A TYPOLOGICAL INVESTIGATION OF DISSIMILATION

by

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STATEMENT BY THE AUTHOR

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ABSTRACT

This dissertation investigates the phenomenon of dissimilation from a theoretical perspective, with special attention to crosslinguistic patterns. After first arguing that the previous accounts based on the Obligatory Contour Principle (OCP) (Leben 1973, McCarthy 1979, 1986) are not satisfactory, I propose an alternative theory of identity avoidance, GENERALIZED OCP (GOCP) which generalizes the applicability of the traditional OCP to a wider range of phenomena, not just autosegmental (i.e. featural) ones. My proposal asserts that identity avoidance between two elements in sequence is fundamental to linguistic theory, an idea that can be characterized by a universal constraint governing various types of dissimilatory phenomena. This concept is implemented within the framework of Optimality Theory (Prince and Smolensky 1993, McCarthy and Prince 1993a,b), which provides the flexibility for constraints to be both violable and rankable. Contrary to the traditional OCP based approach which is bound by various representational properties such as feature geometry and underspecification, the proposed approach abandons this representational dependency in favor of the richly articulated constraint-based system.

Based on the data collected from 57 language cases, I then examine the various factors that play a role in dissimilation, including the elements involved, their adjacency relations, and the domain of dissimilation. I demonstrate that the GOCP constitutes a consistent formal apparatus on the one hand, and the versatility to accommodate the complexity of dissimilation patterns on the other. Moreover, it is shown that the present approach formally unifies the characterization of both the similarity effects and blocking effects by directly incorporating Local Conjunction as a uniform mechanism of accounting for the Similarity effect, OCP-subsidiary feature phenomena. As a result,

these phenomena need not require novel theoretical devices for each case, but rather are construed as instances of the combination of multiple GOCP constraints.

CHAPTER 1: INTRODUCTION

1.1 Objective

The goal of this dissertation is to examine various cases of dissimilatory effects and develop an adequate theory of dissimilation. This work is important in two respects: First, there are few attempts at a cross-linguistic study of dissimilation. While there are a handful of cross-linguistic studies of assimilation cases (Cho 1990, Mohanan 1993, Archangeli and Pulleyblank 1994a, Jun 1995), virtually no such attempt has been made for dissimilation cases. As a result, we have a lesser understanding of dissimilatory phenomena. This thesis makes a systematic attempt to deepen our understanding of dissimilation, based on cross-linguistic generalizations generated from the survey of 57 dissimilation cases.

Second, researchers stopped worrying about dissimilation, largely because of the consensus in phonology that dissimilation cases are explained by invoking a specific principle, the "OBLIGATORY CONTOUR PRINCIPLE" (OCP) (Leben 1973, Goldsmith 1976, McCarthy 1986):

(1) OCP (Obligatory Contour Principle) (McCarthy 1986: 208)
At the melodic level, adjacent identical elements are prohibited.

In her influential study, Yip (1988) demonstrated that various dissimilation cases can be explained by regarding the OCP as a rule-trigger. Under this view, a dissimilation rule is triggered under the compulsion of not violating the OCP. The impact of this proposal has resulted in the situation described by Myers (1994) as follows:

> "it is very common for authors to say that a rule of dissimilation is "triggered" by the OCP, but nobody has yet shown what this means" (p. 3).

This thesis attempts to show "what this means" from the perspective of OPTIMALITY THEORY (OT) (Prince and Smolensky 1993, McCarthy and Prince 1993a,b) and so without rules.

1.2 Scope

In this thesis, I limit my attention to *dissimilatory effects*, excluding other phenomena that are argued to be OCP-related, such as underlying unity of tone (via multiple-linking) (see Leben 1973, Goldsmith 1976), antigemination (see McCarthy 1986), and geminate properties of integrity and inalterability (see Schein and Steriade 1986, Hayes 1986, Suh 1997). The dissimilatory effects I am interested in are the following two types: *dissimilation* and *root cooccurrence restrictions*. Below, I explain what these terms refer to.

First, the term 'dissimilation' should be interpreted as a phenomenon in which one element in a sequence of two identicals gets altered to become different from the other. The definition of dissimilation by Crystal (1997) is given in (2).

(2) Dissimilation (Crystal 1997: 121)

> A general term in phonetics and phonology to refer to the influence exercised by one sound segment upon the articulation of another, so that the sounds become less alike, or different.

A representative example comes from Latin, in which certain suffixes show the effects of dissimilation, most notably -*alis* (Kent 1936: 250). When the stem does not contain any lateral consonant ([l]), the adjectival suffix surfaces as [-alis], as in (3a,b). However, if the stem contains a lateral consonant (underlined), the suffix surfaces as [-aris] (the dissimilated [r] is bolded) instead, as in (3c,d).

(3)	**a.**	/nav-alis/	nav-alis	‘naval’
	b.	/episcop-alis/	episcop-alis	‘episcopal’
	c.	/sol-alis/	sol-a**r**is	‘solar’
	d.	/lun-alis/	lun-a**r**is	‘lunar’

This is a case of dissimilation, since the two identicals (laterals) become dissimilar by the alternation of the suffix /l/ to [r]. My primary concern is to study cases of this sort.

Second, I also look at another type of dissimilatory effect — ‘root cooccurrence restrictions’. Many languages impose conditions against the multiple occurrences of a certain featural property or complex of phonetic properties inside a morpheme (McCarthy 1979, 1986, Mester 1986, Yip 1989, etc.).

Japanese displays an example of such a root cooccurrence restriction. In Japanese, Yamato (native) morphemes cannot contain more than one voiced obstruent (Itô and Mester 1986, Ishihara 1991). Thus, as in (4), while we find words such as *futa* (4a), *fuda* (4b), and *buta* (4c), there are no words like **buda* (4d) which contain two (or more) voiced obstruents (highlighted by the underline).

(4)	**a.**	futa	‘lid’
	b.	fuda	‘sign’
	c.	buta	‘pig’
	d.	*buda	

Cases of root cooccurrence restriction such as the one discussed above will be considered to be a type of 'dissimilatory effect', together with the general cases of dissimilation. The key observation which connects these two types of dissimilatory effects is that they are both phenomena of IDENTITY AVOIDANCE. Cases of dissimilation and root cooccurrence restrictions are both identity avoidance effects, minimally differing in whether the effect is observed under morphological concatenation (yielding dissimilation) or within a morpheme (yielding root cooccurrence restriction).

Next, as a background, I review the principle behind rule-based treatments of identity avoidance, the OCP (1), developed under Autosegmental Phonology (Goldsmith 1976, 1990).

1.3 The Obligatory Contour Principle (OCP)

1.3.1 What is the OCP?

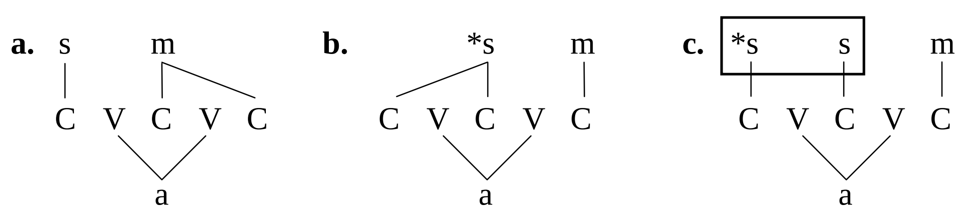
In this section, I review the OBLIGATORY CONTOUR PRINCIPLE (OCP), given in (5), the proposed motivation for various phenomena involving avoidance of identity. I refer this particular formulation of OCP as the traditional OCP, which will later be distinguished from my Generalized OCP.

(5) Traditional OCP (repeated from (1))

At the melodic level, adjacent identical elements are prohibited.

The OCP was first proposed by Leben (1973) (the name is due to Goldsmith 1976), intended to apply to prosodic features like tone. Thus, in Leben's (1973) analysis, the OCP served to explain systematic restrictions found in the tonal melody of Mende morphemes. In the work of McCarthy (1979, 1981), the OCP was extended to cover not only suprasegmental features but also segmental features. A major result of McCarthy's work was that some of the systematic restrictions on consonant patterns in Semitic roots can be explained as automatic consequences of the OCP. The regularity found in Semitic languages is that in a triconsonantal verbal form the first two consonants cannot be identical (**sasam*), but the last two consonants can (*samam* 'poison') (Greenberg 1950). McCarthy's explanation for this asymmetric distribution proceeds as follows: 1) Consonantal melodies occupy separate tiers from vocalic melodies (this is termed 'C/V Planar Segregation'). 2) Spreading of melody elements to skeletal slots is left-to-right. 3) Positing the OCP as a constraint on underlying forms derives the asymmetry, as illustrated in (6).

(6)



Here, as shown in (6a), a form like *samam* is derived from the biconsonantal root *sm*, with rightward spreading of the last root consonant. The direction of spreading is crucial, since as in (6b), the leftward spreading would yield the illicit **sasam*. In order to obtain a form like **sasam* with left-to-right association, a consonantal root of the form *ssm* would have to be posited, but such a form violates the OCP, as indicated by the box in (6c). Thus, for this analysis to work, the OCP must be posited as a Morpheme Structure Constraint (MSC) holding over the underlying representation.

In one of his influential papers, McCarthy (1986) further extends the role of the OCP from an MSC to a constraint which is active throughout the course of phonological derivation. McCarthy's argument comes from cases of *antigemination*, where a rule of syncope systematically fails to apply when the flanking consonants are identical. McCarthy presents examples from Afar, as shown in (7). In (7a,b) a vowel (unstressed) is deleted in a doubly open syllable — syncope. Crucially, the syncope is blocked in (7c,d) when the consonants on both sides of the potential deletion site are identical (underlined).

(7)	**a.**	xamíla	xaml-í	'swampgreass (ACC/NOM-GEN)'
	b.	darágu	darg-í	'watered milk (ACC/NOM-GEN)'
	c.	danan-é	*dann-é	'I/he was hurt'
	d.	walal-é	*wall-é	'I/he conversed'

McCarthy (1986) argues that this antigemination effect is due to the OCP holding through the course of the derivation: "syncope of a vowel between identical consonants would produce a configuration that violates the OCP and is therefore blocked" (p. 230). In this case, the OCP must be interpreted as a *derivational constraint* which blocks application of rules which otherwise would create a violation of the OCP.

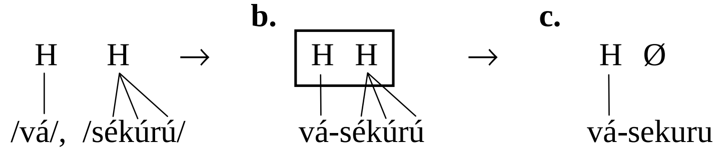
Finally, Yip (1988) extends the role of the OCP to a *rule trigger*. According to this interpretation, if a violation of the OCP arises in the course of a derivation, some rule or operation must be invoked to "repair" the violation. Yip (1988) convincingly demonstrates that phenomena such as degemination, dissimilation, assimilation, metathesis, and epenthesis can be interpreted as the repair strategies to rescue the OCP violation.

An example of an OCP-triggered phenomenon comes from Shona (Myers 1994). If a concatenation of two morphemes creates an OCP-violating representation, the second of the two H-tones deletes, a phenomenon known as Meeussen's Rule (Goldsmith 1984).[1]

[1] This example is used only to illustrate the trigger property of the OCP; the phenomenon of tone-slip, also discussed in Myers (1994), is ignored here.

Thus, a concatenation of the two H-toned morphemes results in the form with a single H-tone, as in /í-bángá/ -> *í-banga* ‘(it) is a knife’ (**í-bángá*) or /vá-sékúrú/ -> vá-sekuru ‘grandfather (honorific)’ (**vá-sékúrú*). This picture is schematically illustrated as follows.

(8) **a.** **b.** **c.**



In (8a), each morpheme has a H-tone underlyingly. When they concatenate (8b), an OCP violation results (boxed in (8b)). The result is the dissimilation of the second H-tone, as in (8c). As illustrated, this is a case where the OCP serves as a trigger, since the OCP-violating configuration is rescued by the application of Meeussen’s Rule.

In the next section, I will question the claim made in Yip (1988) that the OCP is the trigger for dissimilatory effects of any kind.

1.3.2 Problems of the traditional OCP

While I do not deny the fundamental idea of identity avoidance which the OCP is proposed to capture, this specific instantiation of the traditional OCP, repeated in (9), poses some problems concerning its applicability to various dissimilatory phenomena.

(9) **Traditional OCP (repeated from (5))**

At the melodic level, adjacent identical elements are prohibited.

In this section, I explore these issues that are critical to the validity of the OCP as a fundamental principle in deriving dissimilatory effects. To give an overview, as in (10), I provide a list of the issues to be discussed.[2]

(10) Critical issues facing the traditional OCP

a. *Similarity effects*
b. *Adjacency issues*
c. *Non-identical dissimilation cases*
d. *Markedness correlation*
e. *Lack of generalizability*

Below, I discuss each of these issues in depth.

1.3.2.1 Similarity effects

The first issue that is problematic to the traditional OCP has to do with the *similarity effects* — the more similar the two elements are, the stronger the identity avoidance effect is, discussed in Padgett (1991, 1992), Selkirk (1988, 1991, 1993), Yip (1989), and most notably in Pierrehumbert (1993).[3] These researchers have found that cooccurrence restrictions are more rigorously enforced on two segments sharing multiple features than on two segments sharing just a single feature. Yip (1989) observes that languages like Arabic show the similarity effect: a stronger cooccurrence restriction holds between two [coronal] consonants if they agree in [sonorant] value. Thus, a triconsonantal root may contain two coronal consonants differing in sonorancy, such as

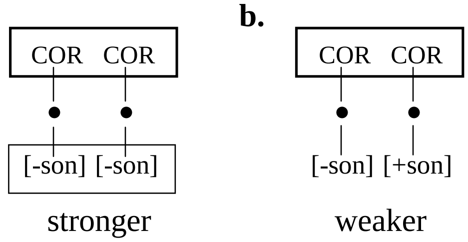
[2] In this thesis, we are not concerned with every role of the OCP proposed in the literature. Rather, we will focus on its role in various dissimilatory effects.

[3] In Padgett (1991, 1992), the same effect is called the 'OCP-subsidiary feature' effect.

rasam ‘I draw’, but not two coronal obstruents *_dasam_, or two coronal sonorants *_ralam_.[4]

The traditional OCP, as formulated above (9), fails to characterize this similarity effect, since it is sensitive only to two features on a particular tier, in this case [coronal]. This is schematically illustrated in (12).

(11) **a.** **b.**



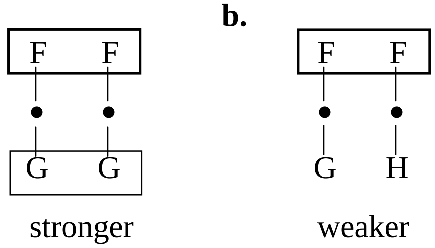
In (11), both (11a) and (11b) equally violate the OCP on the [coronal]-tier: the OCP fails to recognize the additional similarity on the [sonorant]-tier. The traditional OCP cannot distinguish forms like _rasam_ from illicit *_dasam_ or *_ralam_, since it only looks at a particular ‘tier’. In computing the identity of two [coronal] segments, the agreement of the value of the subsidiary-feature [sonorant] must come into play.

Similarity effects are widely attested in other languages as well: Javanese (Mester 1986), Yucatec Mayan (Yip 1989), Luo (Mester 1986, Yip 1989), Alur (Mester 1986), Russian (Padgett 1991), Pomo (Yip 1989), Cambodian (Yip 1989), Takelma (Lee 1991). What is significant about these cases is that the stronger identity avoidance effect holds between two segments that are more similar. The opposite is not true: it is never the case that more different elements are subject to a stronger cooccurrence restriction. The problem of the traditional OCP is that the OCP is unable to capture the additional

[4] This is not an absolute generalization, but rather it is a statistically significant tendency (McCarthy 1986, 1991, Yip 1988, and Pierrehumbert 1993). The root cooccurrence restrictions in Arabic are further discussed in section 2.2.2.

similarity on the G-tier, between forms (12a) and (12b), because the identity is computed based solely on a particular tier, regardless of some subsidiary similarities.

(12) **a.** **b.**



This issue suggests a need for a reconsideration of the tier-sensitive formulation of the OCP (9), the solution taken in Selkirk (1988, 1991, 1993), Padgett (1991, 1992), where the OCP can examine multiple features. An alternative is to elaborate the feature geometry so that the identity of the subsidiary feature figures into the computation of OCP violations (Mester 1986, Padgett 1991).[5]

The traditional OCP fails to recognize the Similarity effect — the greater the similarity, the stronger the identity avoidance.

1.3.2.2 Adjacency issues

The second issue that is problematic to the traditional OCP has to do with the characterization of adjacency. The traditional OCP (9) tries to characterize the various adjacency requirements holding between the two elements collectively under the name of ‘tier’ adjacency. As a result, much effort has been spent to elaborate the representational expression by which the various types of adjacency can be accounted for (Mester 1986,

[5] These proposals are contrasted with the proposed approach later in section 2.2.2.

McCarthy 1988, Selkirk 1988, 1991, 1993, Padgett 1991, for feature geometry, Archangeli 1984, Steriade 1987, 1995 for underspecification). Furthermore, subsequent studies have argued that the various adjacency requirements cannot be dealt with by the notion of tier adjacency alone (Myers 1987, Archangeli and Pulleyblank 1987, 1994a, Odden 1994). What these studies suggest is that the tier adjacency which is built into the definition of the traditional OCP is incapable of characterizing the diversity of the adjacency requirements found in OCP-related phenomena.

In his paper, Odden (1994) proposes a parametric theory of adjacency which is aimed at characterizing any adjacency relations holding between the trigger and the target of a particular rule or constraint. According to Odden (1994), the various adjacency requirements fall into the following four categories: Root adjacency, Syllabic adjacency, Transplanar adjacency, and Unbounded adjacency.[6] The choice is left for a language-particular parameterization of a particular rule or constraint.

Importantly, what is missed in Odden's (1994) parametric theory of adjacency is the correlation between the strength of the OCP-effect and the *proximity* between the two elements; the claim that adjacency is a matter of arbitrary parametric choice fails to characterize the observation that the closer the two elements are, the stronger the interaction (Pierrehumbert 1993, Archangeli and Pulleyblank 1994a, Smolensky 1993).

Pierrehumbert (1993) reports that in Arabic the OCP effect is gradient corresponding to the proximity between the two segments. She demonstrates this by surveying the frequency of cooccurrence between two identical consonants for both

[6] In Odden (1994), Transplanar adjacency and Unbounded adjacency are referred to as Transplanar Locality and the Locality Condition, respectively.

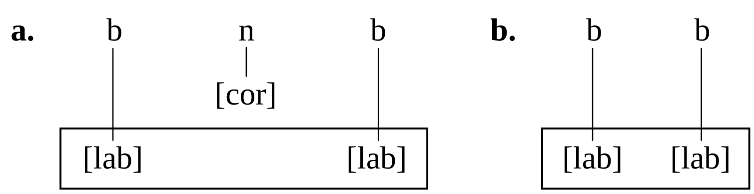
adjacent and non-adjacent ones. The following table shows the relative strength of the OCP for particular consonant pairs with respect to their adjacency.[7]

(13)

Consonants	**O/E (adjacent)**	**O/E (non-adjacent)**
Labials	0.00	0.29
Coronal Sonorants	0.06	0.67
Coronal Obstruents	0.29	0.67
Dorsals	0.04	0.34
Gutturals	0.06	0.36

The above table shows that the OCP effect is observed even when the two consonants are not adjacent (the numbers in the right-hand column are all significantly lower than 1.0). Still, the OCP effect between two non-adjacent consonants are significantly weaker than between two adjacent ones. Pierrehumbert (1993) argues that such a gradient effect cannot be captured by the traditional OCP, since it is governed by the notion of ‘tier’. Consider the following illustration in (14) (it is simplified to make my point clear).

(14)



In both (14a) and (14b) two [b]’s are tier-adjacent, and so are subject to the OCP. Configurations (14a,b) equally violate the traditional OCP on [coronal], assuming that the [labial] tier is distinct from the [coronal] tier. Thus, the tier-sensitive traditional OCP

[7] The O/E ratio is the ratio of the number of occurrences of a pair of identical segments (O) to the number of occurrences which would be expected in the absence of any OCP effect (E). O/E ranges from 0 for an absolute effect (no cooccurrence is found) up to 1.0 or more when there is no OCP effect (the combination occurs as often, or more, than expected). See Pierrehumbert (1993) for details.

predicts that the frequencies of cooccurrence for (14a) and (14b) is equal. However, this is not what we find. As the table in (13) show, the identity avoidance effect is not an all-or-nothing affair, but a gradient effect in proportion to the proximity between the two elements. Thus, not just Odden's (1994) approach, but any kind of parametric approach to adjacency fails to explain the connection between proximity and the strength of the OCP-effects, precisely because of its dependency to the notion of 'tier'.

Additionally, the parametric approach would have to create another parameter every time it encountered a new type of adjacency. Thus, as discussed in section 2.3.3, in order to account for a case such as *a*-dissimilation in Kera, the parametric approach would have to introduce a novel parameter, Single-consonant adjacency. These problems add up to the same problem of having the tier-dependent characterization of adjacency built into the definition of the traditional OCP (9). The Locality requirement is not as simple as the traditional conception in which adjacency is calculated on the relevant tier, which prompts a reconsideration of the traditional OCP with respect to the issues of adjacency.[8]

The traditional OCP fails to recognize the Proximity effect — the closer the distance, the stronger the identity avoidance.

1.3.2.3 Non-identical dissimilation cases

The third issue that is problematic to the traditional OCP involves cases in which dissimilatory effects obtain between elements that are not identical. As obvious from the definition given in (9), the traditional OCP characterizes dissimilation cases as a result of

[8] In this thesis, we are not concerned with the theory of adjacency which dictates the whole domain of phonology; rather, we are interested in characterizing adjacency as it is related to the OCP only.

'identity avoidance'. This predicts that dissimilation occurs only under the compulsion to avoid identical feature specifications between the two segments in question. There must be a triggering feature [F] which is common to both the trigger and the target. Although most cases are found to be characterizable as identity avoidance, there are cases in which dissimilation is observed even though there is no identical feature specification to be avoided. It is impossible to account for such cases in terms of the traditional OCP, since the motivation of dissimilation cannot be the avoidance of two *identical* feature specifications.

One such example is found in Russian, specifically known as dissimilative jakan'e (Halle 1965, Davis 1970, Kuznecov 1973).[9] It is observed that in several Southern Russian dialects dissimilation occurs between the two vowels in adjacent syllables. A striking aspect of this phenomenon is the fact that dissimilation obtains even when the two vowels are not identical, as shown in (15) (Kuznecov 1973: p. 58).[10]

(15)	**a.**	/r'ek'í/	r'**a**k'í	'rivers'
	b.	/n'es'í/	n'**a**s'í	'carry!'
	c.	/v'al'ú/	v'**a**l'ú	'I order'
	d.	/c'em'yú/	c'**a**m'yú	'seven (instrumental)'

The generalization here is that nonhigh vowels (*e,o,ɛ,ɔ,a*) are realized as low (*a*) when the following vowel is high (*i,u*). In terms of features, this can be descriptively stated as follows: [-high] vowels become [+low] when followed by [+high] vowels. This poses a serious problem for the traditional OCP (9), since there is no identical feature to be avoided. The more appropriate characterization here is not identity avoidance, *per se*,

[9] The in-depth description of this phenomenon, as well as an analysis under the proposed approach will be provided in Chapter 3. The description here is somewhat simplified to illustrate my point.

[10] These data are of Don subtype (Донское яканье). C' denotes to a palatalized consonants.

but rather maximization of difference in the vowel height dimension. Under the formulation of the traditional OCP in (9), it is impossible to account for cases like dissimilative jakan'e in which non-identical segments engage in dissimilatory activity.

The traditional OCP fails to account for cases which cannot be characterized in terms of identity avoidance.

1.3.2.4 **Markedness correlation**

The fourth and the fifth problems are independently pointed out by Alderete (1996, 1997) and Itô and Mester (1996a,b). The fourth problem is the traditional OCP's (9) failure to correlate the markedness factor of the elements to dissimilatory phenomena. Since the traditional OCP equally prohibits any identical elements, it cannot capture the generalization that it is the *marked structures* that tend to dissimilate (Alderete 1996, 1997, Itô and Mester 1996a,b, but see section 2.3.4.1 for exceptions to this claim). In order to explain the markedness factor of trigger and target, adjunct theories of feature specification are required. However, this has lead to some controversy regarding the precise nature of phonological unmarkedness (McCarthy and Taub 1992, Mohanan 1993, Smolensky 1993, Steriade 1995, Itô, Mester and Padgett 1995). What is lacking is a formal connection between the OCP and the markedness issues.

The traditional OCP fails to capture the tendency that it is the marked structures that are more likely to dissimilate.

1.3.2.5 Lack of generalizability

The fifth problem of the traditional OCP is about its generalizability. Defined as in (9), the traditional OCP is only effective over elements on an autosegmental tier. However, many cases have been found to show dissimilatory effects outside the domain of autosegmental phonology. These include cases of length dissimilation in Gidabal (Geytenbeek and Geytenbeek 1971), Slovak (Kenstowicz and Kisseberth 1979), Latin (Itô and Mester 1996a,b), and cases of so-called NC dissimilation in Gooniyandi (McGregor 1990), Gurindji (McConvell 1988, Evans 1995), and Yindjibarndi (Wordick 1982). If the OCP is the fundamental principle for all dissimilatory phenomena, cases like the above should follow from the OCP. However, the traditional, tier-dependent OCP (9) is unable to characterize such cases, since dissimilating elements do not reside on an autosegmental tier.

> The traditional OCP cannot handle identity avoidance effects involving non-autosegmental entities.

The issues discussed above are the areas that are problematic to the traditional OCP. These issues are summarized in (16).

(16) Summary of the issues

a. ***Similarity effects***
It is found that stronger identity avoidance effect obtains between the elements that are more similar (i.e. sharing some subsidiary feature) (Padgett 1991, 1992, Selkirk 1988, 1991, 1993, Pierrehumbert 1993). This cannot be explained by the traditional OCP which is sensitive only to the presence or absence of a particular feature.

b. ***Proximity effects***
The formulation of the OCP which is dependent on the notion of ‘tier’ (such as (9)) fails to characterize the importance of the degree of adjacency

between the two elements, missing the generalization that the closer the distance (between the two elements), the stronger the identity avoidance (Pierrehumbert 1993).

c. ***Non-identical dissimilation cases***
The traditional OCP fails to account for cases which cannot be characterized in terms of identity avoidance. In these cases, the motivation must be ‘maximization of difference’, rather than ‘identity avoidance’.

d. ***Markedness correlation***
Since the traditional OCP equally prohibits any identical elements, it fails to capture the tendency that it is the marked structures that are more likely to dissimilate.

f. ***Lack of generalizability***
The traditional OCP as defined above (9) fails to generalize identity avoidance effects to cases involving non-autosegmental entities.

After examining each of the problems, it is clear that the role of the OCP in dissimilation needs to be reconsidered. In the next section, I offer a solution to these problems, introducing an alternative, the GENERALIZED OCP, which is proposed under Optimality Theory (Prince and Smolensky 1993, McCarthy and Prince 1993a,b).

1.3.3 The Solution

In the previous section, I showed that the traditional OCP, repeated below in (17), is incapable of accounting for the diversity of dissimilatory phenomena attested in natural languages.

(17) Traditional OCP (repeated from (9))
At the melodic level, adjacent identical elements are prohibited.

The central goal of this thesis is to develop a model which overcomes the deficiencies in the traditional OCP, discussed in the previous section. In particular, I argue for the GENERALIZED OCP (GOCP)[11], a model in which the traditional OCP is reinterpreted as a more general constraint on identity avoidance (in the spirit of Yip 1988, 1995a,b). The GOCP takes the form of a constraint, as stated below.

(18) Generalized OCP

***X...X:** A sequence of two X's is prohibited.

Where

X $\in$ {PCat, GCat}

"**...**" is intervening material.

Before going in to the details of the proposal, here I lay out the four basic tenets of the GOCP:

(19) Generalized OCP in a nutshell

a. ***Tier-independence***
The GOCP constraints are defined independently of the notion of autosegmental tier.

b. ***Specification of Arguments***
The GOCP constraints must be provided with a set of arguments specified for a particular aspect of identity avoidance.

d. ***Violability***
The GOCP constraints are, in essence, violable.

e. ***Interconnectedness***
The GOCP constraints are closely tied to the sub-theories governing various phonological dimensions.

Tier-independence is essential to the theory of identity avoidance. As pointed out in the previous section (1.3.2), various problems arise because of the clause in the

[11] I am retaining the term 'OCP' here to reflect the original idea of identity avoidance. The addition of the prefix 'generalized' highlights its global applicability, and also enables us to distinguish this from the previous version of the OCP.

traditional OCP (17), “At the melodic level...”. This limitation has kept the traditional OCP from extending to the non-autosegmental entities, such as prominence and prosodic elements. Moreover, due to such a limitation, the research program has been forced to look into the property of tiers, instead of the nature of identity avoidance. The GOCP is argued to overcome these limitations with the removal of tier-sensitivity.

The GOCP is proposed to represents a universal constraint *schema*. This means that specific arguments must be instantiated, just as is required by GENERALIZED ALIGNMENT (McCarthy and Prince 1993b) (discussed in section 1.4.2.1). Thus, the GOCP schema itself provides a formal mechanism of capturing the identity avoidance effects, while the specific GOCP constraints account for the particular instances of dissimilatory phenomenon.

The GOCP constraints are violable. This is because the GOCP is crucially built on Optimality Theory (OT) (Prince and Smolensky 1993, McCarthy and Prince 1993a,b), whose fundamental principle is the violability of constraints. Regarding the GOCP as a violable, rankable constraint allows the flexible interaction of the GOCP constraints with other type of constraints, such as Faithfulness constraints.[12]

The fourth tenet of the GOCP is that it is closely interconnected with the sub-theories governing various phonological dimensions, such as markedness theory (Prince and Smolensky 1993, Smolensky 1993, 1995), and sub-hierarchy of proximity (discussed later in section 1.4.5). This directly or indirectly imposes an appropriate restrictiveness on the full range of logically possible types of arguments to be instantiated.

This thesis provides an argument and an exemplification of the model described above. Having introduced the abstract of the GOCP, the discussion of OT, which this theory is based on, is in order.

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[12] In his recent paper, Myers (1997) proposes his version of tier-sensitive, violable OCP under OT.

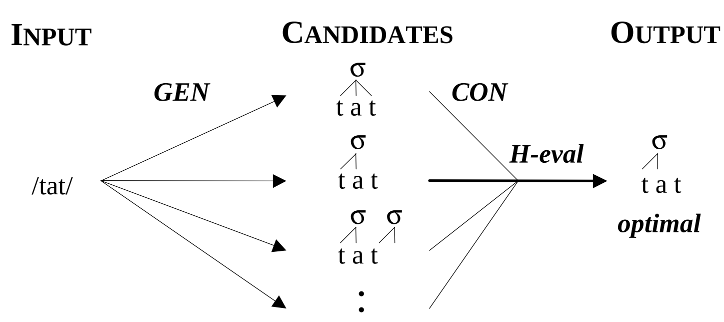
1.4 Optimality Theory (OT)

This section reviews Optimality Theory (OT) (Prince and Smolensky 1993, McCarthy and Prince 1993), the theoretical framework that the present study employs. The basics of the theory are explained in section 1.4.1. Section 1.4.2 covers "Generalized Alignment" and "Correspondence". Section 1.4.3 describes the notion of "Constraint Encapsulation", followed by a discussion of "Local Conjunction" in section 1.4.4. Finally, section 1.4.5 shows how my main proposal (GOCP) is implemented in OT.

1.4.1 OT Basics

OT is a theory of "how one level/component of a structural description is projected from another" (Smolensky 1995: 1). An Optimality Theoretic grammar consists of a set of universal, rankable, violable constraints. In a given language, these constraints form a hierarchy which selects an optimal output from its corresponding input. Smolensky (1995) illustrates this architecture as in (20).

(20) The Architecture of OT (Smolensky 1995):



Any input must first go through a function GEN (Generator) which takes an input and generates a (possibly infinite) set of output candidates. In (20), from the input form /tat/ a number of output candidate forms are generated, such as [tat], [ta] (*t* being deleted), [tati] (*i* being epenthesized), etc. The set of candidates is then evaluated in parallel through a hierarchy of constraints (CON), and the candidate which best satisfies the hierarchy is selected as the optimal output. In (20), the candidate [ta] emerges as the optimal form.

The evaluation of candidate forms is represented through tableaux such as the one in (21) below. Violations are indicated by asterisks (*); fatal violations which would eliminate a particular candidate are indicated by exclamation points (!); and optimal candidates are indicated by the "pointy finger" icon (☞).

(21) Sample Tableau -1-

/input/	Constraint X	Constraint Y
a. ☞ candidate A		*
b. candidate B	*!	

In the tableau above, candidate A wins over candidate B because B fatally violates the higher-ranked constraint, Constraint X. The fact that A violates the lower-ranked constraint, Constraint Y, is irrelevant to the evaluation, because Constraint Y is dominated by Constraint X, and hence the shading. Alternatively, under the reverse ranking where Constraint X is dominated by Constraint Y, candidate B would emerge as optimal, as shown in (22).

(22) Sample Tableau -2-

/input/	Constraint Y	Constraint X
a. candidate A	*!	
b. ☞ candidate B		*

As these two examples show, it is not necessary for optimal candidates to satisfy all constraints. They simply need to satisfy more of the higher-ranked constraints than their competitors. Thus, in Optimality Theoretic grammar, constraints are not absolute, but *violable*, even in the optimal (surface) form.

Both (21) and (22) represent cases in which candidates can be discriminated by comparing the absence of an asterisk (no violation) with the presence of an asterisk (violation). In addition, there are cases in which all candidates violate a given constraint. In such a case, the evaluation looks for the candidate with the fewest violations of the constraint, or else, looks at lower-ranked constraints. Consider tableau (23) below.

(23) Sample Tableau -3-

/input/	Constraint X	Constraint Y
a. ☞ candidate A		*
b. candidate B		**!
c. candidate C	*!	

In tableau (23), candidate C gets eliminated by violating the higher-ranked Constraint X. Both candidates A and B tie for Constraint X, and are passed onto the next highest constraint, Constraint Y. Here, although both candidates violate Constraint Y, only B violates it twice. Candidate A is selected as optimal because A *minimally* violates

Constraint Y. As this example shows, candidates can be discriminated by comparing the number of violations: the one with the fewest violations will emerge as the winner.

1.4.2 Generalized Alignment and Correspondence

In the previous section, I described how a constraint system works under OT. In this section, I look at the two types of constraints: Generalized Alignment, which is discussed in section 1.4.2.1, and Correspondence, discussed in section 1.4.2.2. Each constraint type is important in its own respect: Generalized Alignment capitalizes the gradient nature of OT just mentioned above, while Correspondence represents the current view of Faithfulness, the pressure for an output form to be exactly the same as its corresponding input.

1.4.2.1 Generalized Alignment

GENERALIZED ALIGNMENT, or GA, was introduced by McCarthy and Prince (1993b) to capture various phenomena that involve the alignment of edges between two elements. The definition of GA is given below in (24),

(24) **Generalized Alignment** (McCarthy and Prince 1993b)

ALIGN(Cat1, Edge1; Cat2, Edge2) $=_{def}$

$\forall$ Cat1 $\exists$ Cat2 such that Edge1 of Cat1 and Edge2 of Cat2 coincide.

Where

Cat1, Cat2 $\in$ PCat $\cup$ GCat

Edge1, Edge2 $\in$ {Right, Left}

GA takes four arguments: Cat1, Edge1, Cat2, and Edge2. Cat1 and Cat2 are selected from the set of phonological or grammatical categories, and Edge1 and Edge2 can either be right or left. The four arguments must be instantiated to make GA a usable constraint. Thus, actual alignment constraints look like: ALIGN(Foot, Left, PrWd, Right), ALIGN(σ, Right, μ, Right), etc. These specific alignment constraints are satisfied when the two relevant edges coincide in a candidate form.

There are two important aspects to GA. First, as mentioned above, GA is a particular kind of *constraint schema*, in which each of the four arguments are instantiated to form a constraint. Second, in alignment constraints, violations are evaluated *gradiently*, by counting the distance between the two relevant edges in terms of some phonological unit, typically segments.[13] The number of violations corresponds to the number of segments between the two edges in question. Thus, if the two edges are one segment away from each other, one violation mark is assigned, and if two segments away, two violation marks, and so forth.

Consider the following example for illustrative purposes, where the alignment constraint is defined in (25).

(25) Sample alignment constraint

ALIGN(X, Right, Y, Left)
Align the right edge of every X to the left edge of some Y.

The tableau in (26) shows the application of the alignment constraint, where each of "a", "b", "c", and "d" represents a segment, and $_{\mathbf{X}}$) and ($_{\mathbf{Y}}$ represent the edges of X and Y, respectively.

[13] Unless noted, alignment is calculated in terms of segments in this dissertation.

(26) Sample Tableau -3-

/ a b c d /	ALIGN(X, Left, Y, Right)
a. ☞ a $_X$) ($_Y$ b c d	
b. a $_X$) b ($_Y$ c d	*!
c. a $_X$) b c ($_Y$ d	*!*

In (26), candidate (26a) has perfect alignment of X and Y, since there is no segment between them. Candidate (26b) has one segment intervening between X and Y ("b"), hence one violation, whereas candidate (26c) has two segments intervening X and Y ("b" and "c"), hence two violations.

1.4.2.2 **Correspondence**

Correspondence Theory was first introduced in McCarthy and Prince (1994) to deal primarily with various reduplication phenomena, and was refined in McCarthy and Prince (1995) into a theory of FAITHFULNESS. Faithfulness is one of the key concepts in OT, conveying the pressure for an output to be the same as the input. Any output forms that are different from the input sacrifice having Faithfulness.

Correspondence Theory provides a way to unify the idea of Faithfulness with the relationship between the base and the reduplicant found in reduplicative morphology. In reduplication, the reduplicant must match the segmental melody of its corresponding base. McCarthy and Prince (1995) viewed this as being similar to the way in which an output must match the segmental melody of its corresponding input. Correspondence Theory makes it possible to formally capture the similarity between the base-reduplicant relation and the input-output relation under the notion of Faithfulness.[14]

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[14] For more detailed discussion of this, see McCarthy and Prince (1995).

The heart of Correspondence Theory is the notion of CORRESPONDENCE as defined below in (29).

(27) Correspondence

Correspondence $=_{def}$

> Given two strings S_1 and S_2, correspondence is a relation $\Re$ from the elements of S_1 to those of S_2. Segments $a \in S_1$ and $b \in S_2$ are referred to as correspondents of one another when $a \Re b$" (McCarthy and Prince 1995: 262).

Notationally, what this does is to assign indices to all segments in the Input/Base and in the Output/Reduplicant. Any Input-Output or Base-Reduplicant pair which have the same index are in a correspondence relation. This is illustrated in (28) where we consider five different output candidates emerged from the input form, /$a_1b_2c_3$/.

(28) Examples of Correspondence Relations

Input	Output	
	[$a_1b_2c_3$]	perfect correspondence
	[a_1b_2]	/c_3/ has no correspondent in the output
/$a_1b_2c_3$/	[$a_1b_2c_3d_4$]	[d_4] has no correspondent in the input
	[$a_1b_2c_{100}$]	/c_3/ and [c_{100}] are not in correspondence
	[$a_1b_2d_3$]	/c_3/ and [d_3] are in correspondence, but differing in their segmental content

In (28), the input form has three segments indexed as /$a_1b_2c_3$/. The first candidate, [$a_1b_2c_3$], is in a perfect correspondence relation, sharing all segments and indices with the input. In the second candidate, the input /c_3/ has no correspondent in the output, and in the third candidate, there is an extra segment [d_4] which has no correspondent in the input. The fourth candidate is identical in terms of segments, but /c_3/ and [c_{100}] are not in correspondence, because their indices are different. Finally, the fifth candidate is identical to the input in terms of their indices, hence they are in correspondence; but /c_3/ and [d_3] are segmentally different.

Of the five candidates in (28), only the first candidate is faithful to the input, and the rest of the forms are different from the input in some way. These four candidates would violate faithfulness constraints governing Input-Output Correspondence relations, such as those listed in (29).

(29) **a.** **MAX-IO:** Every element in the Input has a correspondent in the Output.
b. **DEP-IO:** Every element in the Output has a correspondent in the Input.
c. **IDENT(F)-IO:** Correspondent segments have identical values for the feature F.

These constraints are illustrated in (30) below, where only the first candidate does not receive any violation. The second candidate violates MAX-IO, having no correspondent for /c_3/, while the third candidate violates DEP-IO, having no correspondent for [d_4]. The fourth candidate violates both MAX-IO and DEP-IO, since both /c_3/ and [c_{100}] do not have correspondents. Finally, the last candidate violates IDENT-IO, since the correspondent pair /c_3/ and [d_3] differ in their content.

