Chapter 4: Reduplication

[word count: 14,700]

4.1. Overview

Reduplication is the doubling of some part of a morphological constituent (root, stem, word) for some morphological purpose. Total reduplication reduplicates the entire constituent, as with 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 Phillipines; Marantz 1982:439): *takki* 'leg' → *tak-takki* 'legs'.[1]

Reduplication has long been a topic of intense interest for morphological and phonological theory alike. From the morphological perspective, reduplication poses a challenge for item-based theories of morphology because of its process-like phonological character (see e.g. Anderson 1992:59). From the phonological perspective, reduplication, along with other prosodic morphology like truncation and infixation, has trained a bright light on phonological representations, providing evidence outside phonology proper for constituents like the mora, syllable and foot (see e.g. McCarthy & Prince 1986, 1996). More recently, reduplication has been plumbed as a source of evidence for syntagmatic correspondence relationships among segments (e.g. McCarthy & Prince 1995, 1999; Zuraw 2002). Reduplication is also of interest in the study of morphological exponence. What range of semantic and syntactic functions is reduplication associated with? Does reduplication differ from other kinds of morphology in the functions it can perform?

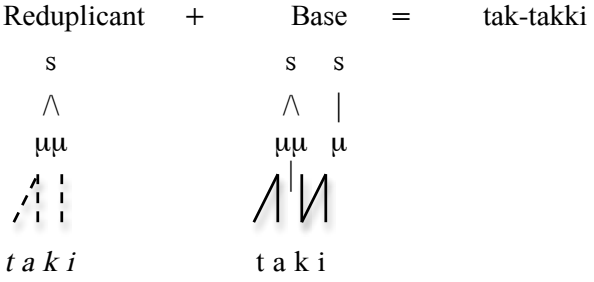
4.1. Approaches to reduplication

There are two basic approaches to reduplicative form in the contemporary literature: **Phonological copying** and **Morphological doubling**. These approaches are distinguished in part by the differing interpretations they supply to the phonological identity effects accompanying — if not defining — reduplication, and the different ranges of effects they predict.

[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.

Phonological copying approaches, developed in e.g. Marantz 1982, Steriade 1988, McCarthy & Prince 1995, Raimy 2000 and discussed in section 4.3, assume that a morphological imperative, namely the realization of an abstract morpheme, compels phonological copying from a base constituent. An early version of such a theory is depicted below. Based on Marantz (1982), McCarthy & Prince (1986) and Steriade (1988), this theory treats reduplicants as segmentally empty skeletal morphemes. A reduplicant specifies its prosodic shape only, and derives its segmental content by means of copying from the base:

(1)

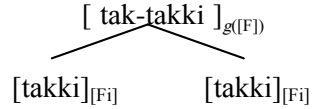


Copy and association

More contemporary implementations of phonological copying theories, including the influential Base-Reduplicant Correspondence Theory of McCarthy & Prince (1995), will be discussed in section 4.3.

The morphological doubling approach of Inkelas & Zoll (2005), sketched in more detail in section 4.6, treats morphosemantic identity as basic. Phonological identity is a side-effect of inserting the same morpheme(s) twice, rather than an explicit imperative of the construction. Partial reduplication occurs when morphologically conditioned phonological truncation applies to one of the stems:

(2) Reduplication in Morphological Doubling Theory (Inkelas & Zoll 2005)



Truncation *No truncation*

Phonological copying theories were developed principally to account for phonological properties of reduplication, while Morphological Doubling Theory focuses more on morphological properties, while also addressing many of the same phonological generalizations.

Recent literature (Singh 2005, Yu 2005, Inkelas 2008) has suggested that phonological

copying and morphological doubling may both be required, but in different, complementary contexts, a proposal to which we will return in section 4.7.

4.2. The phonology of reduplication

Any theory of reduplication must pay particular attention to the phonological form of reduplicants. This section surveys the major phonological components of reduplication, from prosodic shape (section 4.1.1) to phonological reduction of reduplicants (section 4.2.2) to locality effects (sections 4.3.3 and 4.4.4). We begin with the prosodic shapes of reduplicants in partial reduplication.

4.1.1. Prosodic shape of reduplicant

Partial reduplication is the result of a tension between the imperative to preserve base segments in the reduplicant and the imperative that the reduplicant should assume a particular prosodic shape: mora, syllable, foot, or prosodic word. This tension is observed whether the reduplicant is generated by phonologically copying base segments, as in phonological copying theories, or by morphologically supplying an independent double of the base and truncating it, as in Morphological Doubling Theory. We will focus here on the phonological considerations that affect reduplicant shape and relate the output form of the reduplicant to the morphological constituent that is its source.

In seminal articles, Moravcsik (1978) and Marantz (1982) observed that partial reduplication does not in general seem to duplicate an existing phonological constituent (e.g. syllable) of the base. Rather, partial reduplicants tend to have their own invariant overall shape, to which copied base segments are compelled to conform. In Mokilese (Oceanic), for example, partial reduplication, marking progressive aspect, always prefixes a bimoraic syllable to the base (Blevins 1996:523, citing Harrison 1973, 1976):

(3)	a.	pɔdok	pɔd-pɔdok	‘plant/planting’	[Mokilese]
		kasɔ	kas-kasɔ	‘throw/throwing’	
		nikid	nik-nikid	‘save/saving’	
	b.	soorɔk	soo-soorɔk	‘tear/tearing’	
	c.	diar	dii-diar	‘find/finding’	
		wia	wii-wia	‘do/doing’	

In each case, the bimoraic monosyllabic reduplicant is fleshed out by copying segmental material from the base. However, the copied material does not itself necessarily constitute a bimoraic syllable in the base. In examples like (3a), the duplicated strings ([pɔd], [nik]) are split over two syllables in the base of reduplication [pɔ.dok], [ni.kid], but constitute a bimoraic

syllable in the reduplicant. In examples like (3c), the reduplicant copies material which corresponds only to a monomoraic CV in the base ([di], [wi]), lengthening the copied vowel in order to project two moras (→ [dii], [wii]). These data thus illustrate an important point made by Marantz (1982), namely that reduplication can copy either less than or more than the designated prosodic constituent from the base, as long as the segments that are copied can be reconfigured to form the desired shape.

Mokilese progressive reduplication also illustrates a second key generalization about partial reduplication, namely that what is invariant about reduplicant shape is prosodic, not skeletal or (usually) segmental. Early autosegmental approaches to reduplication, starting with Marantz 1982, proposed that reduplicant shape is characterized by CV units. However, pioneering work by McCarthy & Prince (1986, published 1996) and Steriade (1988) made clear that CV skeletal units are not the right level of generality; instead, reduplicants are more accurately and succinctly characterized in prosodic terms. Mokilese reduplicants can assume skeletally diverse shapes: CVC (3a) or CVV (3b, c). As seen in (4), vowel-initial bases in Mokilese give rise to yet a third reduplicant type, namely VCC:

(4)	andip	and-andip	‘spit/spitting’	[Mokilese]
	uruur	urr-uruur	‘laugh/laughing’	
	alu	all-alu	‘walk/walking’	

What unites the CVC, CVV and VCC reduplicant shapes is the size of the prosodic constituent added to the base as a result of reduplication. Each stem increases in size by exactly a bimoraic syllable.

The data in (4) illustrate a third key generalization about reduplicant prosodic shape to which work in Optimality Theory has drawn particular attention, namely that while reduplication typically increases prosodic size by a fixed amount, as is the case in (3) and (4), the reduplicant itself is not always coextensive, in the output, with the added prosodic constituent. This is clearly seen in the examples in (4). The syllabification of *and-andip* is [an.d-an.dip], with the reduplicated string [and] split across two syllables; it is not *[and.-an.dip], in which the reduplicant [and] is a surface syllable. This fact supplements the observation made earlier that syllable reduplication does not necessarily copy existing syllables in the base; rather, it copies enough material to make up a new syllable — and, as in cases like this, it can copy even more than that if the copied material can fit into an existing base syllable. The analysis given to [an.d-an-.dip] by McCarthy & Prince (1986) is shown below:

(5)

$\sigma_{\mu\mu}$ $\sigma_{\mu\mu}$ $\sigma_{\mu\mu}$	
/\ / \\ /|\	Maximal association of copied segments to
a n d i p -a n d i p	available syllables
↓	
Ø	Stray erasure of unassociated copied segments

In Optimality Theory, patterns like those illustrated for Mokilese in (3)-(4) have been taken as evidence that constraints on reduplicant shape (e.g. REDUPLICANT = $\sigma_{\mu\mu}$) are minimally violable (Blevins 1996, McCarthy & Prince 1994, among many others).

The typology of shapes that reduplicants can be constrained to assume has been a major topic of discussion in the literature. McCarthy and Prince (1986) contributed the central observation that the range of possible reduplicant shapes mirrors the range of patterns that are found in truncation: both reduplicative and nonreduplicative truncation make use of the constituents in the prosodic hierarchy, namely mora, syllable, foot, and prosodic word. The examples from Tohono O'odham (Uto-Aztecan, Tepiman), Hausa, and Manam (Oceanic) in (6) illustrate reduplicants of one mora (6a), a bimoraic syllable (6b), and a bimoraic foot (6c), respectively. The Diyari (Pama-Nyungan) pattern in (6d) can be described either as a disyllabic foot or as a minimal prosodic word. The Acehnese pattern in (6e) can be described as maximal prosodic word reduplication, which amounts to the same thing as total reduplication, with no upper limit on the size of the reduplicant:

(6)

a. Tohono O'Odham pluralizing reduplication: monomoraic syllable (Fitzgerald 2001:942,945)

'duck'	pado	→	pa-pado	'ducks'
'shawl'	tablo	→	ta-tablo	'shawls'
'cemetery'	siminǰul	→	si-siminǰul (→ sisminǰul)	'cemeteries'

b. Hausa pluractional reduplication: bimoraic syllable (Newman 2000:424)

'call'	kiraː	→	kik-kiraː	'call (pluractional)'
'beat'	bùgaː	→	bub-bùgaː	'beat (pluractional)'

c. Manam reduplication forming adjectives, nouns and continuative verbs: bimoraic foot (Lichtenberk 1983, Buckley 1998)

'long'	salaga	→	salaga-laga
'knife'	moita	→	moita-ita
'ginger species'	ʔarai	→	ʔarai-rai
'go'	laʔo	→	laʔo-laʔo
'flying fox'	malaboŋ	→	malaboŋ-boŋ

d. Diyari reduplication (multiple functions): minimal prosodic word (Poser 1990:132, citing Austin 1981; see also McCarthy & Prince 1996):

‘woman’	wiḻa	→	wiḻa-wiḻa
‘boy’	kanku	→	kanku-kanku
‘to jump’	kuɭku	→	kuɭku-kuɭkuŋa
‘bird species’	tʲilpa	→	tʲilpa-tʲilparku
‘catfish (pl)’	ŋanka	→	ŋanka-ŋankaṉṉti

e. Acehnese emphatic reduplication: maximal prosodic word (Durie 1985)

‘drum’	tambô	→	tambô-tambô
‘mother’	ma	→	ma-ma

In ‘full copy’ theories like Steriade (1988) and Morphological Doubling Theory (Inkelas and Zoll 2005), partial reduplication results from the truncation of one of the two copies in total reduplication. The question of what forms reduplicants can assume, therefore, reduces to the question of what truncation operations are possible in language.

In BASE-Reduplicant Correspondence Theory (BRCT; McCarthy & Prince 1993, 1994, 1995, 1999), a theory of reduplication couched within Optimality Theory (Prince & Smolensky 1993), reduplicative templates are instantiated as constraints on the surface shape of reduplicants. The fact that constraints are violable permits BRCT to capture the potentially imperfect correspondence between a given reduplicant and the prosodic shape it is instantiating.

