

Takelma Dissimilation and the Form of the OCP*

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0. Introduction

In *The Sound Pattern of English* (SPE), Chomsky and Halle (1968) propose that the form of dissimilation rules is, in general, as in (1).

(1) $[\alpha F] \rightarrow [-\alpha F] / _ [\alpha F]$ (p. 178)

Since dissimilation rules change the feature value $[\alpha F]$ to $[-\alpha F]$ in the context of $[\alpha F]$, it has been proposed that they are a result of the Obligatory Contour Principle (McCarthy 1985, Odden 1987, Yip 1988). McCarthy (1986) proposes that the OCP, in addition to applying to tonal sequences, also applies to melodic sequences as stated in (2).

(2) Obligatory Contour Principle: At the melodic level, adjacent identical elements are prohibited (p. 208)

In this paper I examine two rules of dissimilation in Takelma: Coronal Dissimilation and Nasal Dissimilation. These rules, I claim, are the result of the Obligatory Contour Principle (henceforth OCP). With respect to these two dissimilation rules the question arises as to whether the OCP functions only in cases of dissimilation or whether it plays a more general role in the grammar of Takelma. In addressing the question of the role of the OCP in Takelma, I focus on the non-symmetrical behavior of coronal sonorants and coronal obstruents. The coronal obstruents neither trigger nor undergo the dissimilation rule. One might suggest that this asymmetrical behavior can be characterized by the underspecification of the coronal feature in the case of obstruents. However, I will show that underspecification cannot account for the fact that Coronal Dissimilation targets only coronal sonorants. Rather, I argue that the OCP in Takelma is conditioned by a segment's value for sonorancy. I show that the dissimilation of coronal sonorants is part of a more general prohibition on adjacent coronal specifications with like values for the feature [sonorant] at both the underlying level and during phonological derivations.

Dissimilation in Takelma results in alternations in the final consonant of noun characteristic suffixes as shown in (3).

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| | | | | |
|-----|---------------------------|----|-----------------------|----------|
| (3) | a. /pep+Vn/ | -> | [pepen] | 'rushes' |
| | b. /hel+Vn/ | -> | [helam] | 'board' |
| | c. /ʃim+Vn/ | -> | [ʃimil] | 'dew' |
| | d. /k ^w an+Vn/ | -> | [k ^w alam] | 'road' |

As shown in (3a), the suffix final nasal consonant is [n] following stems which contain non-nasal obstruents. However, if the suffix follows a stem which contains a [+sonorant] consonant, various alternations are evidenced. As shown in (3b) if the stem contains an [l] the suffix final nasal surfaces as [m]. In (3c), the suffix final nasal surfaces as [l] following a stem ending in an [m]. In (3d) the stem contains an [n] underlyingly and the suffix-final nasal surfaces as [m] while the stem-final nasal surfaces as [l]. In this paper I will present an analysis of this set of alternations within a non-linear theory of phonological structure which incorporates the OCP as a constraint on hierarchical phonological representations.

The structure of the paper is the following. In section 1, I discuss the role of the OCP in dissimilation rules. In section 2, I present the facts of Takelma dissimilation. I propose an analysis of both Coronal Dissimilation and Nasal Dissimilation. I claim that the OCP disallows adjacent [+sonorant] coronal and nasal specifications. I also discuss the status of default values and the role of structure preservation. In section 3, I examine the underlying distribution of coronal sequences. I show that both the dissimilation rules and the underlying distribution of coronal sequences provide evidence that the OCP in Takelma is conditioned by a segment's value for [sonorant]. In section 4, I discuss how the facts of dissimilation might be analyzed within an approach which claims that at least some coronal consonants are unspecified for place features and will argue that such an approach is not tenable. Section 5 concludes the paper.

1. The Form of Dissimilation Rules

Following McCarthy's (1985) early proposals, Yip (1988) proposes that all rules involving identity of target and trigger--of which dissimilation is a clear example--are the result of the OCP functioning in the particular language under examination. The OCP, as a universal trigger, renders such rules less marked universally or less costly to the grammar. Alternatively, one might view the OCP as a universal constraint which prohibits the surfacing of disallowed sequences and therefore the language implements a phonological process to alleviate such violations.

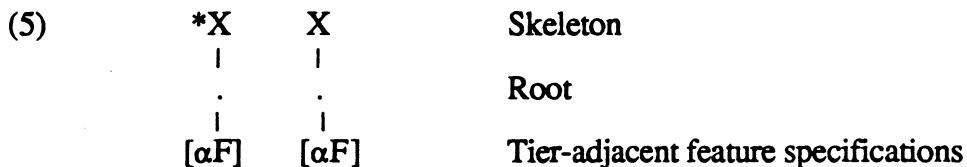
1.1. OCP Triggered Rules and Feature Structure

The relationship of dissimilation and the OCP becomes especially interesting in the context of hierarchical segmental representations such as those proposed in Clements (1985) and Sagey (1986). Models of feature geometry provide a new perspective on dissimilation rules. The relevant aspects of hierarchical representation, for the purposes of this paper, are the characterization of the root node as [sonorant], the representation of place features and the feature [nasal] as illustrated in (4).



I assume that segments are represented by a timing or skeletal slot, depicted here as X. All features characterizing segment quality are dominated by a root node. The root node itself is inherently characterized by the features [sonorant] and [consonantal] following McCarthy (1988). All relevant segments in the case of Takelma dissimilation are [+consonantal] so this is omitted from all following diagrams. The feature [nasal] occurs higher in the representation than the Place node which dominates the terminal articulator features [labial, coronal, dorsal] which are assumed to be single valued (or privative) specifications (following Sagey 1986).

The second important component of the theoretical framework assumed for the treatment of dissimilation in this paper is the OCP. The OCP, as it affects representations such as those in (4), is schematized in (5) where the linear sequence [α F] [α F] is disallowed.