(30) **Examples of Correspondence Constraints**

<u>Input</u>		<u>Output</u>	
	→	[$a_1b_2c_3$]	no violation
	→	[a_1b_2]	violates **MAX-IO**
/$a_1b_2c_3$/	→	[$a_1b_2c_3d_4$]	violates **DEP-IO**
	→	[$a_1b_2c_{100}$]	violates both **MAX-IO** and **DEP-IO**
	→	[$a_1b_2d_3$]	violates **IDENT-IO**

As shown above, Correspondence-based constraints, such as MAX, DEP, and IDENT are all characterized as faithfulness constraints which demand the identity between two representations/strings. MAX (29a) prohibits *deletion* of a segment (ignoring any inserted segment). DEP (29b) regulates only the *insertion* of segments. IDENT (29c), introduced in McCarthy and Prince (1995), crucially differs from MAX and DEP in that it does not distinguish between deletion and insertion (of some feature), but simply requires identity. Both deletion and insertion are regarded as changes and are evaluated in the same way. The combined effect of MAX, DEP, and IDENT is the requirement of complete identity, the basic faithfulness idea.

The next section turns to Constraint Encapsulation, which is crucial to the main proposal, Generalized OCP.

1.4.3 Constraint Encapsulation

OT makes use of universal linguistic hierarchies, such as the Sonority Hierarchy, by implementing them as formal constraint hierarchies. These universal hierarchies play a fundamental role within OT. However, in order to reduce the number of constraints within hierarchies and enhance the interpretability of an analysis, Prince and Smolensky (1993: §8) proposed an operation called CONSTRAINT ENCAPSULATION, which encapsulates portions of the universal sub-hierarchy into single derived (parameterized) constraints.

Consider the constraint HNUC (31), taken from Prince and Smolensky (1993: 127-172). In the definition below, |x| indicates ‘the intrinsic prominence of x’, x ≻ y means ‘x is more harmonic than y’, the expression A/x means ‘x belongs to category A, x is the constituent-structure child of A’, and X » Y denotes ‘Constraint X dominates Constraint Y’.

(31) HNUC (The Nuclear Harmony Constraint)

A higher sonority nucleus is more harmonic than one of lower sonority.
i.e. If $|x| > |y|$ then Nuc/x $\succ$ Nuc/y

The constraint, HNUC in (31), scans candidates' syllable structures and evaluates the optimality of their syllabic nuclei. For example, a candidate form [ta] with [a] in its nucleus is superior to a candidate form [ti] with [i] in its nucleus, and so on. This constraint can be rewritten as follows.

(32) Peak Harmony: P/*a* $\succ$ P/*i* $\succ$ $\cdots$ $\succ$ P/*t*

This hierarchy (32) achieves the same effect as (31) does; namely, a syllable with *a* as its peak is more harmonic than a syllable with *i* as its peak, and so on, such that *t* is the least harmonic peak. This *harmony scale* can be incorporated into constraints using the *constraint schema*, defined in (33).

(33) *P/λ: λ must not be parsed as a syllable peak (i.e. associated to Nuc)

The above schema generates a hierarchy of binary-valued constraints, as in (34).

(34) Peak Hierarchy: *****P/*t* » $\cdots$ » *P*i* » *P/*a*

The following tableau illustrates the evaluation of this hierarchy.

(35) Tableau of Peak Hierarchy

	*P/*t*	…	*P/*i*	*P/*a*
[ta]				*
[ti]			*	
⋮		…		
[tt][15]	*			

As shown above, Peak Hierarchy evaluates the candidates' syllabic structure from least to most harmonic. With Peak Hierarchy, the effect of HNUC (31) is derived in a strictly binary fashion.

In language-specific constraint hierarchies, Peak Hierarchy places itself as a universal sub-hierarchy which is complementary to the main hierarchy. Constraint Encapsulation becomes useful when some constraint interrupts Peak Hierarchy, as in (36). Here, Constraint X is ranked above *****P/λ, interrupting Peak Hierarchy (the actual value of "λ" varies depending on a language in question).

(36) Interruption by ConstraintX

$\boxed{\textbf{*}\mathrm{P}/t \gg \cdots \gg \textbf{*}\mathrm{P}/\tau} \gg \textbf{ConstraintX} \gg \mathrm{*P}/\lambda \gg \cdots \gg \mathrm{*P}/a$

Constraint Encapsulation enables specific groups of constraints (from the top down to the point of interruption, indicated by the box) to be encapsulated into a single, equivalent constraint, as in (37).

[15] I consider this possibility for strictly illustrative purposes.

(37) POSS-NUC(π_{Nuc})

Segments with sonority less than π_{Nuc} may not be parsed as peaks.

Abbreviates: [*P/*t* » ⋯ »*P/τ], where τ is the most sonorous segment with $|\tau| < \pi_{Nuc}$

This encapsulated constraint, POSS-NUC, has a parameter (π_{Nuc}), whose value is determined entirely by the language-particular ranking. Constraint Encapsulation reduces the cluttering by grouping constraints together, as illustrated in the following comparison of tableaux in (38).

(38) Comparison of readability

	POSS-NUC	ConstraintX
[ta]		*
[tτ]	*!	

	*P/*t*	…	*P/τ	ConstraintX	*P/λ	…	*P/*a*
[ta]				*			
[tτ]			*!				

As is obvious from the comparison of the two tableaux in (38), a clear advantage of using Constraint Encapsulation is its interpretability. It allows the otherwise cluttered sub-hierarchy to interact directly with some other constraint in a simple way.

1.4.4 Local Conjunction

LOCAL CONJUNCTION, introduced by Smolensky (1993, 1995), is a constraint operation which combines two independent constraints so that a violation is assessed only when *both* constraints are violated. The idea is that it is worse to violate two constraints at the same time than it is to violate either constraint independently. Thus, violations of conjoined constraints are accrued only when both constraints are violated locally. If only one of the two conjoined constraints is violated, there is no violation of the conjoined constraint. For example, a language may allow violations of NOCODA and *PL/Lab (No Labial Place) individually, meaning there are codas and labials in the language. However, local conjunction of these two constraints will prohibit labials in coda position.

According to Smolensky (1993, 1995), Local Conjunction is defined as follows:

(39) Local Conjunction (Smolensky 1995)

Local Conjunction of C_1 and C_2 ($C_1 \&_{LC} C_2$) in some domain *D*:

a. C_1 & C_2 is violated when there is some domain of type *D* in which both C_1 and C_2 are violated.

b. Universally, C_1 & C_2 » C_1, C_2

Local Conjunction can be *self-conjoining*: if C_1=C_2, C_1&C_2 is violated when there is some domain *D* in which C is violated *twice*. Further, the locally-conjoined constraint must always be ranked above both of the component constraints: (universally) C_1&C_2 » C_1, C_2 (Smolensky 1993, 1995).

Since its introduction, Local Conjunction has been discussed in the following literature: Alderete (1996, 1997), Archangeli and Suzuki (1998), Hewitt and Crowhurst (1995), Itô and Mester (1996a,b), Kirchner (1995), Ohno (1998), and Suzuki (1995b, 1997, 1998). Yet, there remains an unsettled issue concerning which two constraints may be conjoined. In this thesis, I assume that a GOCP constraint can be conjoined only with another GOCP constraint.

Up to this point, I have reviewed the basics of OT, including its architecture, Generalized Alignment, Correspondence, Constraint Encapsulation, and Local Conjunction. In the next section, I discuss how my main proposal, Generalized OCP, is implemented in OT, utilizing the notions just reviewed.

1.4.5 The Generalized OCP in OT

Under OT, I propose that the GOCP is realized as a violable, rankable constraint, expressed as follows.

(40) **Generalized OCP**

***X...X:** A sequence of two X's is prohibited.

Where

X ∈ {PCat, GCat}

"**...**" is intervening material.

The abstract form in (40) represents the GOCP constraint *schema*, to which specific arguments can be instantiated (Pierrehumbert 1993, Yip 1988).[16] For instance, X can be from phonological categories like [lateral], [labial], Rt (root node), σ (syllable) (PCat), or a grammatical categories like Stem, Affix, etc. (GCat).[17] Such extension is made possible because unlike the traditional OCP, the GOCP constraint does not make specific reference to the notion of 'tier'. Thus, elements like a syllable and a morpheme can be subject to the GOCP as well as features.

It is also necessary to clarify what it means to be 'a sequence'. The relevant situation is illustrated in (41). In (41), let us say that two X's are in SEQUENCE in any of the three possible relations (①, ②, and ③), and that two X's are in STRICT SEQUENCE in configurations ① and ②, but not in ③. That is, a strict sequence of X requires no intervening tokens of X while a sequence allows intervening tokens.

(41) ③
X…X…X
① ②

---

[16] By constraint schema, we mean a sort of meta-constraint which takes a particular argument, just like the GENERALIZED ALIGNMENT which we saw in section 1.4.2.1.

[17] Each type of possible argument is fully explored in section 2.2.

In distinguishing sequence and strict sequence formally, we write X...X for sequence, X~X for strict sequence between the two X's. Each of these relations are defined below.[18]

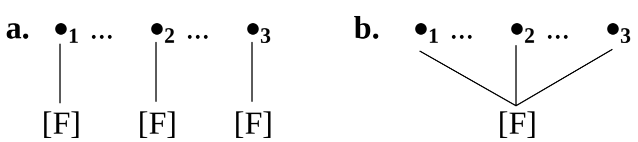
(42) a. **Sequence (X...X):**
In a string, any linearly ordered pair of X's is a *sequence* of X.

b. **Strict Sequence (X~X):**
In a string, any linearly ordered pair of X's which does not contain any proper subsequence of X is a *strict sequence* of X.

Note that by definition all element pairs that are in strict sequence are also in sequence, but not vice versa.

Following McCarthy and Prince (1995) and Alderete et al. (1996), I assume that the computation of sequence between features are always mediated by the segments which bear them. Consider the following examples in (43) ("•": root nodes).

(43)



In (43a), with respect to [F], the pairs $\bullet_1{}^\frown\bullet_2$, $\bullet_2{}^\frown\bullet_3$, $\bullet_1{}^\frown\bullet_3$ are all sequences, but $\bullet_1{}^\frown\bullet_3$ is not a strict sequence, since it is mediated by $\bullet_2$ which bears [F]. The notions of sequence/strict sequence developed here do not hinge on the specific autosegmental representation such as the multiply-linked structure, given in (43b). Here, the sequential relation is computed through the segments, and thus, exactly the same relations seen in

[18] Thanks to Terry Langendoen for his help in developing these definitions.

(43a) hold (the pairs $\bullet_1{}^\frown\bullet_2$, $\bullet_2{}^\frown\bullet_3$, $\bullet_1{}^\frown\bullet_3$ are all sequences, but $\bullet_1{}^\frown\bullet_3$ is not a strict sequence).[19] Compare this with the configurations in (44).

(44) **a.**
$$\begin{array}{ccccc} \bullet_1 & \dots & \bullet_2 & \dots & \bullet_3 \\ | & & | & & | \\ [F] & & [G] & & [F] \end{array}$$

b.
$$\begin{array}{ccccc} \bullet_1 & \dots & \bullet_2 & \dots & \bullet_3 \\ | & & | & & | \\ & & [G] & & \\ [F] & & & & [F] \end{array}$$

In (44a), in which the two [F] bearing segments are mediated by a segment which bears [G], the pair $\bullet_1{}^\frown\bullet_3$ is in strict sequence (as well as in sequence) with respect to [F]. Notice that in the traditional geometrical explanation such as in (44b), the sequential relation between the two [F]'s is explained by the use of the abstract notion of feature tier. Under the GOCP approach, however, such a representational elaboration is unnecessary, making no distinction between (44a) (in which [G] is supposedly on the same tier as [F]) and (44b).

In typical situations, we are concerned with the two elements in strict sequence. Thus, unless noted, we do not distinguish the two kinds of sequence. We will need to distinguish strict sequence from sequence in the situations in which more than one feature becomes relevant (see section 2.2.2 in the discussion of the similarity effects).

To foresee the relevance, consider the case in which two or more features are involved in the evaluation of identity avoidance, as shown in (45).

(45)
$$\begin{array}{ccccc} \bullet_1 & \dots & \bullet_2 & \dots & \bullet_3 \\ | & & | & & | \\ \begin{bmatrix} F, \\ G \end{bmatrix} & & \begin{bmatrix} F, \\ H \end{bmatrix} & & \begin{bmatrix} F, \\ G \end{bmatrix} \end{array}$$

---

[19] A similar system of computing adjacency relations is proposed in Archangeli and Pulleyblank (1994a).

In this configuration, for the pair $\bullet_1{}^\frown\bullet_3$, the sequential relations are different with respect to [F] and with respect to [G]: with respect to [F], the pair $\bullet_1{}^\frown\bullet_3$ is a sequence, but not in a strict sequence, whereas with respect to [G], the pair $\bullet_1{}^\frown\bullet_3$ is a strict sequence. The issue here is that languages vary in whether the two [F, G] segments are involved in dissimilation or not.

Anticipating the strategy taken in what follows, let us suppose that the two segments $\bullet_1$ and $\bullet_3$ are subject to dissimilation in Language *A*, but not in Language *B*.[20] In the present approach, the pair $\bullet_1{}^\frown\bullet_3$ is subject to the GOCP in Language *A*, but not in Language *B*. The sequence/strict sequence distinction becomes crucial for the GOCP constraint in correctly identifying the relevance of the $\bullet_1{}^\frown\bullet_3$ between these two languages. In the dissimilating case, Language *A*, the identity between the segments $\bullet_1{}^\frown\bullet_3$ must be subject to the GOCP: the GOCP constraint must pick out a sequence of [F] which is also a sequence of [G]. On the other hand, in the non-dissimilating case, Language *B*, the identity between the segments $\bullet_1{}^\frown\bullet_3$ must not be subject to the GOCP, since dissimilation does not occur: The GOCP constraint must be sensitive only to a *strict sequence* of [F] which is also a sequence of [G]. In cases like above (45) where more than one feature is relevant, the GOCP-violating segments are identified conjunctively by the two separate statements (in the above example, the GOCP for [F] and the GOCP for [G]).[21] The important issue at this point is to point out that we need the flexibility of the sequence/strict sequence distinction in order to cover the whole array of dissimilatory patterns found in languages without depending on the autosegmental notion of tier.

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[20] The actual languages like Language *A* include Akkadian, Japanese, etc. Those patterning as Language *B* include Latin, Georgian, Tashlhiyt Berber, etc. Analyses of these languages are provided in Chapter 2.

[21] We will propose in Chapter 2 that this is formally expressed by Local Conjunction of the two GOCP constraints.

With the elimination of the tier-dependency, the adjacency requirement holding between the sequence of the two elements must be calculated in some other way. Rather than appealing to some autosegmental mechanism, the GOCP constraints incorporate adjacency into the constraint schema by employing the concept of CONSTRAINT ENCAPSULATION, discussed in section 1.4.3. Incorporating Constraint Encapsulation permits the GOCP constraint to stand for the portion of the universal sub-hierarchy of constraints which are ranked according to the size of the intervening material, call it the Proximity Hierarchy.[22] The result of incorporating the Proximity Hierarchy into the GOCP constraint schema is illustrated in (46), showing that intervening material may be zero or more phonological units, and that the 'closer' the two identicals, the more dominant the constraint.[23]

(46) GOCP + Proximity Hierarchy

*X...X = {*XX » *X-C_0-X » *X-μ-X » *X-$\mu\mu$-X » *X-$\sigma\sigma$-X » ... » *X-∞-X}

The immediate consequence of incorporating Proximity Hierarchy is that it is now possible to formally capture the proximity effect that the identity avoidance effect is stronger the nearer the two elements are (Pierrehumbert 1993). Further, Constraint Encapsulation takes care of the cluttering which this rather lengthy hierarchy would produce.

Central to this theory of dissimilation is the constraint interaction between the GOCP and various Faithfulness constraints under OT. In particular, I propose that various dissimilatory effects result when the GOCP constraint dominates its corresponding Faithfulness constraint (FAITH):

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[22] The universality of the ranking is due to the Pāṇini's Theorem (Prince and Smolensky 1993).

[23] Itô and Mester (1996a,b) propose a similar construction under the OCP-as-Markedness approach.

(47) General Scheme
*X...X >> FAITH [X]

This ranking asserts that the requirement of identity avoidance takes priority over the faithful parsing of input material, leading to dissimilation. The opposite ranking, in which Faithfulness dominates the corresponding GOCP, results in the situation in which identicals are permitted in favor of faithful parsing. The main proposal is summarized below.

> **Generalized OCP (*X...X):** A sequence of X is prohibited.
> *General scheme for dissimilation*:
> *X…X >> FAITH

1.5 Dissimilation in OT

Having outlined the basic properties of the present proposal, let us turn to the other approaches to dissimilatory phenomena proposed under OT. Although there haven't been many studies in this area, at least four proposals are worth mentioning. These include articles by Myers (1994), Holton (1995), Itô and Mester (1996a,b), and Alderete (1996, 1997). These proposals can be categorized into two basic approaches, each labeled as *Representational* approach (Myers 1994, Holton 1995), and *OCP-as-Markedness* (*OM*) approach (Itô and Mester 1996a,b, and Alderete 1996, 1997). I review each of these proposals, clarifying the similarity and differences of these models compared to the GOCP approach proposed here.

1.5.1 Representational approach

1.5.1.1 Myers (1994)

Myers (1994) introduces the OCP to OT as (arguably) a universally undominated constraint. I briefly review his claim regarding the OCP, then evaluate his OT analysis of Meeussen's Rule, the dissimilation between adjacent high-tones, in Shona.[24]

The two major proposals of Myers (1994) are as follows: 1) The OCP functions as a surface constraint which is sensitive only to *parsed* representational elements; 2) The determination of which of the two elements to be deleted (i.e. unparsed) is due to ALIGNMENT. His version of the OCP constraint, which I call REPRESENTATIONAL OCP, is formulated to specifically refer to the parsed elements, as shown in (48).

(48) Representational OCP (Myers 1994: 14)
*F F, where F is a parsed feature specification.

This explicit relativization to 'parsed' elements is crucial under the representation which Myers (1994) adopts. It is assumed that the representations for underlying specifications and associations are distinct from those for output specifications and associations, as in (49).

(49)

<u>Input Representations</u>			**<u>Output Representations</u> (Myers 1994: 10)**		
Association	:	(dotted line)	Association	|	(solid line)
Features	h	(lower-case)	Features	H	(upper-case)

[24] Myers' (1994) proposal is based on the earlier version of OT, namely the Containment Model (Prince and Smolensky 1993). In Myers (1997), this is revised under Correspondence Theory.

This representation produces four logically possible surface representations for a given input, as in (50). These four representations (50a,b,c,d) are distinguished by the two Faithfulness constraints: PARSE(<u>T</u>one) and PARSE(<u>A</u>ssociation), each of which demands faithful parsing of the input specification, and the input associations, respectively.

(50) **<u>UR</u>** **<u>Possible SR's</u>**

UR		**a.**	**b.**	**c.**	**d.**
t		T	T	t	t
⋮		│	⋮	│	⋮
●		●	●	●	●
	PARSE(T)	✓	✓	*	*
	PARSE(A)	✓	*	✓	*

Of these four representations, (50a) is interpreted as a wellformed associated tone, and (50b) is a floating tone. For (50c), in which the association is parsed but the tone is not, it is not clear what this representation actually means. Even though such a representation is a logical possibility, Myers (1994) does not discuss the interpretation of this particular representation. One problem with the model is that it predicts this representation for which no use is yet apparent.

Myers' (1994) demonstration of the OCP constraint (48) crucially involves the representations discussed above in (50). The example comes from Shona, a Bantu language spoken in Zimbabwe. Shona displays a case of dissimilation in which a H-tone span at the beginning of a stem is lowered if it occurs after a H-toned syllable, as shown in (51).[25]

[25] This phenomenon is also known as Meeussen's Rule (Goldsmith 1984), and is observed in many Bantu languages.

(51) **a.** /í-bángá/	í-banga	‘(it) is a knife’
b. /vá-sékúrú/	vá-sekuru	‘grandfather (honorific)’
c. /ndi-čá-téngésá/	ndi-čá-tengesa	‘I will sell’
d. /v-á-téngésá/	v-á-tengesa	‘they sold’

Myers (1994) argues that this phenomenon results from ranking the OCP (48) above PARSE(T), as shown in the tableau in (52).

(52) Shona Meeussen’s Rule (Myers 1994)

h h /i-banga/	OCP(H)	PARSE(T)
a. H H ibanga	*!	
b. ☞ H h ibanga		*

Because the representational OCP (53) is defined as sensitive only to the parsed features, candidate (52a) violates the OCP, but candidate (52b) does not.

(53) Representational OCP (repeated)

*F F, where F is a parsed feature specification.

The tableau in (52), however, fails to pick a winner between candidate (52b) and the candidate in which the first H-tone is unparsed, **i-bángá* (compare *í-banga*), as shown in (54).

(54) Shona Meeussen's Rule (Myers 1994)

h h /i-banga/	OCP(H)	PARSE(T)
a. H h ibanga		*
b. h H ibanga		*

This is because they both equally violate OCP(H) and PARSE(T). Another important aspect of Myers' (1994) proposal is that the determining constraint between these two is ALIGNMENT. Myers (1994) argues that a language-particular version of ALIGNMENT determines whether it is the *first* feature that is deleted or the *second* one in the OCP-induced dissimilation cases. In Shona, the relevant constraint is ALIGN(H), defined in (55), which demands any H-tone to be aligned with the left-edge of a prosodic word.

(55) ALIGN(H) (ALIGN (H, L; PrWd, L)) (Myers 1994: 12)

Left-edge of every H-tone must align with the left-edge of some PrWd.

The following tableau in (56) illustrates the effect of ALIGN(H).

(56) Shona Meeussen's Rule (Myers 1994: 15)

h h /i-banga/	OCP(H)	PARSE(T)	ALIGN(H)
a. H H ibanga	*!		
b. ☞ H h ibanga		*	
c. h H ibanga		*	*!

In (56), candidate (56b) is correctly chosen as the winner, since the H-tone is properly aligned with the left-edge of the PrWd. Candidate (56c) satisfies the OCP, but loses by not aligning the H-tone to the left.

Although Myers (1994) successfully accounts for the Meeussen's Rule in Shona, it succeeds at some cost. First, as discussed, it assumes the unmotivated representation like (50c) where the association is parsed but the specification is not. Second, his proposal that the ALIGNMENT constraint arbitrarily decides which element surfaces is too strong. In fact, according to my survey (see Appendix), a majority of dissimilation patterns show that the element which stays is the one which belongs to a particular morphological category. In Shona, it is the prefixal element that always remains unchanged. Thus, we find examples in which Meeussen's Rule is violated, as in *tí-téngésé* 'we should see' (compare it with *ndi-čá-tengesa* 'they sold' (51c)). The generalization is missed in the analysis which characterizes the pattern in terms of the purely formal ALIGNMENT which incorporates directionality into constraint statements (see McCarthy and Prince 1993b). In addition, positing an ALIGNMENT constraint just for the purpose of accounting for dissimilation unnecessarily predicts that some type of harmony effect is operating in the language. Obviously, such a claim is untenable. Finally, Myers (1994) assumes that his OCP constraint is subject to the adjacency condition which allows forms like *í-badzá* '(it) is a hoe' to escape the OCP since the bearers of the two H-tones are non-adjacent.[26] However, as argued in Odden (1994) and Alderete (1996, 1997), the patterns of dissimilation are more diverse than that predicted by the adjacency condition. Thus, we find cases in which the OCP must hold between elements that are root-adjacent, syllable-adjacent, or unbounded in a certain domain (discussed in Chapter 2). For these reasons, I conclude that the approach suggested in Myers (1994) is unsatisfactory.

Next, I review the OT analysis of dissimilation in Sundanese by Holton (1995).

1.5.1.2 **Holton (1995)**

Holton (1995) gives an OT analysis of liquid dissimilation in Sundanese, an Austronesian language spoken in West Java. Here, I review his analysis, pointing out that his analysis makes a wrong prediction about the pattern documented in Cohn (1992). First, I describe the pattern discussed in Cohn (1992).

Sundanese has the plural affix -*ar*- which has two surface variants: [ar] and [al].[27] This affix, akin to Tagalog -*um*- affix, appears as an infix for consonant-initial roots while appearing as a prefix for vowel-initial roots, as in (57).[28]

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[26] For details of the adjacency condition, see Myers (1987, 1994).

[27] This affix is not a true "plural" morpheme, but actually a "distributive" morpheme. Following both Cohn (1992) and Holton (1995), however, I will continue to call it the plural for the sake of consistency.

[28] For a characterization of the position of this affix, see Cohn (1992) for a rule-based account, and Prince and Smolensky (1993) and McCarthy and Prince (1993a,b) for their OT analysis of the parallel case, Tagalog -*um*- affixation.

(57) **with consonant-initial roots:**

/ar-poho/	p-ar-oho	‘forget’

with vowel-initial roots:

/ar-ayɨm/	ar-ayɨm	‘patient’

The surface occurrence of the two allophones ([ar] and [al]) are conditioned in systematic (though complicated) ways, and the concern here is to correctly characterize this allophonic variation. To begin, let us look at the cases where the [ar] variant surfaces. First, as in (58a), when a root does not contain any liquids, [ar] surfaces. Second, as the forms in (58b) show, [ar] appears following a root-initial [r]. Third, [ar] surfaces when the simplex onset of the immediately following syllable is an [r], as in (58c). Lastly, [ar] is observed before any occurrences of [l], as shown in (58d).

(58) **Conditions for [ar] variant:**

a. in a root containing no liquids ([r] or [l]).

/ar-kusut/	k-ar-usut	‘messy’
/ar-damaŋ/	d-ar-amaŋ	‘well’

b. following a root-initial [r].

/ar-rahɨt/	ṟ-ar-ahɨt	‘wounded’
/ar-rɨwat/	ṟ-ar-ɨwat	‘startled’

c. preceding an [r] which is the first segment of the immediately following syllable.

/(di-)ar-kirim/	(di-)k-ar-aṟim	‘sent (PASS)’
/ar-curiga/	c-ar-uṟiga	‘suspicious’

d. preceding any occurrence of [l].

/ar-gɨlis/	g-ar-ɨḻis	‘beautiful’
/ar-ŋuliat/	ŋ-ar-uḻiat	‘stretch’

Next, we look at the “dissimilated” variant, [al]. First, [al] surfaces following a root-initial [l], as shown in (59a) (cf. (58b)). Second, when the syllable beginning with the affix /r/ ends with a coda [r], dissimilation is observed, as in (59b). Finally, in (59c), we see that [al] surfaces when followed by an [r] which is more distant than the first segment of the following syllable.

(59) Conditions for [al] variant:

a. following a root-initial [l].

/ar-lɨtik/	l̲-al-ɨtik	‘little’
/ar-ləga/	l̲-al-əga	‘wide’

b. in a syllable having [r] in its coda.

/ar-hormat/	h-al-or̲mat	‘respect’
/ar-pərceka/	p-al-ər̲ceka	‘handsome’

c. preceding an [r] which is farther away than the initial segment of the complex onset of the following syllable.

/ar-combrek/	c-al-ombr̲ek	‘cold’
/ar-ŋumbara/	ŋ-al-umbar̲a	‘go abroad’

Summarizing the facts, the basic pattern is that the rhotic /r/ in the plural affix *-ar-* dissimilates to [l] when followed by another [r], as in *c-al-ombrek* (59c). It is observed between two tautosyllabic [r]’s (one in onset and another in coda), as in *h-al-ormat* (59b), but it does *not* apply when the following [r] is an onset of the immediately following syllable, as in *k-ar-arim* (58c). When the root-initial segment is a liquid, it assimilates to the liquid contained in the plural affix, as in *r-ar-ahɨt* (58b) and *l-al-ɨtik* (59a).

In his analysis, Holton (1995) proposes that the basic dissimilation pattern between the two rhotics is the result of the two constraints, OCP(lateral) and IDENT(lateral), as defined below in (60).

(60) **a. OCP(lateral)** (Holton 1995: 170)
Adjacent [lateral] specifications are prohibited.

b. IDENT(lateral) (Holton 1995: 171)
Correspondent segments in Input and Output have identical values for the feature [lateral].

Holton (1995) accounts for the dissimilation by ranking OCP(lateral) above IDENT(lateral) (p. 171), as illustrated in the following tableau in (61).

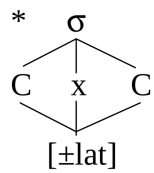
(61) **Sundanese liquid-dissimilation (Holton 1995: 171)**

/s-ar-iduru/	OCP(lateral)	IDENT(lateral)
a. sariduru (-lat -lat)	*!	
b. ☞ saliduru (+lat -lat)		*

In (61), candidate (61a) loses due to the fatal violation of OCP(lateral). Thus, the two constraints accounts for the basic pattern that a sequence of identical laterals dissimilates.

The conundrum here is the fact that the dissimilation does not apply if the two /r/'s occur as onsets of two adjacent syllables: "why tolerate closer /r/'s [our (59b), such as *ha.**lor**.mat*], but not ones farther away [our (59b), such as *ka.**ra**.**r**im*]?" (Cohn 1992: 209-210). This is particularly problematic in Holton's (1995) analysis, since it relies on the OCP constraint (60a), which would equally penalize the closer /r/'s and the farther /r/'s. Holton (1995) gets around this problem by proposing that the tautosyllabic rhotics are subject to the constraint, LATERAL-SYLLABLE-PROHIBITION (LSP) (62), an *independent* restriction on tautosyllabic liquids.

(62) LATERAL-SYLLABLE-PROHIBITION (LSP) (Holton 1995: 177)



(A syllable may not contain more than one segment associated to an [αlateral] feature.)

By ranking LSP above IDENT(lateral), two identical liquids are not allowed if they are within a syllable, forcing dissimilation, as shown in (63).

(63) LSP >> IDENT(lateral) (Holton 1995: 178)

/p-ar-ərceka/	LSP	OCP(lateral)	IDENT(lateral)
a. parərceka (-lat)	*!		
b. ☞ palərceka (+lat -lat)			*
c. parərceka (- lat -lat)		*!	

As tableau (63) shows, LSP and OCP(lateral) each eliminate candidate (63a) and (63c), respectively.

Crucially, this analysis invokes another theoretical device: on the linking status (multiple or single) of the feature [lateral]. Thus, although candidate (63a) and (63c) are phonetically identical, they differ in their linking structure. Under Holton's (1995) proposal, each of these two candidates is subject to different constraints (LSP eliminates

(63a); the OCP eliminates (63c)). It seems that the LSP, which is posited only for the purpose to eliminate candidates with two multiply-linked tautosyllabic laterals, is an ad hoc measure to eliminate candidates which escape the OCP, such as candidate (63a). This LSP constraint is particularly disturbing, since its job is suspiciously similar to what the OCP would normally achieve —avoid two identicals. Thus, it is doubtful that LSP is a constraint independent of the OCP, as proposed by Holton (1995). This problem would not arise in the GOCP approach, since it does not distinguish representational difference between (63a) and (63c).

In addition to this conceptual problem concerning LSP, there is a more serious problem in Holton's (1995) analysis; it predicts a result which contradicts the description given in Cohn (1992). Holton (1995) proposes that the identity of two liquids in consecutive syllable onsets, as in ***r-ar-**ahɨt* (58b) and ***l-al-**ɨtik* (59a), is a result of multiple linking required by the constraint INIT-LINK ([lateral]), defined in (64a). INIT-LINK forces the obligatory assimilation in the first-second pair (as seen in (58b) and (59a)) and NO-GAP, given in (64b) for the identity of rhotics between the second-third pair (as observed in (58c)).

(64) **a.** **INIT-LINK ([lateral])**
All features [lateral] linked to [$_{\mathrm{PrWd}}$ X are multiply linked (Holton 1995: 175).

b. **NO-GAP (relativized)** (Holton 1995: 172)

* C…C…C

F

(it is violated only in the case of an intervening consonant, so it is obeyed when consonants are multiply linked *across vowels*.)

The problem is the constraint NO-GAP (64b). According to Cohn's (1992: 206) description, there are cases in which the two liquids in consecutive syllable onsets are mediated by a coda consonant (e.g. C-ar-VCrVC). Since NO-GAP (64b) does not allow any intervening consonants, the two [r]'s in the form C-ar-VCrVC must not be multiply linked, hence must be dissimilated. Thus, Holton's analysis predicts that they must be dissimilated. it creates a conflict with the original data description in Cohn (1992).

Holton's (1995) OT analysis of Sundanese must be rejected on the two grounds discussed above: One is the conceptual problem of having LSP, an *ad hoc* constraint which should not be separated from the OCP. The other is the empirical problem of making a prediction counter to the source data.

It must be pointed out that the problem of Representational approaches, such as Holton's (1995) and Myers' (1994), deeply roots from their dependence on representational properties, such as multiple linking and gapped associations. In both analyses, the crucial constraint, the OCP, is drawn from the traditional assumptions concerning the representation of features. Under OT, many of these assumptions have been found to be superfluous (Archangeli and Pulleyblank 1994a, Pulleyblank 1994 [vs. feature-geometrical resolution of opacity and transparency], Padgett 1995, 1996 [vs. feature geometry], Smolensky 1993 [vs. underspecification], Gafos 1995 [vs. C/V planer segregation], Hayes and Stivers 1996 [vs. autosegmental spreading], Cole and Kisseberth 1994 [vs. autosegmental theory], etc.). I argue that the OCP is not an exception, and thus, it must be reconsidered in a representation-independent way. In this regard, the representational approach, such as Myers' (1994) and Holton's (1995), is still retrospective in a sense that it is bound by the representational properties (such as multiple linking) developed under pre-OT theories of phonology.

1.5.2 OCP-as-Markedness

In their recent papers, Itô and Mester (1996a,b) and Alderete (1996, 1997) independently propose an approach to view dissimilatory phenomena in a dramatically different way, which we may call *OCP-as-Markedness* (*OM*) approach.[29] The OM approach claims that the traditional OCP-effects are in fact markedness effects concentrated in a particular domain. This is achieved formally by the use of Local Self-Conjunction (Smolensky 1993, 1995) of some markedness constraint. In this section, I consider the similarity and differences between their OM approach and my GOCP approach.[30]

The principal similarities and differences between the two approaches can be summarized as follows.

(65) **a. Similarities**

- ***Tier-independence***
  Both the OM and the GOCP approaches are proposed to be independent of the notion of autosegmental tier.
- ***Generalizability***
  Both the OM and the GOCP approaches are flexible enough to account for cases that the traditional OCP cannot deal with.
- ***Violability***
  Both the OM and the GOCP constraints are, in essence, violable.

b. Differences

- ***Fundamental claim***
  The OM approach differs in the fundamental claim regarding identity avoidance effects from the GOCP approach.

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[29] The similarity of the GOCP approach and the OM approach is not surprising: in preparing to write this thesis, I was heavily influenced by these proposals, and benefited from the discussion with these authors.

[30] We compare OM approach with the GOCP approach with respect to a specific example, Lyman's Law in Japanese, later in section 2.3.4. Here, we contrast the general proposals between the two.

- ***Theory of sequence/adjacency/domain***
  The GOCP approach invokes a richly articulated theory of sequence/adjacency/domain, while the OM approach employs the theory of adjacency by Odden (1994) which is developed under the autosegmental theory, and so is heavily representational.
- ***Applicability to complex cases***
  It is not clear how the OM approach deals with complex cases such as dissimilative jakan'e (Russian) (due to the early stage of the theory's development).

As summarized in (65a), both approaches share some similarities: Both claim that the theory of dissimilatory phenomena must be tier-independent. Unlike the representational approach discussed in the previous section, this resolves various problems which existed under the traditional tier-dependent OCP (discussed in section 1.3.2). Further, both are flexible enough to be extended to cover a broader range of dissimilatory effects, not limited to the area of autosegmental phonology. These approaches are developed under OT, sharing the basic tenets of OT, such as violability.

There is, however, a fundamental difference between these two approaches. The OM approach views identity avoidance effect as a result of prohibiting *marked* structures being concentrated in a domain, whereas the GOCP is a general prohibition against repetition of elements. The markedness factor is not the base of the GOCP, but rather, it is a consequence of the interconnectedness to the universal markedness sub-hierarchy (Prince and Smolensky 1993, Alderete et al. 1996). The prediction made by the OM approach is that a segmental cooccurrence restriction on unmarked elements entails the same cooccurrence restriction for more marked elements. This is explicitly stated in Alderete (1997) as *Theorem of coronal unmarkedness in segmental cooccurrence restrictions*: "a segmental cooccurrence restriction on [coronal] entails the same cooccurrence restriction for [labial] and [dorsal]" (p. 29).

This claim turns out to be too strong. As we will see in section 2.3.4.1, the Theorem of coronal unmarkedness in segmental cooccurrence restrictions does not hold in languages such as Dakota and Akan. The GOCP approach makes no such claim, since the markedness factor is not an entailment, but a result of interaction with independent markedness constraints. Thus, the relationship between the relative markedness of an element and its susceptibility to a particular dissimilatory effect is not absolute, but violable.

Moreover, the OM approach incorporates Odden's (1994) theory of adjacency for its computation of adjacency. The result is the contradiction between its fundamental claim about the *tier-independence* and Odden's (1994) *tier-dependent* theory of adjacency. This point, as well as the last point that the applicability of the OM approach to complex cases of dissimilation is unclear, may be resolved with further development of the OM theory. At the present, however, the OM is highly abstract concept, and it remains to be seen how it evolves in the future.

1.6 Summary

In this chapter, I have discussed various issues surrounding the traditional OCP, leading to the introduction of my main proposal, Generalized OCP. First, I reviewed the brief history of the traditional OCP and concluded that its treatment of dissimilatory effects are not satisfactory. In particular, I argued that the deficiency of the traditional OCP boils down to its autosegmental dependency, directing us toward the necessity of autosegmental independence. Next, I reviewed Optimality Theory, on which the central proposal of this thesis, Generalized OCP, is based. The topics discussed are its basic architecture: Generalized Alignment, Correspondence, Constraint Encapsulation, and Local Conjunction. I then demonstrated how Generalized OCP is implemented under OT.

Finally, I provided a review of the previous two approaches to dissimilation in OT, and argued that both approaches are unsatisfactory.

The rest of the thesis is organized as follows. First, in Chapter 2 I conduct a typological study of dissimilatory phenomena, and demonstrate how Generalized OCP handles a wide variety of cases. An appendix is attached to give a brief summary of the language cases studied. Chapter 3 gives a case study of the phenomenon dissimilative jakan'e, observed in Southern Russian dialects. The proposed analysis incorporates Grounding Theory (Archangeli and Pulleyblank 1994a) to isolate the attested patterns from the unattested ones. Finally, Chapter 4 concludes the thesis with a summary of the work presented and its implications for further research.

CHAPTER 2: THE GENERALIZED OCP

2.1 Introduction

In Chapter 1, I introduced the Generalized OCP (1), designed to replace the tier-dependent, traditional OCP. I proposed that various dissimilatory phenomena result when GOCP constraints dominate their corresponding Faithfulness constraints, as in (2).

(1) **Generalized OCP (GOCP)**
In the scheme *X...X where "..." is intervening material, a sequence of two Xs is prohibited in some domain *D*.

(2) **General Scheme**
*X...X >> FAITH [X]

In this chapter, I explore how the constraint interaction in (2) generates a range of dissimilatory phenomena. In particular, I investigate a number of dissimilation cases with respect to the following questions.

(3)
a. What can count as *elements*?
b. What are the *adjacency* relations between the two identicals?
c. What are the *domains* over which the GOCP holds?
d. What are the possible *extensions* of the proposed approach?

Responding to these specific questions, the rest of the chapter is organized as follows. In section 2.2, I examine the question of which elements can be subject to the GOCP. Following Yip (1988, 1995a,b), I propose that the relevant elements can be features, segments (Root nodes), prosodic units, or morphemes. In addition, I discuss cases involving similarity effects, also known as the OCP subsidiary features, where identity avoidance is enforced more strictly between elements that share some additional feature(s) (Selkirk 1988, 1991, 1993, Yip 1989, Padgett 1991, 1992, Pierrehumbert 1993). In section 2.3, I discuss the various types of adjacency requirements, as exemplified in the languages Ainu, Kera, Yimas, and Japanese. I show how the GOCP is able to characterize these cases, taking advantage of the notion Constraint Encapsulation. I also look at two types of blocking situations in dissimilation: *intervention* and *peripheral blocking* and discover how they are resolved under the current proposal. Section 2.4 focuses on the domains within which the GOCP constraints operate. I argue that morphological categories, as well as basic prosodic units such as syllables and feet, can constitute a domain, drawing a comparison between languages, such as Japanese, Seri, and Woleaian. Following the summary of my main proposals in section 2.5, Section 2.6 discusses possible extensions of the proposal. A striking result is that the proposed theory offers a natural explanation for polarity cases, without any additional mechanism. Under the approach taken here, polarity is crucially recognized as an instance of dissimilation, involving two conflicting identity avoidance requirements in the opposite ends of a spectrum. I provide examples from Huamelultec Chontal, Dinka, and Margi. Finally in section 2.7, I summarize the results.

2.2 Elements

The first aspect to be explored is the question of which elements can participate in dissimilation. As seen in the definition of the GOCP (1), repeated below as (4), I take the view that the GOCP is a fundamental restriction about identity avoidance, which can have specific arguments in its scheme (Pierrehumbert 1993, Yip 1995a,b).

(4) Generalized OCP (repeated from (1))
In the scheme *X...X where "..." is intervening material, a sequence of two Xs is prohibited in some domain *D*.

Generalized in this way, the arguments in question (X's) are not restricted to *autosegmental* elements, per se. This predicts that we will find the effects of identity avoidance in various areas of both phonology and morphology; and in fact, we do (Yip 1988, 1995a,b).

2.2.1 Generalized OCP-Effects[31]

One of the important tenets of the GOCP is its tier-independence. By this, the GOCP may regulate prosodic and morphological elements in addition to featural or segmental material. Specifically, I propose that the range of possible arguments for the GOCP are the ones in (5). I discuss each case in depth below.

