Interior Salish Progressive and Regressive Harmonies*

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1.0 Introduction

This paper presents data on Progressive and Regressive Harmony in the Interior Salish languages. The data provided is meant to be representative of the processes as they occur in each language discussed. My purpose is to elicit commentary on, corrections and additions to the data presented here, with the aim of developing a comprehensive and accurate database of Interior Salish harmonies. It is hoped that such a database will be a reference resource for the Salish and general linguistic community.

First, data on Regressive Harmony is presented (section 2), followed by data on Progressive Harmony (section 3).

2.0 Regressive Harmony

Regressive Harmony is triggered by post-velar segments and retracts preceding vowels. Table 1 charts the effects of post-velars (uvulars and pharyngeals, unless otherwise noted) across Interior Salish based on information in available sources.[1] There are several variations of interest: (i) all languages show local phonetic effects from post-velars, (ii) long-distance effects such as seen in Coeur d'Alene do not occur in all languages, (iii) while the languages of these two groups target all vowels such that /i, ɛ, u/ > [ɐ/ʌ, ɑ, ɔ], Spokane and Kalispel both have long-distance Regressive Faucal Harmonies in which the high front vowel /i/ does not participate. Finally, van Eijk (1985) notes that in Lillooet /ʔ/ is the only consonant which is transparent to post-velar effects which otherwise depend on melodic adjacency.

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[1] The major sources consulted here include:

Nłeʔkepmxcin (Thompson)	Thompson and Thompson 1992; Kinkade 1967
Lillooet	van Eijk 1985); Kinkade 1967
Shuswap	Kuipers 1974, 1989; Gibson 1973
Colville-Okanagan	Mattina 1973; Kinkade 1967
Spokane	Carlson 1972; Kinkade 1967
Coeur d'Alene	Reichard 1938; Kinkade 1967; Sloat 1975, 1980; Doak 1992
Nxa'amxcin (Moses-Columbia Salish)	Kinkade 1967; Czaykowska-Higgins 1992
Sélíš (Flathead)	Egesdal 1993

Table 1: Interior Salish Regressive Harmony onto roots or suffixes

Type	Language	Triggers	Targets	Output	Notes
i	Colville	uvulars and pharyngeals	/i, u, a/	[ɪ˅, o, ɑ]	local only
	Nxa'amx-cin	uvulars and pharyngeals	/i, u, a, ə/	[ɛ, ɔ, ɑ, ʌ]	local only
	Nłeʔkep-mxcin	uvulars, pharyngeals, z,z'	/i, u, e, ə/	[e˅, o, æ, ʌ]	local only
	Lillooet	uvulars, pharyngeals, z,z'	/i, u, æ/	[ɛ, ɔ, a]	all C block except /ʔ/; /z,z'/ do not retract /i/
	Shuswap	uvulars and pharyngeals	/i, u, e/	[ʊ/ɛ, æ/a, ɔ]	local only
ii	Coeur d'Alene	uvulars, pharyngeals, r, r'	/i_1, i_2, u, a/	[ɑ, ɛ, ɔ,ɑ]	long-distance
iii	Kalispel	uvulars and pharyngeals	/e, u/	[a, o]	long-distance; /i/ transparent ; some /l, l'/ retract preceding vowels
	Spokane	uvulars and pharyngeals	/e, u/	[a, ɔ]	long-distance; /i/ transparent
	Sélíš	uvulars and pharyngeals, /l, l'/	/e, u/	[ɑ, ɔ]	long-distance; /i/ transparent

Variation in the domain of Regressive Harmony is characterized by adjacency requirements between trigger and target and whether or not the rule is iterative. In those languages (Type-i) which do not show long-distance Regressive Harmony, local application of the rule requires melodic adjacency between the consonantal trigger and vowel target. In such cases the rule is not iterative and may simply be a late co-articulatory process. Types-ii and iii languages show long-distance post-velar effects. The rule in such cases is iterative. In general, Regressive Harmony does not cross the prefix-root boundary (apart from so-called prefixal reduplication). The single systematic exception to this comes from Coeur d'Alene. There do not appear to be any cases of consonants affected by any language's version of Regressive Harmony, except purely locally. Targets in long-distance application of the rule are vowels.[2] However, there is some variation as to which vowels are targetted. In particular, /i/ is exceptional in Kalispel, Spokane and Sélíš (Flathead).

2.1 Type-i: Local co-articulation

As an example of a Type-i language, consider Shuswap data where there are no vowel alternations from post-velars across an intervening segment although there are some local phonetic effects on vowels that immediately precede a uvular or pharyngeal.

[2] There is some variable evidence for retraction of prefix consonants in Lillooet and Columbian.

(1) Shuswap (Kuipers 1974, 1989)

/i/	x√kɨt̓-n'-s	'?'
	t√kɨt̓=l'qʷ-m	'take off bark'
/e/	x√cq=ép-tn	'saucer'
	cq'=ép=qn	'be hit on the head'
/u/	c√mʊ́y-st-s	'to bend (esp. wood for dipnet or shelter)'
	mʊ́y=qs	'hoop of net'

Colville, Nxa'amxcin (Moses-Columbia Salish), Nɬeʔkepmxcin (Thompson), and Lillooet are understood to operate in the same way. That is, there are local co-articulatory effects from uvulars and pharyngeals on preceding vowels, but no effects across intervening consonants. Any evidence to the contrary, whether confined to individual lexical items or not, would be most interesting. Lillooet and Nɬeʔkepmxcin (Thompson) include /z, z'/ as local retractors.

2.2 Type-ii: Coeur d'Alene

Coeur d'Alene is in its own category because Regressive Harmony here targets all vowels. Coeur d'Alene also includes /r, r'/ in the class of harmony triggers. In both Type-ii and Type-iii languages Regressive Harmony operates from post-velars to preceding vowels, regardless of intervening consonants and morpheme boundaries, except for the prefix-root boundary which generally is not crossed. For the sake of completeness I give examples from Coeur d'Alene here, though the paradigm is by now well-known. Examples are presented of roots in non-harmony context, followed by their appearance in harmony contexts.

(2) Coeur d'Alene Regressive Harmony (Reichard 1938, Doak 1992)

i)	cɪ́št	'it is long'
i~e	t√cɛ́šcəš=qən	'he has long hair'
ii)	dəɬɪm	'he galloped hither'
i~a	č√dɑ́ɬɪm=alqʷ	'train'
iii)	t'ɛ́k'ʷənc	'he laid one down'
e~a	t'ɑ́k'ʷ=qən	'it lies on top'
iv)	ʔɛniʔ kʊ́sɛlscn	'hair curls back from forehead'
u~o	ʔat√kʊ́s=qn	'his hair is curled'

I present here what data I have extracted from Reichard (1938) on prefix alternations in Regressive Harmony. Evidence for prefixal alternations is limited, but appears to be systematic.

The /ɛ/ > [ɑ] alternation is attested in three locative prefixes which always appear left-adjacent to the root (/čɛt-/ 'above, over'; /cɛn-/ 'under'; /mɛl'-/ beside'). There are also two directional prefixes, /tɛ-/ 'thither' and /tɛp-/ 'on the way', which occur to the immediate left of locative prefixes and also take an [ɑ] vowel when the root contains a faucal in C_1, C_2 or C_3 position.[3] The positions of directional and locative prefixes are underlined in the transitive completive predicate template in (3).

[3]There is one exception to the 17 examples of the ɛ~ɑ alternation in these 5 prefixes, and that occurs with /čɛt-/ 'above, over' in conjunction with the root √tar 'untie'. Of the 51 examples of these suffixes in non-harmony contexts, there is one occurrence of it transcribed by Reichard with [ɑ]. There are other potential candidates among prefixes with /ɛ/ for alternation with [ɑ] (the article /ɬɛ-/; the future aspect /čɛɬ-/; the negative /nɛʔ-/) but in these cases there are large numbers of exceptions. The discussion of prefix retraction here presented is based on data without a disconcerting degree of variability, but further work is clearly required.

(3) Coeur d'Alene predicate template (transitive completive)

Object- Subject- /s/ Nominalizer-[**Aspect- <u>DIR-LOC</u>-√ROOT-Suffixes]**

Of interest is that no prefix to the left of aspectual prefixes ever occurs with [ɑ], even if it appears left-adjacent to the root in the absence of intervening prefixes. The maximal domain of Regressive Faucal Harmony in Coeur d'Alene is highlighted in bold and bracketted.

