**Faded Copies: Reduplication as Sharing of Activity**

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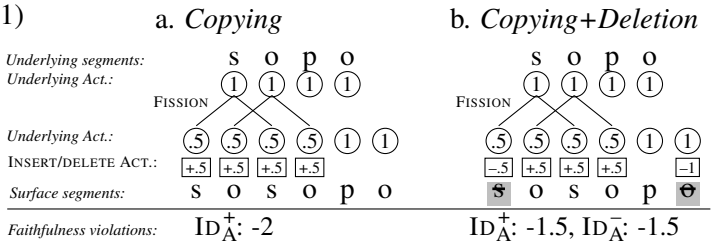
**Main Claim** A new phonological account of reduplication is proposed which is based on segment fission as the sharing of activity. This proposal relying on Gradient Symbolic Representations (Smolensky and Goldrick, 2016) predicts the attested typology of weakening effects for reduplication: Every copy operation gradiently weakens both copies.

**The copying-weakening-correlation** It is an often-discussed property of reduplicants to show Emergence of the Unmarked Effects where markedness reduction applies within a reduplicant that is absent in the rest of the language (McCarthy and Prince, 1995; Struijke, 2000; Becker and Flack Potts, 2011). Interestingly, the mirror image for copied elements (=the 'base') can also be found. An example is vowel reduction and syncope in reduplication contexts in many Salishan languages (van Eijk, 1998; Parker, 2011). In ʔayʔaǰuθəm diminutive reduplication, for example, either a /CV-/ reduplicant (/supaju/ 'ax' → /su∼spaju/ DIM) or a /Ci-/ reduplicant with a fixed segment (gəq'-it 'open-STV' → /gi∼gəq'it/ DIM) surfaces, the choice being lexical. Strikingly enough, vowel deletion of the copied stem vowel that is unpredictable given the general phonology of the language only applies with the former allomorph, never with the latter (*/gi∼gq'it/; Watanabe (1994); Blake (2000); Mellesmoen (2017)). Vowel deletion is hence crucially bound to copying of that vowel. A similar pattern is also attested in Klamath (isolate, Cole, 1997; Kimper, 2007). And Struijke (1998) argues that Kwakwala (Wakashan) reduplication shows an alternation: Either the 'base' or the 'reduplicant' can be shortened if it optimizes the metrical structure whereas shortening for metrical reasons is excluded outside of reduplication. All this data follows from the generalization that *both copies are weakened* in reduplication contexts and thus more prone to changes or deletion. Further support for the copying-weakening-correlation can be found in the typology of multiple reduplication, i.e. patterns where more than one reduplicative morpheme is present in a word. Whereas multiple reduplicants faithfully surface in many languages (e.g. Thompson /sil∼sí∼sil'/ 'DIM-DISTR-calico' (Thompson and Thompson, 1992)), others show shortening effects (Zimmermann, 2018). In basically all Southern Wakashan languages, for example, only a single reduplicant surfaces if multiple reduplication-triggers are present in a word (Stonham, 1994, 2004). And in Sikaiana (Donner, 2012), reduplicants are smaller than expected when they cooccur: The plural reduplication is /CV-/ in isolation (/sopo/ 'jump'; /so∼sopo/ 'PL-jump') but is truncated to /C-/ if it cooccurs with repetitive bisyllabic reduplication (/sopo∼s∼sopo/; */sopo∼so∼sopo/ 'REP-PL-jump'). The modified generalization is hence that *every copy operation gradiently weakens all copies* and multiple copying weakens elements further than just single copying.

**Reduplication as Sharing of Activity** The assumption of gradient activity of phonological elements (Smolensky and Goldrick, 2016; Rosen, 2016) allows to straightforwardly capture the copying-weakening-correlation under a phonological account to reduplication based on segmental fission (Spaelti, 1997; Struijke, 2000; Gafos, 2003; Nelson, 2003). Under the assumption that all phonological elements have an underlying activation, fission of a segment is taken to be the *distribution of its underlying activity unto all its output correspondents*. It thus follows that output elements corresponding to the same input element have only a partial underlying activity since they must share a segments underlying activity. Crucially, under this symmetrical fission account, no output string has an independent status of 'base' or 'reduplicant' and all copied segments are equally weakened. Such a sharing of activity has two important consequences for the constraint evaluation: 1) Given that all output segments must have a full activity of 1 (Smolensky and Goldrick, 2016), activity has to be added for every copied element in order to 'strengthen' it to fully active output element, and 2), copied elements are 'weaker' and only preserved to a lesser degree by faithfulness constraints than elements that are not copied. The formal implementation of this intuition relies on the as-

