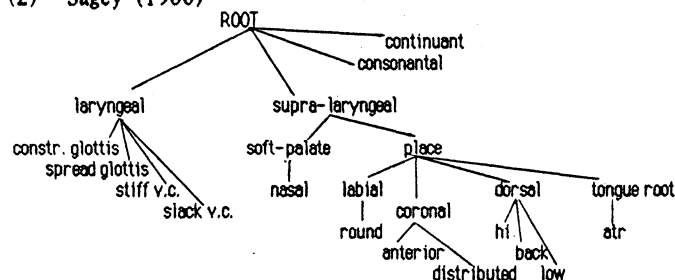


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(2) Sagey (1986)



Given a model of feature representation such as that in (2), retracted vowels, retracted coronals, and uvulars are all coarticulated segments in which one of the articulators is the tongue root (only directly relevant nodes are included in the representations in (3); in fuller representations vowels would be distinguished from uvulars either by major class features or by prosodic structure):

(3)a. Retracted Vowel



b. Retracted Coronal



c. Uvular



Evidence that uvulars are, in fact, dorsal as well as tongue root segments comes from cooccurrence restrictions on roots. Specifically, Columbian roots of the form C_1VC_2X are constrained from containing noncontinuant obstruents with identical place specifications in C_1 and C_2 position. Thus there are (almost) no roots in Columbian containing two labial stops, two coronal stops, two velar stops, or two uvular stops. In addition, there are no roots in which both a uvular and a velar stop occur. This latter gap is easily explained on the assumption that uvular segments are coarticulated dorsal/tongue root segments.

3. Retracted Root Hypothesis

In this section I argue that neither retracted vowels nor retracted coronals are found in the underlying inventory of Columbian. I suggest, instead, that Doak's (1989) retracted root hypothesis is correct for Columbian, and that, in Columbian, retraction is a feature specification associated with a subset of the roots of the language. Doak (1989) argues that a subset of Proto-Salish roots have associated with them a feature of retraction and that this feature has been retained in most of the Interior Salish languages.

3.1 Predictability of Retraction

In prefixes and suffixes the appearance of retracted segments is completely predictable. Retracted segments appear 1) in prefixes and suffixes which are adjacent to roots that contain

one or more retracted segments, 2) in suffixes which contain a uvular consonant, or are adjacent to a uvular consonant (it is still unclear whether prefix vowels and coronals always retract when adjacent to root-initial uvulars; therefore I include no examples of such retraction here).

- (4) a. ʂnəʔimən 'windpipe'
(s- 'nom.', na- 'loc.', $\sqrt{\text{ʔim}}$ - '?', -m 'instr.')
- b. snəʔipɬəʔtən 'drying rack for fish'
(s- 'nom.', na- 'loc.', $\sqrt{\text{ʔip}}$ - 'dry', - əʔtəʔ 'body', -tən 'instr.')
- (5) a. kɬijʔənk 'cinch came loose'
(k- 'loc.', $\sqrt{\text{ʔij}}$ - 'loose', - ənk 'flat')
- b. nəʔamənk 'wall'
(n- 'loc.', $\sqrt{\text{əʔam}}$ - 'surface of', - ənk 'flat')
- c. niʔnɬɬqəʂən 'blow one's nose'
(niʔ- 'loc.', $\sqrt{\text{nɬ}}$ - 'snout', - qəʂ 'nose', -n 'infl.')

In (4a) both prefixes surface with retracted segments in the environment of a root which itself contains a retracted vowel, while in (4b) the same two prefixes surface as unretracted adjacent to an unretracted root. In (5a) the suffix - ənk , which in (5b) surfaces as unretracted, is retracted in the environment of a root $\sqrt{\text{ʔij}}$ - 'loose' which itself contains retracted segments. Finally, in (5c) we see an example of a suffix in which the coronals adjacent to the uvular stop, as well as the final /s/ of the root, surface as retracted. The fact that retraction in suffixes and prefixes is predictable indicates that it is not represented underlyingly on any segments in these morphemes.

