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CYCLICITY AS A MORPHOLOGICAL DIACRITIC: EVIDENCE FROM MOSES-COLUMBIA SALISH (NXA'AMXCIN)*

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Since the late 1970's several different generative models have been proposed to account for the interaction between morphology and phonology. One difference between them has been the characterization of cyclicity. Pesetsky (1979) and Kiparsky (1982a), for instance, derive cyclic rule application from the interleaving of morphological and phonological operations in the lexicon, assuming that all and only lexical phonological rules apply cyclically. Halle and Mohanan (1985) and Pulleyblank (1986) suggest that lexical rules may apply noncyclically and that (non)cyclicity is a property of lexical strata: within cyclic strata cyclic rule application follows from the interleaving of morphology and phonology. In contrast, Halle and Vergnaud (1987a,b) propose that cyclicity is not derivable from the interaction of morphology and phonology, but is an idiosyncratic and hence diacritic property of individual affixes (see also Cole 1987, Halle 1987, and Halle and Kenstowicz 1989). In this paper I argue that the complex system of stress assignment found in Nxa'amxcín, or Moses-Columbia Salish (henceforth Cm), provides strong support for Halle and Vergnaud's hypothesis that cyclicity is an idiosyncratic morphological property. The paper is divided into two parts: the first part presents evidence for cyclic and noncyclic stress assignment in Cm; the second part presents the argument that cyclicity must be a morphological diacritic.

PART I: CYCLIC AND NONCYCLIC STRESS ASSIGNMENT

The basic features of the Cm stress system are set out in (1).

(1) The Cm Stress System:
a. Cm has two rules of stress assignment:
CM FOOT RULE — constructs unbounded rightheaded feet (cyclic, noncyclic)
WORD STRESS RULE — constructs leftheaded constituents (noncyclic)
b. Cm has 2 major classes of roots: strong and weak; each class is further subdivided into 2, characterized in terms of [±Extrametricality]
c. Cm has 2 major classes of suffixes: dominant and recessive; each class is further subdivided into 2, characterized in terms of [±Accent]

In this paper I shall focus on the properties of dominant and recessive suffixes without discussing the role of accent in the stress system; accented and unaccented dominant suffixes function similarly with respect to (non)cyclic stress assignment, as do accented and unaccented recessive suffixes (for extensive discussion of accent and other issues in Cm stress assignment see Czaykowska-Higgins 1990).

1. Cyclic Stress

All full words in Cm surface with one primary stress. The basic stress pattern involves assignment of stress to the rightmost syllable of a form. Examples of monomorphemic forms with stress assigned to the rightmost vowel are given in (2); polymorphemic forms consisting of a root followed by what I shall call for the present a D suffix are given in (3):[1],[2]

(2) (CV)CVC(C)V́C

a. hananík	'jackrabbit'
b. ʔarasík^{w}	'turtle'
c. q̓aláx̣	'fence'
d. macq̓^{w}úl'	'pelican'

(3) Rt+(D)+D́

a. katp̓íqcín	kat=√p̓íq=cin loc=√cook=mouth	'burn lips'
b. p̓íqcncút	√p̓íq=cin+cut √cook=mouth+refl	'cook' VDEL
c. náqs		'one'
d. nnaqsqín	n=√naqs=qin loc=√one=top	'one tipi'
e. naqsqnwíl	√naqs=qin+wil √one=top+container	'one load' VDEL

As (3) shows, stress is assigned to the suffix vowel when one suffix follows the root (3a,d), but shifts to the right when a second suffix is affixed (3b,e). The examples in (2) and (3) suggest the stress rule given in (4).[3]

(4) CM FOOT RULE
a. line 0 parameter settings are [+HT, -BND, R]
b. construct line 0 constituents
c. locate heads of line 0 constituents on line 1

1.1. Dominant and Recessive Suffixes

Not all suffixes trigger the rightward stress shifts seen in (3). In (5), for instance, we see the same stress pattern as in (3): a root followed by one D suffix is stressed on the suffix. In (6), in contrast, we see forms containing the same roots as in (5) followed by different (R) suffixes; instead of stress falling on the R suffixes, however, it falls on the roots. Note that in (5b) stress is not on the rightmost surface vowel of the stressed D suffix, but on the rightmost nonepenthetic vowel.