(5) Possible Elements

a.	***[F]...[F]**	no sequence of the same feature.
b.	***Rt...Rt**	no sequence of the same root node.
c.	***PCat...PCat**	no sequence of the same prosodic category.
d.	***GCat...GCat**	no sequence of the same morpheme (Yip 1995a,b).

[31] The term 'Generalized OCP-effects' comes from Itô and Mester (1996a,b).

First, specifying F-elements as the arguments of the GOCP generates normal featural OCP effects between features (McCarthy 1986, Yip 1988). Thus, for example, I find evidence for the active GOCP constraint *[lateral]...[lateral] which results in the lateral dissimilation found in Latin, Yidiɲ, and Kuman. According to the survey conducted (detailed results are summarized in the Appendix), the following features have been recognized to be subject to the GOCP in actual languages: place features, such as [PLACE], [labial], [coronal], and [pharyngeal]; liquid features, such as [lateral] and [rhotic] (or [retroflex]); laryngeal features, such as [voice], [spread glottis], and [constricted glottis]; the feature [nasal]; stricture features, such as [continuant]; vocalic features, such as [high], [low], and [back]; and tonal features, such as [H] and [L]. The languages that exhibit each type of dissimilatory effect are summarized in (6).[32]

[32] For references, see Appendix.

(6)

Features	**Languages**
Place	
[PLACE]	Arabic, Cambodian, Javanese, Russian, Yucatec Mayan
[labial]	Akkadian, Berber (Tashlhiyt), Cantonese, Palauan, Ponapean, Yao, Zulu
[coronal]	Akan, Dakota
[pharyngeal]	Moses-Columbia Salish
Liquid	
[LIQUID]	Javanese
[lateral]	Kisi, Kuman, Latin, Yidiɲ, Yimas,
[rhotic] ([retroflex])	Ainu, Georgian, Modern Greek, Sundanese, Yindjibarndi
Laryngeal	
[voice]	many Bantu languages (Dahl’s Law), Gothic (Thurneysen’s Law), Huamelultec/Oaxaca Chontal, Japanese (Lyman’s Law)
[spread glottis]	Sanskrit (Grassmann’s Law)
[constricted glottis]	Seri
Nasal	
[nasal]	Chukchi
Stricture	
[continuant]	Modern Greek, Northern Greek
Vocalic	
[high]	Guere, Ngbaka, Southern Russian dialects (dissimilative jakan’e)
[low]	Arusa, Kera, Marshallese, Southern Russian dialects (dissimilative jakan’e), Woleaian
[back]	Ainu, Tzeltal
Tonal	
[H]	Arusa, many Bantu languages (Meeussen’s Rule)
[L]	Peñoles Mixtec

As seen in (6), I find that almost every conceivable feature can be involved in identity avoidance. Note that there are no [dorsal] dissimilation cases on their own, but they pattern together with the other Place features as the [PLACE] dissimilation cases.

Second, I propose that the ‘element’ functioning as argument in the GOCP can be a root node (Rt). This is to cover languages in which sequences of two identical segments are prohibited, regardless of their featural content. Most notably, the constraint *Rt~Rt, when the intervening material is zero, penalizes any occurrence of geminates or long vowels, assuming that they are strict sequences of two root nodes dominating a single set of features. In fact, such constraints have already been proposed, in the forms of NOGEMINATE (Itô and Mester 1996a,b) and NOLONGVOWEL (Rosenthall 1994, Alderete 1996, 1997). These constraints, in effect, accomplish the same task as the GOCP constraints *Rt(C)~Rt(C) and *Rt(V)~Rt(V); however, the difference is that the markedness of long segments now has an explanation, namely that this is *another OCP-effect*. Rather than arbitrarily stating the generalizations as NOGEMINATE and NOLONGVOWEL, it is possible to attribute the markedness of *long segments* to identity avoidance (see Suzuki 1997 for a somewhat different argument, reaching the same conclusion).

Third, I also consider the possibility that prosodic categories such as syllables (σ), and feet (*f*) are subject to the GOCP. One argument for the syllabic GOCP is the cases of length dissimilation observed in Dinka, Finish, Gidabal, Japanese, Latin, Oromo, and Slovak. In these languages, the element that dissimilates is the prosodic length in adjacent syllables. My view is that these cases are a GOCP effect where the identity of syllables is evaluated in terms of their *quantity*. Thus, a sequence of two monomoraic syllables would violate *σ...σ, and so would a sequence of two bimoraic syllables. Cases like Slovak (Rhythmic Law) in which the suffix vowel /aa/ appears long after short vowels and short after long vowels, as shown in (7) (Kenstowicz and Kisseberth 1979: 319-320).

(7)	**a.**	vol-aa-m	'call (1sg)'
	b.	ces-aa-m	'comb (1sg)'
	c.	ciit-a-m	'read (1sg)'
	d.	piis-a-m	'write (1sg)'

In (7a,b), the suffix vowel is long, but when preceded by a syllable containing another long vowel, the suffix vowel surfaces as short (7c,d). Here, the element that dissimilates is the length of the vowel. I propose that this case is characterized as *quantitative dissimilation* between two adjacent syllables. The GOCP constraint ***σ(q)...σ(q)** ("q" for quantity) would pick *pii**.**sam* over **pii**.**saam* ("." indicates syllable boundaries).

Another argument for the syllabic GOCP effect comes from cases of *clash avoidance* (Prince 1983, Hammond 1984, Kager 1994, see also Yip 1988 for the original proposal that relates clash avoidance to the OCP). Suppose that the identity of syllables is evaluated in terms of their prominence. Then, the GOCP incurs a violation whenever it finds sequences of two equally prominent syllables. Clash avoidance takes place between two adjacent stressed syllables — syllables that have equal prominence. Following Prince and Smolensky (1993), viewing stress in terms of prominence makes it possible to explain the phenomenon of clash avoidance as another instance of identity avoidance.[33] Thus, under the GOCP approach, it is possible to characterize stress clash as *prominential dissimilation* between the two adjacent syllables. The constraint ***σ(p)...σ(p)** ("p" for prominence) forces the avoidance of two adjacent stressed syllables. For the identity avoidance between two feet, it still remains to be seen whether we find such cases (Yip 1995a,b also mentions this issue). From the lack of evidence for such cases, I tentatively

[33] This is consistent with the proposals of Kager (1994) and Hung (1994), who offer accounts of alternating stress patterns under OT.

suggest that syllables are the only valid prosodic category to be subject to the GOCP. I will leave the possibility open for the subsequent research, however.

Finally, following (Yip 1995a,b), I propose that identity avoidance effects are observed in morphology, and an individual morphological category can be an argument of the GOCP constraint. Yip (1995a,b) argues that at least four types of dissimilatory phenomena are found in morphology, as shown in (8).

(8) Identity Avoidance in Morphology (from Yip 1995a: 4)

a. The same morpheme cannot appear twice in the same word.
b. Different but homophonous morphemes cannot appear adjacent in the same word, or otherwise adjacent in the sentence.
c. Homophonous morphemes cannot appear on adjacent words.
d. The output of reduplication cannot be total identity.

Yip (1995a) gives an example of morphological OCP-effect from English, based on the observation by Ross (1972) that in English sequences of words ending in -*ing* are disliked. Consider the following examples in (9), which are all ungrammatical.

(9)
a. *John was starting reading the book.
b. *John was keeping reading the book.
c. *John was start~~ing~~ reading the book.
d. *John was starting read~~ing~~ the book.

None of the forms in (9a)-(9d) are wellformed. Yip (1995a: 15-16) accounts for this fact by proposing the following constraints in (10), as well as the tableau in (11): the result is the Null Parse from such inputs.[34] (Yip's (1995a) formulation OCP(*ing*) is entirely consistent with the GOCP constraint, **ing*...*ing*.)

(10) **a. PROG=*ing*:** The progressive must surface marked by -*ing*.
b. OCP(*ing*): Output must not contain two -*ing*.
c. REALIZE-Verb: Verbs must not be deleted.

(11) Identity Avoidance in English -*ing* (Yip 1995a: 16)

Candidates		PROG=*ing*	OCP(*ing*)	REALIZE-Verb
a.	[V-*ing*...V-*ing*]		*!	*
b.	[V-*ing*...V]	*!		
c.	[V...V]	**!		
d.	[V]	*!		*
e. ☞	Ø			**

As the tableau in (11) demonstrates, identity avoidance is actively enforced in morphology.[35] Yip's (1995a,b) findings crucially argue for the GOCP, in which the OCP is generalized to regulate a broader range of identity avoidance effects. Other morphology-related identity avoidance effects include haplology (Stemberger 1981) and echo-word phenomena (Yip 1995a,b). In this thesis, I do not explore the morphological instantiation of GOCP, focusing primarily on the featural aspects of phonology.

In summary, I have examined which types of elements can be subject to the GOCP. I have shown that almost all features may participate in dissimilatory activity. Moreover, I suggested that syllables can be subject to the GOCP, resulting in clash

[34] Yip (1995a) notes "Junko Itô (p.c.) points out that *John was starting to read the book* could be the surface realization of *John was starting read~~ing~~ the book*" (p. 15). I will not pursue this idea here, however.

[35] For other examples of morphological OCP-effects, see Yip (1995a,b).

avoidance. My proposal that the GOCP applies to morphological elements as well heavily draws on Yip's (1995a,b) analysis of identity avoidance in morphology. These findings strongly argue in favor of the GOCP, which generalizes the OCP from its tier-bounded status, making it a more general constraint of identity avoidance.

2.2.2 **Similarity effects (OCP-subsidiary features)**

I have argued that the GOCP can be instantiated with each of the features listed in (6). However, previous studies have found that some cases of root cooccurrence restriction involve more than one feature (McCarthy 1986, 1988, 1994, Mester 1986, Selkirk 1988, 1991, 1993, Yip 1989, Padgett 1991, 1992, Pierrehumbert 1993). In particular, it is observed that dissimilatory effects involving place of articulation are more severely enforced between segments that share some other feature, notably minor place or stricture features. As pointed out in section 1.3.2.1, the existence of these similarity effects, also known as *OCP-subsidiary feature* effects (the term is due to Padgett 1992), have resulted in the introduction of further complexity to the theory of the representation of features (Selkirk 1988, 1991, 1993, Yip 1989, Padgett 1991, 1992).

In this section, I propose an account of similarity effects, based on the GOCP. I first briefly review the analysis of the Arabic root cooccurrence restrictions made in Padgett (1991) which will then be contrasted with the current GOCP approach. I show that the GOCP offers a unified account of the similarity effects by the means of Local Conjunction (Smolensky 1993, 1995), without appealing to novel representations or constraints.

2.2.2.1 Padgett's (1991) analysis of Arabic

Padgett (1991) gives a geometrical solution to account for similarity effects in Arabic. A well-known case of root cooccurrence restrictions is observed in Arabic, familiar from Greenberg (1950) and McCarthy (1979, 1981): within triconsonantal verb roots, no two consonants may be homorganic. The consonants fall into the following homorganic groups:[36]

(12)	**a.**	Labials	f, b, m
	b.	Coronals	θ, ð, t, d, s, z, š, ð̣, ṭ, ḍ, ṣ
	c.	Dorsals	k, g, q, χ, ʁ

Although this generalization is robust, there are some exceptions in which two coronal consonants (12b) appear within the same verb root. However, Yip (1989) observes that within these exceptions, there is a further restriction: coronals are restricted to cooccur with different [continuant] values. The further subdivided groups are given in (13).

(13)	**a.**	Coronals [-cont]	t, d, ṭ, ḍ
	b.	Coronals [+cont]	θ, ð, s, z, š, ð̣, ṣ

Based on these facts, Padgett (1991) proposes that the feature [continuant] is a designated OCP-subsidiary feature for coronals in Arabic, secondary to [PLACE]. His revised OCP constraint, defined in (14), accounts for the additional requirement of the OCP-subsidiary feature [continuant] (for the details of this theory, see Padgett 1991).

[36] Not included are glides (*w* and *y*), coronal sonorants (*l*, *r*, and *n*), and gutturals (χ, ʁ, ħ, ʕ, h, and ʔ). We focus on the place features (coronals in particular), instead of going through the full paradigm.

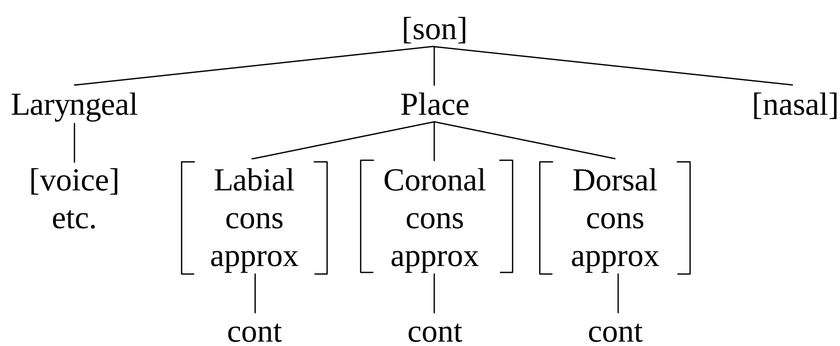
(14) Revised OCP (Padgett 1991: 181)

At the melodic level, adjacent identical elements 'F F' are prohibited, iff all subsidiary features stipulated for F are also identical.

The stipulation here involves [coronal] and [continuant]. Thus, in effect, the revised OCP derives the similarity effect by making the OCP [PLACE] operative for two adjacent identical [coronal] sounds only when they also agree in [continuant] values.

I must point out that Padgett's (1991) proposal is closely tied to his version of feature geometry, in which oral stricture features ([consonantal], [approximant], and [continuant]) are dominated by the place features, as illustrated in (15).

(15) Feature Geometry *a la* Padgett (1991: 17)



Padgett (1991) argues that this geometry restricts the possible set of the OCP-subsidiary features to the stricture features (and presumably minor place features such as [anterior] and [distributed]), since they are dominated by the place features.

Below, I challenge Padgett (1991), by providing a GOCP analysis which departs from the geometry-dependent conception of the OCP-subsidiary features.

2.2.2.2 A Generalized OCP-based Account

The GOCP-based account of these Arabic facts begins with the acknowledgment that the cooccurrence restriction on [PLACE] is active in Arabic, regardless of the presence of the subsidiary features. This is supported by the fact that we find cooccurrence restrictions in non-coronals as well, as shown in (12). Thus, I argue that the GOCP constraint on [PLACE], defined in (16a), is active, independent of the similarity requirements. I propose that the GOCP on [continuant] (16b) is active, independent of a particular place feature such as [coronal], since a similar secondary restriction is found among dorsals as well (Yip 1989, Padgett 1991).[37]

(16) **a.** ***[PLACE]...[PLACE]**
A sequence of two identical [PLACE] is prohibited.

b. ***[cont]...[cont]**
A sequence of two identical [cont] is prohibited.

Having these two constraints individually, however, does not resolve the similarity-effect. The exceptional cases necessarily violate *[PLACE]...[PLACE], since they can have the same [PLACE] value, such as [coronal] and [dorsal]. The restriction for these cases is *[cont]...[cont] (16b) *in addition to* *[PLACE]...[PLACE] (16a).

I propose that the Local Conjunction (Smolensky 1993, 1995) of the two GOCP constraints (16a,b) is responsible for the similarity effect, picking out only candidates that violate both of GOCP constraints in (16). The key issue here is the double requirement of *[PLACE]...[PLACE] and *[cont]...[cont]: winning candidates cannot violate *both* *[PLACE]...[PLACE] and *[cont]...[cont] (**t…t*, **s…s*), but may violate either of the two

---

[37] We are not concerned with the specifics of adjacency and domain, which are orthogonal to discussion here.

constraints individually (*t…s*, *t…k*). Local Conjunction, formulated as (17) (discussed in section 1.4.4), formally captures this '*banning the worst of the worst*' effect (Prince and Smolensky 1993, Smolensky 1993).

(17) Local Conjunction

Local Conjunction of C_1 and C_2 (C_1 *&* C_2) in domain *D* :

a. C_1 *&* C_2 is violated when there is some domain of type *D* in which both C_1 and C_2 are violated.

b. Universally, C_1 *&* C_2 >> {C_1, C_2}

In Arabic, the similarity-effect is accounted for by the locally-conjoined GOCP constraint *[PLACE]...[PLACE] *&* *[cont]...[cont] (18).

(18) *[PLACE]...[PLACE] *&* *[cont]...[cont] (*[PL]...[PL] *&* *[cont]...[cont])

a. *[PL]...[PL] *&* *[cont]...[cont] is violated when the sequence of two segments violate both *[PL]...[PL] and *[cont]...[cont].

b. *[PL]...[PL] *&* *[cont]...[cont] >> {*[PL]...[PL], *[cont]...[cont]}

As shown in the tableau in (19), *[PL]...[PL] *&* *[cont]...[cont] correctly discriminates the candidates that violate both *[PL]...[PL] and *[cont]...[cont] (19a,b) from the candidates that violate only one of the two constraints (19c,d). (In tableau (19), the box is checked when a component constraint is violated. The locally-conjoined constraint is violated only when the both boxes are checked. (I use this convention for the rest of the thesis.)

(19) Arabic Similarity-effect

Candidates		*[PL]...[PL] & *[cont]...[cont]	*[PL]...[PL]
a.	[t...t]	*[PL]...[PL]: ☒ *[cont]...[cont]: ☒ *!	*
b.	[s...s]	*[PL]...[PL]: ☒ *[cont]...[cont]: ☒ *!	*
c. ☞	[t...s]	*[PL]...[PL]: ☒ *[cont]...[cont]: ☐	*
d. ☞	[s...t]	*[PL]...[PL]: ☒ *[cont]...[cont]: ☐	*

As shown above, the locally-conjoined *[PL]...[PL] *&* *[cont]...[cont] correctly picks candidates which satisfy the similarity requirement. Thus, the GOCP offers a formal solution to the stronger effects between segments that are more alike, using local conjunction as a means of capturing similarity effects (Pierrehumbert 1993). Below, I discuss the advantages of the proposed approach, which I call the 'similarity-as-LC' (LC for 'local conjunction')approach, over representational approaches (McCarthy 1986, 1988, Mester 1986, Selkirk 1988, 1991, 1993, Yip 1989, Padgett 1991, 1992).

First, this proposal is expressed solely in terms of independently motivated constraints. As discussed above, each of the component constraints is necessary in its own right. Further, local conjunction itself is independently motivated, in areas other than the similarity effects (Smolensky 1993, 1995, Archangeli and Suzuki 1998, Suzuki 1997, 1998, Kirchner 1995, etc.).[38] In contrast, the representational approaches all involve some elaboration of feature geometry, underspecification, or the OCP itself. Padgett's (1991) revised OCP, discussed above in (14) (and also Selkirk's (1991) Relativized OCP), is one such an example. Such a "principle" is specifically developed for the purpose of

[38] Hewitt and Crowhurst (1995) propose a similarly named operation which has a different effect (the conjoined constraint is violated if *either* of the individual constraint is violated, logically *disjunction*, not conjunction).

accounting for the similarity effects, as opposed to my similarity-as-LC approach in which both the GOCP constraints and local conjunction are independently motivated.

Second, the similarity-as-LC approach accounts for the long-distance OCP effects which have been attributed to various manipulations of feature structure. One such case is Lyman's Law in Japanese in which the dissimilatory effect is observed not between the two voiced segments, but between the two voiced *obstruents*. I recognize such a case as another instance of the similarity effect. That is, it is worse to violate both *[voice]…[voice] and *[-sonorant]…[-sonorant] than it is to violate the constraints individually. Thus, the locally-conjoined constraint *[voice]…[voice] *&* *[-sonorant]…[-sonorant] correctly predicts that the dissimilatory effect is observed only between the two voiced obstruents, excluding voiced sonorants (*sawagi*, not **zawagi*), without appealing to underspecification (Itô and Mester 1986, Steriade 1987, Archangeli and Pulleyblank 1994a), elaborate features (Rice and Avery 1989, Steriade 1995), or the notion of Licensing (Itô, Mester, and Padgett 1995).[39]

Finally, my similarity-as-LC approach is able to account for cases which are problematic for the other geometry-dependent approaches would have trouble with. In cases where dissimilation is blocked by a feature that is *not* a designated OCP-subsidiary feature, geometrical approaches have difficulty characterizing the dual role of the blocking feature in a coherent way. I discuss a case from Akkadian in section 2.3.6 in which I offer an analysis based on the idea that the blocking (of dissimilation) is another instance of a similarity-effect, as compared with the geometry-dependent analysis proposed by Hume (1992) which resorts to an elaborate feature structure.

To summarize, I have argued that similarity effects follow from the local conjunction of GOCP constraints. The proposed geometry-independent account is

[39] The more detailed analysis of Japanese case is provided in section 2.3.4.

preferable to the other geometry-dependent approaches for the following reasons: 1) It does not necessitate any ‘revision’ of the OCP just for the purpose of accounting for the similarity effects; 2) It accounts for the cases of long-distance dissimilation without necessitating some representational manipulation; and 3) It can account for the cases which are problematic to the other representational approaches (see section 2.3.6 for the discussion of Akkadian).

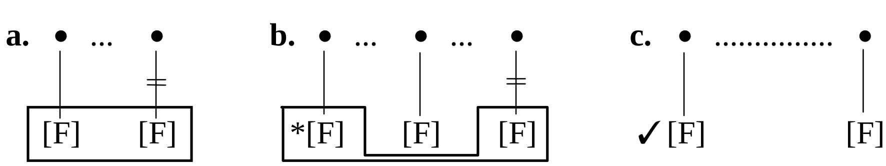
Next, let us turn to the discussion of *adjacency*, the possible spatial relations between the two identicals, in response to the earlier question (3b).

2.3 Adjacency

In this section, I consider the issue of adjacency between two identical elements. Previous proposals regarding adjacency have been fruitful, including Archangeli and Pulleyblank (1987, 1994a), Myers (1987), Steriade (1987, 1995), Odden (1994), etc. One way or another, these approaches have agreed regarding the following generalization — a property referred to as Locality:

(20) Locality (from Steriade 1995: 121)
Phonological rules apply between elements adjacent on some tier.

Locality asserts that no phonological phenomenon is able to *skip* specified features on the tier involved. To visualize this autosegmentally, imagine a case where the second of the two [F]’s is dissimilated, as illustrated in (21).

(21)


In the normal case (21a), the second [F] is dissimilated (indicated descriptively by delinking). Locality predicts that in (21b) dissimilation does not occur between the first [F] and the third [F], skipping an intervening [F]. The critical case is (21c), where dissimilation does not occur, even when no other occurrences of [F] intervene. What then, is the difference between (21a) and (21c)? The difference is the *distance* between the two [F]'s (schematically marked by ellipses). In (21c), the first [F] and the second [F] are 'too far apart': Locality is violated. The focus here is those cases where dissimilation is observed only when the two identicals are within a particular distance. In particular, I discuss four types of distance requirements, drawing representative cases from Ainu, Yimas, Kera, and Japanese. After that, I will consider situations where blocking is caused by *featural* reasons.

2.3.1 **Ainu (Root Adjacency)**

Ainu, spoken on the northern Japanese island of Hokkaido, presents a case of *root adjacency*, where the two identicals cannot surface next to each other. According to Shibatani (1990: 13), Ainu has a dissimilatory phenomenon which turns an /-ɾɾ-/ sequence into [-nɾ-] ([ɾ]: a flap). Examples are given in (22).

(22)	**a.**	/kukoɾ ɾusuy/	kukon ɾusuy	'I want to have (something)'
	b.	/koɾ ɾametok/	kon ɾametok	'his bravery'
	c.	/koɾ mat/	koɾ mat	'his wife'
	d.	/kukoɾ kuɾ/	kukoɾ kuɾ *kukon kuɾ	'my husband'

In (22a,b), we see the effect of *ɾ*-dissimilation: the prefix-final /ɾ/ surfaces as [n] when it is *immediately* followed by another [ɾ]. Dissimilation does not occur in (22c,d). Crucially in (22d), although /ɾ/ is followed later in the word by another [ɾ], dissimilation does not apply: the two flaps are not root-adjacent.

I propose the GOCP constraint *[rhotic]...[rhotic] (*[rhot]...[rhot]) which prohibits a sequence of two rhotics.[40] Recall that in section 1.4.5, I showed that the GOCP is a constraint schema that is backed by a universal sub-hierarchy of constraints which are ranked according to the distance between the two identicals, as in (23),

(23) GOCP + Proximity Hierarchy
*X...X = {*XX » X-C_0-X » X-μ-X » X-$\mu\mu$-X » X-$\sigma\sigma$-X » ... » X-∞-X}

Accordingly, *[rhot]...[rhot] follows this universal sub-hierarchy, as shown in (24).

(24) *[rhot]...[rhot] = {*[rhot][rhot] » ... » [rhot]-σ-[rhot] » ... » [rhot]-∞-[rhot] }

The root adjacency of the pattern suggests that the actual constraint preventing dissimilation from applying to the non-root adjacent rhotics is *[rhot][rhot]. This is illustrated in the following tableaux (25).

[40] The flap is the only liquid in this language (Maddieson 1984, Shibatani 1990); thus, the constraint could well be *[-lateral]…[-lateral], or *[LIQUID]…[LIQUID], depending on one's featural assumptions.

(25) Ainu *ɾ*-dissimilation

/kukoɾ ɾusuy/	*[rhot][rhot]	FAITH	*[rhot]-μ-[rhot]
a. [kukoɾ ɾusuy]	*!		
b. ☞ [kukon ɾusuy]		*	
/kukoɾ kuɾ/	*[rhot][rhot]	FAITH	*[rhot]-μ-[rhot]
c. ☞ [kukoɾ kuɾ]			*
d. [kukon kuɾ]		*!	

The first tableau in (25) shows the general dissimilation effect between two root-adjacent rhotics, whereas in the second tableau, candidate (25c) escapes the higher ranked *[rhot][rhot], since there are intervening segments between the two rhotics. In Ainu, *[rhot][rhot] is actively enforced throughout its phonology. Thus, we find no sequence of two root-adjacent rhotics, including rhotic geminates.[41]

Ainu *ɾ*-dissimilation exemplifies root adjacency, which is accounted for by ranking the Faithfulness constraint immediately below *[X][X]. The universal proximity sub-hierarchy derives the fact that if two elements are farther away, no dissimilation takes place. Other dissimilation cases found in my survey which involve root adjacency are Arusa ([low]), Berber (Tashlhiyt) ([labial]), Cantonese ([labial]), Dakota ([coronal]), Guere ([high]), Huamelultec Chontal ([voice]), Kihehe [Meeussen's Rule] ([H]-tone), Kisi ([lateral]), and Palauan ([labial]) (see Appendix for details). In the next section, I look at a case of *syllable adjacency* observed in Yimas.

[41] Maddieson (1984) describes Ainu as having a phonetically-long rhotic as its sole liquid phoneme, contrary to the more recent description found in Shibatani (1990). The *phonological* status of the rhotic, however, must be drawn from the fact that there is no length contrast for a rhotic in Ainu.

2.3.2 Yimas (Syllable Adjacency)

In Yimas, a Papuan language spoken in New Guinea, Foley (1991: 54) observes that the inchoative suffix *-aɾa* appears as *-ata* when preceded by [ɾ] ([ɾ]: an alveolar tap). This is contrasted in (26a,b). In (26a) the suffix /ɾ/ is not preceded by another [ɾ], showing no effect of dissimilation. In (26b) the suffix /ɾ/ is dissimilated to [t], since the preceding syllable contains a [ɾ].

(26)	**a.**	pak-aɾa	‘break open’
	b.	apɾ-ata	‘open, spread’

Of interest are the cases where the two rhotics are farther away from each other. Dissimilation does not apply if the two /ɾ/’s are not in adjacent *syllables*, as shown in (27a,b,c).

(27)	**a.**	kkɾak-aɾa	‘loosen’
	b.	aɾaŋ-aɾa	‘tear into pieces’
	c.	wuɾpi-aɾa	‘slacken’

In (27), the two /ɾ/’s are mediated by at least one syllable: [.ka.] in (27a), [.ŋa.] in (27b), and [.pi.] in (27c) (where “.” indicates syllable boundary).

This adjacent-syllable restriction is most dramatically illustrated in reduplication, given in (28). The iterative form of the verb is marked by the reduplication (underlined) of an internal CV or VC sequence (28a,b,c). Of interest is that when the reduplicated CV or VC sequence includes [ɾ], the second /ɾ/ dissimilates to [t] (bolded), as shown in (28d,e,f).[42]

[42] We will not give an analysis of any other aspects of this interesting reduplication pattern.

(28)		**Verb**	**Iterative**	**Gloss**
	a.	apan	apapan	‘cry’
	b.	arpal	arpapal	‘go out’
	c.	tɨpaŋ	tɨpapaŋ	‘bathe’
	d.	iɾay	iɾa**t**ay	‘cry
			*iɾaɾay	
	e.	waɾk	waɾa**tɨ**k	‘make’
			*waɾaɾɨk	
	f.	yaɾa	yaɾa**t**a	‘pick up’
			*yaɾaɾa	

The data in (28) confirm the observation that /ɾ/ dissimilates to [t] when the adjacent *syllable* contains [ɾ]. Following Foley (1991: 54), I view this as a general restriction, governing the entire phonology of Yimas.

In my analysis, I follow Odden (1994) and Walsh-Dicky (1997) who explain the reason that the liquid dissimilates to the non-liquid [t] by treating [ɾ] as a *lateral*. In Yimas, the rhotic [ɾ] is in free variation with a lateral [l]. Thus, assigning the [lateral] feature to [ɾ]~[l] variants is not as unreasonable. The pattern, then, is characterized as involving dissimilation of *laterality* (Odden 1994: 316-317).

I propose the GOCP constraint scheme *[lateral]...[lateral] (*[lat]...[lat]) for Yimas. Here, the actual constraint responsible is *[lat]-μ-[lat], which penalizes the sequence of two rhotics up to one syllable away. This is shown in the tableau in (29), where Faithfulness is ranked immediately below *[lat]-μ-[lat].

(29) Yimas *ɾ*-dissimilation

/apɾ-aɾa/	*[lat]-μ-[lat]	FAITH	*[lat]-σ-[lat]
a. [apɾ-aɾa]	*!		
b. ☞ [apɾ-ata]		*	
/aɾaŋ-aɾa/	*[lat]-μ-[lat]	FAITH	*[lat]-σ-[lat]
c. ☞ [aɾaŋ-aɾa]			*
d. [aɾaŋ-ata]		*!	

In the first tableau in (29), candidate (a) loses out by violating *[lat]-μ-[lat]. In the second tableau, candidate (29c) does not violate *[lat]-μ-[lat], since the two [ɾ]'s are more than one syllable away, allowing this more faithful candidate to win out.

The GOCP analysis predicts that any sequence of two [ɾ]'s *within* two syllables span is avoided in Yimas. This will also rule out root-adjacent [ɾ]'s, since in our constraint hierarchy *[lat][lat] must dominate *[lat]-μ-[lat]. This prediction is borne out: Foley (1991: 41-44) confirms that there are no clusters with two rhotics [ɾɾ] in Yimas.

Importantly, the GOCP analysis *predicts* the absence of *ɾɾ*-clusters: the 'closer' the two elements, the stronger the identity avoidance (cf. Pierrehumbert 1993, Archangeli and Pulleyblank 1994a). Under the GOCP, the proximity effect is formally expressed in the universal sub-hierarchy (23) which is built into the GOCP constraint schema. The strength of the restriction is captured by the universal ranking. Departing from the geometry-oriented conception of Locality (20), I pursue the development along the line suggested here.[43]

In summary, the proposed analysis of Yimas *ɾ*-dissimilation demonstrates a case of dissimilation based on syllable adjacency, which is accounted for by ranking the

[43] See also the proposals by Archangeli and Pulleyblank (1987), Odden (1994), and Alderete (1996, 1997), in which Locality is parameterized.

Faithfulness constraint immediately below *[X]-μ-[X]. The difference between Ainu and Yimas —root or syllable adjacency— is explained according to the ranking of the Faithfulness constraint. When Faithfulness is ranked below *[X][X], as in (25), root adjacency results, while Faithfulness is ranked below *[X]-μ-[X], as in (29), syllable adjacency results. Other dissimilation cases involving syllable adjacency are Arabic, many Bantu languages [Meeussen's Rule], many Bantu languages [Dahl's Law] ([voice]), Cantonese ([labial]), Finnish (σ(q)), Gidabal (σ(q)), Gooniyandi (NC), Gothic ([voice]), Javanese ([place]), Latin [Lex Mamilla] (σ(q)), Marshallese ([low]), Ngbaka ([high]), Oromo (σ(q)), Russian [dissimilative jakan'e] ([high], [low]), Slovak (σ(q)), Tzeltal ([back]), Woleaian ([low]), and Yinjibarndi (NC) (see Appendix for details). In the next section, I look at a case of *single consonant adjacency* found in Kera.

2.3.3 **Kera ('Single Consonant' Adjacency)**

So far, I have looked at cases involving root and syllable adjacency. It has been proposed by Odden (1994), McCarthy (1995) and Alderete (1996, 1997) that these two are the parameters by which each phonological phenomenon is constrained. Aside from the unbounded cases such as Lyman's Law in Japanese, these researchers agree that the types of adjacency found in languages fall into one of these categories (root or syllable adjacency). However, Kera, a Chadic language spoken in Chad, presents a type of adjacency which cannot be characterized as either of the above categories. I call this a Single Consonant Adjacency, a dissimilatory effect that occurs between two segments that are at most one consonant away from each other. I discuss *a*-dissimilation in Kera, providing a GOCP-based analysis of the phenomenon.

The data are from Ebert (1974) via Kenstowicz and Kisseberth (1979). In Kera, a low vowel /a/ surfaces as [ə] (a high back unround vowel), when followed by another [a]. This is shown in (30).

(30)	**a.**	ba	'not'
	b.	pa	'again'
	c.	bə-pa	'no more'
	d.	koroŋ	'left'
	e.	da	'to here'
	f.	fadi	'quickly'
	g.	koroŋ-də-fadi	'came here quickly'

In (30), the concatenated form of [ba] (30a) and [pa] (30b) surfaces as [b**ə**-pa] (30c), not *[ba-pa], and the concatenation of [koroŋ] (30d), [da] (30e), [fadi] (30f) yields [koroŋ-d**ə**-fadi] (30g), not *[koroŋ-da-fadi]. Notice that in each case, the two /a/'s are separated by only one consonant (30c,g).

The dissimilation is blocked, however, when the two /a/'s are more than one consonant away, as in (31).

(31)	**a.**	balna-n	'wanted me'
		*bəlna-n	
	b.	ŋafna-n	'met me'
		*ŋəfna-n	
	c.	bəla-n	'want me'
	d.	ŋəfa-n	'meet me'
	e.	bal-l-a	'you must want!'
		*bəl-l-a	

In forms (31a,b), where the two /a/'s are separated by two consonants, the *a*-dissimilation does not apply. In their corresponding PRESENT tensed forms, the a-dissimilation does apply (31c,d). The example in (31e) also shows the blocking effect by the two intervening consonants. Thus, the generalization about the adjacency of this case is that a single intervening consonant is fine, but not two.

It is clear that this single-consonant restriction belongs neither in root adjacency (the two /a/'s can be one consonant away) nor syllable adjacency (when the two /a/'s are two consonant away, they are still syllabically-adjacent). Therefore, any parametric approach must posit another parameter — Single Consonant Adjacency — to account for the data. On the other hand, the GOCP approach handles this quite easily.

Based on the GOCP constraint scheme *[low]...[low], I argue that Faithfulness constraint (presumably IDENT(low)) is ranked directly below *[low]-C_1-[low].[44] The proposed account of the single-consonant effect is illustrated in the tableau in (32).

(32) Kera *a*-dissimilation

/ba-pa/	*[low]-C_1-[low]	FAITH	*[low]-μ-[low]
a. [ba-pa]	*!		
b. ☞ [bə-pa]		*	
/bal-l-a/	*[low]-C_1-[low]	FAITH	*[low]-μ-[low]
c. ☞ [bal-l-a]			*
d. [bəl-l-a]		*!	

The first tableau in (32) shows the general dissimilation effect between two /a/'s, while in the second tableau, candidate (32c) escapes the higher ranked *[low]-C_1-[low], by the virtue of the two /a/'s being more than one consonant away. The data from (30)

[44] We could posit *[low]-μ-[low], assuming that the coda consonant is moraic. However, this would predict that the *a*-dissimilation takes place in forms like /b**a**a.l**a**/ where the first half of the long vowel and the vowel in the second syllable (both are bolded) are separated by another vowel (underlined). Due to the lack of evidence, we assume that this is strictly for consonants.

and (31) suggest that the *a*-dissimilation is not limited to a particular morphology; rather, it is a phonological phenomenon.

Kera *a*-dissimilation demonstrates that the parametric approach must postulate an *ad hoc* Single Consonant Adjacency just to account for Kera, whereas under the GOCP approach, it is a matter of where Faithfulness constraint is ranked. While there are no other case like Kera in my survey, I will leave the possibility open for some other language to have the same pattern as Kera. In the next section, I focus on *the unbounded* cases, drawing examples from Japanese (Lyman's Law).

2.3.4 **Japanese (Unbounded)**

As briefly discussed earlier in section 2.1, Japanese presents a well-known case of a [voice] cooccurrence restriction, Lyman's Law: native morphemes cannot contain more than one voiced obstruent. Previous analyses of this phenomenon include Itô and Mester (1986, 1996a,b), Steriade (1987, 1995), Ishihara (1991), Archangeli and Pulleyblank (1994a), Itô, Mester and Padgett (1995), Pater (1995), and Alderete (1996, 1997). Of interest is the fact that the two voiced obstruents cannot cooccur in the same morpheme regardless of the spatial distance between the them. Thus, Lyman's Law is not subject to any adjacency restrictions I have discussed; rather, it is an instance of *unbounded* interaction. In this section, I give a deeper look at Lyman's Law, providing a GOCP-based analysis which not only accounts for the phenomenon, but also derives another fact about the language — that there are no voiced obstruent geminates.

The effect of Lyman's Law can be seen most dramatically in conjunction with *Rendaku*, voicing of the initial obstruent of the second member of a compound. The upshot is that the initial obstruent surfaces as voiced when preceding only sonorants and voiceless obstruents, but surfaces as voiceless when preceding a voiced obstruent anywhere in the morpheme.[45] In (33), I see the normal pattern of Rendaku which voices the initial obstruent of the second member of a compound.

(33)	**a.**	/ori-kami/	ori-**g**ami	‘paper folding’
	b.	/yama-tera/	yama-**d**era	‘mountain temple’
	c.	/nuri-futa/	nuri-**b**uta	‘lacquered lid’

Voicing is not blocked by the following sonorants, as in (33a,b), or by the following voiceless obstruents, as in (33c).

When the second member of the compound contains a voiced obstruent (underlined), however, Rendaku is blocked, as in (34).

(34)	**a.**	/kami-kaze/	kami-ka<u>z</u>e	‘divine wind’
			*kami-**g**a<u>z</u>e	
	b.	/onna-kotoba/	onna-koto<u>b</u>a	‘feminine speech’
			*onna-**g**oto<u>b</u>a	
	c.	/nuri-fuda/	nuri-fu<u>d</u>a	‘lacquered sign’
			*nuri-**b**u<u>d</u>a	

In (34a), the voiced obstruent /z/ in the second member of the compound prevents Rendaku: /kami-kaze/ does not become **kami-**g**a**z**e*, but rather, surfaces as *kami-ka**z**e*. Similarly in (34b), Rendaku is blocked even when the voiced obstruent is further away from the initial position. A comparison of (33c) and (34c) most clearly illustrates the restriction of Lyman’s Law. Because of the existence of the examples like (34b), Lyman’s

[45] The Rendaku phenomenon is further subject to the morphological restriction called Right Branch Condition (Itô and Mester 1986, 1996a,b, Ishihara 1991 for details).

Law can be characterized as an *unbounded* case of identity avoidance, where the two identicals do not obey any adjacency condition.[46]

Going into the analysis, I propose that the unbounded-effect is due to the combination of the two GOCP constraints ***[voi]...[voi]&*[-son]...[-son]** ([voi] for [voice], [-son] for [-sonorant]), defined in (35). This constraint prohibits any sequences of two [voi] segments when they form a sequence of two [-son] segments.

(35) ***[voi]...[voi]&*[-son]...[-son]**

- **a.** *[voi]...[voi]&*[-son]...[-son] is violated when the sequence of two segments violate both *[voi]...[voi] and *[-son]...[-son].
- **b.** *[voi]...[voi]&*[-son]...[-son] >> {*[voi]...[voi], *[-son]...[-son]}

The proposed constraint crucially incorporates the distinction between sequence (...) and strict sequence (~), discussed in section 1.4.3. In the Japanese case, each components of the locally-conjoined GOCP constraint *[voi]...[voi]&*[-son]...[-son] (35) must not be defined in terms of strict sequence, since not all the [voi] segments participate in the dissimilation, as in *onna-goko**r**o*, and neither do all the [-son] segments, as in *onna-ko**t**oba*. Notice that under the traditional OCP the behavior of these intervening specifications is explained by assuming that voiced sonorants and voiceless obstruents are unspecified for [voice] (Steriade 1987, Itô and Mester 1986, Archangeli and Pulleyblank 1994a, Itô, Mester and Padgett 1995). However, as argued elsewhere in this thesis, such a representational solution has many drawbacks[47]. The current GOCP-based approach, on the other hand, does not rely on representational properties such as underspecification and

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[46] Rather, it is bound by the *domain* of morpheme (specifically the second member of a compound). For the discussion of 'domain', see section 2.4. Here, we anticipate the discussion, implicitly acknowledging such a restriction.

