THE PHONOLOGY OF CONSONANTS
HARMONY, DISSIMILATION, AND CORRESPONDENCE

X *Appendices*

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X.1 Introduction and contents of this document

This online appendix consists of several pieces:

- 'Dissimbase': a database of reported and potential dissimilation cases identified through the typological survey featured in chapter 9
- a typological supplement, which explores specific cases key to establishing the empirical basis for the typology analyzed in chapter 9
- a blocking supplement, which considers additional reported cases of segmental blocking in dissimilation beyond the languages considered in chapter 8
- a bibliography of sources referenced in the Dissimbase list

The database of dissimilation cases and the bibliography are separate files, and can be downloaded from the book's 'Resources' page in the Cambridge online catalogue. What

follows in this document is a brief guide to assist in interpreting the database (§X.2), the typology supplement (§X.3), and the blocking supplement (§X.4).

X.2 Guide to the Dissimbase list of dissimilation cases

X.2.1 Structure of the list

The Dissimbase is divided into two groups, separated out into two pages in the accompanying spreadsheet. The first group are the cases considered in the survey proper: patterns that are judged to potentially reflect genuine cases of long-distance consonant-to-consonant dissimilation phenomena. The second group, found on the second page of the spreadsheet, is a list of known cases excluded from the survey. This exclusion may be for a variety of reasons. Some of the reported patterns are not genuinely dissimilatory in nature; others are, but hold only between adjacent segments, not over distance. Some reported patterns appear to be sporadic and not generalizable; still others seem spurious, in that they are not borne out in the available data. For additional details on the methodology and the basis for including or excluding specific cases, consult §9.2.3 in chapter 9 of the book.

X.2.2 Summary of categories coded in the survey database

Language	Language name (and variety or alternate name)
Family	Family (and sub-group); sourced mainly from Ethnologue
Dissimilation type	The general feature or property changed by dissimilation
Manifestation	The manifestation of dissimilation, in terms of 5 categories: Alternations Limited alternations Similarity avoidance effects (e.g. blocking in allomorphy) MSC (non-gradient similarity avoidance in the lexicon) Diachronic changes Question marks denote uncertainty about the robustness of that categorization.
Description of pattern	A short summary of the basic generalization. Capital letters are used to represent classes of segments, e.g. B for labials, Q for uvulars, V for vowels, C for consonants, L for liquids, Ħ for pharyngeals/gutturals, etc. C^h and C’ represent aspirates and ejectives, respectively. - marks morpheme boundaries ... represents some distance greater than transvocalic / is used in SPE fashion to indicate environments for a change

Segments involved	The segments relevant for the pattern in the language in question. This includes segments that undergo dissimilation, and those that induce dissimilation, as well as segments that are involved in other ways (such as blocking segments). Involved segments are generally listed in the following order: 1) segments that undergo dissimilation 2) the result of dissimilation 3) other segments that participate (by causing or blocking dissimilation)
Remarks	Other remarks, including notes on directionality, productivity, and in some cases examples taken from the sources cited.
References	References where further details of each pattern can be found. These are non-exhaustive lists.

X.2.3 Key to abbreviations used in the database descriptions

RtoL	Right-to-Left directionality (left C dissimilates, right C faithful)
LtoR	Left-to-Right directionality (left C dissimilates, right C faithful)
Bidirectional	Dissimilation can be left-to-right *or* right-to-left
pfx	prefix
sfx	suffix
rt	root
infx	infix
sylladj	syllable-adjacent: holding for two consonants in adjacent syllables
segadj	segment-adjacent: two directly adjacent consonants

X.3 Typology supplement: details of the typology of dissimilating features (appendix to chapter 9)

This section presents the empirical support for the typology summarized in chapter 9. The features are organized into groups in the same way as in the table in (14) in §9.3.1. The purpose of this supplement is not to present full analyses of these cases, but rather to document the facts that support the conclusions about the typology of dissimilation that are addressed in chapter 9, with particular focus on those features for which dissimilation is not clearly attested. A full list of dissimilation cases encountered in the typological survey can be found in the accompanying spreadsheet.

X.3.1 Major Place features

X.3.1.1 Labial

This section covers dissimilation where primarily labial consonants dissimilate to non-labial ones; dissimilation of [Labial] as a secondary feature (e.g. dissimilation of labialization) is discussed in §X.3.4.1.

Labial dissimilation is very robustly attested. Languages with active dissimilation of [Labial] include: Akkadian (Suzuki 1998, Hume 1994); various southern Bantu languages (Doke 1954) such as Ndebele (Sibanda 2004), SiSwati (Chen and Malambe 1998, Malambe 2006), and Xhosa (Vondrasek 2001, Bennett & Braver 2014), and Zulu (see chapter 7); various Berber languages, including Ayt Ndhir Tamazight (Penchoen 1972), Imdlawn Tashlhiyt (Elmedlaoui 1995a, 1995b; Lahrouchi 2005), and Tamashek Tuareg (Heath 2005); and numerous Austronesian languages (Zuraw and Lu 2009). Additional marginal cases of labial dissimilation are reported for Kabyle Berber (Lahrouchi 2005), Kukú (Cohen 2000), Phuthi (Donnelly 2007), and Southern Min (Xiamen and other Min nan) Chinese (Lien 1998), though these cases have no consistent synchronic alternations.)

The outcome of labial dissimilation may be the most similar coronal alternative (e.g. [m]~[n] in Akkadian), but this is not the only possibility: in Tahitian, dissimilation produces a glottal ([f]~[h]); in Zulu the result is an (alveo)-palatal (i.e. [pʼ]~[tʃʼ], and in Acehnese it is a sibilant ([p]~[s̪]).

Two examples of labial dissimilation patterns in unrelated languages are noted below as examples. Details of other cases can be found in the database of dissimilation cases.

X.3.1.1.1 Acehnese

Acehnese (Durie 1985) exhibits labial dissimilation, with visible alternations in affixes. Acehnese has a causative prefix /pɯ-/; this morpheme clearly has an underlying labial /p/ (1a-b), but it surfaces with [s̪][1] instead when the root has an initial labial consonant (1c-d).

[1] Durie (1985:12) describes this sound as 'a laminal alveo-dental fricative with a wide channel area', and says that there is no satisfactory IPA symbol.

(1) Acehnese labial dissimilation in causative prefix /pɯ-/ (Durie 1985:33)

a. [pɯ-nan] 'to name'
b. [pɯ-saka] 'to sugar'

c. [s̪ɯ-mũʔɛ̃n] 'to amuse, entertain'
d. [s̪ɯ-baro] 'to renew'

Dissimilation of labials to [s̪] can also be seen with the intransitive verbalizing affix /ɯm-/. In bisyllabic roots, as long as the initial consonant is not a sonorant or [b], this morpheme appears as [=ɯm=], and is infixed after the root-initial consonant (2a-b)[2]. When this infix follows a root-initial /p/, the /p/ dissimilates to [s̪], as shown in (2c-d) (examples from Durie 1985:33-35).

(2) Acehnese: labial dissimilation with intransitive verbalizer infix /ɯm-/

a. [c=ɯm=atɔʔ] 'to hoe, intr.'
b. [t=ɯm=ulak] 'to push, intr.'

c. [s̪=ɯm=ɯprɛh] 'to wait, intr.' (</p-ɯm-ɯprɛh/)
d. [s̪=ɯm=ãɟoh] 'to eat, intr.' (</p-ɯm-aɟoh/)

Durie notes two particular limitations on this labial~[s̪] alternation: first, it happens only in verbs, never in nominal stems. Second, it is apparently restricted to trisyllabic stems: attaching the /pɯ-/ prefix to monosyllabic roots does not produce the dissimilation. These limitations are illustrated by the examples in (3a) and (3b), respectively, where dissimilation does not occur (cf. (2) above).

(3) Acehnese: limits on labial dissimilation (Durie 1985:33)

a. /pɯ-batɛᵊ/ → [pɯ-batɛᵊ] 'to stone' (< /batɛᵊ/ 'stone (n.)'; no dissim.)
b. /pɯ-blɔᵊ/ → [pɯ-blɔᵊ] 'to sell' (cf. *[s̪ɯ-blɔᵊ]; no dissimilation)

Durie (1985:33) also reports that labials are realized as [s̪] when an /n/ or /l/ intervenes between them. This situation arises consistently due to a nominalizing affix /ɯn-/, which (like other VC prefixes in Acehnese) is infixed after root-initial consonants. Some examples are given in (4):

(4) Acehnese: labial dissimilation with nominalizer affix /ɯn-/ (Durie 1985:33)

a. [s̪=ɯn=ɯ̃poh] 'beating' (</p-ɯn-ɯpɔh/; /p...p/→ [s̪...p])
b. [s̪=ɯn=ɯ̃blɔᵊ] 'thing bought' (</b-ɯn-ɯblɔᵊ/; /b...b/→ [s̪...m])
c. [s̪=ɯn=ɯ̃mɛ̃] 'thing brought' (</m-ɯn-ɯmɛ̃/; /m...m/→ [s̪...m])

Durie (1985:34) also points out that the same thing is observed as a historical change, even with no infixation, as illustrated by the examples in (5).

[2] When the root is trisyllabic and/or starts with a sonorant or [b], the intransitive verbalizer /ɯm-/ appears as a prefix [mɯ-], as in [mɯ-nari] 'to dance'.

(5) Acehnese: historical dissimilation – Bv{l,n}vB → Sv{l,n}vB (Durie 1985:34)

a.	sɯlumpɯk	'protecting flap on banana flower'	(other dialects: *pɯlumpɯk*)
b.	sɯlimɛŋ	'fruit (type)'	(cf. Malay *blimbing*)

Acehnese labial dissimilation has many intriguing nuances that I will not attempt to analyze in full here, but it illustrates clearly that dissimilation of [Labial] can involve incidental changes to other features as 'overkill'. In cases like (4c), where /m...m/ maps to [s̪...m], dissimilation involves changing not only [Labial], but also [±continuant], [±nasal], [±sonorant] (and, depending on representational assumptions, possibly also [±voice], [±strident], and [±anterior]). Nonetheless, it is clear that only [Labial] (and perhaps [–continuant]) are crucially involved in triggering the pattern, since these are the only shared features in forms like (2c), where the interaction is between [m] and [p].

X.3.1.1.2 Southern Bantu Labial Palatalization

Labial dissimilation is found in Zulu (see chapter 7), where it manifests as palatalization of labials before the labial glide [w]. Many related Southern Bantu languages also have cognates of this pattern (see references in chapter 7). Other languages where the labial palatalization is a long-distance effect include Ndebele (Sibanda 2004), SiSwati (Chen and Malambe 1998, Malambe 2006), and Xhosa (Vondrasek 2001). Many other southern Bantu languages also have cognates of the same labial palatalization phenomenon analyzed in Zulu, but without the long-distance character: see, for example, Ikalanga, in the list of excluded cases.

X.3.1.2 Coronal

Dissimilation of [Coronal] is moderately attested. This type of dissimilation manifests with observable alternations in Colombian Spanish (de Ramirez 1996), Ni'ihau Hawaiian (Blust 2004), Tahitian (Blust 2004), and Takelma (Goodman 1992). Akan (McCarthy and Prince 1995/1999) also exhibits [Coronal] dissimilation in the form of blocking effects. All of these cases are discussed below in further detail. (Segment-adjacent dissimilation of [Coronal] has also been reported in Dakota (Shaw 1980, 1985; Fukazawa 1999), and Obispeño Chumash (Klar 1977), though both of these are marginal cases.)

X.3.1.2.1 Akan

In Akan, [Coronal] dissimilation is observed as a blocking effect (McCarthy and Prince 1995/1999). The generalization (Schachter and Fromkin 1968:89, Welmers 1946:11-12) is that velars in Akan are normally palatalized before front vowels, but that this expected palatalization fails when the following syllable contains either of the coronal obstruents /t/ or /s/. Consequently, the generalization is that a sequence of two [Coronal] obstruents in adjacent syllables is avoided – a pattern that is clearly dissimilatory in character.

X.3.1.2.2 Colombian Spanish

Dissimilation of Coronal is attested in Colombian Spanish (de Ramirez 1996, Jose Camacho p.c.), in the form of alternations between the diminutive suffixes *-ito/a* and *-ico/a*. The normal form of the diminutive suffix is *-ita* or *-ito* (the final thematic vowel depends on the gender of the root); this is illustrated by forms like those in (6), and is typical of many other Spanish dialects (de Ramirez 1996:27).

(6) Colombian Spanish: diminutive suffix -ito~-ita

a.	barco	'ship'	barqu-ito	'ship-dim.'
b.	casa	'house'	cas-ita	'house-dim.'
c.	lado	'side'	lad-ito	'side-dim.'
d.	locha	'laziness'	loch-ita	'laziness-dim.'
e.	carro	'car'	carr-ito	'car-dim'
f.	cabeza	'head'	cabec-ita	'head-dim.'
g.	mano	'hand'	man-ito	'hand-dim.'

Where Colombian Spanish exhibits the Coronal dissimilation is in diminutives of roots with /t/ in the final syllable. Instead of forming diminutives with the usual -ita/-ito suffix, these roots appear with [k] instead of [t], as -ico/-ica. This is shown in (7) (data from de Ramirez 1996:27, and Jose Camacho, p.c.).

(7) Colombian Spanish: t~k dissimilation /...t-ito/→[...t-iko]

a.	gato	'cat'	gat-ico [gat-iko]	'cat-dim.'
b.	cara	'letter'	cart-ica	'letter-dim.'
c.	galleta	'cookie'	gallet-ica	'cookie-dim.'
d.	foto	'photo'	fot-ico	'photo-dim.'
e.	pato	'duck'	pat-ico	'duck-dim.'
f.	moto	'motorcycle'	mot-ico	'motorcycle-dim.'
g.	Alberto	(proper name)	Albert-ico	'Albert-dim.'
h.	mamerto	'communist'	mamert-ico	'communist-dim.'

In Colombian Spanish, the distribution of -ico/-ica is clearly dissimilatory in nature: the generalization is that all (and only) forms with [t] in the final syllable form diminutives with [k] (orthographic <c>). It is, in short, an observable synchronic alternation; de Ramirez (p. 27) notes this explicitly: 'en algunos territorios, el alomorfo *-ic-* (Cuba, Colombia, Centroamérica) que, por disimilación, puede ser alomorfo de *-it-* en palabras cuya última sílaba comienza por *t*.'[3]

[3] 'in some territories, the allomorph /-ik-/ (Cuba, Colombia, Central America), which, by dissimilation, may be an allomorph of /-it-/ in words whose last syllable starts with /t/'. Note that there is also considerable cross-dialectal variation in the occurrence of -ico/-ica diminutives. For instance, in Costa Rican Spanish, the -ico/-ica diminutive suffix seems to be the general one, regardless of the consonants of the root (Resnick 1981:151). Moreover, -ico diminutives are also found, albeit marginally, in at least some varieties of peninsular Spanish, in forms like *cafecico*, 'coffee-dim.' (I thank Teresa Torres-Bustamante, p.c. for pointing this form out to me).

Since the dissimilatory alternation changes only the feature [Coronal], this [t]~[k] alternation must be understood as dissimilation of [Coronal]. This is deserving of mention because forms like *lado~ladito* and *casa~casita* show that not all [Coronal] consonants trigger the alternation. The relevant correspondence requirement holds only among voiceless coronal stops (i.e. the set of feature specifications [COR, -son, -cont, -voi]). By hypothesis, this entails that correspondence based on the feature [Coronal] is possible, and may result in dissimilation.

X.3.1.2.3 Ni'ihau Hawaiian

In Ni'ihau Hawaiian (Blust 2004:368), [Coronal] dissimilation manifests as a static restriction, which is observable through its effects on diachronic change. Blust reports that Proto-Polynesian *t is retained as /t/ in Ni'ihau Hawaiian (unlike Standard Hawaiian), except in /t...t/ sequences. This is illustrated by comparisons like those below, where Standard Hawaiian /k...k/ sequences (the outcome of a regular *t > k sound change) correspond to /k...t/ in the Ni'ihau variety.

(8) Diachronic *t > k Coronal dissimilation in Ni'ihau Hawaiian (Blust 2004:368)

	Pre-Hawaiian	Std. Hawaiian	Ni'ihau Hawaiian	Gloss
a.	*te tahi	kekahi	ketahi	'one'
b.	*tatou	kakou	katou	'1.pl incl'
c.	*matahiti	makahiki	makahiti	'year'

This dissimilatory pattern is somewhat confounded with a pattern of dorsal dissimilation (see §X.3.1.3.2 for details). Since Hawaiian has undergone a historical change *t > k, the correspondence between Ni'ihau [t] and Standard [k] could also be interpreted as a multi-stage historical shift, *tVt > kVk, followed by dissimilation of kVk to kVt. If this is the case, then Ni'ihau constitutes an example of dorsal dissimilation rather than coronal dissimilation. However, if this historical pathway is not the actual story, then Ni'ihau would seem to attest both types of dissimilation.

X.3.1.2.4 Tahitian

Standard Tahitian exhibits [Coronal] dissimilation in rapid speech (Blust 2004:371). The generalization is that /tVt/ sequences are produced with two [t]s in slow and/or careful speech, but as [kVt] in rapid speech. Productive alternations occur with the article /te/, but also occur morpheme-internally, especially in loanwords.

(9) Tahitian: t~k dissimilation in rapid speech (Blust 2004:371)

	Careful speech	Rapid speech	Gloss
a.	te taane	kə taane	'man, male'
b.	te taʔata	kə taʔata	'person, human being'
c.	te peretiteni	tə perekiteni	'president'

Forms like (c), [tə perekiteni] (*tə pere**t**iteni), show that the dissimilation is limited to either adjacent syllables or CVC configurations. The word /peretiteni/ contains two

/t/s, in the sequence /tit/; in rapid speech, the first of these dissimilates to [k], but no dissimilation occurs in the preceding article [tə], which is not syllable-adjacent to the remaining [t] in the root. Along the same lines, Blust (2004:371) reports that the article /te/ invariably surfaces with [t] before other roots with no initial /t/, such as /te mata/ 'eye'.

X.3.1.2.5 Takelma

In Takelma (Goodman 1992, Sapir 1912) [Coronal] dissimilation is observed through alternations of [l n] with [m] in certain suffixes. Nouns in Takelma occur with a 'noun characteristic' suffix before pronominal suffixes, and in locatives. The noun characteristic suffix is typically of the shape [-Vn], as illustrated in (10).

(10) Takelma noun characteristic suffix is /-Vn/ (Goodman 1992:46-47)

a.	/pep + Vn/	→ [pepen]	'rushes'
b.	/xt + Vn/	→ [xtan]	'eel'
c.	/tak + Vn/	→ [takan]	'turtle'

However, when the root contains one of the coronal sonorants [n l], then adding the noun characteristic suffix /-Vn/ with another coronal, /n/, leads to dissimilation. One of the coronal sonorants dissimilates to [m], as seen in the examples below. When the root contains /l/, the dissimilation happens in the suffix, turning it into [-Vm] as in (11); when the root contains /n/, the same /n/ → [m] dissimilation occurs in the suffix (12) (though in this situation the root /n/ also appears as [l], the result of a nasal dissimilation pattern discussed in §X.3.2.3.1 below).

(11) Takelma [Coronal] dissimilation: /l...-Vn/ → [l...-Vm] (Goodman 1992:47-48)

a.	/hel + Vn/	→ [helam]	'board'	(*[hela**n**])
b.	/hapil + Vn/	→ [hapilim]	'empty'	
c.	/kul + Vn/	→ [kulum]	'oak'	
d.	/lap^{h} + Vn/	→ [lap^{h}am]	'frog'	
e.	/lox + Vn/	→ [loxom]	'manzanita'	
f.	/tolk^{h} + Vn/	→ [tolk^{h}am]	'anus'	

(12) Takelma [Coronal] dissimilation: /n...-Vn/ → [l...-Vm] (Goodman 1992:48)

a.	/xan + Vn/	→ [xalam]	'urine'	(*[xanan], *[xalan])
b.	/k^{w}an + Vn/	→ [k^{w}alam]	'road'	

Sapir (1912:21) also observes at least one form where reduplication of /n/ leads to an [l...m] sequence (like in (12) above), though dissimilation in this morphological context appears to be sporadic (and perhaps rare).

(13) Takelma [Coronal] dissimilation in reduplication (Sapir 1912)
a. /xan-/ → [xan-] 'urine'
b. /xanaxan-/ → [xalaxam-] 'urinate' (*[xanaxan-], *[xalaxan-])

X.3.1.2.6 [Coronal] dissimilation recap

Dissimilation of [Coronal] is considered only moderately attested for several reasons: there are few confirmed cases, most of them involve the exact same pattern, and the clarity of the data is limited.

The five cases discussed above are the only examples I have found of long-distance coronal dissimilation. This is a marked contrast to labial dissimilation (§X.3.1.1), which is attested by dozens of languages. Moreover, the coronal dissimilation patterns found in Tahitian, Ni'ihau Hawaiian, and Colombian Spanish are ostensibly the exact same thing: *[tVt] is avoided, in favor of [kVk]. In these 3 cases, the interacting segments are strictly [t] and [k], and they only interact when they are in adjacent syllable onsets. Additionally, in each of these cases, the dissimilation is not robustly observed. Colombian Spanish exhibits dissimilation only in diminutive suffixes, and Tahitian exhibits it only in colloquial fast speech. Along the same lines, the Ni'ihau Hawaiian case is supported principally on diachronic evidence, and is not provably productive synchronically (either in the present day, or in the past).