BRCT attributes reduplication to a phonological correspondence relation holding between two substrings in the output form of a word: the substring instantiating an abstract morpheme RED, and the substring (‘BASE’) which is the output correspondent of the input. The RED-BASE correspondence is regulated by BR-Faithfulness constraints: MAX-BR (every element in BASE must have a correspondent in RED), DEP-BR (every element in RED must have a correspondent in BASE), and IDENT-BR (corresponding elements must be identical). If the BR-faithfulness constraints are completely satisfied, reduplication is total. If, however, a constraint on the shape of the reduplicant, e.g. RED = $\sigma_{\mu\mu}$, outranks MAX-BR, reduplication will be partial. This is illustrated in (7) with Mokilese data from (3):

(7)

	/RED-pɔdok/	RED = $\sigma_{\mu\mu}$	MAX-BR
a.	pɔdok-pɔdok	*!	
☞ b.	pɔd-pɔdok		* (ok)

A virtue of attributing reduplicant shape to constraints in a theory where constraints are ranked and violable is that the theory is capable of accounting for contextual variation in reduplicant shape and makeup. In Mokilese, for example, reduplication of vowel-initial bases copies not just the material needed to flesh out a bimoraic reduplicant syllable but also enough to provide an onset to the base-initial syllable. This is why *andip* reduplicates as *and-andip* instead of *an-andip* (4). This ‘overcopy’ of [d], as shown by the analysis in (8), follows readily

in BRCT, in which not only RED = $\sigma_{\mu\mu}$ but also syllable well-formedness constraints like ONSET ('a syllable must begin with a consonant') can determine how much material is copied. In (8a), the reduplicant is exactly bimoraic, but as its final consonant is a coda, the base-initial syllable and the reduplicant are both onsetless. In (8b), the reduplicant-final [n] provides the base with an onset, but leaves the reduplicant one mora below target. Candidate (8c) copies one segment more than will fit into the two moras projected from the reduplicant, but this is optimal because that extra copied segment, [d], provides the base-intial syllable with an onset, besting candidate (8a). The total reduplication candidate overcopies wildly without improving performance on the markedness constraints ONSET and RED = $\sigma_{\mu\mu}$, and loses to candidate (8c).

(8)

	RED-andip	ONSET	RED = s_{mm}	FAITH-BR
a.	an.-andip	**!		(dip)
b.	a.n-andip	*	(-μ, +n)	(dip)
☞ c.	an.d-andip	*	(+d)	(ip)
d.	an.di.p-an.dip	*	(+μμ, +dip)	

In recent work on reduplication in Optimality Theory, there has been a movement towards deriving reduplicant shape instead of stipulating it with constraints like RED = σ. Under this umbrella fall the theories of Generalized Template theory (McCarthy & Prince 1994, Urbanczyk 1996, inter alia) and a-templatic reduplication (Gafos 1998, Hendricks 1999).

Generalized Template Theory, discussed in Chapters 1 and 3, arose out of the desire to derive, rather than to stipulate, reduplicant shape. McCarthy & Prince (1994) observed that, cross-linguistically, roots are often subject to foot-sized minimality constraints requiring them to be bimoraic or disyllabic, whereas affixes are often syllable-sized or smaller. Connecting this morphological observation to reduplication, McCarthy & Prince proposed that instead of stipulating reduplicant size constraints such as RED = σ and RED = FOOT , it would be preferable to derive the size of an individual reduplicative morpheme from the classification of that morpheme as an Affix (thus smaller than or equal to a syllable) or a Root (thus larger than or equal to a binary foot). Downing (2006) observes that roots and affixes are not as uniform in prosodic size across languages as GTT presupposes, and proposes a revised version of GTT with a wider range of morphological categories — Affix, Root, Stem, Word — and a different mapping to phonological shape. Downing argues that reduplicative morphemes tend to assume the canonical shape in that language for the morphological category they correspond to, even when this shape is not one of the classic metrical categories. Recall from Chapter 3 the discussion of Lushootseed reduplication, in which the preposed Diminutive reduplicant is CV in

shape (with a reduced vowel), while the preposed Distributive reduplicant is CVC in shape (with a full vowel):

(9) Lushootseed reduplication

a. Diminutives (reduplicant = type "Affix")

'foot'	ǰə́səd	→ ǰí-ǰəsəd	'little foot'
'animal hide'	s-kʷə́bšəd	→ s- kʷí-kʷəbšəd	'small hide'

b. Distributives (reduplicant = type "Root")

'foot'	ǰə́səd	→ ǰə́s-ǰəsəd	'feet'
'bear'	s-čə́txʷəd	→ s-čə́t-čətxʷəd	'bears'

Urbanczyk (2006) attributes the phonological shapes of the two types of reduplicant to their classification as Affix (constrained to be as small a syllable as possible) and Root (constrained to be minimally bimoraic).

The goal of GTT is to provide language-internal and cross-linguistic motivation for reduplicative templates. In general, however, the distinction between Root and Affix reduplication in this theory has been based on phonology, not morphology; prosodic shape aside, no semantic or distributional evidence supports classifying the Distributive in Lushootseed as a root.

In contrast to templatic analyses such as these, *a-templatic* reduplication analyses have been given to cases of reduplication in which reduplicants are not directly subject to shape constraints and in which reduplicant form is simply a byproduct of constraints on stem shape. One example can be found in Temiar (Mon-Khmer, Aslian), in which continuative aspect is marked by consonant reduplication. Biconsonantal roots prefixally reduplicate both consonants (10a); triconsonantal exhibit infixing reduplication of their final consonant only (10b) (Gafos 1998:517, citing Benjamin 1976):

(10)

a.	'to call'	kɔɔw	→	kwkɔɔw	[Temiar]
	'to sit down'	gəl	→	glgəl	
b.	'to lie down'	slɔg	→	sglɔg	
	'to ask a question'	smaaŋ	→	sŋmaaŋ	

Gafos observes that the primary generalization is output stem shape (CC.CVC), which reduplication helps to achieve. A template is clearly involved, but the reduplicant itself is not fixed; the reduplicant is whatever size and in whatever place is needed to convert an input to a CC.CVC output. Hendricks (2001) develops a 'compression' model for similar minimal reduplication effects in other languages in which reduplication appears to have the effect of

slightly increasing stem size, but not by an amount equivalent to any of the familiar prosodic constituents (mora, syllable, foot).

4.2.2. Phonological reduction of reduplicants

Partial reduplication is prone to phonological reduction, in which segmental and prosodic structure is reduced, or neutralized, in the partial reduplicant. For example, Sanskrit intensive reduplication eliminates onset clusters in the reduplicant (Steriade 1988:108). Stems in (11) are shown in their full grade form:

(11)	'cry out'	krand	→	kan-i-krand	[Sanskrit]
	'fall'	bhranç	→	ban-i-bhranç (→ baniːbhranç)	
	'sleep'	svap	→	saː-svap-	
	'sound'	dhvans	→	dhan-i-dhvans- (→ daniːdhvans-)	

A major achievement of approaches to reduplication within the BRCT framework is the ability to characterize and motivate the types of phonological reduction found in partial reduplication. Niepokuj (1991) and Steriade (1988), among others, were instrumental in drawing attention to the fact that partial reduplicants often exhibit structural simplification, e.g. in restrictions on syllable shape or reduction of length contrasts, as well as segmental reduction, e.g. neutralization of segmental contrasts. The ability to capture both types of reduction is a cornerstone of Base-Reduplicant Correspondence Theory (BRCT; McCarthy & Prince 1995).

Steriade attributes the form of the prefixed reduplicants in (11) to a principle requiring reduplicants to exhibit the unmarked setting for the complex onset parameter, namely prohibition. This insight that reduplicants can have more stringent markedness restrictions than the bases they are derived from plays a key role in BRCT, in which reduplicant unmarkedness effects are analyzed as the emergence of general unmarkedness effects in the language which are normally subordinated to higher-ranking IO-faithfulness. In Sanskrit, complex onsets are not simplified in all syllable nuclei; MAX-IO protects onset clusters in bases and in unreduplicated words. However, by hypothesis, Sanskrit nonetheless shares *COMPLEX, the universal markedness constraint against complex onsets. If *COMPLEX outranks FAITH-BR, it will exert an effect in reduplicants. The reason it does not exert its effects everywhere is that it is outranked by FAITH-IO, which protects outputs that correspond to input stems:

(12)

	/RED-svap/	MAX-IO	*COMPLEX	MAX-BR
a.	svaː-svap		**!	
☞ b.	saː-svap		*	* (v)
c.	saː-sap	*! (v)		! (p)

The 'Emergence of the Unmarked' (TETU) scenario which results from the ranking IDENT-IO » PHONO-C » IDENT-BR plays out in many cases of reduplication (McCarthy & Prince 1994a). As Alderete et al. (1999) point out, TETU is one source of fixed segmentism in reduplication, the other being Melodic Overwriting, discussed below in the context of echo reduplication (section 4.6.2.3). As an example of TETU, Alderete et al. (1999:328, 336 ff.), citing Akinlabi 1984 and Pulleyblank 1988, invoke the example of Yoruba gerundive reduplication, in which the vowel in the monomoraic prefixing reduplicant is always [i]:

(13)	'be warm, hot'	gbóná	→	gbí-gbóná	'warmth, heat'	[Yoruba]
	'be good'	dára	→	dí-dára	'goodness'	
	'see'	jɛ	→	jí-jɛ	'act of seeing'	

Alderete et al. (1999) analyze the fixed [i] vocalism in (13) as an emergent unmarkedness effect, pointing to convincing evidence that [i] is the unmarked vowel in the Yoruba inventory (Pulleyblank 1988, 2009), and observing that treating [i] as an affix or otherwise stipulating its quality would miss this essential generalization. Instead, Alderete et al. (1999) argue, reduplicative [i] is best modeled with the constraint ranking IDENT-IO » *{a,e,o,u}, IDENT-BR » *i.

Beyond capturing generalizations about unmarked segments, the TETU analysis of fixed segmentism also extends nicely to cases in which default segmentism is contextually conditioned. One example, from Lushootseed diminutive reduplication (Bates et al. 1994, Urbanczyk 1996, cited in Alderete et al. 1999:340), is also mentioned in Chapters 1 and 3. In Lushootseed (Central Salish), roots beginning with a single consonant and a short full vowel exhibit exact CV reduplication (14a). However, any other kind of root -- one whose first syllable has an onset cluster, or a long vowel, or a schwa -- exhibits *Ci* reduplication, where [i] is the default vowel used in case exact copy is not permitted (14b):

(14) a. CV reduplication (roots beginning with CV, V = a short full vowel [Lushootseed]

'hand'	čáləs	→	čá-čaləs	'little hand'
'bad'	s-duk^{w}	→	s-dú-ʔ-duk^{w}	'riffraff'

b. Ci reduplication (roots beginning with Cə, CVː, CC)

'run'	təláw-il	→	tí-təlaw'-il	'jog'
'knife'	s-duːk^{w}	→	s-dí-duːk^{w}	'small knife'
'walking stick'	c'k^{w}'usəd	→	c'í-c'k^{w}'usəd	'little walking stick'

According to Alderete et al., markedness constraints on syllable structure prevent the exact copying of anything but a CV sequence; inexact copying reverts to maximally unmarked structure, which for this position in the word is Ci.

TETU effects obtain almost exclusively in partial reduplication (see e.g. Steriade 1988, Niepokuj 1991, Urbancyk 1996, Downing 2006). It is possible to imagine segmental TETU effects in total reduplication, but cases of this sort do not seem to occur. For example, one does not find total reduplication constructions in which all the vowels of one copy are replaced by schwa or [i] (e.g. hypothetical *sandroga → sandroga-sindrigi*); one does not find all complex onsets reduced to simple onsets (*sandroga-sandoga*), or all codas eliminated (*sandroga-sadroga*), just in one copy in total reduplication, even though reduction to schwa, simple onsets, and coda reduction are all hallmarks of partial reduplicants.