In contrast, in roots the appearance of retracted segments is unpredictable. Thus, as the examples in (6) illustrate, otherwise identical roots in Columbian contrast with respect to whether or not they contain a retracted vowel.

- (6) a. jij 'come loose'
 lij 'stab'
- b. təʔ 'hard'
 təʔlən 'pull apart' (-n 'infl.')
- c. təʔn 'tight'
 təʔn 'slow'
- d. ʔiʔ '?' (in ʂnəʔiʔ 'salmon stew')
 ʔiʔ 'ragged'

The examples in (6) contain only retracted vowels. The examples in (7) indicate that within those root morphemes which contain retracted segments, all vowels and (potentially retractable) coronals within those morphemes are always retracted.

- (7) a. ʂəʔəʂjəʔəʔ 'hall' (s- 'nom.', $\sqrt{\text{əʔəʂjəʔ}}$ - '? -usa' 'round object')
- b. ʔiʔəʂəʂinən 'deer-hoof rattle' (ʔiʔ - 'loc.', $\sqrt{\text{əʂəʂ}}$ - 'rattle', - cin-xn 'ankle')

- c. ʔaʔaʔaʔp 'raspberry bush' (√ʔaʔaʔ- 'raspberry', -aʔp 'bush')
 d. x'ŋx'ŋəm 'pl. talk, discuss' (√x'ŋ- 'talk', -m 'middle')
 e. ʃʃ 'cloth'

This fact indicates that retraction is a property of the root morpheme as a whole, and not of the individual segments contained in that morpheme. If retraction were a property of individual segments, rather than a property of root morphemes, we would expect to find roots which contained retracted vowels but no retracted coronals, or retracted coronals and no retracted vowels, or some combination of the two. With the exception of a very small set of potential counterexamples which I discuss in §3.2, such roots are not attested in the native Columbian data.

To account for the fact that retraction is indeed a property of individual root morphemes, rather than of individual segments, one can assume that retracted roots are associated in the lexicon with a tongue root node or feature, and that this feature becomes associated to the potentially retractable segments in the root by means of the (automatic) Universal Association Conventions given in (8) (see Archangeli and Pulleyblank 1989: 181):

(8) Universal Association Conventions (automatic)

- Wherever possible, associate autosegments to anchors in a manner that is
 a. directional (left to right/right to left) and
 b. of a one-to-one nature.

(9a) illustrates the underlying representations of the roots in (7); I assume that the feature of retraction associated with the roots is the Tongue Root node (Doak 1989 assumes that the feature of retraction is the Pharyngeal node; this is equivalent to the Tongue Root node). (9b) shows these same morphemes after application of (8), the Universal Association Conventions. I assume that (8) applies from left to right although there is no clear evidence that this is the case.

- (9) a. TR TR TR TR TR
 ʔəsɪ cus ʔalaʔ x'ən sɪɪ
 b. TR TR TR TR TR
 ʔəsɪ cus ʔalaʔ x'ən sɪɪ

I assume that all native roots in Columbian which contain retracted segments have underlying forms containing a floating TR specification. Given, then, that retraction is a feature of roots, rather than of individual segments in the native vocabulary of Columbian, one can conclude that no retracted vowels or retracted coronal consonants are present in the underlying inventory of the language.

3.2 Counterexamples

There are two types of potential counterexamples to the retracted root hypothesis in Columbian. The first type of counterexample is a set of four roots, given in (10), in which C₁ is a retracted ʃ, C₂ is uvular or pharyngeal, and the vowel in between the two consonants is not retracted.