In Akan, the dissimilation manifests only as blocking; there are no alternations to be found. And, the effect occurs only between voiceless obstruents (not strictly [t]s, also [s] and [tç]), the same narrow class of segments that exhibit the dissimilation in the 3 cases previously noted.

Takelma's pattern of [Coronal] dissimilation is not principally a t~k alternation. But, it is only observed in one morpheme, and is by no means a clear and simple case of dissimilation, since it is confounded with nasal dissimilation, and can involve alternations of both segments (which is unusual crosslinguistically).

X.3.1.3 Dorsal

Dissimilation of [Dorsal] is weakly attested. The only clear example of [Dorsal] dissimilation is Judeo-Spanish (Bradley and Smith 2011). Other possible cases also include Ni'ihau Hawaiian (Blust 2004), Mayali (Evans 1995), and Narragansett (Cowan 1969), though these are marginal examples.[4] Each is discussed below.

X.3.1.3.1 Judeo-Spanish

Judeo-Spanish, exhibits consistent [Dorsal] dissimilation in the form of alternations in the diminutive suffix -iko/a, which has a dissimilated allomorph -ito/a (Bradley and Smith 2011). The essential generalization is that the /k/ of the diminutive suffix dissimilates to [t] when it follows another dorsal consonant in the preceding syllable.

[4] A fifth and very marginal case comes from Korean partial reduplications, where ŋ...ŋ sequences are avoided (Kim 1995, 2003); this could be interpreted as dorsal dissimilation, or nasal dissimilation. See §X.3.2.3.2 for further details of that pattern.

The basic form of the diminutive suffix is either [-iko] or [-ika], with a velar stop. (The final thematic vowel depends on the gender of the root; root-final vowels are deleted, except for stressed /a/ and /o/). This is shown by examples like those in (14) (data from Bradley and Smith 2011:2).

(14) Judeo-Spanish: diminutive suffix -iko/-ika

a.	palo	'stick'	pal-iko	'stick-dim.'
b.	kolcha	'blanket'	kolch-ika	'blanket-dim.'
c.	guluba	'pigeon'	gulub-ika	'pigeon-dim.'
d.	hamor	'donkey'	hamor-iko	'donkey-dim.'
e.	prezente	'gift'	prezent-iko	'gift-dim.'
f.	pará	'money'	para-iko	'money-dim.'

The diminutive suffix appears as -ito/-ita, however, when the root ends in any of the dorsal consonants /k/ /g/ /x/ (orthographically <h>) or /w/, as shown by the examples in (15) (Bradley and Smith 2011:3).

(15) Judeo-Spanish: /-iko/ → [-ito] after dorsals

a.	sako	'sack'	sak-ito	'sack-dim.'
b.	minag	'custom'	minag-ito	'custom-dim.'
c.	malah [malax]	'angel'	mala[x]-ito	'angel-dim.'
d.	lingwa	'tongue'	lingw-ita	'tongue-dim.'

The appearance of the [t] allomorph of the suffix only after velar consonants is interpreted as dissimilation of [Dorsal].

The t~k dissimilation in Judeo-Spanish is subject to a syllable-adjacency condition (or is possibly limited to the stricter CVC configuration). This locality condition can be seen in roots with an underlying final stressed /a/ or /o/ - the only root-final vowels retained in diminutive formation. When the root-final vowel is retained before the /-iko/ suffix, the two dorsal consonants are separated by two vowels; they are therefore in non-adjacent syllables. In this situation, no dissimilation is observed, as shown by the example in (16).

(16) shaká > shaka-ika [ʃa.ka.i.ka] 'joke-(dim.)'

The same CVC/syllable-adjacency limit can also be observed in the behaviour of a third allomorph of the diminutive suffix, -eziko/-ezika. This longer form of the suffix occurs with monosyllabic roots, and disyllabic roots ending in unstressed -e , as shown in (17) below (Bradley and Smith 2011:3). Monosyllabic roots containing dorsal consonants show no dissimilation for this reason.

(17) Judeo-Spanish: k~t dissimilation only in CVC domain

a.	fil	> fil-eziko	[fi.le.zi.ko]	'elephant-(dim.)'
b.	kal	> kal-eziko	[ka.le.zi.ko]	'synagogue-(dim.)'
		*kal-ezito (no dissim.)		

This longer allomorph has no dissimilated counterpart (e.g. -ezito), because the dissimilation only occurs when dorsals are syllable-adjacent, and the long form of the suffix never produces that condition. (By the same token, dissimilation is not observed when the root contains a non-final dorsal consonant, as illustrated by forms like *kolch-ika* in (14b) above).

X.3.1.3.2 Ni'ihau Hawaiian?

Blust (2004:369) reports that the pattern kVk is 'impermissible' in the Ni'ihau variety of Hawaiian. This restriction is evident from the treatment of loanwords like 'cook', borrowed as [kuke] in Standard Hawaiian, but as [kute] in Ni'ihau. This example is the only datum available to me, however. The pattern is also confounded with a diachronic *t>k change that is reportedly dissimilatory in nature (discussed in §X.3.1.2.3 above), which makes it unclear if the dissimilatory effect in this language is for [Coronal], or [Dorsal], or both. As such, I regard Ni'ihau Hawaiian as a marginal case of [Dorsal] dissimilation.

X.3.1.3.3 Mayali?

Another marginal case of [Dorsal] dissimilation is found in Mayali (Evans 1995:758). In iterative reduplications of monosyllabic roots, Mayali uses a reduplicative template of the shape CVNV-. The N in this template alternates between [n] and [ŋ], depending on the place of the C: it is [n] following labial or velar consonants (the 'peripheral' consonants; perhaps analogous to [+grave]), and [ŋ] when following coronals. Evans (1995:728) views this as dissimilation for 'peripherality' - the inserted nasal is /ŋ/ underlyingly, and dissimilates to [n] after consonants that share its '[+peripheral]' characteristic. However, this case could also be analyzed as the reverse, dissimilation of [Coronal]: the inserted nasal would be /n/ underlyingly, and dissimilate to [ŋ] only following another [Coronal] segment. Either way, since the dissimilation effect happens only in a restricted subset of reduplicated forms, it is a marginal case of dissimilation.

X.3.1.3.4 Narragansett?

Cowan (1969:32) posits dissimilation of dorsals as a diachronic change in the history of Narragansett. The generalization of interest is that a locative suffix, commonly found in place names in Rhode Island, was historically /-Vk/ (from Proto-Algonkian *-enki). However, this appears to surface as [-Vt] in a number of forms that have a preceding [k] (18).

(18) Narragansett *kVk > kVt? (Cowan 1969)

a. Aquidneck, Niantic, Mishnock, Niantic, Quaddick
(locative suffix is commonly -Vk)

b. Cominicut, Conanicut, Nonquit, Nausauket, Pawtucket
(locatives with -Vt have preceding [k])

This alternation suggests a diachronic change similar to the pattern observed in Ni'ihau Hawaiian: *kVk > kVt – an apparent case of dorsal to coronal dissimilation. However, as an example of dissimilation, the Narragansett case is marginal: Cowan also notes numerous exceptions, and forms that undermine the generalization (e.g. wékick 'to the house', as well as place names such as Cowesett, Chepachett, Potowomut, Quonset, Wickaboxet, etc.). So, the conditioning of the -Vt allomorph of the locative is clearly not only dissimilatory in nature. Moreover, Cowan's proposal is that some of the relevant locative forms are the result of analogy by English speakers applied during borrowing. On this approach, the apparent allophony is less clearly an approximation of the synchronic phonology of a single grammar. As such, the data does not clearly illustrate a robust synchronic dissimilation pattern.

X.3.1.3.5 [Dorsal] dissimilation recap

Dorsal dissimilation is deemed weakly attested. This is because there are very few possible examples, and all of them are marginal as representations of a genuine synchronic phonological pattern. Of the 4 cases reviewed here, 3 involve exactly the same [k]~[t] alternation, and two of those (Judeo-Spanish and Ni'ihau Hawaiian) are closely related to examples of [Coronal] [t]~[k] dissimilation considered above. So, these do not provide clear and strong evidence that dorsal dissimilation is definitively attested.

X.3.1.4 Radical (Guttural)

The feature [Radical] is taken here to represent the primary place of articulation of all post-uvular consonants (pharyngeals, laryngeals, epiglottals); dissimilation of pharyngealization is considered with other secondary articulations (in §X.3.4). The feature [Radical] is very often confounded with interactions of laryngeal features, as [h] and [ʔ], the two most common [Radical] consonants can often be characterized solely in terms of [±spread glottis] and [±constricted glottis], without reference to their place of articulation. In other words, a descriptively simple pattern of glottal stop dissimilation like /ʔ...ʔ/ → [ø...ʔ] could plausibly be interpreted as either dissimilation of [Radical], or dissimilation of [+cg]. What distinguishes [Radical] place dissimilation from laryngeal-feature dissimilation is crucially the involvement of non-glottal consonants (e.g. pharyngeals). If glottals and pharyngeals interact in a dissimilatory way, to the exclusion of non-[Radical] consonants (perhaps including those that are [+cg] or [+sg]), then the pattern can only be characterized as a type of Place dissimilation.

Dissimilation of [Radical] is very weakly attested. This kind of dissimilation is found in Tigre and Tigrinya (Rose 2000a), where the dissimilatory patterns hold over the class of glottal and pharyngeal segments together. One other case, glottal stop dissimilation in Seri (Marlett and Stemberger 1983; see also Yip 1988), can also be interpreted as radical dissimilation, but is a marginal case (at best).

X.3.1.4.1 Tigre and Tigrinya

Rose (2000a) observes dissimilation among 'gutturals', the class of glottal and pharyngeal consonants, in Tigre and Tigrinya, two North Ethiopian Semitic languages. Both languages have four 'guttural' consonants: the glottals [h ʔ], and the pharyngeals [ħ ʕ]. The relevant generalization in both languages is that two guttural consonants may not occur in a CVC configuration - a pattern of trans-vocalic (and therefore long-distance) dissimilation the property of 'Gutturality', i.e. of [Radical] place.[5]

In Tigre, avoidance of guttural co-occurrence leads to morphologically-based alternations: affixes with gutturals are blocked or modified when affixation would yield a CVC sequence with two [Radical] consonants. This is illustrated below by patterns of pluralization (Rose 2000a, Raz 1983). Tigre 'broken plurals' often have a prefix [ʔa-] (19); however, this prefix never appears before roots with initial gutturals (20) – these roots systematically follow other pluralization paradigms instead.

(19) Tigre: /ʔa-/ prefix in broken plurals (Rose 2000a:89)

	Singular	Plural	
a.	kəbɨd	ʔa-kbud	'belly'
b.	mɨtɨd	ʔa-mtud	'stake'
c.	wərɨk'	ʔa-wərrɨk'	'silver'
d.	bɨħar	ʔa-bħur	'sea'
e.	dɨhəb	ʔa-dhub	'gold'

(20) Tigre: /ʔa-/ plural prefix blocked before gutturals (Rose 2000a:90)

	Singular	Plural		
a.	ʔɨkɨl	ʔakal	'corn, crop'	(*ʔaʔkul; GVG sequence avoided)
b.	ħabil	ħabɨllɨt	'rope'	(*ʔaħbul)
c.	ħɨwar	ħawrət	'foal'	(*ʔaħwur)
d.	ħarɨb	ħarɨb	'water-skin'	(*ʔaħrub, *ʔaħarrɨb)
e.	ħakɨl	ħakɨllɨt	'hoe'	(*ʔaħakul, *ʔaħakkɨl)

Similar alternations occur with the 1st-person singular nonperfective subject marker /ʔɨ-/ (Rose 2000a:89, Raz 1983), and the causative prefix /ʔa-/. This is illustrated

[5] Both Tigre and Tigrinya also ban sequences of two segment-adjacent gutturals, including geminates. The SCTD could be extended to analyze this by adding CORR constraints for the segment-adjacent domain, i.e. by positing CORR-CC·[Radical] alongside CORR-CVC·[Radical]. I do not pursue this here, though.

below, with the causative prefix: this affix normally surfaces as [ʔa-] (21a-b), but with an inserted [t] as [ʔat-] before roots with an initial guttural consonant (21c-d).[6]

(21) Tigre: /ʔa-/ causative prefix appears as [ʔat-] before gutturals (Rose 2000a:90)

a.	k'ətla	ʔa-k'təla	'kill'/'cause to kill'	
b.	səbra	ʔa-sbəra	'break'/'cause to break'	
c.	ʕak'ba	ʔat-ʕak'əba	'guard'/'cause to guard'	(*ʔa-ʕak'əba)
d.	ħadga	ʔat-ħadəga	'leave'/'make leave'	(*ʔa-ħadəga)

The restriction on two gutturals in a CVC sequence also holds over the lexicon of Tigre: Rose (2000a) notes that there are no verbs with forms like CVʔVħ, CVhVʕ, etc. Two gutturals may co-occur in a word only of they are not in a CVC sequence. Thus, Tigre words with two gutturals always have another consonant intervening between them, as illustrated in (22).

(22) Tigre: gutturals may co-occur, when not in a CVC configuration: (Rose 2000a:93)

a.	ʕarʕa	'cause someone to pasture cattle
b.	ʔarʔa	'shove'
c.	ħasʕa	'lack butter/milk in food; be dry due to lack of oil'
d.	ħanʔa	'twist ankle, leg'
e.	hadʔa	'calm down'

Note that forms like these have two gutturals in adjacent syllables. In Tigre and Tigrinya, as Rose (2000a) points out, it is crucially the CVC configuration in which the long-distance dissimilatory pattern holds; it cannot be reduced to syllable-adjacency, or syllable role.

In Tigrinya, the restriction against CVC sequences with two gutturals is enforced only in the domain of the root (Rose 2000a:92). Thus, the Tigrinya lexicon exhibits the same gaps as in Tigre: there are no forms with the shape CVĦVĦ (or ĦVĦVC, etc.), whether the two gutturals are the same or different. However, affixation in Tigrinya does produce sequences of gutturals; the causative prefix /ʔa-/ is (unlike in Tigre) permitted to appear before guttural-initial roots, as in (23).

(23) Tigrinya: /ʔa-/ causative prefix yields sequences of gutturals: (Rose 2000a:93)

a.	ʕayyənə	ʔa-ʕayyənə	'spoil'/'cause to spoil'
b.	ʔasərə	ʔa-ʔ^{a}sərə	'arrest'/'cause to arrest'
c.	ʕaddəgə	ʔa-ʕaddəgə	'buy'/'cause to buy'

[6] In some cases, the causative prefix before a guttural consonant is realized as vowel lengthening, rather than the alternative form [ʔat-] (Rose 2000a:90), e.g.: [ħarsa] 'plough', [ħa:rəsa] 'cultivate'. It is not clear what governs this choice. But, crucially, in both cases a sequence of two gutturals in a CVC configuration is avoided.

In both Tigre and Tigrinya, the dissimilatory pattern holds among glottal and pharyngeal consonants - the entire class of post-uvular consonants in these languages. This interaction can be interpreted as dissimilation for [Radical], a Major Place of Articulation on par with [Labial], [Coronal], and [Dorsal].

X.3.1.4.2 Glottal stop dissimilation as guttural dissimilation?

A small number of other languages also exhibit dissimilation of glottal consonants, in a way that is not subsumed by a more general laryngeal feature dissimilation pattern. Seri (Yip 1988, Marlett and Stemberger 1983) exhibits a pattern of non-adjacent glottal stop dissimilation that does not follow from any larger generalization about the distribution of [±cg] in non-glottal consonants. This could be interpreted as dissimilation of [Radical], or as dissimilation of [+cg]. A similarly ambiguous pattern (a [ʔ]~[w] alternation triggered by [ʔ]) is found in allomorph selection in Caddo (Paster 2006:42), though in this case the dissimilation may be limited to strictly adjacent segments.

X.3.2 'Articulator-free' Manner features

X.3.2.1 Continuancy

Continuancy dissimilation is very weakly attested, and its status is unclear. The most plausible case of long-distance, synchronic, [+continuant] dissimilation found is Chaha, which has significant confounds. It is not a lone example; another related language, Muher, also has a related pattern, but the dissimilatory effect is less clearly robust. Two potential cases [–continuant] dissimilation are found, Palauan and Acehnese, but both are highly marginal too. All four examples are considered below.

X.3.2.1.1 Chaha: dissimilation for [+continuant]?

Long-distance dissimilation of [+continuant] is reported in Chaha (Kenstowicz and Banksira 1999), but there are significant confounds that render this case marginal as an example.

The claimed [+continuant] dissimilation in Chaha is observed in the distribution of [x] and [k]. Chaha has nearly complementary distribution between [x] and [k] (Kenstowicz and Banksira 1999, Banksira 2000): [k] occurs in roots only when followed by any of the underlying continuant consonants /f s z x ʕ/, while [x] occurs everywhere *except* in that circumstance.[7] This generalization is illustrated by comparing examples like (24) with those in (25).

[7] These are in 'nearly complementary' distribution because [k] can also arise from devoicing of /g/, part of a general pattern of geminate devoicing (see Banksira 2000 for details).

(24) Chaha: [x] occurs in roots with no following continuants (Kenstowicz and Banksira 1999:574-575)

a.	y-a-xətɨr	'precede (jussive 3.sg.m)'	/xytr/
b.	yə-xdɨr	'thatch (jussive 3.sg.m)'	/xdr/
c.	yə-xrəm	'spend year (jussive 3.sg.m)'	/xrm/
d.	yə-frəx	'tolerate (jussive 3.sg.m)'	/frx/
e.	sənəx	'be weakened (perfect)'	/srx/
f.	mesəx	'chew (perfect)'	/mysx/

(25) Chaha: [k] occurs in roots only when there is a following continuant (Kenstowicz and Banksira 1999:575)

a.	yə-kfɨr	'separate (jussive 3.sg.m)'	/xfr/
b.	yə-kəʃ	'crush (jussive 3.sg.m)'	/xsy/
c.	yə-kəsɨs	'accuse (jussive 3.sg.m)'	/xs/
d.	yə-ktɨf	'hash (jussive 3.sg.m)'	/xtf/
e.	yə-kad	'deny (jussive 3.sg.m)'	/xʕd/

Kenstowicz and Banksira suggest that this pattern reflects /x/ undergoing dissimilation for [+continuant]. Thus, /x/ surfaces faithfully, as a [+continuant] fricative [x] in the forms in (24), but changes to the [–continuant] stop [k] when any of the [+continuant] radicals /f s z x ʕ/ follow it (25). Examples like (25d) [yə-ktɨf] show that the dissimilatory pattern is long-distance: the initial /x/ in this form surfaces as [k] even though [t] and [ɨ] intervene between it and the triggering continuant [f].

There are some caveats about Chaha as an example, however: the generalization does not hold on the surface in all cases. Note that /ʕ/ represents a historical guttural (i.e. pharyngeal) fricative; it is phonetically realized as a vowel [a] or [ə], not as an actual obstruent. Also, the voiced bilabial [β] does not participate in this dissimilatory pattern; /x/ surfaces as [x] (not [k]) before [β], provided there are no other continuants present. Kenstowicz and Banksira (1999:574) suggest this is because /β/ is underlyingly an approximant rather than a fricative. These opaque cases are illustrated in (26).

(26) Chaha [x]~[k] dissimilation is opaquely triggered

a.	yə-tka	'replace'	/txʕ/ (/ʕ/ → [a] triggers dissim.)
b.	yə-mka	'trouble'	/mxʕ/
c.	yə-ŋxəβ	'find'	/rxβ/ ([β] does not trigger dissim.)
d.	yə-xβɨβ	'encircle'	/xβ/

Thus, [x] may occur on the surface before segments that are [+continuant], and [k] can occur in the absence of any following [+continuant] consonant on the surface.

Regular affixation does not yield any synchronic alternations that show the [x]~[k] dissimilation; [x]~[k] alternations do occur in reduplication, but are opaque in

these cases. When reduplication produces a /x...x/ sequence, it surfaces as either [k...k] or as [x...x], never as [k...x], the expected result of the dissimilation pattern seen above.

(27) Chaha: reduplication of /x/ surfaces as [k...k]: (Kenstowicz and Banksira (1999:578)

a.	kət-kɨt	'crush'	/xt/+RED
b.	kə-kɨm	'trim'	/xm/+RED
c.	kə-kɨr	'hold in armpit'	/xyr/+RED
d.	sɨkɨk	'drive a peg'	/sx/+RED
e.	tə-mərkək	'kneel down'	/mrx/+RED
f.	bʷəkək	'talk a lot'	/βwx/+RED

Kenstowicz and Banksira (1999) interpret this as back-copying: the sequence of /x...x/ is subject to dissimilation as normal, but with the 'triggering' /x/ also modified to achieve base-reduplicant identity. The result is an output form where dissimilation is evident, but there are no [+continuant] consonants.

Chaha also has a pattern of frequentative reduplication which copies the middle radical of a tri-consonantal root; in roots with [x], this produces systematic exceptions to the [+continuant] dissimilation identified above. This is shown by data like that in (28). The abstract roots /sxr/ 'get drunk', /mxr/ 'advise' and /rxβ/ 'find' surface with [x] by default, as in the imperative and imperfect forms in (59a,c,e). However, applying the frequentative /123/→1223 reduplication pattern yields a peculiar asymmetry: the reduplicated stems have [k...k] in their imperfect forms, but [x...x] in imperatives (28b,d,f).