sumption that non-realization of an element is setting its activity to 0, and that a change of activation for a segment is penalized by $\text{ID}_{\text{A}}^{+}$ (=no adding of activity) and $\text{ID}_{\text{A}}^{-}$ (=no deletion of activity). This is illustrated in (1) where two segments from the underlying string /sopo/ are copied. The underlying activity of /s/ and /o/ respectively is thus equally distributed among two output correspondents and four output segments with an activation of 0.5 result (=circles). Since full activity is required in the output, 0.5 activity must be added for all (=boxes). (2-b) shows the effect of copying for deletion (=elements are struck through and have a grey background): Whereas non-realization of a non-copied element (final /o/) implies removal of 1.0 activity, non-realization of a copied element (initial /s/) is 'cheaper' given that it implies reduction of only 0.5 underlying activity. The apparent Duke-of-York situation that a newly created copied segment remains unrealized in the output becomes transparent if one considers the reason for copying in a phonological account to reduplication: It applies to fill otherwise empty prosodic nodes (Marantz, 1982; Pulleyblank, 2009; Saba Kirchner, 2010, 2013*a*,*b*; Bermúdez-Otero, 2012). In a containment-based system (Prince and Smolensky, 1993/2004; Trommer and Zimmermann, 2014), a copied and unrealized element can be sufficient to fill a prosodic node given that an element with activity of 0 is still better than no element at all. How this framework predicts the gradient weakening of copying is shown below for the multiple reduplication in Sikaiana. Vowel deletion is taken to be triggered by an OCP-constraint against identical vowels in adjacent syllables (necessarily violated by CV-copying). There are three important weighting arguments: $\text{ID}_{\text{A}}^{-}$ penalizing deletion has a higher weight than the OCP predicting that non-copied sequences of identical vowels are tolerated. Even 0.5x violations of $\text{ID}_{\text{A}}^{-}$ are still worse than the OCP and the plural reduplicant hence shows no deletion in isolation (2). But $0.\bar{3}$x violations of $\text{ID}_{\text{A}}^{-}$ are finally out-weighed by the OCP and avoidance of too many identical vowels emerges for multiple reduplication (3). Only a vowel that is copied twice and thus had to share its activity among three output instances is hence weak enough for deletion in Sikaiana. (That deletion only applies in the plural 'reduplicant' follows mainly from the different sizes of the prosodic affix nodes and their tolerance for unrealized segments.) The prosodic affixes triggering copying are abbreviated with 'RED' and the constraints ensuring their 'filling' are not given in the following.

(1)




*(2) No shortening in single reduplication*

| $\text{RED}_{\mu}$ s o p o | $\text{ID}_{\text{A}}^{-}$ | OCP | |
|---|---|---|---|
| | 20 | 9 | |
| ☞ a. s o∼s o p o | | -3 | -27 |
| b. s ~~o~~∼s o p o | -0.5 | -2 | -28 |

*(3) Shortening in multiple reduplication*

| $\text{RED}_{\sigma\sigma}$ $\text{RED}_{\mu}$ s o p o | $\text{ID}_{\text{A}}^{-}$ | OCP | |
|---|---|---|---|
| | 20 | 9 | |
| a. s o p o∼s o∼s o p o | | -4 | -36 |
| ☞ b. s o p o∼s ~~o~~∼s o p o | $-0.\bar{3}$ | -3 | $-33.\bar{6}$ |

**Discussion** This account is in spirit similar to an analysis based on existential faithfulness (Struijke, 2000) but differs since it 1) is more modular and avoids morpheme-specific (BR) constraints, and 2) predicts the gradient nature of the copying-weakening-correlation: Fission as sharing of activity implies that elements get weaker the more they are copied and languages can have different thresholds for reduction: It can be generally excluded (Thompson), can only affect copied elements (ʔayʔaǰuθəm), or only elements that are copied at least twice (Sikaiana).