[47] See also Steriade (1995), Pater (1995), Itô and Mester (1996a,b), and Alderete (1996, 1997) on arguments against the underspecification approach to Lyman's Law in Japanese.

feature geometry; rather, it characterizes Lyman's Law as a cumulative effect of *[voi]...[voi]&*[-son]...[-son], formally expressed by means of Local Conjunction.

As for the unbounded characteristic, it is explained through the universal sub-hierarchy of proximity, given in (36).

(36) **a.** ***[voi]...[voi]** = {*[voi][voi] » *[voi]-μ-[voi] » ... » *[voi]-∞-[voi]}
b. ***[-son]...[-son]** = {*[-son][-son] » *[-son]-μ-[-son] » ... » *[-son]-∞-[-son]}

In Japanese, what is different from the previous cases (Ainu, Yimas, and Kera) is that the cut-off point by the RENDAKU constraint which forces the voicing of the initial obstruent is at the bottom of the hierarchy below *[voi]-∞-[voi]&*[-son]-∞-[-son].[48] The effect of this is unbounded adjacency, and is demonstrated in the tableau in (37).

(37) **Japanese Rendaku-Lyman's Law effect (unbounded-effect)**

/onna-kotoba/	*[voi]-∞-[voi]&*[-son]-∞-[-son]	RENDAKU
a. ☞ onna-[kotoba] ①	*[voi]...[voi]: ☐ *[-son]...[-son]: ☒	*
b. onna-[**g**otoba] ①	*[voi]...[voi]: ☒ *! *[-son]...[-son]: ☒	

As shown in the tableau in (37), *[voi]-∞-[voi]&*[-son]-∞-[-son] correctly accounts for the unbounded-effect, where Rendaku is blocked when the second member of the compound *contains* another voiced obstruent.

Moreover, the proposed *[voi]-∞-[voi]&*[-son]-∞-[-son] easily accounts for both non-triggering and non-blocking by voiced sonorants which do not factor in Lyman's

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[48] We accept the view voiced in Itô and Mester (1996a,b) that the Rendaku constraint is motivated by the general preference of avoiding articulatory effort (Lindblom 1988, 1990, etc.). We refer to the constraint as RENDAKU, for the sake of simplicity.

Law, as seen in examples like *onna-**g**okoro* 'feminine feelings' (**onna-kokoro*) and *baka-sawagi* 'spree' (**baka-**z**awagi*) (Ishihara 1991: 267). This is illustrated in tableaux in (38).

(38) Japanese Rendaku-Lyman's Law effect (non-triggering/non-blocking effect)

/onna-kokoro/	*[voi]-∞-[voi]&*[-son]-∞-[-son]	RENDAKU
a. onna-[kokoro] ①	*[voi]...[voi]: ☐ *[-son]...[-son]: ☐	*!
b. ☞ onna-[**g**okoro] ①	*[voi]...[voi]: ☒ *[-son]...[-son]: ☐	
/baka-sawagi/	*[voi]-∞-[voi]&*[-son]-∞-[-son]	RENDAKU
c. ☞ baka-[sawagi] ①	*[voi]...[voi]: ☐ *[-son]...[-son]: ☒	*
d. baka-[**z**awagi] ①	*[voi]...[voi]: ☒ *[-son]...[-son]: ☒ *!	

In each tableau in (38), *[voi]-∞-[voi]&*[-son]-∞-[-son] is able to correctly pick the winning candidate, filtering out the irrelevant voiced sonorants.

In the analysis provided above, I have shown that the GOCP constraint *[voi]...[voi]&*[-son]...[-son]is able to account for the *unboundedness* of the Rendaku-Lyman's Law effect, by ranking the RENDAKU constraint below *[voi]-∞-[voi]&*[-son]-∞-[-son]. Before proceeding to the subsequent analysis of Japanese, I briefly review another OT-based approach to the OCP, which may be characterized as 'OCP-as-markedness' approach.

2.3.4.1 OCP-as-Markedness

The proposed analysis mirrors the recent claims made in Itô and Mester (1996a,b) and Alderete (1996, 1997) in allowing direct reference to the feature combinations such as [voi] & [-son], as opposed to some representational solution which typically appeals to underspecification (Itô and Mester 1986, Steriade 1987, Archangeli and Pulleyblank 1994a), elaborate features (Rice and Avery 1989, Steriade 1995), or the notion of Licensing (Itô, Mester, and Padgett 1995). The OCP-as-markedness approach argues that the local self-conjunction of *markedness* constraints derives the OCP-effects. According to Itô and Mester (1996a,b) and Alderete (1996, 1997), the Japanese example is accounted for by the locally self-conjoined *[voi, -son]$^2_{Stem}$, defined in (39).

(39) *[voi, -son]$^2_{Stem}$ (Itô and Mester 1996b: 6):
No cooccurrence of voiced obstruency with itself within stems.

The locally enhanced markedness constraint *[voi, -son]$^2_{Stem}$ prohibits two occurrences of voiced obstruents in stem. It also utilizes the universal ranking that the self-conjoined *[voi, -son]$^2_{Stem}$ must outrank the component constraint *[voi, -son]$_{Stem}$. The following tableau in (40) demonstrates how their analysis works.

(40) OCP-as-markedness analysis (Itô and Mester 1996a,b, Alderete 1996, 1997)

/onna-kotoba/	*[voi, -son]$^2_{Stem}$	RENDAKU	*[voi, -son]$_{Stem}$
a. ☞ onna-[kotoba]		*	*
b. onna-[**g**otoba]	*!		**

As illustrated above, the OCP-as-markedness approach elegantly accounts for the Rendaku-Lyman's Law effect.

Although the current approach and the OCP-as-markedness approach largely overlap in their function, they differ in their fundamental conception of identity avoidance: the OCP-as-markedness is based on markedness constraints, predicting that identity avoidance effects obtain between *marked types of structures*; the current approach can be affected by markedness, but this is *not necessary*.[49] Although I agree that markedness could factor into the statistics of the OCP-effects, I do not agree that markedness should be the sole basis of the theory, due to the reasons discussed below.

There are at least three difficulties which arise from the OCP-as-markedness approach. First, based on my findings that every feature, not just marked ones, may be involved in dissimilatory phenomena (section 2.2.1, and see also Appendix), it is not true that the OCP-effects occur only between marked type of structures. Unmarked features, such as [coronal], are attested to participate in dissimilatory activity, such as Dakota coronal dissimilation (Shaw 1980, 1985, Hong 1990) and Akan coronal cooccurrence restriction (Welmers 1946, McCarthy and Prince 1995).

Second, it is not clear how one can state the markedness for purely structural nodes (or 'classes' in Padgett's (1995, 1996) Feature Class Theory), such as [PLACE]. We saw earlier in sections 2.2.2 that *[PLACE]...[PLACE] is actively enforced in the phonology of Arabic (Greenberg 1950, McCarthy 1979, 1981, 1986). The recurring cases of such [PLACE] cooccurrence restrictions (Arabic, Cambodian, Javanese, Russian, Yucatec Mayan) pose a problem of how to characterize this generalization based on markedness alone.

Lastly, adopting local conjunction as a means of marking a double occurrence fails to characterize the *sequential* nature of cooccurrence restrictions. For example, the locally-conjoined markedness constraint $*[F]^2_{Stem}$ is violated whenever the stem contains two occurrences of [F], regardless of their adjacency. This implies that the dissimilatory

[49] The similarity of the two approaches is not surprising: in preparing to write this document, I have been heavily influenced by these proposals.

effects are not sensitive to the proximity between the identicals, but to the *number* of occurrence within a particular domain. This nicely characterizes the unbounded-cases like Japanese, but as we saw in the previous sections (2.3.1, 2.3.2, and 2.3.3), the distance between elements can figure into the identity avoidance independently of the domain. Therefore, the OCP-as-markedness approach necessitates a *separate* statement of the relevant adjacency conditions.[50]

Summarizing, I have argued that the OCP-as-markedness approach is too restrictive. In what follows, I will look at how the GOCP-based analysis developed above additionally accounts for the lack of voiced obstruent geminates in Japanese.

2.3.4.2 No Voiced Obstruent Geminates in Japanese

In Japanese, no voiced obstruent geminates are allowed in general (*fuda* 'sign', but **fu**dd**a*, and *kaze* 'wind', but **ka**zz**e*, etc.) (Itô and Mester 1995a,b, Suzuki 1997). I argue that this restriction is driven by the same cooccurrence restriction for voiced obstruents, namely the GOCP, *[voi]...[voi]&*[-son]...[-son]. While Lyman's Law displays unbounded interaction of the two identicals, the lack of voiced obstruent geminates, call it an NVOG-effect for <u>N</u>o <u>V</u>oiced <u>O</u>bstruent <u>G</u>eminate, shows the root-adjacent interaction. My proposal is that these two phenomena must be unified under the GOCP constraint schema, *[voi]...[voi]&*[-son]...[-son] in which the universal sub-hierarchy based on the proximity is encapsulated.

As defined earlier in (35) (repeated in (41)), the schema *[voi]...[voi]&*[-son]...[-son] contains cooccurrence restrictions on any sequence of

[50] This is indeed the approach taken in Alderete (1996, 1997), in which he proposes the parameterized theory of adjacency, based on Odden (1994).

voiced obstruents, ranging from root-adjacent *[voi][voi]&[-son][-son] to unbounded *[voi]-∞-[voi]&*[-son]-∞-[-son].

(41) ***[voi]...[voi]&*[-son]...[-son]:**

a. *[voi]...[voi] = {*[voi][voi] » *[voi]-μ-[voi] » ... » *[voi]-∞-[voi]}
b. *[-son]...[-son] = {*[-son][-son] » *[-son]-μ-[-son] » ... » *[-son]-∞-[-son]}

The constraint hierarchy constructed in the previous section, without any additional modification, accounts for the NVOG-effect, as shown in the following tableau in (42).[51]

(42) **No Voiced Obstruent Geminates**[52]

/fudda/	*[voi]...[voi]&*[-son]...[-son]		FAITH
	[voi][voi]&[-son][-son]	*[voi]-∞-[voi]&*[-son]-∞-[-son]	
a. fu**dd**a	*!	*	
b. ☞ fu**d**a			*

Here, we see that ***fudd**a* loses out by having a voiced obstruent geminate which violates the higher-ranked *[voi][voi]&*[-son][-son]. Thus, the proposed approach unifies the two different types of restrictions concerning voiced obstruents, characterizing them as a matter of proximity.

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[51] This ranking is deduced from the tableaux (37) and (38): from *[voi]...[voi]&*[-son]...[-son] >> RENDAKU and RENDAKU >> FAITH (must be ranked below to obtain the voicing alternation), *[voi]...[voi]&*[-son]...[-son] >> FAITH.

[52] It should be noted that postulating *fu**d**a* as the winning candidate serves illustrative purpose only. What is important here is that some candidate is always more harmonic than *fu**dd**a*, letting *fu**dd**a* never be a winner. We use the same strategy for the tableaux below (cf. Itô and Mester 1995b).

This approach is preferable to those in which an independent constraint is proposed to account for the NVOG-effect, including Itô and Mester (1995a,b) where the constraint NOVOIGEM is posited just for the purpose of characterizing the NVOG-effect (Itô and Mester 1995b: 183). This misses the generalization that both Lyman's Law and the NVOG-effect root from the antagonistic feature combination [voi] & [-son] (cf. Suzuki 1997). Moreover, it makes an incorrect prediction that we would find languages that have unbounded dissimilation of voiced obstruents, while having voiced obstruent geminates in their inventory, since NOVOIGEM is an independent constraint which can be ranked *below* Lyman's Law constraint (such as $*[\text{voi, -son}]^2_{\text{Stem}}$). To my knowledge, such a language does not exist. The GOCP approach, on the other hand, makes a strong prediction that in languages that have a dissimilatory phenomenon involving antagonistic feature combinations, such as [voi] & [-son], do not have contrastive geminates of that feature combination. The Japanese facts confirms this prediction.[53]

It is relevant to note that the NVOG-effect is seen in larger lexical domain than the unbounded Lyman's Law effect. That is, while the NVOG-effect is observed in the Yamato (native), Sino-Japanese, and Foreign vocabulary (Itô and Mester 1995a,b), Lyman's Law holds only in the lexicon of Yamato Japanese.[54] This fact is also derivable from my proposal that the NVOG restriction is stronger than the restriction of Lyman's Law, based on the universal sub-hierarchy of proximity. Further, this is entirely consistent with the claim made in Itô and Mester (1995a,b) that the lexical stratification can be characterized as a reranking of Faithfulness constraints within an otherwise invariant constraint hierarchy.

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[53] More justification of this generalization will be discussed in Suzuki (forthcoming), comparing Standard Japanese with Tohoku Japanese in which Lyman's Law is severely violated while the NVOG-effect is still respected.

[54] Also, a relevant, but may not be significant point is that while Lyman's Law is restricted morpheme-internally, the NVOG restriction holds phonologically.

To sum up the section, I have demonstrated that the NVOG-effect of the antagonistic feature combination [voi] & [-son] observed in Japanese follows directly from my earlier analysis of Lyman's Law in which we saw the unbounded interaction of [voi] & [-son]. Rather than positing an independent constraint for the NVOG-effect (NoVoiGem in Itô and Mester 1995a,b), the GOCP-based approach *formally* captures the relative 'strength' of the NVOG-effect to the Lyman's Law effect, utilizing the universal sub-hierarchy of proximity.

As proposed above, cases of unbounded adjacency results from ranking Faithfulness below *[X]-∞-[X]. Other dissimilation cases involving unbounded adjacency are Akkadian ([labial]), Arusa ([H]-tone), Berber (Tashlhiyt) ([labial]), Georgian ([rhotic]), Gurindji (NC), Japanese (μ), Palauan ([labial]), Peñoles Mixtec ([L]-tone), Sundanese ([rhotic]), Yindjibarndi [rhotic] (μ) (see Appendix for the details).

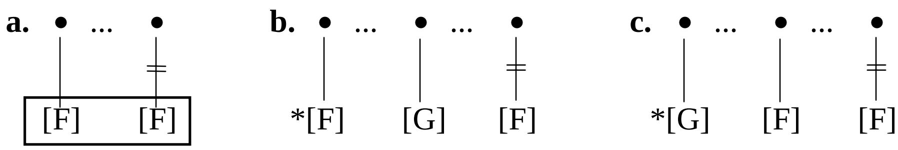
Having discussed attested types of adjacency, I turn into the discussion of 'blocking' in which dissimilatory effects are disrupted, not by the spatial distance between the two identicals, but by some 'blocker' element.

2.3.5 Blocking

In several cases, we find that some 'blocker' element disrupts an application of dissimilation. In those cases, the blocker is typically positioned in between the two identicals which are otherwise subject to dissimilation, as illustrated (autosegmentally) in (43b) (where (43a) is the dissimilation case). There is, however, one instance of 'peripheral blocking', in which the blocker is *outside* the sequence of identicals, as in (43c).[55]

[55] The case of peripheral blocking in Yidiɲ is brought to attention by Crowhurst and Hewitt (1993), Steriade (1995), and most notably by Walsh-Dicky (1997).

(43)



In this section, I discuss these two types of blocking effect, *Intervention* (44a) and *Peripheral Blocking* (44b), drawing examples from Latin and Yidiɲ, respectively.

(44) Types of Blocking

a. Intervention: Blocking by an intervening element.
b. Peripheral Blocking: Blocking by a peripheral element.

2.3.5.1 Intervention

As described in (44a), the term 'intervention' refers to cases where dissimilation does not take place due to some intervening feature(s). Previous accounts of intervention under Autosegmental Theory (Goldsmith 1976, 1990) have sought a geometric explanation for this phenomenon, based on the tier-dependent formulation of Locality (20), repeated below as (45).

(45) Locality (from Steriade 1995: 121)
Phonological rules apply between elements adjacent on some tier.

Thus in (43b), in which dissimilation is blocked by the intervening [G], Locality requires that the two [F]'s must not be tier-adjacent. Stated differently, the feature [G] must be on the same tier as [F] in order to block the dissimilation. This reasoning has led researchers to propose more elaborate feature representations, one way or the other (Steriade 1987, 1995, Hume 1992, Clements and Hume 1995, etc.).

In this section, I look at the well-known case of Latin lateral-dissimilation, and demonstrate how intervention is resolved under the current proposal. The previous studies are fruitful, including such earlier discussions by Kent (1945), Posner (1961), and Johnson (1973) to the more recent analyses by Steriade (1987, 1995), Odden (1994), and Walsh-Dicky (1997).

In Latin, the adjectival suffix -*alis* dissimilates to -*aris* when preceded by another lateral. The data in (46) from Steriade (1987) illustrate the basic pattern. When the stem does not contain any lateral, the suffix surfaces as [-alis], as in (46a,b,c). However, if the stem contains a lateral (underlined), the suffix surfaces as [-aris] (the dissimilated [r] is bolded) instead, as in (46d,e,f). The unboundedness of the phenomenon is observed in (46e,f).

(46)	**a.**	/nav-alis/	nav-alis	‘naval’
	b.	/episcop-alis/	episcop-alis	‘episcopal’
	c.	/infiti-alis/	infiti-alis	‘negative’
	d.	/sol-alis/	sol-a**r**is	‘solar’
	e.	/lun-alis/	lun-a**r**is	‘lunar’
	f.	/milit-alis/	milit-a**r**is	‘military’

This dissimilation, however, is blocked when the laterals are separated by the rhotic [r] (underlined), as in (47).

(47)	**a.**	/flor-alis/	flor-alis	‘floral’
			*flor-a**r**is	
	b.	/sepulkr-alis/	sepulkr-alis	‘funereal’
			*sepulkr-a**r**is	
	c.	/litor-alis/	litor-alis	‘of the shore’

*litor-a**r**is

To recap the facts, Latin presents a case of intervention where the unbounded lateral dissimilation is blocked by an intervening [r]. Below, I give a GOCP-based analysis.

First, following Walsh-Dicky (1997), I assume a feature class [LIQUID] which can be subject to the GOCP constraint (see Padgett 1995,1996 for the notion and the theory of feature 'class'). This is due to the crucial observation that *non-liquids cannot block liquid dissimilation* (Walsh-Dicky 1997: 157).

Second, I propose that intervention is actually a similarity effect in which the context of identity avoidance requires agreement of some extra feature(s). The Latin pattern can be described as follows: *a sequence of two laterals is avoided when it is also a strict sequence of liquids*. This is formally characterized by the use of local conjunction, as discussed in section 2.2.2.2. Here, I argue that the constraint responsible is *[LIQUID]~[LIQUID]&*[lateral]...[lateral], which is the Local Conjunction of *[LIQUID]~[LIQUID] and *[lateral]...[lateral], defined in (48).

(48) *[LIQUID]~[LIQUID] & *[lateral]...[lateral] (*[LIQ]~[LIQ] & *[lat]...[lat])

a. *[LIQ]~[LIQ] & *[lat]...[lat] is violated when the sequence of two segments violate both *[LIQ]~[LIQ] and *[lat]...[lat].

b. *[LIQ]~[LIQ] & *[lat]...[lat] >> {*[LIQ]~[LIQ], *[lat]...[lat]}

Tableaux illustrating both the dissimilation and blocking are given in (49). In the first tableau, candidate (49a) loses, because it contains the sequence of two lateral liquids [sol-alis]. The second tableau in (49) shows that two laterals that are avoided must also be in a *strict sequence*.

(49) Latin lateral-dissimilation and the intervention of [r]

/sol-alis/	*[LIQ]~[LIQ]&*[lat]...[lat]	FAITH
a. [sol-alis] ①	*[LIQ]~[LIQ]: ☒ *[lat]...[lat]: ☒ *!	
b. ☞ [sol-aris] ①	*[LIQ]~[LIQ]: ☒ *[lat]...[lat]: ☐	*
/flor-alis/	*[LIQ]~[LIQ]&*[lat]...[lat]	FAITH
c. ☞ [flor-alis] ① ② ③	*[LIQ]~[LIQ]: ☒ ☒ ☐ *[lat]...[lat]: ☐ ☐ ☒	
d. [flor-aris] ① ② ③	*[LIQ]~[LIQ]: ☒ ☒ ☐ *[lat]...[lat]: ☐ ☐ ☐	*!

In the second tableau in (49), candidates have two sets (vertical pair represents one set) of boxes which figure into evaluation: For candidate (49c), the first pair is for [l] & [r] in [fl̲or̲-alis], the second pair is for [r] & [l] in [flor̲-al̲is], and the third pair is for [l] & [l] in [fl̲or-al̲is]. If none of the pairs violate both *[LIQ]~[LIQ] and *[lat]...[lat], the locally-conjoined *[LIQ]~[LIQ]&*[lat]...[lat] is not violated, as in (49c,d). In candidate (49c), the pair [l] & [l] does not violate *[LIQ]~[LIQ], since the two [l]'s are not in strict sequence.

The proposed *[LIQ]~[LIQ]&*[lat]...[lat] successfully accounts for both the dissimilation of laterals and the intervention of [r], formally expressing the idea of *intervention-as-similarity*. Below, I contrast the current approach to the previous tier-dependent accounts of Latin lateral dissimilation.

Latin lateral dissimilation has been used as a piece of evidence for Contrastive Underspecification (Steriade 1987, 1995, Mester and Itô 1989). Steriade (1987) attributes the intervention of [r] to its contrastively specified [-lateral]. The other non-lateral segments such as [n] (as in *lu**n**-alis* in (46e)) do not block dissimilation by virtue of not having a [-lateral] specification, because [lateral] is not contrastive in nasals. Thus, as illustrated in (50), dissimilation can be accounted for by the OCP on the [lateral] *tier*.

(50)

l u n - a r i s	*l u n - a l i s	f l o r - a l i s
[+lat] [-lat]	[+lat] [+lat]	[+lat] [-lat] [+lat]
OK	*OCP violation*	*OK*

Steriade (1995) further suggests the possibility of [r] being specified for [rhotic], eliminating binary [±lateral] in favor of privative [lateral] and [rhotic] (or [retroflex]). Under this view, the intervention of [r] in *flor-alis* is explained by claiming that the dissimilated **flo**r**-a**r**is* would violate the OCP on the [rhotic] tier (see also Kenstowicz 1994).

The problems of these tier-dependent approaches can be summarized in two respects. First, as pointed out in Kenstowicz (1994), the approach utilizing Contrastive Underspecification has to assume that non-liquid coronals like *t* , which cannot be specified for [lateral], being a non-blocker in *mili<u>t</u>-a**r**is* (**milit-alis*), somehow acquire surface [-lateral] values (assuming surface full specification). This leads to a two-staged derivational conception which distinguishes an underspecified stage where the *t* lacks a [-lateral] value and a surface stage, where it possesses one. Otherwise, for whatever reason, non-liquid coronals must not be specified for [lateral], ever (see Itô, Mester and Padgett 1995 for this view in which they appeal to the notion of *Licensing*). This type of situation does not arise under the tier-independent approach proposed here. As provided earlier, my analysis does not depend on the geometrical expressions; rather, intervention cases are viewed as a similarity-effect, unified formally by the use of local conjunction. No underspecification is necessary.[56]

Second, more seriously, the approach which assumes that intervention is due to the OCP on [rhotic] (suggested in Kenstowicz 1994, Steriade 1995: 172 fn41), fails to account for the following paradigm, given in (51) (data are from Nelson 1996 via Walsh-Dicky 1997).

(51)	**a.** /nav-al-iter/	nav-al-iter	'navally'
	b. /infiti-al-iter/	infiti-al-iter	'negatively'
	c. /singul-al-iter/	singul-a**r**-iter	'exceedingly, one by one'
	d. /vulg-al-iter/	vulg-a**r**-iter	'in a common way'

As pointed out by Walsh-Dicky (1997), dissimilation is not affected by any peripheral occurrences of [r], as shown in the paradigm in (51). Thus, dissimilation is still observed in /l...l...r/ sequences, yielding [l...r...r], in which the putative OCP on the [rhotic] tier is violated (51c,d). This leads to a paradox that in *flor-alis*, dissimilation is blocked under the compulsion of the OCP on [rhotic] (**flo**r**-a**r**is*), while forms like *singul-a**r**-ite**r*** must *not* constitute an OCP violation on [rhotic] (**singul-a**r**-ite**l***). Such an unfortunate situation does not arise in the proposed approach, as demonstrated in tableau (52). In (52), candidate (52a) loses, since the pair [l] & [l] in [singul-al-iter] violates the locally-conjoined *[LIQ]~[LIQ]&*[lat]...[lat] (indicated in the first vertical set of boxes). The winning (52b) does not violate *[LIQ]~[LIQ]&*[lat]...[lat], since neither of the pairs [l] & [r] in [singul-ar-iter] and [r] & [r] in [singul-ar-iter] violate the [lateral] part of the constraint.

---

[56] Also, it is not clear how this is resolved under the OCP-as-markedness approach in geometry-independent way, since ***fl**or-**l**is* and **mi**l**it-a**l**is* are equally bad in terms of the number of [l]'s in the domain of word. They must stipulate the adjacency between [l] and the blocking [r] (Itô and Mester 1996a,b, Alderete 1996, 1997).

(52) Latin lateral dissimilation (No peripheral blocking)

/singul-al-iter/	*[LIQ]~[LIQ] & *[lat]...[lat]	FAITH
a. [singul-al-iter]	*[LIQ]~[LIQ]: ☒ ☒ *[lat]...[lat]: ☒ ☐ *!	
b. ☞ [singul-ar-iter]	*[LIQ]~[LIQ]: ☒ ☒ *[lat]...[lat]: ☐ ☐	*

As argued above, the GOCP approach taken here offers a tier-independent solution to the cases of intervention, taking up the concept of *intervention-as-similarity*. The other tier-dependent approaches not only have to resort to some elaborate underspecification tactic, but also have some empirical problems as well. Other intervention cases include Akkadian ([labial] vowels block *labial*-dissimilation), many Bantu languages (Dahl's Law) (consonants other than [k] block *voicing*-dissimilation), Georgian ([l] blocks *rhotic*-dissimilation), Gooniyandi ([nasal] consonants block *NC*-dissimilation), Guere (consonants other than [coronal] block [high]-dissimilation), Sundanese ([l] blocks *rhotic*-dissimilation) (see Appendix for details). Next, I look at the case of Peripheral Blocking, found in Yidiɲ.

2.3.5.2 Peripheral Blocking

Recently, another type of blocking has been discovered — Peripheral Blocking, in which the blocker element is outside of the two identicals (44b) (Crowhurst and Hewitt 1993, Steriade 1995, Walsh-Dicky 1997). As illustrated in (53), the blocker [G] does not intervene between the two identicals [F]'s, which are otherwise subject to dissimilation.

```
(53)     •  ...  •  ...  •
         |       |       ╪
       *[G]     [F]     [F]
```

The only case of peripheral blocking attested so far is Yidiɲ, an Australian language spoken in Queensland. Dixon (1977: 98-100, 223) observes that lateral dissimilation occurs in a certain combination of verbal affixes. In particular, the ‘going’ aspect suffix -*Vlin* surfaces as [-V**r**in] when followed by the comitative suffix -*ŋal*.[57] Compare the form in (54a) (without comitative) with the form in (54b) (with comitative).[58]

(54) **a.** magi-iliŋ ‘go climbing up’
[root + ‘going’]

b. magi-iriŋ-al ‘go climbing up with’
[root + ‘going’ + COMIT]

In (54a), without the comitative suffix, /l/ of -*Vlin* (‘going’) remains unaffected, whereas in (54b), /l/ of -*Vlin* dissimilates to [r]. Crucially, the dissimilation is restricted to occur within this particular verbal affix complex. Thus, we find [l...l] sequences in other circumstances: [gali-iŋal] ‘go with + PRES’, [ŋalal] ‘big’, [gulbul] ‘wave’, etc.

However, although the ‘going’ suffix surfaces as [-Vrin] before the comitative for most verbs, there are certain verb roots which take the non-dissimilated [-Vlin], as shown in (55).

[57] The final /n/ of the ‘going’ aspect suffix either surfaces as [ŋ] word-finally, or deletes when followed by the comitative suffix /-ŋal/.

[58] Symbols used for Yidiɲ are: [d̪] for a laminal stop, [l] for an apical lateral, [r] for a trilled apical rhotic, and [ɽ] for a retroflex rhotic.

(55) **a.** burwa-aliŋ ‘go jumping’
[root + ‘going’]

b. burwa-ali-ŋal ‘go jumping with’ *burwa-a**r**i-ŋal
[root + ‘going’ + COMIT]

Verb roots which take [-Vlin] are limited to *burwa*- ‘jump’, *burgi*- ‘walk about’, *warŋgi*- ‘move around’, *dari*- ‘sink down’, *gaɽba*- ‘hide’, *daɽba*- ‘slip’, and *wiɽa*- ‘be bent’ (Dixon 1977: 100).

What is striking about these exceptional roots is that they contain a rhotic consonant ([r] or [ɽ]). The dissimilation is blocked when [r] or [ɽ] precedes the target /l/, yielding [r...l...l], not *[r...r...l]. Thus, this is arguably a case of Peripheral Blocking. This contrasts with the intervention cases discussed above in the previous section where the blocker is an intervening rhotic, rather than a peripheral one.

I argue that this is inherently different from the intervention cases which are viewed as instances of the similarity-effect; rather, I follow Steriade (1995) and Walsh-Dicky (1997) that the higher priority of the GOCP constraint *[rhotic]...[rhotic] (*[rhot]...[rhot]) is responsible for the peripheral blocking, as shown in tableaux in (56).[59]

(56) **Yidiɲ lateral-dissimilation and the peripheral blocking of [r]**

/magi-iliŋ-al/	*[rhot]...[rhot]	*[lat]...[lat]	FAITH
a. [magi-iliŋ-al]		*!	
b. ☞ [magi-i**r**iŋ-al]			*
/burwa-alin-ŋal/	*[rhot]...[rhot]	*[lat]...[lat]	FAITH
c. ☞ [burwa-aliŋ-al]		*	
d. [burwa-a**r**iŋ-al]	*!		*

[59] The constraint *[lat]…[lat] is restricted in the domain (Affix+Affix), while *[rhot]…[rhot] is not. An in-depth discussion of ‘domains’ is found in section 2.4.

The first tableau in (56) illustrates the normal dissimilation case in which candidate (56a) crucially violates *[lat]...[lat]. In the second tableau, candidate (56d) violates the higher-ranked *[rhot]...[rhot] by dissimilating /l/ to [r] in [bu**r̲**wa-a**r̲**iŋ-al]. Thus, candidate (56c) wins even though it violates *[lat]...[lat] in [burwa-a**l̲**iŋ-a**l̲**]. This is basically the account proposed by Steriade (1995) and Walsh-Dicky (1997).

My proposal that Yidiɲ (peripheral blocking) is a special case which demands a different treatment from the intervention cases, is based on the following grounds: First, unlike intervention cases found in many languages, Yidiɲ is the only language that shows the effect of peripheral blocking. Unless more cases of peripheral blocking are found, I do not want to extend my claim just for the purpose of covering Yidiɲ.

Second, as pointed out in Walsh-Dicky (1997), the cooccurrence restrictions on rhotics are also observed elsewhere in the language, suggesting the need of *[rhot]...[rhot] independently. The cooccurrence restrictions on liquids are actively enforced in Yidiɲ, prohibiting sequences of two liquids in the verbal roots, unless the second liquid is in the root-final syllable. Moreover, [r...r] (or [r] in combination with [ɽ]) sequences are never found, not even sequences where the second rhotic is root-final. This suggests the stricter restriction on rhotics than on laterals, confirming the ranking proposed above (56).

Based on these reasons, I see peripheral blocking observed in Yidiɲ as a special case of blocking. I support the view pursued by Steriade (1995) and Walsh-Dicky (1997) that such a case is motivated by the higher ranked *[rhot]...[rhot], which is independently motivated. I do not, however, consider this a general phenomenon that figures into the intervention-as-similarity strategy.

In summary, I have discussed two types of blocking effects, intervention and peripheral blocking. I proposed a parallel treatment of intervention which falls under the notion of similarity effects. In the next section, I provide an analysis of Akkadian labial-dissimilation which poses a difficulty for any kind of geometrical approach. I demonstrate how the complex Akkadian pattern is accounted for by the proposed GOCP approach.

2.3.6 **Akkadian**

As a summary of the *adjacency* section (section 2.3), I give a demonstrative analysis of Akkadian labial-dissimilation. Previous analyses include von Soden (1969 (grammar)), McCarthy (1979), Yip (1988), Hume (1992), Odden (1994). I show how the GOCP-based solution can account for the case, contrasting with the tier-dependent analysis from Hume (1992). Following the analysis, I provide a summary of the *adjacency* section as a whole.

In Akkadian, a pattern of dissimilation involving labials is observed between the nominalizer prefix *ma*- and a stem (von Soden 1969). The prefixal nasal typically surfaces as [m], as shown in (57a,b,c). When the stem *contains* a labial consonant ([p], [b], or [m]) (underlined), the prefixal [m] dissimilates to [n] (bolded), as in (57d,e,f). Note also that labial vowels do not trigger dissimilation (57a,b,c), nor does the suffix [-m] (57b).[60]

(57)	**a.**	ma-zuukt	‘mortar’
	b.	ma-škanu-m	‘place’
	c.	ma-śʔaltu	‘question’
	d.	**n**a-<u>p</u>ḥar	‘totality’
	e.	**n**a-rka<u>b</u>t	‘chariot’
	f.	**n**a-raa<u>m</u>u-m	‘favorite’

[60] Following McCarthy (1979) and Hume (1992), we assume that the suffixal [m] fails to trigger dissimilation because of the morphological reason of not being in the stem, and thus excluded from our consideration.

Of particular interest is the fact that dissimilation fails to occur if a labial vowel or glide intervenes (double-underlined), as observed in (58a,b,c).[61]

(58) **a.** mu-šeepiu-m ‘mortar’
***n**u-šeepiu-m
b. mu-ušabu-m ‘seat’
***n**u-ušabu-m
c. ma-amiitu-m ‘oath (from /ma-wmii-t-u-m/)’
***n**a-amiitu-m

It is not surprising to find a consonant-vowel interaction such as this, since labiality is not a property solely of consonants. What is interesting, however, is the dual behavior of labial vowels or glides: *They do not trigger but do block dissimilation*.

As with other intervention cases, I propose that this is a similarity effect, formally expressed by the use of local conjunction. My characterization of Akkadian labial-dissimilation is that *a sequence of two consonants is avoided when it is also a strict sequence of labials*. Formally, this is captured by the locally-conjoined *[LAB]~[LAB] *&* *[cons]...[cons], as defined below.

(59) ***[LAB]~[LAB] & *[cons]...[cons]**

a. *[LAB]~[LAB] *&* *[cons]...[cons] is violated when the sequence of two segments violate both *[LAB]~[LAB] and *[cons]...[cons].

b. *[LAB]~[LAB] *&* *[cons]...[cons] >> {*[LAB]~[LAB], *[cons]...[cons]}

---

[61] A glide may be deleted at the surface but still blocks dissimilation, as in (58c) (cf. *maamiitum* </mawmiitum/). In order to avoid complications involving *opacity* (Kiparsky 1971, 1973, McCarthy 1995, Archangeli and Suzuki 1997), we do not consider this example in our analysis.

In the illustrative tableaux in (60), we see that the dual behavior of labial vowels is straightforwardly accounted for by the GOCP constraint *[LAB]~[LAB] & *[cons]...[cons].

(60) Akkadian labial-dissimilation

/ma-rkabt/	*[LAB]~[LAB] & *[cons]...[cons]	FAITH
a. [markabt]	*[LAB]~[LAB]: ☒ *[cons]...[cons]: ☒ !	
b. ☞ [narkabt]	*[LAB]~[LAB]: ☐ *[cons]...[cons]: ☒	*
/ma-śʔaltu/	*[LAB]~[LAB] & *[cons]...[cons]	FAITH
c. ☞ [maśʔaltu]	*[LAB]~[LAB]: ☒ *[cons]...[cons]: ☐	
d. [naśʔaltu]	*[LAB]~[LAB]: ☐ *[cons]...[cons]: ☐	*!
/mu-šeepiu-m/	*[LAB]~[LAB] & *[cons]...[cons]	FAITH
e. ☞ [mušeepiu]m	*[LAB]~[LAB]: ☒ ☒ ☐ *[cons]...[cons]: ☐ ☐ ☒	
f. [nušeepiu]m	*[LAB]~[LAB]: ☐ ☒ ☐ *[cons]...[cons]: ☐ ☐ ☒	*!

The first tableau in (60) shows the effect of normal dissimilation between two labial consonants. Candidate (60a) is out, by violating both *[LAB]~[LAB] and *[cons]...[cons] locally. In the second tableau, the faithful candidate (60c) wins, showing that the labial vowel [u] does not trigger dissimilation. The third tableau in (60) demonstrates the effect of intervention.[62] Candidate (60e) contains three labial segments to consider. Of these, the pair [m] & [u] in [mušeepiu-m] does not constitute a violation of *[LAB]~[LAB] & *[cons]...[cons], by not violating *[cons]...[cons]. Likewise, the

[62] As mentioned, the suffixal [m] does not participate in the computation by being outside of the domain (the notion of domain is discussed in the next section).

second pair [u] & [p] in [mušeepiu-m] does not violate *[LAB]~[LAB] *&* *[cons]...[cons]. The third pair [m] & [p] in [mušeepiu-m], while violating *[cons]...[cons], does not violate *[LAB]~[LAB], since they are not in a *strict sequence* of [LABIAL]'s. Thus, no pair violates *both* *[LAB]~[LAB] and *[cons]...[cons], and FAITH dictates the outcome.

Crucially, it is the intervention-as-similarity conception that correctly predicts the dual role. Thus, for example, if this case is approached in terms of the prohibition of feature combination [LAB, cons], we do not obtain the right result. This is shown in tableaux (61) in schematized form.

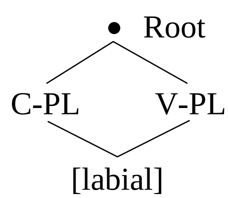
(61) If I had said *[LAB, cons]...[LAB, cons]:

/m...p/	*[LAB, cons]...[LAB, cons]	FAITH
a. [m...p]	*!	
b. ☞ [n...p]		*
/m...u/	*[LAB, cons]...[LAB, cons]	FAITH
c. ☞ [m...u]		
d. [n...u]		*!
/m...u...p/	*[LAB, cons]...[LAB, cons]	FAITH
e. [m...u...p]	*!	
f. ❽ [n...u...p]		*

Here, the first two tableaux show the constraint *[LAB, cons]...[LAB, cons] correctly discriminates consonantal labials. However, in the third tableau, candidate (61f) is incorrectly chosen, since [m] & [p] in [m…u…p] are a sequence (and also a strict sequence) of two consonantal labials. At any case, as stated earlier in section 2.2.1, the proposed model does not allow such feature combination to be subject to the GOCP scheme. I should point out that the previous analyses of Akkadian, such as McCarthy (1979), Hume (1992), and Odden (1994) have resorted to some representational elaboration in order to avoid the problem that the tableau (61) reflects.

Contrasting the proposed approach to the previous ones, I specifically discuss the proposal by Hume (1992).[63] Hume (1992) proposes a model of feature geometry which involves double domination. In Hume's (1992) model, consonantal place node (C-PL) and vocalic place node (V-PL) occupy separate 'planes', as schematically illustrated in (62). By this, a single [labial] tier is accessible from either C-PL or V-PL.

(62)



Borrowing Kenstowicz's (1994) words, this somewhat simplified geometry can be described as follows:

> "From the top seam (root) the features on the bottom can be accessed by paths that run along either side of the ellipse. These paths correspond to different planes that relate the root to the individual features" (p. 463).

Based on this geometry, Hume (1992) proposes the Labial Dissimilation *rule*, as in (63).

[63] Our discussion is also applicable to Odden's (1994) analysis of Akkadian which is build on Hume (1992).

(63) Labial Dissimilation (Hume 1992: 146)

$$\begin{array}{cc} \text{Place}_{\text{CONS}} & \text{Place}_{\text{CONS}} \\ | & | \\ \text{[labial]} & \text{[labial]} \end{array}$$

The analysis flows as follows: Labial dissimilation occurs if two consonants are both labials, triggering the rule of Labial Dissimilation (63). The rule is not triggered, however, when the two consonants are separated by a labial vowel. This is because of the structure illustrated in (62) where even though C-PL and V-PL occupy separate planes, they both dominate single [labial] tier. By the assumption that the adjacency is sensitive not to C-PL, but to [labial] tier, the dissimilation is blocked by the intervening labial vowel.

Hume’s (1992) analysis is reasonable under the traditional OCP which is heavily representation-dependent. However, what is unnecessary in the current approach is the elaborate representation like (62) — a structure which allows double domination. My analysis accounts for the dual role of labial vowels in Akkadian, without appealing to representational elaboration.

In summary, I have provided a comprehensive analysis of complex Akkadian labial-dissimilation. I argued that the approach taken here follows from the conception that blocking effects (intervention) are similarity effect which is characterized by the use of local conjunction. The derived conjecture is this: intervention-as-LC (from intervention-as-similarity and similarity-as-LC). The upshot of this is that the cases of intervention and the similarity (OCP-subsidiary feature) effects are formally unified under local conjunction.