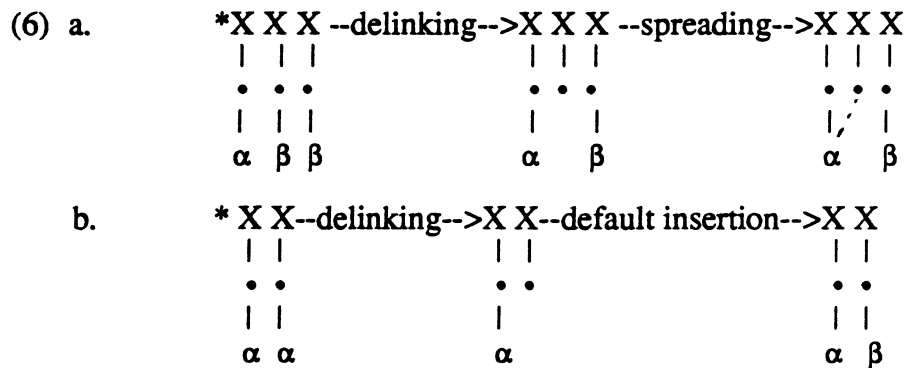
The OCP may affect any aspect of hierarchical feature organization. Thus in (5), [α F] may be any two identical feature specifications. Content nodes, such as [labial], [voice], etc. are the relevant part of the structure for determining whether or not the OCP applies. However, the elimination of a disallowed sequence may affect abstract nodes (for example, place node merger). Such a representation not only characterizes existing dissimilation rules, but predicts that only tier-adjacent identical specifications will result in

dissimilation. Steriade (1987) illustrates, in the context of translaryngeal spreading rules, that hierarchical feature representations themselves impose certain locality conditions on phonological spreading rules. Dissimilation rules are expected to show parallel properties. A dissimilation rule which affects adjacent identical coronal specifications scans the coronal tier. Other place specifications, such as labial or dorsal, will be transparent to the dissimilation process since these features occupy distinct tiers. The Takelma dissimilation facts confirm these predictions.

1.2. Underspecification and Default Rules

Hierarchical segment structure and a universal constraint such as the OCP result in two distinct types of rules. First, the OCP may result in a rule which delinks an existing node. An adjacent node may then spread to this node resulting in assimilation (see Yip's (1988) discussion of Berber). The second type of rule is one which delinks a feature or node as the first step in cases of dissimilation (Odden 1987). Once delinking applies, the segment acquires a feature specification through the insertion of a default value.

Within most versions of autosegmental phonology two fundamental rules types are recognized: spreading and delinking. In (6), I schematize the two cases.



The result of delinking is a segment uncharacterized for any feature on some tier. One way a segment which has no specification can obtain feature content is for an adjacent feature to spread to the unspecified segment as schematized in (6a). Note in this context that after the deletion of the first feature [β], the second feature [β] would be free to spread leftward analogous to the rightward spreading of [α]. Thus, it is theoretically possible that the delinking of [β], will be obscured by the subsequent spreading of the segment which participated in the OCP violation in the first place.

In (6b), I illustrate delinking followed by feature fill-in. However, delinking and subsequent feature insertion depend upon a theory of underspecification and default values. An issue raised by dissimilation rules is, therefore, how nodes are specified once delinking

has applied. It has been suggested by Odden (1987) that one would not expect OCP-triggered rules of feature delinking to be followed by rules that insert arbitrary feature values. Rather, the expected case would be that the delinking of a feature results in a general default specification which can be motivated on independent grounds on a language particular basis.

Alternatively, the fill-in specifications might be expected to be constrained by Structure Preservation (Kiparsky 1982). That is, the choice of appropriate fill-in values is limited by the segmental inventory. As will be shown, the Takelma dissimilation facts present evidence that the value which is filled in following delinking is structure preserving. There is no evidence that the value filled in after dissimilation is the general default value for Takelma. However, the phonemic inventory of Takelma limits the possibility of what values may be filled in for partially specified segments.

Thus, if the result of dissimilation as a series of elementary operations is the change of a sequence of identical melodic elements into a non-identical sequence, then one can view such rules as relating in a direct and obvious way to dynamic OCP effects.

2. Takelma Dissimilation

The focus of this section is on two rules of dissimilation in Takelma, an extinct Penutian language described by E. Sapir in his 1922 dissertation.¹ A lexicon of Takelma appears as an appendix to a collection of texts also authored by Sapir (1909).

In (7) I give the consonant and vowel inventories of Takelma.²

(7) Takelma Consonant and Vowel Inventories:

(a) Vowels: i, ii u, uu
 e, ee o,oo

 a
 Diphthongs: V+i,u

¹Sapir (1922) describes the process of dissimilation of Takelma noun characteristics. His generalizations are incorporated into the analysis proposed in this paper.

²Note that in the consonant inventory, both alveolar and palatal obstruents are given. It is not clear, however, that this is a phonemic contrast. Sapir claims that the alveolar [s] and the palatal [ʃ] may be non-distinct, surface realizations of one phoneme. He does not explicitly claim that this is the case for [ts] and [tʃ]. However affricates may parallel the fricatives. There is one minimal pair in the lexicon which contrasts [ts] and [tʃ]. Within the context of a limited lexicon, the exact status of the alveolar and palatal affricates is, therefore, unclear. I return to this point in section 4. For the time being, I parenthesize the palatal ([-anterior, coronal]) fricative and affricate.

| (b) <u>Consonants:</u> | Labial | Coronal | | Velar |
|------------------------|--------|----------------|-------|----------------|
| | | +Ant | -Ant | |
| Stops: Plain | p | t | | k |
| Asp. | ph | t ^h | | k ^h |
| Glott. | p' | t' | | k' |
| | | | | ʔ,h |
| Affricates | | ts' | (tʃ') | |
| Fricatives | | s | (ʃ) | x |
| Liquid | | l | | |
| Nasals | m | n | | |
| Glides | w | y | | |

2.1. Dissimilation of Noun Characteristics

As exemplified above, Takelma dissimilation occurs when a noun is suffixed with what Sapir terms a noun characteristic. Takelma noun characteristics are suffixes that occur on the noun before all nominal increments, i.e., pronominal suffixes and locatives. According to Sapir, the noun characteristic has no clear grammatical function. Takelma noun stems occur in their underlying, or non-suffixed, form only in their absolutive function or when incorporated into the verb. In their non-suffixed form, most Takelma noun stems are monosyllabic of the shape CV(C).