(5)	Rt + D́		
a.	k̓im'xíkn	k=√ʔim'x=ikn loc=√move=back	'camp up high'
b.	ʔitʔitxáyaʔ	√ʔit+ʔit+x=ayʔ √sleep+RedSuff=head/pretend	'acting asleep' VINS, FF
c.	kʷɬníc̓aʔn	√kʷułn=ic̓ʔ+n+t+Ø+n √borrow=skin+CTR+TR+3O+1sgS	'borrow wig' VDEL,tDEL,AFF
(6)	Rt́ + R (+R)		
a.	sac'ím'xəxʷ	sac=√ʔim'x=mix impf=√move=impf	'he's moving' VDEL, mDEL, FF
b.	ʔítxstn	√ʔitx=n+stu+Ø+n √sleep=CTR+CS+3O+1sgS	'put x under ether' VDEL, VINS, FF
c.	kʷúɬncxʷtaʔ	√kʷułn=n+t+sa+xʷ+taʔ √lend=CTR+TR+1sgO+2sgS+imper	'lend me it!' VDEL,AFF,VINS,FF

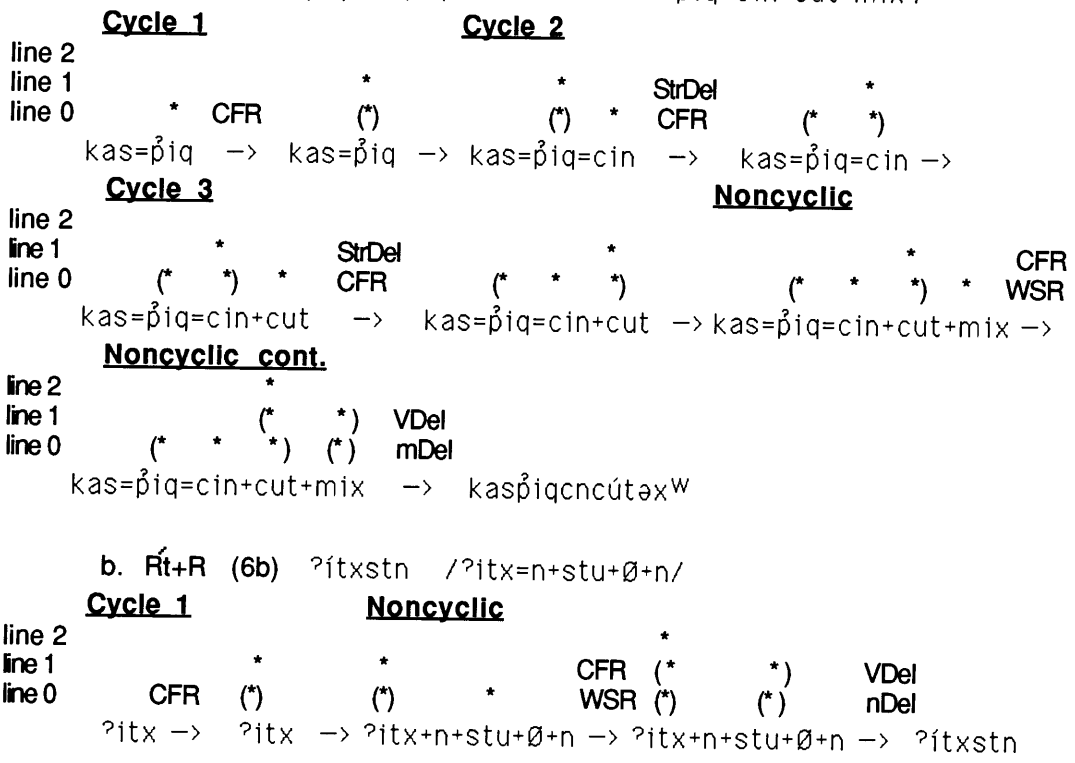
D suffixes, then, are assigned stress when adjacent to (certain) roots while R suffixes are not assigned stress, even when adjacent to the same roots. R suffixes also behave differently from D suffixes when adjacent to Rt+D stems. We saw in (3) that in a Rt+D+D form surface stress falls on the rightmost suffix (cf., (3d) nnaqsqín, (3e) naqsqnwíl). The examples in (7) illustrate, by contrast, that when a R suffix follows a D suffix in a Rt+D+R form stress remains on the D suffix:

(7)	Rt+D́+R		
a.	kask̓im'xíknəxʷ	kas+k=√ʔim'x=ikn+mix unr+loc=√move =back+impf	'he's going to camp up high' VDEL, mDEL, FF
b.	kasp̓iqcncútəxʷ	kas=√p̓iq=cin+cut +mix unr= √cook= food+refl + impf	'he's going to cook' VDEL, mDEL, FF
c.	kʷɬnwílnc	√kʷułn= wil+n+t+sa+s √borrow=vehicle+CTR+TR+1sgO+3S	'he borrowed my vehicle' VDEL, DEG, AFF

