CLA 92

PALATALIZATION AND EPENTHESIS IN PLAINS CREE*

Kevin Russell
University of Southern California

This paper examines what seem to be two types of "palatalization"[1] in Plains Cree. Using the ideas of Lexical Phonology and Radical Underspecification, I offer an analysis that unifies the two types of palatalization, predicts which type will occur where and when both types will fail to apply. This will done without absolute neutralization and the two abstract phonemes that have been the basis of past analyses of Algonquian palatalization.

A crucial part of my analysis of palatalization will be its interaction with epenthesis. I offer an account of epenthesis that relies crucially on the use of syllables that can be incomplete at the edge of their domain but receive default segments when they are no longer at the domain edge. Extrametricality alone, without incomplete syllables, cannot account for the apparent over-application of epenthesis.

The simplest manifestation of palatalization in Cree seems to be a rather garden-variety process. As in (1), *t* affricates to *c* when followed by a high front vowel across a morpheme boundary.

(1) t → c / ____ - i

But there are two things that complicate this simple expression of the rule.

First, not all *t*s palatalize to *c*. Some palatalize to *s*. The following

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[1] As will be argued below, the process is more accurately characterized as assibilation. Nevertheless, I shall continue to use the more traditional term "palatalization" throughout the paper.

(probably unproductive) derivational alternation illustrates:

(2)

it-ohtê	→ itohtê	'go to'
it-i	→ isi	'to' (particle)
oht-ohtê	→ ohtohtê	'come from'
oht-i	→ ohci	'from' particle

Secondly, some *i*s trigger palatalization, while some do not, resulting in phonotactically legal surface sequences of [ti].

Standard analyses of Cree account for this by using two abstract phonemes that undergo absolute neutralization:

(3)

/i/	triggers palatalization	/t/	palatalizes to *c*
/e/	does not trigger palatalization	/θ/	palatalizes to *s*

These are, for example, the phonemes proposed in Wolfart (1973).[2] Piggott (1974, 1978), arguing against the concrete phonology approaches of the 1970s, used the cognate phenomenon in the Odawa dialect of Ojibwe to claim that phonology does require the ability to perform absolute neutralization.

But it is curious that we do not find these two abstract phonemes spread evenly throughout words like any other phoneme. We should expect to find a distribution that is at least unpredictable, if not even. But we do not. Instead, the *t*s that palatalize to *s*, the putative /θ/s, occur only in stems. No suffix has a /θ/. Moreover, *all* *t*s in a stem-final position seem to be /θ/s, none are plain /t/s. Similarly, non-triggering *i*s, putative /e/s, tend to be close in to the stem and the inner layers of inflection, while triggering *i*s are found further out.

I shall explain this asymmetry using two strata in the sense of Lexical Phonolgy (e.g., Kaisse and Shaw 1985, Mohanan 1986). In brief, S-palatalization occurs in stratum 1, C-palatalization in stratum 2. Furthermore, because of a difference in ordering between the epenthesis and palatalization rules in the two strata, an *i* epenthesized in statum 1 will not trigger palatalization, while underlying *i*s and those epenthesized in stratum 2 will. That is, putative /e/s are in fact stratum 1 epenthetic *i*s.

This paper will only deal with inflectional morphology, primarily that of verbs. Many of the same contrasts are found in derivational morphology

[2] Wolfart (1973) remains the most complete description available of Plains Cree morphology and phonology. Most of the descriptive generalizations and preliminary analyses in this paper will be drawn from this work. For complete paradigms of the verbs in question, see Ahenakew (1987).

as well, and a complete account would need to extend the analyses offered here to the derivational domain.

1 The status of e

The phoneme inventory of Plains Cree is given in (4).

