. We have not fully explored the consequences of integrating this difference with the present formulation.



Now the second vowel is in two onset relations. A repair operation applies adding the link f→l in the case of [la.faf] and r→b in the case of [ba.rad]. Thus, in the case of "Co-Onsets", the following linearization proceeds:

(106) ***Co-Onset Repair***If a Ω c and b Ω c and b Ω c is the result of a morphologically more recent rule then a Ω c is deleted and a →b is added.

Luckily, Arabic as the IPO licensing, so the **r** of bar.bad and the **f** of laf.laf are now licensed as apparent "codas" in the first syllable, since the →relation between a1 and them remains.

Linearization produces the forms [laf.laf] and [bar.bad]. Though these forms derive from biliteral and triliteral roots, their derivations proceed exactly in parallel if we acknowledge that onset relations can be added by RRs and the phonology linearizes co-onsets in a particular manner.

One Consonant, two Ω : Spokane Salish and Temiar

Having investigated a case in which Co-Onsethood is linearized, we turn to a case in which the addition of a new Ω relation results from a repair operation. It is striking that Spokane Salish and Temiar are identical in the following respects:

(107) a. They allow pretonic consonants to be unsyllabified (i.e., 'anywhere licensing')
b. All vowels require an onset (i.e., no SPO licensing).

Furthermore, each language has a single-vowel prefix that triggers a phonological repair operation: the addition of an onset relation. Here we see the Temiar simulfactive and the Spokane repetitive (Temiar data is from Benjamin (1976) and Spokane data is from Bates and Carlson (1992)).

(108)

Temiar		Spokane	
Stem	Simulfactive	Stem	Repetitive
kɔɔw	kakɔɔw	k'^{w}ul	k'^{w}e.k'^{w}ul
s.lɔg	sa.lɔg	p.tax^w	pe.tax^w

We follow Bates and Carlson (1992) in analyzing the exponent of the Repetitive morpheme as the affix [e] attached (via →) to the first syllabified consonant. However, Spokane does not allow onsetless syllables (i.e., no SPO licensing). Thus the expected form [e-k'^{w}ul] cannot surface. As a repair, the closest eligible consonant is recruited[27]: an onset relation is added between the first consonant (here [k'^{w}]) and the prefix.

(109) SD: Ω -less initial V
SC: introduce a new Ω relation from C1 to V.

The repair creates a situation in which a vowel that immediately precedes a consonant is in an Ω relation with that consonant. Following our assumptions regarding the representation of affixes, this representation is linearized as [k'^{w}ek'^{w}ul].

We propose that rather than a readjustment rule accompanying affixation (or, in perhaps more familiar terms, the content of RED, this is rather a phonological repair. The analysis of these patterns in Temiar and Salish when construed as a single reduplication operation is bound to be complicated; the realization that onsetless syllables are banned in the language suggests that reapir is incurred much as consonantal spreading obtains in Semitic to fill a template.

Confirmation of /e/ as a prefix comes from the behavior of consonants in the "minor" (e.g. unsyllabified) sullable. Since we know independently that these consonants need to be in an onset relation in their surface form, and that the vowel needs to be in an onset relation, the analysis of the addition of an Ω relation as a repair is natural in the triconsontal case as well. Rather than appealing to totally different rules/constraints for biconsonantal and triconsonantal cases, the same single operation applies; recruiting the nearest consonant for an Ω relation. To spell it out: in [p.tax^w], [p] is unsyllabified. Again, [e] is prefixed to the first onset C, resulting in a form where [e] precedes [t] and [p] precedes [t].

Again, [e] must be in an onset relation, and the minimal repair in this case is the same as we saw above: an onset relation is added between the first C (here [p]) and the affixal [e]. However, since The only relation between [p] and [e] is the onset relation added as a repair, the representation is linearized as [pe.tax^w].

The minimal difference between the repetitive of /k'^{w}ul/ and /p.tax^w/ is therefore status of the initial consonant. In the former, this C is in an onset relation prior to affixation. When such a relation exists, linearization produces what looks like copying. When the first consonant is unsyllabified, however, as in /p.tax^w/, linearization produces what looks like infixation. However, both of these patterns from the *exact same processes*.

The strongest confirmation for a multi-onsethood representation for Salish comes from the fact, readily verified by the reader, that the Temiar data are exactly the same phenomenon. This seems to be a highly suggestive result for a model of the interaction between "syllable structure" and reduplication that have had precursors in formulations such as McCarthy & Prince's ST-ROLE or been altogether ignored by seemingly judicious placement of truncation-junctures, jump links, or directionally competing gradient ALIGN constraints. An incorporation of principles of well-formedness into a "relational phonology" as well as a separation of exponence and repair lead to surprisingly simple models of phenomena often all shouldered under a RED umbrella.

[27] Recall McCarthy & Prince's ST-ROLE, though put to somewhat different use.

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