The difference between the D and R suffixes illustrated above parallels differences between the dominant and recessive suffixes of Vedic Sanskrit as described in Kiparsky (1982b; see also Halle and Vergnaud 1987a,b and references therein). Kiparsky and others have argued that Sanskrit dominant suffixes delete previously assigned stress, whereas recessive suffixes do not delete stress. If one assumes that, as in Sanskrit, Cm D suffixes are dominant and delete previously

assigned stress, whereas R suffixes are recessive and do not delete stress, the differences in the stress patterns associated with Cm D and R suffixes can be explained. The following derivations illustrate this claim. In addition to assuming the D and R suffixes are dominant and recessive, respectively, I assume 1) that the CFR applies cyclically to dominant suffixes, 2) that it applies on the root cycle, and 3) that it applies noncyclically to recessive suffixes. These assumptions are justified below. Note also that a second stress rule, the WSR assigns stress to the leftmost line 1 asterisk in the noncyclic component (prefixes are outside the domain of stress assignment). Stress deletion is ordered before the CFR on each cycle.[4]

(8) a. Rt+D+D́+R (7b) kasp̓iqcncútəx^{w} /kas=p̓iq=cin+cut+mix /



b. Rt́+R (6b) ʔítxstn /ʔitx=n+stu+Ø+n/

In (8a) stress deletion does not apply on the root cycle, since there is no previously assigned stress to delete, but the CFR does apply, assigning stress to the only available vowel; each subsequent addition of a dominant suffix triggers stress deletion, which involves removal of the head and constituent boundaries of the previously erected constituent, and reapplication of the CFR; when -mix is added no stress deletion takes place, since it is recessive; the CFR applies to construct a foot on -mix, then the WSR constructs a leftheaded foot assigning primary stress to the rightmost dominant suffix. In (8b) stress is assigned to the root on Cycle 1; on Cycle 2 stress deletion is prevented from applying since -mix is recessive.

1.2 Cyclic Application of the CFR

In both (8a) and (8b) it is essential to assume that the CFR has applied at least once to assign stress to the rightmost nonrecessive morpheme (i.e., the root in (8a), the rightmost dominant suffix in (8b)) before accessing a final recessive morpheme. If this were not the case then the CFR would simply assign stress to the recessive suffix, as in both cases it is the rightmost stressable suffix in the word. The fact that stress must have applied at least once before accessing a recessive morpheme is explained automatically if one assumes that the CFR applies cyclically. In §3 I provide additional evidence for cyclic stress assignment.

2. Noncyclic Stress

I turn now to evidence that recessive morphemes are assigned stress noncyclically. In order to provide evidence of noncyclic stress assignment, it is first necessary to discussion differences between strong and weak roots.

2.1 Strong and Weak Roots

In the examples we have seen so far, roots are unstressed when followed by one or more dominant suffixes, and stressed when followed by recessive suffixes; these are "strong" roots. In contrast, "weak" roots are characterized by being unstressed both when followed by one or more dominant suffixes as in (9), and when followed by recessive suffixes (10) — WkRt+D́ ..., WkRt+Ŕ... .

(9) Wk Rt+D́+R

a. ncəkcəkqínn	n+ck=√ck=qin+n+t+Ø+n loc+RedP=√hit=top+CTR+TR+3O+1sgS	'hammer it' tDEL, nDEL,VINS,FF
b. tq̓iy'íc̓a?n	t=√q̓y'=ic̓?+n+t+Ø+n loc=√write=side+CTR+TR+3O+1sgS	address a package' tDEL,nDEL,VINS,FF
c. cȟaw'yíknəxʷ	?ac=√ȟw'y=ikn+mix stat=√make=back+impf	'making a bow' VDEL,mDEL,FF

(10) Wk Rt+Ŕ

a. cəkncás	√ck=n+t+sa+s √hit=CTR+TR+1sgO+3S	'he hit me' AFF,VINS,FF
b. sq̓iy'míx	s=√q̓y'=mix nom=√write=people	'school children'
c. cȟaw'istúnn	?ac=√ȟw'y=n+stu+Ø+nn stat=√make=CTR+CS+3O+1sgS	'made it last' nDEL, VOC,VINS,FF

The fact that recessive suffixes are stressed after weak roots indicates that the weak roots do not have stress assigned to them on the first (root) cycle. If weak roots did get stress on the root cycle, then, given that recessive suffixes do not delete stress, forms such as those in (10) would surface with stress on the roots (following the derivation in (8b)). As it turns out, all weak roots contain surface vowels whose quality and position are predictable, and which can therefore be assumed to be

absent in underlying representation: in each of the 3 roots in (9) and (10) the vowel is positioned between the first and the second consonants of the roots; in √cək,[ə] surfaces as a result of default rules, in √q̓iy',[i] surfaces as a result of spreading from the following [y'], and in √ħaw'y,[a] surfaces as a result of spreading from the initial pharyngeal and the final glide may become vocalized (see Note 2 (j)). One can assume, then, that stress falls on recessive suffixes following weak roots because at the point at which the CFR applies on the root cycle, the weak roots are vowelless and hence contain no stressable elements; when the recessive suffixes are accessed they get assigned stress since they are rightmost. In contrast, strong roots contain unpredictable and thus underlying vowels that are stressable on the root cycle.