(28) Chaha medial frequentative reduplication: dissimilation fails? (Kenstowicz and Banksira 1999:581)

	Imperative	Imperfect		
a.	sɨxər	yɨ-sxər	'get drunk'	/sxr/
b.	tə-sxaxər	yɨ-t-sɨkakər	'act naughtily'	/sxxr/
c.	mɨxɨr	yɨ-məxɨr	'advise'	/mxr/
d.	tə-mxaxər	yɨ-tɨ-mkakər	'advise each other'	/mxxr/
e.	nɨxəβ	yɨ-rəxɨβ	'find'	/rxβ/
f.	tə-rxəxəβ	yɨ-tɨ-rkəkəβ	'show up'	/rxxβ/

Chaha perfect forms exhibit another sort of exceptionality, where /x/ seems to dissimilate in the absence of another [+continuant] consonant. The template for forming perfect verbs involves fortition of medial consonants, a phenomenon that Banksira (2000) analyzes as opaque gemination. In this fortition process, underlying voiced obstruents surface as voiceless, /r/ surfaces as [n], and fricative /β/ surfaces as a

stop [b] or [p]. Some examples of this fortition are given in (60), along with Banksira's posited underlyingly geminated forms.[8]

(29) Chaha perfective fortition (Banksira 2000:160-161)

	Jussive	Perfect		
a.	yə-βdər	bətər	< /βəddər/	'be first'
b.	yə-βɨrs	bənəs	< /βərrəs/	'demolish a dam'
c.	yɨ-dəβs	dəbəs	< /dəββəs/	'enlarge'

In the perfect forms with medial fortition, we find the dissimilatory /x/→[k] mapping, again in the absence of any [+continuant] consonant (even an opaque [k]) which could trigger dissimilation. This is illustrated in (30).

(30) Chaha perfective 'gemination' seems like spurious /x/→[k] dissimilation (Banksira 2000:160, Kenstowicz and Banksira 1999:581)

	Imperfect	Perfect		
a.	yɨ-məxɨr	məkər	'advise'	/mxr/
b.	yɨ-rəxɨβ	nəkəβ	'find'	/rxβ/
c.	yə-βxər	bəkər	'lack, miss'	/βxr/

Chaha's [+continuant] dissimilation is further marred by a number of exceptions to the basic generalization. As Banksira (2000:94) dutifully observes, there are two roots that yield a small number of minimal pairs where [k] and [x] contrast; these are given in (31). There are some other forms where [x] appears despite the presence of a following fricative or /ʕ/, or where [k] appears in roots with no fricatives (32).

(31) Chaha exceptional minimal pairs showing [x]~[k] contrast: (Banksira 2000:94)

a.	xəna	'has put/prohibited'
	a-xəna	'has shouted'
	a-ŋ-xəna	'has not put/prohibited'
b.	kəna	'has ascended'
	a-kəna	'has ascended sth.'
	a-ŋ-kəna	'has not ascended'

[8] Some of the alternations seen in medial fortition with perfect forms also happen word-initially; e.g. (29a) has the perfect form [bətər], not *[βətər].

(32) Chaha: other exceptions to [x]~[k] dissimilation: (Banksira 2000:98-109)

a.	xəda	'has betrayed'	(root /xdʕ/)
b.	yə-t-raxəs	'let him bite repeatedly/quarrel!'	
c.	xar	'know (perf.)'	(root /xʕr/)
d.	yə-kβər	'let him be respectable!'	
e.	yə-kmɨr	'let him pile sth. up!'	
f.	y-əkɨm	'let him give medical care!'	
g.	yə-βarɨk	'bless, sanctify'	(root /βrk/; < Amharic)

Some verbs also fail to show the [x]~[k] alternation in reduplication (compare to (28) above):

(33) Chaha: exceptional [x]...[+cont] sequences in reduplications: (Banksira 2000:110)

a.	sɨxəsəx	'has ground sth. slightly'	(*sɨkəsəx, *sɨkəsək; no dissimilation)
b.	məxmɨx	'mash'	
c.	xʷərxʷɨr	'penetrate!'	

Chaha is considered a marginal case of dissimilation. What is happening in the [x]~[k] alternation is not completely clear, but interpreting the pattern as dissimilation for [+continuant] requires significant departure from the observable facts. We must assume that [k] is always underlyingly /x/ rather than /k/, even in morphemes where it invariably appears as [k] (such as /xfr/ 'separate', where /x/ is *always* required to dissimilate). Accordingly, we need to assume a complete absence of underlying /k/; a peculiar gap, given that Chaha has both voiced [g] (from /g/) and ejective [k'] (from /k'/), as well as voiceless stops at other places of articulation ([p t c]). Moreover, the dissimilation needs to occur primarily at the underlying level; it is not predictable from the segments in the surface from. That is, we need to allow substantial flexibility for what counts as a [+continuant] consonant: such that the continuant consonant [β] never triggers dissimilation, while /ʕ/ does, even when it surfaces as [a] or [ə] instead of as a segment with true consonantal articulation.

X.3.2.1.2 Muher: dissimilation for [+continuant]?

The Chaha [x]~[k] pattern has a cognate in another Gurage language, Muher (Rose 2000b). This can also be interpreted as a case of dissimilation, but is far more marginal than the Chaha case. The basic pattern in Muher is that /k/ tends to spirantize to [x], particularly in post-vocalic positions. The dissimilatory generalization is the failure of this spirantization: it tends not to happen before another fricative (Rose 2000b:111), a restriction comparable to the avoidance of [x]...[+continuant] sequences in Chaha. What makes the Muher case dubious as an example of real, synchronic, [+continuant] dissimilation is that there is considerable variability in the generalizations: Rose (2000b:115) explicitly notes that they are not productive, and are only general tendencies. Because the /k/→[x] spirantization is not a productive alternation, its

tendency to fail before fricatives is not clear evidence for a productive restriction against the co-occurrence of multiple continuants. So, while the Muher case could be interpreted along the same lines Kenstowicz and Banksira (1999) propose for Chaha, this leaves a substantial portion of the data unexplained.

X.3.2.1.3 Palauan: dissimilation for [–continuant]?

Palauan (Zuraw and Lu 2009) is the best potential case of [–continuant] dissimilation found in the survey, though here again the situation is quite murky and the key data is thin. The relevant generalization is that an infix /-m-/ surfaces as [-w-][9] when there is another non-continuant labial {m b} later in the stem (Zuraw and Lu 2009, Łubowicz 2010). This affix alternates between a prefix, and an infix positioned after a root-initial consonant, and is a reflex of the same Proto-Austronesian *um affix that demonstrates the same behavior in other related languages (e.g. Tagalog).

The Palauan pattern is illustrated in (34) (examples from Zuraw and Lu 2009:206). The form in (34a) shows a root with no labial consonants; here, the /-m-/ affix surfaces faithfully as [-m-], and is infixed following the root-initial consonant. The forms in (34b-c) show that an [m] or [b] in the next syllable causes the affix to surface as [-w-]; the examples in (34d-e) show the same pattern for more distant root labials. Finally, the examples in (34f-g) show that a [w] in the root does not induce the same alternation. Zuraw and Lu (2009:207) note that the dissimilation is exceptionless when the stem labial is the next consonant, but is not absolute for stem-final labials (cf. 34e).[10]

(34) Palauan: /-m-/ infix appears as [-w-] before [m b]

a.	ŋ-m-as	‘subtract’	(infix [-m-])
b.	ð-w-obəʔ	‘chop down’	(infix dissimilates to [-w-]; *ð-m-obəʔ)
c.	k-w-ɛməð	‘sew up’	
d.	ð-w-aləm	‘plant’	(infix dissimilates; *ð-m-aləm)
e.	s-w-ɛsəb ~ s-m-ɛsəb	‘burn’	
f.	l-m-uwt	‘return’	(no dissimilation before [w]; *l-w-uwt)
g.	k-m-iwt	‘clean up’	

The basis for interpreting this as dissimilation is that the alternation changes a non-continuant, /m/, into a continuant, [w], only before another labial non-continuant (b-e), but *not* before a labial non-continuant (f). The forms in (f) and (g) are crucial to this interpretation: these two examples (the only ones that Zuraw and Lu give with [w])

[9] Zuraw and Lu and Łubowicz cite the same sources, but have different transcriptions: where Zuraw and Lu have [w], Łubowicz has [u] or [o]. If this segment is a vowel rather than a consonant, this pattern is outside the scope of the surface correspondence theory as delineated at the start of the book.

[10] There are also exceptions for vowel-initial roots. In this situation, the /-m-/ infix surfaces as a prefix, and there appears to be no long-distance dissimilation: /m+asəm/ → [im-asəm], *iw-asəm ‘try out’ (Zuraw and Lu 2009:206).

are all that shows that the alternation is induced just by the non-continuant labials, rather than by labials in general. (Note that on this interpretation, the change in nasality from /m/ to [w] is an incidental shift rather than dissimilation – an overkill effect).

The Palauan case is a marginal one, for several reasons. First, the one morpheme that shows the dissimilation shows it only under a very strict set of circumstances. As noted above, the /-m-/ affix is an infix only with consonant-initial roots; with vowel-initial roots, it appears instead as a prefix. The dissimilation pattern only applies to the infixed instances of this morpheme (Łubowicz 2010); in contexts where the affix /-m-/ surfaces as a prefix, there is no dissimilation (35). Second, the same affix surfaces as a vowel [o] when next to a segmentally adjacent [b], whether before or after (36). Here, there is an alternation reminiscent of the one in (34) above, but with the important difference that the output form distinctly has a vowel, and not a continuant consonant. Łubowicz reports that this /m/→[o] alternation happens with stem-initial labials. However, Zuraw and Lu (2009:205) report a different generalization: that the stem-initial labial either deletes or fuses with the affix /m/ (37). Finally, there is no dissimilation root-internally (38).

(35) Palauan: no dissimilation for prefixed /m-/ (Łubowicz 2010:264)

a.	mə-dub	‘get poisoned’
b.	mə-kimd	‘been cut (of hair)’
c.	mə-sesəb	‘been burnt’
d.	mə-ʔarəm	‘been tasted’

(36) Palauan: /m/ surfaces as [o] next to a segment-adjacent [b]

a.	o-burək	‘be swollen’	(/m/→[o] instead of infixing; *b-m-urək)
b.	t-o-bəkij	‘patched (3.sg.)’	(cf. tabək ‘patch’)

(37) Palauan: /m/ before some stem-initial /b/ leads to fusion/deletion?

a.	/m/ + /basəʔ/ → [m-asəʔ]	‘name’	(/m-b/→[m]; *mə-asəʔ, *o-basəʔ)

(38) Palauan: no dissimilation root-internally (Łubowicz 2010:265)

a.	maməd	‘bedding given to visitors’
b.	bab	‘area or space above’
c.	mətab	‘dead fish in trap’

So, to recap: the dissimilation in Palauan occurs only for a subset of instances of one morpheme, and it’s a subset that does not appear to be predictable from the distribution of other labial consonants. This morpheme also exhibits an array of different alternations, and little data is available for many of the crucial contexts (Zuraw and Lu 2009 have no examples of /m/ affixed to roots with initial /m/, for instance). Apart from this one morpheme, the language offers no basis to posit

dissimilation of continuancy or among labials. The situation is complex and clearly deserving of further study, and possibly involves some dissimilatory component; but, it's by no means clear evidence of dissimilation for [–continuant].

X.3.2.1.4 Acehnese: dissimilation for [–continuant]?

Acehnese (Durie 1985) is the only other language I know of that could be argued to have long-distance [–continuant] dissimilation, though it is at best a very marginal example. The relevant generalization is that root-initial /t/ variably surfaces as a laminal sibilant [s̪] when followed by the sequence /ɯ{r l n}/, as illustrated in (39). This alternation occurs optionally in /t/-initial roots when combined with the infix /ɯn-/ (39a-c), and is also evident as a historical change, illustrated in (39d-e) by the comparison between Malay words with [t] and their Acehnese cognates with [s̪].

(39) Acehnese: /t/-frication (Durie 1985:34)

a.	/t-ɯn-ɯboʔ/	→ [s̪ɯnɯ̃boʔ]	'pepper clearing'
b.	/t-ɯn-ɯtroh/	→ [s̪ɯnɯ̃troh]	'something arrived'
c.	/t-ɯn-ɯmpoʔ/	→ [s̪ɯlɯ̃mpoʔ]	'stack of rice sheaves'[11]
d.	Malay [terasi]	~ Aceh. [s̪ɯras̪i]	'prawn paste'
e.	Malay [tenaman]	~ Aceh. [s̪ɯnaman]	'garden'

The alternation between [t] and [s̪] clearly involves a change from [–continuant] to [+continuant]. If the segments [r l n] are all regarded as being [–continuant] as well, then this could be construed as a type of continuancy dissimilation. And, since the interacting segments are always separated by the vowel [ɯ], it would be an instance of long-distance dissimilation.[12]

There are some problems, however, with viewing Acehnese /t/-frication as dissimilation of [–continuant]. First, it is not clear that Acehnese /r/, a trill, should be regarded as [–continuant] rather than [+continuant] (Hall 2007). Second, other consonants which, from an articulatory standpoint, clearly *are* [–continuant] do *not* trigger this alternation, nor do they undergo it. Acehnese also has a verbal prefix /tɯ-/, which can create sequences of two syllable-adjacent [–continuant] segments. But, the alleged [t]~[s̪] dissimilation does not occur in these situations, as shown in (40) (examples from Durie 1985:73-75).

[11] The [l]~[n] alternation seen in this example is due to a distinct pattern of de-nasalization; the exact generalizations are not entirely clear from the available data.

[12] Durie (1985:34) also gives the example [t=ɯn=ɯ̃tɤt] as evidence that frication of initial /t/ is blocked when another [t] is the onset of the final syllable of the stem. This observation is intriguing, but tangential.

(40) Acehnese: /t/-frication does not reflect general [–continuant] dissimilation

a.	[tɯ-dɤŋ]	‘stopping’	(*[ʂɯ-dɤŋ])
b.	[tɯ-koh]	‘harvested’	(*[ʂɯ-koh])
c.	[hãn-tɯ-languᵊ]	‘cannot be swum’	(*[hãn-ʂɯ-languᵊ])

Given the extremely restricted context of application of /t/-frication, its clear non-productivity, and Durie’s own observations that the pattern is highly variable and not systematic, I do not regard this case an attestation of true, phonological, [–continuant] dissimilation.

X.3.2.1.5 Continuancy dissimilation summary

I tentatively consider long-distance continuancy dissimilation to be unattested. The only potential examples of dissimilation for [+continuant] are Chaha and Muher, and both are tenuous. The same goes for long-distance [–continuant] dissimilation: only Palauan and Acehnese are potential examples, and again both are tenuous. There are a few other languages where continuancy dissimilation is evident as a historical change, but with no manifestation in synchronic phonology; these include Iban, Kiput, and Ngaju Dayak (Ohala 1981, Blust 1996; see also Blust 2002). There are other cases where [–continuant] dissimilation is reported in clusters but not between non-adjacent segments; see the database of excluded cases for some examples. Additionally, there are patterns where dissimilation for some other feature results in a change from [–continuant] to [+continuant] as ‘overkill’; this is common for Dahl’s Law [–voice] dissimilation in languages that have [ɣ] but lack [g], such as Gikuyu (Davy and Nurse 1982). But, there appear to be no languages that have bona fide patterns long-distance dissimilation for [–continuant] or [+continuant].

X.3.2.2 Sonority dissimilation

Long-distance [±sonorant] dissimilation seems to be unattested. The most plausible example discovered in the survey comes from Chamorro (Zuraw and Lu 2009:212, Klein 2005). The relevant generalization is that the infixes /-um-/ and /-in-/ optionally undergo metathesis to surface as prefixes [mu-] and [ni-], for some speakers. Klein (2005:973) reports that for a subset of those speakers, this optional metathesis happens only if the root begins with a sonorant. The pattern is exemplified in (41); the optionality of metathesis with liquids (a-b) and nasals (c) but not with obstruents (d) suggests that it is connected to the feature [+sonorant].

(41) Chamorro: metathesis of UM and IN before sonorant-initial bases (Klein 2005:974)

a.	liʔeʔ	l=in=iʔeʔ	l=um=iʔeʔ	'to see'	
		ni-liʔeʔ	mu-liʔeʔ		(/-VN-/→[NV-] metathesis)
b.	risibi	r=in=sibi	r=um=isibi	'to receive'	
		ni-risibi	mu-risibi		
c.	ŋiŋeʔ	ŋ=in=iŋeʔ	ŋ=um=iŋeʔ	'to smell'	
		ni-ŋiŋeʔ	mu-ŋiŋeʔ		
d.	tuŋoʔ	t=iniŋoʔ	t=um=uŋoʔ	'to know'	(no metathesis with obstruents)

Chamorro is at most a highly dubious example of active sonorant dissimilation, since it's not clear the pattern is active or dissimilatory. The metathesis is only optional, and is only attested for speakers over 55 in age (Klein 2005). For younger speakers, the metathesis is either possible with all roots, or not at all: sonority has nothing to do with its occurrence. But for those speakers who do make a split based on sonority, it's not clear this alternation is really dissimilation. The metathesis simply reverses the order of the two sonorants; it does not make them less similar, or farther apart. While dissimilation can conceivably manifest through 'repulsion' patterns, where similar consonants avoid co-occurrence within a domain by moving further apart, Chamorro is at best a tenuous example of this effect.

Apart from Chamorro, there are no clear examples of [±sonorant] dissimilation.[13] What would such a pattern look like? It could possibly resemble either fortition or lenition, depending on which value of [±sonorant] dissimilates. Dissimilation for [+sonorant] could produce alternations like /l...n/ → [d...n], which might be taken as a type of fortition rather than dissimilation. Similarly, dissimilation for [–sonorant] could yield alternations like /t...d/ → [t...ɾ], a sort of flapping pattern with a dissimilatory distribution. While both of these seem like impressionistically plausible types of alternations, it is exceedingly difficult to prove that they are truly dissimilation for [±sonorant] and not any other features (e.g. continuancy, laterality, etc.), and that they cannot be analyzed alternatively as some general strengthening or weakening phenomenon without appealing to dissimilation. Crucially, this would require interaction between different classes of sonorants – a prerequisite that not all languages readily offer.

The point is that dissimilation of [±sonorant] may be an accidental gap of sorts. It may exist, but present in ways that are never characterized as dissimilation, and therefore be under-reported. Along similar lines, since a large and precise array of data is needed in order to prove that an alternation is crucially [±sonorant] dissimilation, this may present a learnability problem. It is possible that this type of dissimilation is unattested because it is statistically unlikely to arise from a historical perspective.

[13] With the possible exception of other Austronesian languages where patterns closely akin to Chamorro can sometimes be found; see Zuraw and Lu (2009) for some examples.

X.3.2.3 Nasality dissimilation

The status of nasal dissimilation is not very clear. There several languages which exhibit dissimilation patterns involving nasality, but the majority of these cases crucially hold only for NC sequences (often interpretable either as prenasalized consonants, or as nasal+C clusters). Patterns interpretable as dissimilation of just [+nasal] or [–nasal] are far fewer in number, and all cases are marginal. So, dissimilation of NC sequences is robustly attested, but true dissimilation of nasality appears to be unattested (or at most very weakly attested). The table in (42) summarizes the types of nasality dissimilation patterns found in the survey, and each one is discussed below.

(42) Summary of attested dissimilation related to nasality:[14]

Language	*Relevant Pattern*	*Complication*
Takelma	/N...N/ → L...N *or* → N...L	confounded with Coronal dissimilation
Xiamen Chinese (Southern Min)	*NVN (*ṼN)	confounded w/ vowel nasality; alternations in both directions
Korean	avoidance of [ŋ...ŋ] in partial reduplication	generalization not robustly supported
Australian NC dissimilation	NC...NC → NC...C (E.g. Gurindji)	NC~NC (cluster) dissimilation
Meinhof's Rule (Ganda Law)	NC...N(C) → N(N)...N(C) (E.g. Luganda)	NC~NC (cluster?) dissimilation
Static NC dissimilation	*NC...NC (E.g. Timugon Murut)	NC~NC (prenasal?) dissimilation

A hypothetical example of 'pure' nasal dissimilation is a pattern like that in (43): a morpheme that clearly contains an unambiguously [+nasal] consonant (i.e. a plain nasal, like {m n ŋ}) productively alternating with another consonant that is clearly [–nasal], but otherwise similar (such as [ɾ l d]), and with that alternation taking place only when another nasal is present.

(43) A hypothetical illustration of 'pure' nasal dissimilation:

a.	tik	tik-na	(suffix /-na/, faithful after roots with no nasals)
b.	mik	mik-ɾa	(*mik-na; /n/ becomes non-nasal [ɾ] after a nasal)
c.	ŋap	ŋap-ɾa	(*ŋap-na; /n/→[ɾ] dissimilation after all nasals)
d.	wa	wa-na	(*wa-ɾa; no dissimilation after non-nasals)

Of the languages that exhibit dissimilatory patterns involving nasality, Takelma comes closest to this type of behavior: the segments that 'trigger' the alternation are

[14] Previous surveys of dissimilation (Suzuki 1998, Bye 2011) also note Chukchi as an example of nasal dissimilation, citing Odden (1987). I do not include the Chukchi case here because it is a strictly segment-adjacent pattern: the relevant generalization is that /ŋ/ becomes [ɣ] in a coda when the following segment is a following nasal. The Chukchi case is also marginal as an example of dissimilation, since the reported dissimilation is confounded with other patterns: segment-adjacent nasal assimilation, and neutralization to [ɣ] in codas.

clearly [+nasal], and the alternation involves mapping one underlying [+nasal] consonant to a [–nasal] surface form. None of the other potential cases of nasal dissimilation have this characteristic: they are evident as static restrictions and do not present real synchronic alternations, or they are alternations which apply crucially to clusters containing both a [+nasal] consonant *and* a [–nasal] one.

