What is Reduplication? Typology and Analysis Part 1/2: The Typology of Reduplication

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Abstract

Reduplication has played a central role in the development of phonological theories for 30 years. The introduction of Classical Optimality Theory (OT) in the 1990s sparked intensive research into the typology and analysis of reduplicative patterns, as reduplication was a key testing area both for OT and for theories critical of OT. Now, after some 20 years of research within the OT model, it is appropriate to assess the leading ideas on reduplication that have come out of this period of concentrated research. This pair of articles serves this purpose. The first article presents a typological survey of the function and form of reduplication, covering classic forms of reduplication as well as less well-studied forms, such as phrasal reduplication, morphologically-complex reduplicants, and reduplication without phonological identity. The second article surveys recent formal approaches, such as Base-Reduplicant Correspondence and Morphological Doubling, covering debates such as the morphological status of the reduplicant, exfixation, semantically empty, a-templatic, and compensatory reduplication.

1. Introduction

Reduplication is a common pattern cross-linguistically. It is also a perennial player in the development of new phonological theories. The introduction of autosegmental representations and prosodic morphology in the 1970s and 1980s (e.g., Marantz 1982, McCarthy & Prince 1986, 1999) brought major advances in the phonological representation of reduplication; the introduction of Classical Optimality Theory in the 1990s sparked productive work on the tension between reduplication and the phonotactics of a given language (e.g., McCarthy & Prince 1995). Wilbur's early (1973) ideas about phonological identity in reduplication inspired the later development of surface correspondence theories (e.g., McCarthy & Prince 1995, Zuraw 2002). Most recently, reduplication has featured in attempts within Stratal Optimality Theory (Kiparsky 2010) and Harmonic Serialism (McCarthy et al. 2012) to address the phenomenon of phonological derivational opacity. Because of the continuing importance of reduplication to theoretical argumentation, it is important to periodically pull together the leading ideas and latest generalizations about the phenomenon of reduplication. This pair of articles serves this purpose. This first article focuses on the morphological status of reduplication across languages. The second focuses on formal analyses and phonological form.

2. Overview

Reduplication involves the doubling of some component of a morphological base for some morphological purpose. Unlike other morpheme types, reduplicative morphemes depend for their form on some linguistic property or properties of the root, stem, or word, which serves as the base of reduplication. The relevant properties can be phonological or morpho-semantic.

Total reduplication reduplicates the entire morphological base, as exemplified by plural formation in Indonesian (Western Malayo-Polynesian, Sundic; Cohn 1989:185): *kərá*

'monkey' → *kərá-kərá* 'monkeys'. Partial reduplication duplicates some phonologically characterizable subpart, e.g., a maximal syllable, as in plural formation in Agta (Western Malayo–Polynesian, Northern Philippines; Healey 1960, cited in Marantz 1982:439): *takki* 'leg' → *tak-takki* 'legs'.[1] In straightforward reduplication patterns like these, the reduplicant is as segmentally identical to its base as possible, while still conforming to size restrictions on the reduplicant. However, as we shall see, there can be principled differences of other kinds between the segments of the reduplicant and its base, motivated on both phonological and semantic grounds.

In this article, we take up two issues in the morphology of reduplication, which have received particular attention in the theoretical literature, namely, what does reduplication copy (i.e., what is the morphological base for reduplication)? What is the morphological composition of the reduplicative morpheme? The companion article focuses on analytical issues of reduplicative form.

3. Functions of Reduplication

Morphological reduplication, both total and partial, is associated with a wide range of syntactic and semantic functions (see e.g., Moravcsik 1978, Kiyomi 1993, Regier 1994, Niepokuj 1997, and Rubino 2005, 2008 for cross-linguistic surveys.) Reduplication is often semantically iconic, expressing meanings that are impressionistically related to its duplicative nature, like pluralization, emphasis, and frequency/repetition (Kiyomi 1993). For example, Warlpiri (Pama-Nyungan) uses total reduplication to express plurality of nouns with human reference (*kurdu* 'child' → *kurdu-kurdu* 'children'; *wirriya* 'boy' → *wirriya-wirriya* 'boys'; Nash 1986:130. Total reduplication encodes pluralization or diversity for nouns in Indonesian (*búku* 'book' → *búku-búku* 'books', *minúman* 'drink' → *minúman-minúman* 'drinks', *kəmàʃarakátan* 'society' → *kəmàʃarakátan-kəmàʃarakátan* 'societies'; Cohn 1989:185). In Acehnese (Western Malayo-Polynesian, Sundic), reduplication expresses emphasis: *tambô* 'drum' → *tambô-tambô*, *ma* 'mother' → *ma-ma* (Durie 1985:39-40); in Lusaamia (J.34; Western Kenya and Eastern Uganda), verb stem reduplication can add the meaning of repetition: *oxu-[lakasy-a]* 'INF-drop-FV = to drop' → *oxu-[lakasya-lakasya]* 'to drop repeatedly', *oxu-[sasak-a]* 'INF–pound–FV = to pound' → *oxu-[sasaka-sasaka]* 'to pound to dust' (Marlo 2002:13); in Nadrogā (Central–Eastern Oceanic; Geraghty 2002:841), agent-oriented verbs form frequentatives when their roots are reduplicated, e.g., *[tola]-vi-a* 'see–TR-3SG = look at it' → *[tola-tola]-vi-a* 'look repeatedly at it'. According to Bakker and Parkvall (2005) and papers in Kouwenberg (2003), these kinds of iconic meanings are characteristic of reduplication in creoles.