- (10) a. ʃáħən 'picked up and shook'
 b. ʃapáw'sqnm 'dog shakes something with its mouth'
 (-ap 'base', -aw's -middle', -qn 'head' -ms 'Infl')
 c. ʃáxwən 'I melted it'
 d. ʃáqəm 'hang around somewhere wanting food'⁶
 e. ʃuxʷoʔsúxʷoʔ 'mint'

If retraction is indeed a feature of the root and not of individual segments, then in these forms one would expect to find a retracted vowel following the retracted s. I suggested above that uvulars are coarticulated dorsal/tongue root segments. If one assumes that pharyngeal segments also contain tongue root specifications, then forms such as those in (10) can be explained by making two assumptions: 1) that the roots in (10) are in fact associated with a floating TR node, 2) that the Obligatory Contour Principle is active in Columbian to prevent two adjacent TR nodes from occurring in the same representation.⁷ Given these assumptions, the vowels in the examples in (10) are not retracted because the Obligatory Contour Principle prevents the TR node from being associated to the vowels; if association to the vowels did occur there would be two adjacent TR nodes in the representation. If the TR node is associated only to the initial consonant, however, the Obligatory Contour Principle is not violated. (11a) presents the underlying form of (10a) (for expository purposes I assume that the pharyngeal is simply a TR node in underlying representation); (11b) illustrates the ill-formed representation that would result if TR associated to the vowel as well as to the initial consonant, and (11c) illustrates the representation of the form which does not violate the Obligatory Contour Principle.

- (11) a. TR b. * c. TR TR
 s a ʃ s a ʃ
 s a ʃ s a ʃ

The hypothesis that forms such as those in (10) are due to the action of a constraint such as the Obligatory Contour Principle is supported by the contrast between (10a) and (10b). Notice that in (10a), when the initial s is not adjacent to the pharyngeal consonant, it is retracted, but in (10b), when the vowel between initial s and the pharyngeal is deleted, s is not retracted. In this latter case, if initial s were retracted, the Obligatory Contour Principle would be violated; to

⁶ This form was provided by Jerome Miller. Emily Peone, however, did not retract /s/ in a form based on the same root: sʔəsəʔmɪl 'one wanting food'.

⁷ McCarthy (1986) states the Obligatory Contour Principle (OCP) as follows: "At the melodic level, adjacent identical elements are prohibited."

prevent this violation. TR is not associated to s when s is adjacent to a pharyngeal. If the hypothesis that the Obligatory Contour Principle prevents TR from being associated to the vowel in roots such as those in (10) is correct, then these forms do not, in fact, constitute counterexamples to the retracted root hypothesis.

There are three forms in the data in which a uvular consonant in C₂ position is preceded by a retracted vowel, three forms with uvular stops in C₁ position which contain retracted segments in V and C₂ position, and one form with a pharyngeal in C₁ followed by a retracted vowel and a coronal nasal:

- | | |
|---|---------------|
| (12) a. nųx ^w nųx ^w | 'wife' |
| b. ɕəxɕəx ⁿ w'á'n | 'nettles' |
| c. nųx ^w t | 'go, walk' |
| d. q ^w əʃt | 'deep' |
| e. q ^w əʃq ^w əy' | 'blue jay' |
| f. nəq ^w əʃq ^w əʃən | (place-name) |
| g. thųnčaʔ | 'rash, hives' |

In order to maintain the Obligatory Contour Principle explanation for the forms in (10), it is necessary to assume that in these cases in (12a-c), the retraction on the segments to the left of the uvular consonants is not due to the presence of a floating TR node, but rather is a result of the spreading of tongue root specifications from the uvulars (see §5). In the examples (12d-g), the consonants in C₂ position are all retractable coronals. In these forms the Obligatory Contour Principle could force TR to associate to the C₂ coronals; vowel retraction could then be due to the phonetic rule of Bidirectional Spread discussed in §5.