In the examples in (8), the noun characteristic surfaces as [-Vn]. In examples (8a-c), we see that the stem final consonant may be a labial stop or glide. In (8d-g), the underlying form of the noun ends in a coronal stop or glide. (I assume that the glides are vocalic articulations mapped to non-peak slots in syllable construction. As such they play no role in consonantal dissimilation.) In (8h-k), the underlying form of the noun ends in a velar stop or fricative. Finally, the examples in (8 l, m) illustrate nouns which end in either a consonant cluster or a labialized velar consonant.

(8) Case 1: Noun Characteristic Surfaces as [-Vn]:

Stem final labial consonant, glide:

| | | | |
|---------------|----|-----------|------------|
| a. /wuup'+Vn/ | -> | [wuup'un] | 'eyebrows' |
| b. /pep'+Vn/ | -> | [pepen] | 'rushes' |
| c. /yiw'+Vn/ | -> | [yiwin] | 'speech' |

Stem final coronal consonant, glide:

| | | | |
|----------------------------|----|------------------------|--------------|
| d. /yut'+Vn/ | -> | [yut'un] | 'white duck' |
| e. /xt+Vn/ | -> | [xtan] | 'eel' |
| f. /k ^w it'+Vn/ | -> | [k ^w it'in] | 'wrist' |
| g. /p'iy+Vn/ | -> | [p'iyin] | 'deer' |

Stem final velar consonant:

| | | | |
|---------------|----|-----------|-----------------------|
| h. /tak+Vn/ | -> | [takan] | 'turtle' |
| i. /wik+Vn/ | -> | [wikin] | 'red lizard' |
| j. /kak'+Vn/ | -> | [kak'an] | 'house ladder' |
| k. /tʃ'ax+Vn/ | -> | [tʃ'axan] | 'blue striped lizard' |

Stem final consonant cluster / labialized velar:

| | | | |
|---------------------------|----|-----------------------|---------------|
| l. /yuxk+Vn/ | -> | [yuxkan] | 'trout' |
| m. /ʃuk ^w +Vn/ | -> | [ʃuk ^w an] | 'root basket' |

In all the examples above, the surface form of the suffix has a final [-n]. Furthermore, in almost all these examples, the vowel of the suffix is a copy of the vowel of the underlying stem. There are two cases where this generalization does not hold. In example (8e), the stem has no underlying vowel and the suffix vowel, in this case, surfaces as an [a], the epenthetic vowel in Takelma (Goodman 1987). In examples (8l) and (8m) the suffix vowel is not a copy of the stem vowel but is, again, [a], the default vowel. These examples contain a consonant cluster or a consonant with a secondary articulation and again surface with the default vowel.³

Based on these patterns, I assume that the underlying form of the noun characteristic is /-Vn/, but surface alternations occur. (The reasons why the underlying representation of the suffix-final nasal is proposed to be fully specified for the feature coronal will be discussed in Section 4.)

The examples in (9) illustrate that when the stem contains an [l], the suffix consonant surfaces as [m].

(9) Case 2: Noun characteristic surfaces as [-Vm] after a stem containing an [l]:

(a) Adjacent /..l+Vn../ sequences:

| | | | |
|-----------------|----|-----------|---------|
| i. /hel+Vn/ | -> | [helam] | 'board' |
| ii. /kel+Vn/ | -> | [kelam] | 'river' |
| iii. /tʃ'el+Vn/ | -> | [tʃ'elem] | 'hail' |

³ Although an interesting issue, the distribution of copy vowels versus the default vowel [a] is beyond the scope of this paper. I will assume that, in general, the duplication of the stem vowel takes place through spreading. In cases where spreading is blocked, the default [a] surfaces.

| | | | |
|----------------|----|-----------------|---------|
| iv. /tʃʷul+Vn/ | -> | [tʃʷulum] | 'wart' |
| v. /hapil +Vn/ | -> | [hapilim] | 'empty' |
| vi. /yul+Vn/ | -> | [yulum ~ yulam] | 'eagle' |
| vii. /kul+Vn/ | -> | [kulum] | 'oak' |

(b) Non-adjacent /..l(V)C+Vn../ sequences

| | | | |
|-----------------------------|----|------------------------|-------------|
| i. /lap ^h +Vn/ | -> | [lap ^h am] | 'frog' |
| ii. /lek+Vn/ | -> | [lekem] | 'kidney' |
| iii. /lox+Vn/ | -> | [loxom] | 'manzanita' |
| iv. /tolk ^h +Vn/ | -> | [tolk ^h am] | 'anus' |

The examples in (9a) illustrate that the noun characteristic surfaces as a vowel plus labial nasal after a stem-final [l]--a coronal sonorant. The underlying coronal nasal dissimilates to the non-coronal [m]. The examples in (9b) show that any occurrence of [l] in the stem triggers the dissimilation of the coronal nasal. The sequential cooccurrence of any two coronal sonorants is prohibited in suffixation contexts. In such cases dissimilation occurs. Thus, the examples in (9) illustrate a case of place dissimilation where the second of two coronal specifications on sonorant consonants is changed to a labial specification.

The third case, where the stem contains an [m] and the suffix surfaces as [-Vl], is exemplified in (10a-c).