Only the /ɛ/ —> [ɑ] alternation is attested in prefixes. /u/ —> [ɔ] and /i/ —> [ɛ/ɑ] alternations do not occur, despite the fact that there are locative and directional prefixes with /i, u/ in the same environments which trigger the /ɛ/ —> [ɑ] alternation. The resistance of /i, u/ to Regressive Harmony occurs only in the application of the process to prefixes, not in roots or suffixes.[4] To illustrate prefixal Regressive Harmony, consider the data in (4) and (5). (4a, 5a) show the form taken by retractable prefixes attached to roots which do not contain a post-velar or /r, r'/. Forms in (4b, 5b) show the alternation of /ɛ/ —> [ɑ] in the same prefixes attached to roots containing a post-velar.

(4) /čɛt-/ 'on a surface/object broader than subject; above; over'

a. <u>Non-harmony forms:</u>

čɛt√puʔɬ=itkʷɛʔ	'bubbling on the surface of water'

b. <u>Harmony forms</u>

i) čat√xʷɛ́rəsənc	'he stepped over him'
ii) čat√(t)ɑl'q=ɪnɛʔ-n-tə-m	'he was stamped on'
iii) čat√χɛl=ɬup-ən	'floor'

(5) /cɛn-/ 'under, off'

a. <u>Non-harmony forms</u>

cɛn√ɬɛc'-p	'string breaks'

b. <u>Harmony forms</u>

i) t-can√ʕʷɛ́l-ən-tə-m	'it was closed off'
ii) can√ʕɛc=ɬplɛʔ-ən	'fishline'
iii) s-can√q'ey-ən-cʊ́t	'picture; self-designing under'

(6) illustrates the resistance of /i, u/ in prefixes to Regressive Harmony.

(6) a. Locative prefix <u>gul'</u>: no alternation before post-velar

gul'√mɑq'ʷ=ɑ́lqʷ	'he laid them under the ledge'
gul' √q'ʷənp'-mən-cɔ́t=alqʷ	'he hid them behind base of tree

b. Directional prefix <u>ci-</u>: no alternation before post-velar

ʔul'-<u>ci</u>√qʷɛl'-stus	'first he lighted it again as he had before'

[4] It is possible, as suggested to me by M.D. Kinkade, that at least some prefix [i, u] may be excluded from Regressive Faucal Harmony effects if they are underlying glides /y, w/. Vocalization of these glides would then be a late process, occuring after Regressive Harmony. In support of the hypothesis that some prefix /i, u/ are glides, there is attested glide~vowel alternation in the prefix hii-/hy- meaning 'the one who'. A similar resistance to Regressive Harmony is found in the suffix =yʔqs 'nose, beak', presumably for the same reason (Doak 1989, 1992).

2.3 Type- iii: Spokane, Kalispel and Séliš (Flathead)

Regressive Harmony in Spokane, Kalispel and Séliš (Flathead) is Type-ii in the sense of being long-distance, but excludes /i/ in roots and suffixes as a target for the rule.

The appearance of most [a, ɔ] in Spokane is conditioned by a post-velar. The vowels [a, ɔ] appear before a post-velar obstruent later in the word, or else in specific harmony roots (Carlson 1972, Carlson 1980, Carlson and Flett 1989). If the phonemic vowel system can be considered /i, u, e/ then /i/ is isolated as the only vowel failing to undergo a productive process of long-distance Regressive Harmony similar to that found in Coeur d'Alene. Thus, while /i/ in Spokane is recorded by Carlson (1972) as having 'a very low variant' before post-velars, this effect is dependent on melodic adjacency. This adjacency restriction does not apply to prevent the alternation of /e/ to [a] and /u/ to [ɔ] which is conditioned by both adjacent and non-adjacent post-velars. The range of attested vowel alternation is shown in (7). In these examples the root in its stressed, non-harmonic form is shown first, followed by forms in which Regressive Harmony has applied. (7vii, viii) illustrate the exclusion of /i/.

(7) Spokane Regressive Harmony (Carlson 1972, Carlson and Flett 1989)

e~a	
i) √c'ér-t	'It's cold'
hen√c'aʔr=p=ós=lqʷ=p-i	'He has a sore throat'
ii) √t'éc'-n	'I straightened (the wrinkles)
s-n-√t'+t'éc'aʔ=qn	'starched sunbonnet'
u~o	
iii) √p'ʊ́x̌'-n	'I oiled it'
č√p'óx̌'=qn-tn	'hair oil'
iv) hi √sʊ́t'	'It's stretched'
s+√sót=lqs	'sweater'
vi) √sʊ́xʷ-n	'I recognize him'
n√sóxʷ=meʔ=qn=cn	'I recognize your voice'
*i~e	
vii) hi√qʷíc'	'It's tough and twisty'
s-n√qʷíc'=qn	'gizzard'
viii) n√sɪ́xʷ+xʷ	'It seeped into a vessel'
č√sɪ́xʷ=qn	'I poured it on his head'

2.3.1 Kalispel Regressive Harmony

Kalispel shows the same resistance of /i/ to long-distance retraction that otherwise affects all other vowels .

(8) Kalispel Regressive Harmony (Vogt 1940)

e~a	
i) ičin√qʷéc	'I am warm'
√qʷéc=qn	'hat'
u~o	
ii) i√pʊ́m	'It is brown'
čine-s-n√póm=qn-i	'I am smoking skins'
*i~e	
iii) i√qʷín	'it is green'
i√qʷín=lqs	'he has a green shirt'

2.3.2 Séliš (Flathead)

Regressive Harmony in Séliš is similar to Spokane and Kalispel. The high front vowel /i/ is unaffected, /e/ retracts to [ɑ] and /u/ to [ɔ]. Séliš introduces /l̩, r̩'/ (from */r, r'/) as a retractor of root vowels. See sections 3.2.2 and 3.3.2 for similar data from Kalispel and Shuswap, where such roots trigger Progressive Harmony, which does not appear to be the case in Séliš.

(9) Séliš Regressive Harmony (Egesdal 1993)

e~ɑ	
i) ʔi √qwéc	'it's warm'
√qwɑ́c=qn	'hat, cap'
u~ɔ	
ii) ʔi √p'ʊ́x̌'	'it is oily'
č̆p'ɔ́x̌'=qn-tn	'hair oil'
*i~e	
iii) ʔi√ kwíl	'it is red'
č√kwíl=qn	'redhead'

(10) Séliš /l̩, r̩'/ as retractors

Séliš	Spokane	
ʔol̩n	ʔurín	'stomach'
c'el̩	cer	'cold, ache'
yal̩	yir	'round'

3.0 Progressive Harmony

A second harmony, Progressive Harmony, occurs in several Interior Salish languages (Mattina 1979). The harmony is root-controlled, targets stressed vowels in suffixes, and conditions a range of alternations familiar from Regressive Harmony. The vowel qualities derived by both Regressive and Progressive Harmonies are identical in some languages. The set of roots triggering Progressive Harmony themselves contain a retracted vowel (usually [a/ɑ, o/ɔ] but in some cases [ɛ]) when the root is stressed. Progressive Harmony is distinct from Regressive Harmony in that segmental faucals do not trigger the process. Mattina (1979) presents arguments for pharyngeal loss as the historical trigger for the process.

In terms of segmental effects, five variations of Progressive Harmony are attested: (i) all vowels become [a] (Colville); (ii) /i/ and /e/ share [a/ɑ] as their harmony alternant and /u/ becomes [o/ɔ] (Kalispel, Spokane, Séliš, some dialects of Okanagan); (iii) all vowels have a specific harmony alternant such that /i, e, u/ > [ɛ, ɑ, ɔ] (Shuswap, Lillooet; Coeur d'Alene adds /i$_1$/ —> [ɑ]); (iv) /i/ is resistant to harmony (Nłeʔkepmxcin, Moses-Columbian); (v) some coronal consonants may be affected (Lillooet, Nłeʔkepmxcin, Moses-Columbian, Shuswap).

The descriptions of Progressive Harmony as it affects vowel quality are summarized in Table 2. Type-v languages (those with consonantal effects) cut across Types (iii) and (iv) and are not tabulated separately here, although those languages which target consonants are noted.