The behavior of CVC Distributive reduplication in Lushootseed (Urbanczyk 2006, Downing 2006) further illuminates this asymmetry. In the Distributive, the reduplicant vowel is a invariant, stressed schwa, which is more marked than [i] (15). Stressed schwa does not appear at all in affixes, for example. Data are from Urbanczyk 2006, citing Bates et al. 1994:

(15) Lushootseed Distributives

'foot'	ǰə́səd	→	ǰə́s-ǰəsəd	'feet'
'bear	s-čə́txʷəd	→	s-čə́t-čətxʷəd	'bears'

As discussed in Chapters 1 and 3, Urbancyzk (2006) analyzes the Distributive reduplicant as a stem, with all the phonological privileges — stressed schwa, syllable coda contrasts — accorded to roots but not affixes. By contrast, the Diminutive is an affix, characterized by the smaller size and vowel inventory of affixes generally.

Whether or not this analysis is morphologically motivated, this example clearly shows the correlation between size (CVC vs. CV) and the degree to which marked segments are allowed. The prosodically smaller the reduplicant, the more prone it is to segmental reduction. This can be conjectured to follow from the diachronic hypothesis of Niepokuj (1991) that partial reduplication develops over time via the erosion of prosodic structure and segmental contrasts from the less prosodically salient of the two copies in total reduplication. As a result, the smallest partial reduplicants will be the oldest, and will show the most segmental neutralization. More research into the historical development of reduplication, and a more detailed cross-linguistic survey correlating prosodic size with amount of segmental neutralization, is clearly needed to test this hypothesis.

4.3.3. Locality and nonlocality in reduplication

Turning from reduplicant size and shape to reduplicant positioning, we address the positioning in the word of partial reduplicants. Most cases of partial reduplication are local; these reduplicants are adjacent to the part of the base from which they draw their segmental substance. However, a small number of cases depart from this pattern, exhibiting 'opposite-edge' reduplication. Examples are given in (16) from Madurese (Western Malayo-Polynesian, Sundic), in which opposite-edge prefixing reduplication encodes plurality (Steriade 1988, citing Stevens 1985), and from Koryak (Northern Chukotko-Kamchatkan), in which opposite-edge suffixing reduplication encodes absolute case (Riggle 2003, citing Bogoras 1969:687-688):

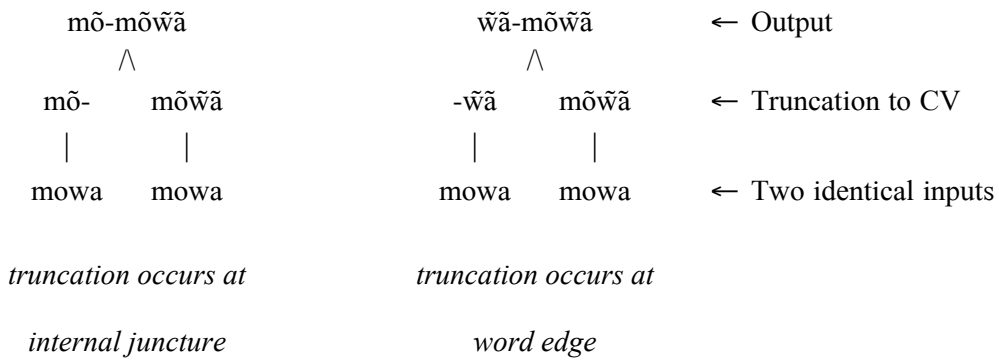
(16) Opposite-edge reduplication

a.	dus-garadus	'fast and sloppy'	[Madurese]
	waʔ-buwaʔ-(an)	'fruits'	
	bit-abit	'finally'	
	w̃ã-mõw̃ã	'faces'	
b.	mɪtqa-mɪt	'oil'	[Koryak]
	kilka-kil	'shellfish'	
	qanga-qan	'fire'	

Based on the rarity of such patterns, Nelson (2003, 2005) argues that opposite-edge reduplication is not a real option in grammars, and that apparent cases always have another explanation. For Madurese, for example, Nelson offers an alternative analysis in which the construction is total reduplication with truncation of the first copy (e.g. *mõw̃ã-mõw̃a* → *w̃ã-mõw̃ã*). In support of this account, Nelson observes that compounds undergo the same reduction: *tuzhuʔ* 'finger' + *ənpul* 'pink' → *zhuʔ-ənpul* 'pinky' (Nelson 2005:141). In Morphological Doubling theory, full copy with truncation is exactly the analysis that is given to all partial reduplication, not just in unusual cases (Inkelas & Zoll 2005).

(17) Partial reduplication in Morphological Doubling Theory

Local partial reduplication:	**Opposite-edge partial reduplication:**



The question for Morphological Doubling Theory would be why truncation occurs more often at the internal reduplication juncture, producing local reduplication, than it does at a word edge, resulting in opposite-edge reduplication.

For Chukchee, which resembles Koryak very closely, Nelson suggests that the source of opposite-edge reduplication is phonological, not morphological; opposite-edge reduplication is a phonological repair which protects the stem-final consonant from undergoing mutation. Reduplication is found in absolutive stems whose prosodic shape is one of the following: CVC, (C)VCV, (C)VCC, and (C)VCCV. Reduplication is never found in stems of other shapes, e.g. CVCVC, CVVCV, etc. According to Nelson (2005:139-140), citing Krause 1980, 'The shapes that do undergo the reduplication are "uniquely those bases whose morpheme-final sequences would be predicted to undergo the word-final phonological mutations of final vowel reduction and/or schwa apocope and/or final epenthesis if left unaffixed" (Krause 1980:157)'. Nonetheless, the process is uniquely associated with, and marks, the absolutive. Even if it is a phonological repair, it is morphologically conditioned to apply in all and only absolutive forms, which in most theories would put it squarely in the camp of morphology.

Opposite-edge reduplication is clearly unusual, cross-linguistically, but ruling it out altogether is probably premature without a better understanding of its historical origins. Reduplication creates new internal junctures, producing a derived environment at which phonological alternations are likely to take place. Erosion at the internal juncture is a plausible source of same-side partial reduplication. If, for example, partial reduplication arises from syncope of unstressed material in a form like hypothetical [mádi-mádi] → [mad-madi], then same-side reduplication is much likelier than opposite-side reduplication, which would require deletion of peripheral unstressed material: [madí-madí] → [dí-madí]. Peripheral deletion is certainly attested cross-linguistically; there is no reason to think it would never apply to the output of reduplication.

4.4.4. Internal reduplication

We turn in this section from adfixing reduplication — whether local or opposite-edge — to infixing, or internal, reduplication. An example of internal reduplication is given below, from Mangarayi (Yu 2006, citing Merlan 1982; see also Kurisu & Sanders 1999 for discussion):

(18)	gurjag	g-**urj**-urjagji	'having a lot of lilies'	[Mangarayi]
	gabuji	g-**ab**-abuji	'old person'	
	yirag	y-**ir**-irag	'father'	
	waŋgij	w-**ag**-aŋgij	'child'	
	jimgan	j-**im**-imgan	'knowledgeable one'	

As far as positioning within the word, internal reduplication is generally amenable to the same analysis as nonreduplicative infixes, discussed in greater detail in Chapter 5. For the purpose of illuminating properties specific to reduplicative infixes, it is important here to focus on two properties of reduplicative infixation: the locality effect and the 'overcopying' effect.

4.2.4.1. Locality effect

Internal reduplication almost always copies adjacent material, as is the case in Mangarayi, where the reduplicative infix copies the immediately following substring of the base. The 'opposite-edge' effects discussed in section 4.3.3 are even rarer in internal than in adfixing reduplication, if one is to judge on the basis of examples discussed in the literature on reduplication. One example of nonlocal internal reduplication has been discovered in Creek (Muskogean), in which plural adjectives are formed by suffixing a copy of the initial CV of the stem just before the stem-final consonant, which is the onset of the syllable headed by the adjectival ending [-iː]. The data in (19) are from Riggle 2003, who cites Haas 1997 and Martin and Mauldin 2000. Reduplicants are double-underlined:

(19)	'clean'	hasátkiː	hasathakíː	[Creek]
	'nasty, dirty, filthy'	likácwiː	likac<u>li</u>wíː	
	'soft'	lowáckiː	lowac<u>lo</u>kíː	
	'sweet'	cámpiː	cam<u>ca</u>píː	
	'torn up, mashed'	citákkiː	citak<u>ci</u>kíː	
	'ugly, naughty'	holwakíː	holwaː<u>ho</u>kíː	

4.2.4.2. The 'overcopying' effect, or exfixation

Many examples of apparent root reduplication may in fact be better analyzed as an outer layer of affixation which looks 'inside' the word to target an embedded prosodic constituent projected

from root (see e.g. Aronoff 1988 on 'head' reduplication). The argument for infixation in these cases comes for 'overcopying' effects, where apparent root reduplication also copies segments from adjacent affixes which happen to syllabify, on the surface, with segments within the root. This phenomenon is termed 'exfixation' in Downing 19xx and Inkelas & Zoll (2005).

A well-known example of this kind is provided by Tagalog (Western Malayo-Polynesian), which exhibits CV root reduplication (e.g. Schachter & Otanes 1972). Reduplication is a concomitant of a number of Tagalog prefixes, including *maN-*, illustrated in (). As seen, reduplication roughly targets the first CV of the root. However, reduplication cannot completely straightforwardly simply be analyzed as the innermost layer of morphology, because it copies the effects of fusion between a (preceding) prefix-final consonant and a (following) root-initial segment. In (20a), the prefix-final and root-initial consonants fuse into one, which forms the onset of the CV substring that reduplicates. In (20b), the prefix-final consonant syllabifies with the root-initial vowel, constituting the CV substring that reduplicates. Phonologically, it thus appears that the prefixed stem is the input to reduplication, which looks into the stem for those segments that belong to the morphological root. Aronoff (1988) analyzes Tagalog as having head reduplication. Citing the phonological facts, Booij & Lieber (1993), Fitzpatrick-Cole (1994), Downing (1998a, 1999b) and Inkelas & Zoll (2005) all propose that reduplication is infixing, targeting a prosodic constituent (which we may call the Prosodic Root) which corresponds closely but sometimes imperfectly to the morphological root. The Prosodic Root is demarcated with curly braces in the examples below. Data are taken from Inkelas & Zoll 2005, citing English 1986 and Schachter & Otanes (1972:103):

(20)

	root	maŋ -root	reduplication
	[Tagalog]		
a.	bayan	ma{**m**ayan}	ma**ma**{mayan}
	'town'	'to live or reside in a town'	'resident of a city or town'
b.	ibig	ma{**ŋ**ibig}	maŋi{ŋibig}
	'to be a suitor'	'beau, suitor, lover'	'love, fondness'

The mismatch between prosodic and morphological structure that is required to support this analysis of exfixation is discussed in more detail in Chapter 9.

Additional support for the infixation analysis of Tagolog comes from variation in the location of reduplication. Rackowski (1999:5) cites the variation depicted in (21), in which aspectual reduplication (underlined) can target any of the (bracketed) embedded subconstituents of the word. This general pattern is also discussed by Carrier (1979), among others.

(21)

Unreduplicated	…with contemplated aspect reduplication
ma-ka-pag-pa-hintay	→ ma-[kaa-ka-pag-pa-hintay]
ABILITY-COMPLETE-TRANS-CAUSE-WAIT	ma-ka-paa-[pag-pa-hintay]
"be able to cause someone to wait"	ma-ka-pa-paa-[pag-hintay]
	ma-ka-pag-pa-hii-[hintay]

Variable order in Tagalog reduplication has been treated both in terms of dominance (hierarchical position) and precedence (simple linear ordering). Syntactic analyses of scrambling (Rackowski 1999) or lowering (Skinner 2008) manipulate the hierarchical position of reduplication in the word. From a more linear perspective, Ryan (2009) takes an Optimality Theory approach which assigns weights to competing bigrams, or pairs of prefixes, including reduplicant prefixes, and models free ordering among prefixes with equal weighting of the relevant bigrams. Combining hierarchical and linear tactics, Condoravdi and Kiparsky (1998) develop an Optimality Theory analysis which treats variable Tagalog reduplicant order as resulting from a tension between Alignment constraints drawing the reduplicant to the root and Scope constraints compelling it to a high hierarchical position and forcing it towards the beginning of the word. Whichever type of approach is taken, the essential observation is that the reduplication process operates semantically on the entire word yet accesses enough internal structure to be able to copy and infix to the (Prosodic) root.