(10) Case 3: Noun Characteristic Surfaces as [-Vl] after a stem containing [m]:

| | | | |
|---------------|----|-----------|----------------------|
| a. /tʃʷam+Vn/ | -> | [tʃʷamal] | 'mouse' |
| b. /ʃim+Vn/ | -> | [ʃimil] | 'dew' |
| c. /meh+Vn/ | -> | [mehel] | 'basket for cooking' |

In the examples in (10), the [m] and the [n] dissimilate with respect to the feature [nasal]. If the stem contains a nasal, the suffix consonant surfaces as the non-nasal coronal sonorant [l]. After dissimilation, these cases contain neither a sequence of coronal sonorants nor a sequence of nasal consonants on the surface.

In the final set of examples, the suffix surfaces as [-Vm] when the stem ends in a coronal nasal [n] as illustrated in (11). Additionally, the underlying stem-final [n] surfaces as [l].

(11) Case 4: Noun characteristic surfaces as [-Vm], stem /n/ dissimilates to [l]:

| | | | |
|---------------------------|----|-----------------------|--|
| a. /k ^w an+Vn/ | -> | [k ^w alam] | 'road' (cf. [k ^w an], absolutive) |
| b. /xan+Vn/ | -> | [xalam] | 'urine' (cf. [xan], absolutive) |

These cases illustrate two cases of dissimilation: the suffix nasal dissimilates in place of articulation and the stem final consonant dissimilates with respect to nasality.

2.2. The OCP and Takelma Dissimilation

In this section I present an analysis of the Takelma facts assuming that the OCP, as defined on sequences of coronal and nasal sequences, is the driving force behind the rules of dissimilation in Takelma. First, the underlying /n/ of the suffix dissimilates to an [m] when preceded by a [coronal, +sonorant] consonant, either oral or nasal. Second, the result of suffixation is never a sequence of two nasal consonants. If the stem contains a nasal, the suffix final [n] dissimilates to an [l] or if the suffix [n] has dissimilated to [m], the [n] of the stem dissimilates to [l]. In this analysis, I propose that [l] is the non-nasal counterpart of the nasal coronal sonorant. That is, [l] need not be characterized for the feature [lateral] at all.

The tiers upon which the OCP is defined and where dissimilation applies are the coronal tier and the nasal tier. The OCP as it applies to segmental sequences is stated in (12).

(12) Statement of the OCP for Takelma

- a. *[coronal] [coronal]; condition: [α sonorant]
- b. *[nasal][nasal]

The statement in (12a) says that two tier-adjacent [coronal] consonants with identical values for [sonorant] are disallowed in Takelma.⁴ The second part of the OCP statement in (12b) disallows a sequence of two tier adjacent [nasal] specifications. The unique aspect of the analysis presented in this paper is the proposal that [α sonorant] conditions the application of the OCP on the coronal tier. The [α sonorant] condition holds vacuously on the nasal tier.

The claim inherent in the proposal that the OCP is conditioned by [α sonorant] is that, on a language paraticular basis, some feature may override the absolute prohibition expressed by the OCP. The feature [sonorant], I claim, is such a feature. A natural question in this context is: what does it mean to claim that the OCP is conditioned? Yip (1989) in a survey of morpheme structure constraints shows that the OCP, in the general case, disallows sequences of consonants from the same place of articulation. One might claim that this is the default setting for the OCP. However, it appears that some languages allow various feature specifications to override the general statement of the OCP. Yip presents cases where [\pm distributed] or [\pm anterior] as dependent features complicate the

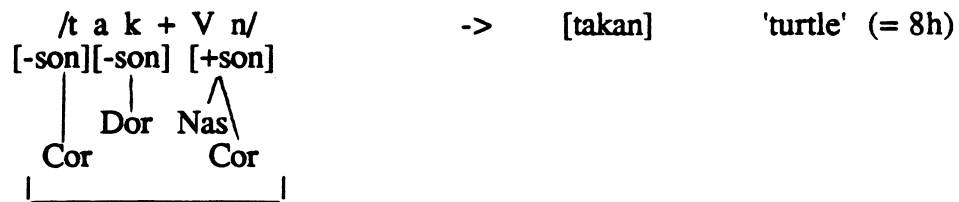
⁴ Dresher (1989) suggests that the OCP in Arabic should be conditioned by the feature [+sonorant]. He proposes that the domain of the OCP is [+sonorant] for coronal consonants. McCarthy (1988) also discusses the fact that the Arabic Morpheme Structure Constraint affecting place of articulation is sensitive to the [sonorant] property of the segments it affects.

statement of the OCP. If the OCP is viewed as a constraint on underlying representations which disallows sequences of segments which are not articulatory and perceptually distinct, then languages may vary in what counts as making two otherwise identical segments distinct enough to satisfy the OCP. From this point of view, it is not surprising that a segment's value for sonorancy would be one way to do this. Under most views of segment specification, all consonants are classified as to whether they are [+sonorant] or [-sonorant]. This distinction characterizes obstruents versus sonorants. There are many cases of phonological rules which refer to one of these groups to the exclusion of the other. Typically only the [+sonorant] consonants serve as syllable nuclei. It is extremely marked for a language to allow syllable peaks to be occupied by obstruents. On the other hand, in the general case of consonant voicing assimilation, the consonants which most typically participate in these rules are obstruents since this is the class of segments which generally involve contrastive voicing. Because a segment's value for [sonorant] is fundamental and phonologically important, it is not unexpected that the distinction in this value may render consonantal sequences distinct enough to override OCP violations. The facts of Takelma, both the dissimilation rule and the underlying distribution of coronal sequences, provide strong evidence for such a view.

2.2.1. The Representation of Non-dissimilating Cases

First, consider the representation of noun stems and the characteristic suffix in cases where dissimilation does not apply. As shown in (8) above, dissimilation does not apply when the coronal consonants in the stem and suffix differ with respect to their values for sonorant. I illustrate this case in (13).

(13) Case 1. No Dissimilation. Underlying /-Vn/ surfaces with an [n].