Table 2: Interior Salish Progressive Harmony

Type	Language	Triggers	Targets	Output	Notes
i	Colville	Some roots with /-ʕa-/; /a/	Stressed /i,u,a/	/i,u,a/ -> [ʕa]; ʕ in root deletes.	
ii	Kalispel	Roots with [a,o]	Stressed /i,u,e/	/i,u,e/ > [ɐ,ɒ,ɑ]	
	Spokane	Roots with [a,o]	Stressed /i,u,e/	/i,u,e/ > [ɐ,ɒ,ɑ]	
	Sélíš	Roots with [ɑ,ɔ]	Stressed /i,u,e/	/i,u,e/> [ɑ,ɔ,ɑ]	uvulars may block
iii	Coeur d'Alene	Roots with [ɐ,ɔ,ɑ]	Stressed /i$_1$, i$_2$, u/[5]	/i$_1$, i$_2$, u/ —> [ɑ, e, ɔ]	
	Shuswap	Roots with [ɐ,ɔ,ɑ]; negative morpheme	Stressed /i,u,e/; /s,c/	/i,u,e/ -> [ɐ,ɔ,ɑ] /s, c/ -> [s̟, c̟]	/q/ may block
	Lillooet	Roots with [ɐ,ɔ,ɑ,ʌ]; adversative morpheme	Stressed /i,u,æ,ə/; /s,c,l,l'/	/i,u,æ,ə/ —> [ɐ,ɔ,ɑ,ʌ]; /s,c,l,l'/ —> [s̟,c̟,l̟,l̟']	
iv	Nłeʔkepmxcín	Retracting roots	/u,e, ə/ /s, c/	/u,e,ə/ > [ɔ,ɑ,ʌ] /s, c/-> [s̟,c̟]	/i/ trans-parent
	Columbian	Roots with [ɐ,ɔ,ɑ,ʌ]	/i,u,a/; some ə; /s,c,l,l',n/	/i, u, a, ə/ -> [ɐ,ɔ,ɑ,ʌ]; /s,c,l,l',(n)/ -> [s̟,c̟,l̟,l̟',(n̟)]	i > u > a

The following sections deal first with the paradigm case as described by Mattina (1979) for Colville. Under Progressive Harmony in Colville, stressed /i, a, u/ —> [(ʕ)a]. The discussion of Colville serves as an introduction to the process in Kalispel, Spokane, Sélíš and Okanagan which are Type (ii).

3.1 Type-i: Colville Progressive Harmony

Mattina describes what he calls Pharyngeal Movement in Colville as a process shifting the pharyngeal of certain roots to a position left-adjacent to a stressed suffix vowel. The suffix vowel subsequently lowers to a quality which Mattina records as [a], noting that it is 'homorganic with the (immediately preceding) inserted pharyngeal' (Mattina 1979:17).[6] All vowels, /i, a, u/, are affected the same way. Examples are given in (11). The stress condition is illustrated with *q'^{w}ʕéy=xən-x* 'Blackfeet' where unstressed suffixes are not intruded on by a root pharyngeal and there is no subsequent alternation of vowel quality to [a]. Unstressed vowels are subsequently deleted (or reduced to schwa).

(11) Colville Pharyngeal Movement (Mattina 1979)

Root	Suffix		
√q'^{w}ʕéy	=lscút	q'wəy=lscʕét	'his clothes are dirty'
	=ús	q'wəy=ʕés	'black man'
	=ɬc'aʔ	...q'wəy=ʕéc'aʔ	'I am very dirty'
√ɬʕat	=xan	ɬaʔ+ɬaʔt=xʕén	'he gets his feet wet'
√q'^{w}ʕéy	=xan	...q'^{w}ʕéy=xən-x	'Blackfeet'
	=alqs	q'^{w}ʕéy=lqs	'priest (black robe)'

[5]Stressed /ɐ/ does not occur in Coeur d'Alene suffixes. Hence the /ɐ/ -->[ɑ] alternation is not attested in suffixes.

[6]Spectrographic work on Colville data from Charlie Quintasket indicates that Colville /a/ in the environment of pharyngeals is lower (has a higher F1) than that found elsewhere, including in the context of uvulars.

(12a) Attested Colville Pharyngeal Movement roots[7]

χl	'bright,clear' (?)	pʕas	'scared'
*cʕam	'cover'	pʕat	'boil'
sʕéy-lχ	'they are noisy'	c'ʕan	'tight'
pʕéw	'he ran down'	*t'ʕam	'suck'
q'^{w}ʕéy	'black'	ɬʕat'	'wet'
χas	'good'		

Colville Pharyngeal Movement is of particular interest because /i, a, u/—>[a]. That is to say, all contrasts in the vowel system are neutralized to [a]. This particular patterning does not occur elsewhere in Interior Salish and Colville does not have a long-distance Regressive Harmony with which to compare the output of its Progressive Harmony.

The Colville post-velars do affect all left-adjacent vowels phonetically, as noted in section 2. While long-distance Regressive Harmony is not noted for Colville there are some examples in Mattina (1989) of what appears to be alternation of suffixal and root /i/ with [a] under the influence of a uvular suffix. The alternation is not regular, but where it occurs /i/ —> [a], not [e,ɐ]. I know of no cases of /u/ —> [o, ɔ] under the same circumstances.

(12b) Colville suffixal uvular effects

Non-harmony form		Harmony Form	
=ip	'base, bottom'	=ap=qin	'back of head'
		=ap=alqs	'bottom, tail end'
=iplɛʔ	'handle'	=apl=χn	'wing'
k'n=ɬyaʔ	'listen'	iwa k'n=ɬéyaʔ-qən	'He tried to listen'
x^{w}ɬəm	'discard'	s-χ^{w}ɬél-qs	'garbage'
k^{w}ɬ(n)-nt	'take st.'	s-k^{w}ɬén-χn	'slave'
		k^{w}u c-k^{w}ɬén-χ-s	'He kidnapped me'

For Colville, and as reflected in the data above, Mattina suggests that the conditioning pharyngeal is present in the relevant roots. This is not reported for other languages with Progressive Harmony. Possibly the relevant pharyngeal in Colville is in C3 position. There is some evidence for this in the reduplication of Colville Pharyngeal Movement roots since the pharyngeal itself does not seem to be picked up by C_1VC_2- reduplication templates.

(13) Reduplication of Colville Progressive Harmony roots

Root		Reduplicated forms	
q'^{w}ʕéy	'black'	q'^{w}y-q'^{w}ʕéy	'black, *pl.*'
		t-q'^{w}y-q'^{w}ʕéy=s currants'	'black garden
c'ʕan	'tight'	c'n-c'ʕan	'tight'
sʕn	'tame'	sn-sʕén-t	'tame, gentle'

3.2 Type (ii): Spokane, Kalispel and Sélíš

It was noted that Colville Pharyngeal Movement is unique in neutralizing all vowel contrasts to [a]. However, there is some dialectal variation on this. The Okanagan form for Colville q'^{w}əy=ʕés 'black man' is q'^{w}əy=ús, thus introducing an /u/—> [o/ɔ] alternation which is familiar from Regressive Harmony in Coeur d'Alene.[8] The resulting alternations are /i, e, u/—> [a/ɑ, a/ɑ, o/ɔ]. The same alternations are found in Progressive Harmony in Spokane and Kalispel.

[7]*=forms which are not attested with root stress, and so the presence of the root pharyngeal is inferred.

[8]The distinction between the Colville form and the Okanagan form was pointed out to me by Charlie Quintasket.

3.2.1 Spokane

The underlying vowels of Spokane are /i, e, u/. I have found 69 roots with [a] and 17 roots with [ɔ] in Carlson and Flett (1989). None of these roots contains a following faucal, which is otherwise the only context in which such vowel qualities are present, suggesting that they are potential harmony roots. Eighteen of the [a] roots and four of the [ɔ] roots are onomatopoeic. Kuipers (1989) remarks that retracted roots tend to be associated with animal and plant names, sound symbolism or strong emotive values. Examples of such roots in Spokane are:

(14) Spokane sound-symbolic roots

c'al'	'sound made by falling sticks'
lay'	'sound of pan hitting floor'
ɬ'ap'	'sound of flat-footed running'
mal'l'l'	'sound of gurgling stomach'
t'ac'	'sound of grasshopper'
com'	'sound of egg being smashed'
ɬo	'sound of steady rain'

Of the 51 non-onomatopoeic roots with [a, ɔ], 17 are recorded as retracting stressed suffix vowels. Seven others do not seem to affect stressed suffix vowels.[9]

(15) Non-retracting [a, ɔ] roots

i) čpasɛ́w'e?	'dogbells, metal harness ornaments'
ii) √wa-t-n'=ɛ́ɬp	'buckbrush'
iii) č√waw-p=ʊ́s	'tears'
iv) √t'ap(ɬ)	'shoot'
v) √yac'm-s-t-ɛ́s	'he made it fast'
vi) (ʔ)aɬɬp	'he lost'
vii) čoš̓t-m	'he shouted'

The remaining roots do not occur in a context that allows the prediction that they are harmony roots to be tested. Of those roots with attested harmony effects, /e, u/ are lowered to [a, ɔ] just as with Regressive Harmony in Spokane. When /i/ is in a harmony context it alternates with [a]. I have found three cases of /i/ —> [a], none of /i/ —> [e]. Two cases are on the suffix /=qin/ 'head' with the root √p't', the third is on the suffix /=cin/ 'mouth, language'. These examples are included in (16). While it is possible that these forms are borrowings from Colville-Okanagan, where /i/ —> [a] in Pharyngeal Movement, the pattern appears in Kalispel as well. The stress condition noted in Colville and relevant for Coeur d'Alene is respected in Spokane also. Consequently the rule targets stressed vowels, and like Coeur d'Alene can target stressed vowels several morphemes distant from the root.