More broadly, however, reduplication can be associated with quite a wide range of derivational and inflectional meanings, some of them not clearly iconic at all. These include changes in part of speech. Reduplication can convert verbs to nouns, as in Banoni (Oceanic): *resi* 'grate coconut' → *re-resi* 'coconut grater', *sogu* 'to husk coconut' → *so-sogu* 'coconut-husking stick' (Lynch & Ross 2002:442, Lincoln 1976:164). Conversely, reduplication can convert nouns to verbs, as in Ulithian (Oceanic; Lynch 2002:799): *sifu* 'grass skirt' → *sif-sifu* 'wear a grass skirt'; *ɣaŋi* 'wind' → *ɣaŋi-ɣaŋi* 'blow'. Beyond changing part of speech, reduplication can carry out other functions typically categorized as derivational. In Nadrogā, reduplication is used 'to form intransitives of patient-oriented verbs', thus *vuli* '[to be] turned over' → *vuli-vuli* 'turn over' (Geraghty 2002:841). In Siroi, reduplication of the verb plus class marker connotes pretence, e.g., *[malmbi-k-et]-[malmbi-k-et]-ng-ate* '[cry-k-1SG.PRES]-[cry-k-1SG.PRES]-ng-3SG.PRES = he is pretending to cry' (Wells 1979:36). Reduplication can even mark inflectional categories not related to plurality. In Tarok (Benue-Congo, Platoid), noun reduplication expresses third person singular possession: *a-[fini]* 'yarn' → *a-[fini-fini]* 'his/her yarn', *a-[dànkali]* 'potato' → *a-[dànkali-dànkali]* ~ *a-[dànkali-kali]* 'his/her potato' (Niepokuj 1997:23, citing Robinson 1976, Sibomana 1980, 1981).
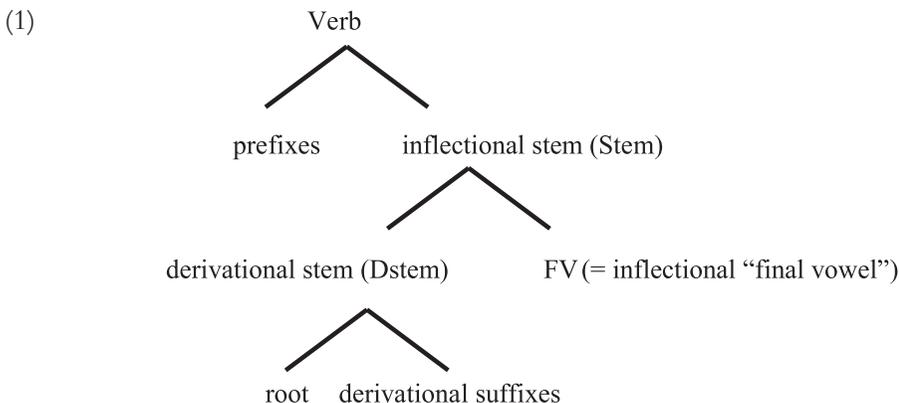
In sum, reduplication is associated, cross-linguistically, with a fairly large subset of the derivational and inflectional semantic and syntactic operations that morphology can perform. Although one might initially hypothesize, based on its form, that reduplication is likely to be associated with iconic meanings, reduplication is certainly not limited to encoding pluralization, distributivity, intensity, and so on. Statistical studies are needed to determine whether reduplication is more likely to be iconic than other types of morphology. It does seem clear even at this preliminary state that not every morphological function is equally likely to be encoded through reduplication. Operations like applicativization, negation, and case marking are just some of the functions that are commonly morphologically encoded but which seem rarely, if ever, to be reduplicative in form.

4. What, Morphologically, Does Reduplication Copy?

Reduplication can target the entire word, the root, or any stem-sized subconstituent in between. More surprisingly, it can target non-lexical bases, like individual affixes, and it can target supralexical bases, like phrases. It is also not uncommon for the morphological base of reduplication in any given pattern to vary among several options, determined by phonological or semantic factors. We briefly review each of these possibilities, dwelling on the theoretically challenging cases where the reduplicant does not subcategorize for a lexical constituent of fixed description.

4.1. REDUPLICATION COPIES A LEXICAL CONSTITUENT OF THE BASE

For an example of variation in the lexical base for reduplication within a language family, we can turn to the family of Bantu languages, in which verb reduplication is widespread. The schema in (1), based on work by Downing (e.g., 1997, 1998ab, 1999ab, 2000, 2003, 2006), Hyman (e.g., 2009), and others, shows an internal analysis of the verb which has been motivated in many Bantu languages.

(1)

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                    Verb
                   /    \
            prefixes    inflectional stem (Stem)
                        /            \
       derivational stem (Dstem)    FV (= inflectional "final vowel")
            /          \
        root    derivational suffixes
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In a study of the natural history of Bantu reduplication, Hyman (2009) identifies examples of reduplication at each verb-internal level. The semantics of the constructions Hyman surveys are similar, indicating a common historical source. Ciyao (p. 21; Ngunga 2001) manifests full stem reduplication, including derivational suffixes (2a) and the final inflectional suffix (2b). By contrast, Ndebele (S. 44; Sibanda 2004) reduplicates only the Dstem, excluding any suffix in the FV position (2c–d). In Kinyarwanda (N. 61; Kimenyi 2002), only the root is reduplicable,

as shown in (2e–f). Verb stems are shown, in all examples in (2), without inflectional or infinitival prefixes, as these do not undergo reduplication:

(2)   *Full stem reduplication (all suffixes)*   [Ciyao]
    a. telec-el-a   →   telec-el-a + telec-el-a
      'cook–APPL-FV'   'cook for someone frequently'
    b. dim-ile   →   dim-ile + dim-ile
      'cultivate–PERF'   'cultivated many times'

    Dstem reduplication (no inflectional suffixes)   [Ndebele]
    c. lim-el-a   →   lim-e + lim-el-a
      'cultivate–APPL-FV'   'cultivate for/at a little, here and there'
    d. lim-e   →   lim-a + lim-e   (*lim-e + lim-e)
      'cultivate–SUBJ'   'cultivate a little, here and there (subjunctive)'
    Root reduplication (no suffixes)   [Kinyarwanda]
    e. rim-w-a   →   rim-aa + rim-w-a   (*rim-w-a + rim-w-a)
      'cultivate–PASS-FV'   'be cultivated several times'
    f. rim-ir-a   →   rim-aa + rim-ir-a   (*rim-i + rim-ir-a)
      'cultivate–APPL-FV'   'cultivate for/at, here and there'

This cross–linguistic variation could be modeled by treating reduplication variously as either affixation or compounding at the root, stem, or word level.

4.2. REDUPLICATION COPIES AFFIXES AND OTHER SEMANTIC SCOPE MISMATCHES

In some cases, reduplication copies an affix, rather than a root, stem, or word. Affix reduplication is significant because it shows the degree to which reduplication can be sensitive to the internal morphological structure of the input to reduplication. In addition, the meaning associated with affix reduplication is often seemingly unrelated to the meaning of the affix being reduplicated. Several cases of affix reduplication are discussed in Inkelas & Zoll (2005).

One such case occurs in Amele (Trans New Guinea, Madang). According to Roberts (1991:130–31), to express iterative aspect in Amele,

"the whole stem is normally reduplicated if the verb does not have an object marker, otherwise the object marker is reduplicated either in place of or in addition to the reduplication of the verb stem."

The following data are from Roberts (1987:252–254; 1991:131):

(3)   a. qu-qu   'hit' (iterative)   [Amele]
      ji-ji   'eat' (iterative)
      budu-budu-eʔ   'to thud repeatedly'
      ḡbatan-ḡbatan-eʔ   'split–INF' (iterative)
    b. hawa-du-du   'ignore-3S-3S' (iterative)
      gobil-du-du   'stir-3S-3S = stir and stir it'
      guduc-du-du   'run-3S-3S' (iterative)
    c. bala-bala-du-d-eʔ   'tear-3S-INF = to tear it repeatedly'

In Boumaa Fijian (Oceanic), stems formed by spontaneous or adversative prefixes mark plurality by reduplicating both the prefix and the root (Dixon 1988:226):

(4)   ta-lo'i   'bent'   ta-ta-lo'i-lo'i   'bent in many places'   [Boumaa Fijian]
    ca-lidi   'explode'   ca-ca-lidi-lidi   'many things explode'
    'a-musu   'broken'   'a-'a-musu-musu   'broken in many places'

Note that in both these cases even though an affix is copied, reduplication has semantic scope over the entire stem or word.