X.3.2.3.1 Takelma: nasal dissimilation?

Takelma (Goodman 1992, Sapir 1912) exhibits nasal dissimilation, in the form of visible alternations between nasals and [l] in 'noun characteristic' suffixes (cf. §X.3.1.2.5 above). As noted above, nouns in Takelma occur with a 'noun characteristic' suffix before pronominal suffixes, and in locatives. The noun characteristic suffix is underlyingly of the form /-Vn/, with a coronal nasal [n].

(44) Takelma noun characteristic suffix is /-Vn/ (Goodman 1992:46-47)

a.	/pep + Vn/	[pepen]	'rushes'
b.	/xt + Vn/	[xtan]	'eel'
c.	/tak + Vn/	[takan]	'turtle'

Nasal dissimilation occurs in Takelma when the /-Vn/ noun characteristic suffix is added to roots containing the nasals [m n]. If the root contains [m], the /-Vn/ suffix surfaces with [l] instead of [n] (45). When the root contains [n], the resulting /n...n/ sequence surfaces as [l...m], with the nasal dissimilation affecting the root nasal instead of the suffix (46).

(45) Takelma nasal dissimilation: /-Vn/ surfaces as [-Vl] after [m]: (Goodman 1992:48)

a.	/ʃim+ Vn/	[ʃimil]	'dew'
b.	/tʃʼam + Vn/	[tʃʼamal]	'mouse'
c.	/meh + Vn/	[mehel]	'basket for cooking'

(46) Takelma nasal dissimilation: /...n...-Vn/ surfaces as [...l...-Vm]: (Goodman 1992:48)

a.	/kʷan + Vn/	[kʷalam]	'road'
b.	/xan + Vn/	[xalam]	'urine'

In both of these situations, a sequence of two nasals is changed to one nasal and [l]. But, unusually, the direction of the dissimilation (rightward vs. leftward) depends on the input, and on whether coronal dissimilation occurs. Nasal dissimilation happens from right to left *only* in forms like (46), where coronal dissimilation *also* happens to the same consonants, but from left to right. So, Takelma's two dissimilation patterns are entangled in a way that renders this a somewhat marginal example of long-distance dissimilation for [+nasal].

X.3.2.3.2 Korean partial reduplication?

A very limited form of nasal dissimilation is also reported in Korean ideophones (Kim 1995:407, 2003). Kim's claim is that in partial reduplication systematically fails to copy

/ŋ/ from the base, though other sonorants and other velar consonants may be copied. This is illustrated in (47). The forms in (a-b) suggest that the reduplicative template is typically CVC; but, the forms in (c-e), where the second C would be [ŋ], have a CV reduplicant instead.

(47) Korean partial reduplication: dissimilatory non-copying of /ŋ/ (Kim 2003)

	Base	Reduplicated Form		
a.	kolu	kol-kolu	'evenly'	(CVC reduplicant)
b.	t'ekul	t'ek-t'ekul	'rolling'	
c.	tuŋsil	tu-tuŋsil	'floating gently'	(CV reduplicant; *tuŋ-tuŋsil)
d.	pʰaŋ	pʰa-pʰaŋ	'exploding'	(*pʰaŋ-pʰaŋ)
e.	p'aŋ	pa-paŋ	'banging (of a gun)'	(*p'aŋ-paŋ)

Kim (1995, 2003) proposes a rule of nasal dissimilation (ŋCVŋ{C,#} → ØCVŋ{C,#}) to explain this asymmetry. If this analysis is correct, this could be another case of dissimilation for [+nasal].

There are several caveats about the Korean case, however, which must be emphasized. First, this sort of partial reduplication is limited to a relatively small number ideophones, not found in the core lexicon of Korean (Seunghun Lee, p.c.). Second, as Kim (2003:8) notes, this pattern 'is not regular in Korean phonology', and is by no means productive. Third, there is a substantial range of variation in these reduplicated ideophones: not all of them manifest the same type of reduplication. For example, compare (47) to [culuk] → [cululuk] 'dribbling', where the reduplicant is infixed, and is CV in shape even though there are no velar nasals that fail to copy. As such, Korean is a very marginal example of nasal dissimilation at best.

X.3.2.3.3 Xiamen Chinese

Dissimilatory restrictions against nasals are found in Xiamen Chinese, as well as some other Southern Min varieties (Lien 1998). The generalization in this case is that a syllable with a nasal onset cannot contain any other nasals. Thus, nasal codas are permitted only in syllables that do not have nasal onsets: an apparent pattern of [+nasal] dissimilation. This *NVN ban manifests primarily as a static restriction, but there are also diachronic examples of de-nasalization that are consistent with it, e.g. Middle Chinese [nɐn] > Xiamen [lɛ̃ŋ^{5}] (not > [nɛ̃ŋ]) 'milk' (Norman 1988:241). Additionally, Lien (1998:4) observes that the *NVN restriction is evident in L2 mispronunciations: Xiamen speakers have been documented interchanging nasals and non-nasals when speaking Japanese and Mandarin. Some examples of this accidental L2 nasality reversal are given in (48).

(48) Xiamen: *NVN evident from de-nasalization in L2 Japanese? (Lien 1998:4-5)

	Correct Japanese form	Mispronunciation	
a.	mannaka	bannaka	‘center’
b.	mendori	bendori	‘hen’
c.	nandaka	dandaka	‘what’
d.	sakunen	sakuren	‘last year’
e.	kunin	kurin	‘nine persons’
f.	minarenai	midadenai	‘unfamiliar’
g.	dame	name	‘bad’
h.	danshi	nanshi	‘man’
i.	bin	min	‘vase’
j.	hanete	harete	‘hop’
k.	ichiba	ichima	‘market’

Forms like (a-f) can be interpreted as the result of a *NVN restriction in Xiamen, which is transferred into L2 speech. However, examples like (g-k) call these mispronunciations into question as genuine evidence of dissimilation. In cases like (g) [dame] ~ [name], the mispronunciation *creates* an NVN sequence, instead of avoiding one. Furthermore, examples like (j) and (k) show reversal of nasality in words with no other nasals. So, these mispronunciations run in all directions; they are not evidence of a truly dissimilatory pattern.

The Xiamen case is only marginal as an example of dissimilation, due to involvement of vowel nasalization. Lien (1998:2) notes that syllables with nasal onsets always have nasal nuclei: if the onset is [m n ŋ], then the nucleus is either a nasalized vowel, or a syllabic nasal. Along related lines, Norman (1988:235) characterizes the historical change in words like *nen > lẽŋ as de-nasalization before oral vowels. This could still be viewed as dissimilation, but it is crucially a segment-adjacent interaction. As such, the Xiamen pattern does not seem to exhibit an interaction that is both long-distance, and consonant-to-consonant.

X.3.2.3.4 Dissimilation of NC sequences

In the remainder of the cases of nasal dissimilation, the segments involved are crucially NC sequences, not simple [+nasal] consonants: the alternations and/or restrictions observed in these languages cannot be characterized solely in terms of the [±nasal] value of an individual segment. In some languages, these NC sequences have been – or could plausibly be — analyzed as complex segments, e.g. pre-nasalized stops. In other cases, they are very clearly consonant clusters, consisting of one nasal consonant followed by another consonant. I use the term ‘NC sequence’ to abstract away from this distinction; examples from both groups are discussed below.

X.3.2.3.4.1 NC cluster dissimilation in Australian languages

A number of Australian languages are reported to have patterns of NC cluster dissimilation; as an example, let us consider Gurindji (McConvell 1988), one of the more well-studied cases. Gurindji exhibits semi-productive NC ~ C alternations in suffixes, depending on the distribution of nasals in the root. The pattern is illustrated in (49): the suffix /-mpal/ 'across' surfaces as [-mpal] after roots with no nasals or NC sequences (49a), but appears instead as [-pal] after roots with an NC sequence (49b).[15]

(49) Gurindji: NC dissimilation (McConvell 1988:138)

a.	kayirra-mpal	'across the north'	(suffix /-mpal/ 'across')
b.	kanyju-pal	'across below'	(dissimilation: /NC...-mpal/ → [NC...-pal])

In Gurindji, however, this alternation cannot plausibly be characterized as [+nasal] dissimilation, nor even as dissimilation of prenasality. This is because the alternation is an interaction between clusters, not individual segments. It is only N+C *sequences* that produce the alternation; ordinary nasals do not, as illustrated in (80a), where the locative suffix /-mpa/ surfaces faithfully even though the root contains the [+nasal] consonant [n]. Additionally, N+C clusters which are *not* homorganic, do trigger the alternation. This is illustrated in (50b): neither [k] nor [n] triggers dissimilation, but the cluster [n.k] does.

(50) Gurindji: NC dissimilation is a property of N+C clusters

a.	kani-mpa	downstream-LOC	*kani-pa; no dissimilation after [n] or [k]
b.	kanka-pa	upstream-LOC	*kanka-pa; dissimilation after [n.k]

Dissimilation of nasal-stop clusters also occurs in other Australian languages, including Bardi (Bowern 2004), Gooniyandi (Suzuki 1998, Evans 1995, McGregor 1990), Nhanda (Blevins 2001, Blust 2012), and Yindjibarndi (Suzuki 1998, Wordick 1982). For a fuller list of other languages with such patterns, consult the database of dissimilation cases.

X.3.2.3.4.2 Meinhof's Law: NC dissimilation in Bantu languages?

A related phenomenon, the 'Ganda Law' or 'Meinhof's Rule' is also found in many Eastern Bantu languages, including Lamba (Piggott 1994, Doke 1938), Luganda (Meinhof 1962, Hyman 2003), Lumasaaba (Piggott 1994), Kikuyu (Piggott 1994, Armstrong 1967), Kinyarwanda (Kimenyi 1979), Kwanyama (Hyman 2003), UmBundu (Kula 2006), and Yao (Hyman 2003) (a more extensive list can be found in the database of cases). The common characteristic of all of these cases is the avoidance of NCVNC sequences, but the details vary from one language to another. In the canonical example, Luganda, /NC...N(C)/ → [NN...N(C)]: root-initial consonants become nasals when preceded by a nasal, and followed by another nasal in the next syllable (Hyman 2003). In other

[15] The Gurindji case is simplified somewhat here for illustrative purposes; in some cases, /NC...NC/ dissimilates to [NC...N] or [NC...CC]; see McConvell (1988), and the supplement on the typology of blocking in §X.4 for examples and further discussion.

languages, the root-initial consonant deletes instead, and in Kwanyama it is the second NC sequence that is adjusted instead of the first one. There is also cross-linguistic variation in what 'triggers' the process. For instance, in Luganda, the later triggering element can be a single nasal rather than an NC sequence; in Yao only NC sequences cause the alternation, and in Kikuyu it is only NC sequences with a voiced consonant. This cross-linguistic variation is illustrated in (51) (Piggott 1994:131, Hyman 2003:51-56).

(51) Meinhof's Law (Ganda Law): sample of cross-linguistic variation

a.	Ganda:	NC...N	→ NN...N	/n-limi/	→ [nnimi] 'tongues'
b.	Lamba:	NC...NC	→ N...NC	/i-n-βaŋgo/	→ [imaŋgo] 'bonds'
c.	Lumasaaba:	NC...N	→ N...N	/i-n-lima/	→ [inima] 'I dig'
d.	Yao:	NC...NC	→ N...NC	/ku-n-dííŋga/	→ [kuu-nííŋga] 'to try me'
e.	Kwanyama:	NC...NC	→ NC...C	/N-gandu/	→ [oŋ-gadu] 'crocodile'

Not all instances of Meinhof's Law are necessarily genuine dissimilation. In Luganda, for example, the change is /NC...N/ → [NN...N]: this can be readily explained as nasal assimilation rather than dissimilation of prenasality (a point made by Herbert 1977b, 1986). Additionally, in some languages, the pattern is observed only as a diachronic change, and does not necessarily reflect any actual synchronic mapping.[16]

X.3.2.3.4.3 Other cases of NC dissimilation

Dissimilation of NC sequences is also found in a number of other languages, including Timugon Murut (Prentice 1971, Blust 2012), Muna (Coetzee and Pater 2006, Zuraw and Lu 2009), Ngadju Dayak and Mori Bawah (Blust 2012). Old Japanese (Unger 1975, Vance 2005, Kawahara 2008) also had NC dissimilation effects, in the form of static co-occurrence restrictions and blocking of alternations.[17]

X.3.2.3.5 [–nasal] dissimilation?

Dissimilation of [–nasal] is unattested: in my survey, I was not able to find any languages that show dissimilation of this sort. This kind of dissimilation, if it exists, could manifest in familiar-looking ways, though. For instance, if [-nasal] dissimilation occurred only among sonorants, it would presumably result in alternations like /r...r/→[r...n]. While Ainu has this type of [r]~[n] dissimilation in consonant clusters (Suzuki 1998, Shibatani 1990), long-distance dissimilation patterns of this type appears to be unattested.

[16] Non-dissimilatory alternations of a similar sort also seem to be possible, though the only cases known to me are anecdotal reports. For instance, Limpopo, a province in South Africa, is also attested as [limpompo], with apparent NC harmony; and as [lipompo], with apparent NC metathesis.

[17] Modern Japanese voiced stops developed historically from prenasalized stops in Old Japanese (which some dialects retain as such), which were subject to the same dissimilatory generalizations (i.e. Lyman's Law).

X.3.2.3.6 Nasality dissimilation summary

In sum: it is not clear whether true dissimilation for [±nasal] is phonologically possible. While dissimilatory patterns involving phonetically nasal (and/or nasalized) consonants are attested, there are no clear examples of long-distance, synchronic, consonant-to-consonant, dissimilation of [+nasal]. The best examples of dissimilatory interactions between just nasals are either confounded with other patterns (Takelma), or are not really long-distance consonant interactions (Xiamen Chinese), or are empirically suspect (Korean). While there are abundant examples of languages that avoid the co-occurrence of N+C clusters, not all of these are clearly dissimilatory: many cases of Meinhof's Rule (the Ganda Law) are just as readily explained as nasal assimilation (Herbert 1977b, 1986), and some cases of NC dissimilation in Australian can also be alternately explained as spreading of [–nasal] (cf. Odden 1994:303). Furthermore, they crucially apply only to clusters that contain both a nasal and oral component – they are not clearly segmental interactions, nor dissimilation for any one feature.

X.3.2.4 Length

Previous surveys of dissimilation (Suzuki 1998, Bye 2011) report that length dissimilation is attested; the finding of this survey is that length dissimilation is not supported as a genuine type of long-distance consonant dissimilation.

The languages reported to have length dissimilation are: Dinka, Gidabal, Oromo, Slovak, Latin, Finnish, and Japanese. The first 4 of these involve only vowel length alternations, and do not affect consonants. Of the remaining 3 reported cases (Latin, Finnish, and Japanese), none are clearly patterns based on consonant length. The pattern in Latin is degemination before a heavy syllable (the so-called 'Lex Mamilla' alternation): geminates shorten before any syllable with a long vowel, not just before another geminate (Itô and Mester 1996). The alleged dissimilation pattern in Finnish is the failure of 'consonant gradation' before heavy syllables, a pattern that likewise is neither dissimilatory nor strictly a consonant length alternation (Bye 2011:f.n.1). The alleged dissimilation pattern in Japanese is a static prohibition against multiple geminates in the same word; however, the only evidence for this restriction is the generalization that gemination in English loanwords does not produce two geminates in the same morpheme (Itô and Mester 1996, Tsuchida 1997:151). I know of one other recently reported case of geminate dissimilation, Talaud (Blust 2012). Here, again, the pattern really isn't about length: the generalization (Blust 2012:364) is that diachronic gemination of word-final consonants fails after any CC sequence - including not just geminates, but also NC clusters.

If we eliminate the dubious cases of length dissimilation, and the cases that apply only to vowels, there are no examples left. As such, I consider length dissimilation to be unattested (contra Suzuki 1998, Bye 2011).

X.3.3 Laryngeal features

This section considers dissimilation for the laryngeal features - [±voice], [±spread glottis], and [±constricted glottis]. All three can participate in dissimilation, but there is a peculiar asymmetry between [±voice] and the two glottal constriction features. Dissimilation is attested for both values of [±voice] (viz. [+voice] *and* [–voice]); on the other hand, only the 'positive' specifications [+sg] and [+cg] exhibit dissimilation.

X.3.3.1 Voicing

X.3.3.1.1 [+voice] dissimilation

Dissimilation for [+voice] is moderately attested. There are not many languages that exhibit this type of dissimilation, but it does occur with overt alternations in Western Bade (Schuh 1977, 2002), and also manifests as very robust blocking effects and co-occurrence restrictions in Japanese (Itô and Mester 1986, 1996; Alderete 1996, Kawahara et al. 2006).[18]

X.3.3.1.1.1 Western Bade

Dissimilation of [+voice] is found in Western Bade (Schuh 1997, 2002). The core generalization observed by Schuh (2002:4) is that 'a voiced obstruent becomes voiceless if the next syllable begins in a voiced obstruent.' In most varieties of Western Bade, this dissimilation is apparent only as a static restriction: relatively few words in the lexicon contain sequences of two [+voice] obstruents, and those that do are largely loanwords, ideophones, or full-root reduplicants (Schuh 2002:4-5). Alternations can be seen in CV-reduplicants, though (52): roots with an initial [+voice] obstruent have CV-reduplicated forms with a sequence of [–voice]...[+voice], instead of two [+voice] obstruents. The same sort of alternations can also be observed comparatively (e.g. Western Bade [kádùwá:n] ~ Hausa [gàdá:] 'duiker' (Schuh 2002:5)).

(52) Western Bade: [+voice] dissimilation in CV reduplicants (Schuh 2002:5,9)

a.	fà:vàrú	'go out repeatedly'	(< vàrú 'go out'; *[và:vàrú])
b.	tádàmán	'blood'	(cf. Bole dòm; *[dádàmán])
c.	pàbdú	'ask repeatedly'	(< àbdú; *[pàbdú])

In addition, some varieties of Western Bade have productive [+voice] dissimilation in prefixes (Schuh (2002:6) terms these varieties 'Far Western Bade'). Some examples are given in (53) below: prefixes that contain voiced obstruents in other dialects of Western Bade exhibit, in 'Far' Western Bade, systematic alternations between [+voice] and [–voice] obstruents.

[18] Voicing dissimilation is also reported in Gothic (a pattern known as 'Thurneysen's Law'; Chomsky and Halle 1968, Walker 2000a; see also Thurneysen 1897), though Flickinger (1981) argues that this case is spurious and not actually supported by the Gothic data available.

(53) 'Far Western' Bade: Synchronic [+voice] dissimilation in prefixes (Schuh 2002:7)

a.	ká-zənàɛá	'whithered'	(cf. [gà-hə́ɗà] 'dried', with /ga-/→[ga-])
b.	ká-vàrú	'you went out'	(cf. [gà-kárū] 'you stole', with /gə-/→[gə-])
c.	tə́-bàkà	'burned'	(cf. [dà-səɛà] 'washed', with /də-/ as [də-]
d.	tâ-bdə́t͡ʃi	'that he ask'	(cf. [dà-kárə́t͡ʃî] 'that he steal', with [da-])

X.3.3.1.1.2 Japanese

Dissimilation for [+voice] is also attested in Japanese, in the form of a static morpheme structure constraint, and blocking of regular alternations. The static dissimilatory restriction is observed in the native 'Yamato' vocabulary of Japanese: roots in this stratum of the lexicon never contain two voiced obstruents (Itô and Mester 1986:67; see also Kawahara et al. 2006, among many others).

There is also evidence that the co-occurrence restriction against multiple [+voice] obstruents is an active part of the synchronic phonology of Japanese: it blocks regular voicing alternations, an interaction known as 'Lyman's Law' (Itô and Mester 1986, 1996, 1998; Vance 1987, 2005; see also Alderete 1997, among others). The generalizations are the following: in compounds, the initial consonant of the second root must be voiced, resulting in a constellation of alternations known as 'Rendaku' or 'sequential voicing' (54).[19] However, when the second morpheme in the compound already contains another [+voice] obstruent, the Rendaku voicing alternation fails to occur (55).

(54) Japanese: Rendaku voicing in compounds (Itô and Mester 1986:52)

a.	iro	+	kami	→	irogami	(*irokami)
	'color'		'paper'		'colored paper'	
b.	e	+	tako	→	edako	(*etako)
	'picture'		'kite'		'picture kite'	
c.	yo	+	sakura	→	yozakura	(*yosakura)
	'night'		'cherry'		'blossoms at night'	
d.	hana	+	t͡ʃi	→	hanad͡ʒi	(*hanat͡ʃi)
	'nose'		'blood'		'nosebleed'	

[19] The Rendaku pattern also involves alternations between /h/ (including allophones [h f ç]) and [b], e.g. [ike] 'arrange' + [hana] 'flower' → [ike**b**ana] 'ikebana (art of flower arrangement)' (Itô and Mester 1986:53). This quirk in the pattern is because modern /h/ descends from earlier *p.
Additionally, Vance (1987:114) notes that some speakers use [ŋ] instead of [g] intervocalically; for these speakers, sequential voicing of /k/ produces [ŋ] rather than [g], e.g. [jama] 'mountain' + [kawa] 'river' → [jamaŋawa]. Vance suggests this is related to the fact that modern Japanese voiced stops derive historically from prenasalized stops (i.e. [g] originates from earlier *ŋg).
For simplicity, I will abstract away from these two irregularities in the Rendaku pattern, and will take [+voice] to be the only relevant feature involved.