[9]There are no examples of forms (i, ii, iii) with a stressed root vowel to check the underlying quality of the root vowel. It may be then, that these are not legitimate harmony roots. The cognate of (iv) does trigger Progressive Pharyngeal Harmony in Coeur d'Alene but does not in Colville; the cognate of (v) retains a pharyngeal in Coeur d'Alene and Colville. The cognate of (vi) is √ʕal in Colville. None of these roots trigger harmony in Colville or Coeur d'Alene. I know of no explanation why (vii) does not behave as a harmony root, unless this is a case of /i/ resistance. Egesdal (p.c) reports that the root of (iv) t'ap(ɬ) 'shoot' still contains a pharyngeal, thus [ʈ'ap], and the root of (iii) č√waw-p=ʊ́s 'tears' is [ʕaw]. This would mean they are not legitimate harmony roots, since the pharyngeal is still present.

(16) Spokane Progressive Harmony roots[10]

Root	Suffix		
a) √p'c'	-es	√p'c'-n-t-ɛ́s	'he lets his bowels go'[11]
b) √p't'	-en	n√p't'-n-t-ɛ́n	'I poured in a gravy-like substance'
	=use?	p't'a-y'=ʊ́se?	'newly born fish'
	=qin	s√p'at'=qɛ́n'	'tree moss gravy and cakes'
		ye' p;n' k^{w}√p'at'=qɛ́n'	'You're a dummy. Your head is like squishy tree moss gravy'
c) c'an(ɛ́)	-en	√c'n-m-s-t-ɛ́n	'I tightened it'
	=enč	čɨ√c'n-m=ɛ́nč-m-s-t-n	'I tied the cinch'
d) √say	=cin	sa?ssa?s=cɛ́n	'diminishing voices and sounds of people as they wander away'

3.2.2 Kalispel

Progressive Harmony in Kalispel is noted by Vogt (1940). He records that /i/ and /e/ are replaced by [a], but presents several cases of 'unexplained [o]' which (as Mattina (1979) points out) are cases of /u/ affected by Progressive Harmony. Kalispel also introduces a second source of Progressive Harmony: /l/ derived from Proto-Salish */r/. Historically, this is the same /r/ which participates in the class of Coeur d'Alene post-velars for the purposes of long-distance Regressive Harmony, although it does not condition Progressive Harmony in any of the r-languages (Coeur d'Alene, Colville, Spokane and Columbian).

[10]Further examples of Spokane Progressive Pharyngeal Harmony roots are:

√ɬak^{w}	-ule?ɪx^{w}	s-n√ɬak=ʊ́le?ɪx^{w}	'pancake'
√ɬc	-e	ɬc+ɬac-p-m-ɛ́	'It's dripping here and there'
spayʊ́l			'Spaniard'
√t'ac'	-V	t'a+t'a?c'ɛ́-n'm'	'It made the sound of a grasshopper'
t'mayʊ́ ye?			'small shell, like a cowrie'
√mal	=ɛɬx^{w}	s√ml-t+ɛ́ɬx^{w}	'brick house'
√nak^{w}	=ene?	s√nak^{w}+k^{w}=ɛ́ne?	'toad'
√pt	=ule?ɪx^{w}	s-n√pt=ʊ́le?ɪx^{w}	'dumplings, noodles'
√p'at'	=use?	p't'a-y=ʊ́se?	'newly born fish'
√q^{w}ay	=ups	q^{w}i?-t=ʊ́ps	'blue-tailed lizard'
√q'^{w}ay	=us	q'^{w}y=ʊ́s	'black face'
√san		č√san-p-mɛ́m	'He's engrossed'
√ʎ'o'ɬ	-cut	ʎ'o'ɬ-mn-cʊ́t	'dust storm'
√ɬom	=eye?	ɬm'+ɬm'=ɛ́y'e?	'frogs'

[11]But *c.f.* p'c'=alq'^{w}=ɛ́ wes-t=šn 'excrement on his legs (Coyote's third son)'
In this form the root √p'c' is not affecting the stressed /e/ of the suffix /-ew'es/.

(17) Kalispel Progressive Harmony roots

Root	Suffix		
ic'an	-mV	ʔes√c'ən-p-mɛ́	'It is tightening'
	-Vp	c'ən-ɛ́p	'It got tight'
*pat	=etkʷ	n√pt=ɛ́tkʷ	'the water boils'
pas	-min	√psa-p-mɛ́n	'I admire him'[12]
	-Vp	ps-ɛ́p	'he is scared'
pʔos	=etkʷ	čɨ-pʔos-ɛ́tkʷ	'foam on water'[13]
san	-il'š	√sən+sən-t-uw-ɛ́l'š	'he gets tame'
*tas	-cut	ʔes√ts-p-mn=cɔ́t-i	'they applaud'
*t'am	-mV	t'əm-ɛ́m	'he sucks'
		ʔes√t'əm-mɛ́	'he is sucking'
	=cin	n-t'am=cɛ́-n	'I kiss his mouth'[14]

(18) Kalispel Progressive Harmony roots with C_2=/l/ < */r/

Root	Suffix		
c'al	=etkʷ	ʔin√c'əl=ɛ́tkʷ	'the water is cold'
šal	=emen	√šəl+l=ɛ́mən	'person inclined to laziness'

The cognates of Kalispel *c'al* are *c'ar-* (Columbian, Colville), *c'or-* (Coeur d'Alene), *c'ur-* (Spokane). I note here the following exceptions to Progressive Harmony from /l/ roots:

(19) Exceptions to Progressive Harmony: /l/ roots.

Root	Suffix		
c'al	-il'š	c'al=tkʷ-ɬɨši	'the water is getting colder'
c'aʔl	=us	činesč√c'a+c'al'=ʊ́s-i	'my eyes are aching'
	=ɬčn	činesən√c'aʔl=ɬčən-i	'my back is aching'
kʷali		ʔi√kʷaɬi	'it is yellow'

It may be that harmony from Kalispel /l/ roots affects only suffixal /e/ vowels. Based on the data available, it may also be that Kalispel /l/-roots harmonize only under melodic adjacency. There are insufficient data available in Vogt (1940) to explore the issue satisfactorily. Further fieldwork is needed.

3.2.3 Sélíš Progressive Harmony

Sélíš roots with [ɑ, ɔ] trigger Progressive Harmony, with the same output as found in Spokane and Kalispel.

(20) Sélíš (Egesdal 1993)

Root	Suffix		
p'ɑc'	-es	p'ɑc'ntɑ́s	'it [skunk] sprayed him'
	-mi	ʔespc'mɑ́	'it [fly] is laying eggs'
	-uɬ	pcpc'mɔ́	'he has diarrhea'

Egesdal (1993) notes that no Sélíš Progressive Harmony root ends in a uvular, pharyngeal or a laryngeal. There is some evidence for uvulars in suffixes blocking Progressive Harmony, but it is by no means conclusive. (21) shows the same suffix /=qin/, blocking retraction from √xʷɑt but accepting it from √p'ɑt'. Since both roots appear with [ɑ], it is assumed that they are both harmony roots.

(21) Uvular blocking?

xʷɑtqɨn'eʔ	'dragon fly'
p'ɑt'qɑ́n	'dummy'

[12]This example is from Speck (1980).
[13]This example is from Speck (1980).
[14]This example is from Speck (1980).

3.3 Type (iii): Coeur d'Alene, Lillooet and Shuswap

Coeur d'Alene's version of Progressive Harmony alternates all vowels: //i_1, i_2, (ɛ), ɑ/ —> [ɑ, ɛ, (ɑ), ɔ] rather than neutralizing to [a] as in Colville. Lillooet and Shuswap have very similar progressive harmonies, but lack the /i_1/ —> [ɑ] alternation found in Coeur d'Alene and provide examples of the /e,ɛ/ —> [a,ɑ] alternation which is not attested in Coeur d'Alene (since /ɛ́/ does not appear in Coeur d'Alene suffixes). Furthermore, Progressive Harmony in all three Type-iii languages shows /i/ alternating with [ɛ]. This alternation is attested in Regressive Harmony in Coeur d'Alene, but is not found in the progressive harmonies examined so far (Colville, Spokane, Kalispel, Sélíš).