Affix copy is not the only type of reduplication that leads to such mismatches in semantic scope. Harley and Leyva (2009) cite an interesting case of internal root reduplication in Hiaki (also known as Yaqui; Uto–Aztecan, Cahita), in which habitual reduplication appears to reach into N–V compounds to target the head V but semantically takes scope over the entire compound. Thus, the verb *kuta-siute* 'stick-split = wood-splitting' reduplicates as *kuta-siu-siute* 'wood-splitting habitually'; *pan-hooa* 'bread–make = making bread' reduplicates as *pan-ho-hoa*; etc. Haugen (2009), like Aronoff (1988) before him, relates head reduplication in general to the phenomenon of head inflection, familiar from such English examples as *understand~understood* or *grandchild~grandchildren*.

An even more extreme case in which reduplication of an inner element can have semantic scope over a higher constituent comes from noun–noun compounds in Pima (Uto–Aztecan, Tepiman). Either the first member or the second member, or both, can be reduplicated to effect pluralization, with no apparent difference in the meaning. According to Haugen (2009), citing Munro and Riggle (2004), speakers exhibit free variation according to whether the first member, the second member or both reduplicate. Reduplicants are underlined:

(5) a. 'ònk-'ús   'ò̲-'onk-'ús ~ 'ònk-'ú̲-'us ~'ò̲-'onk-'ú̲-'us   [Pima]
         salt-tree
         'tamarack'   'tamaracks'
      b. bàn-nód:adag   bà̲-ban-nód:adag ~ bàn-n̲ond:adag ~bà̲-ban-n̲ond:adag
         coyote-plant.type
         'peyote'   'peyote (pl.)'

This case can be instructively compared with the examples of Boumaa Fijian, above, in which both elements of an affixed stem must reduplicate, and with Hiaki serial verb reduplication, where habitual reduplication targets the constituent it scopes over. Harley & Leyva 2009, n. 44, cite the example of nok 'speak' + ii'aa 'want': compare [nok]-[i'–i'aa] 'always want [him] to speak' with [no–nok]-[ii'aa] 'want [him] to habitually speak] with [no–nok]-[i'–i'aa] 'always want [him] to habitually speak'. The three-way comparison shows that reduplication processes can target a morphological subconstituent whose contribution to the syntax and semantics of the resulting word need not be related to its unreduplicated meaning.

4.3. INFIXATION

Reduplicative morphemes often occur as infixes (Broselow & McCarthy 1983). In his comprehensive overview of infixation, Yu (2007: 10) defines an affix as infixing "if it appears as a segmentally distinct entity between two strings that form a meaningful unit when combined but do not themselves exist as meaningful parts." Some infixes, like the Yurok (Algic) intensive *-eg-,* occur just inside the edge of a word, adjacent to some peripheral 'pivot' (Yu 2007). Yurok *-eg-* always appears before the first vowel of the verb: *la:ɣ-* 'to pass' → *legaːɣ; trahk-* 'to fetch' → *tregahk* (Yu 2007:89, citing Garrett 2001). Other infixes, like construct state markers in Ulwa (Misumalpan), are attracted to some salient, typically stressed, potentially internal position. Ulwa construct state infixes are positioned after the first iambic foot (thus after the first stressed syllable) of the stem: *súːlu* 'dog' → *súː-ma-lu* 'dog-CNS2', *waráɰwa* 'parrot sp.' → *waráɰ-kana-wa* 'parrot sp.–CNS33' (McCarthy & Prince 1993; Green 1999, cited in Yu 2007:119). Yu (2007), and before him, McCarthy & Prince (1990), analyze Ulwa-style infixes as affixing to a prosodic constituent, namely, the stressed syllable.

These distributional properties of infixation hold equally of internal reduplication, or reduplicative infixes. A parallel case to Yurok of internal 'edge–pivot' reduplication occurs in Mangarayi (Australian, Mangarayi), where plurality and adjective intensification are marked by a –VC(C)– reduplicant preceding the first vowel: *gurjag* → **gurj**urjagji 'having a lot of lilies', *gabuji* → **gab**abuji 'old person' (Yu 2007:92, citing Merlan 1982 and Kurisu & Sanders 1999). A reduplicative counterpart of Ulwa prosodically affixing infixes is exemplified by continuative reduplication in Chamorro (Western Malayo–Polynesian), marked by CV reduplication of the stressed syllable (Topping 1973:259, cited by Yu 2007:122): *sága* 'stay' → *sásaga* 'staying'; *hugándo* 'play' → *hugágando* 'playing'.

Infixing reduplication has the potential for creating the kind of mismatches between scope and linear position that were discussed in the preceding section, in which reduplication of an element close to the root can be associated with a meaning that has scope over a larger subconstituent, or even the whole word. A typical example in this respect is Samala (Chumash), in which reduplication of the first syllable of the root in complex words endows the entire verb with the meaning of 'repetitive, distributive, intensive, or continuative force' (Applegate 1972:383–84; 1976). Examples include *s-am-ti-lok'in* 'they cut it off' → *samti**loklok**'in*, where the root is *lok'in*. Following Applegate's original insight, Inkelas & Zoll (2005) analyze Samala reduplication as infixing; it is actually an outer layer of morphology, matching its semantically wide scope, even though it is infixed to an inner prosodic constituent that roughly corresponds to the root. Aronoff (1988) provides a similar account of root-targeting infixation in Tagalog. Root-targeting infixes often result in the phonological effect known as 'Exfixation', discussed in section 3.2 of part 2 of this article.

4.4. REDUPLICATION COPIES A PHRASE

Reduplication is normally characterized as a word–bounded process. Reduplication performs derivational or inflectional morphological functions; it can be interspersed among other clearly lexical layers of morphology; like other non–clitic morphemes, it operates on lexical inputs (roots, stems, and words). All of this accounts for why reduplication is typically discussed in morphology rather than in syntax textbooks.