Predictable vowels are never assigned stress by the CFR but instead are assigned stress by the second rule, the WSR, which was illustrated in (8) above, and which is formalized in (13) below. The WSR constructs leftheaded constituents: in (11) we see cases where both the root and the suffix vowels are predictable, and stress falls on the leftmost root vowel; in (12) we see roots in which both vowels are predictable, and stress falls on the leftmost.

(11) Wk Rt (+R) (+R)

a. sq̓íy'q̓iys	s=√q̓y=q̓y+s nom=√write=RedS+poss	'his writings' VINS,FF
b. ħáw'iɬn lx	√ħw'y+ɬ+Ø+n √do=redir+3O+1sgS	'I did it for them' VOC, VINS,FF
c. k̓ə́məlqstxən	√k̓m=lqst+xn √surface of=shin+leg	'lower leg' VINS,FF

(12) CəC(C)əC

a. ʔəħʷaʔ	√ʔħʷʔ	'have cold, cough'
b. xʷúw'iy'	√xʷw'y'	'fly'
c. məlx̣aʔ	√mlx̣ʔ	'tell a lie'

(13) Word Stress Rule (WSR):
- a. line 1 parameter settings are [+HT, -BND, L]
- b. construct constituent boundaries on line 1
- c. locate the heads of line 1 constituents on line 2

As we saw in the derivations in (8) the WSR is ordered after the CFR and is noncyclic. Since predictable vowels are only assigned stress by the WSR, it is clear that the WSR is also ordered after vowel insertion takes place.

2.2 Noncyclic Application of the CFR

We saw above in (10) that if 1 recessive suffix appears affixed to a weak root, it is assigned stress. If 2 recessive suffixes are affixed to a weak root, stress is always assigned to the rightmost of the suffixes.

(14) Wk Rt + R + Ŕ

a. cəkstwás	√ck=n+stu+wa+s	'he throws it'
	√hit=CTR+CS+TO+3sgS	VDEL, VINS,FF
b. c?əmstáls	?ac=√?m+n+stu+al+s	'he is feeding us'
	stat=√feed=CTR+CS+1plO+3sgS	VDEL, VINS,FF

If the CFR applied cyclically to recessive suffixes, then stress should always fall on the leftmost suffix in a sequence of these suffixes. In (14a), for example, if the CFR applied cyclically, it would apply first on cycle 2 to assign stress to -stu, and then would reapply on cycle 3 when -wa was affixed. However, since recessive suffixes do not delete stress, on cycle 3 stress would incorrectly remain on the vowel of -stu and would not get assigned to the rightmost vowel in the word (i.e., */cəknstúwas/). However, if the CFR is assumed to apply noncyclically, then it will derive the correct surface forms since it will apply only once to assign rightmost stress to forms which include all the noncyclic suffixes (i.e., /cəknstuwás/). So we can conclude that the CFR must apply noncyclically to recessive suffixes.

3. More on Cyclic Stress Assignment

I want now to provide additional evidence that the CFR applies cyclically. In order to do so I must first discuss further complications in the stress behaviour of roots in Cm.

3.1 Root Stress: [±extrametricality]

Recall from (3) and (5) above that when one dominant suffix is added to a strong or weak root stress shifts to the suffix. In (15), however, we see examples of strong and weak roots followed by one dominant suffix in which the roots (referred to as [+E]), and not the suffixes are stressed.[5]

(15) Ŕt$_{[+E]}$+D

a. xʷírkstm	√xʷir=akst+m	'reach out'
	√reach=hand+mid	VDEL
b. namáʕ'ʷkn	na=√maʕ'ʷ=ikn	'he broke his back'
	loc=√break=back	VDEL
c. sə́lya?	√ sl=ay?	'round hill'
	√round=top	VINS,FF

If one compares (15b) to (5a), one sees that the same suffix -ikn surfaces as stressed when adjacent to the root √?im'x, but as unstressed when adjacent to √maʕʷ; this indicates that the stress pattern in (15) is due to a property of the roots,

not of the suffixes. Interestingly, addition of a second dominant suffix to roots such as those in (15) causes stress to shift off the root:

(16) $Rt_{[+E]}+D+\acute{D}$

a. xʷirkstátkʷ	√xʷir=akst+atkʷ	'reach into water'
	√reach=hand+water	VDEL
c. səlya?qín	√sl=ay?+qin	'knob, SE of sə́lya?'
	√round=top+head/top	VDEL, VINS, FF

The primary characteristic associated with forms containing the [+E] roots, then, is that any suffix that is adjacent to such roots and not followed by any other suffix is invisible to the CFR, and is not assigned stress. This fact can be accounted for if one assumes that [+E] roots are lexically marked to make suffixes adjacent to them extrametrical (see Halle and Vergnaud (1987b) on Polish). Extrametricality is not a property of individual suffixes: suffixes are extrametrical only when directly adjacent to [+E] roots: -atkʷ 'water', for instance, is invisible to the stress rules when adjacent to √qʷay= 'blue' in qʷáykʷtn √qʷáy=atkʷ+tn 'bluing', but not when separated from the root by the suffix -akst 'hand' in (16a).[6]

3.2 Vowel Deletion

The examples in (17) and many other examples illustrate that unstressed vowels situated to the right of surface stress are always deleted:

(17) $R\acute{t}_{[+E]}+D+R+R(+R)$

a. ?acwákʷcnmstus	?ac=√wakʷ=cin+min+stu+wa+s	'He talks about him (TO)'	
	stat=√talk about=mouth+rel+caus+TO+3S		VDEL, VOC
b. ħúykstmnc	√ħuy=akst+min+t+sa+s	'He is bothering me'	
	√bother=hand+rel+trans+1sgO+3S		VDEL, AFF

Vowels situated to the left of surface stress may also be deleted, but only under certain conditions. In the paired forms in (18), we find the same 2 dominant suffixes in the same relative order, with stress assigned to the rightmost suffix in each case. However, in the case of (18a,b,c), the vowels of the underlined suffixes are deleted, while in (18a',b',c') the vowels of the underlined suffixes are not deleted:

(18)

a. xʷirkstátkʷ	√xʷir=akst+atkʷ	'reach into water'	
	√reach=hand+water	VDEL	
a'. nk̓ʷx̓'pakstátkʷn	n=√k̓ʷx̓'=p+akst+atkʷ+n+t+Ø+n	'I drop s.t. into water'	
	loc=√drop=inch+hand+water+cont+trans+3O+1sgS	tDEL,nDEL,VINS,FF	
b. kɬc̓aw'lqʷqnákstm	kɬ=√c̓aw'=alqʷ+qin+akst+m	'wash wrists'	
	loc=√wash=pole+top+arm+mid		

b' kyər'yər'qnalqʷákstn k+yr'=√yr'=qin+alqʷ+akst+n+t+Ø+n 'roll up sleeves'
loc+RedP=√roll=top+pole+arm+cont+trans+3O+1sgS tDEL, DEG, VINS,FF

c. kʷənksntwáxʷ √kʷan=akst+n+t+waxʷ 'get married'
√grab=hand+cont+trans+recip

c'. k̓ʷaʔaksncút √k̓ʷʔ=akst+n+cut 'bite one's own hand'
√bite=hand+cont+refl VINS,FF

In (18a), for example, the root is extrametricality-assigning (cf. xʷírkstm 'reach out'), so -akst is not stressed on cycle 2. Conversely, in (18a') -akst is stressed on cycle 2, since the root is weak (cf. k̓ʷx̓'k̓ʷx̓'pákstms 'he dropped it'). So the vowel situated to the left of surface stress in (18a) which is deleted is a vowel that was never stressed by the CFR. Conversely, the vowel in (18a') which was stressed on cycle 2 remains undeleted. The other examples in (18) illustrate the same relationship of vowel deletion to cyclic stress assignment

3.3 Secondary Stress

At most about 5% of forms in the Cm data have been transcribed with secondary stress. Secondary stress occurs only on vowels which are unpredictable and hence underlying. When marked, it is always situated to the left of primary stress, and is assigned to a vowel which would have had stress assigned to it on an early cycle of the derivation. In the first 3 forms in (19), for instance, the CFR would have assigned stress cyclically to the root vowels; these surface with secondary stress, primary stress being assigned to a following dominant suffix. In the last 2 forms in (19), secondary stress surfaces on the leftmost dominant suffixes: in these forms the CFR would have applied cyclically on cycle 2 to assign stress to these dominant suffixes, and then reapplied on cycle 3 to shift stress onto the final dominant suffixes in the word. Note that in (19c,d) stress would never have been assigned to the root vowels, since the roots in these forms are weak.