Further, I suggest that the possible types of locally-conjoined GOCP constraints are typically the ones which conjoin a GOCP constraint with the one which is a *proper* *subset* of the other. The cases we have looked at, such as Japanese, Latin and Akkadian, both confirm this generalization (Japanese: *[voi]...[voi]&*[-son]...[-son], Latin: *[LIQ]~[LIQ] & *[lat]...[lat], Akkadian: *[LAB]~[LAB] & *[cons]...[cons]).[64] This is consistent with the proposal made in Padgett (1991: 185) that the OCP-subsidiary features are restricted to those that are either stricture features, including [consonantal], [approximant], and [continuant] or other articulator-dependent features, such as [anterior] and [distributed], except for the fact that it is stated non-geometrically.

Summarizing the *adjacency* section, I have discussed various cases of adjacency requirements. The ones that are based on spatial distance are: Root, Syllabic, Single Consonant, and Unbounded. These requirements are formally expressed by the universally-ranked sub-hierarchy of proximity. I also discussed the cases involving adjacency based on features, namely the blocking cases. It is argued that intervention must be unified as similarity-effects.

In the next section, I consider the question regarding *domains* within which the GOCP constraints operate.

2.4 Domain

The third aspect to be explored is the issue concerning *domains* where the two elements can locally interact. In the preceding sections, I have deliberately avoided giving a definite statement concerning domains. The goal of this section is to provide a formal account of *domain-specification* with respect to the GOCP constraints. I propose that the GOCP constraints can be bound to a specific domain, whether morphological or phonological ones. This idea of delimiting constraints to apply to a particular domain has

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[64] I assume that major class features, such as [son] and [cons] are superset of more specific features, such as [voi] and [lab] (McCarthy 1988).

been articulated in Archangeli and Pulleyblank (1994b) for Grounded constraints, Itô and Mester (1996a,b) and Alderete (1996, 1997) for identity avoidance.

I first provide an argument for the necessity of domain-specification, followed by a discussion of possible types of domains.

2.4.1 On the Necessity of Domain-Specification

The clearest example which evidences the need of domain-specification comes from Japanese (Itô and Mester 1986, 1996a,b), discussed in section 2.3.4. I have already noted that the Rendaku-Lyman's Law effect is only seen in the second member of a compound, as shown in (64).

(64)	**a.**	/kami-kaze/	kami-kaze	'divine wind'
			*kami-**g**aze	
	b.	/onna-kotoba/	onna-kotoba	'feminine speech'
			*onna-**g**otoba	
	c.	/kuzu-kago/	ku**z**u-ka**g**o	'wastebasket'
			*kusu-kago	
	d.	/geta-hako/	**g**eta-**b**ako	'footwear case'
			*geta-hako	

In (64a,b), Rendaku is blocked by Lyman's Law holding on the second member of a compound. Thus, compounding two morphemes both of which contain a voiced obstruent does not result in dissimilation, as in (64c), and Rendaku can apply even if the first member contains a voiced obstruent, as in (64d). Following Itô and Mester (1996a,b), I formally express this requirement by binding the application of the GOCP constraint *[voi]...[voi]&*[-son]...[-son] to a *stem*, as in (65).[65]

[65] We follow Itô and Mester (1996a,b) in using the specification *Stem* to express each member of a compound.

(65) **(*[voi]...[voi]&*[-son]...[-son])$_{\text{Stem}}$**

A sequence of voiced obstruent is prohibited *within a stem*.

The following tableaux in (66) compare a general version of the GOCP constraint (applicable to the whole string) with the domain-specified version, illustrating the necessity of domain-specification.

(66) **Domain-specification of Lyman's Law**

/geta-hako/	(*[voi]...[voi]&*[-son]...[-son])$_{\text{Stem}}$	RENDAKU
a. ☞ [[**g**eta]-[**b**ako]]		
b. [[**g**eta]-[hako]]		*!
/geta-hako/	*[voi]...[voi]&*[-son]...[-son]	RENDAKU
c. [[**g**eta]-[**b**ako]]	*!	
d. ❽ [[**g**eta]-[hako]]		*

The first tableau in (66) shows that the domain-specified (*[voi]...[voi]&*[-son]...[-son])$_{\text{Stem}}$ correctly predicts that Rendaku voicing is not affected by the voiced obstruent ([g]) in the first member ([**g**eta]). However, in the second tableau, the general GOCP constraint —which applies to the whole string— incorrectly picks the winner in which Rendaku is blocked due to the voiced obstruent in the first member. This shows that we need domain-specification to delimit the application of the GOCP constraint to a parrticular domain. Note also that the domain must be specified independently of *adjacency* to derive the unbounded interaction of Lyman's Law (see section 2.3.4 for the discussion of unbounded adjacency).

Interestingly, Unger (1975 via Itô and Mester 1996a,b) reports that a *strong version of Lyman's Law* existed in Old Japanese, preventing Rendaku from occurring even when the *first* member contained a voiced obstruent. Thus, the second tableau in (66) is exactly what was the case in Old Japanese, which is explained by the general *[voi]...[voi]&*[-son]...[-son]. This suggests a general tendency for the domain of the identity avoidance effects to change through time from the larger domain to the smaller domain, informally stated in (67).[66]

(67) Diachronic domain-size reduction
Domain-size tends to make transition from larger to smaller through time.

In what follows, I look at the types of domains (morphological or phonological) and their possible restrictions.

2.4.2 Morphological Domains

The Japanese case, that I just discussed, represents a case of a *morphological* domain-specification. According to my survey (see Appendix), many cases are found to be in this category, since in these cases, dissimilatory effects are restricted by certain morphological requirements. Here, rather than listing each and every morphological restrictions (as the rest of the literature in which these requirements are tacitly assumed), I subdivide them into two categories, morphophonemic and root cooccurrence, and attempt to derive these categories in terms of the GOCP-based theory of dissimilation.

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[66] This generalization is explored in Suzuki (forthcoming), contrasting Old, Standard, and Tohoku (dialect) Japanese.

The first type, *morphophonemic restriction*, refers to cases in which a certain dissimilatory phenomenon is observed when two morphemes concatenate. As pointed out by Johnson (1973: 49), the majority of dissimilation cases involve some morphological concatenation (such as Stem+Affix). For example, Latin lateral-dissimilation, discussed in section 2.3.5.1, is restricted across the Stem-Affix juncture. Thus, the dissimilation is observed in *so**l**-aris* 'solar' (</*so**l**-a**l**is*/), but not within a morpheme, as in *ca**l**cu**l**us* 'pebble, stone' and *di**l**ucu**l**o* 'dawn, daybreak' (Nelson 1996). In these cases, dissimilation operates provided that two morphemes concatenate.

I have argued earlier that dissimilatory effects are stronger between 'closer' elements ('proximity effects', discussed in section 2.2.2 and 2.3.4.2). Thus, cases such as Latin poses a conceptual problem, since dissimilation takes place in *larger* domain ([Root+Affix]) but not in *smaller* domain ([Root]). This appears to conflict with the universal sub-hierarchy of proximity which the GOCP constraints subsumes. However, I argue that morphophonemic restrictions are consistent with my proposal, given the observation that Root elements are more *faithful* than Affix elements (McCarthy and Prince 1995). According to McCarthy and Prince (1995: 364), Faithfulness constraints must be divided into ROOT-FAITH and AFFIX-FAITH, and must be ranked universally as ROOT-FAITH >> AFFIX-FAITH.

Based on their proposal, we now have a formal explanation of morphophonemic restrictions, as in (68).

(68) Morphophonemic Restriction

ROOT-FAITH >> $(\text{GOCP})_{\text{Stem}}$ >> AFFIX-FAITH

The ranking in (68) ensures that root elements are not affected by the GOCP constraint while affixal elements are. The following tableaux from Latin illustrate this point.

(69) Latin morphophonemic restriction

/sol-alis/	ROOT-FAITH	(*[LIQ]~[LIQ] & *[lat]...[lat])$_{Stem}$	AFFIX-FAITH
a. [sor-alis]	*!	*[LIQ]~[LIQ]: ☒ *[lat]...[lat]: ☐	
b. ☞ [sol-aris]		*[LIQ]~[LIQ]: ☒ *[lat]...[lat]: ☐	*
/calculus/	ROOT-FAITH	(*[LIQ]~[LIQ] & *[lat]...[lat])$_{Stem}$	AFFIX-FAITH
c. ☞ [calculus]		*[LIQ]~[LIQ]: ☒ *[lat]...[lat]: ☒ *	
d. [calcurus]	*!	*[LIQ]~[LIQ]: ☒ *[lat]...[lat]: ☐	

In the first tableau, (69a) is eliminated, because it fatally violates ROOT-FAITH, and the correct winner is chosen (see section 2.3.5.1 for the details about the GOCP constraint, *[LIQ]~[LIQ] & *[lat]...[lat]). In the second tableau, since candidate (69d) fatally violates ROOT-FAITH, the faithful candidate (69c) wins, violating the GOCP constraint. Thus, as shown above, the morphophonemic restriction is characterized by the ranking in (68). I note that this is assumed implicitly or explicitly in the literature, dealing with the cases involving morphophonemic restrictions (Holton 1995, Itô and Mester 1996a,b, Alderete 1996, 1997).

The other type of morphological restriction is a *root cooccurrence restriction*, found in languages such as Arabic (discussed in section 2.2.2), Cambodian, Javanese, Russian, and Yucatec Mayan. In these languages, the multiple occurrence of a certain phonetic property or complex of phonetic properties inside a morpheme is highly restricted. Such morpheme-internal restrictions must be distinguished from the morphophonemic cases like Latin in which dissimilatory effects are observed only across morphemes. I propose that the root cooccurrence restriction cases are formally characterized by the GOCP constraint which is domain-specified for Root. Moreover, I posit the following ranking in (70).

(70) Root Cooccurrence Restriction

$(\text{GOCP})_{\text{Root}}$ >> ROOT-FAITH >> AFFIX-FAITH (>> $(\text{GOCP})_{\text{Stem}}$)

This ranking predicts that root cooccurrence restrictions are found only within root morphemes. To illustrate this, consider the case of Javanese, in which a native root does not contain more than one labial consonant (Uhlenbeck 1949, via Mester 1986). Thus, **bb*, **pp*, **mm*, **bp*, **pb*, **bm*, **mb*, **pm*, and **mp* are all illicit combinations (Mester 1986: 88).[67] However, in reduplicated forms such as ***b**al-**b**ul* 'puff (Habitual-Repetitive)' (Yip 1995b: 10), the cooccurrence restriction on labial consonants is violated (**<u>d</u>al-**b**ul*). The following tableaux in (71) illustrate how the proposed ranking in (70) accounts for the fact that the cooccurrence restriction holds only within a root (here, GOCP should be taken to mean *[labial]...[labial]).[68]

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[67] Though this is a correct generalization, totally identical labials *bb*, *pp*, and *mm* are allowed in limited environments.

[68] To simplify things, we do not consider the mechanism of reduplication, noting that our account is consistent with McCarthy and Prince's (1995) Correspondence Theory if we substitute IDENT-BR(labial) for AFFIX-FAITH.

(71) Root Cooccurrence Restriction on [labial]

/bab/	$(GOCP)_{Rt}$	ROOT-FAITH	AFFIX-FAITH
a. **b**a**b**	*!		
b. ☞ da**b**		*	
/RED+bul/	$(GOCP)_{Rt}$	ROOT-FAITH	AFFIX-FAITH
c. ☞ **b**al-**b**ul			
d. dal-**b**ul			*!

The first tableau in (71) shows that the ranking correctly eliminates candidate with two labial consonants (71a). The second tableau accounts for the fact that the cooccurrence restriction holds only within a root, picking the right form (71c).

As I show above, domain-specification is necessary to distinguish the two different types of morphological restriction: the GOCP which is domain-specified for Stem derives morphophonemic restrictions, such as those in Latin, whereas the GOCP domain-specified for Root accounts for the root cooccurrence restrictions, such as those in Javanese.

2.4.3 Phonological Domains

More interesting types of domains are the ones that are phonological. These include prosodic categories, such as syllables and feet (cf. Itô and Mester 1996a,b, Alderete 1996, 1997). Based on the attested patterns, I propose that a GOCP constraint can be (phonological) domain-specified either for a *syllable* or for a *foot*. I first looks at Seri (Marlett and Stemberger 1983, Yip 1988), in which the application of the GOCP constraint is limited to a syllable.

2.4.3.1 Seri (Domain = Syllable)

To demonstrate the necessity of specifying a syllable as a domain, what I need to show is the following: 1) Dissimilation takes place within a syllable (i.e. dissimilation does not occur across a syllable boundary); 2) The two identicals that are subject to the GOCP cannot be characterized in terms of adjacency. To visualize this, let us consider schematic examples in (72) where sequences of two X's are subject to the GOCP.

(72) **a.** *[**X**V**X**]$_\sigma$
b. ...**X**V]$_\sigma$ [**X**V...

In the first form (72a), the two X's are contained in a syllable. Suppose form (72a) is illformed, violating the GOCP. Here, root adjacency (*XX) is not relevant, since the two X's are separated by a vowel. The GOCP constraint which is conditioned only by adjacency predicts that the second form (72b) is also illformed, since the two X's are mediated by a vowel. At this point, what I need to show in order to prove the necessity of syllable as a domain is that the form (72b) is actually wellformed, since the difference between (72a) and (72b) is only the existence of a syllable boundary.

Seri (Marlett and Stemberger 1983, Yip 1988), a Hokan language of north-western Mexico, presents a case like that just described. In Seri, there is a dissimilatory phenomenon in which a glottal stop preceded by another glottal stop is deleted *if they are in the same syllable*, as in (73) (Marlett and Stemberger 1983: 628).[69]

[69] We are not concerned with the phenomenon of vowel deletion which deletes the first of the hiatus, seen in (73a,b,c) (see Marlett and Stemberger 1983 for the analysis of this).

(73)	**a.**	/ʔa-aaʔ-sanx/	ʔ-aa-sanx [ʔaa**.**sanx]	'who was carried'
	b.	/ʔa-aaʔ-otš/	ʔ-aa-otš [ʔaa**.**otš]	'what was sucked'
	c.	/ʔa-aaʔ-aχš/	ʔ-aa-aχš [ʔaa**.**aχš]	'what was hit'
	d.	/ʔi-ʔ-aaʔ-kašni/	ʔi-ʔ-aa-kašni [ʔi**.**ʔaa**.**kaš**.**ni]	'my being bitten'

In (73a,b,c), the second of the two glottal stops in a syllable does not surface. In (73d), however, the second glottal stop ([ʔi**.ʔ**aa**.**kaš**.**ni]) is not affected, since the first glottal stop ([**ʔ**i**.**ʔaa**.**kaš**.**ni]) and the second are not tautosyllabic. This restriction is not a restriction on glottal stops in coda, as evidenced by forms like *koʔpanšX* [ko**ʔ.**panšχ] 'Run like him!' (Marlett and Stemberger 1983: 624). Thus, this is exactly the case that I lay out in the illustration (72).

Following Yip (1988), I argue that this phenomenon is motivated by the OCP. Specifically, I propose the GOCP constraint *[c.g.]...[c.g.] ([c.g.] for [constricted glottis]) which is domain-specified for a syllable, as in (74).

(74) **(*[c.g.]...[c.g.])$_\sigma$**

A sequence of [c.g.] are prohibited within a syllable.

By this, I now am able to account for the Seri glottal-dissimilation, as shown in the tableau in (75). The general version of the GOCP constraint *[c.g.]...[c.g.] is also posited for comparative purposes.

(75) Seri glottal-dissimilation[70]

/ʔi-ʔ-aaʔ-kašni/	(*[c.g.]...[c.g.])$_\sigma$	FAITH	*[c.g.]...[c.g.]
a. ʔi.ʔaaʔ.kašni	*!		**
b. ☞ ʔi.ʔaa.kašni		*	*
c. ʔi.aa.kašni		**!	

Candidate (75a) violates the domain-specified GOCP because of the two occurrences of glottal stops in the same syllable, [ʔaaʔ]. Candidate (75b) wins by having fewer violations of FAITH. Notice that with the non-domain-specified version of GOCP, *[c.g.]...[c.g.], candidate (75c) would have incorrectly been chosen. Thus, this argues for the necessity of recognizing syllable as a specifiable domain. Also note that I am assuming that any domain-specified GOCP constraints must be ranked above its general version, given the Pāṇini's Theorem (Prince and Smolensky 1993, cf. Archangeli and Pulleyblank 1994b).

In the next section, I motivate the necessity of the foot-domain.

2.4.3.2 Woleaian (Domain = Foot)

A striking pattern of dissimilation motivating the foot domain is observed in Woleaian, a Micronesian language spoken in Woleai Island (data are from Sohn 1975, and Sohn and Tawerilmang 1976; analyses includes Howard 1972, Poser 1982, Odden 1987, Alderete 1996).

The description of dissimilation in Woleaian is quite simple: a short low vowel [a] becomes a mid [e] (bolded) when the next syllable contains another low vowel [a, aa, ɔɔ]

[70] In the tableau, candidates that syllabify a glottal stop as the first member of a complex onset are eliminated by the higher-ranked constraint on syllable structure (based on Marlett 1981).

(underlined), as shown in (76).[71,72] In Woleaian, the causative is formed by attaching the prefix *ga-*, as in (76a,b). The causative prefix, however, surfaces as *ge-* when followed by another low vowel (in the next syllable), as in (76c,d,e). When the two *a*'s are not in adjacent syllables, as in (76f), dissimilation does not obtain.

(76)	**a.**	/ga-boso/	ga-bosO	'[caus.] cause him to show off'
	b.	/ga-kere/	ga-kerE	'[caus.] to make happy'
	c.	/ga-taŋi/	g**e**-taŋI	'[caus.] to make him weep'
			*ga-taŋI	
	d.	/ga-maaro/	g**e**-maarO	'[caus.] make him starve'
			*ga-maarO	
	e.	/ga-mɔɔwa/	g**e**-mɔɔwE	'[caus.] erase it'
			*ga-mɔɔwE	
	f.	/ga-gofagiiye/	ga-gofagiiyE	'[caus.] make it slow down'
			*g**e**-gofagiiyE	

Low dissimilation is not limited to causative formation, as evidenced in (77). In these examples, the first vowel of the morpheme alternates between [a] and [e], indicating that dissimilation is phonological, not morphological.

(77)	**a.**	/mata-i/	m**e**taI	'my eyes'	cf. /mata/	matE	'eyes'
	b.	/bara-i/	b**e**raI	'my tattoo'	cf. /bara/	barE	'tattoo'

These examples suggest the need of the GOCP constraint *[low]...[low] in (78) which is responsible for the dissimilation of low vowels.

[71] The low back vowel [ɔɔ] always appears as long (Sohn 1975).

[72] I use upper-case letters to denote voiceless vowels, which are obligatorily devoiced in word-final position. Word-final *a* surfaces as *E* due to an independent process of word-final raising (also obligatory). See Sohn (1975) and Suzuki (1995b) on these effects.

(78) ***[low]…[low]**

A sequence of two low vowels is prohibited.

The primary concern here is the domain of the application of this constraint.

What is striking about Woleaian pattern is that the dissimilation applies *iteratively*, shown in the next set of data in (79). In words containing a sequence of more than two *a*'s, the alternating pattern emerges.

(79)	**a.**	/marama/	m**e**ramE	'moon'
	b.	/marama-li/	mar**e**malI	'moon of'
	c.	/marama-mami/	m**e**ram**e**mamI	'our (excl.) moon'
			*mar**e**mam**e**mI	
	d.	/yafara/	y**e**farE	'shoulder'
	e.	/yafara-i/	yaf**e**raI	'my shoulder'
	f.	/yafara-mami/	y**e**far**e**mamI	'our (excl.) shoulders'
			*yaf**e**ram**e**mI	

In (79), depending on the number of successive *a*'s, the location of the dissimilated [**e**] changes. Thus, in an unaffixed form (79a), the first vowel is dissimilated (*m**e**ramE*), while in (79b), it is the second vowel (*mar**e**malI*), and in (79c), it is both the first and the third vowels (*m**e**ram**e**mamI*). Forms in (79d,e,f) follow the same pattern.

In order to characterize this alternating pattern, I propose that the GOCP constraint *[low]…[low] (78) must be domain-specified for a foot, forcing the identity avoidance effect to be bound within a foot, in this case, an *iambic* foot (see also Alderete 1996 in which a similar proposal is suggested). This constraint is formalized as follows.

(80) **(*[low]…[low])**$_f$

A sequence of two low vowels are prohibited *within a foot*.

My view is that the dissimilation occurs within an iambic (right-headed) foot. This is supported by the following reasons. It has been argued that in an iambic foot, the first syllable is preferred to be maximally differentiated from the second syllable (head), quantity-wise (Hayes 1987, 1995, Prince 1990). By considering the Woleaian pattern to be the result of identity avoidance within an iambic foot, the characterization of the dissimilation is made parallel to other quantitative phenomena observed in an iambic foot, such as vowel deletion, vowel devoicing, and vowel reduction (Hayes 1987, 1995, Prince 1990, Mester 1994, Cohn and McCarthy 1994, Suzuki 1995a, Bakovic 1996). The difference is only that the actual alternation is qualitative (vowel raising), not quantitative.

Another reason to believe the involvement of an iambic foot is the blocking effect of long vowels. As shown in (81), if the low vowel is long, it does not dissimilate even when it is followed by another low vowel (Sohn 1975). Thus, in configurations ($\sigma_{\mu\mu}$ σ_{μ}) and ($\sigma_{\mu\mu}$ $\sigma_{\mu\mu}$), both of which are illformed iambs, dissimilation does not take place, as seen in (81a,b), respectively. This contrasts with example (81c,d), in which dissimilation obtains in (σ_{μ} $\sigma_{\mu\mu}$), a wellformed iamb. Notice that in (81d), dissimilation does take place in the prefix.

(81) Long low vowels do not undergo raising!

a.	/faaragi/	faaragI	‘to walk’
		*f**ee**ragI	
b.	/maamaawa/	maamaawE	‘to be strong’
		*m**ee**maawE	
c.	/ga-maaro/	g**e**-maarO	‘[caus.] make him starve’
		*ga-maarO	
d.	/ga-tɔɔ-tɔɔ-wa/	g**e**-tɔɔtɔɔwE	‘support it’
		*ga-t**ee**tɔɔwE	

These data give further support for specifying the domain as an iambic foot. Forms such as *faaragI* cannot be parsed into iambic foot, since **(faara)gI* is an illformed iamb.[73]

Let us see how the proposed (*[low]...[low])$_f$ accounts for the complex Woleaian *a*-dissimilation. First, I assume that the correct foot assignment is done by the foot-related constraints including FOOTBINARITY, FOOTFORM=Iamb, NONFINALITY, and ALIGNMENT (Prince and Smolensky 1993, McCarthy and Prince 1993b, Cohn and McCarthy 1994). Further, following Alderete (1995), McCarthy (1996), and Itô, Mester and Kitagawa (1996), I assume that the head element is privileged to be more faithful to input than non-head elements, a requirement formally expressed by the constraint HEAD-FAITH, as in (82).

(82) HEAD-FAITH (cf. Alderete 1995)
Corresponding head elements have identical values for the feature F.

This ensures that the head of an iamb (right syllable) remain faithful to the input, resulting in the dissimilation in the non-head position (left syllable) under the compulsion of the GOCP constraint. The tableau in (83) illustrates the interaction of (*[low]...[low])$_f$, HEAD-FAITH, and normal FAITH (for any elements).

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[73] The word-final vowel, being voiceless, never figures in the foot formation (see Suzuki 1995b for more discussion).

(83) Woleaian *a*-dissimilation

/ga-tɔɔ-tɔɔ-wa/	HEAD-FAITH	(*[low]...[low])$_f$	FAITH
a. ga(t**ee**tɔɔ)wE			**
b. (gatɔɔ)tɔɔwE		*!	
c. ☞ (g**e**tɔɔ)tɔɔwE			*
d. (gat**ee**)tɔɔwE	*!		**

In (83), candidates like (83a) which have an illformed iamb would violate the higher ranked FOOTFORM=Iamb (such candidates will not be included from now on). Candidates (83b,c,d) all have a wellformed iambic foot which can be the domain for the GOCP constraint. Among these, candidate (83b), while being faithful to the input, violates the GOCP constraint by not dissimilating. Candidate (83d) is out, violating HEAD-FAITH, dissimilating the low vowel in the head position of an iamb. Only candidate (83c) satisfies both (*[low]...[low])$_f$ and HEAD-FAITH. Thus, the proposed constraints correctly account for two facts: 1) it is the first of the two *a*'s that dissimilates, and 2) long low vowels do not undergo dissimilation.

The constraint hierarchy developed above (83), however, appears to have a problem in choosing a correct output for the inputs like /marama-li/ (>[mar**e**malI]) as illustrated in (84).

(84) Woleaian *a*-dissimilation (indeterminacy)

/marama-li/	HEAD-FAITH	(*[low]...[low])$_f$	FAITH
a. ☞ ma(r**e**ma)lI			*
b. ☞ (m**e**ra)malI			*

However, I argue that this indeterminacy is resolved by the lower-ranked GOCP constraint which is free from the domain-specification. Here, the role of this general GOCP constraint is akin to that of RHYTHM constraint in Hung (1994), demanding overall preference of alternating pattern (see Hung 1994 for the detail). Thus, the two candidates (84a,b) are decided by *[low]...[low], as shown in (85). The lower-ranked *[low]...[low] correctly picks the winner (85a), since candidate (85b) has a sequence of two *a*'s if we disregard the foot domain.

(85) Woleaian *a*-dissimilation (indeterminacy resolved!)

/marama-li/	HEAD-FAITH	(*[low]...[low])$_f$	FAITH	*[low]...[low]
a. ☞ ma(r**e**ma)lI			*	
b. (m**e**ra)malI			*	*!

While the above two candidates are equal with respect to the foot-domain, candidate (85b) is worse overall. The ranking between the specific (*[low]...[low])$_f$ and the general *[low]...[low] follows from Pāṇini's Theorem (Prince and Smolensky 1993) that the more specific constraint takes primacy over more the more general one. The summary of the ranking is given in (86).[74]

(86) Ranking Summary (Woleaian)

HEAD-FAITH, (*[low]...[low])$_f$ >> FAITH, *[low]...[low]

[74] In order to account for forms like *ge-rategI* (</ga-rategi/), it must be further assumed that the head of the iamb must be a low vowel. I will leave this issue for further research.

In summary, I have proposed that the GOCP constraint can be domain-specified for a foot. This is because of the existence of patterns like Woleaian *a*-dissimilation, in which dissimilation is sensitive to the iambic foot structure. By domain-specifying the GOCP for a foot, the proposed hierarchy accounts for not only the alternating pattern, but also the blocking effect of long low vowels. Without domain-specification, it is impossible to correctly predict the attested pattern in Woleaian, as schematically illustrated below. All forms in (87) are equal with respect to the general *[low]...[low] and Faithfulness.

(87) /a...a...a...a/ → [**e**...a...**e**...a]
[a...**e**...a...**e**]
[a...**e**...**e**...a]

What is crucial in distinguishing these forms is the specification of *foot-domain*, specifically in Woleaian, an iambic foot.

I have looked at the domains of dissimilation in this section. I proposed that there are two general types of domain which can be specified. One is morphological, and the other is phonological. Morphological domains can either be morphophonemic or root cooccurrence, depending on the characteristics. While many of the cases (see Appendix) are characterized by morphological domains, there are also cases which involve phonological domain-specification. It is argued that the syllable-domain is necessary to account for cases like Seri, in which dissimilation is delimited within a syllable. Moreover, we must also allow foot-domain, as evidenced by the Woleaian *a*-dissimilation. In the next section, I summarize my proposals discussed in the previous sections. After that, I will discuss how this approach is extended to cover some additional phenomena.

2.5 Summary of the Proposal

The GOCP account of dissimilation developed through the previous sections is summarized as follows:

Generalized OCP (*X...X): A sequence of X is prohibited.

General Scheme:
*X…X >> Faithfulness

Components:
Element (phonological or morphological)
Adjacency (by Constraint Encapsulation)
Domain (phonological or morphological)

Derived Hypotheses:
Proximity: The closer the elements are the stronger the interaction.
Similarity: The more similar the elements are the stronger the interaction.

Sub-Theories:
Local Conjunction: subsidiary-as-LC and intervention-as-LC
Domain-specification: morphological or phonological

First, I proposed the Generalized OCP constraint schema, *X...X, which derives dissimilatory effects by dominating the corresponding Faithfulness constraint (*X...X >> FAITH). Second, I looked at the components —elements, adjacency, and domains— which serve to relativize the GOCP constraint to a particular language case. I explored the possibilities in each component to cover a variety of attested dissimilatory phenomena. Third, I specifically proposed two key hypotheses: Proximity and Similarity. Proximity addresses the general tendency that the interaction is stronger if the two things are closer, whereas Similarity is set to derive both the OCP-subsidiary feature effects and the blocking effects by intervention. The formal devices I employ are Local Conjunction and

Domain-specification. I proposed that local conjunction formally offers a unified treatment of the phenomena involving the similarity effects. I also argued that the specification of domain within which the GOCP applies must be specified in some cases where dissimilatory effects are observed in restricted domains.

Having summarized my main proposals, let us consider how this theory is extended to cover an additional phenomenon — *polarity*.

2.6 Extension (Polarity)

There is a common phenomenon in tone systems where a morpheme appears as H when adjacent to a L-tone, and as L, when adjacent to a H-tone. For example, in Margi, a Chadic language of Nigeria (Hoffmann 1963, Pulleyblank 1983, 1986), the subject clitic for 'you (sg.)' surfaces as having a H-tone after a predicate ending in a L-tone (88a) and as having a L-tone after a predicate ending in a H-tone (88b).

(88)	**a.**	hə̀gyì gụ́	'you are a Higi'
	b.	màrgyí gụ̀	'you are a Margi'

This type of phenomenon is described as a case of 'polarity', in which dissimilation appears to operate bidirectionally (e.g. H-to-L and L-to-H). Polarity is also attested in cases involving voicing (Huamelultec Chontal), height (Guere, Ngbaka, Russian (dissimilative jakan'e)), backness (Ainu, Tzeltal), and length (Dinka).

In this section, I demonstrate how the GOCP approach is extended to cover the cases involving polarity. In particular, I look at cases from Huamelultec Chontal and Margi, providing GOCP-based analyses, which are entirely consistent with my proposal thus far.

2.6.1 Voicing Polarity in Huamelultec Chontal

As a simple illustration, I first look at a case of polarity observed in Huamelultec Chontal, a Hokan language spoken in Mexico (Waterhouse 1949, Kenstowicz and Kisseberth 1979).[75] In Huamelultec Chontal, the imperative is formed by the addition of the imperative suffix *-laʔ*. As shown in (89), this suffix displays polarity effects (data are from Kenstowicz and Kisseberth 1979: 364).[76] The initial lateral of the imperative suffix surfaces as voiced [l] after voiceless segments, as in (89a,b), and as voiceless [ɬ] after voiced ones, as in (89c,d).

(89)	**a.**	fuš-laʔ	'blow it!'
	b.	panx-laʔ	'sit down!'
	c.	ko-ɬaʔ	'say it!'
	d.	kan-ɬaʔ	'leave it!'

Following Kenstowicz and Kisseberth (1979), I will analyze this case as involving dissimilation of [voice]. Our characterization of the voicing polarity in Huamelultec Chontal imperative formation is that the polarity results from the requirements of two opposing GOCP constraints on voicing. Specifically, I propose the two GOCP constraints in (90). Assuming that the polarity is particular to this combination of morphemes, I suggest that these constraints are domain-specified for the verb+suffix (imperative) complex, which I will refer to as Stem.

[75] Waterhouse (1962) discusses the identical phenomenon observed in Oaxaca Chontal.

[76] The effects of palatalization which palatalizes the suffix-initial [l] after a high vowel or a glide, are omitted from the data (see Waterhouse 1949 and Kenstowicz and Kisseberth 1979 for details).

(90) **a.** **$(*[voi]...[voi])_{Stem}$:**
A sequence of two [voi] is prohibited within a stem.

b. **$(*[-voi]...[-voi])_{Stem}$:**
A sequence of two [-voi] is prohibited within a stem.

The proposed constraints account for the polarity, as illustrated in the following tableaux in (91). For the purpose of discussion, I assume that the input of the initial lateral of the suffix is voiced [l], though this is irrelevant to the outcome.

(91) **Voicing polarity in Huamelultec Chontal**

/fuš-laʔ/	Root-Faith	$(*[voi]...[voi])_{Stem}$	$(*[-voi]...[-voi])_{Stem}$	Affix-Faith
a. ☞ fuš-laʔ				
b. fuš-ɬaʔ			*!	*
/kan-laʔ/	Root-Faith	$(*[voi]...[voi])_{Stem}$	$(*[-voi]...[-voi])_{Stem}$	Affix-Faith
c. kan-laʔ		*!		
d. ☞ kan-ɬaʔ				*
e. kan̥-laʔ	*!			

The proposed ranking contains the two GOCP constraints for opposite ends of the voicing feature. This accounts for the fact that neither a [voi]...[voi] nor a [-voi]...[-voi] sequence is allowed. Thus, in both of the tableaux in (91), candidates with either [-voi]…[voi] (91a) or [voi]…[-voi] (91d) are selected as the winner. Candidate (91e), which resolves the identity avoidance by devoicing the nasal, is out, since it violates Root-Faith.

In the tableaux above in (91), I specifically assumed that the input form for the imperative suffix is /*-laʔ*/. Significantly, our hierarchy predicts the right result even when we take into account alternative input forms. Suppose that the initial lateral of the suffix is specified for [-voi] underlyingly (/-*ɬaʔ*/). Below, the tableaux in (92) show that we obtain the correct outputs for such an input as well.

(92) Alternative input 1. (voiceless)

/fuš-ɬaʔ/	ROOT-FAITH	(*[voi]...[voi])$_{Stem}$	(*[-voi]...[-voi])$_{Stem}$	AFFIX-FAITH
a. ☞ fuš-laʔ				*
b. fuš-ɬaʔ			*!	
/kan-ɬaʔ/	ROOT-FAITH	(*[voi]...[voi])$_{Stem}$	(*[-voi]...[-voi])$_{Stem}$	AFFIX-FAITH
c. kan-laʔ		*!		*
d. ☞ kan-ɬaʔ				

Here, these tableaux show that the polarity effect can be obtained through *output constraints alone*. Finally, to test this claim, I consider a case in which the input lateral is unspecified for [voice] in the tableaux in (93) (the feature [voice] is indicated as “V”). I assume that the feature [voice] must be fully (i.e. binary) specified in the output.

(93) Alternative input 2. (unspecified)

/fuš-Laʔ/	ROOT-FAITH	(*[voi]...[voi])$_{Stem}$	(*[-voi]...[-voi])$_{Stem}$	AFFIX-FAITH
a. ☞ fuš-laʔ (-V V)				*
b. fuš-ɬaʔ (-V -V)			*!	*
/kan-Laʔ/	**ROOT-FAITH**	**(*[voi]...[voi])$_{Stem}$**	**(*[-voi]...[-voi])$_{Stem}$**	**AFFIX-FAITH**
c. kan-laʔ (V V)		*!		*
d. ☞ kan-ɬaʔ (V -V)				*

In tableaux (93), we see that the candidates with polarity wins (93a,d), even through there are no [voice] specifications in the input.

As we see in the above tableaux (91), (92), and (93), the experiment with various inputs confirms to the fundamental property in OT called *Richness-of-the-Base* (McCarthy 1995), which basically reiterates that there are no constraints on the input. Therefore, the constraint hierarchy must be able to pick the correct output, irrespective of specification in the input. The strength of the proposed account of polarity is exactly this —there is no need for a separate theory of underlying feature minimization (i.e. underspecification). Thus, under this approach, it is no longer necessary to arbitrarily assign an underlying feature value to characterize the behavior of polarity affixes.

In effect, this account of polarity is closer to the account which utilizes α-notation (or variable notation) proposed in Chomsky and Halle (1968). Under this view, the polarization rule can be stated as follows:

(94) Polarization Rule (Kenstowicz and Kisseberth 1979: 364)

$$[\text{lateral}] \rightarrow [-\alpha\text{voice}] \ / \ [\alpha\text{voice}] \ \_\_$$

While this rule captures the polarity effect, allowing the use of the variable notation considerably increases the theoretical power, and thus must be avoided.

The GOCP-based account of polarity proposed here formally captures the generalization about the polarity that in some (featural) dimension the difference is maximized, without appealing to the powerful mechanism like the variable notation. In the next section, we see that the current approach successfully accounts for the polarity case in Margi, which is used to argue for the superiority of underspecification approach in accounting for the polarity phenomena (Pulleyblank 1983, 1986, Archangeli and Pulleyblank 1994a).

2.6.2 Tonal Polarity in Margi

The second case of polarity comes from Margi, a Chadic language spoken in Nigeria. In Margi, polarity is observed between verbs and the present-tense prefix *a*-.[77] According to Hoffmann (1963: 190), the prefix *a*- is a polarity affix which surfaces as having a H-tone when the next syllable (i.e. the initial syllable of a verb) is L-toned, and as having a L-tone when the next syllable is H-toned. This is shown in (95) (tones are also schematically illustrated).

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[77] This affix appears in the past-tense formation as well.

(95)	**a.**	wì	(L)	‘to run’
	b.	sá	(H)	‘to err’
	c.	á-wì yụ́	(H-L)	‘I run’
		*à-wì yụ́	(L-L)	
	d.	à-sá yụ́	(H-L)	‘I err’
		*á-sá yụ́	(H-H)	

Bare forms of the verbs are given in (95a,b). When the present-tense prefix is added, depending on the initial tone of the verb, the prefix shows up either as H-toned, as in (95c), or as L-toned, as in (95d).

I argue that the polarity observed in the present tense formation is due to the combination of the following two GOCP constraints (96a,b), both of which are domain-specified for the prefix (*a*-)+verb complex, which I again call Stem.

(96) **a.** **$(*H...H)_{Stem}$:**
A sequence of H-tone is prohibited within a stem.
b. **$(*L...L)_{Stem}$:**
A sequence of L-tone is prohibited within a stem.

My proposal is that the dual requirements by the two GOCP constraints derives the polarity effect. The following tableaux illustrate how this accounts for the examples above. For the purpose of the discussion, I assume that the input of the prefix *a*- has a H-tone.

(97) Margi tonal polarity

/á-wì/	ROOT-FAITH	(*L...L)$_{Stem}$ (*H...H)$_{Stem}$	AFFIX-FAITH
a. ☞ á-wì			*
b. à-wì		*!	
/á-sá/	ROOT-FAITH	(*L...L)$_{Stem}$ (*H...H)$_{Stem}$	AFFIX-FAITH
c. á-sá		*!	
d. ☞ à-sá			*
e. á-sà	*!		

The tableaux in (97) show that the two GOCP constraint correctly accounts for the data. In the first tableau, candidate (97a) is selected, obeying the two GOCP constraints. Similarly in the second tableau, candidate (97d) wins, satisfying the polarity requirement. It should be noted that as in the discussion of Huamelultec Chontal, we obtain the same result regardless of the specificational status of the input tone of the prefix.

So far, the result is not surprising, since the analysis is basically the same as the one given in the previous section 2.6.1. However, there is an interesting twist in the Margi polarity case which has made an underspecification approach attractive.

In addition to the two classes of verb roots (H-toned and L-toned) considered above, there exists another class — *the toneless* class (Hoffmann 1963, Pulleyblank 1983, 1986). As shown in the examples in (98), the surface tone of the toneless class is dependent on the suffix tone, or else the default L-tone.

(98)	**a.**	/məl-ía/	mə́l-ía	‘to make (ready)’
	b.	/ŋal-bá/	ŋál-bá	‘to bite a hole’
	c.	/hər-ɗà/	hə̀r-ɗà	‘bring me’
	d.	/skə-ɗà/	skə̀-ɗà	‘wait for me’
	e.	/sa/	sà	‘drink’

In (98), the toneless behavior of these roots is observed. In (98a,b), when a toneless roots precedes a H-tone suffix, the root vowel surfaces as H-toned, and in (98c,d) before a L-tone suffix, a toneless root surfaces as L-toned. Example in (98e) shows that if no tone is present, the root surfaces as L-toned, presumably by default.

What is interesting is the cases in which these toneless roots concatenate with the polarity affix. As shown in (99), the present-tense of the toneless verbs have the surface melody [L...H].

(99)	**a.**	/a-sa/	à-sá	‘drink (PRES)’
			*à-sà	
			*á-sà	
			*á-sá	
	b.	/a-hər/	à-hə́r	‘take (PRES)’
			*à-hə̀r	
			*á-hə̀r	
			*á-hə́r	

The emergence of the [L...H] pattern is striking, since the root vowel does not surface as having a L-tone, its default tone, but as having a H-tone. The tones between the prefix and the root still disagree, as in (99a,b). Below I provide a GOCP-based analysis of this interesting pattern, followed by the comparison with Pulleyblank’s (1983, 1986) analysis which introduces a property called *extratonality*.

My central claim here is that this is a case of *the Emergence of the Unmarked* (TETU) (McCarthy and Prince 1994, Alderete et al. 1996). First, I begin by proposing that the default realization of L-tone in the toneless roots is due to a constraint requiring every vowel to have a tone and to other markedness constraints. These constraints are listed in (100a).

(100) **a.** **HAVETONE** (cf. Goldsmith 1976, Pulleyblank 1997)
Every vowel must have at least one tone.
b. **T/L** (cf. Archangeli and Pulleyblank 1994a, Alderete et al. 1996)
Tones are [L] (low).
c. **T/H** (cf. Archangeli and Pulleyblank 1994a, Alderete et al. 1996)
Tones are [H] (high).

The interaction of these constraints generates the surface L-tone of the toneless root, as shown in (101).[78]

(101) **Margi toneless roots (surfacing as having a L-tone)**

/sa/	HAVETONE	T/L	T/H
a. sa	*!		
b. ☞ sà			*
c. sá		*!	