However, numerous studies have also documented reduplication at the phrasal level (see e.g., Fitzpatrick–Cole 1994, Lidz 2001), and it seems clear that while reduplication may be primarily a word–internal phenomenon, it is equally possible for it to apply to syntactic structures. Many examples of phrasal reduplication are of the 'echo' variety (see Section 11). For example, Emeneau (1955) reports that echo reduplication in Kolami can apply not only to words but also to phrases: *meˑkel toˑtev* 'goat not' → *meˑkel toˑtev - giˑkel toˑtev* 'There are no goats at all' (Emeneau 1955:102). Lewis (1967:237) reports compound and phrasal echo reduplications in Turkish: *Ben adam [tarih hoca-sı-ymış] anla-ma-m* 'I man [history teacher-POSS-EVID] care-NEG-1SG = 'I don't care if he is [a history teacher] → *Ben adam [tarih hoca-sı-ymış] [marih hocasıymış] anla-ma-m* 'I man [history teacher-POSS-EVID] [RED] care-NEG-1SG = 'I don't care if he is [a history teacher or whatever].' Lidz (2001) cites similar findings from Kannada (Southern Dravidian):

(6) a. nannu   [baagil-annu   much-id-e]   [giigilannu muchide]   [Kannada]
         I-NOM   [door-ACC   close-PST-1S]   [ECHO-REDUPLICANT]
                    anta   heeLa-beeDa
                    that   say-PROH

     'Don't say that I closed the door or did related activities.'

     b. pustav-annu [meejin-a   meele]   [giijina meele]   nooD-id-e
         book-ACC   [table-GEN   on]   [ECHO-REDUPLICANT]   see-PST-1S

     'I saw the book on the table and in related places'

A particularly interesting case of reduplication at the syntactic level is found in Fongbe (Niger-Congo, Kwa). As discussed by Collins (1994) and Lefebvre & Brousseau (2002:505), Fongbe verb doubling occurs in four syntactic constructions: temporal adverbials (7a), causal adverbials (7b), factives (7c), and predicate clefts (7d). In each case, an extra copy of the verb appears initially in the verb phrase. The fronted copy is either identical to the main verb or, for some speakers, truncated to its first syllable:

(7)	a.	**sísɔ́ ~sí**	Kɔ́kú	**sísɔ́**	tlóló	bɔ́	xὲsí	ɖì	Bàyí	[Fongbe]
		tremble	Koku	**tremble**	as.soon.as	and	fear	get	Bayi	
		'As soon as Koku trembled, Bayi got frightened'								
	b.	**sísɔ́ ~sí**	Kɔ́kú	**sísɔ́**	útú	xὲsí	ɖì	Bàyí		
		tremble	Koku	**tremble**	cause	fear	get	Bayi		
		'Because Koku trembled, Bayi got frightened'								
	c.	**sísɔ́ ~sí**	ɖé-è	Bàyí	**sísɔ́,**	ɔ́,	vέ	nú	mi	
		tremble	OP-RES	Bayi	**tremble,**	DEF	bother	for	me	
		'The fact that Bayi trembled bothered me'								
	d.	**sísɔ́ ~sí**	wὲ̖	**Kɔ́kú**	**sísɔ́**					
		tremble	it.is	Koku	**tremble**					
		'It is tremble that Koku did'								

Reduplication at the phrasal level is problematic for theories that treat reduplication as affixation. First, affixation is normally considered a word-internal process, although the concept of phrasal affixation has been proposed, e.g., by Anderson (1992: ch.8), as a way of modeling clitics or even phrasally distributed inflectional elements. Second, affixation as a phenomenon is normally understood to be restricted to monomorphemic, bound elements; a duplicated phrase is less compatible with this understanding. Third, unlike word-internal reduplication, phrasal reduplication is never infixing.

For all of these reasons, phrasal reduplication has been argued to lend itself to the compounding-style analysis of reduplication discussed in part 2 of this article.

5. Morphologically Complex Reduplicants

Some reduplication constructions involve reduplicants, which have internal morphological structure that is not directly related to that of the base. Such reduplicants appear to be morphologically constructed independently of the base, despite being closely related to it semantically and similar phonologically. Such cases also challenge the conception of reduplication as an affixation construction. We take up two such cases below: verb stem reduplication in Bantu languages and echo reduplication.

5.1. DEFAULT VERB STEM REDUPLICATION IN BANTU LANGUAGES

Recent studies of Bantu reduplication (Downing 1998ab, 1999ab, 2000, 2003, 2005, 2006; Hyman & Mtenje 1999; Hyman et al. 2009, among others) argue that verb stem reduplicants are (canonical) verb stems with internal structure. The phenomenon in question is illustrated by the data in (8) from Ndebele (S. 44, Zimbabwe; Sibanda 2004, Hyman et al. 2009). As discussed earlier (see example (2)), the locus of verbal reduplication in Ndebele is the derivational stem, which consists of the root and derivational suffixes, but excludes the obligatory final inflectional suffix. Reduplicants are disyllabic and prefixed, as shown in (8). When the verb root itself is two syllables or longer, as in (8a), the reduplicant copies the first two open syllables of the stem. If the verb root is monosyllabic but combines with derivational suffixes such as

applicative *–el* or causative *-is*, reduplication copies material from both, as in (8b). But reduplication cannot copy inflectional suffixes. When the derivational stem (root plus derivational suffixes) is only monosyllabic, as in (8c), the reduplicant recruits the semantically empty suffix *–a* to flesh out its obligatory disyllabic shape. This suffix is found on verb stems when one of the more contentful inflectional endings (e.g., subjunctive *–e* or perfective *–ile*) is absent; it is the default morphological filler of the obligatory inflectional suffix position. Because the suffix *–a* has no meaning of its own, it is recruitable to flesh out subminimal reduplicants even of verb stems that end in one of the other inflectional suffixes.

8   stem   reduplicated stem   [Ndebele]

	gloss	stem	reduplicated stem
a.	'INF–taste–FV'	(uku-)nambith-a	(uku-)<u>nambi</u>+nambith-a
	'INF–appear–FV'	(uku-)bonakel-a	(uku-)<u>bona</u>+bonakel-a
b.	'INF–cultivate–APPL–FV'	(uku-)lim-el-a	(uku-)lim-e+lim-el-a
	'INF–cultivate–CAUS–fv'	(uku-)lim-is-a	(uku-)lim-i+lim-is-a
c.	'INF–cultivate–FV'	(uku-)lim-a	(uku-)<u>lim-a</u>+lim-a
	'INF–cultivate–SUBJ'	(uku-)lim-e	(uku-)<u>lim-**a**</u>+lim-e
	'INF–cultivate–PERF'	(uku-)lim-ile	(uku-)<u>lim-**a**</u>+lim-ile
	'INF–send SUBJ'	(uku-)thum-e	(uku-)<u>thum-**a**</u>+thum-e
	'INF–send–PERF'	(uku-)thum-ile	(uku-)<u>thum-**a**</u>+thum-ile

Downing (1999c, 2000, 2005, 2006) characterizes the morphologically complex reduplicants of Ndebele and other Bantu languages as 'canonical stems'. The canonical verb stem in Bantu (e.g., *lim-a* 'cultivate', *thum-a* 'send') ends in the suffix *–a* and is minimally disyllabic; this is exactly the shape the reduplicant assumes when, because of various constraints on reduplication, it cannot copy the verb stem exactly. The ability of the reduplicant to assume the canonical morphological structure of verb stems even when that structure is not found in the apparent base of reduplication illustrates the potential morphological independence of reduplicant and base.