(4)

i, î				p	t	k
	(e), ê		o, ô	m	n	
		a, â			c	
					s	
					(θ)	
						w y h

Vowels distinguish length. On the surface there are four long vowels and three short. The phonetic realization of short and long *o* varies between [o] and [u]. The significant thing to note about the consonant system is that, unlike more eastern dialects of Cree, there is only one coronal series. *s* and *š* do not contrast. *c* can vary between [ts] and [č].

Syllables are canonically CV(V), with the following exceptions. C*w* clusters are legal onsets. Codas can occur after long or short vowels only if there is a following onset; the only permissible coda consonants are *h* and (if the following onset is a stop) *s*.

It would be tempting to give the Plains Cree vowel system the rectangular feature analysis that is often used in other Algonquian languages:

(5)

	[−back]	[+back]
[+high]	i, î	o, ô
[−high]	(e), ê	a, â

Putative short /e/, though it is never realized on the surface as anything but [i], nicely fills a gap in this rectangle. But there are reasons to doubt this analysis for Plains Cree. While *o*/*ô* can often be pronounced high, it is often no higher than [−high] *ê*. *a*/*â* is similarly ambiguous with regard to backness. Most tellingly, *ê* and /e/ never act as long and short counterparts of each other, as the other pairs do.

It would in fact be more perspicuous to analyze Plains Cree as having a traditional triangular vowel system, with *i*, *u* (or *o*), and *a*. The only thing standing in the way of this is the stubborn existence of *ê* and the more ghostly existence of *e*. We would rather get rid of them altogether.

Long *ê* poses no problem. It can easily be reanalyzed as a heavy diphthong with the underlying representation /ai/, fused by a late, possibly

phonetic, rule. This is already a widely attested sandhi process in Plains Cree. For example, the pre-verb *kâ-* and the initial *i* of *itwêt* 'says' are usually fused to *kê* except in very careful speech.

This leaves us with putative /e/. It is not only odd that /e/ never surfaces as [e], but also that it often never surfaces at all. Any analysis with underlying /e/ needs a battery of special rules to delete it whenever it either precedes or follows any other vowel, long or short, including another /e/ —in short, everywhere but between two consonants. Given Cree's aversion to consonant clusters, this sounds suspiciously like an epenthetic segment.

I should like to make the strong claim that all apparent cases of /e/ are really epenthetic *i*. We can order epenthesis after the palatalization rule, and account for why these [i]s never trigger palatalization.

There is an immediate and serious problem with this proposal: Cree already has an epenthesis rule. The default method of breaking up an illicit consonant cluster across a morpheme boundary is to insert a "connective *i*" by rule (6), proposed by Wolfart (1973). Worse yet, as (7) shows, the *i* inserted by this rule *does* trigger palatalization.

(6) C–C → C–iC

(7) pamih – â – t – k → pamihâcik

It is the usual belief nowadays, due in large part to the work of Junko Itô (e.g., 1986), that epenthesis should be driven by syllabification. Two examples should suffice to show that something more complicated is going on here than simple insertion of a default vowel in order to syllabify otherwise illegal consonant clusters.

(8)

sakah–		kê–	→	sakahikê–
'fasten it by tool'		deriv		'drive nails'

(9) wîcêw–â–hk–an–k → wîcêwâhkanik
not wîcêwâkahk

In (8), the stem *sakah-* and the derivational morpheme *-kê-* that forms verbs of action on a general goal get separated by a connective *i*, despite the fact that *hk* is a perfectly legal consonant cluster in Cree. An inflectional example in apparent violation of the Elsewhere Principle is given in (9) where, as pointed out by Dahlstrom (1986). an *n* and a *k* are separated by a connective *i*, the default cluster elimination method, when the more specific method of eliminating a nasal-stop cluster is to change the nasal into *h*.

I shall argue later that Wolfart's rule in (6) captures the results of epenthesis in stratum 2. /e/, which I claim results from epenthesis in stratum 1, has the same bad habit of occurring where it is apparently not needed to break up an illegal consonant cluster. In section 3, I propose an analysis of Plains Cree syllabification that explains the strange distribution of both types of epenthetic *i*. But first, we need some background on the inflectional system of Cree nouns and verbs.