4.3. Phonological identity effects in reduplication

Phonological identity effects in reduplication are not surprising: whether it is analyzed as phonological copying or morphological doubling, in most cases the logical starting point in reduplication is two phonologically identical copies. In partial reduplication, identity is necessarily disrupted in terms of quantity, because the reduplicant must conform to a template which is smaller (or bigger) than the base. Identity can also be disrupted along the quality dimension, often in cases in which the reduplicant undergoes reduction while the base remains intact. Prosodic templaticity and reduction effects were discussed above in sections 4.2.4.1.1 and 4.2.4.2.2, respectively. BASE and reduplicant can diverge further if normal, word-level phonology applies to the output of reduplication, effecting changes such as assimilation or epenthesis at the base-reduplicant juncture (e.g. Hausa *tam-tambaya:* → *tantanbaya:* ~ *tattambaya:* 'ask (pluractional)'; Newman 2000:425), or assigning word-level accent which happens to target a syllable which is in the base or the reduplicant (e.g. Chamorro *hugándo* 'play' → *hugágando* 'playing'; Topping 1973:259).

4.1.1. Wilbur's Identity principle

Many researchers in reduplication have been struck by the impression that there is less phonological divergence between base and reduplicant than might be expected, given the general phonological alternations of the language. Wilbur (1973) terms this the 'Identity Effect', pointing to cases in which an ordinary phonological alternation is either inhibited from applying if it would create divergence between base and reduplicant ('underapplication'), or applies even when not conditioned ('overapplication'), in order to keep base and reduplicant the same in some respect.

An example of underapplication occurs in Indonesian. As documented in Cohn (1989), Indonesian has alternating stress, with the rightmost stressed syllable exhibiting primary stress: *àmerikànisási* 'Americanization' (p. 170). Stress assigned on a new cycle of affixation causes pre-existing stress to subordinate and, often, to shift rightward: *bìjaksána* 'wise' → *kə-bìjaksaná-an* 'NOM-wise-NOM = regulations' (p. 176). In compounds, the stress of the first member is subordinated to that of the second member: *polùsi udára* 'pollution' + 'air' = 'air pollution' (p. 188). In reduplication, however, stress subordination underapplies: the reduplication of *minúm-an* 'drink-NOM' is *minúman-minúman* 'drinks' (p. 185). Significantly, if a reduplicated form is suffixed, it behaves exactly like a compound, with stress subordination applying normally: *[minùman-minumán]-ña* 'drinks-DEF = the drinks' (p. 185); *anèka rágam* 'various' + 'way' = 'varied' (188); *kə-[anèka-ragám]-an* 'NOM-varied-NOM = variety' (p. 189). Cohn & McCarthy (1998) analyze the stress in reduplication as underapplication of stress subordination, driven by reduplicant-base identity requirements. When a suffix is added, fusing prosodically into the base, the base and reduplicant no longer have the potential for total identity, and stress subordination can apply. But when stress subordination would be the only barrier to total identity, it underapplies.

An example of overapplication occurs in Dakota (Siouan; Shaw 1980:344-345; see also Marantz 1982:459), in which velars normally palatalize after /i/, and spirants voice intervocalically. Pluralizing CVC reduplication postfixes a copy of the root CVC root, and in cases like the following, creates the context for 'overapplication' of velar palatalization. In these examples, velar palatalization is conditioned transparently in the first copy of the root but not in the second:

(22)	wič^{h}á-ki-**čax-x̌ax**-ʔiyèya	'he made it for them quickly' (root = /kax/)
	napé kí-**čos-x̌oz**-a	'he waved his hand to him' (root = /kos/)

Underapplication and overapplication are opacity effects. The ability to capture them with the same mechanisms that drives copying in the first place — an identity relation between base and reduplicant — is a cornerstone of BRCT.

4.2.2. Reduplicative opacity in BRCT

As seen in section 4.2.4.1.1, BRCT (McCarthy & Prince 1993, 1994b, 1995, 1999) attributes reduplication to a phonological correspondence relation holding between two substrings in the output form of a word: the substring instantiating an abstract morpheme RED, and the substring ('BASE') which is the output correspondent of the input. The RED-BASE correspondence is regulated by Faithfulness constraints: MAX-BR (every element in BASE must have a correspondent in RED), DEP-BR (every element in RED must have a correspondent in BASE), and IDENT-BR (corresponding elements must be identical). MAX-BR, DEP-BR and IDENT-BR are counterparts of the input-output constraints (MAX-IO, DEP-IO, IDENT-IO) governing the correspondence between BASE and input.

(23) RED ⇔ BASE ⇳ Input — Original ('Basic') model of BRCT

In the original model of BRCT there is no correspondence relation between RED and the input; RED is thus entirely dependent, for its substance, on BASE. (See McCarthy & Prince 1995 and Struijke 2000 for arguments that the input may in some cases directly influence RED, forcing a change in the architecture of BRCT.)

In BRCT, overapplication and underapplication result from high-ranking BR-Faithfulness that mandate identity, causing the same alternation to apply to both BASE and RED even if it is only transparently conditioned in one of them, or preventing an alternation from applying because its effects would introduce a discrepancy between the copies. As an example of overapplication of an effect in RED, McCarthy & Prince (1995) cite the following example from of CVC reduplication in Madurese. In these data the glides *ʔ, w* are inserted between adjacent vowels. As seen, a glide epenthesized into the base will also appear in the (underlined) reduplicant, even when not intervocalic there (24a, b). Overapplication of nasal harmony, normally conditioned only by a preceding nasal consonant, is also illustrated in the reduplicant in (24b). (Note the opposite-edge character of this reduplication (see section 4.2.4.3.3), an interesting wrinkle but orthogonal to the issue of overapplication.)

(24) a. /a–taña–a/ a-ñãʔ-tañãʔã ‘will ask often’ [Madurese]
b. /moa/ w̃ã-mõw̃ã ‘faces’

/RED-moa/	MAX-BR	ONSET	DEP-IO
☞ wa-.mo.wa	** (mo)		* (w)
a-.mo.wa	***! (mow)	*	* (w)
a-.mo.a	** (mo)	**!	

As an example of how FAITH-BR can produce underapplication in RED, McCarthy & Prince (1995) cite the example, in 0, of *š* → *č* in Luiseño (Uto-Aztecan, Takic). In Luiseño, *š* and *č* are in complementary distribution: *š* occurs in onsets, and *č* in codas. McCarthy & Prince assume that *š* is underlying and converts to *č* when syllabified into the coda. The existence of a few exceptional *č* onsets, but no exceptional *š* codas, supports this directionality. In the forms below, reduplication postfixes a CCV copy of the CVCV root, setting up a situation in which the corresponding initial consonants of BASE and RED occupy different syllable positions. If the *š* ~ *č* distributional pattern were enforced transparently, then in cases where the BASE begins with *č*, RED should begin with *š*. However, this does not happen: RED begins with *č*, too, an underapplication in RED of the *č* ~ *š* constraints, in service of BR-identity. BASE has a transparent *č* onset; RED has an opaque *č* coda. The Luiseño data in (26) are taken from Munro & Benson (1973:18-19), who analyze the sibilant suffix as an absolutive marker which follows a (deleted) nominalizing suffix /-i/. The tableau is taken from McCarthy & Prince (1995):

(26)

/čara/	‘to tear’	ča.rá-č.ra-š	‘torn’	*ča.rá-š.ra-š
/čoka/	‘to limp’	ču.ká-č.ka-š	‘limping’	*ču.ká-š.ka-š
/čaku-/	(unattested)	ča.kú-č.ku-š	‘crest on roadrunner’	*ča.kú-š.ku-š

/ šaku-RED-š/	IDENT-BR	*š-ONSET	IDENT-IO	*č
☞ ča.kú-č.ku-š			*	**
ča.kú-š.ku-š	*!		*	*
ša.kú-š.ku-š		*!		

BR-Faithfulness, like IDENT-BR in the above tableau, is a symmetric constraint. It does not in itself privilege BASE and require RED to conform; it simply requires identity. As a result of this design feature of Optimality Theory constraints, BRCT predicts that BASE and RED are equally likely sites of identity-induced opacity. McCarthy & Prince cite several examples of overapplication and underapplication that have a ‘backcopying’ character, in which a base conforms to RED rather than the reverse. Such effects are difficult to describe in theories of

reduplication without BR correspondence. To support backcopying, McCarthy & Prince cite examples in which external juncture effects are copied from RED to BASE, as in the Tagalog and Ineseño Chumash overapplication examples below. In both cases, a segmental interaction between a prefixal reduplicant and a preceding prefix is reflected in the base, even though it is not transparently conditioned there. The data in (27) are from McCarthy & Prince, citing Bloomfield 1933 on Tagalog and Applegate 1976 and Mester 1986 on Ineseño Chumash:

(27) a. Tagalog: N-Ci → Ni

paŋ-RED-putul	→ pa-**m**u-**m**utul	*pa-mu-putul

b. Ineseño Chumash: C_i-ʔ → C_i'

k-RED-ʔaniš	→ k'an-k'aniš	*k'an-ʔaniš

Stress and vowel length are not marked in the Tagalog example, following McCarthy & Prince 1995; typographical errors in the Chumash forms have been corrected to conform to the data given in Applegate (1972, 1976).

4.3.3. Opacity as a cyclic effect

Interleaving between phonology and morphology (cyclicity, stratal effects) is a potential source of many opacity effects in reduplication, and constitutes an alternative to surface BR correspondence constraints in many cases. Cyclicity and interleaving are the focus of Chapter 6. Here we will focus only on cases in which phonology applies both to the input to and to the output of reduplication.

For example, the 'overapplication' of nasal harmony in Madurese reduplication, illustrated in (28), can be accounted for if nasal harmony applies to the stem prior to reduplication, which copies its effects. In this instance, 'overapplication' of nasal harmony is simple input-output faithfulness:

(28)

Stem cycle:	/mowa/	→	[mõwã]	[Madurese]
Reduplication cycle:	[RED-mõwã]	→	[wã-mõwã]	

Inkelas & Zoll (2005) and Kiparsky (2006) have argued that most, if not all, cases of overapplication and underapplication yield to a cyclic account that obviates the backcopying power accorded to BRCT. As Inkelas & Zoll (2005) and Kiparsky (2006) observe, cyclicity is independently needed outside of reduplication. By contrast, bidirectional BR correspondence was introduced just to handle reduplicative opacity. If cyclicity turned out to be sufficient to handle opacity effects, bidirectional BR correspondence would be unnecessary.

The most celebrated example of backcopying does not yield to a cyclic analysis. McCarthy & Prince cite Onn's (1976) intriguing example of overapplication of nasal harmony

in Johore Malay (Western Malayo-Polynesian, Sundic) (29). According to Onn, the rightward spread of nasality from consonants to vowels crosses the internal boundary in reduplication and is then reflected back into the first copy:

(29) hamə hãmə-hãmə 'germ/germs' [Johore Malay]
aŋãn aŋãn-aŋãn 'fragrant/(intensified)'

As McCarthy and Prince argue, these data require the Identity constraints of BRCT, and cannot be handled cyclically. Even if nasal harmony applies cyclically, before and after reduplication, it is only possible, on a cyclic analysis without Identity constraints, to derive **hamə-hãmə*, from reduplication of *hamə* and assimilation of nasality across the internal boundary (*hamə → hamə hamə → hamə-hãmə*).