The crucial ranking between the two markedness constraints, combined with the surface requirement to have a tone, derives the default L-tone in the toneless roots.

When the toneless root concatenates with the polarity prefix *a*-, the L-H pattern shows up. I argue that this is because the unmarked L-tone must be assigned to the

[78] We placed HAVETONE on top of the hierarchy, since it is never violated in Margi. The markedness constraint T/L is crucially ranked below HAVETONE, anticipating the evidence of such ranking from the tableaux below in (102).

weaker affixal element, in this case, the vowel [a]. Consider the following tableau in (102).

(102) Margi polarity (toneless roots)

/a-sa/	HAVETONE	$(*L...L)_{Stem}$	$(*H...H)_{Stem}$	T/L
a. a-sa	*!			
b. ☞ à-sá				*
c. à-sà		*!		
d. á-sá			*!	**
e. ☞ á-sà				*

As seen above, the constraint hierarchy developed so far cannot determine the winner between the two forms [L...H] (102b) or [H...L] (102e). Both are even in terms of their polar-ness. The difference, which is a crucial one, is that candidate (102b) has the unmarked L-tone on the affix, whereas candidate (102e) has the L-tone on the root vowel.

I argue that the determining factor here is the relative unmarkedness of the affixal element with respect to the root element. As McCarthy and Prince (1995) observe, “roots are never unmarked relative to affixes” (364). This claim is confirmed by a number of findings, including the robust generalization that affixes have reduced segmental inventories, favoring unmarked segments such as coronal consonants (Broselow 1984) and unmarked vowels (Yip 1987). My view is that because of the inherent unmarkedness of the toneless affix, the L-tone, the unmarked tone in Margi, is preferably realized in the affix, rather than in the root — an instance of TETU.

I propose that this is formally expressed by imposing gradient violability on the markedness constraint T/L, which demands that a tone be the unmarked L-tone.[79] I argue that realizing a L-tone in the affix is preferable compared to realizing the L-tone in the root. Thus, the tableau in (102), partially repeated here as (103), actually selects candidate (103a) over candidate (103b).

(103) Margi polarity (toneless roots)

/a-sa/	HAVETONE (*L...L)$_{Stem}$ (*H...H)$_{Stem}$	T/L
a. ☞ à-sá		[L] in affix
b. á-sà		[L] in root!

As seen in (103), the relative unmarkedness of the affix distinguishes itself from the root in the evaluation of the markedness constraint T/L.[80] Below, I contrast this GOCP-based account with Pulleyblank's (1983, 1986) account.

Pulleyblank (1983, 1986) introduces the notion of extratonality to account for the polarity case we just looked at. According to Pulleyblank, the polarity affix *a-* has an underlying H-tone, but at the same time, it is marked as extratonal. The concept of extratonality is illustrated in (104). Here, the vowel has a lexically marked [+ex] (extratonal) and a floating H-tone.

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[79] Another possible strategy is to impose the ranking IDENT(L-tone)$_{Root}$ >> IDENT(L-tone)$_{Affix}$, which is consistent with the general ROOT-FAITH >> AFFIX-FAITH. We chose the markedness approach, as opposed to the faithfulness approach like this, in order to emphasize the TETU character in our analysis.

[80] The exact formulation of how the violation of T/L is calculated awaits further refinement, however.

(104) Underlying form of the polarity affix (Pulleyblank 1986: 206)

$$\left[\begin{array}{c} \text{a} \\ [+\text{ex}] \\ \text{H} \end{array}\right.$$

Aside from the various Lexical-phonological restrictions (see Pulleyblank 1986 for details), Pulleyblank's argument is that because the affix is marked as extratonal, when it attaches to the toneless root, the floating H-tone associates to the root vowel, rather than the affix vowel. Then the default L-tone in the affix is filled in by the default rule. This derivation is illustrated below in (105).

(105) Derivation (Pulleyblank 1986: 207)

$$\left[\left[\begin{array}{c} \text{a} \\ [+\text{ex}] \\ \text{H} \end{array}\right. \quad \left[\begin{array}{c} \text{sa} \\ \\ \\ \end{array}\right]\right] \rightarrow \left[\left[\begin{array}{c} \text{a} \\ [+\text{ex}] \\ \text{H} \end{array}\right. \quad \left[\begin{array}{c} \text{sa} \\ \\ \\ \end{array}\right]\right] \rightarrow \quad \text{default Fill-in}$$

While this approach correctly derives the output, it involves a sophisticated mechanism which makes use of such devices as extratonality, underlying floating H-tone, and the default Fill-in of L-tone at the later stage.[81] The GOCP-based approach proposed here eliminates the complex derivational 'steps' which figure in Pulleyblank's (1983, 1986) analysis. I simply derive the pattern for the toneless case by the basic GOCP constraints needed for the cases with L/H-toned roots (97). The other constraints proposed (HAVETONE and T/L) are independently motivated to account for the default L-tone marking observed in toneless roots (101). Further, this TETU conception of the

[81] Not included are the various Lexical-phonological restrictions and the Peripherality Condition which designates the extratonal element to be peripheral (see Pulleyblank 1983, 1986 for details).

[L...H] pattern seen in the toneless roots follows naturally from the sound generalization that affixes are unmarked relative to roots.

In addition, Pulleyblank's (1983, 1986) analysis, which relies on the notion of extratonality and floating tone, cannot be extended to the polarity cases other than the tonal case. The GOCP-based approach, on the other hand, offers a coherent account of all of the polarity cases, not just the tonal ones (see section 2.6.1), since it does not depend on the tone-specific notions such as the extratonality, and the floating tone. Not only that, the GOCP approach formally unifies the polarity cases with the rest of the dissimilatory effects under OT.

Finally, while Pulleyblank's (1983, 1986) account characterizes the polarity effect of the toneless case as 'association' (see (105)), it begs a question concerning the essence of the polarity effect. An autosegmental characterization of polarity has to assume that only one of the features is present underlyingly, and that feature surfaces or deletes depending on the context with respect to the OCP. I claim that specifying (or unspecifying) the underlying feature of the polarity affixes obscures the fundamental property of these affixes: they want to be maximally distinct from the roots. The approach which employs underspecification and default feature assignment does not express this bidirectional character of polarity, rather it is treated as a one-way phenomenon. On the contrary, the GOCP-based approach, based on the idea that the polarity effects are due to enhance the distinctiveness between the root and some affix, formally reflects the bidirectionality of polarity — perhaps the more intuitive characterization.

In summary, I have shown that the GOCP can be extended to cover polarity effects with no extra cost. The proposed view of polarity is consistent with the rest of the theory developed here. Under this model, polarity results from the opposing two GOCP constraint defined on the same dimension. In effect, this produces the bidirectional effect in which the two elements in question must be different. I have argued that the GOCP-approach accounts for various types of polarity without introducing some additional mechanism needed in the previous mono-directional approaches.

2.7 Summary

In this chapter, I presented a detailed discussion of the Generalized OCP. I have explored various issues concerning the proposal, including *elements*, *adjacency*, *domains*.

First, in section 2.2 I proposed that the argument of the GOCP constraint schema (*X…X) may be specified with one of the following elements {[F], Rt, PCat, GCat}. This is reminiscent of Generalized Alignment (see section 1.4.2), where the four arguments must be instantiated in order to make a particular constraint. I also considered the issue of the similarity effect, proposing that similarity is captured by the Local Conjunction of the relevant GOCP constraints (*Similarity-as-LC*).

Second, in section 2.3 I demonstrated how the GOCP accounts for various adjacency requirements. Under previous theories, these requirements were dealt with by brute force, stipulating each type of adjacency: Root, Syllable, and Unbounded (Odden 1994). Under the current theory, separate assumptions about adjacency are no longer necessary; rather, the adjacency is built into the constraint by the means of a universal sub-hierarchy of Proximity. Specifically, I argued that NVOG (‘No Voiced Obstruent Geminates’) in Japanese follows from the GOCP. I then discussed cases of ‘blocking’, proposing that the blocking is in fact another similarity effect, handled by Local Conjunction (*Intervention-as-Similarity*).[82]

[82] Together with ‘Similarity-as-LC’, by transitivity, we can say ‘Intervention-as-LC’.

Third, in section 2.4, I motivated the ‘domains’ which are sometimes required by the GOCP constraints. In particular, I proposed that the GOCP constraints may be domain-specified, such as the one used to account for Latin, (*[LIQ]~[LIQ] *&* *[lat]...[lat])$_{Stem}$. I further discussed cases involving morphological and phonological domains. The identified phonological domains are syllables and feet.

Finally, in section 2.5, I looked at the cases of polarity, and proposed that these cases fall under the GOCP. Having two opposing GOCP constraints for a particular feature achieves the bidirectional effect in which the two elements in question must differ on their values for the feature. This was contrasted with the previous mono-directional approaches (e.g. Pulleyblank 1983, 1986) in which mono-directional rules were supplemented with underspecification. I argued that the present approach captures the bidirectional nature of polarity, without requiring any representational maneuver.

An appendix follows, presenting the results of the survey I have conducted, followed by Chapter 3, which gives a case study of the phenomenon dissimilative jakan’e, observed in Southern Russian dialects.

APPENDIX A: THE SURVEY

The results of my survey are summarized below. A total of 57 language cases is examined in this thesis. The results are organized by the features which undergo dissimilation. For each case, the following information is given: 1) Language name; 2) References; 3) Input forms (I); 4) Output forms (O); 5) Adjacency relation between the trigger and the target (ADJ.); and 6) Domain of dissimilation (DOM.). Input and Output (I/O) can be specified as having a Morpheme Structure Constraint (MSC), which indicates that some identity avoidance condition is enforced regardless of the input forms, or they can be specified as a case of polarity.

A. Consonantal Dissimilation

Place features

[PLACE]

1. **Arabic** .... Greenberg (1950), McCarthy (1979, 1981), Mester (1986), Padgett (1991), Yip (1989)

   I/O=MSC (*PLACE…PLACE), **ADJ**=∞, **DOM**=M

2. **Cambodian** .... Yip (1989)

   I/O=MSC (*PLACE…PLACE), **ADJ**=∞, **DOM**=M

3. **Javanese** .... Mester (1986), Padgett (1991), Uhlenbeck (1949)

   I/O=MSC (*PLACE…PLACE), **ADJ**=∞, **DOM**=M

4. **Russian** .... Padgett (1991)

   I/O=MSC (*PLACE…PLACE), **ADJ**=∞, **DOM**=M

5. **Yucatec Mayan** .... Yip (1989), Lombardi (1991)

   I/O=MSC (*PLACE…PLACE), **ADJ**=∞, **DOM**=M

[labial]

6\. **Akkadian** .... Hume (1992), McCarthy (1979), Odden (1994), von Soden (1969), Yip (1988)

I=/m…LAB/, **O**=[n…LAB], **ADJ**=∞, **DOM**=M

7\. **Tashlhiyt Berber** .... Boukous (1987), Elmedlaoui (1985, 1992 [1995]), Jebbour (1985, 1987), Larsi (1991), Odden (1994), Selkirk (1988, 1993)

a.	**I**=/LAB…w/, **O**=[LAB…DOR], **ADJ**=Rt, **DOM**=M
b.	**I**=/m…LAB/, **O**=[n…COR], **ADJ**=∞, **DOM**=M
c.	**I**=/u…w/, **O**=[u…DOR], **ADJ**=∞, **DOM**=M

8\. **Cantonese** .... Yip (1982, 1988)

a.	**I/O**=MSC (*LAB…LAB), **ADJ**=σ, **DOM**=M
b.	**I**=/LAB…LAB/, **O**=[LAB…COR], **ADJ**=σ, **DOM**=M

9\. **Palauan** .... Finer (1986), Josephs (1975, 1990)

a.	**I**=/m…LAB/, **O**=[o…LAB], **ADJ**=Rt, **DOM**=M
b.	**I**=/m…LAB/, **O**=[u…LAB], **ADJ**=∞, **DOM**=M

10\. **Ponapean** .... Rehg & Sohl (1981), Goodman (1995)

I/O=MSC (*LAB…LAB), **ADJ**=∞, **DOM**=M

11\. **Yao** .... Ohala (1981), Purnell (1965)

I/O=MSC (*LAB…LAB), **ADJ**=∞, **DOM**=M

12\. **Zulu** .... Doke (1926)

I/O=MSC (*LAB…LAB), **ADJ**=∞, **DOM**=M

[coronal]

13\. **Akan** .... McCarthy and Prince (1995), Welmers (1946)

I/O=MSC (*COR…COR), **ADJ**=∞, **DOM**=M

14\. **Dakota** .... Hong (1990), Shaw (1980, 1985)

I=/COR…COR/, **O**=[DOR…COR], **ADJ**=Rt, **DOM**=M

[pharyngeal]

15\. **Moses-Columbia Salish**...... Bessel & C-Higgins (1992), Czaykowska-Higgins (1993)

I/O=MSC (*PHAR…PHAR), **ADJ**=∞, **DOM**=M

Liquid features

[LIQUID]

16. **Javanese** .... Mester (1988), Uhlenbeck (1949)

    I/O=MSC (*LIQ…LIQ), **ADJ**=∞, **DOM**=M

[lateral]

17. **Kuman** .... Trefry (1969), Walsh-Dicky (1997)

    I=/l…l/, **O**=[r…l], **ADJ**=∞, **DOM**=M

18. **Latin** .... Johnson (1973), Kent (1945), Odden (1994), Posner (1961), Steriade (1987, 1995), Walsh-Dicky (1997)

    I=/l…l/, **O**=[l…r], **ADJ**=∞, **DOM**=M

19. **Yidiɲ** .... Crowhurst and Hewitt (1993), Dixon (1977), Steriade (1995), Walsh-Dicky (1997)

    I=/l…l/, **O**=[r…l], **ADJ**=∞, **DOM**=M

20. **Yimas** .... Foley (1991), Odden (1994), Walsh-Dicky (1997)

    I=/r…r/, **O**=[r…t], **ADJ**=∞, **DOM**=M

[rhotic] ([retroflex])

21. **Ainu** .... Maddieson (1984), Shibatani (1990)

    I=/r…r/, **O**=[n…r], **ADJ**=Rt, **DOM**=M

22. **Georgian** .... Fallon (1993), Odden (1994)

    I=/r…r/, **O**=[r…l], **ADJ**=∞, **DOM**=M

23. **Modern Greek** .... Newton (1972), Walsh-Dicky (1997)

    I=/r…r/, **O**=[l…r], **ADJ**=∞, **DOM**=M

24. **Sundanese** .... Cohn (1992), Holton (1995)

    I=/r…r/, **O**=[l…r], **ADJ**=∞, **DOM**=M

25. **Yindjibarndi** .... Wordick (1982)

    I=/r…r/, **O**=[r…ɹ], **ADJ**=∞, **DOM**=M

Laryngeal features

[voice]

26. **Bantu languages (Kikuyu, Kukuria, etc) (Dahl's Law)** .... Bennett (1957), Davy and Nurse (1982), Lombardi (1995), Odden (1994)

    I=/$C_{[-voi]}$...$C_{[-voi]}$/, **O**=[$C_{[+voi]}$...$C_{[-voi]}$], **ADJ**=σ, **DOM**=M

27. **Gothic (Thurneysen's Law)** .... Chomsky and Halle (1968)

    I=/$C_{[voi]}$...$C_{[cont,\ voi]}$/, **O**=[$C_{[voi]}$...$C_{[cont,\ -voi]}$], **ADJ**=σ, **DOM**=M

28. **Japanese (Lyman's Law)** ... Alderete (1996, 1997), Archangeli and Pulleyblank (1994a), Ishihara (1991), Itô and Mester (1986, 1996a,b), Itô, Mester and Padgett (1995), Pater (1995), Steriade (1987, 1995)

    I/O=MSC (*[voi]…[voi]), **ADJ**=∞, **DOM**=M

[spread glottis]

29. **Sanskrit (Grassmann's Law)** .... Borowsky and Mester (1983), Kaye & Lowenstamm (1985), Langendoen (1966), Lombardi (1991), Phelps (1975), Phelps and Brame (1973), Sag (1974, 1976), Schindler (1976)

    I/O=MSC (*[s.g]…[s.g]), **ADJ**=∞, **DOM**=M

[constricted glottis]

30. **Seri** .... Marlett and Stemberger (1983), Yip (1988)

    I=/[c.g]…[c.g.]/, **O**=[ø…[c.g.]], **ADJ**=N/A, **DOM**=σ

Nasal feature

[nasal]

31. **Chukchi** .... Odden (1987)

    I=/[nas]…[nas]/, **O**=[[nas]…[-nas]], **ADJ**=∞, **DOM**=M

NC cluster

32. **Gooniyandi** .... Evans (1995), McGregor (1990), Odden (1994)

    I=/NC…NC/, **O**=[NC…C], **ADJ**=σ, **DOM**=M

33. **Gurindji** .... Evans (1995), McConvell (1988, 1993), Odden (1994)

    I=/NC…NC/, **O**=[NC…C], **ADJ**=∞, **DOM**=M

34. **Yinjibarndi** .... Odden (1994), Wordick (1982)

    I=/NC…NC/, **O**=[NC…C], **ADJ**=∞, **DOM**=M

Stricture feature

[continuant]

35. **Modern Greek** .... Kaisse (1988)

I=/[cont]…[cont]/, **O**=[[cont]…[-cont]], **ADJ**=Rt, **DOM**=M

36. **Northern Greek** .... Newton (1971)

I=/s…s/, **O**=[ø…s], **ADJ**=Rt, **DOM**=M

B. Vowel Dissimilation

[high]

37. **Guere** .... Paradis & Prunet (1989)

I=/-hi]…[-hi]/, **O**=[[+hi]…[-hi]], **ADJ**=Rt, **DOM**=M

38. **Ngbaka** .... Chomsky and Halle (1968), Mester (1986)

I/O=MSC (*HI…HI for back vowels), **ADJ**=σ, **DOM**=M

[low]

39. **Arusa** .... Alderete (1996), Levergood (1987)

I=/[mid]…[lo]/, **O**=[[hi]…[lo]], **ADJ**=Rt, **DOM**=*f*

40. **Kera** .... Ebert (1974), Kenstowicz and Kisseberth (1979)

I=/a…a/, **O**=[ə…a], **ADJ**=C, **DOM**=M

41. **Marshallese** .... Bender (1968a,b), Kenstowicz and Kisseberth (1977)

I=/a…a/, **O**=[e…a], **ADJ**=σ, **DOM**=*f*

42. **Woleaian**.............................. Howard (1972), Odden (1987), Poser (1982), Sohn (1975), Sohn and Tawerilmang (1976)

I=/a…a/, **O**=[e…a], **ADJ**=σ, **DOM**=*f*

[back]

43. **Ainu** .... Archangeli and Pulleyblank (1994a), Ito (1984), Mester (1986)

I/O=MSC (*BK…BK for high vowels), **ADJ**=σ, **DOM**=M

44. **Tzeltal** .... Ito (1984), Slocum (1948)

I/O=MSC (*BK…BK for high vowels), **ADJ**=σ, **DOM**=M

C. Length Dissimilation

45. **Finnish** .... Anderson (1974), Alderete (1996), Keyser and Kiparsky (1984)

    I=/CCVC/, **O**=[CVC], **ADJ**=σ, **DOM**=*f*

46. **Gidabal** .... Anderson (1974), Geytenbeek and Geytenbeek (1971), Howard (1972)

    I=/VV…VV/, **O**=[VV…V], **ADJ**=σ, **DOM**=*f*

47. **Japanese** .... Ito and Mester (1996), Iwai (1989), Wade (1996)

    I/O=MSC (*CC…CC), **ADJ**=∞, **DOM**=*f*

48. **Latin (Lex Mamilla)** .... Ito and Mester (1996), Leumann (1977), Sihler (1995)

    I=/CC…CC/, **O**=[C…CC], **ADJ**=σ, **DOM**=*f*

49. **Oromo** .... Alderete (1996), Gragg (1976), Lloret-Romanyach (1988, 1991)

    I=/VV…VV/, **O**=[VV…V], **ADJ**=σ, **DOM**=*f*

50. **Slovak (Rhythmic Law)** ..... Howard (1972), Kenstowicz (1972), Kenstowicz and Kisseberth (1977, 1979)

    I=/VV…VV/, **O**=[VV…V], **ADJ**=σ, **DOM**=*f*

D. Tonal Dissimilation

[H]

51. **Arusa** .... Levergood (1987), Odden (1994)

    I=/H…H/, **O**=[H…L], **ADJ**=∞, **DOM**=M

52. **Bantu languages (Makonde, Kihehe, etc.) (Meeussen's Rule)** .... Goldsmith (1984), Odden (1994)

    I=/H…H/, **O**=[H…L], **ADJ**=Rt, σ, **DOM**=M

[L]

53. **Peñoles Mixtec** .... Daly (1993), Odden (1994)

    I=/L…L/, **O**=[L…M], **ADJ**=∞, **DOM**=M

E. Polarity Cases

Vowel Height

54. **Southern Russian dialects(dissimilative jakan'e)** .... Davis (1970), Halle (1965), Kuznecov (1973), Kenstowicz and Kisseberth (1979)

I/O=Polarity, **ADJ**=σ, **DOM**=*f*

Vowel Length

55. **Dinka** .... Anderson (1974), Gleason (1955), Kenstowicz and Kisseberth (1979), Malou (1988)

I/O=Polarity, **ADJ**=N/A, **DOM**=M

Voice

56. **Huamelultec Chontal** .... Kenstowicz and Kisseberth (1979), Waterhouse (1949, 1962)

I/O=Polarity, **ADJ**=Rt, **DOM**=M

Tone

57. **Margi** .... Hoffmann (1963), Pulleyblank (1983, 1986)

I/O=Polarity, **ADJ**=σ, **DOM**=M

CHAPTER 3: THE DISSIMILATIVE JAKAN'E: A CASE STUDY[*]

3.1 Introduction

In this chapter, the theory of Generalized OCP developed in the preceding chapters will be applied to the case of dissimilative jakan'e (диссимилятивное яканье), observed in South Great Russian dialects.[83] Dissimilative jakan'e, extensively documented in Kuznecov (1973), refers to the dissimilative pronunciation of non-high vowels as either high [i] or low [a] in the environment after a palatalized consonant, before a stressed vowel (schematically described as C'__C_0V́).

There are two notable characteristics of the dissimilative jakan'e phenomenon which are problematic for the traditional OCP. First, it is a case of non-identical dissimilation in which dissimilation occurs even though there is no identical feature specification to be avoided. As pointed out in section 1.3.2.3, dissimilative jakan'e cannot be characterized in terms of identity avoidance, but must be characterized as a case in which the difference between the two elements is maximized. Cases like this pose a significant problem for the traditional OCP, or any other approaches which are only capable of characterizing dissimilation as the avoidance of some identical feature specification.

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[*] I owe special thanks to Mike Hammond for pushing me to look at this case for years, and for helping me with translating Kuznecov's (1973) book which is written in Russian.

[83] The South Great Russian is the area which includes Smolensk, Kaluga, Bjansk, Velikoluksk, Orel, Lipetsk, Kursk, Voronež, Zadonsk, and Belgorod.

Furthermore, the triggering feature(s) of the dissimilation vary among the seven dialect groups: Don, Obojansk, Dmitrievsk, Žizdra, Ščigrovsk, Sudžansk, and Mosal'sk.[84] In order to account for the variation, the traditional OCP approach would have to posit a separate constraint for each group (such as OCP[high], OCP[low], etc.). In such an account, there is no theoretical coherence to the entire dissimilative jakan'e phenomenon, and the relationships between these dialects are obscured. A successful analysis of this phenomenon rests upon the characterization of the above two properties.

I will show in this chapter that the GOCP-based analysis of dissimilative jakan'e does not suffer from the deficiencies of the traditional OCP. Moreover, as OT leads us to expect, the variation among the dissimilative jakan'e dialects follows from the reranking of constraints, and thus the core constraints for the phenomenon are the same in each case.

The rest of the chapter is organized as follows. In section 3.2, I examine the phenomenon of dissimilative jakan'e, and the variation between the dialect groups. In section 3.3, I provide an analysis of the phenomenon, demonstrating that the two characteristics noted above do not arise under the proposed approach. Finally, section 3.4 concludes the chapter.

3.2 Dissimilative jakan'e (диссимилятивное яканье)

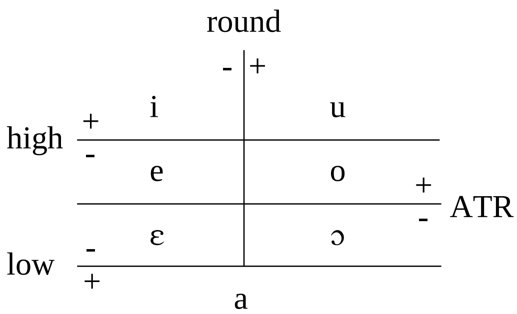
In this section, I examine the patterns of dissimilative jakan'e, described by Kuznecov (1973). Following Davis (1970), I assume that these dialect groups have the seven-vowel system, as depicted below in (1).[85]

---

[84] Davis (1970) discusses one other dialect group, Zadonsk, in which all pretonic nonhigh vowels surface uniformly as a mid [e] (after a palatalized consonant). Since this case is not discussed in Kuznecov (1973), it will not be included in the discussion below.

[85] Departing from Davis (1970), however, I use [ATR] to distinguish ([e], [o]) from ([ɛ], [ɔ]), instead of the feature [tense].

(1) Vowel system



As briefly mentioned in the previous section, dissimilative jakan’e is the name for the dissimilative behavior of pretonic non-high vowels after a palatalized consonant.[86] The schematic illustration of the environment is repeated below in (2), where C’ is a palatalized consonant and V́ is a stressed vowel.

(2) Environment for dissimilative jakan’e

C’ __ C_0 V́

In this environment, an underlying non-high vowel surfaces either as high [i] or low [a], depending on the quality of the following stressed vowel. If the stressed vowel is a high vowel ([i], [u]) (underlined), the pretonic vowel is [a] (bolded), as in (3a,b,c,d): If the stressed vowel is a low vowel [a] (underlined), the pretonic vowel is [i] (bolded), as in (3e,f).

---

[86] According to Kuznecov’s (1973) description, the dissimilative jakan’e phenomenon has a further variation depending on whether the consonant preceding the stressed vowel is palatalized or not ((C’__C’V́) or (C’__CV)). However, in accordance with the observation made in Halle (1965), Davis (1970), and Kenstowicz and Kisseberth (1979), I will not consider these cases here. Also excluded is the phenomenon of diphthongization found in Davis (1970) and Kenstowicz and Kisseberth (1979), which will obscure the point being made here.

(3) Dissimilation of nonhigh vowels before high and low vowels

a.	/r’ek’í/	r’**a**k’í̱	‘rivers’
b.	/n’es’í/	n’**a**s’í̱	‘carry!’
c.	/v’al’ú/	v’**a**l’ú̱	‘I order’
d.	/c’em’yú/	c’**a**m’yú̱	‘seven (INSTRUMENTAL)’
e.	/gl’ad’át/	gl’**i**d’á̱t	‘they see’
f.	/d’es’átka/	d’**i**s’á̱tka	‘tenfold’

The data in (3) show that dissimilative jakan’e is a polarity effect. That is, the dissimilation is going both directions (from non-high to low when followed by high, and from non-high to high when followed by low). Underlying high vowels do not undergo dissimilative jakan’e.[87]

The seven dialect groups (Don, Obojansk, Dmitrievsk, Žizdra, Ščigrovsk, Sudžansk, and Mosal’sk) differ among themselves in what happens when the pretonic non-high vowels are followed by the mid vowels ([e], [o], [ɛ], [ɔ]). Below, I take a closer look at each of the seven dialect groups. The difference between these groups are exemplified by contrasting the surface quality of the pretonic vowel in the following underlying forms in (4), where the stressed vowels are mid vowels (underlined). Depending on the dialect group, the underlying /ɛ/ surfaces either as [i] or [a].

(4)

a.	/v’ɛl’é̱t’/	v’[**i**/**a**]l’é̱t’	‘to command’
b.	/s’ɛló̱/	s’[**i**/**a**]ló̱	‘village’
c.	/t’ɛp’ɛ̱́r’/	t’[**i**/**a**]p’ɛ̱́r’	‘now’
d.	/s’ɛlɔ̱́m/	s’[**i**/**a**]lɔ̱́m	‘village (INSTRUMENTAL)’

[87] The sources I have looked at do not give examples of such cases (Halle 1965, Davis 1970, Kuznecov 1973). Since all agree on the fact that only underlying nonhigh vowels are subject to dissimilative jakan’e, I assume that underlying high vowels do not undergo dissimilation without giving actual examples.

3.2.1 Don Subtype (Донское яканье)

In the Don subtype, when the stressed vowel is a high vowel, the pretonic vowel surfaces as [a], as shown in (5a,b) (Kuznecov 1973: 58). When the stressed vowel is a non-high vowel, [i] surfaces, as in (5c,d,e,f,g).

(5) Don Subtype pattern

a.	/r’ek’í/	r’**a**k’í	‘rivers’
b.	/v’al’ú/	v’**a**l’ú	‘I order’
c.	/v’ɛl’ét’/	v’**i**l’ét’	‘to command’
d.	/s’ɛló/	s’**i**ló	‘village’
e.	/t’ɛp’ɛ́r’/	t’**i**p’ɛ́r’	‘now’
f.	/s’ɛlɔ́m/	s’**i**lɔ́m	‘village (instrumental)’
g.	/gl’ad’át/	gl’**i**d’át	‘they see’

The pattern observed in the Don subtype can be illustrated as in (6). Following Davis (1970), I use two boxes to indicate the groupings of the stressed vowels as to whether the group induces dissimilation to [a] or [i].

(6) Dissimilative jakan’e in the Don subtype

e, ε, a → ***a*** / __	i	u
	e	o
e, ε, a → ***i*** / __	ε	ɔ
	a	

As shown above in (6), the division is between high vowels and non-high vowels: in featural terms, dissimilation to [a] results when the stressed vowel is [+high], while dissimilation to [i] results when the stressed vowel is [-high].

3.2.2 Obojansk Subtype (Обоянское яканье)

The second dialect group is the Obojansk subtype (Kuznecov 1973: 57). In the Obojansk subtype, when the stressed vowel is either a high or a ATR mid vowel, the pretonic vowel surfaces as [a], as shown in (7a,b,c,d). When the stressed vowel is a low vowel, [i] surfaces, as in (7e,f,g).

(7) Obojansk Subtype pattern

a.	/r’ek’í/	r’**a**k’í	‘rivers’
b.	/v’al’ú/	v’**a**l’ú	‘I order’
c.	/v’ɛl’ét’/	v’**a**l’ét’	‘to command’
d.	/s’ɛló/	s’**a**ló	‘village’
e.	/t’ɛp’ɛ́r’/	t’**i**p’ɛ́r’	‘now’
f.	/s’ɛlɔ́m/	s’**i**lɔ́m	‘village (instrumental)’
g.	/gl’ad’át/	gl’**i**d’át	‘they see’

This Obojansk pattern can be illustrated as in (8).

(8) Dissimilative jakan’e in the Obojansk subtype

$$e, \varepsilon, a \rightarrow \boldsymbol{a} \;/\; \_\_ \boxed{\begin{matrix} i & & u \\ e & & o \end{matrix}}$$

$$e, \varepsilon, a \rightarrow \boldsymbol{i} \;/\; \_\_ \boxed{\begin{matrix} \varepsilon & & ɔ \\ & a & \end{matrix}}$$

As illustrated in (8), the division is between ATR vowels and non-ATR vowels: in featural terms, dissimilation to [a] results, when the stressed vowel is [+high] or [+ATR] ([+ATR] is redundant for [+high] vowels), while dissimilation to [i] results, when the stressed vowel is [+low] or [-ATR] ([-ATR] is redundant for [+low] vowels).

3.2.3 Dmitrievsk Subtype (Дмитриевское яканье)

The third dialect group to look at is the Dmitrievsk subtype (Kuznecov 1973: 57-58). In this subtype, when the stressed vowel is either a high or a ATR mid round vowel, the pretonic vowel surfaces as [a], as shown in (9a,b,d,), otherwise it surfaces as [i], as in (9c,e,f,g).

(9) Dmitrievsk Subtype pattern

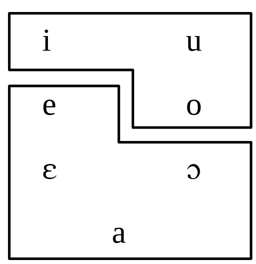
a.	/r’ek’í/	r’**a**k’<u>í</u>	‘rivers’
b.	/v’al’ú/	v’**a**l’<u>ú</u>	‘I order’
c.	/v’ɛl’ét’/	v’**i**l’<u>é</u>t’	‘to command’
d.	/s’ɛló/	s’**a**l<u>ó</u>	‘village’
e.	/t’ɛp’ɛ́r’/	t’**i**p’<u>ɛ́</u>r’	‘now’
f.	/s’ɛlɔ́m/	s’**i**l<u>ɔ́</u>m	‘village (instrumental)’
g.	/gl’ad’át/	gl’**i**d’<u>á</u>t	‘they see’

This pattern can be illustrated as follows.

(10) Dissimilative jakan’e in the Dmitrievsk subtype

e, ɛ, a → ***a*** / __

e, ɛ, a → ***i*** / __



As shown in (10), the class of stressed vowels which induce dissimilation to [a] includes high and ATR mid round vowels ([i], [u], [o]), whereas the other vowels ([e], [ɛ], [ɔ], [a]) trigger dissimilation to [i]: in featural terms, dissimilation to [a] results when the stressed vowel is either [+high] or [+ATR, +round], while dissimilation to [i] results when the stressed vowel is either [-high, +ATR, +round] or [-ATR].

3.2.4 Žizdra Subtype (Жиздринское яканье)

The fourth dialect group is the Žizdra subtype (Kuznecov 1973: 54-55). In this subtype, when the stressed vowel is a nonlow vowel, the pretonic vowel surfaces as [a], as in (11a,b,c,d,e,f). When the stressed vowel is a low vowel, [i] surfaces, as in (11g).

(11) Žizdra Subtype pattern

a.	/r’ek’í/	r’**a**k’í	‘rivers’
b.	/v’al’ú/	v’**al**’ú	‘I order’
c.	/v’ɛl’ét’/	v’**al**’ét’	‘to command’
d.	/s’ɛló/	s’**al**ó	‘village’
e.	/t’ɛp’ɛ́r’/	t’**a**p’ɛ́r’	‘now’
f.	/s’ɛlɔ́m/	s’**al**ɔ́m	‘village (instrumental)’
g.	/gl’ad’át/	gl’**i**d’át	‘they see’

This pattern can be illustrated as in (12).

(12) Dissimilative jakan’e in the Žizdra subtype

		i	u
e, ɛ, a → ***a***	/ __	e	o
		ɛ	ɔ
e, ɛ, a → ***i***	/ __	a	

As shown above in (12), the division is between low vowels and nonlow vowels: in featural terms, dissimilation to [a] results when the stressed vowel is [-low], while dissimilation to [i] results when the stressed vowel is [+low].

3.2.5 Ščigrovsk Subtype (Щигровское яканье)

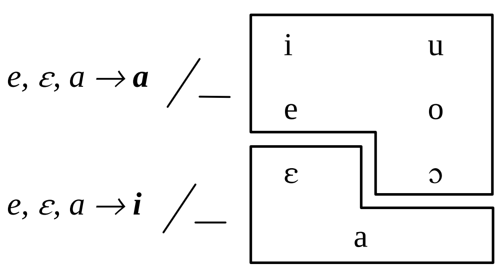
The fifth dialect group to look at is the Ščigrovsk subtype (Kuznecov 1973: 56-57). In the Ščigrovsk subtype, when the stressed vowel is either an ATR vowel or a non-ATR round vowel ([i], [u], [e], [o], [ɔ]), the pretonic vowel surfaces as [a], as shown in (13a,b,c,d,f). When the stressed vowel is either a low vowel or a non-ATR unround vowel ([a], [ɛ]), the pretonic vowel surfaces as [i], as in (13e,g).

(13) Ščigrovsk Subtype pattern

a.	/r’ek’í/	r’**a**k’<u>í</u>	‘rivers’
b.	/v’al’ú/	v’**a**l’<u>ú</u>	‘I order’
c.	/v’ɛl’ét’/	v’**a**l’<u>é</u>t’	‘to command’
d.	/s’ɛló/	s’**a**l<u>ó</u>	‘village’
e.	/t’ɛp’ɛ́r’/	t’**i**p’<u>ɛ́</u>r’	‘now’
f.	/s’ɛlɔ́m/	s’**a**l<u>ɔ́</u>m	‘village (instrumental)’
g.	/gl’ad’át/	gl’**i**d’<u>á</u>t	‘they see’

This pattern can be illustrated as in (14).

(14) Dissimilative jakan’e in the Ščigrovsk subtype



As shown in (14), the class of stressed vowels which induce dissimilation to [a] are [+ATR] vowels and [-ATR, +round] vowel, while the vowels that trigger dissimilation to [i] are [+low] and [-ATR, -round] vowels.

3.2.6 **Sudžansk Subtype (Суджанское яканье)**

The sixth dialect group is the Sudžansk subtype (Kuznecov 1973: 55). In this subtype, when the stressed vowel is either a high vowel or a round vowel ([i], [u], [o], [ɔ]), the pretonic vowel surfaces as [a], as shown in (15a,b,d,f). When the stressed vowel is either a low vowel or a non-high unround vowels ([e], [ɛ], [a]), the pretonic vowel surfaces as [i], as in (15c,e,g).

(15) Sudžansk subtype pattern

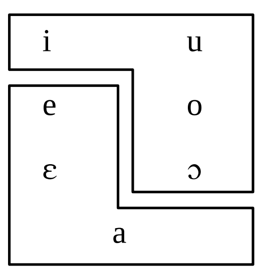
a.	/r’ek’í/	r’**a**k’í̲	‘rivers’
b.	/v’al’ú/	v’**a**l’ú̲	‘I order’
c.	/v’ɛl’ét’/	v’**i**l’é̲t’	‘to command’
d.	/s’ɛló/	s’**a**ló̲	‘village’
e.	/t’ɛp’ɛ́r’/	t’**i**p’ɛ̲́r’	‘now’
f.	/s’ɛlɔ́m/	s’**a**lɔ̲́m	‘village (instrumental)’
g.	/gl’ad’át/	gl’**i**d’á̲t	‘they see’

This pattern can be illustrated as in (16).

(16) Dissimilative jakan’e in the Sudžansk subtype

e, ɛ, a → ***a*** / __

e, ɛ, a → ***i*** / __



As illustrated in (16), the class of stressed vowels which induce dissimilation to [a] includes high and round vowels ([i], [u], [o], [ɔ]), while low and non-high unround vowels ([e], [ɛ], [a]) induce dissimilation to [i]: in featural terms, dissimilation to [a] results when the stressed vowel is either [+high] or [+round], while dissimilation to [i] results when the stressed vowel is [-high, -round] ([a] is treated as [-round] here).

3.2.7 Mosal'sk Subtype (Мосальское яканье)

The last (seventh) dialect group is the Mosal'sk subtype (Kuznecov 1973: 56). This subtype is identical to the Sudžansk subtype, so the pattern depicted in (16) applies.[88] Here, too, dissimilation to [a] results when the stressed vowel is either [+high] or [+round], while dissimilation to [i] results when the stressed vowel is [-high, -round] ([a] = [-round]).

3.2.8 Data Summary

To summarize so far, dissimilative jakan'e is a case of polarity, where dissimilation goes in both directions: a pretonic non-high vowel surfaces as [a] when followed by *higher* vowels, or as [i] when followed by *lower* vowels. The seven dialects (six patterns) differ in the location of the cut-off point which distinguishes which vowels group with high vowels vs. low vowels. This is summarized below in (17).

(17) Summary

a. ***Symmetric Subtypes*:**

i. *Don subtype*

i	u
e	o
ɛ	ɔ
a	

ii. *Obojansk subtype*

i	u
e	o
ɛ	ɔ
a	

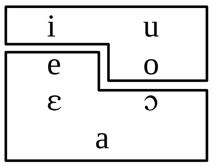
iii. *Žizdra subtype*

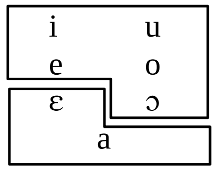
i	u
e	o
ɛ	ɔ
a	

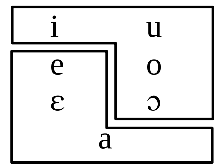
[88] Davis (1970) distinguishes the Mosal'sk subtype from the Sudžansk subtype, based on the "[+round] manifestation" (p. 363) of an underlying /ɛ/. Since such a distinction is not made in Kuznecov (1973), I will treat the Mosal'sk subtype as an identical case to the Sudžansk subtype.

b. ***Asymmetric Subtypes*****:**

i. *Dmitrievsk subtype* **ii.** *Ščigrovsk subtype* **iii.** *Sudžansk subtype*

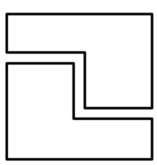






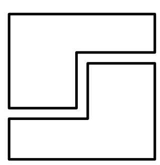
The illustrations above clearly show the cut-off lines in the six patterns generated by the seven dialect groups (the Mosal’sk subtype has the same pattern as the Sudžansk subtype (17b-iii)). The *symmetric* subtypes are the ones in which the only determining factor is the height dimension of the stressed vowel. The *asymmetric* subtypes are cases where not just the height dimension, but also the roundness dimension comes into play: the Dmitrievsk subtype (17b-i), the Ščigrovsk subtype (17b-ii), and the Sudžansk subtype (17b-iii). In these cases, the pattern is consistent in the way that the round vowels are more likely to group with the higher vowel group. Thus, schematically, the pattern is always of the form (18a), not of the form (18b).