(55) Japanese: Rendaku voicing blocked when it would yield two [+voice] obstruents

a.	kami	+	kaze	→	kamikaze	'divine wind'	(*kamigaze)
b.	mono	+	ʃizuka	→	monoʃizuka	'tranquil'	(*monod͡ʒizuka)
c.	siro	+	tabe	→	sirotabi	'white tabi'	(*sirodabi)

Thus, Rendaku voicing systematically fails to produce roots with multiple voiced obstruents. This shows that the restriction on the Yamato vocabulary is not a historical accident; it the prohibition against voiced obstruent co-occurrence is actively enforced on the surface, even though it does not cause alternations on its own. See also Kawahara (2012) for additional experimental evidence that Lyman's Law reflects an active phonological restriction.

X.3.3.1.2 [–voice] dissimilation

Dissimilation of [–voice] is robustly attested. Overt voiceless dissimilation is found in many Eastern Bantu languages (Dahl's Law), including: Kikuria, Ekegusii, Embu and Meru (Davy and Nurse 1982); Kikuyu (Davy and Nurse 1982, Armstrong 1967); Tharaka, Mwimbi, and possibly Nyamwezi and Luyia (Bennett 1967); Kinyarwanda (Kimenyi 1978, 1979); and Kirundi (Hyman 2003:56, Meussen 1959). These languages all exhibit dissimilatory voicing of stops (most commonly /k/) before voiceless obstruents, though with some cross-linguistic variation. This phenomenon is not unique to Bantu languages, however: overt [–voice] dissimilation also occurs in Moro (Rose 2011b), a Kordofanian language; Minor Mlabri (Rischel 1995:90), an Austro-Asiatic language; and Bororo, a Macro-Gê language spoken in Brazil (Nonato 2015). Other potential cases of voiceless dissimilation may also be found Bukawa (Ross 1993) and Bakairi (Bye 2011; de Souza 1991; Wetzels and Mascaró 2001), though these are less clear cut.[20]

X.3.3.2 Spread Glottis

X.3.3.2.1 [+spread glottis]

Dissimilation of [+spread glottis] is robustly attested. Languages with this type of dissimilation include: Ekoti (also known as Makhuwa/Makua) (Kisseberth 2003; Schadeberg 1999, 2000), Meithei (Chelliah 1997), Ofo (MacEachern 1999, De Reuse 1981), Cuzco Quechua (MacEachern 1999, Rowe 1950, Parker and Weber 1996; see chapter 5),

[20] The pattern in Bukawa is that stops in adjacent syllables always disagree for voicing; thus, sequences like [papa] are impossible. Ross (1993) explains this as the result of a diachronic voicing pattern based on foot structure: obstruents are voiceless in the head of a foot, and voiced in the non-head of a foot. If this is correct, then the non-co-occurrence of [–voice] obstruents in Bukawa could be seen as an accidental gap.

In Bakairi, the generalization (Wetzels and Mascaró 2001:235) is that a word can contain no more than one word-internal voiceless obstruent. Thus, Bakairi has words like [igeke] 'singing', but no words of the form *[ikeke]. What makes this a marginal case is that word-initial obstruents are always voiceless, and have no bearing on the occurrence of voiceless obstruents elsewhere in the word. Thus, Bakairi does have numerous words like [sekadai] 'asked', with two [–voice] obstruents, which are apparent counter-examples.

Sanskrit (Anderson 1970), and perhaps also Adiyaman Kurmanji, a Kurdish Indo-Iranian language spoken in Eastern Turkey (Ümit Atlamaz, p.c.).[21] Additionally, static morpheme structure constraints that prohibit the co-occurrence of two [+sg] consonants are found in Peruvian Aymara, Zuberoan Basque, Gojri and Harauti (MacEachern 1999), though in these cases there are no observable alternations.

X.3.3.2.1.1 A note about 'Vaux's Law' and [+spread glottis] in fricatives

Vaux (1998a) argues that voiceless fricatives should be regarded as having a default or underlying [+spread glottis] specification, even in the absence of any contrastive function of [±sg] as a feature. If we accept this proposal, it allows a number of additional patterns of long-distance consonant interaction to be understood in terms of dissimilation.

In Makhuwa (Schadeberg 1999, 2000; Kisseberth 2003), there is a static, dissimilatory, co-occurrence restriction against aspirated stops: only one aspirate is allowed in a root. Schadeberg (2000:15) observes that in some verbs, addition of the causative suffix [-is-]~[-ih-] can result in deaspiration in the root, as shown below (56).

(56) Ekoti: de-aspiration before causative /-is-/ (Schadeberg 2000:15)

a.	osut^{h}uwa	'to be startled'	
b.	osutisa	'to startle'	(cf. *osut^{h}isa; deaspiration before /s/)
c.	okatipuk^{h}a	'to be angry'	
d.	okatipuk$^{(h)}$isa	'to make angry'	(optional deaspiration)

A similar pattern is found in Huave (Kim 2008:81-85), a language isolate spoken in Mexico (Oaxaca). Huave deletes /h/ following other /h/s, an apparent pattern of [+spread glottis] dissimilation. As Kim notes, the sibilant fricatives [s ʃ] also trigger this [h]-deletion, perfectly consistent with Vaux's claim that they are [+sg].

Both of these cases can be understood if sibilant fricatives are [+sg], and they can then be assimilated to other cases of regular [+sg] dissimilation like those discussed above.

X.3.3.2.2 [–spread glottis]

Dissimilation of [–spread glottis] is unattested. This type of dissimilation is easy to conceive of: imagine a language in which stops are usually unaspirated, but become aspirated when another stop follows. There are numerous languages where stops are aspirated only in certain contexts, but I do not know of any languages where aspiration is distributed in this dissimilatory way.[22]

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[21] The generalization in Adiyaman Kurmanji is that breathiness/aspiration is lost in intensivizing partial reduplication. For example: [z^{h}a] > [zəpɪ-z^{h}a], *z^{h}əpɪ-z^{h}a 'dry'/'very dry'; and [m^{h}or] > [mos-m^{h}or], *m^{h}os-m^{h}or 'purple'/'very purple'. This pattern of partial reduplication involves the insertion of an extra consonant [p] or [s] in these examples, and appears to be borrowed from Turkish; see §X.3.4.5.1.2.

[22] A related pattern is reported for Tangkhul Naga (Shosted 2007, Bhat 1969): word-initial stops are aspirated only when the onset of the next syllable is a sonorant. Shosted (2007) characterizes this as a

X.3.3.3 Constricted Glottis

X.3.3.3.1 [+constricted glottis]

Dissimilation for [+constricted glottis] is robustly attested. Languages with this type of dissimilation include: Cuzco Quechua (Parker and Weber 1996); various Salish languages including Moses-Columbian (Fallon 2002:213), Okanagan (Thompson and Thompson 1985), Shuswap (Thompson and Thompson 1985, MacEachern 1999, Fallon 2002), and Tillamook (Fallon 2002:214). Marginal cases of [+cg] dissimilation with visible alternations are also found in Seri (Yip 1988, Marlett and Stemberger 1983), where the dissimilation applies to glottal stops only (not any other [+cg] consonants), and in partial reduplications in both Kalispel Salish (Fallon 2002:211)[23] and Korean ideophones (Kim 2003, Kim 1995:407). Static restrictions against co-occurrence of [+cg] consonants are also found in Bolivian Aymara (MacEachern 1999), Old Georgian (MacEachern 1999), Hausa (MacEachern 1999, Newman 2000); various Mayan languages, including Chol (Gallagher and Coon 2009), Tzeltal (Suzuki 1999, Kaufman 1971), Tzutujil (MacEachern 1999, Dayley 1985), and Yucatec (Yip 1989, MacEachern 1999); and Bolivian Quechua (Gallagher 2010, 2011).

X.3.3.3.2 [–constricted glottis]

Dissimilation for [–constricted glottis] is unattested. What this might look like is conditional glottalization of obstruents, e.g. stops are ejective only when the following syllable also contains a stop. Positional glottalization of obstruents is attested,[24] but I have found no languages where this happens only to avoid the co-occurrence of two non-glottalized consonants.

The absence of dissimilation for [–cg] is significant because there are consonant harmony patterns where agreement holds over only non-glottalized obstruents. An example is Ngizim (Hansson 2001/2010; Schuh 1979, 1997): Ngizim has voicing agreement among stops and fricatives in the root (as evidenced by diachronic changes). But, implosives do not participate in this agreement: [ɗ] is a voiced consonant, but it neither agrees with voiceless obstruents, nor does it cause voiceless obstruents to assimilate to match its [+voice] value.

Interpreting the Ngizim pattern as agreement by correspondence among all and only the [–constricted glottis] consonants, we might posit a CORR constraint CORR·[–son, –cg] – a constraint that demands correspondence among all and only the non-

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perceptual OCP effect. This case does not pass the test for dissimilation, though: the interaction is between sonorants and stops, two classes of segments that have no shared features. Underlying aspirated and unaspirated stops behave in exactly the same way - [±spread glottis] has nothing to do with 'triggering' this pattern, and it therefore cannot be dissimilation for [–sg].

[23] Kalispel Salish exhibits de-glottalization of ejectives in reduplication, a pattern found in the other Salish languages noted above. I exclude this case because there are no examples where a vowel intervenes between the two dissimilating ejectives (though dissimilation does occur across other intervening non-ejective consonants). See Fallon (2002:211-212) for discussion and examples.

[24] For example, in some varieties of American English, including the author's, phrase-final voiceless stops may be realized as ejectives.

glottalized obstruents. The existence of this constraint, given the Mismatch property of the SCTD, would predict that dissimilation for [–cg]. But, such dissimilation doesn't appear to be attested.

X.3.4 Secondary Place features

X.3.4.1 Secondary Labialization

By labialization, I mean a secondary labial gesture that is distinct from the main place of articulation - e.g. the difference between [k] and [kʷ]. I will represent this property using an ad hoc feature [±labialized].

Long-distance dissimilation of labialization is considered unattested. This type of dissimilation is reported in Imdlawn Tashlhiyt Berber (Elmedlaoui 1995a, 1995b, Selkirk 1993), but this case is a marginal one (see discussion below). This is the only case I know of where labialization dissimilation is reported to be long-distance; other cases of labialization dissimilation (e.g. Moroccan Arabic, Elmedlaoui 1995a, 1995b) are strictly segment-adjacent patterns.

X.3.4.1.1 Imdlawn Tashlhiyt Berber

Elmedlaoui (1995a, 1995b) reports dissimilation of secondary labialization on velars, distinct from another pattern of dissimilation for [Labial] as a major place feature. The relevant generalization is that a labialized consonant cannot appear before other labialized consonants, or the vocalic elements [w] and [u]. This is illustrated below (examples from Elmedlaoui 1995a:57): aorist forms involve a final [-u] (57), and this round vowel causes loss of labialization on a previous consonant (58).

(57) Imdlawn Tashlhiyt Berber: Aorist formation with [-u]

	Perfective	Aorist	
a.	bna	bnu	'bâtir'
b.	ʒla	ʒlu	'égarer'
c.	rka	rku	'ê. sale'

(58) Imdlawn Tashlhiyt Berber: de-labialization before Aorist [-u]

	Perfective	Aorist	
a.	gʷna	gnu (*gʷnu)	'coudre'
b.	kʷna	knu	'se courber'
c.	ʁʷla	ʁlu	'ê. cher'
d.	χʷla	χlu	'démolir'

Similar alternations are found in singular-plural pairs of nouns, as illustrated below (Elmedlaoui 1995a:56). Some nouns show regular ablaut of their final vowel, with [u] in the singular form and [a] in plurals (59a-b). A subset of these nouns show a corresponding alternation in labialization: a dorsal consonant is labialized in the plural form (where the final vowel is [a]), but not in the singular form (with final vowel [u]), as

in (59c-f). This is taken to be dissimilation: these consonants are labialized underlyingly, but this labialization fails to appear when the labialized element [u] follows. This is a long-distance pattern: as (59c-f) show, the 'triggering' [u] and the consonant exhibiting the K~Kʷ alternation can be separated by other segments, even other labial consonants. The forms in (59g-h) show that this is crucially a dissimilatory phenomenon: nouns that have no [u] in their singular forms may have labialized consonants, and do not show the labialization alternation.

(59) Imdlawn Tashlhiyt Berber: [Cʷ]~[C] dissimilation before [u] (Elmedlaoui 1995a:56)

	Singular	Plural		
a.	a-srdun	i-srdan	'mulet'	(Sg. [u] ~ Pl. [a])
b.	a-zgzu	i-zgza	'verdure'	
c.	a-mrgul	i-mrgʷal	'récipient aved couvercle pour pâte'	
d.	a-gdur	i-gʷdar	'gargoulette'	
e.	a-ʁnbub	i-ʁʷnbab	'visage (au péjoratif)'	
f.	a-qmmu	i-qʷmma	'museau'	
g.	a-χʷrʔbiʃʼ	i-χʷrʔbaʃʼ	'mosquée modeste du douar'	
h.	a-skʷfl	i-skʷfal	'gradin'	

Note that in these examples, the interaction is between a consonant and a vowel, and crucially *not* between two consonants. The de-labialization of the dorsals in (58) and (59) is 'triggered' by a surface vowel [u], not by another labialized consonant. Labial consonants do not cause loss of labialization, as in (59e) [i-ʁʷnbab].

Cross-dialectal comparisons provide evidence for de-labialization in Imdlawn, induced by another labialized consonant, though the pattern is not completely parallel. Elmedlaoui (1995a:121) provides the comparisons in (60), between the Imdlawn Tashlhiyt dialect, and the Tashlhiyt dialects of Indawzal and Zagmuzn; sequences of two labialized consonants in Indawzal/Zagmuzn correspond to single instances of labialization in Imdlawn, suggesting dissimilation.

(60) Imdlawn Berber: Comparative evidence for labialization dissimilation[25]

	Imdlawn	Indawzal/Zagmuzn	
a.	agʷmar	agʷmʷar	'cheval'
b.	lkʷmmijt	lkʷmmʷijt	'poignard chevaleresque'
c.	aqʷmlil	aqʷmʷlil	'gifle'
d.	akʷfaf	akʷfʷafʷ	'toît'
e.	χʷbi	χʷbʷi	'lacérer à coup de griffe'

[25] In these forms, Elmedlaoui (1995a) transcribes the dorsal consonants with labio-velarization, and the labials with velarization (as [mˠ] rather than [mʷ]). However, he notes (p. 113) that this velarization is an articulatory configuration comparable to the labio-velarized [kʷ]. I have changed the velarization diacritics to [Cʷ] for consistency.

There are some notable asymmetries, however, between this pattern of apparent dissimilation and the synchronic pattern considered above. First, the direction of dissimilation is reversed: the comparative evidence points to de-labialization *after* another labialized segment, not before (cf. (58-59) above). Second, this pattern of dissimilation is only observed between one [Dorsal] consonant and one [Labial] one - a peculiar gap, given that the synchronic labialization dissimilation seems to hold only for [Dorsal] consonants. Finally, in the comparative case, the presumed dissimilation is always segment-adjacent: neither vowels nor other non-labialized consonants intervene. This apparent historical dissimilation is apparently not a long-distance pattern.

Labialization dissimilation as a long-distance, synchronic, consonant-to-consonant interaction is not observed in Imdlawn Tashlhiyt, and fails to occur in morphological configurations that would give rise to it. The language has two verbal agreement suffixes with relevant consonants: 2nd-person masculine plural object suffix /-kʷn/ (with a labialized velar), and the 2nd-person plural dative suffix /-awn/ (with [w]). Neither of these suffixes causes de-labialization in the root:

(61) Imdlawn Tashlhiyt: Cʷ dissimilation is not productive (Elmedlaoui 1995a:59)

a.	i-gʷmr-kʷn	i-gʷmr-awn	‘pratiquer la chasse’
b.	i-ʁʷi-kʷn	i-ʁʷj-awn	‘tenir, attraper, arrêter’
c.	j-agʷi-kʷn	j-agʷj-awn	‘refuser’

In these examples, affixation yields input sequences of /Cʷ...Cʷ/ or /Cʷ...w/. These sequences should dissimilate to [C...Cʷ] and [C...w] respectively, but this is not what happens - the sequence is simply tolerated instead.

Imdlawn Tashlhiyt Berber is considered a marginal case of dissimilation due to the complications discussed here. When the alternation is long-distance, it is only observed between a consonant and a vowel, never between two consonants. A related consonant-to-consonant interaction can be inferred from comparative evidence, but here the pattern is not a long-distance one. This complementary distribution is suspicious, and undermines the validity of Imdlawn Tashlhiyt as a case of genuine dissimilation for the property of (secondary) labialization.

X.3.4.2 Labio-velarity dissimilation

By ‘Labio-velarity’, I mean a second velar articulation on a consonant that is primarily labial – i.e. the distinction between [p] and [k͡p]. This property is typically viewed as a second [Place] feature, forming a complex segment (Sagey 1986, Clements and Hume 1995, Hall 2007, e.g.).

Dissimilation of labio-velarity is unattested. I know of no languages with dissimilatory patterns that crucially pick out labio-velar consonants, to the exclusion of [Labial] segments more generally. For instance, I have found no languages where labio-velars may co-occur with labials, but not with other labio-velars.

This property is notable because it participates in consonant harmony patterns. In Ngbaka (Thomas 1963, Sagey 1986), for instance, labials and labio-velars may not co-occur in roots, a pattern interpretable as agreement among [Labial] consonants for labio-velarity. Ponapean is another possible case (Hansson 2001/2010, Mester 1986, Rehg and Sohl 1981), along with Mokilese, which is reported to share the same generalizations (Mester 1986, McCarthy 1989).

What is not reported, however, is harmony specifically *among* labio-velars (for some other feature, e.g. voicing). This is the sort of harmony that would be predicted if there are CORR constraints which refer to the property of labio-velarity. This is consistent with the non-existence of this type of dissimilation.

X.3.4.3 Uvularity and backness dissimilation

Dissimilation for uvularity – i.e. for the uvular vs. velar distinction among dorsals – is unattested. This type of dissimilation would appear as alternations like /q...q/ → [q...k], where a sequence of two uvular consonants surfaces as one uvular and one velar. In my survey, I have found no languages with dissimilatory patterns of this type, even as marginal examples or with only local, segment-adjacent dissimilation.

The closest candidate for dissimilation of any secondary place feature of dorsals is a form of diachronic backness dissimilation found in a number of Quichéan Mayan languages, including Tzutujil and Kaqchikel (Grimes 1969; Campbell 1974, 1977; Ohala 1981; Noguchi 2014).[26] The generalization in these languages is that historical velars are palatalized in the context of another dorsal. Some examples are given in (62) below.

(62) Diachronic palatalization before dorsals in Quichéan (Grimes 1969)

	Proto-Quichéan	Kaqchikel	Tzutujil	
a.	*k'aq	kʲ'aq	kʲăq	'flea'
b.	*ʔiʃk'aq	ʔiʃkʲ'eq	wiʃkʲăq	'fingernail'
c.	*kʲeq	kʲeq	kʲăq	'red'
d.	*kik'	kʲik'	kʲik'	'blood'
e.	*kex	kʲex	kʲex	'horse'
f.	*kax	kax	kax	'sky'
g.	*kem	-kʲem-	-kʲem-	'weave'

The Quichéan case comes with several confounds in the data, though, which make it a less-than-clear case of dissimilation. For example, (62f) shows palatalization failing to occur in *kax, even though palatalization can otherwise be conditioned by *x (as in (*kex > kʲex), and can happen across *a (as in *k'aq > kʲ'aq) – a clear exception. By the same token, (62g) shows palatalization of a velar in the presence of a labial rather than a dorsal. Taken together, these counter-examples suggest that the diachronic

[26] Some Mamean dialects exhibit a similar dissimilatory effect, albeit in more restricted circumstances; see the database entry for Mam for more details and references.

palatalization is not strictly dissimilatory in nature. Campbell (1974) notes a wide range of dialect variation, and it's quite plausible that some varieties may exhibit a truly dissimilatory form of this pattern; further research is necessary to confirm this.[27]

X.3.4.4 Laterality dissimilation in non-liquids

Lateral dissimilation is well attested among liquid consonants, but not among non-liquids. While lateral fricatives and affricates are not rare crosslinguistically, I found no cases where they show dissimilatory alternations for [+lateral] (e.g. /ɮ...tɬ/ → [ɮ...tʃ]). Only one language, Jibbāli, is reported to have dissimilatory restrictions on lateral obstruents (Walsh-Dickey 1997:57), has static restrictions involving both the lateral sonorant [l] and lateral obstruents.

X.3.4.4.1 Jibbāli

Jibbāli is a Modern South Arabian Semitic language, and has three lateral consonants: two fricatives [ɬ ɮ] and a sonorant [l].[28] The dissimilation generalization, reported by Walsh-Dickey (1997:57), is that while different laterals freely co-occur, a root may not contain two identical laterals.