(19)

a. xʷìrkstátkʷ √xʷir=akst+atkʷ 'reach into water'
√reach=hand+water VDEL

b. c̓iy'c̓ày'xáłp c̓y'=√c̓ay'x=ałp 'plant species'
RedP=-√? = plant

c. c̓àl'sncút √c̓al'=us+n+cut 'shade one's eye'
√shade=eye+cont+refl VDEL
cf. c̓əl'√c̓ál'sn 'I shade the eyes'

d. niʔk̓əmàn'kákst niʔ=√k̓m=ank+akst 'palm of hand'
loc=√surface of=flat+hand VINS,FF

e. nməq̓ʷàpánaʔ n=√mq̓ʷ=ap+anʔ 'bulge on side of face'
loc=√bulge=base+ear VINS,FF

The following generalizations emerge concerning leftward vowel deletion and secondary stress:

(20) Vowel Deletion/ Secondary Stress Generalizations
A. A vowel situated to the left of primary stress
1) is always deleted if it was never assigned stress on any cycle
2) is not deleted if it was assigned stress on an earlier cycle[7]
B. Secondary stress appears only if the vowel on which it occurs was stressed on an earlier cycle.

These facts show that there is a correlation between vowel deletion, secondary stress occurrence, and cyclic stress assignment, and provide additional evidence that the CFR does apply cyclically.

Part II: Cyclic and Noncyclic Suffixes

In the previous section I argued that Cm has 2 classes of suffixes, dominant and recessive, where dominant suffixes trigger cyclic stress assignment and recessive suffixes trigger noncyclic stress assignment. To account for the difference in the cyclic properties of dominant and recessive suffixes, one could hypothesize either that Cm has a cyclic and a noncyclic lexical stratum—with dominant suffixes ordered in the cyclic stratum, and recessive suffixes in the noncyclic stratum—or that Cm has cyclic and noncyclic suffixes. The distribution of the suffixes provides evidence for the latter hypothesis.

4. Suffix Distribution

As (21) illustrates, the order in which suffixes appear in a word is to some extent determined by their semantic/grammatical category:

(21) PREFIX - √**ROOT** - PRIMARY - LEXICAL - IN/TRANS - OBJ - SUBJ
AFFIX SUFFIX

Suffixes from each category are also ordered with respect to each other. In each category the number and distribution of dominant and recessive suffixes is different. Of the primary affixes, only -ilx 'autonomous' is syllabic. There are no forms which show unambiguously whether it is dominant or recessive, since it only ever occurs adjacent to roots. The set of suffixes which follow -ilx, the lexical suffixes, are dominant, with 6 exceptions, 4 of which are consonantal: -tn 'nominalizer.', -xn 'foot', -lqst 'shin', -lqs 'nose, -min 'instrument', -mix 'people'. The recessive lexical suffixes are usually ordered outside the dominant lexical suffixes. The distribution of the in/trans suffixes is particularly complex. (22) lists the suffixes of this class and specifies their dominant/recessive status.

(22)

Dominant		Recessive	
-nun	'success'	-min	'relational'
-tuɬ	'redirective'	-xit	'redirective'
-xix	'indirective'	-stu	'causative'
-xax	'indirective'		
-cut	'reflexive'	-m	'middle'
-waxʷ	'reciprocal'	-n	'control'
-ul	'characteristic'	-t	'transitive'
-wil'x	'developmental'	-ɬ	'redirective'

More than one in/trans suffix can occur in the same word; in (23) I list those cooccurrences which are attested in the data. Based on the order in which the cooccurring suffixes are found, one can establish the relative order, given in (24), of all suffixes from the in/trans category:

(23) In/trans Suffix Cooccurrences

R-D		R-R		D-R
-ɬ-tuɬ-	-min-cut	-min-xit-	-n-t-	-nun-ɬ-
-min-nun-	-xit-cut	-stu-ɬ-	-n-stu-	-tuɬ-t-
-min-tuɬ-	-n-t-waxʷ	-ɬ-t-	-min-t-	-nun-t-
-xit-tuɬ-	-stu-waxʷ	-min-ɬ-	-m-stu-	-nun-stu-
-stu-cut	-n-cut	-min-stu-		-xix-min-
				-xax-min-

(24) Order of In/trans Suffixes

			-ɬ-			
-xix-	-min-	-nun-	-m-	-tuɬ-	-t-	-cut
-xax	-xit-		-stu-			-waxʷ
			-n-			
D	R	D	R	D	R	D

The distribution of in/trans suffixes given in (24), combined with that of the primary affixes and the lexical suffixes, shows that although Cm suffixes fall into 2 classes with respect to their phonological behaviour, that is, dominant=cyclic and recessive=noncyclic, the order in which they occur cannot be explained simply by assuming that Cm has 2 strata. For stratum-ordering to reflect the morphological distribution of Cm suffixes, it is necessary to assume a distinct stratum for each subset of dominant or recessive suffixes that is adjacent to suffixes of the other class. In other words, taking only the primary affixes, lexical suffixes and in/transitivizers into account, one must postulate 9 distinct strata for Cm, plus a tenth to account for the fact that the recessive suffix -mix 'impf.' is ordered after