2 Cree inflectional morphology

The Cree third person has two forms — proximate and obviative. For our purposes it is sufficient to think of the obviative form simply as a fourth person. The persons are arranged in what has been called an animacy hierarchy.

(10) 2 > 1 > 3 (proximate) > 3 (obviative)

Whichever argument is highest on this hierarchy has the right to be marked on the verb in the main person-marking affix positions, regardless of what its thematic role is. I shall call this the "ranking argument".

The most complex kind of verb is the transitive verb with an animate object, which codes, at least implicitly, the person of both subject and object. I adopt Wolfart's analysis of the affix positions classes for this type of verb, though, at the risk of some inaccuracy, I have simplified the descriptions of each slot:[3]

(11) **Prefix:**
ranking argument person: *ni-* 1, *ki-* 2
Suffixes:
1. obviative object marker
2. direction marker
   direct: ranking argument acts on other argument
   inverse: other argument acts on ranking argument
3. obviative subject marker
4. mode markers (rare)
5. ranking argument suffix (only non-third persons overt)
6-7. mode markers (rare)
8. third person suffixes
9. third person plural and obviative suffixes
10. subjunctive and iterative mode markers

[3] For a somewhat different analysis, see Dahlstrom (1986).

The ranking argument gets marked in the prefix and in suffix position 5. Intransitive verbs and transitive verbs with inanimate objects use a subset of the positions in (11). These slots also apply in large part to nouns. The prefix and position 5 mark the possessor, if any. Positions 8 and 9 mark the person and number of the noun itself. (Various word-final deletion processes often keep 8 from being overt in the singular.) It is typical for each morpheme in a slot to have several allomorphs, sensitive to such factors as verb mode.

The following verbs, which are reanalyzed in the next section, are given here with the underlying morpheme shapes proposed by Wolfart (1973). In (12), nothing more is involved than concatenation of the morphemes in the appropriate slots.

(12) ni pamih â Ø wa k → nipamihâwak
1sg stem 2direct 5 1sg 8 3rd 9 3pl 'I look after them'

In (13), the only operation needed besides concatenation is the absolute neutralization of the /e/ in the inverse suffix to [i]. Because it occurs after a consonant, the *ân* allomorph of '2sg' is selected over the *yân* allomorph.[4]

(13) pamih et ân → pamihitân
2inverse 5 2sg 'that I look after you'

In (14), $_5$*yahkw* is selected over *ahkw* because of the post-vocalic environment. Connective *i* is inserted between *yahkw* and the final *k*, and merges with the *w* to produce *o*.

(14) ê pamih â yahkw k → ê-pamihâyahkok
mode 2direct 5 1pl:incl 9 3pl 'that we (incl) look after them'

3 Syllabifying with defective syllables

I propose there are two strata involved in the inflectional morphology of Cree. Stratum 1 is responsible for the prefix and stem through the ranking argument marker in position 5. Stratum 2 is responsible for suffixes in positions 8 through 10. (Position 6 and 7 suffixes are too rare in modern Plains Cree to determine their place reliably.)[5] Conceptually, stratum 2 does some

[4] Every position 5 person-number morpheme in a subordinate-clause form shows an identical alternation between a *y*-initial allomorph and a V-initial one, which my proposal will account for with an epenthetic *y*.

[5] In the version of this paper presented at the Canadian Linguistics Assocation meeting, I argued that the person-marking prefix was added at stratum 2, and that the characteristic *-t-*

minor mood and agreement marking, while stratum 1 is responsible for filling in the argument structure of the verb.[6]

I also propose that a syllable can be "defective", thhat is, missing either its onset or its nucleus. I shall symbolize a defective syllable by a σ with a superscript minus sign in the direction of its missing element.