The second type of counterexample to the retracted root hypothesis consists of words borrowed from English or French. In most borrowings all potentially retractable segments are in fact retracted (see (13)); in five cases, however, this is not true (see (14)).⁸

- | | |
|-------------------------|--------------|
| (13) a. ʃəmʃəʃ | 'molasses' |
| b. ʃəʃwəm | 'embroidery' |
| c. ʃək ^w qəʃ | 'pig' |
| (14) a. púɕ | 'boots' |
| b. ʃlpoə | 'peas' |
| c. məɕiʃ | 'matches' |

The only way to account for examples such as those in (13) is to assume that individual retracted segments are associated with the TR node (see Archangeli and Pulleyblank 1989 for a similar problem in Yoruba). Since there are few such examples, and since, furthermore, they

⁸ There are 5 names of people in which not all potentially retractable segments are retracted: pəq^wotəʃ, ʃəliʃtə, ʃənpeʃtə, ʃələmən, wəʃk^wə. In 7 names all potentially retractable segments are retracted. Since names are often unusual morphologically and phonologically, I have not included them in my discussion.

are all borrowed words, such exceptionality does not constitute a serious counterexample to the retracted root hypothesis.

4. Progressive Harmony

As the example in (5a) above illustrates, suffixes which follow retracted roots may surface as retracted. I suggest in this section that the suffixes are retracted by a rule of Progressive Harmony which applies cyclically, and which is the Columbian version of a Proto-Interior Salish process of "pharyngeal movement" (see Mattina 1979).

4.1 Progressive Harmony Roots

The Columbian retracted roots which cause adjacent suffixes to become retracted are listed in (15). Not all roots in the data occur in suffixed forms; it may be the case then, that other roots also trigger suffix-retraction.

- | | |
|-----------|------------------|
| (15) *ɕəʃ | 'thin' |
| ɕyʃ | 'rattle' |
| *ɕəʃ | '?' |
| *ɕəʃ | '?' |
| ʃəm | 'steal' |
| ʃly | 'loose' |
| *ʃəʃəʃ | 'raspberry' |
| ʃəm | '?' |
| *pəʃ | 'stupid' |
| *pəʃ | 'water' |
| βəʃ | 'stick up' |
| *βəʃ | 'quilt' |
| *βəʃ | 'dump' |
| *βəʃ | 'soft excrement' |
| βly | 'snap' |
| təʃ | 'hard' |
| *təm | 'burn' |
| *yət | 'sway' |

In (15) I have used an asterisk to indicate roots for which I have found "retracted" cognates in Coeur d'Alene, Colville, Spokane or Shuswap (my search for cognates has not been exhaustive). The existence of such roots in Columbian provides further evidence for Mattina's (1979) conclusion that in the Interior Salish languages there existed a wide-spread process by which a "pharyngeal" property of a root was "transferred" to a suffix.

Mattina (1979) hypothesizes that in Colville pharyngeal movement the pharyngeal of the root is "pushed onto an inherently stressed suffix (but not onto a variable stress suffix)" from a stress-retentive (strong) root, and that the pharyngeal of a "stress-shifting root is pushed onto both inherently stressed and variable-stress suffixes." In other words, according to Mattina's hypothesis, pharyngeal movement in Colville targets stressed vowels. In Columbian, however, both stressed and unstressed vowels may surface as retracted. In many cases in Columbian vowels are deleted from unstressed roots (see (16), and in such cases the root may surface as unretracted even though it causes retraction of a following suffix. As the examples in (17) show, however, deletion of unstressed root vowels does not always occur; in these cases unstressed retracted vowels appear in the roots and stressed retracted vowels appear in the adjacent suffixes.

- (16) a. sɒ́ǰʌ́ŋk 'soft excrement'
 (cf., sɒ́ǰʌ́ 'soft excrement, -ank 'surface, stomach')
 b. p̥t͡ʃʌ́ŋʌ́?ən 'I threw/dumped it (e.g., mud) on it'
 (cf., p̥ǰʌ́ŋ 'I dumped it'; -ana? 'over', -n 'infr.')
- (17) a. sɒ́ǰʌ́t͡ʃʌ́? 'a quilt' (s- 'nom.', √p̥ǰʌ́- '?', -lʌ́? 'cover')
 b. t͡ʃʌ́ʌ́?ʌ́tɔ 'raspberry bush' (cf. t͡ʃʌ́ʌ́? 'raspberry')
 c. ṣʌ́ʌ́ʌ́x̣ʌ́ṃiʌ́t͡ʃʌ́ʌ́qʌ́ʌ́w 'bird cleaning itself with beak'
 (s- 'nom.', √x̣ʌ́ṃ- '?', -ʌ́ʌ́qʌ́ 'clothes', -mix 'impr.')
- d. mɔʌ́tʌ́tkwɔ 'fire smokes' (cf., smúʌ́t 'smoke')