-cut 'refl.' and -waxʷ 'recip.' (e.g., s+√x̣əs+mən+cút+əxʷ 'he's dressed up'). The strata needed for Cm are given in (25):

(25)			
	Stratum 1:	Primary Affixes, Lexical Suffixes	Cyclic
	Stratum 2:	-mix (LS), -min (LS), -tn, -xn, -lqst, lqs	Noncyclic
	Stratum 3:	-xix, -xax	Cyclic
	Stratum 4:	-min, -xit	Noncyclic
	Stratum 5:	-nun	Cyclic
	Stratum 6:	-m, -stu, -ɬ, -n	Noncyclic
	Stratum 7:	-tuɬ	Cyclic
	Stratum 8:	-t, obj., subj.	Noncyclic
	Stratum 9:	-cut, -waxʷ	Cyclic
	Stratum 10:	-mix, -taʔ	Noncyclic

Cm also has forms known by Salishanists as "secondary derivatives", which seem to have undergone a second layer of derivation:

(26)	Rt+R+R+R+D		
a.	tumstmtúɬn	√tw=min+stu+min+tuɬ+t+Ø+n	'I sold it to him'
		√sell+rel+caus+rel+redir+trans+3O+1sgS	VDEL, nDEL, tDEL
	Rt+R+D+R		
b.	kyaʕ'mncútmntm	k=√yaʕ'=min+cut+min+t+m	'we all jumped on him'
		loc=√gather=rel+refl+rel+trans+mid	
	Rt+D+R		
c.	kɬilncútmn	k=√ɬil+n+cut+min+t+Ø+n	'I'm jealous of him'
		loc=√jealous+cont+refl+trans+3O+1sgS	

In each of these examples the recessive suffix -min 'relational' is ordered after a suffix which it would normally precede. Furthermore, in (26a,b) -min occurs twice. To account for cases in English in which morphemes from early strata are found to occur outside morphemes from later strata, Halle and Mohanan (1985) posit that it is possible to loop back to earlier strata from later ones. The Cm data in (26) could thus be accounted for by postulating that Cm has a loop from Stratum 9 back to Stratum 4. In fact, however, the existence of secondary derivatives shows that morphemes of the dominant and recessive classes are freely interspersed with each other in Cm, subject only to subcategorization and selectional restrictions. Even though it is so complex, the stratum-ordering analysis of Cm given above simply cannot account for all the possible orders of morphemes in the language.

5. Conclusion

The distribution of the dominant and recessive suffixes of Cm makes it very clear that the stratum-ordering hypothesis has no explanatory value in Cm.

Knowledge of the dominant or recessive status of an affix does not allow one to predict what stratum that affix is associated with and so provides no information about the position that that affix occupies; similarly, knowing the position in which an affix occurs does not enable one to predict whether that affix triggers cyclic stress assignment or not. Moreover, the generalization that there really are only 2 classes of suffixes in Cm is completely obscured in a stratum-ordering analysis. Finally, the fact that Cm requires postulation of 10 strata — 2 of which consist of only one affix each — to account for the morphological order and the phonological properties of its morphemes considerably undermines the value of a Lexical Phonology model which assumes stratum-ordering. The analysis of Cm leads one to conclude that such a model of Lexical Phonology does not allow any constraints on the numbers and types of strata found in any one language. And, as Cole (1987) points out, a model without these kinds of constraints can make no cross-linguistic predictions about the organization of morphology, or about the interaction of morphology and phonology.

I have shown in this paper 1) that Cm has 2 classes of suffixes, one of which triggers cyclic rule application, the other of which does not, 2) that no morphological properties of suffixes can predict their phonological behaviour, and 3) that suffixes of the 2 classes are freely interspersed with each other throughout words. These facts can only be accounted for by assuming that (non)cyclicity must be idiosyncratically specified for each affix.

Notes

*Moses-Columbia Salish (Nxa'amxcin) is an Interior Salish language spoken by about 25 speakers in Washington State. The data have been gathered by M. D. Kinkade, and to a much lesser extent by me. I am very grateful to M.D. Kinkade for allowing me access to his files and for many hours of discussion. I am also very grateful to Agatha Bart, Elizabeth Davis and Mary Marchand, who have helped me to learn about their language, and to N. Bessell, B. Bagemihl, T. Borowsky, M.Halle, M. Hammond, J. Melvold, P. Shaw for comments and discussion. My research has been supported by SSHRCC (Postdoctoral Fellowship #457-89-0027, and Research Grant #410-90-1561), and by the Jacobs Research Funds.