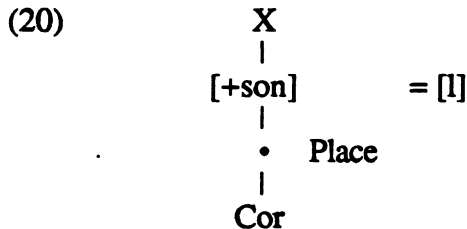


No OCP violations; coronal specifications are not [α sonorant]

No rules apply to forms of this type. Although there are two coronal specifications, they differ in their value for sonorant and the OCP fails to apply. The [n] of the suffix is represented as specified for the feature coronal. One of the central claims made in this analysis is that full specification provides the better and more predictive analysis of the

(19) Preliminary: Nasal Dissimilation: Delink [nasal]

In these cases, the second of two nasal specifications delink. Once the rule of Nasal Dissimilation has applied to forms such as those illustrated in (18), the derived structure of the non-nasal coronal sonorant is as illustrated in (20).

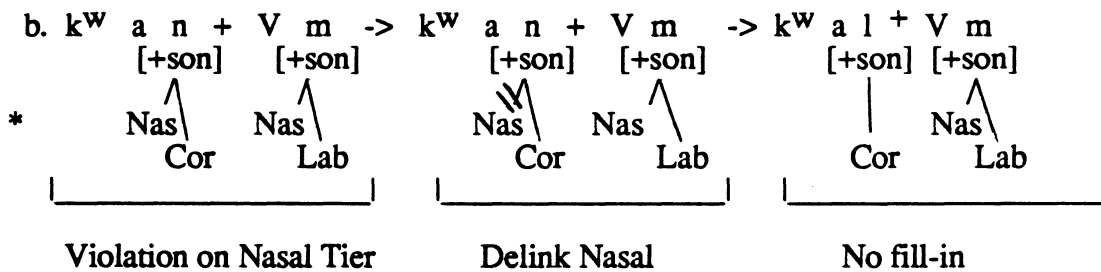
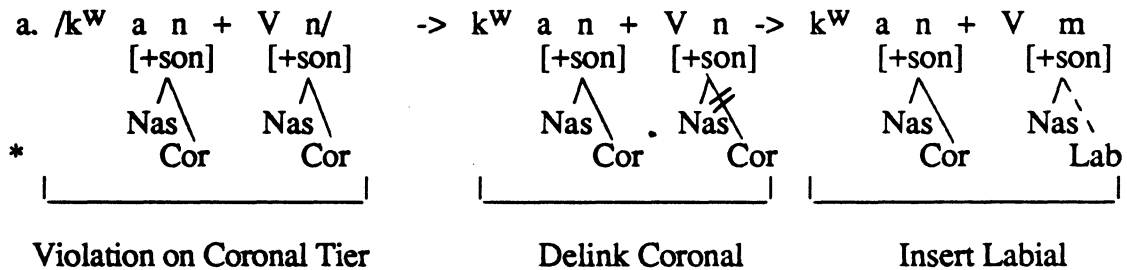


I assume that this is the representation of [l] in Takelma.

2.2.4. Cases which Involve both Coronal and Nasal Dissimilation

The data in (11) above illustrate the application of both Coronal Dissimilation and Nasal Dissimilation within the same form. Such cases are represented as shown in (21). Examples such as these require the reformulation of the Nasal Dissimilation rule.

(21) Case 4. Both Coronal Dissimilation and Nasal Dissimilation apply.



$\rightarrow [k^w \text{alam}]$ 'road' (= 11 a)

In (21a) the application of Coronal Dissimilation is illustrated and in (21b) the application of Nasal Dissimilation is illustrated. In (21a) the OCP violation on the coronal tier is alleviated by deleting the second occurrence of the [coronal] articulator node under the

[α sonorant] condition. The feature [labial] is filled in for the suffix-final nasal consonant, this being the only other place of articulation at which nasals occur.

Following the analysis developed to this point, we would expect the second nasal specification to delink in (21) while, in fact, the OCP violation on the nasal tier is alleviated by delinking the first occurrence of [nasal] (21b). Briefly consider the possibilities involved in this derivation. Delinking the second [nasal] specification results in intermediate /kwan+al/. If Coronal Dissimilation applies and delinks the place specification of [l] the segment is uninterpretable since there is no non-nasal labial sonorant in Takelma. Therefore, this derivation is ruled out. Structure preservation then plays an important role in both Coronal Dissimilation and Nasal Dissimilation. To capture this fact, I propose to reformulate Nasal Dissimilation as in (22) encoding the structure preserving nature of the rule directly. The statement of Nasal Dissimilation says that [nasal] can only be delinked from coronal consonants.

(22) Nasal Dissimilation

•
✕ \

Operation: Delink Nasal Cor

3. The Morpheme Structure Constraint

In addition to claiming that dissimilation rules are triggered by the OCP, Yip (1988) also makes the following claim:

(23) ...All rules involving identity of target and trigger with an output in which they are no longer identical and adjacent are OCP-triggered rules. The kind of case that would...require a weakening of this claim would be a language with the following properties:

- (i) Dissimilation of F: [α F] \rightarrow [- α F] / __[α F]
- (ii) Demonstrable morpheme-internal [α F] [α F] sequences, as opposed to doubly linked [α F]. (p. 73)

While Yip herself does not pursue this prediction, the expectation is that if a language evidences a rule of dissimilation which is arguably due to the OCP, then it follows that such a language should also have a morpheme structure constraint which disallows morpheme-internal sequences of the dissimilating feature(s) (see also Cohn, this volume).

The analysis developed above depends on the claim that the OCP operates in Takelma on tier-adjacent coronal specifications and tier-adjacent nasal specifications. According to Yip's proposals, these are just the sequences which should either be multiply-linked or absent underlyingly. Given the proposal that the OCP in Takelma is conditioned by a segment's value for the feature [sonorant], the predictions are even more specific.