(15) σ^- rightward defective missing nucleus
$^-\sigma$ leftward defective missing onset

I propose that a Plains Cree syllable can be defective only if it is at the edge of its domain (left edge for leftward defective, right edge for rightward defective). If an affix is added on later and the defective syllable is no longer at the edge of its domain, it must be normalized by filling in the empty part of the syllable. This can be done in two ways: If there is unsyllabified material lying next to the defective syllable that can be incorporated into the empty part, it will be. Otherwise, the empty part will be filled by inserting the appropriate default segment, *i* or *y*.

These kinds of incomplete syllables have been used various places. For example, McCarthy and Prince's (1989) Prosodic Morphology analysis of Classical Arabic verb templates uses defective syllables at the edges of the verb domain. Government Phonology has also used syllables with various empty positions, though in a way somewhat different from how I am using them here.

I shall not be more explicit than the fairly informal sigma notation. This type of analysis can be made to work with almost any specific set of assumptions about syllable structure and the timing tier, or even if one doubts (as in Government Phonology) that syllables exist.

There are two more crucial assumptions. One is that Cree has a language-particular requirement that once syllabic structure has been built, it cannot be destroyed and rebuilt (except in a couple of narrowly defined morphological environments which will not appear in this paper). The second is that

epenthesized between *ki-* or *ni-* and a vowel-initial stem was the default consonant of stratum 2, inserted by the same principles that I shall argue below are responsible for inserting the default *y* in position 5 suffixes. The analysis as presented, however, would have made the incorrect prediction that the *-t-* inserted after the prefix should palatalize before *i*. It in fact does not: $_{pre}$*ki* + *itwân* 'say (2sg)' results in *kititwân*, not *kicitwân*.

Rather, I now propose that the prefix is added in stratum 1, and *t*-insertion is a morphologically conditioned rule taking precedence over default *y*-insertion.

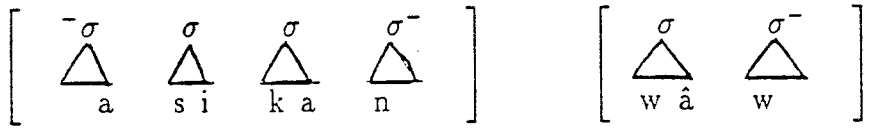
[6]This includes identifying the arguments as ranked on the animacy hierarchy with particular thematic roles and providing the information necessary to link morphologically marked arguments with non-configuarationally adjoined nominals in the rest of the sentence.

the stem and the ranking argument suffix (position 5) come into stratum 1 concatenation with syllabic structure already built over them.[7]

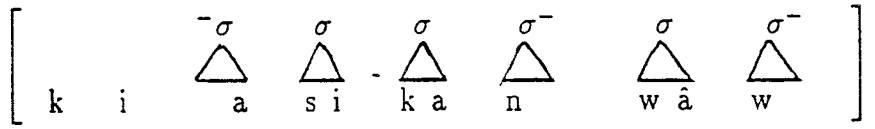
As a first example of how this works, consider the inflected noun, 'your socks'. The prefix and position 5 mark the person and number of the possessor—2pl. Positions 8 and 9 mark the person and number of the noun itself—3pl.

(16) ki asikan ewâw a k → kitaskikaniwâwak
2nd sock $_5$2pl $_8$3rd $_9$3pl 'your socks'

Before we do any inflection, the stem *asikan* and the position 5 possessive suffix *wâw* (Wolfart's /ewâw/) are already syllabified as in (a).

a) 

In stratum 1, these are concatenated together, as in (b).

b) 

The initial leftward-defective syllable of the stem, [-$_\sigma$a], is filled by a specially morphologically conditioned rule inserting *t* after a personal prefix.