[1] The transcription system and abbreviations used in this paper are as follows:

Consonants	labial	coronal	velar	uvular	pharyngeal	glottal
Stops &	p	t c c̓	k k^w	q q^w		ʔ
Affricates	p̓	t̓ c̓ x̌'	k̓ $k̓^w$	q̓ $q̓^w$		
Fricatives		s ṣ ɬ	x x^w	χ̣ $χ̣^w$		h
Resonants					ħ $ħ^w$	
	m	n r y l̓	w		ʕ $ʕ^w$	
	m'	n' r' y' l'	w'		ʕ' $ʕ'^w$	

Vowels: i u ə a

x̌' = [tl'] ṣ = [s] c = [tʃ] c̓ = [ts]

ɬ = lateral (vls) fricative

C' = glottalized consonant

χ̣ = retracted segment

XX+ prefix, +XX suffix, =√XX= root; TO-topical object; S-subject; O-object; CTR-control; CS-causative; TR-transitive; impf-imperfective; imper-imperative.

[2] The phonological processes relevant to the data under consideration here are given below in their order of application; each example in the text is listed with the rules which apply to it. Most likely all these processes are triggered by constraints on Cm syllable shapes, but since an extended study of Cm syllable structure is needed to confirm this hypothesis, I simply provide descriptive statements here. Preliminary investigations of Cm syllable structure suggest that there are 2 stages of syllabification: at one stage syllabification builds CVC-syllables, allowing only vowels as nuclei; at the second stage syllabification, including vowel insertion, applies after the noncyclic CFR and builds syllables from left to right:

a. VDeletion $V \longrightarrow \emptyset / X \_\_\_\_$ ([-str] [+str])

b. t_1Deletion $t \longrightarrow \emptyset / C \_\_\_ n$

c. t_2-Deletion $t \longrightarrow \emptyset / C \_\_ k^w$ ([+cor])

d. n-Deletion $n \longrightarrow \emptyset / \_\_ s,m$

e. m-Deletion $mx \longrightarrow mVx^w$

f. Degemination $C_i\ C_i \longrightarrow C_i$

g. Affrication $t + s \longrightarrow c$

h. Vocalization $\{y,w\} \longrightarrow \{i, u\} \; C\_\{C, \#\}$ ($\{y',w'\} \longrightarrow \{i?, u?\}$)

i. VInsertion $\emptyset \longrightarrow V / \_\_ ?$

$\emptyset \longrightarrow V / \_\_\_$ [+sonorant]

$\emptyset \longrightarrow V / [C—C(C)]_{Root}$

j. Feature Filling

V—>i/__y,y'; u/__w,w', C^W;

a/phar's, lar's; ə/ elsewhere.

[3] I assume the metrical framework of Halle and Vergnaud (1987a,b), although nothing crucial hinges on this assumption. The CFR must also make reference to accented syllables, but since I do not discuss accent here, I do not include it in (4).

[4] In Czaykowska-Higgins (1990) I suggest that stress deletion in Cm is actually due to the Stress Erasure Convention (Halle and Vergnaud 1987a,b). I also argue that the CFR can apply on the root cycle because accent on roots is predictable and therefore not distinctive; accent is unpredictable on suffixes.

[5] Weak [+E] roots are stressed when followed by a recessive suffix as well (e.g., sacsə́l'l'əx^w sac=√sl'=l'+mix 'crazy').

[6] The behaviour of recessive consonantal suffixes such as -t 'stative' -m 'middle' supports the hypothesis that a class of roots assign extrametricality. When such suffixes are affixed to [+E] roots they block the assignment of extrametricality to final suffixes by ensuring that the final suffixes are not adjacent to the roots and thus not available to become extrametrical (cf. nt̓əq̓^{w}tú́l'əx^w n=√t̓iq̓^{w}=t+ul'əx^w 'dried up lake'; nat̓íq̓^{w}l'əx^w na=√t̓iq̓^{w}=ul'əx^w 'cracked earth').

[7]There is variability as far as leftward deletion is concerned: the same speaker may delete an unstressed root vowel, may leave the vowel intact, or may delete the vowel, and then replace it with an epenthetic [ə] (e.g., [x^{w}irkstátk^w] may also be pronounced [x^{w}rkstátk^w]with a syllabic [r], or [x^{w}ərkstátk^w]; when the word is pronounced with [i] in the root, the vowel may surface with secondary stress). In spite of the variability, however, it is clear that lack of deletion of vowels situated to the left of surface stress is always linked to cyclic application of the CFR.

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