While this case falls outside the descriptive capacity of cyclic accounts, the more restrictive predictions of cyclicity do capture a generalization pointed out by McCarthy & Prince (1995) and Inkelas & Zoll (2005). BRCT predicts possible opacity effects that appear not to occur, one example being the overapplication of internal junctural effects in reduplication. For example, effects like *tami → tan-tani*, with overcopying of the assimilatory *m → n* alternation at the internal RED-BASE juncture, appear not to exist. These cannot be generated cyclically, a point in favor of cyclic approaches to opacity.

The competition between cyclic and BRCT accounts of reduplicative opacity continues to thrive; its resolution will depend in part on what turns up in future empirical surveys.

4.4.4. Templatic backcopying

McCarthy & Prince (1999) credit Philip Hamilton and René Kager with an interesting prediction of BRCT. The so-called Hamilton-Kager prediction has to do with the possibility of backcopying a reduplicant's templatic restrictions to the base, in service of base-reduplicant identity. The result would be simultaneous reduplication and truncation, e.g. hypothetical *harpin → har-har* or *pin-pin*. At one point thought not to occur (McCarthy & Prince 1999), this pattern has since turned up in several languages. Inkelas & Zoll (2005) and Downing (2006) point out cases in several different languages in which a base word corresponds to a reduplicated, truncated counterpart, without the existence of independently truncated forms that would motivate an intermediate stage, or a third point in a triangle of related forms. For example, an informal survey of professional athletes reveals a number of $C_1V_2C_1V_2$ nicknames, for which it is implausible that the CV truncatum could ever have existed on its own: *Dietmar → Didi* (Dietmar Hamann, professional football (soccer) player), *Covelli → Coco* (Covelli Crisp, professional baseball player), *Thierry → Titi* (Thierry Henry, professional football (soccer) player) *Lori → Lolo* (Lori Jones, track and field athlete), *Sisleide → Sisi* (Sisleide do Amor

Lima, professional football (soccer) player), and *LeBron* → *BronBron* (professional basketball player). One could argue that *Didi, Coco* etc. were previously established nicknames that were assigned to *Dietmar* and *Covelli* on the basis of alliteration; however, *LeBron* is an uncommon name and the nickname *Bronbron* appears to have been created on the fly for this particular athlete.

Double truncation of this kind has been attested as an established grammatical construction in several languages. Perhaps the most striking comes from Guarijio (Uto-Aztecan, Tarahumaran) inceptive reduplication, which applies to verbs denoting iterated punctual events (Caballero 2006; data from Miller 1996:65-66):

(30)	toní	'to boil'	to-tó	'to start boiling'	[Guarijio]
	sibá	'to scratch'	si-sí	'to start scratching'	
	čonó	'to fry (intr.)'	čo-čo	'to start frying'	
	nogá	'to move'	no-nó	'to start moving'	
	kusú	'to sing (animals)'	ku-kú	'to start singing'	
	suhku	'to scratch body'	su-sú	'to start scratching the body'	
	muhíba	'to throw'	mu-mú	'to start throwing'	

According to Caballero (2006:278), "There is no independent process of truncation in the language, and the base is only shortened in this reduplicative construction". These Guarijio inceptives are thus structurally parallel to *Bronbron*, but without the wordplay dimension that can enter into nickname formation.

In considering the possibility of simultaneous truncation and reduplication, it is also worth making the connection to simultaneous truncation and affixation, which is quite common. A well-known example in the Optimality Theory literature is German nickname truncation + *i*-suffixation, exemplified by forms such as *Gabi* (< *Gabriele*), *Klinsi* (< *Klinsmann*), *Gorbi* (< *Gorbatschow*) (Ito & Mester 1997). The truncated bases of affixation in the German construction (*Gab-, Klins-, Gorb*) do not exist as independent words, and violate phonotactic constraints on possible words. Rather they are generated as part of the overall construction, just like the truncata in Guarijio are generated as part of the reduplication construction.

Once the possibility of double truncation is acknowledged to exist, a different question arises: why is it uncommon, if it is so easy for theories to generate? The answer to this question may be functional: truncation + reduplication removes a lot of lexical material from bases, and can therefore present recoverability problems. From this perspective, it is not surprising that our two examples have the properties that they do. Nicknames are notoriously exempt from recoverability concerns. In Guarijio, according to Caballero 2006 and Miller 1996, the class of verbs that undergoes abbreviated reduplication is tightly semantically restricted, therefore a small set, reducing the potential for neutralization. It would be surprising to see a productive

construction applying to a large, open class of items (e.g. inflection, or nominalization) exhibit the extreme phonological curtailment seen in Guarijio inceptives. Nonetheless, this construction type seems to be possible in human language.

4.4. Phonological (compensatory) duplication

A challenge in developing theories of morphological reduplication is disentangling imposter cases of reduplication that may be purely phonological, instance of phonologically conditioned long-distance assimilation. In this section we will explore the boundary between morphological reduplication and phonological copying.

Yu (2005) and Inkelas (2008) discuss a number of cases of what Yu calls 'compensatory reduplication' in which phonological considerations such as syllable well-formedness or the need to supply segments to a prosodic template can induce copying of single segments, substrings, or even syllabic constituents. For example, loanwords into Cantonese undergo syllable rhyme reduplication in order to break up a consonant-liquid onset cluster (Yu 2005):

(31)	'break'	[pʰɪkˀlɪk]	[Cantonese]
	'clutch'	[kɪkˀlɪkˀtsi]	
	'blood'	[pʌtˀlʌtˀ]	

Phonological copying theories such as BRCT could handle these phenomena using the same type of correspondence constraints used for morphological reduplication, except that the correspondence would be between output syllables instead of between BASE and RED per se. In Cantonese, syllable structure considerations force epenthesis, but a high-ranking prohibition on epenthesizing default features forces the epenthetic segments to assimilate to, or correspond with, existing segments, mimicking the effects of morphological reduplication but without an abstract RED morpheme. Long-distance phonological assimilation, seen commonly in harmony systems, is at work in non-morphological reduplicative effects of the kind documented by Zuraw (2002:396), e.g. *orangutan → orangutang, smorgasbord → smorgasborg, persevere → perservere,* etc.

Taking this analysis one step farther, it is possible to attribute at least some cases previously analyzed as morphological reduplication to the phonology, as well. For example, monomoraic reduplications like the Yoruba gerundive (e.g. *g͡bóná → g͡bí-g͡bóná*) (see section 4.2.4.2.2) could be analyzed as prefixation of an underspecified vowel, which in turn triggers epenthesis of an underspecified onset consonant; both vowel and consonant acquire surface feature specifications through a combination of assimilation and default feature fill-in.

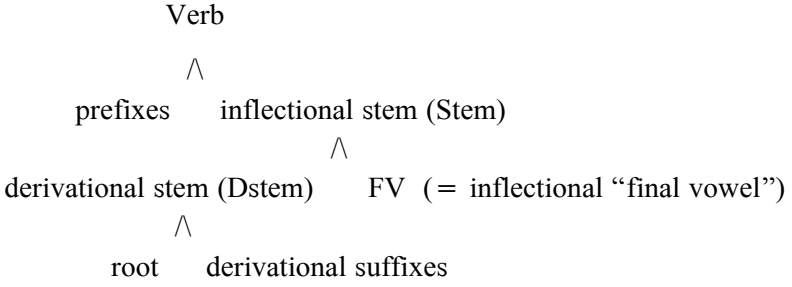
Yu (2005) and Inkelas (2008) find that phonological duplication and morphological reduplication have a number of distinct properties, including locality and size restrictions. These suggest a division in which phonological duplication is modeled like phonological assimilation (using correspondence constraints as in BRCT), whereas morphological reduplication is modeled like synonym compounding (using a theory like Morphological Doubling Theory).

Nonetheless, there exists a continuum of cases, both synchronic and diachronic, which straddles any line that can be drawn between phonological duplication (including lengthening and gemination) and partial morphological reduplication. A number of relevant cases arise with internal (infixing) reduplication and are discussed in more detail in §3 of Chapter 5. Examining this issue more closely is likely to illuminate future theoretical models of reduplicative phenomena.

4.5. What, morphologically, does reduplication copy?

Reduplication can target the entire word, the root, or any subconstituent in between; it can even target individual affixes. For an example of this kind of variation within a language family, we can turn to the family of Bantu languages, in which verb reduplication is widespread. The schema in (32), based on work by Downing (e.g. 1997, 1998ab, 1999ab, 2000, 2006), Hyman (e.g. 2008), and others, shows an internal analysis of the verb which has been motivated in many Bantu languages, including the ones that will be illustrated bellow. Verb reduplication can target the whole verb, the macro-stem (stem plus preceding object marker), the inflectional stem ('Stem'), or the derivational stem ('Dstem).

(32)



In a study of the natural history of Bantu reduplication, Hyman (2008) identifies examples of reduplication at each 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 0a) and the final inflectional suffix 0b). By contrast, Ndebele (S.44; Sibanda 2004) reduplicates only the Dstem, excluding any suffix in the FV position (33c-d). In Kinyarwanda (N.61; Kimenyi 2002), only the root is reduplicable, as

shown in (33e-f). Verb stems are shown, in all examples in (33), without inflectional or infinitival prefixes, as these do not undergo reduplication:[2]

(33) 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) [Kinyarw

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'

Reduplicants in all three of these languages, among others, are similar in another way: they must be minimally disyllabic. As will be discussed further (for Ndebele) in section 4.6.2.2, this requirement compels the use of a semantically empty dummy suffix (*-a* or *-aa*) which fleshes out the otherwise subminimal Ndebele and Kinyarwanda reduplicants in (33d-f).

In some languages, there is free variation as to what portion of the word reduplicates. For example, Harley & Levya (2009:269, p. 269, fns. 44, 46) report that in compound verbs in Hiaki (aka Yaqui; Uto-Aztecan), such as *nok-ii'aa* 'speak-want = want to speak', habitual/emphatic reduplication can target either member or both members:

(34)

nok-ii'aa	speak-want	'want [someone] to speak' [Hiaki]
no-nok-ii'aa	RED-speak-want	'want [someone] to **always** speak
nok-ii-ii'aa	speak-RED-want	'**always** want [someone] to speak'
no-nok-ii-ii'aa	RED-speak-RED-want	'**always** want [someone] to **always** speak'

As seen in (34), the constituent(s) which are reduplicated are those over which reduplication has semantic scope (glosses have been slightly modified from the original).

[2] Bantu languages are cited with their Guthrie classification number, roughly reflecting geographical zone, following the practice in Hyman 2008 and other specialized works on Bantu languages.

4.1.1. Root reduplication

The examples discussed above from Hiaki, Ciyao, Ndebele and Kinyarwanda are typical in that, no matter what the specific morphological and phonological conditions on reduplication may be, reduplication ends up copying at least a portion of the morphological root. This is probably no accident. As observed by Hyman (2008) and Hyman et al. (2009), partial reduplication tends cross-linguistically to occur on the opposite edge from the side of the root at which most affixation takes place in the language. Thus, while affixation tends cross-linguisticalyl to be suffixing (e.g. Dryer 2008), reduplication tends to be prefixing (Rubino 2008). In the majority of Bantu languages, for example, as seen in (32), partial verb stem reduplication is almost exclusively prefixing, while stems themselves are otherwise internally exclusively suffixing, with the result that the copied material always includes some or all of the root.

Sometimes, however, even what looks like straight root reduplication will pull in segments from a neighboring affix, as mentioned in §4.2.4.2. This typically occurs under two conditions: pressures of minimality, and pressures of syllable well-formedness.