The final defective syllable of the stem, [$_\sigma$-n], is no longer at the edge of the domain. It must be saved. There is no free segmental material lying around the neighbourhood for it to take. It cannot absorb the *wâ* of the following suffix, even though the resulting *nwâ* would be a legal syllable, because the suffix already has syllabic structure built and we are assuming it will not be destroyed just to build a more streamlined structure. The only alternative is to fill the missing nucleus with the default vowel *i*.

This is essentially the mechanism I propose for how "/e/" is epenthesized. The surface *i* is not underlyingly present in the position 5 suffix as an /e/. Rather, it the default segment inserted to save the stem-final σ^- when it is

[7]This independent syllabification suggests that position 5 might be more accurately thought of as some kind of clitic pronoun. There are a few possibilities for how the pre-syllabification comes to be. One is that it is in the lexical entry of each stem and position 5 suffix. Another is that it is built in a third stratum preceding the other two. I think the most interesting possibility is that it is built by the same two strata that syllabify whole words and that stems and position 5 suffixes are returned to stratum 1 via a loop. The fact that the same contrast between S- and C-palatalization exists in derivational morphology also suggests a loop. Clearly Cree derivational morphology deserves more attention.

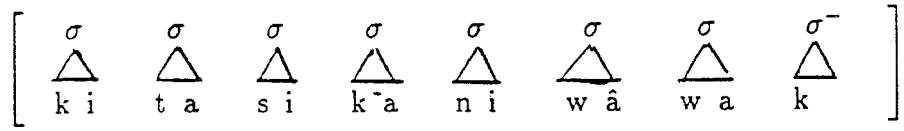
no longer at the edge of its domain. If there had been a free vowel in the vicinity, say from a position 2 suffix, the stem's σ^- would have taken it and no default would have been inserted—in standard analyses, a special rule would have deleted the /e/.

Finally in stratum 2, we add the position 8 and 9 person and number suffixes, as in (c).

c) 

Now the rightward defective $[_\sigma$-w] at the end of the position 5 suffix is no longer at the edge of the domain. It too must be saved. The position 8 third person suffix has given us a free *a* lying next to the $[_\sigma$-w] of the position 5 suffix. The defective syllable can simply steal it, and so cease being defective.

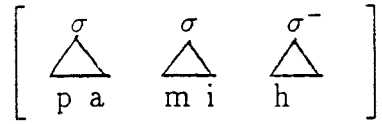
The final result in (d) is the form we actually hear: *kitasikaniwâwak*:

d) 

Now let's apply this to some verbs. The simplest one is *nipamihâwak*. Wolfart's analysis of (12) is repeated here:

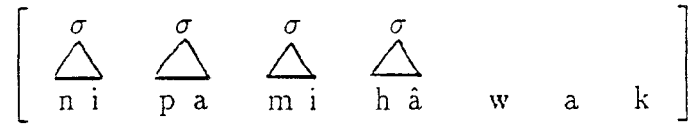
(16) ni pamih â ∅ wa k → nipamihâwak
1sg stem 2direct 5 1sg 8 3rd 9 3pl 'I look after them'

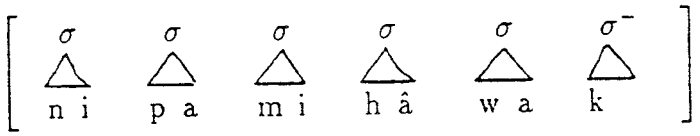
First the stem enters stratum 1 already syllabified:

a) 

During stratum 1, the prefix and the position 2 direction marker *-â-* are added. The stem final $[_\sigma$-h] is no longer stem final, but can save itself by absorbing the vowel from the position 2 suffix. The output of stratum 1 is (b). In stratum 2, position 8 and 9 suffixes are concatenated on, giving (c), and are syllabified, giving the final form, (d).

b) 

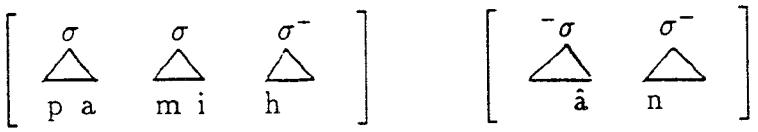
c) 

d) 