The fact that vowels in retracted roots may surface as retracted even when unstressed suggests that the floating TR node is associated to retractable segments in the root by application of the Universal Association Conventions (8) before rules such as stress-assignment and progressive spreading of TR are activated in Columbian. This hypothesis is supported by forms such as (18), in which although the roots are unstressed and vowelless, the coronal segments surface as retracted:

- (18) a. çşûşm 'veil' (cf., çâş 'net'; -us 'face')
 b. şĉşâ?st 'gravel' (cf., √ĉş 'gravel', -a?st 'stone')
 c. psâya? 'stupid, dumb' (cf., √pâs-s-âya? 'old and feeble')

The hypothesis is further supported by forms in which the root has undergone CaC-reduplication:

- (19) a. ɕənɕənwáyə? 'crippled' (√ɕənw- '?', -aya? 'head')
 b. ʂənɕənɕəm 'courthouse' (√ɕən- 'talk, discuss', -m 'mid')
 c. kəpəpətəts 'tears in both eyes' (k- 'loc.', √pə- 'water', -us -eye')

As (19) illustrates, the CaC-reduplicated prefix, as well as the root-base surface as retracted (see Czaykowska-Higgins ms.a for discussion of CVC-reduplication in Columbian). Most theories of reduplication assume that only features which are associated may be copied in reduplication. Given this assumption, the fact that the reduplicated prefixes surface as retracted suggests that at the point at which reduplication applies the TR node must already be associated to the underlying segments by application of (8).⁹

As we saw in §4.2, unstressed as well as stressed roots may surface with retracted segments. The surfacing of retracted segments in suffixes is governed by the following generalizations. First, in most cases stressed suffixes affixed to retracted roots surface with retracted segments (see also examples in 16-19):

- (20) a. ʎəmʎəmmúʎ 'thief' (√ʎəm- 'steal', -ul 'characteristic')
 b. ɕʎəmúʃ 'blind' (c- 'asp.', √ʎəm- 'steal', -us 'eye')
 c. kʎiʎánk 'cinch came loose' (k- 'loc.', √ʎiʎ- 'loose', -ank 'surface')
 d. kʔéʎən 'he put it on fire' (√kʔéʎ- 'dump', -us 'fire', -inʎl.)
 e. sʎəmʎiʔa? stxwúʎ 'stuccoed house' (s- 'nom', √ʎəmʎ- '?', -iʔa? 'skin')
 f. ntəmpáʔiʔa? 'burn (when cooking)'
 (n- 'loc.', √təmp- 'burn', -p 'inch', -aʔiʔa? 'body')

But, second, in a number of examples an unstressed suffix surfaces as retracted:

- (21) a. *ʃçʷʃkʃtm* 'rattle, shake a rattle'
(s- 'nom', *ʃçʷʃ*- 'rattle', -akst 'hand', -m 'mid')
b. *tʃʷlɾəx^w* 'hard ground' (*ʃtʃəl*- 'hard', -ul^{əx^w} 'ground')
c. *kpaɾəts* 'tears in one eye' (k- 'loc', *ʃpaɾ*- 'water', -us 'eye')

And, third, there also exist forms in which the suffixes are stressed, but do not surface as retracted:

- (22) a. *ʃamʔcinn* 'I stole it from you'
(-ʔ 'redir', -t 'trans', -sɪ '2sg obj.', -n '1sg subj.')
- b. *ʃamncás* 'he stole it from me/you'
(-n 'control', -t 'trans', -sa '1sg obj.', -s '3sg subj.')