3.3.1 Coeur d'Alene

Progressive Harmony in Coeur d'Alene is triggered by the roots which contain one of the vowels [ɛ, ɔ, ɑ].[15] The process targets stressed suffix vowels /ʌ, ʊ/ and produces vowels of the same quality as Regressive Harmony. Since stressed /ɛ/ does not occur in suffixes, it is not available as a target for the rule (Doak 1992).

(22) Coeur d'Alene (Reichard 1938, Doak 1992)

Root	Suffix		
c'ɔʔt	=ɬləmxʷ	√c'ɔʔt=ɑ́l'əmxʷ	'dwarf'
t'ɑm		syɛ√t'ɑm=ɑ́ləmxʷ	'one who licks people'
p'c'		cɛɨ-həs-t√p'ɑc'=ɔ́s-əm	'I will squirt him in the eye'

There does not appear to be any blocking of Progressive Harmony in Coeur d'Alene (Doak 1992). (23) gives examples of Progressive Harmony passing through retracted /r/ and uvulars. There are no examples of Progressive Harmony passing through pharyngeal segments, since no harmony root contains a pharyngeal.

(23) Uvular or /r,r'/ root, Progressive Harmony permitted

Root	Suffix		
kʷɑr	-i_1w'ɛs	həŋ-√kʷɑr+kʷɑr-ɑ́w'ɛs-ən	'crossbills'
c'ɑχ	-i_1p	həŋ-√c'ɑχʷ + c'ɑχʷ-ɑ́p-n'-m	'he retired'
ɬɑqʷ	-i_2p	√ɬɑqw-ɛ́p-əw'əs-šn	'breechclout'

3.3.2 Shuswap

Kuipers (1974) notes 41 harmonizing roots in Shuswap. Progressive Harmony in Shuswap is often variable, with some harmony roots permitting both harmonic and non-harmonic suffixes (Kuipers 1974). In cases of variability, non-harmonic forms tend to replace harmonic forms. In a number of cases the retracting roots are cognate with Colville forms transcribed with a pharyngeal, but in other cases the Shuswap root contains an /l/ derived from Proto-Salish */r/. The inclusion of /l/ < */r/ has already been noted for Kalispel and Sélíš. Kuipers (1974, 1989) notes that none of the known Shuswap harmony roots contain a uvular or pharyngeal. The lack of pharyngeals can be explained as it is for Coeur d'Alene: in becoming a harmony root, a root loses its only possible pharyngeal. However, some Coeur d'Alene and Lillooet harmony roots do contain a uvular, so the constraint against uvular obstruents in retracted roots may be language-specific (note that it applies for Sélíš also).

With respect to harmonic vowel quality, Shuswap [ɛ] functions as the retracted variant of /i/, as well as the non-harmony alternant of /e/. This is similar to Coeur d'Alene, but with /l/ < */r/ participating in Progressive Harmony and without the /i_1/ —> [ɑ] alternation attested in Coeur d'Alene.

[15]Since /ɛ/ occurs as a non-harmonic vowel as well as harmonic vowel, its status as a harmony trigger can only be determined from its behaviour, not from its appearance in a root without a faucal. Doak (1992) gives instances of the root √šɛt' which show the quality of the root vowel to be [ɛ] under stress. This root triggers Progressive Harmony, and so provides a (predicted) example of /ɛ/ as a harmony-triggering root vowel.

(24) Shuswap Progressive Harmony: /ʌ, é, ʊ/ > [é, á, ɔ]

Root	Suffix		
t's	-es	√t's-nt-ás	'he pats it down'
pt		√ptét	'to boil'
	=ule?xʷ	s-n√pt=ɔ́le?xʷ	'dumplings'
pat'	-min	pət'-mén-s	'pour out mushy stuff'
	=etkʷ	x√pt'=átkʷ	'to soak s.t.'
	=ep	c√pət'+pt'=áp hanging down'	'have one's pants
k'is	=us	√k'əs=ɔ́s	'bad looking'
/ʌ/ roots			
xʷ?al	=ekst	√xʷəl'=ákst	'do s.t. quickly'
c'al	=ene?	x√c'əl=áne?	'have ear throb'
	=us	x√cl+c'əl=ɔ́s	'have eyes smart'
	=cin	x√c'l=cén stung'	'have one's mouth
	=ixʷe?ck	x√c'l=éxʷe?ck smart'	'have one's tongue
wl	=en's	s√wl=én's-m	'flower'
		~ s√wl=án's-m	
	=ul'xʷ	c-x√wl=n's-m=ɔ́l'əxʷ bottom of water'	'mud and weeds at

Of some interest in the Shuswap data is that the suffix /=qin/ is never retracted. (25) shows examples of Progressive Harmony roots which affect /i, e, u/ but do not affect the /i/ of /=qin/.

(25) No retraction on /=qin/

Root	Suffix		
sel	-es	səl-nt-ás	'to peel'
	=ic'e?	sl-t=éc'e?	'to peel off'
	=qin	x√sl=qín-s	'to scalp'
tlat'	=ep	x√tləɬ+tɬt'=áp	'have wet behind'
	=qin	√tləɬ+tɬt'=qín	'having wet hair'
kʷl	=elst	√kʷl=álst	'gall'
	=ulxʷ	x√kʷlə-t=ɔ́lexʷ	'Reserve No.9 at Alkali Lake'
	=qin	c√kʷl-e?=qín	'strawberry roan horse'

This is contrary to the situation in Spokane where there is an example of [-qán] as a result of Progressive Harmony. It cannot be argued that Shuswap /i/ does not retract, because there is evidence that it does. As a consequence, these data raise the issue of the uvular /q/ blocking Progressive Harmony. We know that post-velars do not block Progressive Harmony in Coeur d'Alene, where there is a reasonable range of data available on which to base such observations. Unfortunately, as noted by Doak (1992), there is a Shuswap form xəp=qn-mén 'noontime approaches' in which the final suffix /-min/ is retracted to [-mén] past a uvular (Kuipers 1974). This of course contradicts the interpretation of /q/-blocking seen in (25). Further work is required to resolve this issue.

3.3.3 Lillooet

Lillooet does not have long-distance Regressive Harmony, but it does show local effects from post-velars (including /z, z'/) on immediately preceding full vowels, as noted in Table 1. Progressive Harmony roots in Lillooet are of several types. There are some harmony roots with /ʌ/ < *r or cognate with retraction roots in Moses-Columbian. There are also harmony roots with no apparent segmental source for harmony, that is to say, it is difficult to trace cognates with Progressive Harmony roots in the other Interior Salish languages. A third class is harmony roots which carry a negative connotation (*cf.* Kuipers 1974, 1989 who notes several sources of harmony roots in Shuswap). All types of harmony roots condition the same alternations, *viz.* /i, u, ɐ, ə, c, s, l, l'/ —> [ɛ, ɔ, a, ʌ, ç, ʂ, ɬ, ɮ']16. This is quite different from the targets of local Regressive Harmony in Lillooet, which do not include /ə/ or /c, s, l, l'/. The inclusion of consonantal targets for Progressive Harmony is discussed below, since it differentiates Lillooet harmony from that found in Coeur d'Alene. Lillooet is Type-iii on the basis of the vocalic alternations attested, which are also found in Coeur d'Alene and Shuswap.

(26) Lillooet Progressive Harmony (van Eijk 1985)

Root	Suffix		
√qʌɬ	-wil'x	qʌɬ-wɛ́ɮ'x	'to get spoiled'
√c'a?p	=ɐl'iwš	c'a?p-ɛ́l'iwš	'to have body odour'
√k'ɮ	=ulm'xʷ	k'ɮ-ɔ́lm'əxʷ	'boundary'
		c'ʌ́np	'ringing sound'

Type-iii Progressive Harmony languages show each vowel with a unique harmonic alternant. The stress condition is unambiguously upheld in Coeur d'Alene and Shuswap, and appears to be in Lillooet. The suggestion that /q/ may block Progressive Pharyngeal Harmony in Shuswap cannot be properly evaluated without further fieldwork and analysis.