As Downing (1999ab) argues, additional evidence for internal morphological structure in Bantu verb stem reduplicants comes from languages where the reduplicant is a morphosyntactically related default stem, not an exact phonological copy of the base. For example, in Kinande (Bantu J40, DRC; Mutaka & Hyman 1990), the reduplicant of a causative verb stem optionally copies the causative suffix *–y-* even though this can lead to a reduction in phonological identity between the reduplicant and the corresponding base segments: *erí-bulya* 'to ask'; *erí-bulirya* 'to ask for' reduplicates as, *erí-<u>bulya</u>-bulirya*; *erí-buliranya* 'to ask for each other' reduplicates as, *erí-<u>bulya</u>-buliranya*. Downing (1999b,c) points out that this kind of divergence between the reduplicant and the base is best accounted for if the reduplicant is required to be formally identical to a minimal causative stem morphologically related to the base verb stem. The reduplicant thus replicates both morphosyntactic and phonological information from the base verb stem, but exhibits different internal morphological organization.

5.2. ECHO REDUPLICATION AND MELODIC OVERWRITING

'Echo' reduplication is a term often applied to total reduplication constructions in which the beginning of the second copy is replaced by a fixed substring which cannot be analyzed as a phonological default string. Familiar English examples include the ironic or pejorative Yiddish–derived *fancy-schmancy*, *resolutions-schmesolutions*, in which the fixed substring [ʃm] stands in as the onset of the copy, replacing any existing initial consonant(s) (see e.g., Alderete et al. 1999). As mentioned above, the Kolami (Central Dravidian) 'et cetera' construction duplicates a word or phrase and replaces the initial (C)V of the second copy with *gi* (*maasur* 'men' → *maasur-giisur* 'men and the like', *kota* 'bring it!' → *kota-gita* 'bring it if you want to' (Emeneau 1955)).

Echo reduplication is very common cross-linguistically and appears to be a contagious areal phenomenon, especially throughout South Asia, where pockets of it are found not just in Dravidian but also in Indo Aryan, Tibeto–Burman, and Austro–Asiatic languages (see e.g., Abbi 1991, Singh 2005, Keane 2001). Further west, an echo reduplication pattern meaning 'X and the like' is found in Turkish (Turkic), Armenian (Indo–European) and Abkhaz (Northwest Caucasian), languages from completely different families but spoken in the same general part of the world (see e.g., Johanson & Csato, 1998, Vaux 1998). Turkish has a well-known 'et cetera' construction involving *m-* (a) (Lewis 1967:237)*;* parallel constructions are found in Armenian (b) (Vaux 1998:246), and Abkhaz (c) (Vaux 1996, cited in Inkelas & Zoll 2005).

(9)   a. ağaç   'tree'   → ağaç–mağaç   [Turkish]
        dergi   'journal'   → dergi-mergi
      b. pətuʁ   'fruit'   → pətuʁ–mətuʁ   [Armenian]
      c. gaʒá-k'   'fool'   → gaʒák'–maʒák'   [Abkhaz]

Echo reduplication is often subject to the requirement that the fixed substring not be identical to the substring that the copy would otherwise begin with. Yip (1992, 1998) relates this pattern to the dissimilation often required in poetic rhyme. Thus, for example, in Hindi the 'et cetera' echo construction uses a replacive *v-*: *narendra* 'Narendra' (proper name) → *narendra-varendra* 'undesirables like Narendra' (Singh 2005:266), *tras* 'grief' → *tras-vras* 'grief and the like' (Nevins 2005:280). However, for stems that are already *v*-initial, *š* is used instead: *vakil* 'lawyer' → *vakil-šakil* 'lawyers and the like' (Nevins 2005:280). In Kashmiri (Indic), *v*-replacement (*gagur* 'mouse' → *gagur-vagur* 'mouse and the like', *poosh* 'flower' → *poosh-voosh* 'flower and the like') alternates with *p*-replacement: *vaan* 'shop' → *vaan paan, vɔzul* 'red' → *vɔzul pɔzul* (Koul, 2005:149). According to Lewis (1967), speakers cannot employ the Turkish *m*-construction when the input would begin with [m], and resort to a periphrastic alternative instead.

Alderete et al. (1999) propose that echo reduplication is a combination of affixation and reduplication. The fixed material in echo reduplication – *shm-* in English and *gi-* in Kolami – is an affix. It co-occurs with a phonologically copied reduplicant, with which it competes to fit into a constituent whose prosodic shape is determined by the reduplication construction.

(10)   [maasur]$_{CVVCV}$ + [gi, RED]$_{CVVCV}$ →maasur-giisur   [Kolami]
        [kota]$_{CVCV}$ + [gi, RED]$_{CVCV}$ →kota-gita

Because the affix in echo reduplication typically replaces segmental material that would otherwise be expected to be copied, the term 'Melodic Overwriting' has been invoked for this type of construction (see e.g., Yip 1992, McCarthy & Prince 1996, Alderete et al. 1999). On the view that the fixed, overwriting element is an affix, echo reduplication patterns with Bantu reduplication is showing that the reduplicative complex can have internal morphological structure which differs from that of the base.

6. Reduplication Without Phonological Identity

In its canonical form, reduplication involves a high degree of phonological identity between reduplicant and base. We have seen cases, in Bantu and in echo reduplication, of minor morphological deviations which can disrupt this identity. Markedness–driven phonological alternations applying to the output of reduplication are another minor identity-disrupting force, as discussed in part 2 of this article. However, in some languages, we find a much greater divergence between the form of the reduplicative morpheme and its base than can be attributed to such pressures. In the cases discussed in this section, the reduplicant is a semantic, but not a phonological, double of its base. These cases represent an extreme endpoint of a scale of morphological independence between base and reduplicant.

In Sye (Oceanic) reduplication, base and reduplicant can consist of different suppletive allomorphs of the same lexeme. Most Sye verb roots have two different forms (Crowley 1998:81, Crowley 2002), termed here for convenience stem 1 and stem 2. Examples can be seen in (11a). Many stem 1-stem 2 pairs exhibit a relatively transparent relationship, e.g., *aruvo~naruvo* 'sing', *owi~nowi* 'plant'. In other cases, the relationship is opaque enough to motivate treating the allomorphy as suppletive (though cf. Frampton 2009). Examples include *owi~awi* 'leave', *ovoli~aompoli* 'turn it', and *velom~ampelom (*singular imperative only)*/elom* 'come'. Crowley (1998:82) likens such pairs to 'strong verb alternations in Germanic languages'. Each affixation construction in Sye selects for one of these two stem shapes. (11b) illustrates the same root combining with two different prefixes, one of which calls for stem 1 (*arinova*) and the other of which calls for stem 2 (*narinova*). The point relevant to reduplication, made by Crowley, is that stem reduplication in morphological contexts calling for stem 1 yields two copies of stem 1, whereas stem reduplication in contexts that call for stem 2 yields stem 2–stem 1 (11c) (Crowley 1998: 79, 84; 2002:704).