First, we predict that sequences which do not agree in sonorancy are freely permitted. The second prediction is that all underlying monomorphemic sequences of [coronal] which agree in sonorancy are either subject to dissimilation or are multiply linked, since sequences of the feature coronal agreeing in sonorancy are disallowed on the surface in Takelma. Therefore, if such sequences are present underlyingly they must consist of only one occurrence of the feature linked to two segments. The third prediction is that there will be no sequences of coronal specifications which agree in sonorancy but which differ in [\pm anterior] since these sequences should share a single coronal specification but cannot if they differ in anteriority. This set of predictions is borne out in an interesting way by the distributional facts of Takelma.

In a corpus of 575 nouns and adjectives in the lexicon, there are 61 cases which contain an underlying coronal-vowel-coronal sequence. This is a large number compared to other places of articulation.⁵ However, in 47 of these cases (77%) the sequence consists of a non-sonorant coronal and a sonorant coronal consonant with the order [obstruent] - [sonorant] in most cases. I summarize the distributional facts in (24).

| (24) | Coronal | Vowel | Coronal | Total |
|------|-----------------------|-------|------------------------|-------|
| | [α son] | | [- α son] | 47 |
| | [+ son] | | [+ son] | 2 |
| | [- son, α ant] | | [- son, α ant] | 8 |
| | [- son, α ant] | | [-son, - α ant] | 4 |
| | | | | 61 |

Examples illustrating the allowed sequences of coronal-vowel-coronal differing in sonorancy are given in (25).

⁵ There are 12 labial-vowel-labial sequences. Five of these are obstruent-vowel-obstruent, five are obstruent-vowel-sonorant, there is one sonorant-vowel-sonorant and one sonorant-vowel-obstruent sequence within the labial group. There are 10 dorsal-vowel-dorsal sequences; all are obstruent-vowel-obstruent since there are no dorsal sonorants in Takelma.

(25) Underlying sequences of coronal differing in sonorancy (partial list):

| | | | | | |
|----|---------------------|------------------------|----|-----------------------|----------------------------|
| a. | /tan/ | 'rock' | j. | /ʃin/ | 'wood coals' |
| b. | /tel/ | 'yellow-jacket' | k. | /tola/ | 'hollow tree' |
| c. | /nos/ | 'next door' | l. | /tolax/ | 'things,utensils' |
| d. | /ʃal/ | 'foot' | m. | /ʃilek ^w / | 'acorn-pestle of stone' |
| e. | /sel/ | 'black paint, writing' | n. | /t ^h elma/ | 'acorn pestle' |
| f. | /sens/ | 'bug' | o. | /t'ela/ | 'louse' |
| g. | /t ^h an/ | 'squirrel' | p. | /tʃ'ana/ | 'about to die' |
| h. | /t'ela/ | 'shinny stick' | q. | /tʃ'ulm/ | 'wart' |
| i. | /tʃ'il/ | 'red' | r. | /ts'an/ | 'porcupine' |

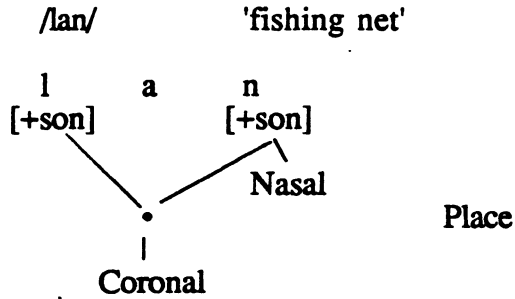
Given the proposal that the OCP in Takelma disallows all coronal sequences except those which disagree in sonorancy, this is the expected underlying distribution of such sequences. Thus the first prediction, that coronals differing in sonorancy should occur freely, is borne out.

Turning to the second prediction, we see that, while the overall preference for coronal-vowel-coronal sequences is for only one of the coronal consonants to be [+sonorant], cases where both coronal consonants are [+sonorant] are the most infrequent. Since such sequences must be linked to only one coronal specification, their infrequency may be attributed to their complex underlying representation. With respect to the third prediction, we note that coronal sequences which disagree with respect to the feature [anterior] are rare in Takelma nouns and adjectives. In general, coronal obstruents agree in their value for [anterior] systematically in the small number of lexical items available. The four cases in (24) above which constitute violations to this generalization come from the semantic field centering around 'smallness,' i.e., [t'oʃo] 'small, a little' and, by semantic criteria, constitute only one exceptional case.

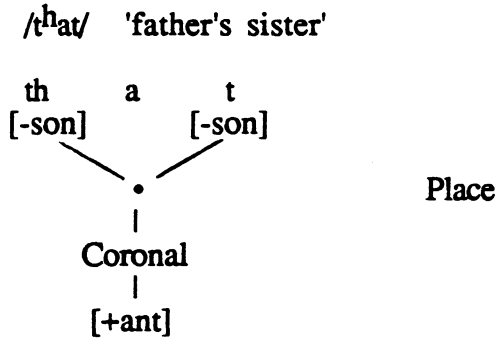
The examples below in (26) illustrate the apparent underlying violations of the OCP. In all cases, it is possible to represent the sequences in question as involving multiply linked segments.

The sequences illustrated below are infrequent in the corpus of nouns and adjectives examined. However, these cases illustrate how coronal and nasal sequences are allowed if the [coronal] and [nasal] nodes are multiply linked in underlying representations. The cases that cannot be multiply linked are the cases where coronal obstruents differ in their value for [±anterior] and these are true exceptions.