(18) **a.**



b.

*



The contrast between (18a) and (18b) suggests that round vowels tend to pattern with high vowels. This is not surprising, since it has been pointed out that there is a close connection between the features [round] and [high] (Hong 1994). Hong (1994) observes that the sympathetic feature combination of [+round] and [+high] plays a crucial role in many cases of parasitic harmony. Based on Grounding Theory (Archangeli and

Pulleyblank 1994a), Hong (1994: 68) formulates various grounded conditions which express the sympathetic relation between roundness and higher tongue body, as in (19).

(19) **a.** **RD/HI**
If [+round], then [+high]: If [+round], then not [-high].

b. **HI/RD**
If [+high], then [+round]: If [+high], then not [-round].

c. **RD/LO**
If [+round], then [-low]: If [+round], then not [+low].

d. **LO/RD**
If [+low], then [-round]: If [+low], then not [+round].

e. **NONHI/RD**
If [-high], then [-round]: If [-high], then not [+round].

In my analysis, I will utilize the grounded conditions in (19) for the cases in which roundness becomes relevant.[89]

3.3 The Analysis

In this section, I turn to the GOCP analysis of the dissimilative jakan'e patterns described in the preceding sections. In section 3.3.1, I first outline my core proposal. In the remaining sections I provide an analysis for each of the dialect subtypes.

3.3.1 Core Proposal

My analysis of the dissimilative jakan'e phenomenon capitalizes on its three crucial characteristics: 1) it is a polarity effect; 2) it is a case of non-identical

[89] Odden's review of Archangeli and Pulleyblank (1994a) in *Language* states that Grounding is irrelevant in OT. However, this analysis shows that to the contrary, Grounding is highly relevant.

dissimilation (i.e. ‘maximization of difference’); and 3) it is bounded by a stress foot. Below, I consider how each of these characteristics are accounted for under the current approach.

3.3.1.1 **Polarity effect**

First, the fact that dissimilative jakan’e is a polarity effect prompts my basic strategy for polarity effects laid out in section 2.6. There, I have proposed that two opposing GOCP constraints are defined in the same dimension. Building on this proposal, I argue that the general pattern of dissimilative jakan’e can be derived by the two opposing GOCP constraints on the vowel height dimension.

If the language in question has a two-height system, say high and non-high, the following two constraints are relevant to characterize the polarity effect.

(20) **a. *[+hi]...[+hi]**
A sequence of two [+high] segments are prohibited.

b. *[-hi]...[-hi]
A sequence of two [-high] segments are prohibited.

In such a case, the above two constraints account for the polarity effect, as exemplified in the tableau below in (21).

(21) Polarity in the two-height system

/i…i/	*[+hi]...[+hi]	*[-hi]...[-hi]	FAITH
a. ☞ a…i			*
b. i…i	*!		
/a…a/	*[+hi]...[+hi]	*[-hi]...[-hi]	FAITH
c. ☞ i…a			*
d. a…a		*!	

In (21), the polarity effect is captured straightforwardly: in both tableaux, the loser is the one that violates either of the GOCP constraints. In my account of polarity, the two opposing GOCP constraints act as one *block* in a constraint hierarchy (i.e. they, as a block, can be ranked with other constraints). I refer this block of the two opposing constraints as ***[αhi]...[αhi]** for descriptive purposes.[90] In fact, cases such as Huamelultec Chontal voicing polarity (*[αvoi]...[αvoi]) and Dinka length polarity (*σ(q)...σ(q)) are of this type, where some dimension is split into two series.

Accounting for the dissimilative jakan'e dialects is, however, much more complicated than the above scenario, since vowel height is divided into four series. The features which are needed to distinguish four different height series include [+ATR], [-ATR], [+low], and [-low], in addition to [+high] and [-high]. I propose the GOCP constraints for each of these additional features.

[90] I emphasize that this is strictly descriptive device, and has no theoretical meaning to it (unlike the variable notation used in Chomsky and Halle (1968)). I use this notation to save space in the subsequent tableaux.

(22) **a.** ***[+A]...[+A]**

A sequence of two [+ATR] ([+A]) segments are prohibited.

b. ***[-A]...[-A]**

A sequence of two [-ATR] ([-A]) segments are prohibited.

c. ***[+lo]...[+lo]**

A sequence of two [+low] segments are prohibited.

d. ***[-lo]...[-lo]**

A sequence of two [-low] segments are prohibited.

Together with the ones in (20), constraints in (22) make up my core constraints for dissimilative jakan'e. The block comprised of (22a,b) is referred to as ***[αA]...[αA]**, and the block of (22c,d) as ***[αlo]...[αlo]**. Thus, the three constraint blocks proposed in this analysis are: *[αhi]...[αhi], *[αA]...[αA], and *[αlo]...[αlo].

In the next section, I discuss how these constraints derive the effect of 'maximization of difference', rather than the more standard 'identity avoidance'.

3.3.1.2 Maximization of difference

The four-way distinction of vowel height in the dissimilative jakan'e dialects poses a problem for the traditional OCP approach where dissimilation is characterized as 'identity avoidance'. This is because for the traditional OCP there must be a sequence of some feature [F] which must be avoided, and in dissimilative jakan'e dissimilation obtains even though there is no such feature [F] to be avoided. For instance in the word /r'ek'í/ → *r'**a**k'í* 'rivers', dissimilation occurs between the pretonic [-high] vowel and a stressed [+high] vowel (the same for all of the seven dialects). In such a case, the traditional OCP-based approach fails, since a sequence of a [-high] vowel and a [+high] vowel does not violate the traditional OCP: there are no identical feature specifications to be avoided. This tells us that dissimilative jakan’e cannot be simply characterized as ‘identity avoidance’.

I argue that the proper characterization of dissimilative jakan’e must be ‘maximization of difference’. In the preceding example, when the [-high] vowel is followed by the [+high] vowel, it surfaces as [+low] (/r’ek’í/ → **r’**e**k’í*, but *r’**a**k’í*). The difference in the height dimension is being maximized. In my account, this is captured by the coexisting three constraint blocks in the constraint hierarchy.

Let us consider the input /r’ek’í/. The following tableau shows what happens if we only have the block *[αhi]...[αhi].[91]

(23) Difference is *not* maximized!

/r’ek’í/	*[αhi]...[αhi] *[+hi]...[+hi]	*[-hi]...[-hi]	FAITH
a. ☞ r’**e**k’í			*
b. r’**i**k’í	*!		
c. ☞ r’**a**k’í			*

The result of having only the *[αhi]...[αhi] block is the indeterminacy between **r’**e**k’í* (23a) and *r’**a**k’í* (23c), as shown above. By the *[αhi]...[αhi] block alone, the ‘maximization of difference’ effect is not captured. This problem is resolved once all three constraint blocks (*[αhi]...[αhi], *[αA]...[αA], and *[αlo]...[αlo]) are evaluated simultaneously, as shown in (24).[92]

[91] Since the stressed vowel is never altered, I assume for the moment that a faithfulness constraint for stressed vowels is ranked at the top of the hierarchy. I do not consider candidates which violate such a constraint hereafter.

[92] In order to save some space, hereafter I will write only the relevant feature specifications to represent each of the components constraints of the constraint blocks (e.g. [+hi] for *[+hi]...[+hi]).

(24) Difference *is* maximized!

/r'ek'í/	*[αhi]...[αhi] [+hi]	[-hi]	*[αA]...[αA] [+A]	[-A]	*[αlo]...[αlo] [+lo]	[-lo]
a. r'**e**k'í			*!			*
b. r'**i**k'í	*!		*			*
c. ☞ r'**a**k'í						
d. r'**ɛ**k'í						*!

The 'maximization of difference' effect is captured by having all the three constraint blocks, as shown in (24). In (24), the three blocks need not be crucially ranked with respect to each other. However, it will be demonstrated that the reranking of these three blocks accounts for the variation between the Don, Obojansk, and Žizdra subtype.

3.3.1.3 Foot domain

The third character to be considered is the fact that dissimilation occurs within the domain of a foot. What is striking about the pattern of dissimilative jakan'e is that the dissimilation obtains not between any two adjacent vowels, but it takes place only between two adjacent vowels when the second of the two is stressed, as in [r'ak'í], for example. This pattern can be captured by making the relevant GOCP constraints domain-specified for a foot. We have already seen an instance of this foot-binding in the discussion of Woleaian *a*-dissimilation in section 2.4.3.2. However, the difference between the Woleaian case and dissimilative jakan'e is in the type of feet that are invoked: in Woleaian it is a general *prosodic* foot which is independent of stress, while in this case it is precisely a *stress* foot. Dissimilative jakan'e results from the interaction between a pretonic vowel and a stressed vowel. Thus, the relevant domain must be a stress foot which is independently needed to derive the stress pattern of the language.

In my analysis, this is formally expressed by domain-specifying the GOCP constraints to a foot, as shown in (25).

(25) **Foot-domain specification**

(*X...X**)$_f$:** A sequence of X is prohibited *within a foot*.

To save some space, I assume, without indicating, that all of the GOCP constraints used in this analysis are domain-specified for foot. I also assume that the assignment of feet follows from other foot-related constraints, such as ALIGNMENT, FOOT-FORM, and FOOTBINARITY, not discussed here.

In summary, there are three main aspects to my core proposal. First, the polarity effect of dissimilative jakan'e follows from the strategy laid out in section 2.6; this polarity effect is obtained by the interaction of the two opposing GOCP constraints in the vowel height dimension. In particular, three constraint blocks (the sets of two opposing GOCP constraints) are proposed: *[αhi]...[αhi], *[αA]...[αA], and *[αlo]...[αlo]. Second, I showed that all of the three constraint blocks must be simultaneously present to derive the 'maximization of difference' effect. Third, I proposed that all of the GOCP constraints must be domain-specified for a foot. Unlike Woleaian, the specified foot is a stress foot, not just a general prosodic foot.

In what follows, building on the core proposal above, I provide an account for each of the dialect groups.

3.3.2 Symmetric Subtypes

In this section, I offer an analysis for the three symmetric subtypes. It is demonstrated that the reranking among the three constraint blocks account for the type variation between the Don, Obojansk, and Žizdra subtypes.[93]

3.3.2.1 Don subtype

First, I examine the Don subtype where the cut-off line is between [+high] and [-high], as illustrated in (26).

(26) Don subtype

i	u	
········	········	← Cut-off point
e	o	
ɛ	ɔ	
a		

In the preceding section (3.3.1), I proposed the following core constraint blocks: *[αhi]...[αhi], *[αA]...[αA], and *[αlo]...[αlo]. Here, I provide an account of the Don subtype, imposing the ranking in (27).

(27) The proposed ranking for the Don subtype

*[αhi]...[αhi] >> *[αA]...[αA], *[αlo]...[αlo] >> FAITH

[93] Analyses for the asymmetric cases, where roundness matters (Dmitrievsk subtype, Ščigrovsk subtype, and Sudžansk subtype), are offered in section 3.3.3.

First, let us look at how this ranking accounts for the cases where the stressed vowel is either [+high] or [+low], such as /r’ek’í/ ‘rivers’ and /gl’ad’át/ ‘they see’, as in the following tableaux in (28).

(28) Don subtype: /r’ek’í/ and /gl’ad’át/

/r’ek’í/	*[αhi]...[αhi] [+hi]	*[αhi]...[αhi] [-hi]	*[αA]...[αA] [+A]	*[αA]...[αA] [-A]	*[αlo]...[αlo] [+lo]	*[αlo]...[αlo] [-lo]	FAITH
a. r’**e**k’í			*!			*	
b. r’**i**k’í	*!		*			*	*
c. ☞ r’**a**k’í							*
d. r’**ɛ**k’í						*!	*
/gl’ad’át/							
e. gl’**a**d’át		*!		*	*		
f. ☞ gl’**i**d’át							*
g. gl’**e**d’át		*!					*
h. gl’**ɛ**d’át		*!		*			*

In (28), the first tableau shows a case where the stressed vowel is [+high]. Candidate (28a) lose out by violating *[+hi]...[+hi], and (28b) also loses due to the violation of . *[+A]...[+A], leaving (28c) as the winner. In the second tableau, again, candidate (28f) where the height difference is maximized is chosen as the winner. The only crucial ranking deduced from these tableaux is: *[αhi]...[αhi], *[αA]...[αA], *[αlo]...[αlo] >> FAITH, where FAITH is a general faithfulness constraint.

The ranking between *[αhi]...[αhi], *[αA]...[αA], and *[αlo]...[αlo] becomes crucial in the next tableau (29) which consider the examples where the stressed vowel is a mid vowel, such as /v’ɛl’é̲t’/ ‘to command’.

(29) Don subtype: /v’ɛl’é̲t’/

/v’ɛl’ét’/	*[αhi]...[αhi] [+hi]	[-hi]	*[αA]...[αA] [+A]	[-A]	*[αlo]...[αlo] [+lo]	[-lo]	FAITH
a. v’**ɛ**l’ét’		*!				*	
b. ☞ v’**i**l’ét’			*			*	*
c. v’**a**l’ét’		*!					*
d. v’**e**l’ét’		*!	*			*	

The tableau in (29) shows that *[αhi]...[αhi] must outrank *[αA]...[αA] and *[αlo]...[αlo]. The winning candidate (29b) violates both *[αA]...[αA] and *[αlo]...[αlo], but comes up as a winner, since the other candidates violate higher ranked *[αhi]...[αhi].

The proposed ranking is confirmed by the remaining case in which the stressed vowel is [-ATR] mid vowel, such as /t’ɛp’ɛ́r’/ ‘now’, as exemplified in (30). Candidate (30b) wins due to the crucial ranking between *[αhi]...[αhi] and *[αlo]...[αlo]. (candidates (30b) and (30c) would be tied if the ranking were not crucial).

(30) Don subtype: /t’ɛp’ɛ̲́r’/

/t’ɛp’ɛ́r’/	*[αhi]...[αhi] [+hi]	[-hi]	*[αA]...[αA] [+A]	[-A]	*[αlo]...[αlo] [+lo]	[-lo]	FAITH
a. t’**ɛ**p’ɛ́r’		*!		*		*	
b. ☞ t’**i**p’ɛ́r’						*	*
c. t’**a**p’ɛ́r’		*!					*

As shown above, the proposed ranking, repeated below in (31), accounts for the patterns observed in the Don subtype, capturing the cut-off between [+high] and [-high].

(31) The proposed ranking for the Don subtype

*[αhi]...[αhi] >> *[αA]...[αA], *[αlo]...[αlo] >> FAITH

As I will show below, the remaining two dialect types (Obojansk and Žizdra subtype) are accounted for by the reranking of these constraint blocks.

3.3.2.2 Obojansk subtype

The second type to be considered is the Obojansk subtype where the cut-off line is between [+ATR] and [-ATR], as illustrated in (32).

(32) Obojansk subtype

i	u
e	o
ε	ɔ
a	

← Cut-off point

For the analysis of the Obojansk subtype, I propose the ranking in (27), in which the ranking between *[αA]...[αA] and *[αhi]...[αhi] is reversed from the previous case.

(33) The proposed ranking for the Obojansk subtype

*[αA]...[αA] >> *[αhi]...[αhi], *[αlo]...[αlo] >> FAITH

This ranking is exemplified first by the following tableaux in (34), which consider the examples /r’ek’í̲/ ‘rivers’ and /gl’ad’á̲t/ ‘they see’, where the stressed vowel is [+high] and [+low], respectively. The tableaux (34) show that despite the reranking of the constraint blocks, the same result obtains for these examples as in the case of the Don subtype: the correct forms (*r’**a**k’í̲* and *gl’**i**d’á̲m*) are chosen.

(34) Obojansk subtype: /r’ek’í̲/ and /gl’ad’á̲t/

/r’ek’í/	*[αA]...[αA]		*[αhi]...[αhi]		*[αlo]...[αlo]		FAITH
	[+A]	[-A]	[+hi]	[-hi]	[+lo]	[-lo]	
a. r’**e**k’í	*!					*	
b. r’**i**k’í	*!		*			*	*
c. ☞ r’**a**k’í							*
d. r’**ɛ**k’í						*!	*

/gl’ad’át/	*[αA]...[αA]		*[αhi]...[αhi]		*[αlo]...[αlo]		FAITH
	[+A]	[-A]	[+hi]	[-hi]	[+lo]	[-lo]	
e. gl’**a**d’át		*!		*	*		
f. ☞ gl’**i**d’át							*
g. gl’**e**d’át				*!			*
h. gl’**ɛ**d’át		*!		*			*

The next set of tableaux in (35) demonstrate that the proposed ranking accounts for the remaining two height series, [-high, +ATR] ([e] and [o]) and [-low, -ATR] ([ɛ] and [ɔ]), as well. The crucial ranking: *[αA]...[αA] >> *[αhi]...[αhi], *[αlo]...[αlo] is confirmed by the first tableau.

(35) Obojansk subtype: /v'ɛl'ét'/and /t'ɛp'ɛ́r'/

/v'ɛl'ét'/	*[αA]...[αA] [+A]	[-A]	*[αhi]...[αhi] [+hi]	[-hi]	*[αlo]...[αlo] [+lo]	[-lo]	FAITH
a. v'**ɛ**l'ét'				*		*!	
b. v'**i**l'ét'	*!					*	*
c. ☞ v'**a**l'ét'				*			*

/t'ɛp'ɛ́r'/	*[αA]...[αA] [+A]	[-A]	*[αhi]...[αhi] [+hi]	[-hi]	*[αlo]...[αlo] [+lo]	[-lo]	FAITH
d. t'**ɛ**p'ɛ́r'		*!		*		*	
e. ☞ t'**i**p'ɛ́r'						*	*
f. t'**a**p'ɛ́r'		*!		*			*

As seen above, the proposed ranking (36) successfully accounts for the pattern of the Obojansk subtype.

(36) The proposed ranking for the Obojansk subtype

*[αA]...[αA] >> *[αhi]...[αhi], *[αlo]...[αlo] >> FAITH

In the next section, it is shown that the remaining type, the Žizdra subtype, follows from the other possible ranking: *[αlo]...[αlo] >> *[αhi]...[αhi], *[αA]...[αA].

3.3.2.3 Žizdra subtype

The third type to be considered is the Žizdra subtype where the split is between [+low] and [-low], as illustrated in (37).

(37) Žizdra subtype

```
i           u

e           o

ɛ           ɔ
------------------ ← Cut-off point
      a
```

This pattern is accounted for by the ranking in (38).

(38) The proposed ranking for the Žizdra subtype

*[αlo]...[αlo] >> *[αhi]...[αhi], *[αA]...[αA] >> FAITH

The following four tableaux in (39) show how this ranking accounts for the pattern observed in the Žizdra subtype: each tableau corresponds to one of the four height series: [+high], [+low], [-high, +ATR], and [-low, -ATR].

(39) Žizdra subtype: /r’ek’í/, /gl’ad’át/, /v’ɛl’ét’/, and /t’ɛp’ɛ́r’/

/r’ek’í/	*[αlo]...[αlo]		*[αhi]...[αhi]		*[αA]...[αA]		FAITH
	[+lo]	[-lo]	[+hi]	[-hi]	[+A]	[-A]	
a. r’**e**k’í		*!			*		
b. r’**i**k’í		*!	*		*		*
c. ☞ r’**a**k’í							*
d. r’**ɛ**k’í		*!					*

/gl’ad’át/		*[αlo]...[αlo] [+lo]	[-lo]	*[αhi]...[αhi] [+hi]	[-hi]	*[αA]...[αA] [+A]	[-A]	FAITH
e.	gl’**a**d’át	*!			*		*	
f. ☞	gl’**i**d’át							*
g.	gl’**e**d’át				*!			*
h.	gl’**ɛ**d’át				*!			*

/v’ɛl’ét’/		*[αlo]...[αlo] [+lo]	[-lo]	*[αhi]...[αhi] [+hi]	[-hi]	*[αA]...[αA] [+A]	[-A]	FAITH
i.	v’**ɛ**l’ét’		*!		*			
j.	v’**i**l’ét’		*!			*		*
k. ☞	v’**a**l’ét’				*			*

/t’ɛp’ɛ́r’/		*[αlo]...[αlo] [+lo]	[-lo]	*[αhi]...[αhi] [+hi]	[-hi]	*[αA]...[αA] [+A]	[-A]	FAITH
l.	t’**ɛ**p’ɛ́r’		*!		*		*	
m.	t’**i**p’ɛ́r’		*!					*
n. ☞	t’**a**p’ɛ́r’				*		*	*

These tableaux demonstrate that the constraint hierarchy proposed, repeated below as (40), correctly picks the right forms.

(40) The proposed ranking for the Žizdra subtype

*[αlo]...[αlo] >> *[αhi]...[αhi], *[αA]...[αA] >> FAITH

3.3.2.4 Summary (Symmetric subtypes)

To summarize my analysis so far, it has been shown that the three types of dissimilative jakan’e are accounted for by the set of GOCP constraints, referred to as the constraint blocks: *[αhi]...[αhi], *[αA]...[αA], and *[αlo]...[αlo]. The three types considered here differ in where the cut-off point is on the height dimension, as illustrated in (41).

(41) Three dialect types

i. *Don subtype*

i	u

e	o
ɛ	ɔ
a	

ii. *Obojansk subtype*

i	u
e	o

ɛ	ɔ
a	

iii. *Žizdra subtype*

i	u
e	o
ɛ	ɔ

a

I proposed that reranking of the three constraint blocks derives each of these three different types, as summarized in (42). Of the three constraint blocks, the constraint which is ranked highest determines the outcome: 1) when *[αhi]...[αhi] is on top, the Don subtype results; 2) when *[αA]...[αA] is the highest, the Obojansk subtype obtains; and 3) when *[αlo]...[αlo], is on top, the Žizdra subtype results.

(42) Ranking Summary

a. ***Don subtype***

*[αhi]...[αhi] >> *[αA]...[αA], *[αlo]...[αlo] >> Faith

b. ***Obojansk subtype***

*[αA]...[αA] >> *[αhi]...[αhi], *[αlo]...[αlo] >> Faith

c. ***Žizdra subtype***

*[αlo]...[αlo] >> *[αhi]...[αhi], *[αA]...[αA] >> Faith

Under this analysis, the 'maximization of difference' effect is captured by the interaction between the three constraint blocks. Further, significantly, this analysis accounts for the variation among the three different types by means of constraint reranking. The proposed analysis successfully derives the height-based classification.

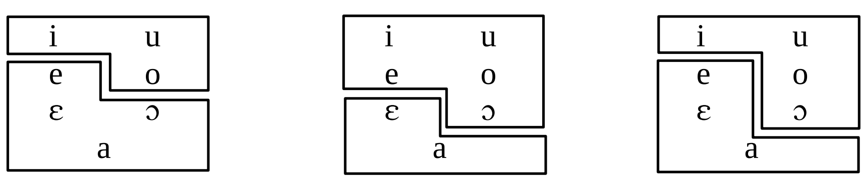
However, these dialect types are not the whole story. Of the six subtypes, the Don, Obojansk, and Žizdra subtypes have been analyzed, but there are three other cases that cannot be characterized solely by the height features alone. In the next section, I turn to these *asymmetric* subtypes.

3.3.3 Asymmetric Subtypes

In addition to the three types discussed so far (the Don, Obojansk, and Žizdra subtypes), there are three patterns of dissimilative jakan'e in which the *roundness* of the stressed vowel becomes relevant in the height consideration. These patters are observed in the Dmitrievsk, Ščigrovsk, and Sudžansk (and Mosal'sk) subtypes, as summarized below in (43).

(43) Three asymmetric subtypes

i. *Dmitrievsk subtype* **ii.** *Ščigrovsk subtype* **iii.** *Sudžansk subtype*



The patterns in (43) illustrate the complexity of the grouping in these dialect subtypes. It is impossible to define these groupings with the height features ([αhigh], [αATR], [αlow]) alone; the round feature [+round] must also be involved.

As pointed out in section 3.2.8, the pattern is consistent in the way that the round vowels are grouped into the higher vowel group with the exclusion of unround vowels, suggesting that round vowels tend to pattern with high vowels. Thus, none of the dialect groups have the pattern in which unround vowels pattern together with the higher vowel group with the exclusion of round vowels. I argue that this fact is motivated by the grounded conditions (Archangeli and Pulleyblank 1994a) governing height dimension and roundness dimension (Hong 1994).

Hong (1994) argues that the sympathetic relation between the roundness of vowels and the tongue height is phonetically motivated. That is, the higher the vowel, the more round the vowel, and vice versa. Hong (1994) proposes the grounded constraints, such as those in (44), in order to describe cases of parasitic harmony where roundness of a vowel conditions height harmony. Although not mentioned in Hong (1994), I include RD/ATR, defined in (44c), which is a reasonable constraint for the four height system like the dissimilative jakan'e dialects.[94]

(44) Grounded constraints governing height and roundness

a. RD/+HI
If [+round], then [+high].

b. RD/-LO
If [+round], then [-low].

c. RD/+ATR
If [+round], then [+ATR].

These three constraints yield the positive correlation between [+round] and the height features [high], [low], and [ATR], respectively. It is relevant to note that the

[94] The specific value of the features, such as "+" or "-" is added to the constraint names in order to avoid confusion.

following ranking between these constraints must be imposed due to the Pāṇini's Theorem which asserts that specific constraints must be ranked higher than the more general ones:

(45) Ranking among the Grounded constraints

RD/+HI >> RD/+ATR >> RD/-LO

The ranking in (45) follows from the inclusive relation among the height features: [-low] includes [+ATR], and [+ATR] include [+high].

Capitalizing on Hong's (1994) observation, I argue that the patterns in the Dmitrievsk, Ščigrovsk, and Sudžansk (and Mosal'sk) subtypes (43) are governed by the grounded conditions holding between height and roundness. In these dialects [+round] vowels phonologically behave together with the higher vowels, because of the positive correlation between [+round] and the height features. I argue that this idea is formally expressed by the following GROUNDED GOCP constraints which are constructed on the basis of the grounded constraints in (44).

(46) Grounded GOCP constraints

a. **RD/*[+hi]...[+hi]** (based on RD/+HI)
   If [+round], then *[+hi]...[+hi].

b. **RD/*[+A]...[+A]** (based on RD/+ATR)
   If [+round], then *[+A]...[+A].

c. **RD/*[-lo]...[-lo]** (based on RD/-LO)
   If [+round], then *[-lo]...[-lo].

The derived constraints above in (44), let us call these *Grounded GOCP constraints*, make round vowels be subject to the cooccurrence restrictions on the higher vowels. The

Grounded GOCP constraints must be ranked higher than its corresponding GOCP constraint as required by the Pāṇini's Theorem.

The likelihood of round vowels to behave with the higher vowels mirrors the ranking proposed in (45), repeated here as (47).

(47) Rd/+Hi >> Rd/+ATR >> Rd/-Lo

I propose that the above constraint hierarchy can be directly transformed to the following constraint hierarchy of the Grounded GOCP constraints in (48).

(48) **Ranking among the Grounded GOCP constraints**

Rd/*[+hi]...[+hi] >> Rd/*[+A]...[+A] >> Rd/*[-lo]...[-lo]

I turn now to the individual cases of the subtypes: the Dmitrievsk, Ščigrovsk , and Sudžansk subtypes.

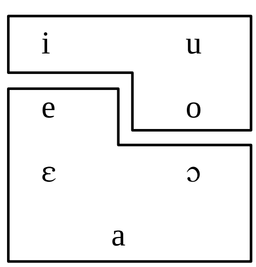
3.3.3.1 Dmitrievsk subtype

First, in the Dmitrievsk subtype [+high] and [+ATR, +round] vowels ([i], [u], and [o]) pattern together to induce dissimilation of non-high to low, as illustrated in (49).

(49) **Dissimilative jakan'e in the Dmitrievsk subtype**

e, ε, a → ***a***

e, ε, a → ***i***



The pattern illustrated in (49) is reminiscent of the Don subtype, except that the vowel [o] acts as the [+high] vowel group, instead of the lower vowel group. I propose that this pattern is captured by ranking RD/*[+A]...[+A] (46c) (and accordingly RD/*[+hi]...[+hi]) above *[αhi]...[αhi] in the hierarchy developed for the Don subtype (42a), as shown in the following tablueaux in (50).[95] The tableaux compare examples: *s’**a**ló* ‘village’ (</s’εló/) and *v’**i**l’ét’* ‘to command’ (</v’εl’ét’/), where the stressed vowel (underlined) in both forms is of the same height ([-high, +ATR]), but differing in their roundness.

(50) Dmitrevsk subtype: /s’εló/ and /v’εl’ét’/

/s’εló/	RD/*[+A]...[+A]	*[αhi]...[αhi] [+hi]	[-hi]	*[αlo]...[αlo] [+lo]	[-lo]	FAITH
a. s’**ε**ló			*		*!	
b. s’**i**ló	*!				*	*
c. ☞ s’**a**ló			*			*
/v’εl’ét’/	RD/*[+A]...[+A]	*[αhi]...[αhi] [+hi]	[-hi]	*[αlo]...[αlo] [+lo]	[-lo]	FAITH
d. v’**ε**l’ét’			*!		*	
e. ☞ v’**i**l’ét’					*	*
f. v’**a**l’ét’			*!			*

In (50), the first tableau shows that because of the roundness of [o], candidate (50b) loses by violating RD/*[+A]...[+A]. Competition between candidate (50a) and (50c) is determined by otherwise effective hierarchy for the Don subtype. As a result, candidate

[95] In these tableaux, the constraint *[αA]...[αA] which is irrelevant to the evaluations of the examples considered is not included for space-saving reasons.

(50c) wins, maximizing the height differential. In the second tableau, the same evaluation for the Don subtype is enforced, selecting candidate (50e), since roundness is irrelevant.[96]

In summary, the pattern observed in the Dmitrievsk subtype is accounted for by ranking the Grounded GOCP constraint RD/*[+A]...[+A] above the hierarchy developed for the Don subtype, as shown below in (51).

(51) Proposed ranking for the Dmitrievsk subtype

RD/*[+A]...[+A] >> *[αhi]...[αhi] >> *[αA]...[αA], *[αlo]...[αlo] >> FAITH

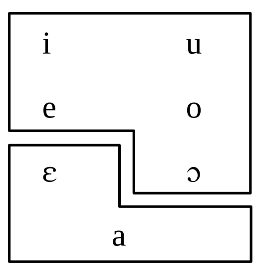
3.3.3.2 Ščigrovsk subtype

Second, I consider the case of the Ščigrovsk subtype, whose pattern is illustrated as follows.

(52) Dissimilative jakan’e in the Ščigrovsk subtype

e, ε, a → ***a***

e, ε, a → ***i***



Here, the stressed vowel [ɔ] acts as if it belongs to the higher vowel group, while [ε] does not. This pattern is the same as the one for the Obojansk subtype, except for the behavior

[96] A theoretically possible candidate [v’ɔ̱l’ét’] would violate the constraint which restricts vowels in the pretonic, post palatal position to only [e], [ε], and [a]. Such a constraint is neither included nor formulated here for the sake of simplicity. For the description of this restriction, see Davis (1970: 362).

of [ɔ]. My proposal is that the Grounded GOCP constraint RD/*[-lo]...[-lo] (46b) is ranked above the hierarchy developed for the Obojansk subtype, as in (53).[97]

(53) Proposed ranking for the Ščigrovsk subtype

RD/*[-lo]...[-lo] >> *[αA]...[αA] >> *[αhi]...[αhi], *[αlo]...[αlo] >> FAITH

This ranking accounts for the contrast between *s’**a**lɔ́m* ‘village (instrumental)’ (</s’εlɔ̱́m/) and *t’**i**p’έr’* ‘now’ (</t’εp’ɛ̱́r’/), as shown in the following two tableaux.[98]

(54) Ščigrovsk subtype: /t’εp’ɛ̱́r’/ and /s’εlɔ̱́m/

/s’εlɔ́m’/	RD/*[-lo]...[-lo]	*[αA]...[αA]		*[αhi]...[αhi]		FAITH
		[+A]	[-A]	[+hi]	[-hi]	
a. s’**ε**lɔ́m’	*!		*		*	
b. s’**i**lɔ́m’	*!					*
c. ☞ s’**a**lɔ́m’			*		*	*

/t’εp’έr’/	RD/*[-lo]...[-lo]	*[αA]...[αA]		*[αlo]...[αlo]		FAITH
		[+A]	[-A]	[+lo]	[-lo]	
d. t’**ε**p’έr’			*!		*	
e. ☞ t’**i**p’έr’					*	*
f. t’**a**p’έr’			*!			*

In the first tableau, candidates (54a) and (54b) both fatally violate RD/*[-lo]...[-lo], leaving candidate (54c) as the winner. When the stressed vowel is

[97] Although not significant in the tableaux, both RD/*[+hi]...[+hi] and RD/*[+A]...[+A] must be ranked higher than RD/*[-lo]...[-lo].

[98] As before, not all constraints can appear in the tableaux due to the limitations of space. The constraint *[αlo]...[αlo] is omitted, since it is not crucial here.

unround, as in the second tableau, the evaluation proceeds as in the case of the Obojansk subtype, picking candidate (54e) as the winner.

To summarize, the pattern of the Ščigrovsk subtype is accounted for by ranking the Grounded GOCP constraint RD/*[-lo]...[-lo] above the hierarchy developed for the Obojansk subtype, as shown in (55).

(55) Proposed ranking for the Ščigrovsk subtype

RD/*[-lo]...[-lo] >> *[αA]...[αA] >> *[αhi]...[αhi], *[αlo]...[αlo] >> FAITH

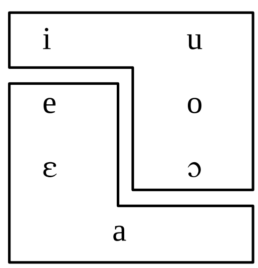
3.3.3.3 Sudžansk (and Mosal'sk) subtype

The final case to consider is the Sudžansk (and Mosal'sk) subtype, in which all round vowels ([u], [o], [ɔ]) belong to the higher vowel group, as illustrated in (56).

(56) Dissimilative jakan'e in the Sudžansk subtype

e, ε, a → ***a***

e, ε, a → ***i***



The split here is between [+high] and [+round] vowels which yield dissimilation to [a] and [+low] and [-round] vowels which induces dissimilation to [i]. I argue that this pattern is the same as the one for the Don subtype, with the additional RD/*[-lo]...[-lo] (46b). Such a constraint hierarchy is shown in (57).

(57) Proposed ranking for the Sudžansk subtype

RD/*[-lo]...[-lo] >> *[αhi]...[αhi] >> *[αA]...[αA], *[αlo]...[αlo] >> FAITH

This ranking is exemplified by the following four tableaux which correspond to the examples *s’**a**ló* ‘village’ (</s’ɛló̲/), *s’**a**lɔ́m* ‘village (instrumental)’ (</s’ɛlɔ́m/), *v’**il**’ét’* ‘to command’ (</v’ɛl’é̲t’/), and *t’**ip**’ɛ́r’* ‘now’ (</t’ɛp’ɛ̲́r’/), respectively.

(58) Sudžansk subtype: /s’ɛló̲/, /s’ɛlɔ̲́m’/, /v’ɛl’é̲t’/, and /t’ɛp’ɛ̲́r’/

/s’ɛló/	RD/*[-lo]...[-lo]	*[αhi]...[αhi]		*[αlo]...[αlo]		FAITH
		[+hi]	[-hi]	[+lo]	[-lo]	
a. s’**ɛ**ló	*!		*		*	
b. s’**i**ló	*!				*	*
c. ☞ s’**a**ló			*			*

/s’ɛlɔ́m’/	RD/*[-lo]...[-lo]	*[αhi]...[αhi]		*[αlo]...[αlo]		FAITH
		[+hi]	[-hi]	[+lo]	[-lo]	
d. s’**ɛ**lɔ́m’	*!		*		*	
e. s’**i**lɔ́m’	*!				*	*
f. ☞ s’**a**lɔ́m’			*			*

/v'εl'ét'/	RD/*[-lo]...[-lo]	*[αhi]...[αhi] [+hi]	[-hi]	*[αlo]...[αlo] [+lo]	[-lo]	FAITH
g. v'**ε**l'ét'			*!		*	
h. ☞ v'**i**l'ét'					*	*
i. v'**a**l'ét'			*!			*

/t'εp'έr'/	RD/*[-lo]...[-lo]	*[αhi]...[αhi] [+hi]	[-hi]	*[αlo]...[αlo] [+lo]	[-lo]	FAITH
k. t'**ε**p'έr'			*!		*	
l. ☞ t'**i**p'έr'					*	*
m. t'**a**p'έr'			*!			*

As shown in the first and the second tableaux, when the stressed vowel is [+round], dissimilation to [i] takes place (candidates (58c) and (58f)). When the stressed vowel is mid unround vowel ([e] or [ε]), the same pattern as the Don subtype is observed, as shown in the third and the fourth tableaux (candidates (58h) and (58l)).

In summary, I repeat the ranking proposed for the Sudžansk subtype (and for the Mosal'sk subtype as well), below in (59).

(59) Proposed ranking for the Sudžansk subtype

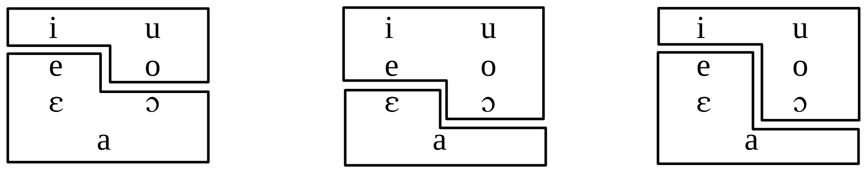
RD/*[-lo]...[-lo] >> *[αhi]...[αhi] >> *[αA]...[αA], *[αlo]...[αlo] >> FAITH

3.3.3.4 Summary (Asymmetric subtypes)

The asymmetric patterns considered above are summarized in (60).

(60) Three asymmetric subtypes

i. *Dmitrievsk subtype* **ii.** *Ščigrovsk subtype* **iii.** *Sudžansk subtype*



I have proposed that the addition of the Grounded GOCP constraints to the previously-developed hierarchy accounts for the patterns in these subtypes. The derived GOCP constraints are intrinsically ranked as RD/*[+hi]...[+hi] >> RD/*[+A]...[+A] >> RD/*[-lo]...[-lo]. These constraints are founded on the basis of the generalization regarding the phonetically motivated relation between roundness and tongue height (Hong 1994), and thus are argued to be universal. As predicted by Pāṇini's Theorem, each of the Grounded GOCP constraints must be ranked above the corresponding GOCP constraint, as shown in (61).

(61)
a. RD/*[+hi]...[+hi] >> *[+hi]...[+hi]
b. RD/*[+A]...[+A] >> *[+A]...[+A]
c. RD/*[-lo]...[-lo] >> *[-lo]...[-lo]

The proposed rankings for the subtypes, shown in (62), confirms this observation.

(62) Ranking Summary

a. ***Dmitrievsk subtype***
RD/*[+A]...[+A] >> *[αhi]...[αhi] >> *[αA]...[αA], *[αlo]...[αlo] >> FAITH

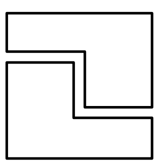
b. ***Ščigrovsk subtype***
RD/*[-lo]...[-lo] >> *[αA]...[αA] >> *[αhi]...[αhi], *[αlo]...[αlo] >> FAITH

c. ***Sudžansk subtype*** **(and *Mosal'sk subtype*)**
RD/*[-lo]...[-lo] >> *[αhi]...[αhi] >> *[αA]...[αA], *[αlo]...[αlo] >> FAITH

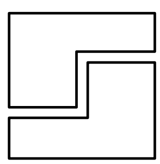
The proposed analysis demonstrates that these additional subtypes are byproducts of the basic subtypes (the Don, Obojansk, and Žizdra subtypes) where the cut-off point is based solely on the height dimension: the Dmitievsk, Ščigrovsk, and Sudžansk subtype (and Mosal'sk subtype) are based on the Don, Obojansk, and Don subtype, respectively, sharing the base hierarchy. The lack of a subtype based on the Žizdra subtype follows from its logical impossibility, since there is no roundness contrast for the low vowel series.

The current proposal also accounts for the lack of subtypes in which mid round vowels behave together with the lower vowel groups. In such a case, the schematic cut-off looks like the one illustrated in (63b). To the contrary, all of the attested subtypes follow the pattern in (63a).

(63) **a.**



b. *



This fact is explained by the groundedness of the positive relation between [+round] and the height features. The constraint such as RD/-HI (if [+round], then [-high]) is excluded, and so is RD/*[-hi]...[-hi], since such a feature pair is phonetically unmotivated.[99] Consequently, it is predicted that no subtypes should have a pattern such as (63b).

Finally, a ranking summary of the six patterns of dissimilative jakan'e is given below:

[99] Even if such a constraint is included into the hierarchy, it must be ranked below the phonetically-grounded constraints.