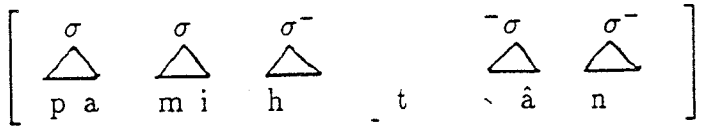
pamihitân in (17) shows what happens when there is no vowel for the stem's final rightward-defective syllable to steal:

(17) pamih t ân → pamihitân
stem ₂inverse ₅2sg 'that I look after you'

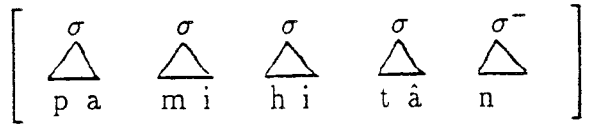
The stem *pamih-* and the position 5 suffix *ân* come pre-syllabified.

a) 

In stratum 1, they are concatenated together along with the position 2 direction marker *-t-* (Wolfart's /et/~/eti/).

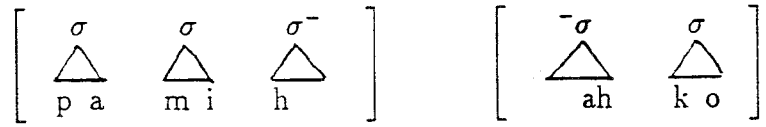
b) 

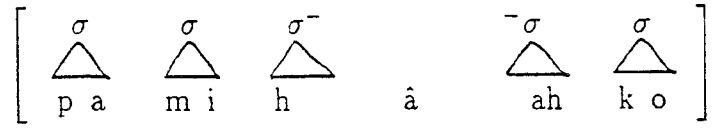
The $^{-}\sigma$ of the position 5 suffix can absorb the position 2 suffix's consonant. The σ^{-} of the stem can only be saved by default insertion. The final result is (c).

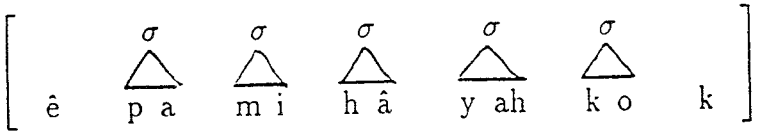
c) 

This shows the suffix's defective syllable getting filled by taking neighbouring material while the stem's had to use default segment insertion. *ê–pamihâyahkok* shows the opposite: the stem can save itself by taking neighbouring material, while the suffix must use default segment insertion:

(18) ê pamih â yahkw k → ê–pamihâyahkok
mode ₂direct ₅1pl:incl ₉3pl 'that we (incl) look after them'

a) 

b) 

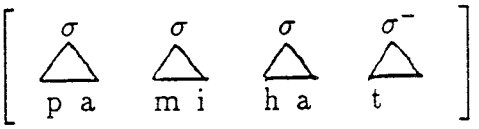
c) 

This is how we get the V-initial∼*y*-initial allomorphy of position 5 suffixes using the same V-initial underlying representation.

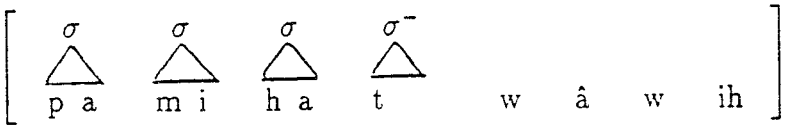
The hypothesis that position 5, like the stem, enters stratum 1 presyllabified does more than simply predict the distribution of *y*s. It protects position 5 from being absorbed into a stem-final σ^-. Consider the contrast between *kitasikaniwâwak* 'your socks', which we saw in (16), and the verb *pamihatwâwih* 'that you might look after them'. The third person plural suffix in the subjunctive, *wâw*, is homophonous with the second person plural suffix of 'your socks'. The difference is that, while 2pl *wâw* was in position 5, and thus entered into stratum 1 already syllabified, 3pl *wâw* is in position 9, is *not* already syllabified, and enters into stratum 2 as just a string of segments.[8]