(11)   a.   Stem   Stem2   gloss   [Sye]
            arinova   narinova   'provoke'
            omol   amol   'fall'
       b.   etw-**arinova**-g   co-**narinowa**-nt
            2SG.IMP.NEG-**provoke$_1$**-1SG   3SG.FUT-**provoke$_2$**-1PL.INCL
            'Don't provoke me!'   '(S)he will provoke us'
       c.   cw-**amol-omol**
            3.FUT-**fall$_2$-fall$_1$**
            'they will fall all over'

Inkelas & Zoll (2005), building on proposals by Singh (1982, 2005), point to cases of this kind in arguing that reduplicative identity may, in some cases, be solely semantic. Sye reduplication consists of selecting the same lexeme twice, potentially drawing upon different, phonologically discrepant, and suppletive allomorphs each time.

Another instance of reduplication involving different allomorphs of the same morpheme occurs in Chechen (Nakh–Dagestanian, Nakh), in which reduplication is one strategy for satisfying the syntactic requirements of a second position clitic (Conathan & Good 2000; see also Peterson 2001 and Good 2006 on closely related Ingush). As shown in (12), chained clauses are marked by an enclitic particle *'a* (=IPA [ʔa]), which immediately precedes the inflected, phrase-final, main verb (Conathan & Good 2000:50). This enclitic must be preceded by another element in the same clause. If neither an object (12a) nor a deictic proclitic or preverb (12b) is present to host the enclitic, the obligatory pre-clitic position is filled by reduplicating the verb (12c). ('B' (12a) and 'D' (12b) represent gender agreement.)

(12)   a.   Cickuo,   [ch'aara   ='a   gina]$_{VP}$,   'i   bu'u   [Chechen]
            cat.ERG   [fish   =&   see.PP]$_{VP}$ 3S.ABS   B.eat.PRS

            'The cat, having seen a fish, eats it.'
       b.   Aḥmada,   [kiekhat   jaaz   ='a   dina]$_{VP}$,   zhejna   dueshu
            Ahmad. ERG   [letter   write   =&   D.do.$_{PP}]_{VP}$ book   D.read.PRS

            'Ahmad, having written a letter, reads a book.'
       c.   Aḥmad,   [ʕa   ='a   ʕiina]$_{VP}$,   dʕa-vaghara
            Ahmad   [**stay.INF$_{RED}$**   =&   **stay.PP**]$_{VP}$ DX.V.go.WP
            'Ahmad stayed (for a while) and left.'

The Chechen reduplicant, subscripted above as 'RED', occurs in the infinitive form, while the main verb is inflected. Inflected verbs require a different form of the verb stem than that used in the infinitive. In some cases, the stem allomorphy is clearly suppletive, e.g., *Dala* 'to

give' vs. *lwo* 'gives', or *Dagha* 'to go' vs. *Duedu* 'goes'. As Conathan & Good (2000:54) observe, the result is that Chechen can exhibit suppletive allomorphy differences between base and reduplicant.

Inkelas and Zoll (2005) relate reduplication of the type seen in Chechen and Sye to synonym compounding constructions of the sort discussed by Singh (1982). As illustrated in (13), a construction in Modern Hindi (Indic) pairs synonymous adjectives, the first of native origin and the second of Perso-Arabic origin, to give an overall meaning of '[noun] et cetera' (Singh 2005:271):

(13) a.   tan   badan   tan-badan   [Hindi]
           'body' [+native]   'body' [–native]   'body, etc.'
      b.   vivaah   shaadi   vivaah-shaadi
           'marriage' [+native]   'marriage' [–native]   'marriage, etc.'

Structurally, this construction is parallel to Sye reduplication in juxtaposing semantically identical lexical constituents (synonyms in Hindi, suppletive allomorphs in Sye).

Once total reduplication and synonym constructions are connected conceptually, it also be–comes possible to relate both of these to compounding constructions requiring different degrees of semantic similarity across daughters, including part–whole and even antonym constructions. In Acehnese, for example, Durie (1985:40-44) documents a construction that pairs words of opposite meaning to yield a word whose meaning encompasses both:

(14)   tuha-muda   'old and young'   [Acehnese]
       bloe-publoe   'buy and sell'
       uroe-malam   'day and night'
       beungöh-seupôt   'morning and evening'

7. Conclusion

Because of its unique property of duplication, reduplication is often studied in isolation from other morphological and syntactic constructions of language. What we hope to have shown in this overview, however, is that reduplication is not morphologically monolithic, nor is it morpholog–ically isolated. Rather, reduplication is a collection of morphological constructions unified by the property of some kind of identity. Each reduplication construction coexists and interacts and shares properties with other morphological and syntactic constructions in the same language.

If we posit that the canonical example of reduplication is total word reduplication, then we can characterize the constructions covered in this survey as deviating from this canon in numer–ous directions. Like non–reduplicative constructions, reduplication can target a root, or a stem, a phrase, or even an affix. Reduplication can create two copies of a stem which have the same meaning but differ in the morphs that comprise them; in this way, it structurally resembles compounding constructions involving semantically related lexemes. Reduplication can be partial instead of total; partial reduplication resembles non–reduplicative affixation constructions in being adfixing or infixing. It is important for theories of reduplication to keep this variety in mind, rather than focusing on only one narrow morphological subtype of reduplication.

Having situated reduplication in morphological context, we turn in part 2 of this article to formal analyses of reduplication and to theories of reduplicative form.

Short Biographies

Sharon Inkelas is Professor of Linguistics at the University of California, Berkeley. Since her Stanford University dissertation (1989), her research has focused on the phonology-morphology

interface, as represented most recently by her 2014 book, *The Interplay of Morphology and Phonology* (Oxford University Press). In 2005, she published *Reduplication: Doubling in Morphology* (Cambridge University Press), co-authored with Cheryl Zoll. Other focal research interests include affix ordering and combinatorics; children's acquisition of phonology; and, most recently, the phonological behavior of contour segments. She has published in a variety of journals, including *Morphology, Phonology, Natural Language and Linguistic Theory, and Language*.

Laura J. Downing is the Professor of African Languages at the University of Gothenburg, Sweden. Her central research interest since her dissertation (University of Illinois at Urbana–Champaign 1990) has been the prosody of Bantu languages, including prosodic morphology and the phonology-syntax interface. Her work on these topics has been published in a variety of journals, such as *Africana Linguistica, Journal of African Languages and Linguistics, Lingua, Natural Language and Linguistic Theory* and *Phonology*, as well as numerous anthologies. She is the author of the Oxford University Press monograph, *Canonical Forms in Prosodic Morphology*, and, with Prof. Al Mtenje, she is currently writing a phonological grammar of Chichewa, to be published by Oxford University Press.