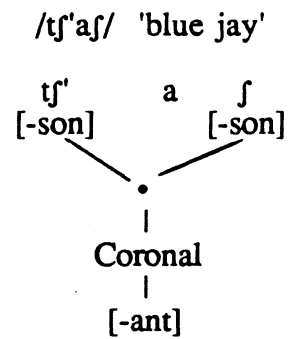
(26) a. Coronal-Vowel-Coronal; [+sonorant]



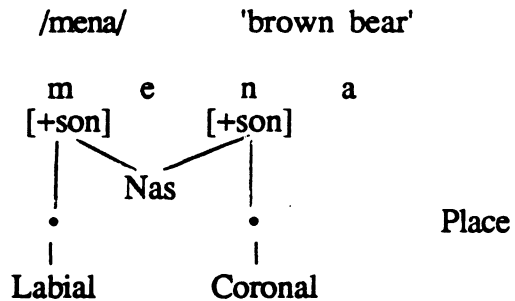
b. Coronal-Vowel-Coronal; [-sonorant]



c. Coronal-Vowel-Coronal; [-sonorant]



d. Nasal-Vowel-Nasal



In this context, one might wonder why there is a difference between the result of OCP violations underlyingly and derivationally. Underlyingly, sequences of features which violate the OCP are multiply linked and in this way removed as violations. Derivationally, however, such multiple linkings are not an option; hence disallowed sequences result in the application of the dissimilation rules. We can assume that the rule of dissimilation in Takelma is subject to the Strict Cycle Condition (Kiparsky 1982). Therefore, it is expected that it will apply only in derived environments and not root-internally.

3.1. Summary

The analysis of Takelma Dissimilation proposed above claims that the OCP operates on adjacent coronal and nasal specifications under the [α sonorant] condition. The analysis also proposes that structure preservation is a guiding principle for the specification of fill-in values. Further, under the assumption that place of articulation features are privative, we explain the failure of labial and dorsal consonants to block dissimilation. We have seen that the proposals developed in the context of the dissimilation rules extend in an interesting way to the underlying distribution of coronal sonorants and obstruents. However, the fact that only the coronal sonorants participate in the rule of Coronal Dissimilation raises, quite naturally, the question of whether all coronal consonants are fully specified for the coronal feature, an issue we turn to in the next section.

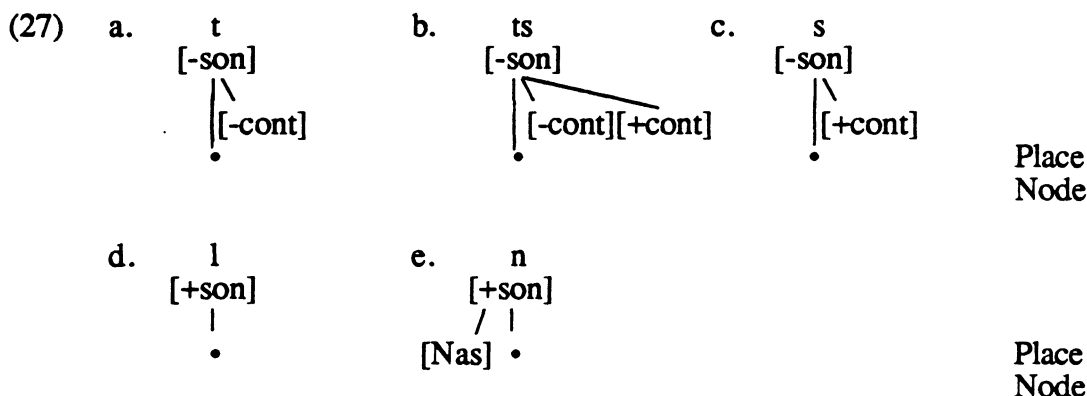
4. Underspecification and Takelma Dissimilation

As Mester and Ito (1989) point out in a review of the issues, underspecification plays a central role in the theory of Autosegmental Phonology. In determining whether or not a segment is specified for some feature the criteria of transparency or opacity and a segment's failure to trigger or to undergo some process are often invoked. We have seen that coronal obstruents neither trigger nor undergo dissimilation on the coronal tier. We have proposed to account for this fact by claiming that the OCP is sensitive to a segment's value for sonorant. However, it would be equally plausible to assume that the asymmetry is due to the absence of a coronal specification in the case of the coronal obstruents. The facts of Takelma are especially interesting in the context of underspecification because it is precisely the coronal place of articulation which has been claimed to be the unmarked or default case (Avery and Rice 1988). We now turn to an examination of the underspecification of coronal in Takelma.

There are three possibilities for coronal underspecification in the case of Takelma dissimilation. First, all coronal consonants may be unspecified for place of articulation. Second, one might claim that only coronal obstruents are unspecified for coronal thus accounting for their failure to trigger the dissimilation of the noun characteristic. Third, perhaps only the suffix-final nasal is unspecified for the coronal feature. I discuss each of these possibilities in the following sections.

4.1. Total Coronal Underspecification

Consider an analysis where all coronal consonants are unspecified for place of articulation. Avery and Rice (1988) develop such an approach to underspecification. They claim that the underspecification of coronal is inventory-driven. This means that if all coronal consonants can be distinguished without the use of the coronal articulator feature then that feature must be suppressed in underlying representations. Such a proposal results in representations of the Takelma coronal consonants as illustrated below with the place node unspecified.



At this level of representation the OCP will have no effect on any of these segments on the coronal tier since none of them have a coronal feature. Therefore, at least some of these segments must be specified for [coronal] before the rule of dissimilation can apply.

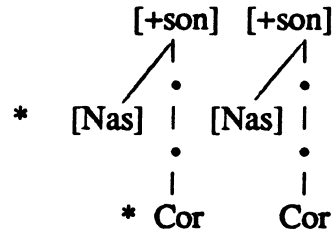
Assume that the coronal sonorants acquire place features via the following rule:
 $\emptyset \rightarrow [\text{coronal}] / \underline{\quad} [+\text{son}]$. A later context-free default rule will fill in the value for [coronal] on

non-sonorants. If the rule that fills in [coronal] applies to all consonants unspecified for place of articulation--non-sonorants as well as sonorants--the underspecification analysis becomes identical with the one proposed here, including the conditioning of the OCP by the feature [sonorant].