3.4 Type-iv languages: Nɬe?kepmxcin (Thompson) and Nxa'amxcin (Moses-Columbia Salish).

The reflex of Progressive Harmony in Type-iv languages shows the high front vowel /i/ behaving uniquely. Nɬe?kepmxcin data introduce a distinction between (i) the effect of harmony in the root itself and (ii) its spread past the root to suffix morphemes. All vowels (/i, e, u, ə/) are targetted for initial association within roots. However, the targets of spread beyond the root domain are /e, u, ə/, with /i/ never affected. Similar facts are noted for Nxa'amxcin (Moses Columbia Salish), where Czaykowska-Higgins argues that in roots, initial association is regressive and targets all retractable segments including /i/, but in the stem domain the direction of spread is progressive. In the latter domain a cline /a > u > i/ is claimed: /a/ is most likely to be targetted, /u/ less likely and /i/ least likely (Czaykowska-Higgins, in preparation). Likewise, there is some evidence in Nɬe?kepmxcin that /u/ is less likely to harmonize than /e/, whereas /i/ is not a target for Progressive Pharyngeal Harmony at all. There is also evidence in both Nɬe?kepmxcin and Nxa'amxcin for the inclusion of consonants as harmony targets. Because of these distinct properties, I present Nɬe?kepmxcin and Nxa'amxcin harmony in some detail.

Despite these differences, Nɬe?kepmxcin retraction parallels all other aspects of Progressive Harmony as discussed from Coeur d'Alene, Shuswap, Kalispel and Spokane. The discussion of Nɬe?kepmxcin harmony which follows owes a great deal to work on Nxa'amxcin retraction by Czaykowska-Higgins (in preparation), where the facts are similar.

3.4.1 Nɬe?kepmxcin retraction

Nɬe?kepmxcin retraction is an unpredictable, lexical property of root morphemes. There are not many examples of roots contrasting only for the presence of retraction but (70) lists those I have found in Thompson and Thompson (1990).

16 However, it should be noted that there are cases in Lillooet where stressed /i/ of an otherwise retracted root is not retracted, and there are some cases where /i/ in a stressed suffix is not retracted. Van Eijk (1985) observes that the latter cases seem to be correlated with the presence of a following 'neutral' consonant, that is, some consonant other than uvulars, pharyngeals and retracted or retractable coronals.

(27) Nɬeʔkepmxcin retraction: Minimal or near minimal pairs (Thompson and Thompson 1990)

Plain		Retracted	
a) ʔes√kél	'detached'	ʔes√k'ɛ́l	'dirty, muddied'
b) √pəl-tés	'flatten s.t.'	√pʌ́x̌'-tés	'dump s.t. over'
c) √sík'ʷ-es	'break, smash s.t.'	√sɛ́k-es	'whistleto, at s.b.'
d) √cm	'small' (pl.)	√cm	'dirty'

Within retracted roots, the surface manifestation of retraction is variable, as the data in (28) indicate. Despite this variability, for most roots there exists a form in which all potentially retractable segments in a given root are retracted. In Nɬeʔkepmxcin the class of retractable segments in roots is /i, e, u, ə/ and the consonants /c, s, l, l'/.

(28) Retracted roots: all retractable segments in a root can be retracted

cɔs	'scatter in piles'	cʌm ~ cəm	'dirty'
k'ʌs ~ k'ʌs ~ k's	'bad'	cən ~ cʌn	'ring'
c'əs ~ c'ʌs	'hoof'	cɔl ~ cɔl ~ cɔl	'wink'
səl ~ sʌl	'peel smooth'	kil ~ kɛl	'gap'
ləs ~ ləs ~ lʌs ~ lʌs	'low-down'	sik ~ sɛk	'whistle'
mʌlsm	'bog blueberry'	cʌs ~ cəs	'dry-roast'

The observation that the root is a domain for retraction is supported by the behaviour of prefixes, which do not participate in retraction. The exclusion of prefixes to retraction is robust, with three exceptions that I have been able to find, and of course parallels the Regressive Harmony behaviour found throughout Interior Salish. The three exceptions all involve the s-nominalizer which is seen not to retract in (30) and there is variation between a retracted and non-retracted prefix in two of these exceptions. The third exception is a loan from the Coast Salish language Halkomelem, which has an unclear /s:š/ contrast (part free variation, part complementation: Thompson 1979). Czaykowska-Higgins (in preparation) argues that there is a separate rule of regressive [RTR] spread in Moses-Columbian which optionally affects prefixes. There is some evidence from Lillooet (van Eijk 1985, Remnant 1990) that prefixal elements are affected by harmony also.

(29) Prefix exceptions

(a)	stm'élt ~ stm'élt ~ stm'élt	'cow; bull; cattle'	(may be a loan)
(b)	√sʷl-; √sʷəl-	'shiny-green/brown'	(loan from Okanagan)
	s√sʷl-éps ~ s√sʷl-éps		
	s√sʷl-éps ~ s√sʷl-éps		
	so√sʷl-éps		
(c)	s?amélə	'Okanagan people'	(loan from Halkomelem)

The examples in (30) show the usual case, with the s-nominalizer and stative prefix /ʔes-/ remaining unretracted, despite being prefixed to a retracting root.

(30) Prefixes do not retract

s√c'ɔ́l'=sqeʔ	'tall Oregon grape berries'
s√cn-ʌ́p	'ring, strike'
ʔes√cʌ́m	'dirty, dirty-coloured'

In all the reduplication of retracted roots that I have been able to examine, retracted consonants are reduplicated as retracted. Once reduplication has occurred the vowel of the reduplicated prefix reduces and usually is not transcribed with retraction (though *cf.* Lillooet, where it often is).

(31) Reduplication of retracted consonants

Augmentative reduplication: CVC+√CVC

√sɔsʷ	ʔes sɔsʷ+sɔ́sʷ	'peeled off in several strips'
√sql	ʔes səl+sʌ́l	'sheer cliffs'
√cəl'	cəl'+cɔ́l'	'striped around'
√səw'	suʔ+sɛ́w'	'scratched'
√k'əs	n-k'əs+k's=init	'bad singing'
√yep	ʔes yəp+yép	'(already) squeezed'

Retraction on suffixes is entirely predictable based on the properties of the root to which they are attached.[17] This distribution of retraction on suffixes is directly analogous to that found in languages with Progressive Harmony.

There is however, a distinction to be made between retraction in roots and retraction in suffixes. While there are no examples of /i/ retracted in a suffix (to be discussed below), there are some examples of it in retracted roots.

(32) /i/ —> [ɛ] in harmony roots

k'él-e-s	'cut up s.t.'
s-yəm+yém	'(double) rainbow'
xlél'x	'salmon turn red and get slimy during spawning'
ʔes √yép	'(already) squeezed'
n-sék-mn	'short whistle'
c'ɛ́x̌'-p	'pitch, sap'
kél'	'gap'
cɛ́leʔ	[place name, creek in Spuzzum area]

The coronals targetted by Progressive Harmony in the stem domain are assumed to be the same as those targetted within roots, but there are data confirming only the retraction of /s/ when immediately following a retracted suffix vowel, or in one case, right-adjacent to a harmony root.

The stress condition on Progressive Harmony is assumed by Thompson and Thompson to apply in Nɬeʔkepmxcin also. All retracted vowels following attested harmony roots are stressed except for the following two examples.

(33) Unstressed retracted vowels

√k'ɬ=ɔs-n-cút	'smear dirt on one's face'
kʷl-ɔʔ=éytxʷ ~ -eytxʷ	'yellow leaves'

Stress alone does not seem to be a sufficient requirement for retraction. Instead, it would appear that adjacency and stress are relevant. Adjacency facts are discussed below, but here I note that retraction in Nɬeʔkepmxcin does not spread beyond the stressed syllable. In polysyllabic roots, for example,

[17]While the retraction of suffixes is ordinarily dependent on retraction in a root, I have found the following exceptions:

(a) √təm 'lack'	=əltn	n-təm=ʌ́ltn	'nothing in basket'
		n-tə-təm=ʌ́ltn	'nothing in basket' (emphatic)
(b) √nek' 'change'	=ls	nék'=ls-m	'corrode; rust'
	=elst	nek'=ls-m=élst	'knife gets rusty'
(c) √cw 'make, do'	=els	cw=élš-m	'make a stone knife'
	=ezn	cw=ézn-me	'make net(s)'

The root √təm 'lack' is cognate with the Sélíš retracting root √tam (Egesdal, p.c.). The presence of /l/ or /z/ in the suffixes noted here may explain the appearance of retracted vowels, but there are a number of suffixes with /l/ which do not exhibit this retracting effect (/=el'qs/, /=ele?l/, /=elus/). The analysis of suffixal /l/'s as retracting can only be by analogy to /l/'s occuring in C_2 position of roots, since it is in this position, and not in suffixes, that [l] is historically derived from retracting */r/. /z/ usually locally retracts regardless of position. Another possibility is that these suffixes were at one time roots.

retraction does not affect anything past the rime of the stressed syllable. This explains nine of the thirteen polysyllables with retracted segments. Of the remaining 4 cases, all have /i/, which we have seen is resistant to retraction in suffixes.