The generalization reported for Jibbāli is spurious, however. A search through Johnstone's (1981) dictionary turns up numerous roots containing two identical lateral consonants. While some of these roots can be seen as reduplicated forms (e.g. fully reduplicated roots like /ɬlɬl/ 'move slowly', as well as possible final reduplications like /fɬɬ/ 'squirting everywhere'), others plainly are not reduplicated. These include forms with two laterals that are non-adjacent radicals (63), and quadrilateral roots with two identical final radicals (64). Tri-consonantal roots with two identical final laterals could be interpreted as copying of an underlyingly bi-consonantal root to fill out the basic 3-consonant template, (e.g. following McCarthy 1979); however, this does not hold for roots that already have 3 consonants like those in (64). As such, I see no reason to think that the two identical final laterals in (64) should be regarded as copies of the same consonant - the template conditions are already satisfied without copying.[29]

(63) Jibbāli: non-reduplicated roots with two identical laterals (Johnstone 1981)
   a. lhlʕ
   b. sʕlwl

[27] The Tzutujil example is also a reported case of segmental blocking (Ohala 1981); see §X.4.3 for further discussion.

[28] In at least some Jibbāli dialects, the voiced lateral fricative [ɮ] is in complementary distribution with [l], appearing only next to high vowels (Johnstone 1975, 1980; Al Aghbari 2011).

[29] Johnstone (1981) does not give glosses for roots themselves, only forms derived from them. As such, no glosses are given here.

(64) Jibbāli: 4-Consonant roots with identical final laterals: (Johnstone 1981)
- a. dħll
- b. dk'll
- c. gmll
- d. hbll
- e. ħɮˤll
- f. sˤwll
- g. zħll

Thus, the generalization that Jibbāli prohibits all co-occurrences of identical laterals does not actually hold. Jibbāli is therefore not an actual case of [+lateral] dissimilation.

What the Jibbāli data possibly might be evidence for is voicing agreement among the lateral fricatives, though this rests on a particular interpretation of the data. My search of Johnstone (1981) turned up no roots containing both of the lateral fricatives. Both of the lateral fricatives may co-occur with the lateral sonorant [l], but not with each other – there are no roots like [ɬmɮ] or [ɮɬɬ], etc. This is illustrated by the examples in (65).[30]

(65) Jibbāli: co-occurrence of non-identical laterals

a.	ˠɬ ~ l	ɬll, ɬltˤ, ɬml, ɬwl, ɬxl, ɬlɬl
b.	ˠɮ ~ l	ħɮˤll, ɮl, ɮfl, ɮbl, ɮlʔ, ɮwl
c.	*ɬ ~ ɮ	(unattested; *ɮmɬ, *ɬɮɮ, *hɮɬɬ, etc.)

The gap in the lexicon in (65c) is not consistent with the reported dissimilation pattern. There are two possible explanations for it. The more interesting possibility is that this gap represents a real prohibition against voiced and voiceless lateral obstruents in the same root. This would be a case of agreement among laterals: the observation is that a root may not contain lateral fricatives that disagree in voicing. The alternative is that the gap in (65c) may be accidental – a coincidence likely due to the low frequency of homorganic consonant co-occurrence throughout the Semitic languages (Greenberg 1950) (and perhaps amplified by the relatively low frequency of lateral fricatives in general).

X.3.4.4.2 Recap: Why [±lateral] dissimilation is 'unattested'

As shown above, the lateral dissimilation reported in Jibbāli is not an accurate characterization of the pattern. This case is spurious, not even marginal.

I found only one other possible candidate for [±lateral] dissimilation in obstruents, Shangzhai Horpa (Sun 2007), but it is strictly segment-adjacent dissimilation, and thus outside the scope of the survey. The pattern is that /s/ alternates with the lateral fricatives [ɬ] (or [ɮ], due to voicing agreement) in clusters

[30] Incidentally, Johnstone's lexicon contains no examples of the opposite order from (64a-b): there are no roots that have /l/ as the first consonant, and also contain a following /ɬ/ or /ɮ/. I do not know if this is a meaningful generalization or simply an accidental gap in the data available.

before another sibilant. This could be interpreted as local dissimilation of [–lateral], but it is a marginal case. First, the pattern is not robust: only one morpheme exhibits this alternation. Second, [±lateral] is not necessarily the crucial difference between [s] and [ɬ].

X.3.4.5 Coronal minor place features

This section considers dissimilation of the 'minor place' features and manner features associated with [Coronal] non-liquids (liquids are discussed in §X.3.5). These features consist of [±anterior], which distinguishes dentals and alveolars from palatals and retroflexes; [±distributed] which separates palatals and dentals from alveolars and palatals from retroflexes; and [±sibilant] (≈ [±strident]), which distinguishes the sibilant stops and affricates {s z ʂ ʐ ʃ ʒ t͡s d͡z t͡ʂ d͡ʐ t͡ʃ d͡ʒ} from other coronal obstruents.

Long-distance dissimilation is not attested for any of the coronal minor place features. That is, there are no attested patterns of dissimilation for retroflexion, palatality, dentality, or sibilance.

X.3.4.5.1 Sibilant dissimilation

I have found no cases of productive sibilant dissimilation – cases where sibilants systematically alternate with non-sibilants in a dissimilatory way. The two closest approximations of this type of pattern are presented below; they come from Hungarian and Turkish. Both involve alternations between sibilants and non-sibilants; but, both also appear to be morphologically based. Sibilant dissimilation may also have occurred as a diachronic change in Zan languages, but does not hold as a synchronic pattern.

X.3.4.5.1.1 Hungarian - sibilant dissimilation?

In Hungarian (Paster 2006:41-42)[31], second-person singular agreement is typically marked on present tense verbs by the suffix [-s]; however, after stems that end in a sibilant, we find [-El] instead (where E is a harmonizing mid vowel). This is illustrated in (66).

(66) Hungarian suppletive morphological sibilant dissimilation (Paster 2006:42)

a.	va:r-s	'you wait'	(2nd sg. suffix is sibilant /-s/)
	ɲom-s	'you press'	
	rak-s	'you place'	
	mond-a-s	'you say'	
b.	vonz-ol	'you attract'	(*vonz-s; suffix is [-Vl] after sibilants)
	edz-el	'you train'	(*edz-s)
	hajha:s-ol	'you seek'	(*hajha:s-s)
	fø:z-ol	'you cook'	(*fø:z-s)

[31] Paster attributes this generalization to Kenesei, Vago and Fenyvesi (1997) and Rounds (2001); the examples in (66), she attributes to Abondolo (1988:102). I have not consulted these sources.

This is not actually dissimilation of sibilance. While it does involve a sibilant vs. non-sibilant alternation ([s]~[l]), and it is induced by the presence of another sibilant, it is clearly morphological in nature. This is based on two main observations noted by Paster (2006:42). First, the alternation involves more than just a difference on [±sibilant]: the 'dissimilated' allomorph [-El] has a vowel that isn't there in its usual [-s] counterpart. Second, it is not a general phonological pattern: Hungarian does have sibilant-sibilant clusters elsewhere, and does *not* exhibit this dissimilation except in this particular suffix.

So, the Hungarian pattern is not a bona fide case of long-distance sibilant dissimilation.

X.3.4.5.1.2 Turkish - Sibilant dissimilation?

The other possible – though marginal – example of synchronic dissimilation comes from Turkish (Yu 1999; see also Wedel 1999), where combinations of sibilants are avoided in fixed-segment reduplication.[32] Turkish has a process of emphatic reduplication which copies the initial (C)V portion of an adjectival root, and inserts an extra consonant; Yu terms this consonant the 'linker'. This linker consonant varies: it may be {p m s r}, and is not consistently predictable based on the consonants of the base. Some examples are given in (67). The dissimilation generalization is that the one sibilant linker consonant [-s-] never appears with bases that contain another sibilant. This is shown in (68): the bases in (68b-e) all contain sibilants, and their reduplicated forms may have any of the linker consonants *except for* [-s-].

(67) Turkish: emphatic reduplication inserts a linker consonant {p m s r} (Yu 1999:4)

	Base		Reduplication		
a.	deɹin	'profound'	de-p-deɹin	'extremely profound'	(-p- as linker)
b.	dʒɯlk	'rotten'	dʒɯ-m-dʒɯlk	'extremely rotten'	(-m- as linker)
c.	belli	'obvious'	be-s-belli	'unmistakably obvious'	(-s- as linker)
d.	sefil	'miserable'	se-r-sefil	'very miserable'	(-r- as linker)

(68) Turkish: linker -s- doesn't occur if the base contains a sibilant (Yu 1999:4)

a.	dʒaʋlak	'naked'	dʒa-s-dʒaʋlak	'totally naked'	(no root sibilant, ˅-s-)
b.	zor	'difficult'	zo-p-zor	'very difficult'	(*zo-s-zor)
c.	buɹuʃuk	'wrinkled'	bu-m-buɹuʃuk	'very wrinked'	(*bu-s-buɹuʃuk)
d.	temiz	'clean'	te-r-temiz	'spotlessly clean'	(*te-s-temiz)
e.	eski	'ancient'	e-p-eski	'very ancient'	(*e-s-eski)

This appears to be a dissimilatory prohibition against the co-occurrence of sibilants; however, there are good reasons to think this is a morphological pattern and

[32] The same pattern also occurs in Adiyaman Kurmanji, a Kurdish language spoken in Adiyaman in eastern Turkey, and the generalizations about sibilants appear to be the same (I thank Ümit Atlamaz, p.c., for informing me of this).

not a genuine example of phonological dissimilation. First, like the Hungarian case above, this is a pattern limited to this one morpheme – Turkish has multiple affixes with sibilants, but sibilant dissimilation effects are not reported except in this emphatic reduplication. Second, the dissimilatory effect is not a predictable alternation: bases containing sibilants may not have [-s-] as their linker consonant, but they *may* have *any* of the other three possibilities, as seen in (68b-e) above. Third, the sibilant dissimilation pattern is not the only restriction imposed on the linker (Yu 1999:5)[33]: it may not be the same as the first consonant of the base, may not be the same as the last consonant of the base, and it gradiently avoids similarity with all consonants of the base. All of these observations suggest that the determination of the linker consonant is morphological in nature; it may be (partially) phonologically conditioned, but it is not the same phenomenon as other cases of long-distance dissimilation considered here.

X.3.4.5.1.3 Dissimilatory de-affrication in Zan languages

Strident dissimilation is reported diachronically in the Zan languages Mingrelian (a.k.a. Megrelian) and Laz, by Gudava (1964). This report does not appear to be a genuine case of productive synchronic dissimilation.

The dissimilatory observation is that proto-Zan voiced strident affricates *dz and *dʒ have changed to [d] in Mingrelian/Laz only in words containing a later strident affricate *ts or *tʃ. Gudava's (1964:502-503) examples are given in (69).

(69) Zan: Diachronic dissimilatory de-affrication: *dZ...tS > d...tS [34]

a.	*d͡ʒimt͡ʃ'k'u	> dimt͡ʃ'k'u	'ant'
b.	*d͡ʒint͡ʃ'k'id͡ʒ-	> dint͡ʃ'k'id͡ʒ-	'nettles'
c.	*d͡ʒirt͡ʃe	> dirt͡ʃe	(type of plant)
d.	*d͡ʒat͡ʃ'v-	> dat͡ʃ'v-	'chain'
e.	*d͡zit͡sxir-	> dit͡sxir-	'blood'
f.	*d͡zot͡sxu	> dut͡sxu	'linden'
g.	*d͡zit͡s-	> dit͡s-	'(to) laugh'
h.	*d͡zat͡ʃxur-	> dat͡ʃxur-/dat͡ʃxir-	'fire'

The change in (69) could be interpreted as dissimilation of stridency, or continuancy: [d͡z d͡ʒ] are both strident affricates, while [d] is neither. However, neither strident dissimilation nor continuant dissimilation holds as a synchronic generalization in Mingrelian, as the data in (70) shows. The forms in (a) and (b) show that the language does allow words where voiced strident affricates co-occur with another strident affricate. These words may even have the same combinations that underwent de-affrication diachronically: compare (69f) *[d͡zot͡sxu] vs. (70a) [d͡zit͡sa]. The voiced

[33] Yu attributes these generalizations to Demirican (1989), a source which I have not consulted here.

[34] My thanks to Vera Gor for her assistance in translating the glosses for these forms from Russian. At the time of writing, the Wikipedia entry for 'Mingrelian language' also features two other examples showing much the same change in the opposite direction: *orcxonži* → *orcxondi* 'comb', *č'anži* → *č'andi* 'fly (insect)', and *isinži* → *isindi* 'arrow'. I have not been able to locate an original published source for these examples, and have no further details on their relation to the examples in (69)-(70).

strident affricates can also occur synchronically before non-strident continuants (c-e), and before sibilants (f-k). The same is true of the voiceless strident affricates (l-m).

(70) Mingrelian: strident de-affrication isn't synchronic (data from Harris 1991)

a.	d͡zit͡sa	'laugh/Nom'
b.	o-rd͡ʒgin-an-t͡s-ə	'he outdoes him'
c.	d͡ʒoɣorepi	'dogs-Nom'
d.	mard͡zɣvani	'right side'
e.	d͡zɣabi-k	'girl-Nar'
f.	t'orond͡ʒ-i-s	'dove-Dat'
g.	d͡ʒa-ʃ-i-ʃ	'wood-Gen-Emph-Gen'
h.	d͡ʒar-sə	'grief-Dat'
i.	va-d͡ʒer-s	'Neg-believe-3.sg.subj'
j.	d͡ʒma-sə	'brother-Dat'
k.	ud͡ʒguʃ	'good'
l.	t͡ʃ'q'ant͡ʃ'q'ua	'crush'
m.	birt͡sxa-ʃ	'fingernail-Gen'

Based on the Mingrelian data in (70), I do not consider the historical de-affrication in (69) to reflect a valid case of dissimilation. This is a purely diachronic change, and it doesn't appear to correspond to a synchronically real restriction on strident affricates.

X.3.4.6 Pharyngealization dissimilation?

By pharyngealization, I mean consonants that have a Labial, Coronal, or Dorsal primary place of articulation, but with a secondary pharyngeal articulations. A canonical example is the Coronal 'emphatic' consonants found throughout most varieties of Arabic, and in other Semitic languages (see Lehn 1963, Hoberman 1989, McCarthy 1994, Davis 1995, among many others).

Pharyngealization dissimilation is considered unattested: the survey found very few potential cases, and none are clearly synchronic, long-distance, consonant-to-consonant patterns. None of the potential cases involve productive alternations; the dissimilatory effects are evident only as historical changes or static restrictions. Furthermore, all of them are languages with strictly local spreading of pharyngealization to both consonants and vowels; this makes them dubious as genuinely long-distance consonant interactions. The relevant languages are discussed below in more detail.

X.3.4.6.1 Kurmanji (Kurdish)?

The best evidence of synchronic dissimilation of pharyngealization is found in Kurmanji Kurdish, an Indo-Iranian language. The generalization noted in previous work is a static dissimilatory restriction: roots may contain at most one of the 'emphatic' (≈pharyngealized) consonants (Kahn 1976; see also Hoberman 1989, McCarthy 1994). The synchronic reality of this restriction is evident in borrowings from Iraqi Arabic, where source words with two emphatics have one reduced to its non-pharyngealized counterpart (Kahn 1976:314).

(71) Kurmanji Kurdish: only one emphatic consonant retained in Arabic loanwords

a.	Ar. qu:tˤijja	> qoti	*qotˤi	'box'
b.	Ar. sˤuħbat	> sibħæt	*sˤibħæt	'conversation'

The Kurdish pattern is marginal as a case of long-distance pharyngealization dissimilation: the reduction seen in Arabic loanwords in (70) is evidence for a dissimilatory effect, but not one that holds between non-adjacent consonants. In Iraqi Arabic, pharyngealization spreads from emphatic consonants to adjacent segments, affecting both consonants and vowels, and may spread across multiple segments (Erwin 1963:36). As such, the intervening segments in forms like (70) are not inert, they are also pharyngealized. This means the pharyngealization dissimilation is an interaction between adjacent segments, and not a long distance interaction.[35]

X.3.4.6.2 Other cases of pharyngealization dissimilation

Patterns similar to the Kurdish one are reported in Palestinian Arabic (Davis 1995:480) and Maltese Arabic (Walter 2006), but these cases are similarly marginal. In both of these varieties, the generalization is that Classical Arabic emphatic fricatives lost their pharyngealization before a historical uvular. This seems to be a dissimilatory effect, but it is only evident from diachronic changes. Moreover, both varieties have local spreading of emphasis, so they exhibit the same confound as Kurdish. Pharyngealization dissimilation is also reported in Jewish Koy Sanjaq variety of Neo-Aramaic (Mutzafi 2004:27), but appears to be a sporadic diachronic change only. Moses-Columbia (Nxa'amxcin) Salish is also reported (by Suzuki 1998) to have a static restriction that prohibits velars, uvulars, pharyngeals and pharyngealized coronals after a pharyngeal consonant (Bessel and Czaykowska-Higgins 1992, 1993:43), though this restriction is not clearly a long-distance interaction.

Dissimilation of emphatic consonants is also reported diachronically in Akkadian (Caplice and Snell 1988, Fallon 2002). However, as Fallon (2002) points out, the emphatic consonants of Akkadian are thought to be phonetically ejectives, rather than obstruents with secondary pharyngealization. As such, I consider them [+constricted

[35] This also fits with Kahn's (1976:314) observation that certain Arabic loanwords have pharyngealization, with unstable position, e.g. [tˤas]~[tasˤ] 'metal cup'. This variation suggests that the entire word is phonetically pharyngealized; there is no evidence of pharyngealized consonants interacting across intervening, non-pharyngealized, segments.

glottis], and this case is on the same order as other cases of [+cg] dissimilation noted in §X.3.3.3.1 above.

X.3.5 Liquid features

Dissimilation among liquids is very robustly attested (previously noted by Walsh-Dickey 1997, Suzuki 1998, Hansson 2001:5, Bye 2011, among many others). Most commonly, liquid dissimilation involves alternations between one liquid and another (e.g. r~l) - typically between a rhotic and a lateral. However, other patterns are also attested, such as dissimilation of one rhotic to another (non-lateral) rhotic, as in Yindjibarndi. And, in some languages, liquid dissimilation yields a non-liquid consonant instead (Kɔnni, Yimas).

It is worth noting that dissimilation of liquids is common in sporadic historical changes (Lloret 1997, Proctor 2009); these are ignored here. For example, English *colonel* is pronounced [kʰɻnl̩] (author's variety); this is due to dissimilation of the first 'l' somewhere along the line, historically (cf. Italian source *colonnella*). But, this dissimilation is clearly *not* a systematic pattern (cf. other words with [l...l] like *colonial, lily, ladleful, liminal,* etc.). Such cases of historical dissimilation are potentially interesting, and definitely informative on the matter of whether dissimilation is in any way connected to phonetics (cf. Ohala 1981). But, they are not clearly input-output mappings produced by a single grammar, and therefore are well outside the scope of this investigation.

It is quite common for languages to have two liquid consonants, one that is 'R-like', and one that is 'L-like' (e.g. English, German, Greek, Latin, Sundanese, etc.). In this situation, the featural specifications of each liquid often cannot be fully determined based on the liquids alone: an R/L distinction could potentially be viewed in terms of any of the features [±lateral], [±rhotic], [±retroflex], [±distributed], [±continuant], or various combinations thereof – all of these possibilities would be descriptively sufficient. Consequently, it is often impossible to determine precisely which features are crucial in liquid dissimilation. For example, a dissimilatory alternation like /l...l/→[r...l] could be dissimilation 'for' [+lateral], or [–rhotic], or [–retroflex], or [+distributed], or [–continuant], etc.

From the standpoint of the theory, this boils down to the question of precisely which CORR constraint requires correspondence between the two /l/s. Since dissimilation entails escape from the scope of a CORR constraint, the relevant CORR constraint must be one that requires L~L correspondence, but not L~R correspondence. Thus the crucial CORR constraint must refer to at least some feature that R and L differ on. This space of possibilities can in principle be narrowed down more, but only for languages with more than 2 liquids.

In light of this descriptive confound, dissimilation involving liquids is treated separately from other features. The most 'typical' sort of liquid dissimilation involves dissimilation of rhotics (as coronal approximants, taps, or trills) to laterals (coronal approximants), or vice versa. Both of these patterns are attested.

From the perspective of a primarily descriptive analysis, it is often not necessary to pull apart the features [±rhotic] and [±lateral] - in a language with one rhotic and one lateral, the distinction between them can be understood as either [+rhotic] vs. [–rhotic], or as [–lateral] vs. [+lateral]. For this reason, [±lateral] dissimilation in liquids is treated separately from [±lateral] in other (non-liquid) consonants.

X.3.5.1 R-dissimilation ([+rhotic]/[–lateral])

Dissimilation among liquids for [+rhotic] (≈[–lateral]) is very robustly attested. Patterns of R→L dissimilation are found in various Kartvelian languages, including Georgian (Fallon 1993; see also chapter 8), Mingrelian (Harris 1991), Svan (Tuite 1997); Manambu (Aikhenvald 2008:56); and Sundanese (Cohn 1992; see also chapter 4). Dissimilatory blocking effects, whereby other alternations fail to produce sequences of R...R, are also found in Yidiny (Dixon 1977:99), and possibly in Latin (Walsh-Dickey 1997; see also Cser 2007/2010, and discussion in chapter 8).[36]

X.3.5.2 L-dissimilation([+lateral]/[–rhotic])

Dissimilation among liquids for [+lateral] (≈ [–rhotic]) is moderately attested. Patterns of overt L→R dissimilation are found in Latin (Steriade 1987, a.o.), Kuman (Walsh-Dickey 1997, Lynch 1983), and Sabzevari Persian (Kambuziya et al. 2009:70), and as blocking effects in Yidiny (Dixon 1977).