(64) Ranking Summary

a. ***Don subtype***
*[αhi]...[αhi] >> *[αA]...[αA], *[αlo]...[αlo] >> FAITH

b. ***Obojansk subtype***
*[αA]...[αA] >> *[αhi]...[αhi], *[αlo]...[αlo] >> FAITH

c. ***Žizdra subtype***
*[αlo]...[αlo] >> *[αhi]...[αhi], *[αA]...[αA] >> FAITH

d. ***Dmitrievsk subtype***
RD/*[+A]...[+A] >> *[αhi]...[αhi] >> *[αA]...[αA], *[αlo]...[αlo] >> FAITH

e. ***Ščigrovsk subtype***
RD/*[-lo]...[-lo] >> *[αA]...[αA] >> *[αhi]...[αhi], *[αlo]...[αlo] >> FAITH

f. ***Sudžansk subtype* (and *Mosal'sk subtype*)**
RD/*[-lo]...[-lo] >> *[αhi]...[αhi] >> *[αA]...[αA], *[αlo]...[αlo] >> FAITH

3.4 Conclusion

In this chapter, I have examined dissimilative jakan'e, the characteristics of which are particularly problematic to the traditional OCP (discussed in 3.1). I offered a GOCP-based analysis which overcomes the difficulties which would have arisen under the traditional OCP-based approach.

First, I showed that the GOCP captures the 'maximization of difference' effect, by treating dissimilative jakan'e as a case of polarity. The current proposal utilizes the three GOCP constraint blocks (*[αhi]...[αhi], *[αATR]...[αATR], and *[αlo]...[αlo]) in order to generate the non-identical dissimilation effect.

I also demonstrated that the proposed GOCP constraints derive the dialectal variation via reranking. Under this analysis, the variation among the symmetric subtypes is a result of reranking the three constraint blocks, rather than posting a separate constraint for each of the dialect groups.

Finally, I proposed the Grounded GOCP constraints to account for the patterns in the asymmetric subtypes. In these subtypes, in addition to height, roundness also factors into the structural description of the dissimilation. By appealing to the Grounded GOCP, which is based on Grounding Theory (Archangeli and Pulleyblank 1994a), not only is the added complexity resolved, but the non-occurrence of the pattern depicted in (63b) is also successfully predicted.

CHAPTER 4: CONCLUDING REMARKS

4.1 Introduction

This dissertation has focused on how to characterize dissimilatory phenomena observed in a number of languages. The central proposal made is that such patterns are accounted for by the GOCP, theory of identity avoidance in OT. I have examined a number of cases and shown that the GOCP is able to handle them in a formally consistent manner, without resorting to some representational manipulation found in previous analyses of comparable data. I have also provided an analysis of the complex patterns of Russian dissimilative jakan'e, demonstrating the explanatory power of the GOCP.

In this concluding chapter, I review the specific proposals made in this thesis, as well as the remaining issues which deserve investigation. First in section 4.2, I summarize the general claims of the Generalized OCP and the specific issues that are addressed by this theory. Second in section 4.3, I discuss the remaining issue which came up in the course of this study: a significant generalization about the C/V asymmetry. Lastly in section 4.4, I provide an overall conclusion.

4.2 Summary of the Proposal

The Generalized OCP presented in this dissertation is a theory of identity avoidance that generalizes the applicability of the traditional OCP to a wider range of phenomena, not just autosegmental (i.e. featural) ones. By utilizing the notion of 'sequence' and 'strict sequence', the current proposal asserts that identity avoidance between two elements *in sequence* is fundamental to linguistic theory, an idea that can be expressed through a universal constraint governing various types of dissimilatory phenomena. This concept is implemented within the framework of Optimality Theory, which provides the flexibility for constraints to be both violable and rankable.

The core constraint schema can be realized in various forms, depending on the arguments it instantiates. This constitutes a consistent formal apparatus on the one hand, and the versatility to adjust to a variety of distinct individual cases on the other. In Chapter 2 we investigated the types of arguments in the GOCP, as well as other necessary specifications which determine the precise nature of the manner in which the GOCP constraints apply. The things explored are: <u>elements</u>, <u>adjacency</u>, and <u>domains</u>.

Just like Generalized Alignment, the GOCP itself is a constraint schema in which its arguments need to be specified. This way, it allows the effect of identity avoidance (the OCP-effect) to be applicable to other phenomena than just the autosegmental ones. In this thesis, those proposed to be a possible X in the GOCP schema (*X…X) are PCat or GCat, including features, root nodes, syllables, prominence, and morphemes.

It is also argued that the current theory eliminates the need of adjacency parameter. Building on the universal hierarchy of proximity, the GOCP does not need to posit some additional parameter just for the purpose of accounting for adjacency.

Also introduced is the need of domain-specification in cases where dissimilation is bound in a particular domain. In addition to the familiar morphological domains, this study recognizes the prosodic domains figuring into cases of identity avoidance. In particular, it is proposed that certain dissimilation cases are bound within the domain of a syllable or a foot. As a result, cases such as Woleaian and dissimilative jakan'e (Russian) obtain an inherently closer characterization to that which has been regarded as rhythmic phenomena in the area of prosody.

Further, by directly incorporating Local Conjunction as a uniform mechanism of accounting for the OCP-subsidiary feature phenomena, the present proposal gives a formally unified characterization of both the similarity effects and blocking effects, which were treated individually under the previous theories. Accordingly, these phenomena need not require different theoretical devices for each case, but rather are understood as instances of the combination of multiple GOCP constraints.

It was also suggested that cases involving polarity effects follow from the current approach as a consequence of having two opposing GOCP constraints in a particular featural dimension. Under the previous theories, these cases are considered an instance of one-way phenomenon in which a unique feature must be posited underlyingly. The proposed characterization of polarity obviates the need for such an assumption by deriving the polarity effect from the basis of the Richness-of-the-Base, the abandonment of constraining inputs.

Finally, Chapter 3 gave a GOCP-based analysis of dissimilative jakan'e. In particular, the Grounded GOCP constraints were proposed to account for the asymmetric subtypes. It was argued that the GOCP constraints may be subject to Grounding (Archangeli and Pulleyblank 1994a), depending on the feature involved.

4.3 A Remaining Issue: C/V Dissimilation Asymmetry

In this section, I discuss one additional issue that emerged from this study which deserves further investigation.[100] There is a significant asymmetry between consonantal dissimilation patterns and vowel/length dissimilation patterns; while the trigger and the

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[100] The discussion here is by no means complete, and it should be noted that the details need to be worked out in the future in much greater detail.

target in consonantal dissimilation cases may be further away from each other, those elements participating in all reported cases of vowel/length dissimilation cases are restricted to adjacent ones.[101] I have found a number of consonantal dissimilation cases which are characterized as unbounded, meaning that the two participating elements are as far from each other as the morphology allows (e.g. Latin, Japanese, etc.). However, no vowel/length dissimilation cases exhibit this unbounded characteristic. Thus, of the 57 dissimilation cases being looked at, I found no case in which two vowels that are separated by one or more vowels show dissimilatory effects (see Appendix for details).

This is surprising, considering the arguments made elsewhere that consonants typically interact within a close range, whereas vowels interact over a longer distance (see especially Gafos 1995). Immediate support for the latter claim comes from the contrast between cases of assimilation between two strictly adjacent segments (such as Nasal Place assimilation) and cases of vowel harmony in which vowel interactions are long-distance. The C/V asymmetry found in this study appears to counter such general conception about C-C and V-V interactions.

This finding is characterized as C/V dissimilation asymmetry, as in (1).

(1) C/V Dissimilation Asymmetry

Consonantal dissimilation may be long-distance, but vowel dissimilation may not be long-distance.

The C/V dissimilation asymmetry is not predicted by the model developed so far, since the GOCP constraint schema does not impose any kind of restriction between its arguments. Thus, for instance, nothing in the theory prohibits the unbounded *[high]-∞-

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[101] Regarding tonal dissimilation cases, Odden (1994) argues that Arusa and Peñoles Mixtec show the unbounded dissimilation pattern.

[high] from being an active constraint in a hierarchy. Some additional condition must be imposed to capture the C/V asymmetry. The condition I suggest is that foot-domain is the largest type of domain-specification available for vowel/length dissimilation cases.[102] By this restriction, vowel/length interactions are bound to the domain of a foot.

The key idea here is that dissimilation involving vowel features as well as vowel length are viewed on a parallel with other rhythmic phenomena such as stress. This idea is stated as the RHYTHMIC DISSIMILATION HYPOTHESIS, as in (2).

(2) Rhythmic Dissimilation Hypothesis

Vowel/length dissimilation is inherently rhythmic.

Under this hypothesis, cases such as Woleaian *a*-dissimilation (section 2.4.3.2) and dissimilative jakan'e (Russian) (chapter 3) can be viewed as prosodic effects driven by rhythmic principles governing foot structure (Hayes 1987, 1995, Prince 1990, Hung 1994, Suzuki 1995a, Bakovic 1996).[103]

To illustrate this, let us consider the Woleaian-type /a/ to [e] dissimilation case. Dissimilation occurs when the trigger and the target are within a foot, as illustrated in (3a) ("." indicates a syllable boundary). However, it is impossible to obtain long-distance vowel/length dissimilation effects, since that would exceed the disyllabic maximum of a binary foot, as in (3b).

(3) (for the pattern: /a/ $\rightarrow$ [e] / __ [a])

a. **b.**

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[102] At this point, I do not know how to motivate this foot-domain binding on more substantive grounds. Here I simply state that vowel/length dissimilation cases are prosodic phenomena.

[103] In fact, this view is suggested by Kirchner (p.c.) that the dissimilation of /a/ to [e] in Woleaian is actually an instance of length (non-contrastive) alternation in order to achieve an optimal (L H) iambic foot.

a . (**e** . a)$_f$ ***e** . (u . a)$_f$

The motivation behind the Rhythmic Dissimilation Hypothesis (2), drawn from the observed parallel between rhythmic phenomena, such as alternating stress, and vowel/length dissimilation cases are summarized as follows:

(4) Summary of Observations

a. ***Alternating pattern***
Alternating patterns observed in dissimilation cases such as Woleaian, Gidabal, and Oromo are reminiscent of the patterns of alternating stress.

b. ***Similarity between quantitative effects and vowel/length dissimilation***
Vowel/length dissimilation cases can be viewed as equivalent to the quantitative effects driven by the principle of foot optimization found in a number of languages (Hayes 1987, 1995, Prince 1990, Mester 1994).

c. ***Functional similarity between stress clash and the OCP-effects***
As argued in Yip (1988), it is possible to construe both stress clash and dissimilation to be instances of identity avoidance, subject to the OCP.

The first point (4a) is that both vowel/length dissimilation and stress assignment may involve an alternating pattern, which is not found in consonantal dissimilation cases. This functional similarity can be captured by specifying the foot as the domain for the vowel/length dissimilation cases, and letting the independently motivated principles governing foot structure take over (see discussion of Woleaian in section 2.4.3.2).

The second point (4b) is that vowel/length dissimilation cases may find a treatment similar to that of quantitative effects such as stress-driven lengthening and shortening. It has already been argued that these quantitative effects are the result of foot optimization (Hayes 1987, 1995, Prince 1990, Mester 1994). Thus, it may not be unreasonable to categorize vowel/length dissimilation cases together with other quantitative effects.

Finally, the third point (4c) is to view stress clash avoidance as a result of identity avoidance, subject to the OCP (Yip 1988). As suggested in section 2.2, the generalized nature of the GOCP allows the argument of the GOCP constraint (*X…X) to be specified as the relative prominence markings that constitute a representation of stress (such as a grid). Under this view, avoidance of stress clash can formally be explained by the GOCP.

Of course, the above properties need to be investigated further to justify the validity of the Rhythmic Dissimilation Hypothesis (2).

4.4 Conclusion

In this dissertation I have proposed an alternative theory of identity avoidance, Generalized OCP, and demonstrated that it achieves an explicit characterization of the various cases of dissimilation, while maintaining its formal consistency.

The previous approaches are unsuccessful in accounting for both the generalizability and the language-specific variability which characterize the phenomena of identity avoidance. Representational approaches (e.g. feature geometry and underspecification) are successful in providing an explicit formal analysis for a language-specific patterns but fail to generalize to phenomena that cannot be characterizable in autosegmental terms; on the other hand, the recent approach proposed by Ito and Mester (1996a,b) and Alderete (1996, 1997) offers an elegant solution to these non-autosegmental phenomena, but needs to be elaborated to fully deal with the diverse typology of dissimilatory phenomena. In the present study the Generalized OCP expresses the fundamental principle of identity avoidance under Optimality Theory, which equally captures featural (autosegmental) and prosodic/morphological (non-autosemgmental) patterns of dissimilation. Moreover, the explicit domain-specification as well as the tightly interconnected sub-hierarchies are capable of accounting for the diverse typology of dissimilatory phenomena attested in a number of languages.

Most importantly, the present study is different from the previous approaches in proposing a formal mechanism which does not rely on some geometric explanations to capture crucial feature interactions observed in dissimilation cases. This general mechanism, or the Generalized OCP, therefore, provides an explicit formal account for dissimilatory phenomena *independent of* the theories of feature representation, which are still subject to ongoing debate.

REFERENCES

Alderete, John. (1995) Faithfulness to Prosodic Heads, ms, University of Massachusetts, Amherst, ROA-94.

Alderete, John (1996) A Formal Theory of Dissimilation, Handout of the talk presented at Rum J. Clam II, University of Massachusetts, Amhurst.

Alderete, John (1997) Dissimilation as Local Conjunction, To appear in K. Kusumoto (ed.), *Proceedings of the North East Linguistics Society* 27, 17-32, GLSA, Amhurst, MA.

Alderete, John, Jill Beckman, Laura Benua, Amalia Gnanadesikan, John McCarthy, and Suzanne Urbanczyk. (1996) Reduplication and segmental unmarkedness, ms, University of Massachusetts, Amherst, ROA-134.

Archangeli, Diana. (1984) *Underspecification in Yawelmani Phonology and Morphology*, Doctoral dissertation, MIT.

Archangeli, Diana and Douglass Pulleyblank. (1987) "Minimal and Maximal Rules: Effects of Tier Scansion," *Proceedings of North Eastern Linguistics Society* 17: 16-35.

Archangeli, Diana and Douglas Pulleyblank. (1994a) *Grounded Phonology*, MIT Press, Cambridge, Mass.

Archangeli, Diana and Douglas Pulleyblank. (1994b) *Kinande Vowel Harmony: Domains, Grounded Conditions, and One-Sided Alignment*, ms, University of Arizona and University of British Columbia.

Archangeli, Diana and Keiichiro Suzuki. (1997) "The Yokuts Challenge," in I. Roca, (ed.), *Derivations and Constraints in Phonology*. Oxford University Press, Oxford.

Archangeli, Diana and Keiichiro Suzuki. (1998) "Menomini Vowel Harmony: O(pacity) and T(ransparency) in OT," in K. Suzuki and D. Elzinga, (eds.), *Proceedings of Southwest Optimality Workshop I: Features in Optimality Theory*: 1-17, Coyote Working Papers, University of Arizona, Tucson.

Bakovic, Eric. (1996) Foot harmony and quantitative adjustment, ms, Rutgers University.

Bennett, Patrick. R. (1967) "Dahl's Law and Thagicu", African Language Studies 8: 127-159.

Borowsky, Toni and Armin Mester (1983) “Aspiration to Roots: Remarks on the Sanskrit Diaspirates”, *CLS* 19: 52-63.

Boukous, A. (1987) Phonotactiques et domaines prosodiques en Berbère (Parler Tachelhit d’Agadi, Maroc), Thèse d’etat, Université de Paris VIII, Vincennes à Saint Denis.

Broselow, Ellen (1984) “Default consonants in Amharic morphology”, in M. Speas and R. Sproat (eds.), *MITWPL* 7: 15-32.

Cho, Young-mee Yu. (1990) *Parameters of Consonantal Assimilation*, Doctoral dissertation, Stanford University.

Chomsky, Noam and Morris Halle. (1968) *The Sound Pattern of English*, Harper and Row, New York.

Clements, George N and Elizabeth Hume. (1995) “The Internal Organization of Speech Sounds,” In J. Goldsmith, ed., *The Handbook of Phonological Theory*: 245-306, Basil Blackwell, Cambridge, Mass.

Cohn, Abigail. (1992) “The Consequences of Dissimilation in Sundanese,” *Phonology* 9: 199-220.

Cohn, Abigail and John McCarthy. (1994) *Alignment and Parallelism in Indonesian Phonology*, ms, Cornell University and University of Massachusetts, Amherst, ROA-25.

Cole, Jennifer and Charles Kisseberth. (1994) “An Optimal Domains Theory of Harmony”, *Cognitive Science Technical Report* UIUC-BI-CS-94-02 (Language Series). The Beckman Institute, University of Illinois, Urbana-Champaign: 1-12, University of Illinois, ROA-22.

Crowhurst, Megan and M. Hewitt (1993) Prosodic Fusion and Moonlighting Feet in Yidin^{y}, ms., University of Texas, Austin.

Crystal, David (1997) *A Dictionary of Linguistics and Phonetics*, 4th edition, Blackwell Publishers, Oxford.

Czaykowska-Higgins, Ewa. (1993) “Cyclicity and Stress in Moses-Columbia Salish (Nxa'amxcin),” *Natural Language and Linguistic Theory* 11: 197-278.

Davis, Phillip (1970) “A Classification of the Dissimilative Jakan’e Dialects of Russian”, *Orbis* 19: 360-376.

Davy, J. I. M and Derek Nurse. (1982) “Synchronic Versions of Dahl's Law: The Multiple Applications of a Phonological Dissimilation Law,” *Journal of African Languages and Linguistics* 4: 157-195.

Dixon, R. M. W. (1977) *A Grammar of Yidiɲ*, Cambridge University Press, Cambridge.

Ebert, Karen (1974) Partial Vowel Harmony in Kera, *Studies in African Linguistics*, Supplement 5, 75-80.

Elmedlaoui, M. (1985) *Le parler Berbère Chleuh d'Imdlawn: segments et syllabation. Doctorat de troisième cycle*, Université de Paris VIII, Saint-Denis.

Elmedlaoui, M. (1992 [1995]) *Aspects des representations phonologiques dans certaines langues chamito-semitiques*, Thèse de doctoral d'état. Université Mohammed V, Rabat. [Publications of the Faculté des Lettres et des Sciences Humaines, Rabat, Serie: theses et memoires No. 23]

Evans, Nick. (1995) "Current Issues in the Phonology of Australian Languages," In J. Goldsmith, ed., *The Handbook of Phonological Theory*: 723-761, Basil Blackwell, Cambridge, Mass.

Fallon, Paul (1993) Liquid Dissimilation in Georgian, ms., Ohio State University.

Finer, Daniel. (1986) "Reduplication and Verbal Morphology in Palauan," *The Linguistic Review* 6: 99-130.

Foley, William (1991) *The Yimas Language of New Guinea*, Stanford University Press, Stanford.

Gafos, Adamantios (1995) On the Proper Characterization of 'Nonconcatenative' Languages, ms., Johns Hopkins University.

Geytenbeek, Brian and Helen Geytenbeek (1971) *Gidabal Grammar and Dictionary*, Australian Institute of Aboriginal Studies No. 43, Canberra.

Gleason, Henry (1955) *Workbook in Descriptive Linguistics*, Holt, New York.

Goldsmith, John. (1976) *Autosegmental Phonology*, Doctoral dissertation, MIT. [Published by Garland Press, New York, 1979].

Goldsmith, John. (1984) "Meeussen's Rule," In M. Aronoff, R. T. Oehrle, F. Kelley and B. W. Stephens, (eds.), *Language Sound Structure*: 245-259, MIT Press, Cambridge, Mass.

Goldsmith, John A. (1990) *Autosegmental and Metrical Phonology*, Basil Blackwell, Oxford.

Goodman, Beverley. (1995) *Features in Ponapean Phonology*. Doctoral dissertation, Cornell University.

Greenberg, Joseph. (1950) "The Patterning of Root Morphemes in Semitic", *Word* 6: 162-181.

Halle, Morris (1965) “Akan’e, the treatment of unstressed nondiffuse vowels in Southern Great Russian Dialects”, *Symbolae linguisticae in honorem Georgii Kuryłowicz*: 103-109, PAN, Warsaw.

Hammond, Michael. (1984) *Constraining Metrical Theory: A Modular Theory of Rhythm and Destressing*, Doctoral dissertation, UCLA.

Hayes, Bruce. (1986) “Assimilation as Spreading in Toba Batak,” *Linguistic Inquiry* 17, 467-499.

Hayes, Bruce. (1987) “A Revised Parametric Metrical Theory,” *Proceedings of the North Eastern Linguistic Society* 17. 1: 274-289.

Hayes, Bruce. (1995) *Metrical Stress Theory: Principles and Case Studies*, University of Chicago Press, Chicago.

Hayes, Bruce and T. Stivers (1996) The Phonetics of Postnasal Voicing, ms., UCLA.

Hewitt, Mark and Megan Crowhurst (1995) Conjunctive constraints and templates in Optimality Theory, ms, University of British Columbia and University of North Carolina.

Hoffmann, C. (1963) *A Grammar of the Margi Language*, Oxford University Press, Oxford.

Holton, David. (1995) “Assimilation and Dissimilation of Sundanese Liquids,” In J. Beckman, L. Dickey and S. Urbanczyk, eds., *Papers in Optimality Theory*: 167-180, University of Massachusetts Occasional Papers 18.

Hong, Sung-Hoon (1990) OCP-Triggered Rules in Dakota and their Interaction with Morphology, ms., University of Arizona.

Hong, Sung-Hoon (1994) *Issues in Round Harmony: Grounding, Identity, and their Interaction*, Doctoral dissertation, University of Arizona.

Howard, Irwin. (1972) *A Directional Theory of Rule Application*, Doctoral dissertation, MIT.

Hume, Elizabeth V. (1992) *Front Vowels, Coronal Consonants, and their Interaction in Nonlinear Phonology*, Doctoral dissertation, Cornell University.

Hung, Henrietta. (1994) *The Rhythmic and Prosodic Organization of the Edge Constituents*, Doctoral dissertation, Brandeis University, ROA-24

Ishihara, Masahide. (1991) *A Lexical Prosodic Phonology of Japanese Verbs*, Doctoral dissertation, University of Arizona.

Itô, Junko. (1984) “Melodic Dissimilation in Ainu,” *Linguistic Inquiry* 15: 505-513.

Itô, Junko and Armin Mester. (1986) “The Phonology of Voicing in Japanese: Theoretical Consequences for Morphological Accessibility,” *Linguistic Inquiry* 17: 49-73.

Itô, Junko and Armin Mester. (1995a) “Japanese Phonology,” In J. Goldsmith, ed., *The Handbook of Phonological Theory*: 817-838, Basil Blackwell, Cambridge, Mass.

Itô, Junko and Armin Mester. (1995b) “The Core-Periphery Structure of the Lexicon and Constraints on Reranking,” In J. Beckman, L. Dickey and S. Urbanczyk, eds., *Papers in Optimality Theory*: 181-209, University of Massachusetts Occasional Papers 18.

Itô, Junko and Armin Mester. (1996a) “Rendaku I: Constraint Conjunction and the OCP,” Paper presented at Kobe Phonology Forum, Kobe, Japan.

Itô, Junko and Armin Mester. (1996b) “Structural Economy and OCP Interactions in Local Domains,” Paper presented at Western Conference on Linguistics 1996, University of California, Santa Cruz.

Itô, Junko, Armin Mester and Jaye Padgett. (1995) “NC: Licensing and Underspecification in Optimality Theory,” Linguistic Inquiry 26: .

Jebbour, Abdelkrim (1985) “La labio-vélarization en Berbère—Dialecte Tachelhit (Parler de Tiznit)”, *Mémoire de Phonologie*, Université Mohammed V, Rabat.

Jebbour, Abdelkrim (1987) La labialisation consonantique en Tachelhit, Talk presented at the First International Meeting of the Moroccan Linguistics Society, Rabad.

Johnson, Lawrence (1973) “Dissimilation as a Natural Process in Phonology”, *Stanford Occasional Papers in Linguistics* 3: 45-56.

Josephs, Lewis S. (1975) *Palauan Reference Grammar*, University of Hawaii Press, Honolulu.

Josephs, Lewis S. (1990) *New Palauan-English Dictionary*, University of Hawaii Press, Honolulu, Hawaii.

Jun, Jongho (1995) *Perceptual and Articulatory Factors in Place Assimilation: An Optimality Theoretic Approach*, Doctoral dissertation, UCLA.

Kager, René. (1994) *Ternary Rhythm in Alignment Theory*, ms, Utrecht University. ROA-35.

Kaisse, Ellen. (1988) *Modern Greek Continuant Dissimilation and the OCP*, ms, University of Washington.

Kaye, J. and J. Lowenstamm (1985) A Non-Liear Treatment of Grassmann’s Law”, *NELS* 15.

Kenstowicz, Michael. (1994) *Phonology in Generative Grammar*, Blackwell Publishers, Cambridge, Mass.

Kenstowicz, Michael and Charles Kisseberth. (1977) *Topics in Phonological Theory*, Academic Press, New York.

Kenstowicz, Michael and Charles Kissberth. (1979) *Generative Phonology: Description and Theory*, Academic Press, New York.

Kent, Ronald G. (1936) “Assimilation and Dissimilation”, *Language* 12: 245-258.

Kent, Ronald G. (1945) The Sounds of Latin: A Descriptive and Historical Phonology. Waverly Press, Baltimore.

Keyser, Samuel J and Paul Kiparsky. (1984) “Syllable Structure in Finnish Phonology,” In M. Aronoff, R. T. Oehrle, F. Kelley and B. W. Stephens, eds., *Language Sound Structure*: 7-31, MIT Press, Cambridge, Mass.

Kiparsky, Paul (1971) “Historical Linguistics”, In W. Dingwall (ed.), *A Survey of Linguistic Science*, University of Maryland Press, College Park.

Kiparsky, Paul. (1973) “Phonological Representations,” In O. Fujimura, ed., *Three Dimensions of Linguistic Theory*: 1-136, Taikusha, Tokyo.

Kirchner, Robert. (1995) *Going the Distance: Synchronic Chain Shifts in Optimality Theory*, ms, UCLA, ROA-66.

Kuznetsov, P. S. (1973) *Russkai͡a Dialektologii͡a*, prosveshchenie, Moscow.
[Кузнецова, П. С. (1973) *Русская Диалектология*, просвещение, Москва.]

Langendoen, D. Terence (1966) “A Restriction on Grassmann’s Law in Greek”, *Linguistic Inquiry* 1: 7-9.

Larsi, Ahmmed (1991) *Aspects do la phonologie non-linéaire du parler Berbère Chleuh de Tidli*, Thèse de Doctorat, Université de la Sorbonne Nouvelle, Paris III.

Leben, William. (1973) *Suprasegmental Phonology*, Doctoral dissertation, MIT, Cambridge, Mass.

Lee, B. (1991) *Prosodic Structures in Takelma Phonology and Morphology*, Doctoral dissertation, University of Texas, Austin.

Leumann, Manu (1977) Lateinische Laut- und Formenlehre, Neuausgabe der 5, Auflage (1926-28). Handbuch der Altertumswissenschaft, Abt. 2. Teil 2, Lateinische Grammatik von Leumann-Hofmann-Szantyr. Band 1. C. H. Beck’sche Verlagsbuchhandlung München.

Lindblom, B. (1988) “Some Remarks on the Origin of the Phonetic Code”, Paper presented at the Symosium on Developmental Dyslexia at the Wenner-Geren Center, Stockholm, Sweden.

Lindblom, B. (1990) “Explaining Phonetic Variation: A Sketch of the H&H Theory”, In W. J. Hardcastle and A. Marchal (eds.), *Speech Production and Speech Modelling*: 403-439, Kluwer Academic Publishers, Dordrecht.

Lombardi, Linda. (1991) *Laryngeal Features and Laryngeal Neutralization*, Doctoral dissertation, University of Massachusetts, Amherst. [Published by Garland Press, New York, 1994].

Lombardi, Linda. (1995) “Dahl's Law and Privative [voice],” *Linguistic Inquiry* 26: 365-372.

Maddieson, Ian. (1984) *Patterns of Sounds*, Cambridge University Press, Cambridge.

Malou, Job (1988) *Dinka Vowel System*, Summer Institute of Linguistics.

Marlett, S. (1981) *The Structure of Seri*, Doctoral dissertation, University of California, San Diego.

Marlett, S. and J. Stemberger (1983) “Empty Consonants in Seri”, *Linguistic Inquiry* 14: 617-639.

McCarthy, John J. (1979) *Formal Problems in Semitic Phonology and Morphology*, Doctoral dissertation, MIT. [Distributed by Indiana University Linguistics Club, Bloomington].

McCarthy, John J. (1981) “A Prosodic Theory of Nonconcatenative Morphology”, *Linguistic Inquiry* 12: 373-418.

McCarthy, John J. (1986) “OCP Effects: Gemination and Antigemination,” *Linguistic Inquiry* 17: 207-264.

McCarthy, John J. (1988) “Feature Geometry and Dependency: A Review,” *Phonetica* 43: 84-108.

McCarthy, John J. (1994) “The Phonetic and Phonology of Semitic Pharygeals,” In P. Keating (ed.), *Phonological Structure and Phonetic Form - Papers in Laboratory Phonology III*: 191-233, Cambridge University Press, Cambridge.

McCarthy, John J. (1995) Remarks on Phonological Opacity in Optimality Theory, ms, University of Massachusetts, Amherst, ROA-79.

McCarthy, John J and Alan Prince. (1993a) *Prosodic Morphology I: Constraint Interaction and Satisfaction*, ms, University of Massachusetts, Amherst and Rutgers University.

McCarthy, John J and Alan Prince. (1993b) *Generalized Alignment*, ms, University of Massachusetts, Amherst and Rutgers University, ROA-7.

McCarthy, John J and Alan Prince. (1994) *The Emergence of the Unmarked: Optimality in Prosodic Morphology*, ms, University of Massachusetts, Amherst and Rutgers University, ROA-13.

McCarthy, John J and Alan Prince. (1995) “Faithfulness and Reduplicative Identity,” In J. Beckman, L. Dickey and S. Urbanczyk, eds., *Papers in Optimality Theory*: 249-384, University of Massachusetts Occasional Papers 18.

McCarthy, John J and Alison Taub. (1992) “Review of Paradis and Prunet 1991”, *Phonology* 9: 363-370.

McConvell, Patrick (1988) “Nasal Cluster Dissimilation and Constraints on Phonological Variables in Gurindji and Related Languages”, *Aboriginal Linguistics* 1: 135-165.

McGregor, William (1990) *A Functional Grammar of Gooniyandi*, John Benjamins, Amsterdam.

Mester, R. Armin. (1986) *Studies in Tier Structure*, Doctoral dissertation, University of Massachusetts, Amherst. [Published by Garland Press, New York, 1988].

Mester, R. Armin. (1994) “The Quantitative Trochee in Latin,” *Natural Language and Linguistic Theory* 12: 1-61.

Mester, R. Armin and Junko Itô. (1989) “Feature Predictability and Underspecification: Palatal Prosody in Japanese Mimetics,” *Language* 65: 258-293.

Mohanan, K. P. (1993) “Fields of Attraction in Phonology,” In J. Goldsmith, ed., *The Last Phonological Rule: Reflections on Constraints and Derivations*, 61-116, University of Chicago Press, Chicago.

Myers, Scott. (1987) *Tone and the Structure of Words in Shona*, Doctoral dissertation, University of Massachusetts, Amhurst.

Myers, Scott. (1994) OCP Effects in Optimality Theory, ms, University of Texas, Austin, ROA-6.

Myers, Scott (1997) OCP Effects in Optimality Theory, *Natural Language and Linguistic Theory* 15: 847-892.

Nelson, Lynn H. (1996) Latin-English Dictionary, ms, University of Kansas. (http://humanum.arts.cuhk.hk/Lexis/Latin/index.html).

Newton, B. E. (1971) “Sibilant Loss in Northern Greek”, *Canadian Journal of Linguistics* 17: 1-15.

Odden, David. (1987) “Dissimilation as Deletion in Chukchi,” Paper presented at Eastern States Conference on Linguistics.

Odden, David. (1994) “Adjacency Parameters in Phonology,” *Language* 70: 289-330.

Ohala, J. J. (1981) “The Listener as a Source of Sound Change”, In C. S. Masek, R. A. Hendrick, & M. F. Miller (eds.), Papers from the Parasession on Language and Behavior, *CLS*: 178-203.

Ohno, Sachiko (1998) “Synchronically Unified Ranking and Distribution of Voice in Japanese”, In K. Suzuki and D. Elzinga, (eds.), *Proceedings of Southwest Optimality Workshop I: Features in Optimality Theory*: 126-144, Coyote Working Papers, University of Arizona, Tucson.

Padgett, Jaye. (1991) *Stricture in Feature Geometry*, Doctoral dissertation, University of Massachusetts, Amherst. [Published by CSLI, Stanford, 1995].

Padgett, Jaye. (1992) “OCP Subsidiary Features”, *Proceedings of the North East Linguistics Society* 22, 335-346, GLSA, Amhurst, MA.

Padgett, Jaye. (1995) “Feature Classes,” In J. Beckman, L. Dickey and S. Urbanczyk, eds., *Papers in Optimality Theory*: 385-420, University of Massachusetts Occasional Papers 18. ROA-112.

Padgett, Jaye. (1996) “Partial Class Behavior and Nasal Place Assimilation”, (Appeared in K. Suzuki and D. Elzinga, (eds.), *Proceedings of Southwest Optimality Workshop I: Features in Optimality Theory*. Coyote Working Papers, University of Arizona, Tucson.) ROA-113.

Pater, Joe. (1995) *Austronesian Nasal Substitution and Other NC Effects*, ms, ROA-92.

Phelps, Elaine (1975) “Sanskrit Diaspirates”, *Linguistic Inquiry* 6: 447-464.

Phelps, Elaine and Brame, M. (1973) “On Local Ordering of Rules in Sanskrit”, *Linguistic Inquiry* 4: 387-400.

Pierrehumbert, Janet. (1993) “Dissimilarity in the Arabic Verbal Roots’, *Proceedings of the North East Linguistics Society* 23, 367-381, GLSA, Amhurst, MA..

Poser, William J. (1982) “Phonological Representations and Action-At-A-Distance,” In H. v. d. Hulst and N. Smith, eds., *The Structure of Phonological Representations (Part II)*: 121-158, Foris, Dordrecht.

Posner, Rebecca R. (1961) *Consonantal Dissimilation in the Romance Languages*, Basil Blackwell, Oxford.

Prince, Alan. (1983) “Relating to the Grid,” *Linguistic Inquiry* 14: 19-100.

Prince, Alan. (1990) “Quantitative Consequences of Rhythmic Organization,” Paper presented at *CLS* 26-II: 355-398 The Parasession on the Syllable in Phonetics and Phonology, Chicago.

Prince, Alan and Paul Smolensky. (1993) *Optimality Theory: Constraint Interaction in Generative Grammar*, ms, Rutgers University and University of Colorado at Boulder.

Pulleyblank, Douglas. (1983) “Extratonality and Polarity,” *Proceedings of the West Coast Conference on Formal Linguistics* 2, Stanford Linguistics Association, Stanford.

Pulleyblank, Douglas. (1986) *Tone in Lexical Phonology*, D. Reidel Publishing Company, Dordrecht.

Pulleyblank, Douglas. (1994) *Neutral Vowels in Optimality Theory: A Comparison of Yoruba and Wolof*, ms, University of British Columbia.

Pulleyblank, Douglas. (1997) “Optimality and Features,” In D. T. Langendoen and D. Archangeli, eds., *Optimality Theory: An Introduction*, Blackwell Publishers, Oxford.

Rehg, K. L. and D. G. Sohl (1981) *Ponapean Reference Grammar*, University of Hawaii Press, Honolulu.

Rice, Keren and Peter Avery (1989) “On the Interaction between sonority and voicing”, *Toronto Working Papers in Linguistics* 10: 65-92.

Rosenthall, Sam (1994) *Vowel/Glide Alternation in a theory of Constraint Interaction*, Doctoral dissertation, University of Massachusetts, Amhurst.

Ross, J. R. (1972) “Double-ing”, *Linguistic Inquiry* 3: 61-86.

Sag, Ivan (1974) “The Grassmann’s Law Ordering Pseudoparadox”, *Linguistic Inquiry* 5: 591-607.

Sag, Ivan (1976) “Pseudosolutions to the Pseudoparadox: Sanskrit Doaspirate Revisited”, *Linguistic Inquiry* 7: 609-622.

Schein, Barry and Donca Steriade. (1986) “On Geminates,” *Linguistic Inquiry* 17: 691-744.

Schindler, Jochem (1976) “Diachronic and Synchronic Remarks on Bartholomae’s and Grassmann’s Laws”, *Linguistics Inquiry* 7: 622-637.

Selkirk, Elisabeth. (1988) Dependency, Place and the Notion ‘Tier’, ms, University of Massachusetts, Amherst.

Selkirk, Elisabeth. (1991) “Vowel Height Features: Evidence for Privativity and Dependency”, Paper presented at UQAM, Montreal.

Selkirk, Elisabeth. (1993) [Labial] Relations, ms, University of Massachusetts, Amherst.

Shaw, Patricia (1980) *Dakota Phonology and Morphology*, New York, Garland.

Shaw, Patricia (1985) "Modularization and Substantive Constraints in Dakota Lexical Phonology", In C. Ewen and J. Anderson (eds.), *Phonology Yearbook* 2.

Shibatani, Masayoshi (1990) *The Languages of Japan*, Cambridge, Cambridge University Press.

Sihler, Andrew L. (1995) *New Comparative Grammar of Greek and Latin*, Oxford University Press, Oxford.

Slocum, M. C. (1948) "Tzeltal (Mayan) Noun and Verb Morphology", *International Journal of American Linguistics* 14: 77-86.

Smolensky, Paul. (1993) Harmony, Markedness, and Phonological Activity, Handout from ROW-1. [Revised, ROA-87, 1995].

Smolensky, Paul. (1995) On the Internal Structure of the Constraint Component Con of UG, Handout of talk at UCLA, 4/7/95, ROA-86.

Sohn, Ho-min. (1975) *Woleaian Reference Grammar*, The University of Hawaii Press, Honolulu.

Sohn, Ho-min and Anthony F. Tawerilmang. (1976) *Woleaian-English Dictionary*, The University of Hawaii Press, Honolulu.

Stemberger, Joseph (1981) "Morphological Haplology", *Language* 57: 791-817.

Steriade, Donca. (1987) "Redundant Values," In A. Bosch, B. Need and E. Schiller, eds., *CLS 23-II: Papers from the Parasession on Autosegmental and Metrical Phonology*: 339-362, Chicago Linguistic Society, Chicago.

Steriade, Donca. (1995) "Underspecification and Markedness," In J. Goldsmith, ed., *The Handbook of Phonological Theory*: 114-174, Basil Blackwell, Cambridge, Mass.

Suh, Chang-Kook (1997) *Consonant Geminates: Towards a Theory of Integrity and Inalterability*, Doctoral dissertation, University of Arizona.

Suzuki, Keiichiro. (1995a) "Consequences of Iambic Stress System in Southern Paiute," Paper presented at LSA Annual Meeting, New Orleans.

Suzuki, Keiichiro. (1995b) *Vowel Raising in Woleaian: Adjacency and Linear Precedence in OT*, ms, University of Arizona.

Suzuki, Keiichiro. (1997) "NN: Rendaku and Licensing Paradox," In Ho-min Sohn & J. Haig (eds.) Japanese/Korean Linguistics, vol 6: 215-228, CSLI Publications, Stanford, Calfornia.

Suzuki, Keiichiro. (1998) "Double-Sided Effect in OT: Sequential Grounding and Local Conjunction," In K. Suzuki and D. Elzinga, (eds.), *Proceedings of Southwest Optimality Workshop I: Features in Optimality Theory*: 209-224, Coyote Working Papers, University of Arizona, Tucson.

Suzuki, Keiichiro (forthcoming) Locality and Lexical Stratification in Japanese, ms, University of Arizona.

Uhlenbeck, E. M. (1949) *De Structuur van het Javaanse Morpheem*, Nix & Co, Bandoeng.

Unger, James (1975) Studies in Early Japanese Morphophonemics, Doctoral dissertation, Yale University.

von Soden, Wolfram (1969) *Grundriss der Akkadischen Grammatik*, Analecta orientalia 33.2, Pontificum Institutum Biblicum, Rome.

Walsh-Dicky, Laura (1997) The Phonology of Liquids, Doctoral dissertation, University of Massachusetts, Amhurst.

Waterhouse, Viola (1949) "Learning a second language first", *International Journal of American Linguistics* 15: 106-109.

Waterhouse, Viola (1962) "The Grammatical Structure of Oaxaca Chontal", *International Journal of American Linguistics* 28.

Welmers, William (1946) A Descriptive Grammar of Fanti. *Language dissertation* 39. [Language vol. 22, no.3, Suppl.].

Wordick, Frank (1982) *The Yinjibarndi Language*, (Pacific Linguistics Series C, 71.), Australian National University, Canberra.

Yip, Moira (1982) "Reduplication and CV Skeleta in Chinese Secret Languages", *Linguistic Inquiry* 13: 637-662.

Yip, Moira (1987) "English vowel epenthesis," *Natural Language and Linguistic Theory* 5: 463-484.

Yip, Moira (1988) "The Obigatory Contour Principle and Phonological Rules: A Loss of Identity," *Linguistic Inquiry* 19: 65-100.

Yip, Moira (1989) "Feature Geometry and co-occurrence restrictions", *Phonology* 6: 349-374.

Yip, Moira (1995a) *Identity Avoidance in Phonology and Morphology*, ms, University of California, Irvine, ROA-82.

Yip, Moira (1995b) "Repetition and its Avoidance: The Case of Javanese", (Appeared in K. Suzuki and D. Elzinga, (eds.), *Proceedings of Southwest Optimality Workshop I: Features in Optimality Theory*. Coyote Working Papers, University of Arizona, Tucson.) ROA-83.