⁹ There is one form in which the CaC-reduplicated prefix of a retracted root does not itself surface as retracted (i.e., *yət-yət-(ʃs-n* 'something swaying'), suggesting that in this form (8) must have applied after reduplication. In all forms in which the CVC-reduplication involves suffixation to the root, both the root and the CVC-reduplicated suffix are retracted (e.g., *ʔəpəpə* 'puddles all over', *səpəpə* 'a boil'). In these latter forms, retraction on the reduplicated-suffix could be due either to the application of Progressive Harmony, or to prior application of (8).

The examples in (21) and (22) show clearly that whether a suffix gets retracted is not directly related to whether or not it is stressed.

In a paper on stress in Columbian (Czaykowska-Higgins, ms.b) I argue that Columbian has two distinct sets of suffixes: suffixes which trigger cyclic rules and are therefore cyclic, and those which do not trigger cyclic rules and are therefore noncyclic.¹⁰ Most lexical suffixes belong to the class of cyclic suffixes. As the examples in (16)-(21) indicate, lexical suffixes get retracted, even when, as in (21) they are not stressed.¹¹ Furthermore, in (22) the two stressed suffixes which are not retracted (-si and -sa) are noncyclic.

These facts suggest that Columbian has a cyclic rule of Progressive Harmony which spreads retraction rightwards from roots onto suffixes; Progressive Harmony applies independently of stress-assignment. In (16)-(21), then, the suffixes are retracted because they are cyclic and therefore trigger the cyclic rule of Progressive Harmony; in (22) the suffixes are noncyclic, and therefore the cyclic spreading rule does not apply.

Confirmation of this hypothesis comes from the observation that in words containing two potentially retractable suffixes, the first and the second suffix are both retracted if both are cyclic (23a-c). If, however, the second suffix is noncyclic, while the first is cyclic, only the first gets retracted – in (23d) the final suffix -mix is noncyclic, and surfaces as unretracted (and also as unstressed). (23e) is an example of a form in which an unstressed noncyclic suffix (-min) adjacent to a retracted root surfaces as unretracted, further supporting the hypothesis that noncyclic suffixes do not get retracted.

- (23) a. nǒłǝǝłxwtn 'mix in mortar'
(n- 'loc.', /ǝǝł- 'dump', -us 'face/head', -ałxw 'house', -tn 'instr.')
- b. nǒlyǝmǝnc 'snap eyes and look other way'
(n- 'loc.', /ǝly- 'snap', -us 'eye', -min 'rel.' -c 'infl.')
- c. kǝmǝǝyn 'partially blind' (k- 'loc.', /ǝm- 'steal', -us 'eye', -ayn '?')
- d. ǝłǝłǝłǝłǝłǝłǝł 'bird cleaning itself with beak'
(s- 'nom.', /ǝłǝł- '?', -alǝs 'clothes', /-mǝł /→ ǝłxw 'impr.')
- e. ǝnǝłǝmmǝn 'windpipe' (s- 'nom.', na- 'loc.', /ǝłym- '?', -min 'instr.')

There are several forms in which cyclic suffixes do not become retracted as expected. In (24) the suffixes -wil'x and -cin are cyclic, but are not affected by Progressive Harmony. Similarly, in (25a,b) the cyclic suffixes -nun 'success' and -waxw 'reciprocal' are not retracted:

¹⁰ In Czaykowska-Higgins (ms.b) the distinction between the two types of suffixes is established primarily on the basis of the application of the stress rules of the language. Cyclic suffixes trigger 1) deletion of stress that has been previously assigned to the stems to which they are affixed, and 2) subsequent reapplication of the cyclic rules of stress assignment; noncyclic suffixes do not trigger deletion of previously assigned stress and are themselves assigned stress by a noncyclic application of the stress rule. Motivating the cyclic/noncyclic status of the suffixes discussed here is beyond the scope of this paper, and I shall therefore simply state that suffixes are or are not cyclic without providing evidence that this is true. See Czaykowska-Higgins (ms.b) for detailed justification of the cyclic/noncyclic status of the suffixes of Columbian.