(19) pamih a t wâw ih → pamihatwâwih
$_2$direct $_5$2sg $_9$3pl $_{10}$subjunctive 'that you might look after them'

At the end of stratum 1, we have (a):

a) 

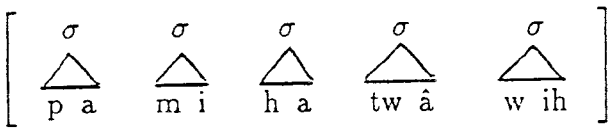
Starting into stratum 2, we have (b):

b) 

Recall that in 'your socks' in (16) the defective syllable at the end of the stem would have stolen the *wâ* of the 2pl possessive suffix, but could not, because the *wâ* was protected by its own already-built syllable structure. The 3pl *wâ* here has no such luck. There is no syllable structure protecting it. The defective syllable [$_\sigma$-t] steals it to rescue itself from defectiveness.

The final result is (c):

[8] Wolfart would analyze this form as having a null position 2 suffix and a position 5 suffix of *-at-* '2sg'. Under my proposal, *-at-* should then alternate with *-yat-* after vowels, which it does not. I have reanalyzed the sequence as $_2$a-$_5$t. Under either analysis, both allomorphs have a limited distribution and so far as I can tell the change affects no other part of the grammar.

c) 

I chose the stem *pamih-* to illustrate these verbs because it ends in an *h*, which makes it clear that what is going on here is not simply epenthesis driven by the unsyllabifiability of a string of free segments. In *pamihitân* in (17), the *h* at the end of the stem and the *t* at the beginning of the suffix could form a perfectly legal cluster. It is only the fact that *h* is already in the onset of a defective syllable and cannot leave there to become the preceding syllable's coda that forces the insertion of the default vowel.

Note that we cannot replace defective syllables with any reasonable version of extrametricality. Such an account might say the stem-final consonant *h* could be extrametrical at the edge of its domain, giving [$_\sigma$pa][$_\sigma$mi]<h>, but that once the suffix *t* is added, the extrametricality of the preceding stem-final C is revoked and it now has to be syllabified. But we would still have a legal cluster and there is no principled reason that the *h* should not syllabify into the coda of the preceding syllable, *mi*.

Though space does not permit a demonstration that all suffixes containing /e/ in Wolfart (1973) can be reanalyzed in a similar way, I have at least shown how the distribution of putative /e/s in some words can be explained by reanalyzing them as default *i*s inserted to save defective syllables.[9] It remains to be shown that the reanalysis can also do the main job that /e/s were initially proposed to do—namely, failing to trigger palatalization.

4 Palatalization

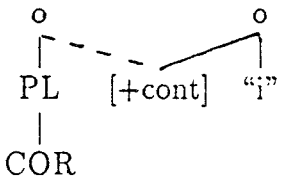
"Palatalization" is really not an accurate term for this process in Plains Cree. "Affrication" or "assibilation" would be more accurate. As I mentioned earlier, *s* can range between [s] and [š]. *c* can range between [ts] and [č]. This possibility of being anterior applies even to *ss* and *cs* that were created by palatalization. This is clearly not a change in the place of articulation. What is changing is the value of the feature [continuant].

I propose that the palatization rule is a rule that spreads [+cont] from a following *i* onto a coronal consonant. (Structure preservation will keep it

[9] More conventional epenthesis also operates in Cree. For example, in *pamih*-$_2$*â*-$_5\emptyset$-$_8$*t*-$_9$*k* → *pamihâcik* of (7), the connective *i* is inserted between two free non-presyllabified consonants, *t* and *k*, that would otherwise not be syllabifiable. The underlying suffix *t* that becomes the surface *c* is not part of a defective syllable.

from applying to *n*.)