Notes

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[1] Most language classifications (genus and sometimes also subfamily) are taken from the World Atlas of Linguistic Structures (Haspelmath et al. 2005), available online at http://wals.info. Bantu languages are classified, following the practice in the literature, with their Guthrie number, accompanied by their name of the country in which they are primarily spoken.

Works Cited

Abbi, A. 1991. *Reduplication in South Asian languages: an areal, typological and historical study*. New Delhi: Allied Publishers Limited.

Alderete, J., J. Beckman, L. Benua, A. Gnanadesikan, J. McCarthy, and S. Urbanczyk. 1999. Reduplication with fixed segmentism. *Linguistic Inquiry* 30:327–64.

Anderson, S. R. 1992. *A-morphous morphology*. Cambridge: Cambridge University Press.

Applegate, R. 1972. *Ineseño Chumash grammar*. University of California, Berkeley Ph.D. dissertation.

—— 1976. Reduplication in Chumash. In Langdon, M., and S. Silver (eds), Hokan studies. The Hague: Mouton. 271–83.

Aronoff, M. 1988. Head operations and strata in reduplication: a linear treatment. *Yearbook of Morphology* 1:1–15.

Bakker, P, and M. Parkvall. 2005. Reduplication in pidgins and creoles. *Studies on reduplication*, Hurch B., and V. Mattes (eds). Berlin: Mouton de Gruyter. 511–31.

Broselow, E., and J. McCarthy. 1983. A theory of internal reduplication. *The Linguistic Review* 3. 25–88.

Cohn, A. 1989. Stress in Indonesian and bracketing paradoxes. *Natural Language and Linguistic Theory* 7:167–216.

Collins, C. 1994. The factive construction in Kwa. *Travaux de recherche sur le créole haïtien* 23:31–65.

Conathan, L., and J. Good. 2000. Morphosyntactic reduplication in Chechen and Ingush. *Proceedings of the Chicago linguistic society 36–2: the panels*, Okrent A., and J. P. Boyle (eds). Chicago: Chicago Linguistic Society. 49–61.

Crowley, T. 1998. *An erromangan (Sye) grammar*. Oceanic Linguistics Special Publication no. 27. Honolulu: University of Hawaii Press.

—— 2002. Sye. The oceanic languages, Lynch J., M. Ross and T. Crowley (eds). Richmond: Curzon Press. 694–722.

Dixon, R. 1988. *A grammar of Boumaa Fijian*. Chicago: University of Chicago Press.

Downing, L. J. 1997. Correspondence effects in Siswati reduplication. *Studies in the Linguistic Sciences* 25:81–95.

—— 1998a. Prosodic misalignment and reduplication. *Yearbook of Morphology* 1997:83–120.

—— 1998b. Prosodic stem ≠ prosodic word in Bantu. Studies on the phonological word, T. Hall and U. Kleinhenz (eds), Current Studies in Linguistic Theory. Amsterdam: Benjamins. 73–98.

—— 1999a. Morphological constraints on Bantu reduplication. *Linguistic Analysis* 29:6–46.

—— 1999b. Onset motivated overcopy in reduplication. Proceedings of the xth Western Conference on Linguistics. Fresno.

—— 1999c. Verbal reduplication in three Bantu languages. In Kager R., H. van der Hulst & W. Zonneveld, eds. The prosody-morphology interface. Cambridge: Cambridge University Press, 62–89.

—— 2000. Morphological and prosodic constraints on Kinande verbal reduplication. *Phonology* 17:1–38.

—— 2003. Compounding and tonal non-transfer in Bantu languages. *Phonology* 20, 1–42.

—— 2005. Morphology conditions minimality in Bantu languages. In Bostoen, K. and J. Maniacky, eds. Studies in African Comparative Llinguistics, with special focus on Bantu and Mande. Tervuren: Royal Museum for Central Africa, 259–80.

—— 2006. Canonical forms in prosodic morphology. Oxford: Oxford University Press.

Durie, M. 1985. *A grammar of Acehnese: on the basis of a dialect of North Aceh*. Dordrecht: Foris.

Emeneau, M. 1955. *Kolami: a Dravidian language*. Berkeley: University of California Press.

Fitzpatrick-Cole, J. 1994. *The prosodic domain hierarchy in reduplication*. Stanford University dissertation.

Frampton, J. 2009. *Distributed reduplication*. Cambridge, MA: MIT Press.

Garrett, A. 2001. Reduplication and infixation in Yurok: morphology, semantics, and diachrony. *International Journal of American Linguistics* 67:264–312.

Geraghty, P. 2002. Nadrogā. *The oceanic languages*, Lynch J., M. Ross and T. Crowley (eds). Richmond: Curzon Press. 833–47.

Good, J. 2006. *Rarum begets rarum: a rare clitic and morphosyntactic reduplication in Chechen and Ingush*. Rara and Rarissima conference. Max Planck Insititute for Evolutionary Anthropology, Leipzig

Green, T. M. 1999. A lexicographic study of Ulwa. MIT dissertation.

Harley, H, and M. F. Leyva. 2009. Form and meaning in Hiaki (Yaqui) verbal reduplication. *International Journal of American Linguistics* 75:233–72.

——Haspelmath, M., M. Dryer, D. Gil, and B. Comrie (eds.) 2005. The world atlas of language structures. Oxford: Oxford University Press.

Haugen, J. 2009. Three challenges for morphological doubling theory. Workshop on the division of labor between morphology and phonology. Meertens Instituut, Amsterdam. Handout downloadable from http://www.uni-leipzig.de/%7Eexponet/Slides/Amsterdam/Haugen.pdf

Healey, P. M. 1960. *An Agta grammar*. Summer Institute of Linguistics: Philippine Branch, Manila.

Hyman, L. M. 2009. The natural history of reduplication in Bantu. *Morphology* 19. 177–206.

Hyman, L. M., and A. Mtenje. 1999. Prosodic morphology and tone: the case of Chichewa. *The prosody-morphology interface*, Kager R., H. van der Hulst and W. Zonneveld (eds). Cambridge: Cambridge University Press. 90–133.

Hyman, L. M., S. Inkelas, and G. Sibanda. 2009. Morphosyntactic correspondence in Bantu reduplication. *The nature of the word: essays in honor of Paul Kiparsky*, Hanson K., and S. Inkelas (eds). Cambridge: MIT Press. 273–309.

Inkelas, S., and C. Zoll. 2005. *Reduplication: doubling in morphology*. Cambridge: Cambridge University Press.

——Johanson, L., and E. Csato (eds.) 1998. The Turkic Languages. New York: Routledge.

Keane, E. 2001. Echo words in Tamil. Oxford University dissertation.

Kiparsky, P. 2010. Reduplication in Stratal OT. In Uyechi, L., and L. H. Wee (eds.), *Reality exploration and discovery: pattern interaction in language and life*, 125–42. Stanford: CSLI Publications.