In Kinande (J. 42; Mutaka & Hyman 1990:77-80, Downing 2000, Hyman 2008), noun reduplication normally targets only the root, not the noun class prefix: *kʊ-gʊlʊ* 'leg' → *kʊ-gʊlʊ + gʊlʊ* 'a real leg', not *kʊ-gʊlʊ + kʊ-gʊlʊ. But if a noun root is smaller than two syllables, the prefix is compelled to copy as well: *ri-bwɛ* 'snake' → *ri-bwɛ + ri-bwɛ* 'a real snake', not **ri-bwɛ-bwɛ*. In Emerillon (Tupi-Guarani), for example, disyllabic 'repeated action' reduplication targets the root, but will pull in material from prefixes as needed to flesh out the reduplicant. Thus *o-ʤika-ŋ* '3-kill-PL' and *o-eta* '3-cut' reduplicate as *o-ʤika-ʤika-ŋ* and *o-eta-eta,* respectively. But in forms with a monosyllabic root, like *o-**ʔal**-oŋ* '3-**fall**-PL' OR *a-lo-**wag*** '1sg-CAUS.COM-go', reduplication pulls in the prefix: *oʔa-o-**ʔal**-oŋ, a-lowa-lo-wag* (Rose 2005:353-359).

In Eastern Kadazan (Western Malayo-Polynesian, Borneo; Hurlbut 1998) and Javanese, affix consonants 'overcopy' in order to provide onset or coda consonants for the reduplicated root, exemplifying a common cross-linguistic pattern discussed by Downing (1999b). In Eastern Kadazan, the first CV of the root is reduplicated, whether the root is final, medial, or initial in the word (35a). (Roots are shown in boldface in underlying representation; reduplicants are underlined in surface forms.) If, however, the root is vowel-initial and preceded by a consonant-final prefix, the prefix-final consonant reduplicates along with the root-initial vowel (35b). McCarthy & Prince (1995) analyze similar effects in Tagalog and Ineseño Chumash as backcopying, in which material from other affixes fuses into the reduplicant and is then reflected back into the base under pressure of base-reduplicant identity (see section 4.2.4.2). Downing (1998b) and Inkelas & Zoll (2005) offer a different analysis of such cases, proposing that reduplication is infixing. It targets the initial CV of the prosodic root, which consists of all

the segments of the root morpheme plus any segments that are syllabified together with those segments. Prosodic roots are indicated with curly brackets.

(35) a. Prosodic root = Morphological root [E. Kadazan]

/m-pi-ku-{bojo}/	'af-du.rec-aug-obey'	→	mikubobojo
/pog-{**baya**}-an/	'ASS.COL-ignore_someone-RF'	→	pogbabayaan
/{**ruvang**}-o-ko/	'catch_an_illness-UF-YOU'	→	ruruvangoko

b. Prosodic root > Morphological root

/m-pi-si{N-**alud**}/	'AF-DU.REC-N.SER-paddle_a_boat'	→	misingangalud
/so{N-**onggom**}/	'DIM-hold_in_hand'	→	songongonggom

c. Prosodic root < Morphological root

/**i{du}**-an-ku/	'run_away-RF-I'	→	iduduanku
/**in{dad}**-an-po/	'wait-RF-N.COMP.M'	→	indadadanpo

The infixation analysis is motivated most transparently by the data in (35c), in which the reduplicant infixes after the root-initial vowel. As Downing (1998a, 1999b) points out for cases of this kind, this infixation pattern can be accounted for misalignment between morphological root and prosodic root, forced by the requirement that prosodic roots must be consonant-initial.

In Javanese, a case discussed in Inkelas and Zoll (2005), consonantal suffixes 'overcopy' to provide a final coda to a reduplicant which otherwise is co-extensive with the morphological root. Root reduplication, which pluralizes nominals and, roughly, marks attenuation and/or repetition in verbs, is illustrated in (36a). Reduplication normally excludes affixes, as illustrated in (36b) and (36c). However, just in case a consonantal suffix follows a vowel-final root, it is included in the reduplication (36d-f), just as a preceding consonantal prefix may be included if it syllabifies into the root-initial syllable (36e-f)[3]. Data come from Horne 1961, Sumukti 1971, and Dudas 1976:

[3] The behavior of consonantal prefixes is variable; Horne and Dudas present slightly different generalizations about when these prefixes reduplicate with a following root. The segmentation of simple causative *-qake* into bimorphemic *-q-ake*, following Inkelas & Zoll (2005), is based on the existence of two other causatives, the causative imperative *-qnɔ* and causative subjunctive *-qnɛ*, both of which also start with *q*. The segmentation of simple locative *-ni* into bimorphemic *-n-i* is based on the existence of two other locatives, the locative imperative *-(n)ɔnɔ,* and the Locative Subjunctive *-(n)ane*, both of which start with *n*. Inkelas & Zoll propose analyzing *q* and *n* as general causative and locative formatives, respectively. Note also, in (36), the interaction between suffix-triggering vowel alternations and reduplication; this has been discussed in the literature on Javanese reduplication. See e.g. McCarthy & Prince 1995, Inkelas & Zoll 2005. Transcription note: *q* = [ʔ]; *dj* = [ʤ]; *ng* = [ŋ]. *t* and *d* are dental; *ṭ* and *ḍ* are alveolar.

(36)

a.	/medja/	medjɔ + medjɔ	[Javanese]
	‘table’	‘tables’	
b.	/medja-ku/	medja + medja-ku	
	‘table-1SG.POSS’	‘my tables’	
c.	/ḍon-an/	ḍun + ḍun-an	
	‘descend-NML’	‘things which have been taken off or unloaded’	
d.	/uni-an/	unɛ-n + unɛ-n	
	‘sound-NML’	‘noise, saying’	
e.	/tiba-q-ake/	tiba-q + tiba-q-ake	
	‘fall-CAUS-SIMPLE.CAUS’	‘repeatedly drop’	
f.	/ng-ambu-n-i/	ng-ambɔ-n + ng-ambɔ-n-i	
	‘ACTIVE-odor-LOC-SIMPLE.LOC’		

Morphologically sensitive reduplication often privileges the root, but this is not always the case. In the Ineseño dialect of Chumash (an extinct isolate of California), reduplication targets the prosodic stem, which includes the root as well as any prefixes of the ‘cohering’ type that incorporate into the Prosodic Stem. According to Applegate (1972, 1976), reduplication carries a repetitive, distributive, intensive, or continuative force; it appears to take wide semantic scope over the verb. Inkelas & Zoll (2005) analyze Ineseño Chumash much like Eastern Kadazan, with reduplication being a late process that targets the Prosodic Stem. Data in (37a-c) are from Applegate 1976:281-82; (37d) is from Applegate 1972:384. Roots are boldfaced and Prosodic Stems are demarcated with curly brackets in the inputs to reduplication, below; reduplicants are underlined in outputs:

(37)

a.	k-{su-**pše?**}	→ k<u>sup</u>supše?	[Ineseño Chumash]
	1SUBJ-CAUS-to_be_extinguished = ‘I’m putting out a fire’		
b.	k-{su-**towič**}	→ k<u>sut</u>sutowič	
	1SUBJ-CAUS-? = ‘I’m doing it fast’		
c.	s-{pil-**kowon**}	→ s<u>pil</u>pilkowon	
	‘it is spilling’		
d.	k-{xu-ni-**yɨw**} (< /k-xul-ni-**yɨw**/)	→ k<u>xun</u>xuniyɨw	
	1SUBJ-?-TRANS-? = ‘I am looking all over for it’		

In some cases, reduplication copies affixes not just incidentally, as in Ineseño Chumash, but explicitly. The significance of these case is discussed in Inkelas & Zoll 2005. According to Roberts (1987, 1991), to express iterative aspect in Amele (Trans New Guinea, Madang), “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" (Roberts 1991:130-31). Data are from Roberts 1987:252-254 and Roberts 1991:131:

(38)	a.	qu-qu	'hit' (iterative)	[Amele]
		ji-ji	'eat' (iterative)	
		budu-budu-eʔ	'to thud repeatedly'	
		g͡batan-g͡batan-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):

(39)	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'	

The fact that the size of the reduplicants in (38) and (39) varies with the size of the morpheme being reduplicated suggests strongly that this is morpheme doubling, not phonological copying motivated by the need to flesh out an abstract, phonologically skeletal morpheme.

Harley and Leyva (2009) cite an interesting case of internal root reduplication in Hiaki (aka 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 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), in which either 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:

(40) a. ’ònk-’ús ’ò-’onk-’ús ~ ’ònk-’ú-’us ~ ’ò-’onk-’ú-’us [Pima]
salt-tree
‘tamarack’ ‘tamaracks’

b. bàn-nód:adag bà-ban-nód:adag ~ bàn-nond:adag ~ bà-ban-nond:adag
coyote-plant.type
‘peyote’ ‘peyote (pl.)’

This case can be instructively compared with the examples of Boumaa Fijian (39), in which both elements of an affixed stem must reduplicate, and of Hiaki complex verb reduplication, in which reduplication of either member of a compound is also possible, but where the variation correlates tightly with meaning. The three-way comparison shows both that morphemes, or morphological subconstituents, can be the direct target of reduplication processes whose contribution to the syntax and semantics of the word are seemingly unrelated to the meaning of the actual morpheme whose phonological material is reduplicated.

4.2.2. Phrasal reduplication

Reduplication is normally characterized as a word-bounded process. It performs derivational or inflectional functions; it can be interspersed among other clearly lexical layers of morphology; it operates on lexical inputs (roots, stems, words). It is normally studied in a morphology, if not a phonology, class, and appears as a standard entry in morphology 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. For example, Emeneau (1955) reports that ‘echo’ reduplication in Kolami (section 4.6.2.3) can apply not only to words but also to phrases: *meˈkel toˈtev* ‘goat not’ → *meˈkel toˈtev - giˈkel toˈtev* ‘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] [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):

(41) 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'

Another 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), and cited by Inkelas & Zoll (2005) in support of the Morphological Doubling approach to reduplication, Fongbe verb doubling occurs in four syntactic constructions: temporal adverbials (42a), causal adverbials (42b), factives (42c) and predicate clefts (42d). 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:

(42) a. **sísɔ́ ~ sí** Kɔ́kú **sísɔ́** tlóló bɔ̀ xèsí ɖ̀ì 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 xèsí ɖ̀ì Bàyí
tremble Koku **tremble** cause fear get Bayi
'Because Koku trembled, Bayi got frightened'

c. **sísɔ́ ~ sí** ɖé-è Bàyí **sísɔ́** ɔ́, vɛ́ nú mi
tremble OP-RES Bayi **tremble**, DEF bother for me
'The fact that Bayi trembled bothered me'

d. **sísɔ́ ~ sí** wɛ̀, Kɔ́kú **sísɔ́**
tremble it.is Koku **tremble**
'It is tremble that Koku did'

4.6. The morphology of reduplication

Many modular theories of morphology, including A-morphous morphology (Anderson 1992) and Distributed Morphology (Halle and Marantz 1993), segregate affixation, compounding, and morphophonology in different components of the grammar. In such theories, reduplication would lay claim to all three components. Reduplication sometimes resembles affixation (see e.g. Marantz 1982), at other times morphophonology, and at other times compounding in its form and integration with other morphological processes. These different faces of reduplication have motivated two basic theoretical models: phonological copying (Marantz 1982; McCarthy & Prince 1986, 1995; Steriade 1988; Raimy 2000) and morphological doubling (Singh 2005, Inkelas & Zoll 2005). Phonological copying theories typically treat reduplication as the affixation of a segmentally null morpheme which must be fleshed out through the process of phonological copying of segments from the base of affixation. Morphological Doubling theory,

by contrast, treats reduplication as the insertion of two identical or semantically equivalent morphological constituents.

Both types of approach are descriptively rich enough that each has been fruitfully extended to virtually all types of reduplication. However, the two approaches do make different predictions in some key areas. In this section we focus on the morphology of reduplication, which will allow us to draw attention to some phenomena for which Morphological Doubling theory provides a natural account. In section 4.2, which focuses on the phonology of reduplication, we will focus on phenomena for which phonological copying theories are particularly suited.