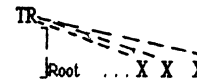
¹¹ -ul 'characteristic' in (20a) is not a lexical suffix, but it can be shown to be cyclic.

- (24) a. nǝłtwil'xǝw 'it's getting heavier'
(/nǝł- 'heavy', -t 'stat', -wil'x 'inch', -ǝw 'impr.')
- b. ǝnǝnǝntwil'x 'become gentle' (/ǝnǝ- 'tame')
- c. ǝłǝłtwil'x 'it's getting hard' (/ǝłǝ- 'hard', -p 'inch')
- d. ǝǝncimn 'I encouraged/reminded him'
(/ǝǝ- 'encourage', -cin 'mouth', -min 'rel')
- e. ǝłǝłǝłcinx 'deer-hoof rattle' (ǝł- 'loc.', /ǝł- 'rattle', -cin-xn 'ankle')
- (25) a. ǝǝmnun 'I accid. stole it' (/ǝǝ- 'steal', -nun 'success', -n 'infl.')
- b. ǝłǝłǝłǝłmnantwǝxw 'they're talking to each other'
(/ǝłǝł- 'talk', -min 'rel.', an-t- 'trans.', -wǝxw 'reciprocal')

The fact that -wil'x and -cin always remain unretracted suggests that the absence of retraction on these suffix may be systematic (perhaps the quality of the underlying vowel is significant). The forms in (25), however, are the only examples of these two suffixes occurring in words containing retracted roots. It is therefore difficult to know whether these are forms in which retraction was simply not perceived on the suffixes, or whether some additional explanation for the absence of retraction on these suffixes is required. At present I have no explanation for the examples in (24) and (25). But it is interesting to note that while there are examples of cyclic suffixes unexpectedly surfacing as unretracted, there are no examples in the data of noncyclic suffixes surfacing as retracted.¹²

To conclude this discussion of Progressive Harmony, I provide in (26) a formalization of the rule.

(26) Progressive Harmony (cyclic)¹³



where X=vowel or (retractable) coronal

Progressive Harmony targets all potentially retractable segments in the suffixes. This is clear from the fact that in suffixes which have been affected by Progressive Harmony all the vowels and coronal consonants are retracted. The only exceptions to this latter observation are vowels which are derived by means of late rules of epenthesis. In the forms in (27), for instance, the final vowel of the suffixes -ǝčǝ? and -ǝya?, respectively, is not retracted, even though the initial vowel is.

¹² There is one form in which the noncyclic suffix -stu 'causative' is partially retracted: ǝłymǝstun 'I loosened it' (/ǝly- 'loose', -m 'mid.', -stu, -n 'infl.'). Since only the /s/ in this suffix is retracted, whereas the vowel is not, I assume that the retraction is due to the late rule of Bidirectional Retraction (§5), and is not due to Progressive Harmony.

¹³ Note that the TR node which spreads as a result of Progressive Harmony does not have to be anchored to a segment in the root in order to spread. In (23b) nǝlyǝmǝnc, for instance, no segments in the root are retracted, but Progressive Harmony has affected the suffixes. (23b) can be accounted for by assuming that the root has no underlying vowel, and that the floating TR cannot associate to either C₁ or C₂ of the root since they are not retractable segments; [ɪ] surfaces as a result of a late rule).

- (27) a. skəm]ičə? stxwúl 'stuccoed house'
 b. pəššəya? 'old and feeble'

5. Bidirectional Retraction

Although in (27) the epenthetic vowel [a] is not retracted, there are a number of forms in the data in which an epenthetic vowel does surface as retracted. In (28a,b) we see examples in which a retracted epenthetic [a] occurs in the environment of [ʔ], in (28c), an example of retracted epenthetic [ə] in the environment of /n/:

- (28) a. pšəyqə? 'stupid, dumb'
 b. kʃiʔa? 'careless'
 c. pəʔəɳ 'I dumped it (wet clothes)' (cf., yatyqʔʃən 'something swaying')