Kimenyi, A. 2002. *A tonal grammar of Kinyarwanda: an autosegmental and metrical analysis*. Lewiston, NY: E. Mellen Press.

Kiyomi, S. 1993. A typological study of reduplication as a morpho-semantic process: evidence from five language families (Bantu, Australian, Papuan, Austroasiatic and Malayo-Polynesian). Ph.D. dissertation, Indiana University.

Koul, O. N. 2005. Studies in Kashmiri Linguistics. Delhi: Indian Institute of Language Studies.

Kouwenberg, S. (ed.) 2003. *Twice as meaningful*. London: Battlebridge.

Kurisu, K., and N. Sanders. 1999. Infixal nominal reduplication in Mangarayi. *Phonology at Santa Cruz* 6:47–56.

Lefebvre, C., and A. M. Brousseau. 2002. *A grammar of Fongbe*. Berlin: Mouton de Gruyter.

Lewis, G. 1967. *Turkish grammar*. Oxford: Oxford University Press.

Lidz, J. 2001. Echo-reduplication in Kannada and the theory of word formation. *The Linguistic Review* 18:375–94.

Lincoln, P. 1976. Describing Banoni, an Austronesian language of Bougainville. University of Hawaii dissertation.

Lynch, J. 2002. Ulithian. *The Oceanic Languages*, Lynch J., M. Ross and T. Crowley (eds). Richmond: Curzon Press. 792–803.

Lynch, J., and M. Ross. 2002. Banoni. *The oceanic languages*, Lynch J., M. Ross and T. Crowley (eds). Richmond: Curzon Press. 440–55.

Marantz, A. 1982. Re reduplication. *Linguistic Inquiry* 13:483–545.

Marlo, M. 2002. Reduplication in Lusaamia. vol. 02–03. IULC Working Papers Online

McCarthy, J., and A. Prince. 1986. Prosodic morphology. University of Massachusetts, Amherst and Brandeis University, ms.

McCarthy, J., and A. Prince. 1990. Foot and word in Prosodic Morphology: the Arabic broken plural. *Natural Language and Linguistic Theory* 8:209–82.

——. 1993. Generalized alignment. In G. Booij and J. van Marle (eds.), Yearbook of morphology 1993. Dordrecht: Kluwer Academics. 79–153.

——. 1995. Faithfulness and reduplicative identity. University of Massachusetts occasional papers in linguistics 18: papers in optimality theory, Beckman J., L. Dickey and S. Urbanczyk (eds). Amherst, MA: GLSA. 249–384.

——. 1996. Prosodic morphology 1986. Technical Report #32, Rutgers University Center for Cognitive Science.

——. 1999. Prosodic Morphology (1986). In Goldsmith, J. (ed.), Phonological theory: the essential readings, 238–88. Malden, MA: Blackwell.

McCarthy, J., W. Kimper, and K. Mullin. 2012. Reduplication in harmonic serialism. *Morphology* 22. 173–232.

Merlan, F. 1982. *Mangarayi*. Amsterdam: North-Holland.

Moravcsik, E. 1978. Reduplicative constructions. *Universals of human language*, Greenberg J. (ed), Stanford: Stanford University Press. 297–334.

Munro, P., and J. Riggle. 2004. Productivity and lexicalization in Pima compounds. *Proceedings of BLS*. Berkeley: Berkeley Linguistics Society.

Mutaka, N., and L. M. Hyman. 1990. Syllable and morpheme integrity in Kinande reduplication. *Phonology* 7:73–120.

Nash, D. 1986. Topics in Warlpiri grammar. Outstanding Dissertations in Linguistics. New York: Garland.

Nevins, A. 2005. Overwriting does not optimize in nonconcatenative morphology. *Linguistic Inquiry* 36:275–87.

Ngunga, A. 2001. *Phonology and morphology of the Ciyao verb*. Stanford: CSLI Publications.

Niepokuj, M. K. 1997. *The development of verbal reduplication in Indo-European*. Washington: Institute for the Study of Man.

Peterson, D. 2001. The Ingush clitic ʔa: the elusive type 5 clitic? *Language* 77:144–55.

Regier, T. 1994. A preliminary study of the semantics of reduplication. TR-94-019, International Computer Science Institute.

Roberts, J. 1987. *Amele*. London: Croom Helm.

—— 1991. Reduplication in Amele. *Papers in Papuan Linguistics* 1:115–46.

Robinson, J. O. 1976. His and hers morphology: the strange case of Tarok possessives. *Studies in African linguistics, supplement* 6, Hyman L., L. Jacobson and R. Schuh (eds). Los Angeles: Department of Linguistics, UCLA. 201–9.

Rubino, C. 2005. Reduplication: form, function and distribution. *Studies on reduplication*, Hurch B., and V. Mattes (eds). Berlin: Mouton de Gruyter. 11–29.

—— 2008. Reduplication. The world atlas of language structures online, Haspelmath M., M. Dryer, D. Gil, and B. Comrie (eds). Munich: Max Planck Digital Library. Available online at http://wals.info/feature/27. Accessed on 2010-01-28.

Sibanda, G. 2004. *Verbal phonology and morphology of Ndebele*. University of California, Berkeley dissertation.

Sibomana, L. 1980. Grundzüge der Phonologie des Tarok (Yergam). *Afrika und Übersee* 63:199–206.

—— 1981. Tarok II: Das Nominalklassensystem. *Afrika und Übersee* 64:25–34.

Singh, R. 1982. On some 'redundant compounds' in Modern Hindi. *Lingua* 56:345–51.

—— 2005. Reduplication in Modern Hindi and the theory of reduplication. Studies on reduplication, Hurch B. (eds) Berlin: Mouton de Gruyter. 263–82.

Topping, D. 1973. *Chamorro reference grammar*. Honolulu: University of Hawaii Press.

Vaux, B. 1996. Abkhaz Mabkhaz: m-reduplication in Abkhaz and the problem of melodic invariance. Harvard University, ms.

Vaux, B. 1998. *The phonology of Armenian*. Oxford: Clarendon Press.

Wells, M. 1979. Siroi grammar. *Pacific linguistics series B*, 51. Canberra: Dept. of Linguistics, Research School of Pacific Studies, Australian National University.

Wilbur, R. 1973. *The phonology of reduplication*. Bloomington: Indiana University Linguistics Club.

Yip, M. 1992. Reduplication with fixed melodic material. *Proceedings of NELS 22*. Amherst: GLSA.

—— 1998. Identity avoidance in phonology and morphology. Morphology and its relations to phonology and syntax, LaPointe S., D. Brentari and P. Farrell (eds). Stanford: CSLI Publications. 216–46.

Yu, A. C. -L. 2007. *A natural history of infixation*. Oxford: Oxford University Press.

Zuraw, K. 2002. Aggressive reduplication. *Phonology*. 19:395–439.