However, if we maintain the idea that there are two rules involved in specifying the articulator feature coronal, then the underspecification approach can distinguish between the sonorant and non-sonorant coronal consonants. The OCP, as stated, will correctly apply to all sequences of coronal sonorants. If these are the only coronal consonants specified for [coronal], the [α sonorant] condition on the OCP is unnecessary; it is replaced by the context-sensitive rule which inserts [coronal] for consonants unspecified for place but specified for [+sonorant].

The representation of a case which involves both Coronal Dissimilation and Nasal Dissimilation is illustrated in (28) after the rule which inserts [coronal] in [+sonorant] contexts applies.

(28) a. k^w a N + V N \rightarrow [k^walam] 'road'



At this point, there are two options available. If Nasal Dissimilation applies first, the second occurrence of [nasal] will be delinked. Coronal Dissimilation then applies and the second occurrence of [coronal] is delinked and replaced by [labial]. This results in the incorrect form: *[k^wamal]. Alternatively, if [coronal] delinking and [labial] insertion apply first and the statement of the rule of Nasal Dissimilation in (22) is adopted, then the first [nasal] specification is delinked because it is the only occurrence of [nasal] which is also characterized by [coronal] as required by the rule. If the rules apply in this order, the correct [k^walam] results. Note, however, that the formulation of Nasal Dissimilation itself requires the coronal sonorants to be specified for place of articulation.

To sum up, an approach which underspecifies [coronal] must have two separate rules which insert the value for place of articulation, one context-sensitive insertion rule and one context-free rule. Second, the rules of Coronal Dissimilation and Nasal Dissimilation must apply in that order. In contrast, if underspecification of [coronal] is not adopted but rather the OCP in Takelma is conditioned by [α sonorant], there are no default rules, context-sensitive or otherwise. Further, in an analysis which specifies coronal underlyingly, only one ordering, Coronal Dissimilation followed by Nasal Dissimilation, is possible.

4.2. Partial Coronal Underspecification

Consider then an analysis where only the [+sonorant] coronals are specified. This would account for the failure of coronal obstruents to trigger the dissimilation of the suffix final coronal nasal. An approach which accounts for the behavior of coronal obstruents by claiming that they are unspecified for the dissimilating feature predicts that all underlying

contrasts within the coronal obstruent series can be captured without specifying the coronal place of articulation.

This prediction is, as mentioned earlier, difficult to test. Takelma may or may not contrast affricates in terms of [\pm anterior]. There is one minimal pair in the lexicon which I give below.

(29) /tʃ'aya/ 'hide' vs. /ts'aya/ 'wash'

Adopting the claim that [anterior] is a dependent of the coronal articulator node (Sagey 1986 and others) leads to the representations for the coronal affricates given in (30).

(30)

| | |
|-----------|-----------|
| X = [tʃ'] | X = [ts'] |
| | |
| • | • |
| | |
| Coronal | Coronal |
| | |
| [-ant] | [+ant] |

Within any theory of underspecification, at least one of these two segment types must be specified for the feature coronal underlyingly. We would then expect at least one of these segments to pattern with the coronal sonorants with respect to the rule of dissimilation. However, this sort of argument against the underspecification approach is considerably weakened by the scarcity of relevant minimal pairs.

If the underspecification of coronal obstruents is, at least in part, motivated by their high-frequency across languages and is intended to reflect their unmarked status then we would also expect that the unmarked coronal obstruents will be frequent in lexical items which contain a coronal-vowel-coronal sequence. The distributional facts of Takelma, however, show that the coronal obstruents and the coronal sonorants are equally frequent in lexical items. The underspecification approach offers no explanation for the fact that the most highly preferred sequence of coronal consonants in Takelma are just those which disagree with respect to their value for [sonorant]. This is especially striking when one takes into account the fact that five out of the seven coronal consonants in the Takelma inventory (suppressing the questionable palatals) are coronal obstruents.

Thus, under an analysis that underspecifies coronal, the distributional facts of Takelma are, while accommodated, unexplained.

4.3. Suffix Underspecification

Finally, consider an analysis where only the suffix nasal is unspecified for place of articulation and the feature [coronal] is inserted by default. In cases where the suffix nasal

surfaces as [m], the rule of [coronal] insertion must be blocked. The claim would be, then, that the insertion of default values does not take place if the result creates an OCP violation. However, such an analysis hinges on the default rules of coronal insertion applying only to the suffix nasal. The specification for [coronal] in the case of sonorants must be present in the stem in order to block the insertion of [coronal] in the suffix.

There are, however, problems with an analysis which blocks the insertion of [coronal] in the suffix if the stem contains a coronal consonant. One of these is that the rule of [coronal] insertion must "look ahead" to see that the result of rule application is not well-formed. Alternatively, suppose that the rule which inserts [coronal] applies freely and creates an OCP violation. The [coronal] specification is therefore delinked. This allows the [labial] specification to be inserted. Both these alternatives are somewhat unsatisfactory. The first because rules must be given the power to look ahead; the second because it is more complicated than assuming that the [coronal] specification of both the stem consonant and the suffix-final consonant is simply present underlyingly.

5. Conclusions

In this paper we have proposed that the alternations of the Takelma noun characteristic suffix involve two cases of dissimilation: nasal dissimilation and coronal dissimilation. We adopt an approach where both nasal and the articulator features coronal, labial, dorsal are specified in underlying representation. We propose that the OCP in Takelma operates on the nasal and coronal tier and is conditioned by a segment's value for sonorant. In cases where coronal consonants agree in their value for sonorant one of the offending coronal specifications delinks. The labial specification is filled in for nasal consonants. Because nasals in Takelma can be only coronal or labial, the rule that fills in labial is structure preserving.

Analyzing Takelma dissimilation as the result of the OCP applying to sequences of [nasal] and to sequences of [coronal] place specifications governed by like values for sonorancy simplifies the rule statements and allows dissimilation to be related to more general distributional properties of underlying representations. Based on the facts of Takelma dissimilation and the underlying distribution of coronal obstruents and sonorants, I conclude that underspecification provides a less explanatory and more complicated analysis of the selective behavior of coronal sonorants.

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