The rule which causes retraction of the epenthetic vowels in (28) cannot be the same rule as Progressive Harmony. First, as we saw above, Progressive Harmony obligatorily retracts all potentially retractable (not epenthetic) segments in the suffixes which it affects; in contrast, epenthetic segments may or may not be retracted. Second, if, as I have argued, Progressive Harmony is a cyclic rule, then it must be ordered before the rule of epenthesis, since the latter is a noncyclic late rule of the Columbian grammar (epenthesis is clearly ordered after cyclic stress assignment since epenthetic vowels are never stressed by the cyclic stress rules). This suggests, therefore, that Columbian has a second, noncyclic rule of retraction which must be ordered after epenthesis.

Additional evidence for this postulated second rule of retraction comes from prefixes and uvular environments. As the following examples illustrate, prefixes which occur in the environment of retracted roots may or may not be retracted:

- (29) a. ʃ+nə+√tʃi 'salmon stew' a'. na+√tʃiʔʃən 'sound made by horned owl'
 b. ʃ+p+√pəʔ+pəʔ 'puddles all over' b'. kat+√pəʔ+qwaʃ 'Moses-Lake'
 c. nə+√məʃ 'getting warm' c'. na+√məʃ? 'water getting warm'

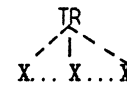
Columbian prefixes are never stressed even if they contain a full vowel whereas the following root contains an epenthetic vowel (see Czaykowska-Higgins ms.b). This fact can be explained if one assumes that prefixes are situated outside of the phonological word domain within which cyclic and noncyclic rules apply, and are therefore accessed only by the late phonological rules of the language. As in the case of epenthetic vowels, then, the rule which retracts prefixes must be a variable rule which is ordered late in the grammar.

While there is no clear evidence indicating that the rule which causes segments adjacent to uvulars to retract is a late rule, there is some evidence that this rule applies variably. Thus in

niʔ+√niʃ+qʃən 'blow one's nose' the /s/ following the uvular is retracted, whereas in na+√tʃiʔʃən 'sound made by horned owl', it is not retracted.¹⁴

In addition to being a late and variably-applying rule of the grammar, the second rule of retraction found in Columbian spreads tongue root specifications both leftward (as in the case of prefixes) and rightward (as in the case of epenthetic vowels and segments following uvulars). Moreover, the data presented in this section illustrate that it affects vowels and retractable coronal segments, and that it applies across long-distances. Bidirectional Retraction is formalized in (30). In all the examples of its application this rule is always triggered by a TR specification associated to a retracted segment or to a uvular; it is not triggered by a floating TR specification:

- (30) Bidirectional Retraction (ordered late in the grammar)



where - any retractable segment

Although it is clear that (30) is a late rule of the grammar in Columbian, I leave open the question of whether it is a phonetic or a phonological rule.

Bidirectional Retraction is likely the Columbian equivalent of the Coeur d'Alene rule of Regressive Harmony (discussed most recently in Doak ms., Bessell ms.). Coeur d'Alene Regressive Harmony seems to be a late rule of the grammar since it can affect prefixes; it is also triggered by faucal consonants (i.e., consonants which are arguably articulated with the tongue root). The similarity between the Columbian Bidirectional Retraction and the Coeur d'Alene Regressive Harmony suggests that a late rule of retraction triggered by segments articulated with the tongue root may also be found in other Interior Salish languages.

¹⁴ In addition to examples such as those in (12) which indicate that retraction may be triggered by a uvular in Columbian, there are two forms which suggest that deletion of a uvular stop may cause retraction of adjacent segments: ʔəykw-əʃt 'tomorrow', and ʔkw-əʃt 'morning' both contain a suffix which seems to have the same meaning as the suffix -əʃt 'day' in a word like kʃam+əʃt 'Monday'. While some retraction of the segments in the suffix occurs in the latter form, in the two former cases the retraction is much greater.

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