From a morphological point of view, the prototypical example of reduplication is as a stand-alone morphological process which serves as the sole marker of a morphological category. This description fits the Warlpiri, Indonesian, Acehnese, Lusaamia, Nadrogā, Banoni, Ulithian, and Tarok examples discussed in the previous sections. In this section we will focus on reduplication patterns which depart from this canonical morphological character. We begin with cases in which reduplication is a concomitant of other morphological processes (section 4.1.1), and then move on to cases in which reduplication patterns more like compounding in that the reduplicant and base have distinct lexical bases (section 4.6.2.1) or in that the reduplicant is morphologically internally complex (sections 4.6.2.2, 4.6.2.3).

4.1.1. Reduplication as concomitant of affixation

Both full and partial reduplication are commonly found as part of a complex morphological construction which also features ordinary affixation. Such cases are of considerable interest to morphologists, as they disrupt the idealized one-to-one mapping between meaning and form (see e.g. Anderson 1992, ch. 3). In Roviana (Oceanic), for example, the derivation of instrumental or locational nouns from verbs is marked simultaneously by total reduplication and the nominalizing suffix *-ana; ha^{m}bo* 'sit' ~ *ha^{m}bo-ha^{m}botu-ana* 'chair', *hake* 'perch' ~ *hake-hake-ana* 'chair', *hale* 'climb' ~ *hale-hale-ana* 'steps, stairs'. (Corston-Oliver 2002:469, 472). The reduplication co-occurring with *-ana* serves no distinct semantic function of its own. In Hausa (West Chadic), one class of nouns forms its plurals via CVC reduplication and suffixation of *-i:,* as in *gútsúrè:* 'small fragment', *gútsàttsárí: (< gútsàr-tsár-í:), gáɗàm* 'dispute, argument, *gáɗàndámí (<gáɗàm-dám-í*) (Newman 2000:451).

In Nitinaht (Southern Wakashan), about 40 suffixes trigger reduplication on the stems they attach to (Stonham 1994). For example, the 'resemble' suffix triggers CV root reduplication:

(43) a. ƛ’ic- ‘white’ [Nitinaht]
ƛ’ic-ak ‘white-DUR’ = ‘whiteness’
ƛ’i-ƛ’ic-ak’uk ‘RED-white-resembles’ = ‘flour’
b. tu:χ- ‘scare’
tu:χ-apt ‘scare-plant’ = ‘Spruce var.’
tu:-tu:χ-ubq-ak’uk ‘RED-scare-plant-resembles’ = ‘looks like a spruce tree (= juniper-leafed hair moss)’
c. pi:la:q ‘liver’
pi:-pi:la:q-k’uk ‘RED-liver-resembles’ = ‘resembles liver (= yellow pond lily)’

In cases like these, reduplication can potentially be viewed as a morphophonological accompaniment to affixation, much like ablaut or other morphophonemic alternations which commonly apply to bases of affixation. Alternatively, reduplication that accompanies affixation can be analyzed in terms of what Aronoff (1994) and Blevins (2003) term ‘morphomic stems’, i.e. semantically empty stem-forming constructions producing stems that certain affixes select for; this is the approach taken by Inkelas & Zoll (2005), who analyze reduplication in the examples above as a semantically empty morphological process whose purpose is to form stems of a particular type. (For an overview of morphological types in the lexicon, see e.g. Riehemann 1998.) In Nitinaht, for example, the ‘resembles’ suffix selects for stem of the type formed by CV reduplication. Supporting evidence for a stem type analysis is that, as observed by Stonham, if two co-occurring suffixes both select for a reduplicated stem type, reduplication occurs only once (Stonham 1993:49). Reduplication converts a root to a stem of the appropriate type, to which both affixes attach. This is true, however, only if the suffixes also create stems of that same morphological type. Stonham posits two morphological levels, or stem types, in Nitinaht. Reduplication can occur twice if triggered by affixes in both levels (p. 59).

4.2.2. Morphologically independent reduplicants

In section 4.1.1 we saw examples in which reduplication departs morphologically from canonical affixation in being an apparently semantically empty concomitant of an otherwise straightforward affixation process. In this section we look at another way in which reduplicant can depart from canonical affixation: reduplicants can consist of, or contain, morphemes not found in the apparent ‘base’ of reduplication. We will look first at reduplication in which the reduplicant and base are synonyms or allomorphs of each other (section 4.6.2.1) and then at cases in which the reduplicant is morphologically complex and contains morphemes that the base does not (sections 4.6.2.2, 4.6.2.3). These examples tend to support the point of view that

reduplication can consist of morphological doubling (Inkelas and Zoll 2005), instead of (or in addition to) phonological copying.

4.6.2.1. Synonym reduplication

Sye (Oceanic) reduplication illustrates the potential morphological independence of the two copies in reduplication. Here we build on the discussion in Inkelas & Zoll (2005), which is in turn based closely on the description and analysis of Crowley 1998, 2002. In Sye, most verb roots have two different forms, termed here for convenience Stem1 and Stem2. Examples can be seen in (44a). Many Stem1-Stem2 pairs exhibit a relatively transparent relationship, e.g. *aruvo ~ naruvo* 'sing', *owi ~ nowi* 'plant' (Crowley 1998:81). In other cases, the relationship is opaque enough to motivate treating the allomorphy as suppletive. Examples include *owi ~ awi* 'leave', *ovoli ~ aompoli* 'turn it', *velom ~ ampelom (*singular imperative only*)/elom* 'come'. Crowley likens such pairs to 'strong verb alternations in Germanic languages' (Crowley 1998:82)[4]. Each affixation construction selects for one of the two stem shapes. (44b) 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 reduplication in morphological contexts calling for Stem1 yields two copies of Stem1, whereas reduplication in prefixing contexts that call for Stem2 surfaces as Stem2-Stem1. It is cases of this latter kind, illustrated in (44c), that support the idea that reduplication is selecting the same lexeme twice, rather than selecting it once and phonologically copying the segments of that allomorph. Data come from Crowley 1998:79, 84; 2002:704:

(44) a.

Stem	Stem2	gloss
arinova	narinova	'provoke'
omol	amol	'fall'

[Sye]

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'

[4]Building on the correspondences between stem alternants elucidated by Crowley (1982:81-84), Frampton (2009) argues in favor of deriving the allomorphy using a combination of an *an-* prefix, which has two suppletive allomorphs of its own, and a number of lexically conditioned readjustment rules. The question of when to recognize allomorphy as suppletive and when to attribute it to phonology is notoriously difficult. The approach taken here is to treat allomorphy as suppletive unless the alternations that would derive it generalize beyond the morphemes in question; by that criterion, this allomorphy counts as suppletive.

Another case of reduplication involving different allomorphs of the same morpheme occurs in Chechen (Nakh-Dagestanian, Nakh) which uses reduplication as one means of satisfying the syntactic requirements of a second position clitic (Conathan & Good 2000; see also Peterson 2001 and Good 2006 on the closely related language Ingush). As shown in 0, from Conathan & Good (2000:50), chained clauses are marked by an enclitic particle *'a* (= IPA [ʔa]), which immediately precedes the inflected, phrase-final, main verb. The enclitic must be preceded by another element in the same clause. Two types of constituent may occur before the verb (and enclitic particle) in the clause: an object (45a), or a deictic proclitic or preverb (45b). If neither of these elements is present, then the obligatory pre-clitic position is filled by reduplicating the verb (45c).[5]

(45) 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. Aħmada, [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. Aħmad, [**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 occurs in 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. *Iwo* '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 (e.g. *Dagha 'a Duedu*, based on 'go').

Inkelas and Zoll (2005) draw a connection between the Chechen and Sye cases, on the one hand, and synonym compounding constructions of the sort discussed by Singh (1982), on the other hand. For example, 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'. Data are from Singh 2005:271:

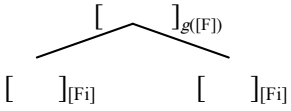
[5] Note on practical orthography used here: right apostrophe = [ʔ]; 'c' = [ts]; 'ch' = [ʧ]; 'sh' = [ʃ]; 'zh' = [ʒ]; 'gh' = [ɣ], 'kh' = [χ]. In glosses and verbs cited in isolation, 'B' (45a) and 'D' ((45b) and subsequent text) refer to gender. Chechen has four noun genders; many verbs take gender prefixes which agree with the gender of the absolutive argument.

(46)

a.	tan	badan	tan-badan	[Hindi]
	‘body’ [+native]	‘body’ [-native]	‘body, etc.’	
b.	vivaah	shaadi	vivaah-shaadi	
	‘marriage’ [+native]	‘marriage’ [-native]	‘marriage, etc.’	

Building on a related proposal by Singh (2005), Inkelas & Zoll (2005) use constructions such as these to advocate for Morphological Doubling Theory, in which reduplication is modeled by a construction which calls for two semantically and syntactically equivalent subconstituents. In 0a), the daughter nodes bear the same features, thus are synonymous. The meaning of the construction as a whole is some function of the meaning of the daughters; that function could be any of the functions associated cross-linguistically with reduplication (see section 4.1).

(47) A morphological doubling schema in Morphological Doubling Theory (Inkelas & Zoll 2005)



Because the equivalence between the daughters in (47) is defined over the features that the daughters independently expone ($[F_i]$), morphological doubling could result either in the exact same morpheme(s) being used twice (48a), as in Warlpiri pluralizing total reduplication, or in the co-occurrence of different suppletive allomorphs or distinct but synonymous lexical items (48b), as in the Hindi ‘et cetera’ construction:

(48) a. Total reduplication construction in Warlpiri, in Morphological Doubling Theory

b. Synonym compounding in Hindi

Singh (2005) and Inkelas & Zoll (2005) observe that once total reduplication and synonym constructions are connected under one morphological analysis of synonym compounding, it also becomes possible in the same formal model to relate both 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 which juxtaposes words of opposite meaning to yield a word whose meaning encompasses both:

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

Insofar as these constructions resemble, in their behavior, total reduplication or synonym compounding, extending the schemas in (48) to them is a useful ability. In the case of Acehnese, all three constructions — reduplication, synonym compounding, and antonym compounding — have the same stress pattern, a generalization which can be captured in an inheritance hierarchy in which all three similar constructions inherit the same cophonology.

4.6.2.2. Morphologically complex reduplicants

Moving beyond synonym compounding, a different type of morphological independence between the two copies in reduplication is demonstrated by reduplicants which are morphologically complex, composed of elements not all of which are found in the apparent base of reduplication.

One way in which this can happen is when reduplicants contain semantically empty 'filler' morphs. These have been the focus of several studies of Bantu reduplication by Downing (1998ab, 1999ab, 2000, 2006) and Hyman (Mutaka & Hyman 1990; Hyman & Mtenje 1999; Hyman, Inkelas & Sibanda 2009), among others. The phenomenon in question is illustrated by the data in (50) from Ndebele (S.44, Zimbabwe; Sibanda 2004, Hyman, Inkelas & Sibanda 2009). As discussed earlier in section 4.5 (see example (32)), 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 (50). When the verb root itself is two syllables or longer, as in (50a), 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 (50b). But reduplication cannot copy inflectional suffixes. When the derivational stem (root plus derivational suffixes) is only monosyllabic, as in (50c), the reduplicant recruits semantically empty *-a* to flesh out its obligatory disyllabic shape.[6] The suffix *-a* occurs on verb stems when one of the more contentful inflectional endings (e.g. subjunctive *-e* or perfective *-ile*) is absent; it is the default filler of the obligatory inflectional suffix position. Because it 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.

(50)

		stem	reduplicated stem [Ndebele]
a.	'INF-taste-FV'	(uku-)nambith-a	(uku-)nambi + nambith-a
	'INF-appear-FV'	(uku-)bonakel-a	(uku-)bona + 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-)lim-a + lim-a
	'INF-cultivate-SUBJ'	(uku-)lim-e	(uku-)lim-**a** + lim-e
	'INF-cultivate-PERF'	(uku-)lim-ile	(uku-)lim-**a** + lim-ile
	'INF-send SUBJ' (uku-)thum-e		(uku-)thum-**a** + thum-e
	'INF-send-PERF' (uku-)thum-ile		(uku-)thum-**a** + thum-ile

Downing (2006) characterizes the morphologically complex reduplicants of Ndebele and several other Bantu languages as 'canonical stems'. The canonical verb stem in Bantu ends in the final vowel *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.