X.3.5.3 Dissimilation among rhotics

There are also a small number of cases where one rhotic dissimilates to another rhotic, rather than to a lateral. These cases of dissimilation involve alternations among the [+rhotic] consonants, but for some other feature like [±anterior] or [±retroflex] - whatever is responsible for distinctions among different rhotic liquids.

X.3.5.3.1 Yindjibarndi

Yindjibarndi (Wordick 1982) exhibits dissimilation from one rhotic to another rhotic: that is, dissimilation happens *among* the [+rhotic] liquids, *for* the [±anterior] (but not *for* [+rhotic]).

Yindjibarndi has two rhotic consonants: /r/ (which varies freely between a tap and a trill) and /ɻ/ (a retroflex approximant). Wordick (1982:12) describes the distinction between the two rhotics as an apical vs. retroflex contrast (which runs parallel to a distinction observed in stops, nasals, and laterals). I interpret this contrast as a distinction for the feature [±anterior]: the alveolar rhotic /r/ is [+anterior], while the retroflex rhotic /ɻ/ is [–anterior].

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[36] Modern Greek is often cited as another example of rhotic dissimilation (Walsh-Dickey 1997, Suzuki 1998, Fukuzawa 1999, Bye 2011, a.o.), but this unfounded. As far as I can tell, Greek does not exhibit any productive synchronic R~L alternations of this sort, and Manolessou & Toufexis (2008:303) observe that less than 1% of words with historical *r...r sequences show evidence of dissimilation as a diachronic change.

Both of Yindjibarndi's rhotics are subject to parallel co-occurrence restrictions, stated in (72) below.

(72) Yindjibarndi rhotic co-occurrence restrictions (Wordick 1982:13-14)
   a. *rVr, for hetero-morphemic sequences only
   b. *ɻVɻ, generally

Wordick's (1982:13-14) description of the situation explicitly characterizes it as an active process of dissimilation: 'The restrictions on the occurrence of the two rhotics, *r* [=ɻ] and *rr*, [=r] are quite interesting, being of the co-occurrence type...If the sequence [ɻV] occurs first, and a second syllable containing a rhotic plus vowel follows, then the second rhotic will be [r]...The situation with respect to [rVr] is similar except that the alternation restriction only applies, if a morpheme boundary comes between the two syllables.'

The *rVr constraint is illustrated by the data below. The examples in (73) show that the inchoative verbalizer suffix /-ri/ normally surfaces with the alveolar rhotic [r]. However, after roots ending in /...rV/, this suffix appears instead with the retroflex rhotic [ɻ] (74).

(73) Yindjibarndi inchoative verbalizer suffix /-ri/: (Wordick 1982:87)
   a. kutapa 'short'
      kutapa-ri 'shrink'

   b. warkamu- 'work'
      warkamu-ri 'be working'

   c. jiriɻi 'sick'
      jiriɻi-ri 'get sick'

   d. wanka 'alive'
      wanka-ri 'come alive'

(74) Yindjibarndi /-ri/ undergoes /rV-r/→[rV-ɻ] dissimilation: (Wordick 1982:87)
   a. wanara 'long'
      wanara-ɻi 'get long'

   b. ɲucuwiri 'soft'
      ɲucuwiri-ɻi 'get soft'

   c. parawara 'shiver'
      parawara-ɻi 'shiver (v.)'

   d. jiʈiɲkara 'lined up'
      jiʈiɲkara-ɻi 'line up (v.)'

The *[ɻVɻ] restriction is observed as a static pattern: Wordick (1982:14) reports that this sequence is absent in the lexicon. (though [ɻVr], the expected output of dissimilation, does occur). Yindjibarndi does not appear to have /-ɻV/ in any productive suffixes, but Wordick does note a number of 'contentless' suffixes, where we can see apparent alternations. The lexical doublets in (75) suggest the existence of a suffix /-ɻa/, with the retroflex rhotic.

(75) Yindjibarndi 'contentless' suffix /-ɻa/ (Wordick 1982:124-125)

a.	kakuɭi	'species of milkweed'
	kakuɭi-ɻa	(no other gloss given)
b.	kaɳʈa	'tear (drop)'
	kaɳʈa-ɻa	'cloud'
c.	maʈuɣuni	'Martuyhunira' (name of a language)
	maʈuɣuni-ɻa	(no other gloss given)

Wordick's grammar contains no examples of this apparent /-ɻa/ suffix after roots ending in /...ɻ(V)/. There is, however, another 'contentless' suffix [-ra], which *does* occur after roots containing /ɻ/ (76)[37]. This is consistent with the dissimilation of /ɻ/ to [r] that Wordick describes: we find [-ra] after roots with [ɻ], and find [-ɻa] elsewhere.

(76) Apparent /ɻVɻ/ → [ɻVr] dissimilation: (Wordick 1982:124-125)

a.	kuɻa	'spiderflower'
	kuɻa-ra	'native mesquite'
b.	maɻa	'hand'
	maɻa-ra	'index finger'

Thus, Yindjibarndi is a language in which 'rhotic dissimilation' is dissimilation of both [+anterior] and [–anterior], but only among rhotics. In other words, the dissimilation turns one rhotic into the other (and vice versa), leaving the underlying [+rhotic] specification of both liquids intact.

X.3.5.3.2 Warlpiri

Warlpiri (Nash 1980) is another potential case of dissimilation within the class of [+rhotic] consonants, but not *for* the feature [+rhotic]. Warlpiri has three rhotics: an apical alveolar flap [ɾ], a retroflex (apico-domal) flap [ɽ], and a retroflex approximant [ɻ]. The relevant generalization (Nash 1980:76) is that a CVC sequence may not contain two identical rhotic consonants. This holds as a static lexical restriction, but is observable in remnants of diachronic change (Nash 1980:77, Laughren 1978:15, f.n. 7): a

[37] Note that the contentless suffix /-ra/ does *not* occur exclusively after roots with /ɻ/, as shown by words like [paʈura] 'plain turkey' (cf. [paʈu] 'feather') and [campura] 'left-handed implement' (cf. [campu] 'left (hand)').

suffix /-ɾa/ which forms directional terms appears as [-ɻa] in the word [kakaɾa-ɻa] 'east' where the root ends in [...ɾV], but appears as [-ɾa] elsewhere (cf. [jatiɟa-ɾa] 'north'). This can be interpreted as evidence that an older form of Warlpiri may have had synchronic dissimilation, with /ɾVɾ/ surfacing as [ɾVɻ]. This dissimilation would have occurred among rhotic consonants, but crucially would be dissimilation for some other feature, e.g. [+anterior], and not [+rhotic].

Warlpiri is a marginal case of dissimilation, though, since the dissimilatory effect is not productive synchronically. Nash notes two exceptions to the lexical restriction: [juɾuɾu] 'big pile of firewood stacked up to make sufficient coals to cook big game', and [kuɻaɻa] '(species of) prickly hardwood'. He also observes that no dissimilation occurs when the clitic /-ɾa/ 'forth' follows a stem ending in /...ɾV/, e.g. [muɟumuɟu-ɟaɾi-ɾa] 'spread out (of creek)' (with [...ɾV-ɾV], not *[...ɾV-ɻV]). This morpheme is identical in form and extremely close in meaning to the formative /-ɾa/, the only morpheme that shows the diachronic dissimilation noted above. These facts suggest that if an ancestor of modern Warlpiri did have synchronic dissimilation of /ɾVɾ/ sequences, it was limited and/or sporadic in nature.

X.3.5.4 Dissimilation of [+liquid]

Dissimilation in liquids can also lead to alternations between a liquid and another, non-liquid consonant – a pattern characterizable as dissimilation for [+liquid]. Active dissimilation of this sort is attested in Kɔnni (Cahill 2007), and possibly also Yimas (Foley 1991). Analysis of reconstructed Proto-Indo-European roots suggests comparable liquid dissimilation as a static pattern (Cooper 2009:59) (see database for further details).

X.3.5.4.1 Kɔnni

Kɔnni (Cahill 2007) exhibits dissimilation for the feature [+liquid]. Kɔnni has two liquid consonants: an alveolar tap or flap [ɾ] (transcribed as ⟨r⟩ in Cahill's examples, and below), and a lateral approximant [l][38]. Kɔnni has two synchronically active affixes that show visible, dissimilatory, alternations. In both cases, the alternation is between a liquid and a stop, not between two liquids. And, in both cases, the dissimilatory alternation is observed in the context of both of the liquids, /r/ *and* /l/. These generalizations, together with facts Cahill (2007) observes about static co-occurrence patterns, mean that Kɔnni's dissimilation is not about the features [±rhotic] or [±lateral], but both at once - i.e. the class of [+liquid] consonants.

Kɔnni has an agentive suffix /-rU/ (where U is a high, back vowel that harmonizes for ATR). This suffix normally surfaces with [r], as illustrated by the examples in (77).

[38] Cahill does not explicitly state that Kɔnni ⟨l⟩ is [l], but this seems like the most obvious realization given his choice of transcription. Moreover, the waveform he gives (p. 101) for the word [balɪsɪ] shows that ⟨l⟩ is clearly an approximant (and not a lateral flap, for example).

(77) Kɔnni agentive suffix /-rU/: (Cahill 2007:144)[39]

a. gù-gùù-rú ‘burier’
b. tì-tàà-ró ‘shooter, thrower’
c. dì-dìgì-rú ‘cook’
d. gàà-ró ‘thief (deceiver)’
e. wʊ-wɔ̀sì-ró ‘greeter’
f. mì-mì-rʊ̀ ‘builder’
g. bóntʊ̀ʊ̀-ɲìì-ró ‘hoodless cobra (lit. toad-swallower)’

The agentive suffix /-rU/ also has a second allomorph, [-tU], with a stop [t] instead of the liquid [r]. This allomorph appears when the preceding syllable contains [r] (78), or [l] (79).

(78) Kɔnni suffix /-rU/ dissimilates to [-tU] after /r/: (Cahill 2007:145)

a. fì-fàárí-tʊ́ ‘groomsman (lit. marrier)’
b. bʊ̀-bʊ̀rì-tʊ́ ‘sower’
c. bìm-vàárí-tʊ́ ‘feces collecter’
d. gbì-gbàrì-tʊ́ ‘watcher’

(79) Kɔnni /-rU/ dissimilates to [-tU] after /l/: (Cahill 2007:145)

a. bì-bàlì-tʊ́ ‘talker’[40]
b. jʊ̀-jʊ̀àlì-tʊ́ ‘climber’
c. mʊ̀-mʊ̀lì-tʊ́ ‘announcer’
d. yàlì-tʊ́ ‘hunter’

The generalization evident from these forms is that suffixal /r/ surfaces as [t] after a syllable-adjacent [+liquid] consonant, whether that liquid is a lateral or a rhotic. Since the interaction is between two liquids, and involves mapping a [+liquid] consonant to a [–liquid] one, this is necessarily dissimilation for the feature [+liquid].[41]

Kɔnni also has a suffix /-raaŋ/ ‘male’ that also shows dissimilation from /r/ to a stop. This suffix normally surfaces with an [r] (80); however, when there is an [r] in the preceding syllable, it appears as [-daaŋ] instead (81). When the preceding syllable

[39] NB: Kɔnni data is presented here as in the same practical orthography that Cahill presents it in. ⟨j⟩ is used for [dʒ], ⟨y⟩ for [j], and ⟨r⟩ for [ɾ].

[40] Cahill (2007:145) has this word as ⟨bì-bàlì-ó⟩. I assume the absence of [t] is a typographical mistake, since the form is explicitly presented as an example of where the agentive suffix appears as [-tʊ] instead of [-rʊ].

[41] Cahill (2007:145) also notes two other circumstances where the agentive suffix surfaces with its [-tU] allomorph. The first is after a segment-adjacent [n] (ex: [dì-dààn-tʊ́] ‘forgetter’, from root /daaN/). Cahill suggests this is post-nasal hardening, and notes that [Nr] sequences never occur in the language. The -tU allomorph also occurs optionally when following a syllable-adjacent underlying /ŋ/ (ex: [pì-pàŋì-ró] ~ [pì-pàŋì-tʊ́] ‘borrower’); there is little to be said about this, and other nasals do not behave in this way.

contains [l], the same /r/~[d] dissimilation occurs, albeit variably (82) (at least in the speech of Cahill's consultant).[42]

(80) Kɔnni suffix /-raaŋ/ 'male': (Cahill 2007:147)
- a. dù-ràáŋ 'male horse'
- b. zùù-ràáŋ 'male vulture'
- c. ná-↓rááŋ 'male cow'
- d. dàkóá-rááŋ 'male parrot'
- e. kpá-↓rááŋ 'male guinea fowl'

(81) Kɔnni suffix /-raaŋ/ dissimilates to [-daaŋ] after /r/: (Cahill 2007:147)
- a. ŋmárí-dá↓áŋ 'male dove' (*ŋmárí-rá↓áŋ)
- b. gàɲìàrà-dàáŋ 'male weaver-bird'

(82) Kɔnni suffix /-raaŋ/ variably dissimilates after /l/: (Cahill 2007:147)
- a. kùlì-dàáŋ ~ kùlì-ràáŋ 'male tortoise'
- b. gáán↓lù-dàáŋ ~ gáán↓lù-ràáŋ 'male cat'
- c. jɔ̀là-dàáŋ ~ jɔ̀là-ràáŋ 'male whydah'

Cahill also notes two static co-occurrence generalizations that are consistent with Kɔnni's liquid dissimilation process. First, there are no CVC sequences of the form [lVr], [rVl], or [rVr] in the lexicon (Cahill 2007:85)[43]. Second, besides the two suffixes discussed above, Kɔnni has a third affix with /r/, which systematically fails to give rise to Liquid-V-Liquid sequences. For nouns of class 1, the definite singular marker is a suffix /-rI/; Cahill (2007:147) notes that this noun class contains no nouns ending in [...rV], though other classes do contain nouns of that shape.

To recap: Kɔnni shows overt dissimilation, with [r]~[t] and [r]~[d] alternations. The segment dissimilating is a liquid, and the result is a non-liquid (a stop). Since this dissimilation is induced not only by [r] but also by [l], the crucial feature involved in triggering dissimilation must be [+liquid], and cannot be simply [+rhotic] or [+lateral].

X.3.5.4.2 Yimas

Yimas (Foley 1991) exhibits dissimilation where liquids systematically dissimilate to non-liquids, a pattern interpretable as dissimilation for the feature [+liquid] itself (rather than any of the sub-features of liquids, like [±rhotic] or [±lateral]).

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[42] Cahill (2007:147): 'When the final consonant of the noun is [l], my language consultant pronounced both'; it is not clear if this is typical or not, or which option should be viewed as canonical here. Note that the [-daaŋ] form of the 'male' suffix also occurs after a segment-adjacent /n/: bɔ̀n-dàáŋ 'male donkey' (Cahill 2007:147). This can be understood as post-nasal hardening of the same kind as the agentive suffix noted above.

[43] Cahill's summary of co-occurrence combinations lists lVl as possible, but there are no productive affixes containing /l/. I have found only one example in Cahill's grammar of an [lVl] sequence, the word [bàllílí] 'children (def. pl.)', which Cahill notes is an irregularly inflected form.

Yimas has two liquid consonants. One is an apical liquid, transcribed by Foley (1991:40) as ⟨r⟩, which varies (more or less freely) between a lateral approximant [l] and an alveolar tap [ɾ]. The other liquid, transcribed as ⟨l⟩, is a palatalized lateral approximant realized variably as [ʎ] or [ʲl]. Odden (1994:316-317) suggests that both liquids should be considered [+lateral]; this seems entirely reasonable to me, but I will follow Foley's convention of representing them as ⟨r⟩ and ⟨l⟩ for simplicity.

Foley (1991:53) notes that 'Yimas does not permit two liquids to appear in adjacent syllables separated only by a vowel. If this is to be the case, the second becomes *t*.' This /r/~[t] alternation is observed in several suffixes (83)-(85), and in partial reduplication (86)-(87) (reduplicant and base are underlined in these examples).

(83) Yimas /r/ to [t] dissimilation in inchoative suffix /-ara/: (Foley 1991:244)

a.	pak-ara-	'break up, open'	(suffix /-ara/)
b.	apr-ata-	'open, spread'	(dissimilation: /rVr/→[rVt]; *[apr-ara])

(84) Yimas /r/ to [t] dissimilation in perfective suffix /-r/: (Foley 1991:244, 310)

a. /kra-r-akn/ → [kratakn] (*[krarakn]; /rVr/ → [rVt])
   cut-perf-3sg dat
   '(I) cut (his hair)'
b. nam p-ka-kan-ŋa-r-akn (/r/ otherwise)
   skin 7sg t-1sgA-COM-pierce-BEN-PERF-3sg D
   'I pierced the skin for him'

(85) Yimas /r/ to [t] dissimilation in nominalizing suffix /-ru/:

a. /tu-ru-awt/ → [turawt] (suffix has [r] typically)
   kill-Nmlz-M Sg
   'killer'
b. /ira-ru-awt/ → [iratawt][44] (*[irarawt]; dissimilation)[45]
   cry-Nmlz-M Sg
   'cry baby'

(86) Yimas iterative partial reduplication in roots: (Foley 1991:53-54)

a.	tɨpaŋ-	tɨpapaŋ-	'bathe'
b.	apan-	apapan-	'spear'
c.	arpal-	arpapal-	'go out'

[44] Foley (1991:426) also gives examples of another surface form for this word, [iracawt]. It is not clear from the available data whether this is due to some sort of variation, or something else. But, notably, even this alternate form has the underlying liquid /r/ dissimilated to a stop, rather than another liquid.

[45] The disappearance of the /u/ in the Yimas nominalizing suffix /-ru/ is typical for suffixes containing /u/ in general, part of a consistent pattern that Foley (1991:63) describes with a rule of unstressed /u/ deletion.

(87) Yimas /r/ to [t] dissimilation in partial reduplication: (Foley 1991:53-54)

a.	iray-	iratay-	'cry'	(cf. *[iraray])
b.	wark-	waratik	'make'	
c.	park-	paratik	'cut up'	
d.	yara-	yarata-	'pick up'	

In all of the cases shown above, the underlying liquid /r/ dissimilates not to the other liquid /l/, but instead to a voiceless stop [t].

Yimas also exhibits a similar liquid ~ [t] alternation with the palatal liquid [ʎ] (transcribed as /l/, following Foley's conventions). Alternations can be seen in the same partial reduplication pattern shown in (87) above. Somewhat surprisingly, the reduplicated /lVl/ sequences surface not as [lVt], but rather as [rVt], with the apical liquid instead of the palatal one. This is shown in (88) below.

(88) Yimas /l/ to [t] dissimilation in partial reduplication: (Foley 1991:54)

a.	tal-	tarat-	'hold'
b.	mul-	murit-	'run'
c.	wul-	wurit-	'put down'

The appearance of /r/ instead of /l/ here is unexpected, and most likely has something to do with the fact that Yimas's palatal /l/ developed historically from **ri* sequences[46].

The behavior of underlying /rVl/ or /lVr/ sequences in Yimas is uncertain. Dissimilation is expected in this case, and would prove that the crucial shared feature is [+liquid] (not [+lateral] or [+rhotic], e.g.). However, such sequences are exceedingly rare for independent reasons: roots never begin with /r/ or /l/ or end with /...lV/; relatively few morphemes contain these consonants; many of the morphological combinations that would yield /rVl/ or /lVr/ sequences are ruled out by morphosyntactic restrictions (e.g. gender agreement); and, systematic fortition of /r/ in word-final and pre-nasal contexts causes /r/ to frequently surface as [t], even independently of any dissimilation. I was able to find only one example in Foley's (1991) grammar of a CVC configuration containing both liquids: the word [na-n-tal-iray] '(he) made (him) cry'. Here, dissimilation appears to fail, but the significance of this data point is wildly open to interpretation: none of the observed contexts where dissimilation occurs involve prefixes, and the morpheme involved, the causative prefix /tal-/~/tar-/ varies (in some contexts freely) between /r/ and /l/ in any case. Consequently, it's not clear what the correct generalization is: it could be that dissimilation happens only to identical liquids, or that dissimilation is limited to roots and suffixes, or that something else is going on in this one data point.

Yimas dissimilation is viewed as dissimilation of [+liquid] because this is the feature that (i) is always shared by the interacting consonants in the input, and (ii) always changes in the mapping to the output form.

[46] Thus, the reduplicated form *tarat-* presumably comes from a historical form **tarari*; where dissimilation to [rVt] would be normal.

One might entertain an alternative analysis of Yimas, in which dissimilation happens for the features [+lateral] an [+rhotic] instead of [+liquid]. This does not offer an adequate way to characterize the Yimas pattern. The crucial data comes from the partial reduplication of /l/: when reduplication produces /lVl/ sequences, they surface as [rVt], not *[rVl] or *[lVr]. This shows that Yimas avoids a sequence of *any* two liquids, even liquids of two different types.

X.3.5.4.3 [+liquid] dissimilation recap

Dissimilation of [+liquid] is deemed moderately attested. The case in Kɔnni is a clear example. The cases in Yimas and Proto-Indo-European are less clear, but it nonetheless confirms that the Kɔnni pattern is not a mere fluke.