(34) Polysyllables

s̓ʔamél̓ə	'Okanagan people'	(loan from Halkomelem)
ʔʌ́sxe	'sneeze'	(imitative)
kʷéȿu	'pig'	(loan from French via Chinook Jargon)
pʌ́ki(h)	'buggy'	(loan from English)
cél̓eʔ	[place name, creek in Spuzzum area]	
k'ʌ́k'ałweʔ	'weevil'	
mʌ́c'e(h)	'hornet'	
p'ʌ́s̓keʔ	'hummingbird'	(loan from Halkomelem)
kʌ́lwet	'False Solomon's-seal'	
/i/ exceptional		
s̓ipiʔéȿ(ʕ)	'CPR'	(loan from English)
s̓əl'píp̓x	place name, fishing place near Barney's cabin	(possible loan from Halkomelem)
ʔʌl's̓íkʷ	'Western painted turtle'	
mitʌ́s ~ mitʌ́s̓	'gaiters, leggings'	(Chinook Jargon)

When joined to a retracting root, the stressed vowels of suffixes undergo the following alternations: /e/ —> [a]; /u/ —> [o]; /ə/ —> [ʌ][18] but /i/ does not become [e]. The /e/ > [a] alternation is the most consistent of the three. /u/ > [o] occurs less reliably, and I have found no cases of /i/ being affected at all.[19] The same cline is noted by Czaykowska-Higgins (in preparation) for the distribution of retracted vowels in Moses-Columbian. In the examples which follow /e/ of suffix vowels regularly retracts to [a], although there is variation recorded on some forms.

(35) Nɬeʔkepmxcin Harmony roots: /e/ > [a]; /u/ > [o]; /ə/ > [ʌ]; */i/ > [e]

Root	Suffix		
c̓m	=ep	ʔes-n√c̓m=ʌ́p	'get dirty on bottom'
k'ʌ́ɬ		n√k'əɬ-k'ɬ=ʌ́ps	'seat of pants is dirty'
c̓m	=eleʔ	ʔes √c̓m=ʌ́leʔ=xn	'have dirty, smeared feet'
k'ʌ́ɬ	=ekst	k'əɬ-p=ʌ́kst	'got hands muddy'
c̓m	=us	ʔes-n√c̓m=ɔ́s	'dirty window'
k'ʌ́ɬ		k'əɬ-p=ɔ́s	'get face dirty'
		k'ɬ=ɔ́s̓-n-cʉ́t	'smear dirt on one's face'
k'el		n√k'l=ɔ́s̓-m	'cut out, make a pattern'
k'ʌ́ɬ	=ic'eʔ	ʔes√kɬ=íc'eʔ	'dirty clothes'
k'ʌ́ɬ-	-Vp	k'ɬ-ʌ́p	'get smeared with mud'
k'el	-Vm	k'l-ʌ́m	'cut hide, cloth'

[18]Thompson and Thompson (1992) note that the transcription of retracted schwa is difficult, since it sounds a lot like [a].

[19]There may be some speaker-dependent variation on this. Egesdal (p.c.) reports pmé yx 'he went fast' from √pəm=iyx in the speech of some Lytton speakers. Data from Annie York are consistent in showing no retraction of /i/.

The examples above show one case of /i/ unaffected by harmony (ʔes√kɬ=íc'eʔ). The phenomenon is better illustrated in (36) with the root √k'ʌs̓ 'ugly', which harmonizes /e, u/ but not /i/, despite identical environments (immediately adjacent stressed vowel in a lexical suffix).

(36) /i/ opacity

k'ʌs̓		
=elus	nk's̓=ʌ́lus	'bad-tempered'
=eɬxʷ	k's̓=ʌ́ɬxʷ	'ugly house'
=ens	k's̓=ʌ́ns̓ ~k's̓=ʌ́ns	'poor quality board'
=us	k's̓=ɔ́s̓	'ugly-looking person'
=iceʔ	k's̓=íceʔ	'dirty, ragged clothes'
=ikn'	k's̓=íkn'	'have a bad back'
=in'ek	k's̓=ín'ek	'ugly-looking weapon'
=init	n-k'əs̓-k's̓=ínit	'poor singer'

Although the /e/ —> [a] alternation is subject to some variation in that a harmonic and a non-harmonic form may exist in the same harmony context (as seen in (37)), there is more variation in the /u/ —> [o] alternation. (37) details the number of examples of each type of alternation found in Thompson and Thompson (1990). These data are drawn from entries for attested harmony roots with the suffix vowels in a harmony context.

(37) Nɬeʔkepmxcin cline in suffix vowels[20],

e > a	38 examples	*e > a	30 examples
u > o	7	*u > o	15
ə > ʌ	13	*ə > ʌ	5
i > e	0	*i > e	15

The critical point here is the absolute exclusion of /i/, although the cline /a > u > i/ is exactly the one argued by Czaykowska-Higgins (in preparation) for Nxa'amxcin.

Discussing the effect of retracting roots, Thompson and Thompson (1992:31) note several aspects of the spread of retraction to following vowels: (i) that immediately following stressed vowels except /i/ are the targets of the rule; (ii) that if such a target is followed by /y, y'/, application of the rule is blocked[21] and (iii) postvocalic /s/ in the suffix is optionally retracted to [s̓]. The exceptionality of /i/ has been discussed, but not the restriction of retraction to 'immediately following stressed vowels'. I turn to this now.

Although there is a lot of retraction data in Thompson and Thompson (1992), there are very few examples in which the effect is demonstrably long-distance (*i.e.*, spreads through several morphemes). In the vast majority of cases, retraction occurs only on adjacent suffixes, but there are examples of spread through /-p/ 'Inchoative' and /-m/ 'Middle'.

(38) Retraction through /-p/ Inchoative and /-m/ Middle; /-uʔ/ '?'.

k'əɬ-p=ʌ́kst	'got hands muddy'
k'əɬ-p=ɔ́s	'got hands dirty'
tʌl~təl-p=ʌ́w's	'pull muscles in lower back'
k'ə̓s-m'=ʌ́keʔ ~ ʌ́keʔ	'dirty, untidy, messy'
kʷl-oʔ=ʌ́ytxʷ ~ -eytxʷ	'yellow leaves'

The /-t/ transitivizing suffix though, does not appear to allow the spread of retraction. This is of course, evidence of blocking, but the data are scarce and not always unambiguous, given the facts of

[20]There are also some suffixes for which there are no examples of alternation. /-es/ is an example. This suffix comprises 10 of the 30 cases where no alternation is attested. Of the remaining 20, 12 are suffixes which are attested with harmony alternates. It is unclear at this point in our understanding of the lexical phonology of Nɬeʔkepmxcin what the rationale (if any) for the exclusion of particular suffixes from harmony might be.

[21]The example given is √kʔal'=ɑ́ym'xw 'earth begins to turn green [with green plants growing]'.

variability and the cline discussed above. Fieldwork may be needed to make firm conclusions. All of the examples I have been able to find of possible blocking behaviour are given in (39).

(39) Potential blocking of retraction by consonants

s√c'ɔl'=ʂəʔ-élp	'tall Oregon-grape bush; *Mahonia nervosa*'
√ləʂ-p-s-cút	'settle, subside'
√k'əʂ-t-n'-cút	'misbehave, act badly'
√k'l-əp-nwén'-ne	'I managed to cut'
√pʌX̌'-nwén'-ne	'I dumped it accidentally'
n√ʂaw'-y-epsém	'get scratched (all) around the neck'
/-t/ transitivizer	
√çʌʂ-t-és	'suspend s.t. over fire to preserve by roast-drying'
√pʌm-e-t-és	'make s.t. go fast'
√p'ʌɬ-(e)-t-és	'flood s.t.; fill s.t. with liquid'
√pʌl'xʷ-e-t-és	'make hole right through something'
√pʌX̌'-t-és	'pour s.t. out'
√ləʂ-p-s-t-és	'manage to lower s.t.; lower accidentally'
√ləʂ-t-és	'lower s.t. from above'
k'əɬ+k'ʌɬ-t-és	'daub s.t. (here and there, repeatedly)'
√kʌʂ-t-és	'dislike, not want s.t.'
√kʌʂ-t-éy-s	'they don't like us to go with them'
√mʌX̌'-t-és	'flatten, trample, stomp on s.t.'
Minimal pair	
n√k'ɬ=étkʷ	'muddy water (caused by animals or people)'
n-√k'ɬ-t=étkʷ	'muddy water (caused by animals or people)'

There are also some harmony effects from root-final post-velars in Nłeʔkepmxcin. Segmental faucals in root-final position often trigger alternation of suffixal /e/ —> [a] if the suffix vowel is right-adjacent to the root. As with root-triggered retraction, progressive effects from segmental faucals onto suffix vowels are largely confined to /e/ and do not target /i/. I have found one example of /u/ —> [ɔ] in Thompson and Thompson (1990). Egesdal (1993) notes similar effects in Sélíš. Thus, /e/ retracts to [ɑ] and /u/ to [ɔ] directly following /ʁ, ʕ'/ and /ʁʷ, ʕ'ʷ/ respectively. The phonetic nature of these effects is clear from the diphthongization of /u/ to [ɑu] after /ʁ, ʕ'/. Likewise, Egesdal (1993) reports that /u/ retracts to [o] after rounded uvulars, but diphthongizes to [ʌu] after unrounded uvulars. The /i/ vowel is also diphthongized after pharyngeals, and lowered to [e] after uvulars.