4.6.2.3. Echo reduplication and other types of morphologically fixed segmentism

'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. Familiar English examples include the ironic or pejorative Yiddish-derived *fancy-schmancy, resolutions-schmesolutions*, in

[6] Hyman, Inkelas & Sibanda 2009 discuss a second empty morph, *yi*, which is used to augment reduplicants of stems formed from consonantal roots such as /dl-/ 'eat'. When reduplicated, stems like [dl-e] 'eat-SUBJUNCTIVE' or [dl-ile] 'eat-PERFECTIVE' recruit both *-a* and *yi* to the cause of reduplicant disyllabism, thus *dl-a-yi- + dl-e* or *dl-a-yi + dl-ile*. The facts in (50b) are more complex than reported here; see Hyman et al. 2009. Note also that all of the forms in (50) are provided in the infinitive, prefixed with *uku-*. However, the infinitive prefix is outside the scope of reduplication and can be ignored; for this reason it is parenthesized in the data in (50).

which the fixed substring [ʃm] stands in as the onset of the copy, replacing any existing initial consonant(s). Kolami (Central Dravidian) has an 'et cetera' construction, exemplified by *maasur* 'men' → *maasur-giisur* 'men and the like' or *kota* 'bring it!' → *kota-gita* 'bring it if you want to' (Emeneau 1955), in which *gi* stands in for the initial (C)V of the copy.

Alderete (et al.) analyze the fixed material in echo reduplication as an affix which merges with the reduplicant into a constituent whose prosodic shape is determined by the reduplication construction; in most examples cited, this shape is determined by the base, since most examples involve total reduplication. The affix — *shm-* in English, *gi-* in Kolami — often supplements segmental material that would otherwise be expected to be copied, giving rise to the term 'Melodic Overwriting' for the replacive affix found in echo reduplication (e.g. Yip 1992, McCarthy & Prince 1996). In possessing an affix that the base lacks, reduplicants in Melodic Overwriting situations pattern with examples like Ndebele in which the reduplicant is morphologically complex, independently of the base.

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 1988, Vaux 1998). Turkish has a well-known 'et cetera' construction involving *m-: ağaç* 'tree' → *ağaç-mağaç* 'trees and suchlike', *dergi* 'journal' → *dergi-mergi* 'journals and suchlike' (Lewis 1967:237); a parallel construction is found in Armenian (*pətuʁ* 'fruit' → *pətuʁ-mətuʁ*; Vaux 1998:246) and Abkhaz (*gaʒá-k'* 'fool' → *gaʒák'-maʒák';* Vaux 1996, cited in Inkelas & Zoll 2005).

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), invoking an anti-homophony constraint, 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, vwazul* 'red' → *vwazul pwazul* (Koul 2008). 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.

In habitual-repetitive total reduplication in Javanese (Western Malayo-Polynesian, Sundic), the two copies in reduplication must differ in the quality of their last vowel (Yip 1992, 1998). The basic pattern is for the last vowel in the first copy to be replaced with [a]: *eliŋ* 'remember' → *elaŋ-eliŋ* 'remember (habitual/repetitive)', *tuku* 'buy' → *tuka-tuku* 'buy (habitual/repetitive)'. If, however, that vowel would have been [a] anyway, then the last vowel in the second copy is replaced with [e]: *udan* 'rain' → *udan-uden* 'rain (habitual/repetitive)', *kumat* 'have a relapse' → *kumat-kumet* 'have a relapse (habitual/repetitive)'.

Analyzing echo reduplication as affixation, following Alderete et al. (1999), may not appear to cover cases like Javanese, in which the modification to the 'echo' is not a segmentable affix. However, the insight that the 'echo' in echo reduplication is morphologically complex still survives as long as one acknowledges the role of realizational processes like ablaut, mutation, and other phonological modifications in instantiating morphological constructions.

Some echo reduplication constructions ensure anti-homophony in a brute-force method, modifying *both* copies but in distinct ways, as in the following data from Hua (Trans New Guinea, Eastern Highlands; Haiman 1980:126):

(51)	kveki	'crumple'	kveku kveke hu	'crumple'	[Hua]
	ebsgi	'twist'	ebsgu ebsge hu	'twist and turn'	
	ftgegi	'coil'	ftgegu ftgege hu	'all coiled up'	
	ha-vari	'grow tall'	ha-varu ha-vare hu	'grow up'	

While it might not be termed 'echo' reduplication, the third logical subtype of reduplication + modification also exists, namely cases in which both copies are modified, but in the same way. This occurs in Siroi (Trans-New Guinea), where, like Javanese, Melodic Overwriting is internal. The medial consonant of the input stem is modified to [g] in both copies (Wells 1979:37):

(52)						
	a.	tango	maye	→	tango mage-mage	[Siroi]
		'man'	'good'			
		'a mature man'			'mature men'	
	b.	tango	su**ng**o	→	tango su**g**o-su**g**o	
		'man'	'big'			
		'a ruler'			'rulers'	
	c.	tango	kuen	→	tango ku**g**en-ku**g**en	
		'man'	'tall'			
		'a tall man'			'tall men'	

Reduplication with Melodic Overwriting, including echo reduplication, is much more common in total reduplication than it is in partial reduplication; it is hard to find examples of partial echo reduplication that are comparable to the clear total reduplication cases in Kannada, Hindi, Kashmiri, Turkish, Javanese, and Siroi.

One clear case is documented in child language. As discussed in Inkelas (2003), between the ages of 2:5 and 4;6, child J, acquiring English, invented a language game involving reduplication. While the game evolved over time, in its first phase, the reduplicant was a disyllabic foot whose initial consonant was replaced with *b*: *towel-bowel, Minnesota-bota, stegosaurus-baurus, engineer-beer, helicopter-bopter*. For words whose reduplicated portion would already begin with *b*, J substituted *p* in its place: *ball-pall, Alabama-pama, alphabet-pet*. This pattern is very similar to that in Kannada, etc., except for being partial reduplication. However, clear cases like this are not easy to find in adult language.

Another pattern of partial reduplication and Melodic Overwriting that is clearly attested in adult language is attested in a number of languages in the Micro-Altaic group (including Turkic, Mongolic and Tungusic; see e.g.), as well as in various dialects of Armenian (Vaux 1998). The process in question intensifies adjectives and is marked by a preposed reduplicative syllable whose onset and nucleus are copied from the base but whose coda consonant is drawn from a small fixed set of consonants. Data from the Arabkir dialect of Armenian and from Oroqen (Tungusic) are shown in (53). In Oroqen, in which the process only applies to color terms, the reduplicant copies a stem coda if there is one (53a), and otherwise inserts the fixed segment [b] (53b) (Li & Whaley 2000:356). In Armenian, where a greater semantic range of adjectives participate, the reduplicant coda is [s] (53c) except before coronals, in which case it switches to [p^h] (53d) (Vaux 1998:243):

(53)	a.	‘white’	bagdarın	bag-bagdarın	‘very white, white as snow’	[Oroqen]
	b.	‘yellow’	ʃiŋarın	ʃib-ʃinarın	‘very yellow, golden yellow’	
		‘black’	kara	kab-kara	‘glossy black, very dark’	
		c.	‘red’	karmir	kas-karmir	[Arabkir Armenian]
		‘empty’	parap	pas-parap		
		‘violet’	moːr	moːs-moːr		
	b.	‘black’	sev	sep^h-sev		
		‘yellow’	deʁin	dep^h-deʁin		

These cases aside, partial reduplication with fixed segmentism of the Melodic Overwriting type has not frequently been described. There are at least two plausible reasons why Melodic Overwriting in general, and echo reduplication in particular, are more common in total reduplication than in partial reduplication. One is the role of anti-homophony considerations. To the extent that anti-homophony is a motivating factor in the morphological

modification of one of the two copies, this asymmetry makes sense: partial reduplication intrinsically differentiates base and reduplicant, in most cases, removing the functional motivation for further modification.

Another reason that Melodic Ovewriting has not been documented as often as an accompinament to partial reduplication as it has for total reduplication is that there is an alternative analysis for many of the apparent partial reduplication cases. In Yoruba, for example, gerundive reduplication is marked with a CV prefix whose consonant is reduplicative but whose vowel is fixed as [í]: *gb͡óná → gb͡í-gb͡óná, wɔ̀ → wí-wɔ*, etc. (see discussion of Yoruba around example (13)). This effect could be analyzed as partial reduplication with Melodic Overwriting by [í], but, as argued in Alderete et al. (1999), could also be analyzed as CV reduplication with reduction of the reduplicant vowel. This type of analysis, involving phonological copying and phonological reduction, is discussed in section 4.2.4.2.2, in the context of Base-Reduplicant Correspondence Theory.

Alternatively, the consonant copy which takes place in Yoruba Cí prefixation could be treated as epenthesis and assimilation, both independently motivated phonological phenomena which occur in nonreduplicative contexts; looked at from this angle, Yoruba might not be classified as reduplication proper at all. This is the approach Kim takes to a similar duplication phenomenon in the San Francisco del Mar dialect of Huave (isolate; Oaxaca, Mexico). As shown in (54a-c), the 1st person suffix, which surfaces in these data as a copy vowel followed by [s], copies the preceding stem vowel exactly, just as long as the palatality of the final stem vowel agrees with the frontness/backness of that vowel (Kim 2008:144 ff.). If the conditions for vowel assimilation are not met, the vowel assimilates only to the preceding consonant, surfacing as as [i] after a palatal or [a] after a plain consonant (54d-e).

(54)	a.	/t-a-mongbk-Vs/	→	t-a-mong-os	[San Francisco del Mar Huave]
		CP-TV-pass-1		‘I passed by’	
	b.	/a-xum^{bk}-Vj/	→	a-xum-**u**j	
		TV-find-3PL		‘they find (it)’	
	c.	/t-a-j.chik^{pal}-Vs/	→	t-a-j.chik-**i**s	(→ [tachikius] due to later rule)
		CP-TV-jump-1		‘I jumped’	
	d.	/t-a-j.mik^{bk}-Vs/	→	t-a-j.mik-**a**s	(→ [tamikas] due to later rule)
		CP-TV-descend-1		‘I came down’	
	e.	/t-a-long^{pal}-Vs/	→	t-a-long-is	(→ [talongius] due to later rule)
		CP-TV-hang-1		‘I hung (it)’	

Kim (2008) analyzes the copy vowel as epenthetic (p. 144 ff.), and attributes its copy properties entirely to phonological assimilation; there is no need to formally classify the suffix as reduplicative, or invoke any special reduplicative apparatus, in this analysis.

In conclusion, fixed segmentism in reduplication is widespread. It can have its source in an affix which co-occurs with and supplants reduplicative material, a phenomenon that occurs commonly in total reduplication, or it can have its source in phonological reduction, which occurs commonly in partial reduplication. Fixed segmentism can also co-occur with phonological assimilation, giving the appearance of reduplication; whether such cases should be classified with other, more clearly morphologically reduplicative constructions remains an open question.

4.7. Conclusion

Reduplication has been and is likely to continue to be a phenomenon of enduring interest to morphologists and phonologists alike. It has a unique capacity to shed light on the internal structure of words, and it is a constant thorn in the side of reductionist theories which try to lump morphology with phonology or to lump morphology with syntax. It is innovated readily in creoles and in the course of first language acquisition, and it is easily spread from one language to another. Of all of the elements in language games, reduplication is arguably the one that occurs most often in ordinary grammar as well. Reduplication is at the same time commonplace, occurring in virtually every language, and mysterious; its historical trajectory remains elusive. The study of reduplication has burgeoned in the last thirty years and is by no means exhausted; future decades are likely to turn up new typological discoveries as well as historical and psycholinguistic revelations about the nature of reduplication.