X.4 Blocking supplement: reported cases of segmental blocking in dissimilation (appendix to chapter 8)

Segmental blocking of dissimilation appears to be a relatively rare phenomenon. The reported cases of blocking known to me are summarized in the table in (89), and discussed below.

(89) Known cases of long-distance dissimilation with segmental blocking effects

Language	*Dissim. type*	*Blocking segment(s)*	*Source*
Latin	Lateral	intervening root-final rhotics *and* intervening non-coronals	Jensen & Strong-Jensen 1979, Steriade 1987, Hurch 1991, Cser 2007/2010
Yidiny	Lateral	preceding, non-intervening, rhotics	Dixon 1977, Walsh-Dickey 1997, Suzuki 1998
Georgian (and others)	Rhotic	intervening laterals	Fallon 1993
Akkadian	Labial	root-initial /u w/ (sometimes deleted; *not* surface [u w])	Barth 1887, Hume 1994, Odden 1994, Suzuki 1998
Gurindji (and others)	NC cluster dissimilation	intervening non-continuants (all stops and all nasals)	McConvell 1988, Odden 1994
Tzutujil (diachronic)	Backness? (velar fronting before dorsals)	intervening /o/, when segment-adjacent to both dissimilators	Campbell 1974, 1977; Ohala 1981, 1993
Dahl's Law	Voiceless	everything but [k]	Suzuki 1998, Davy & Nurse 1982

The first three of these cases involve genuine long-distance consonant-to-consonant dissimilation patterns, blocked by other consonants, and they are analyzed in chapter 8 of the book.

The remaining four cases fall outside the scope of the theory of surface correspondence developed in the book: the blocking patterns cannot be characterized as consonant-to-consonant interactions. In Gurindji, what dissimilates is not single segments, but rather nasal+stop clusters (which cannot be analyzed as prenasalized stops). In Tzutujil, the dissimilation is observed only as a diachronic change that fails across certain vowels; this case is readily explained on functional phonetic grounds (Ohala 1981). In Akkadian, the blocking pattern is both empirically tenuous and outside the scope of the theory. The generalization previously reported (Hume 1994, Odden 1994, Suzuki 1998) is that labial dissimilation fails across [u]. This apparent blocking seems to be attested in just five examples, though, all inferred from inscriptions. One of these examples is suspect because it does not appear to have the blocking [u]; another is attested with dissimilation dialectically. Finally, Dahl's Law (analyzed in Kinyarwanda

in chapter 3) is sometimes erroneously presented as an example of blocking (Suzuki 1998:107), but this characterization fails to recognize the syllable-adjacency condition that is a prerequisite for dissimilation in the first place.

X.4.1 Akkadian: /u w/ block labial dissimilation

Akkadian is not analyzed here for two reasons: because the 'blocker' segments are vowels and not consonants, and because the validity of the generalization is suspect. The Akkadian pattern is labial dissimilation: the prefix /ma-/ (90a) normally surfaces as [na-] before a root containing a labial (90b). The reported blocking generalization (Odden 1994:321; see also Hume 1994:113, Suzuki 1998:112)[47] is that the /ma-/ prefix surfaces with the non-dissimilated form [m] when there is an intervening [u] or [w]. This is illustrated by the examples in (90c) (examples from Hume 1994, originally from Von Soden 1969).

(90) Akkadian: Labial dissimilation: /ma-...B/ → [na-...B]

a.	ma-ʃkanu-m	'place'
b.	me-ereʃu-m	'plantation'
c.	mi-i-ʃaru-m	'justice'
d.	ma-zuukt	'mortar'
	(prefix /ma-/)	
e.	/ma-rkabt/ → na-rkabt	'chariot'
f.	/ma-lmenu/ → ne-lmenu	'loss, damage'
g.	/ma-raamu-m/ → na-raamu-m	'favourite'

(/m/→[n] dissimilation before [b p m]; *[ma-rkabt], etc.)

(91) Akkadian: Labial dissimilation blocked by intervening /u/? (Hume 1994:113)

a.	mu-ʃeepiu-m	'work leader'
b.	mu-uʃabu-m	'seat'
c.	mu-ʃpalu-m	'deep'
d.	mu-nnab(it)tu-m	'fugitive'
e.	mu-ʃteepiʃtu	'to leave one baffled'
f.	ma-amiitu-m	'oath' (</ma-wmii-t-u-m/?)

(dissimilation blocked by [u]; *[nu-ʃeepiu-m], etc.)

Unfortunately, it is not clear that the Akkadian blocking pattern is adequately supported. The six examples in (91) appear to be the entirety of the data that supports the blocking generalization. In literature on Akkadian, I have found no mention of this blocking effect.[48] Barth (1887) was, I believe, the first to point out the dissimilatory [m]~[n] alternation; he describes it as a generally systematic pattern, and makes no

[47] Hume, Odden & Suzuki all attribute the Akkadian data to Von Soden (1969:64-66). I consulted Von Soden's book, but failed to locate these examples.

[48] The Akkadian sources I consulted include Barth (1887), Berkooz (1937), Caplice & Snell (1988), Ungnad et al. (1992), Miller & Shipp (1996), and Huehnergard (2005).

mention of failure of dissimilation related to [u], or any other segment. Barth (1887:116) does note two isolated exceptions, [mu-šab] and [ma-mit] (no glosses given). One of these, [mu-šab], has the [u] which is reported to block dissimilation; however, Berkooz (1937:52) notes that in the Nuzi dialect of Akkadian, this form *does* dissimilate (to [nu-šab-]), so its quality as an example of blocking may be suspect. The other exception noted by Barth, [ma-mit], is the same root as in [ma-amiitu-m] 'oath' (91f). Odden (1994) analyzes this root as /wmii/, with the blocking of dissimilation being attributed to an underlying round segment /w/. Blocking in this form obviously cannot be explained by surface correspondence, since the alleged blocker is not realized in the surface form.

For the remainder of the examples in (91), it is worth noting that the blocker [u] is always directly adjacent to the prefix /m/, and is in the prefix rather than the root. There are no forms like [ma-ʃulib], where labial dissimilation is blocked by an [u] in the root that is not directly adjacent to the prefixal /m/. As such, it's not really evident that Akkadian exhibits labial dissimilation that is blocked by *intervening* [u]. The only generalization evident from (91) is that a prefix [mu-] does not dissimilate, and even this generalization seems to be supported by just five examples in total. From the data in (90)-(91), it is nearly as accurate to say that [ʃ] blocks labial dissimilation as it is to say that [u] blocks it. For these reasons, I do not consider Akkadian to be a reliable example of segmental blocking of dissimilation.

If the Akkadian case *is* treated as genuine, it poses an obvious problem for a surface correspondence analysis: it's not a consonant-to-consonant interaction. If [u] blocks dissimilation, it cannot be because [u] is required to correspond with [m], or is permitted to correspond with [m], or anything of the sort. The surface correspondence relation holds over surface consonants, so the SCTD has no bearing on interactions between consonants and vowels like this.

X.4.2 Gurindji: Nasals & Stops block NC-cluster dissimilation

Blocking in Gurindji is not analyzed here in detail because the dissimilation is not between single consonants, but rather between clusters. The dissimilation generalization in Gurindji (and shared by a number of related languages; see appendix for details) is that nasal + consonant clusters alternate with either singleton non-nasal consonants, or with clusters of two non-nasals, when they follow another nasal + consonant cluster. This is illustrated schematically in (92). When the second NC sequence is homorganic, the nasal is deleted (93), (94) (examples from McConvell 1988:137-138). When the second NC cluster is heterorganic, its nasal may change to a non-nasal stop instead of deleting (95). In both cases, a sequence of two NC clusters surfaces with only one such cluster.

(92) Gurindji NC dissimilation

a.	NC...NC	→	NC...ØC	(if second cluster is homorganic)
b.	NC...NC	→	NC...CC	(if second cluster is heterorganic)

It should be noted that there are some assorted minor differences between these two alternation patterns; the distinction is not strictly between homorganic and heterorganic clusters. McConvell (1988) notes that the N~C alternation in (92b) may occur across word boundaries, whereas its deletion counterpart (92a) does not. It also depends on the quality of the second consonant in the second NC cluster: all speakers do the N~C alternation (92b) when the second cluster is a nasal + stop sequence; some speakers also do it when the second cluster is a nasal + liquid or nasal + glide sequence; and, some speakers also apply denasalization in nasal + nasal clusters.

(93) Gurindji NC dissimilation results in deletion of second N[49]
   a. [lutcu-ŋka] 'on the ridge'
   (locative suffix /-ŋka/)

   b. /pinka-ŋka/ → [pinka-ka] 'at the river'
   c. /wiɲci-ŋka/ → [wiɲci-ka] 'at the spring'
   (dissimilatory loss of suffix /ŋ/ after /...nk.../; *[pinka-ŋka], etc.)

(94) Gurindji NC dissimilation yields N-deletion in other suffixes as well
   a. /kaɲcu-mpal/ → [kaɲcu-pal] 'across below'
   (NC dissimilation in suffix /-mpal/ 'across')

   b. /tanku-ɳʈaɳ/ → [tanku-ʈaɳ] 'always eating'
   (NC dissimilation in suffix /-ɳʈaɳ/ 'always consuming X')

   c. /cunpa-ŋku/ → [cunpa-ku] 'with a song'
   (NC dissimilation in ergative/instrumental suffix /-ŋku/)

   d. /paɳku-ŋkuɾa/ → [paɳku-kuɾa] 'towards a cross-cousin'
   (NC dissimilation in allative suffix /-ŋkuɾa/)

(95) Gurindji NC dissimilation yields nasal ~ stop alternations in heterorganic contexts
   a. /ɲampa-n-pula/ → [ɲampa-t-pula] 'what [did] you two [see]?'
   (NC dissimilation changes second NC to CC; *[ɲampa-n-pula], *[ɲampa-Ø-pula])

   b. /ɲatcaŋ-pa-n-pula/ → [ɲatcaŋ-pa-t-pula] 'how many [did] you two [see]?'
   (*[ɲatcaŋ-pa-n-pula], *[ɲatcaŋ-pa-Ø-pula])

   c. /ɲuntu-waɻiɲ-cu/ → [ɲuntu-waɻic-cu] ~ [ɲuntu-waɻiɲ-cu] 'you alone (erg.)
   (optional NC dissimilation: /nt...nc/ → [nt...cc])

The Gurindji data presented by McConvell clearly shows that this is an interaction involving clusters, and not single segments (as McConvell astutely points

[49] I have converted McConvell's transcriptions into IPA. Gurindji does not make a distinction between voiced and voiceless stops; I have transcribed all as voiceless. The consonants McConvell describes as 'lamino-palatal' are given here as palatal [c ɲ].

out throughout). In the cases where both NC sequences are homorganic, they could be interpreted as prenasalized stops, and the dissimilation would thus be a consonant-to-consonant interaction. But, the forms in (93b), (94b-d) have *heterorganic* NC sequences [nk np ŋk], which offer no such interpretation as single consonants. The examples in (96) also show that this dissimilation occurs following NC clusters formed by morpheme concatenation – clusters that are not systematically present underlyingly. Finally, the examples in (97) show that no dissimilation happens for nasals that are not in clusters. The pattern is *not* straightforward dissimilation of nasality: it's dissimilation of nasal+stop clusters exclusively. The example in (97b) also shows that the domain of scope for this dissimilation is the word.[50]

(96) Gurindji NC dissimilation is induced by derived clusters (McConvell 1988:139)
   a. /ŋaɻin-kuɲca/ → [ŋaɻin-kuca] 'lacking meat' (*[ŋaɻin-kuɲca])
   (NC dissimilation in suffix /-kuɲca/ 'lacking', when after root-final nasal)

   b. /ɲin-kumpalŋ/ → [ɲin-kupalŋ] 'to avoid drowning' (*[ɲin-kumpalŋ])
   (NC dissimilation in suffix /-kumpalŋ/ 'lest', when after root-final nasal)

(97) Gurindji NC dissimilation does *not* affect lone nasals
   a. /ŋawa-ɳʈaɳ/ → [ŋawa-ɳʈaɳ] 'always drinking'
   (*[ŋawa-ɳʈaØ]; NC dissimilation happens only to Ns in clusters)

   b. /tampaŋ kari-ɲa/ → [tampaŋ kari-ɲa] 'he died'
   dead be-PAST
   (*[tampaØ kariɲa], *[tampaŋ karica], [tampaŋ kariØa])
   (NC dissimilation happens only to NC clusters, and only those in the same word)

The blocking generalization reported for Gurindji is that NC dissimilation in Gurindji fails in the context of intervening non-liquids (McConvell 1988:140; see also Odden 1994:303). Thus, dissimilation occurs when liquids or glides intervene between the two NC sequences (98), even across numerous syllables (e.g. 98c). But, NC dissimilation does not occur across an intervening stop (99), or an intervening nasal (100).

[50] Following McConvell (1988), the word consists of the root, prefixes and suffixes, and pronominal enclitics.

(98) Gurindji NC dissimilation occurs across intervening liquids & glides
   a. /kankula-mpa/ → [kankula-pa] 'on the high ground'
   (NC dissimilation happens across intervening [l]; *[kankula-mpa])

   b. /waɲci-waɭa-ŋku/ → [waɲci-waɭa-ku] 'which (foc.) is [yours]?'[51]
   (NC dissimilation across intervening morpheme [waɭa]; *[waɲci-waɭa-ŋku])

   c. /ɲampa-wu-waɭa-ji-nta/ → [ɲampa-wu-waɭa-ji-nta]
   'why [did] you lot [look] at me?'
   (NC dissimilation across 4 syllables; *[ɲampa-wu-waɭa-ji-nta])

(99) Gurindji NC dissimilation does *not* occur across an intervening stop
   a. /waɲci-ŋka-nta/ → [waɲci-ka-nta] 'where are you lot?'
   (*[waɲci-ka-ta]; no NC dissimilation across intervening [k])

   b. /nampijita-wuɲca/ → [nampijita-wuɲca] '(animal) lacking a female'
   (*[nampijita-wuca]; no NC dissimilation across intervening [t])[52]

   c. /paɳku-ʈi-ŋkuɾa/ → [paɳku-ʈi-ŋkuɾa] 'towards as cross-cousin'
   (*[paɳku-ʈi-kuɾa]; no NC dissimilation across intervening [ʈ])

   d. /ŋu-ŋantipa-ŋkulu/ → [ŋu-ŋantipa-ŋkulu] 'they [saw] us'
   (*[ŋu-ŋantipa-kulu]; no NC dissimilation across intervening [p])

(100) Gurindji NC dissimilation does *not* occur across an intervening nasal
   a. /kuja-ŋka-ma-ŋku/ → [kuja-ŋka-ma-ŋku]
   'it was for that reason that he [hit] you'
   (*[kuja-ŋka-ma-Øku]; no NC dissimilation across [m])

   b. /ŋu-n-cunu-ŋkuɭa/ → [ŋu-n-cunu-ŋkuɭa] 'you [put] it on yourself'
   (*[ŋu-n-cunu-Økuɭa]; no NC dissimilation across [n])

   c. /ŋanta-ɳa-ŋku/ → [ŋanta-ɳa-ŋku] 'I want [to go] to you'
   (*[ŋanta-ɳa-Øku]; no NC dissimilation across [ɳ])

   d. /ɲampa-ŋala-ŋkulu/ → [ɲampa-ŋala-ŋkulu] 'what [will] they [give] us?'
   (*[ɲampa-ŋala-Økulu]; no NC dissimilation across [ŋ])

The Gurindji blocking pattern is clearly different from the segmental blocking effects in Latin, Georgian, and Yidiny (the cases chosen for analysis in chapter 8): in the Gurindji case, the dissimilators are not a class of consonants, but rather a class of

[51] The examples in (99) are words extracted from full sentence examples that McConvell gives. The portions of the glosses in square brackets are not contributed by these words.
[52] The suffix in this example is the same morpheme as [-kuɲca] in (84a) above. McConvell notes that [p k] generally lenite to [w] intervocalically in suffixes.

clusters. And, what the dissimilation changes is a property of clusters, and not of individual segments. So, the pattern cannot be characterized as an interaction between two dissimilator segments, with failure due to blocker segments. This is because the dissimilation is contingent on the presence of another consonant after each nasal. It requires reference to more than 4 classes of segments, and also to particular structural arrangements among them. It is not clear to me how any theory of segmental dissimilation, including the one advanced in this book, can explain this kind of cluster-to-cluster interaction.

X.4.3 Tzutujil: [o] blocks backness dissimilation

The dissimilatory generalization for Tzutujil is that the Proto-Quichéan velars *k and *k' became palatalized velars in Tzutujil when followed by another velar or a uvular (see §X.3.4.3 in the typology supplement above for further discussion). This diachronic palatalization is seen in forms like (101). Ohala interprets this as dissimilation for the feature 'BACK-VELAR' – the velars are fronted before another back consonant in a CVC root.

(101) Tzutujil: diachronic 'backness' dissimilation (Campbell 1977)

	*Proto-Quichéan		Tzutujil		
a.	*keːx	>	kʲeːx	'horse'	(not keːx; velar fronted)
b.	*k'aq	>	k'ʲaq	'flea'	(not k'aq)

The blocking generalization for the Tzutujil case is that this dissimilatory fronting of velars does not occur when the intervening vowel is [o]. This is illustrated in (102).

(102) Tzutujil: no backness dissimilation across [o]

	*Proto-Quichéan		Tzutujil		
a.	*koxl	>	kox	'cougar'	(not kʲox; *no* fronting, cf. 89a)
b.	*k'ox	>	k'oːx	'mask'	(not k'ʲoːx)

Like the Akkadian case, this blocking pattern is not obviously explainable by the surface correspondence theory of dissimilation, because the blocking segment is crucially a vowel. I don't consider this a problem because it's a diachronic pattern, not a synchronic one. Ohala proposes that it is the result of hyper-correction (cf. also Ohala 1981), and this offers a perfectly reasonable explanation of the change. It's not dissimilation produced by a synchronic grammar, so it doesn't need any synchronic explanation, and so it's not a problem that the surface correspondence theory doesn't readily offer such an explanation.

X.4.4 Dahl's Law: only [k] **doesn't** *block voiceless dissimilation*

Suzuki (1998:107) also reports blocking in Dahl's Law in 'many Bantu languages'; I do not include this in the table of known segmental blocking cases because it is not necessarily a case of segmental blocking. The significant generalization (Davy & Nurse 1982) is that in at least Embu and (Ki)Kuria, voiceless dissimilation is normally

restricted by syllable adjacency, but *may* apply over sequences of three consecutive /k/s. Suzuki's characterization of the pattern is that [k] is transparent to dissimilation, and all consonants *other than* [k] are 'blocker' consonants. This characterization is confounded with the fact that /k/ is voiceless, and the pattern is one of voiceless dissimilation. This means any situation in which [k] could be interpreted as a 'transparent' consonant, it can also be interpreted as a consonant that triggers dissimilation.

The characterization of Dahl's Law as a case of blocking is questionable for Embu: the generalization that Davy & Nurse (1982:166) observe is that input /k...k...k...-$C^{voiceless}$/ sequences may surface as either [k...ɣ...ɣ...-$C^{voiceless}$] or [ɣ...k...ɣ...-$C^{voiceless}$]. In both outputs, there are no sequences of two voiceless consonants in adjacent syllables, and neither of the acceptable options shows voiceless dissimilation crucially applying across an intervening [k]. The pattern can be characterized just as accurately in terms of [–voice] consonants (the dissimilators) and [+voice] consonants (the rest); it does not require the descriptive analyst to recognize distinct classes of 'transparent' and 'blocker' consonants.

The blocking characterization of Dahl's Law is also questionable for Kuria, the other language observed by Davy & Nurse (1982) where Dahl's Law is allegedly blocked by just [k]. The generalization in Kuria (Davy & Nurse 1982:166) is that input sequences of the form /k...k...k...-$C^{voiceless}$/ can surface with any and all of the /k/s turned into voiced [ɣ] – all 8 logical possibilities are possible surface forms, from [ɣ...ɣ...ɣ...-$C^{voiceless}$] to [k...k...k...-$C^{voiceless}$] and everything in between. Consequently, the claim that [k], and only [k], is transparent dissimilation is anything but clear: output sequences like [k...k...k...-$C^{voiceless}$] show that dissimilation need not occur across an intervening [k], and ones like [ɣ...ɣ...ɣ...-$C^{voiceless}$] show that dissimilation does not occur exclusively across [k], but also [ɣ].

There are plausible several ways to interpret these patterns. The view Suzuki apparently takes is that dissimilation is always triggered by the stem-initial consonant, irrespective of distance. Lombardi (1995) argues for a different approach, though: she proposes that there is spreading of [+voice] – i.e. voicing assimilation – happening among the /k/s in prefixes. Under this interpretation, there is no segmental blocking of dissimilation: dissimilation occurs only from the stem-initial voiceless consonant to the nearest prefixal /k/; the other /k/→[ɣ] mappings reflect agreement triggered by the [ɣ], and not dissimilation triggered by the stem-initial consonant. This view has one extremely appealing characteristic: Dahl's Law is canonically an interaction between adjacent syllables (cf. its occurrence in Kinyarwanda, considered in chapter 3). Lombardi's approach sticks to this in spirit: the interactions are always between consonants in adjacent syllables. Suzuki's view, on the other hand, requires a significant abstraction away from this observation. Treating Dahl's Law as an example of segmental blocking of dissimilation presupposes that the dissimilation *can* happen across an intervening consonant, but this is not clearly evident from the original descriptions (cf. Davy & Nurse 1982, a.o.).