3.4.2 Nxa'amxcin (Czaykowska-Higgins 1990, in preparation)

As with Nłeʔkepmxcin, Progressive Harmony in Nxa'amxcin is triggered by a subset of roots, themselves reliably containing a retracted vowel when stressed. Within harmony roots, all potentially retractable segments are retracted: /i, u, a, ə, c, s, l, l', n/ —> [ɛ, ɔ, ɑ, ʌ, ç, ʂ, ɬ, ɬ', (n̩)].

(40) Root minimal pairs

ɬɛy	'come loose'	tʌn	'tight'
liy	stab	tən	'slow'

The distribution of retracted segments in polysyllabic roots suggests that the harmony feature of roots associates from right to left, and that /i, u/ may be resistant to harmony.

(41) Polysyllabic roots

ʂɑɬéʂtɑ	name
wɑʂkwú	name
ɬɑmy'ɑkɑʔ	name

(42) Resistance of /i, u/ in roots

kɑntínɑʂ	'saddlebags' (borrowing)
lípuɑ́	'peas' (borrowing)

Harmony of affixes is dependent on the root to which they are attached, as with Progressive Harmony in all of the language data reviewed.

(43) Suffix alternation

Root	Suffix		
ɬɛy	=ank	k√ɬɛy'=ɛ́nk	'cinch came loose'
tʌɬ	=ul'əxʷ	tʌɬ=ɬ'ʌxʷ	'hard ground, hard pan'
c'm	=us	kɬ√c'ʌm=ɔʂ-ç	'he kissed someone'

The form tʌɬ=ɬ'ʌxʷ 'hard ground, hard pan' introduces the issue of stress as a condition for Progressive Harmony in Nxa'amxcin. Czaykowska-Higgins (in preparation) proposes that Progressive Harmony applies obligatorily to cyclic suffixes following a harmony root, regardless of whether they are stressed or not, while non-cyclic suffixes harmonize optionally, and variably. The only exceptions to this generalization involve the vowels /i/ and /u/ in cyclic suffixes (see Czaykowska-Higgins 1993 for a full discussion of cyclicity in Nxa'amxcin). These same vowels are resistant to Progressive Harmony in Nłeʔkepmxcin, though it is unclear whether they are resistant only in cyclic suffixes.

(44) Resistance of /i, u/ in cyclic suffixes

Root	Suffix		
çɔʂ	=cin	kɬ√çɔʂ=cín=xn	'deer-hoof rattle'
ɬm	-nun	ɬəm-nún-n	'I accidentally stole it'
ʂn̩	-wil'xʷ	ʂn̩+ʂn̩-t-wílxʷ	'become gentle'

As a result of this variation, and that found in roots, Czaykowska-Higgins suggests a cline of retractability: i < u < a.

Nxa'amxcin presents evidence for an interesting variation on Progressive Harmony, which is that Progressive Harmony roots optionally trigger Regressive harmony on prefixes. To the best of my knowledge, this does not occur systematically in the other languages, though there are three cases of prefix /s-/ retraction in Nłeʔkepmxcin.

(45) Regressive Harmony on prefixes

nɑ√mɑɬ'+ɬ'	'getting warm'
nʌ√mɑ-ʔ-ɬ'	'water getting warm'
ʂ√c'ɑm'	'bone'
s√c'ɔm+c'ɔm	'a boil'

Contrary to Nłeʔkpemxcin, it seems that prefixal reduplication in Nxa'amxcin shows variable rather than regular retraction.

3.5 Type-v: Retraction of consonants

The final variant of harmony is one in which certain consonants are targetted, both in roots and in suffixes. Examples of this have already been seen in Nłeʔkepmxcin and Nxa'amxcin. Those languages which allow the retraction of consonants limit the targets to a subset of the Coronals: /c, s/ in Shuswap, /c, s, l, l'/ in Lillooet and Nłeʔkepmxcin, Nxa'amxcin and possibly /n/ as well in Nxa'amxcin. All root vowels in these languages retract from /i, e/æ, u, ə/ to [ɛ, a, ɔ, ʌ] under harmony conditions.

(46) Coronal targets of retraction in Lillooet (van Eijk 1985)

tʌʂp	'to trill, vibrate'
ʂɬ̓ʌl	'to drip in a string'
pʌmp-ʂɔt	'to run fast without being able to stop'
pm-ɬ̓ɩx	'to hurry'
c'ʌʔp-ɬ̓ɩw's	'to have body-odour'

4.0 Conclusion

As stated, the data presented here are intended to be representative rather than exhaustive. I invite comments on, corrections and additions to any and all of this material.

References

Bessell, N. 1992. Towards a phonetic and phonological typology of post-velar articulation. University of British Columbia Ph.D. dissertation.

Carlson, B. 1972. A grammar of Spokan. University of Hawaii Ph.D. dissertation. Distributed as University of Hawaii Working Papers in Linguistics 4.4.

Carlson, B. and P. Flett 1989. Spokane dictionary. University of Montana Occasional Papers in Linguistics 6. Missoula.

Caykowska-Higgins, E. 1990. Retraction in Moses-Columbia Salish. Papers for the 25th International Conference on Salish and Neighbouring Languages.

Czaykowska-Higgins, E. 1993. Cyclicity and stress in Moses-Columbia Salish (Nxa'amxcin). Natural Language and Linguistic Inquiry.

Czaykowska-Higgins, E. (in preparation). Long-distance retraction in Moses-Columbia Salish (Nxa'amxcin).

Doak, I. 1992. Another look at Coeur d'Alene harmony. International Journal of American Linguistics 58(1), 1-35.

Gibson, J. 1973. Shuswap grammatical structure. University of Hawaii Ph.D. dissertation. Distributed as University of Hawaii Working Papers in Linguistics 5.5.

Egesdal, S. 1993. Retracted vowels in Sélíš (Flathead). Salish Kootenai College ms. Presented at the 32nd Conference on American Indian Language, Washington, D.C..

van Eijk, J. 1985. The Lillooet language. Universiteit van Amsterdam Ph.D. dissertation.

Kinkade, M.D. 1967. Uvular-pharyngeal resonants in Interior Salish. International Journal of American Linguistics 39, 224-234.

Kinkade, M. D. 1981. Dictionary of the Moses-Columbia language. Nespelem: Colville Confederated Tribes.

Kuipers, A. 1974. The Shuswap language. The Hague: Mouton.

Kuipers, A. 1989. A report of Shuswap with a Squamish lexical appendix. Paris: Peeters/SELAF.

Mattina, A. 1973. Colville grammatical structure. University of Hawaii Ph.D. dissertation. Distributed as University of Hawaii Working Papers in Linguistics 5.4.

Mattina, A. 1979. Pharyngeal movement in Colville and related phenomena in the Interior Salishan languages. International Journal of American Linguistics 45, 17-24.

Reichard, G. 1938. Coeur d'Alene. Handbook of the American Indian Languages, 3, ed. F. Boaz. Hamburg: J. Augustin.

Sloat, C. 1975. Vowel harmony in Coeur d'Alene. International Journal of American Linguistics 38, 234-239.

Sloat, C. 1980. Vowel alternations in Coeur d'Alene. International Journal of American Linguistics 46, 14-20.

Speck, B. 1980. An edition of Father Post's Kalispel grammar. University of Montana Occasional Papers in Linguistics 1, Missoula.

Thompson, L. C. and M. T. Thompson. 1990. Thompson dictionary. University of Hawaii ms.

Thompson, L. C. and M. T. Thompson 1992. The Thompson language, University of Montana Occasional Papers in Linguistics 8, Missoula.

Vogt, H. 1940. The Kalispel language. Oslo: Det Norske Videnskaps-Akademi i Oslo .

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