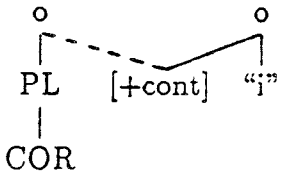
(20)



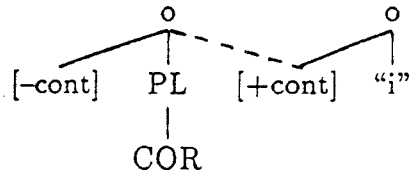
This formulation of the rule avoids making any claims about the nature of *i*—whether it is coronal or dorsal is irrelevant. The only requirement is that it already be specified [+cont] by the time the rule applies. This can be ensured by Archangeli and Pulleyblank's (1989) Redundancy Rule Ordering Convention.

The only difference between S-palatalization and C-palatalization is in whether the target of spreading is already specified [–cont]. If there is no [cont] specification already there, the result is a pure [+cont], that is *s*. If there is already a [–cont], we end up with a [–cont][+cont] contour, that is, the affricate *c*.

(21) S-palatalization



C-palatalization



The question is how we know whether the coronal already has a [cont] specification. The abstract neutralization analysis says quite simply that there are two different underlying phonemes: /θ/ has no [cont], plain /t/ has [–cont]. But we can get the same effect using Radical Underspecification.

Underlyingly, the only value of [cont] that is specified is [+cont]. Underlying /s/ will have [+cont] in UR. Stops have no [cont] specification. Vowels are [+cont], but redundantly so, so they too are underlying unspecified and get specified by the Redundancy Rule Ordering Convention before the palatalization rule applies.

The crucial assumption is that the default rule assigning [–cont] to stops does not apply until stratum 2.

(22) Stratum 2: $\emptyset \rightarrow$ [–cont] / $\left[\frac{\quad}{+\text{cons}} \right]$

The same palatalization rule in (20) applies in both strata. The two types of palatalization depend only on whether the coronal that [+cont] is being

spread onto has had this default rule apply yet. Putative /θ/ is simply a t that is palatalized in stratum 1. In stratum 1, the t is unspecified for [cont] and after receiving [+cont] from the following vowel, the result is s. If palatalization applies in stratum 2, the t has now been specified [–cont] and the result is the contour segment c. This agrees well with our original observation that putative /θ/s were all in the verb root, while outlying suffixes could have only plain /t/—the difference is not in the inherent phonemic content of stems and affixes, but in which stratum they are liable to undergo palatalization.

To get the difference in the palatalizing effects of /i/ and of putative /e/, we can keep our assumption that /e/s are really default is that are inserted in stratum 1 to save defective syllables. All we have to do is order palatalization before default insertion in stratum 1. Putative short /e/s do not trigger palatalization because, quite simply, when palatalization applies they don't exist yet.

On the other hand, palatalization follows default insertion in stratum 2. So in *pamih*-$_2$*â*-$_5\emptyset$-$_8$*t*-$_9$*k* → *pamihâcik* of (7), the connective i between the underlying t of the first suffix and the k of the second suffix is inserted in stratum 2, and does trigger palatalization of the t to c. This is what underlies Wolfart's connective i insertion rule in (6).

Since we have not yet any examples of S-palatalisation operating in a verb, we can look the following contrast:

(23) ki nât i n → kinâsin
2nd fetch $_2$direct $_5$2sg 'you fetch me'

(24) ki nât t n → kinâtitin
2nd fetch $_2$inverse $_5$2sg 'I fetch you'

The only difference between the two verbs is the position 2 direction marker. In (23), the direct direction marker is an underlying -*i*-. This i triggers palatalisation of the stem-final t. Since this occurs in stratum 1, t has not yet been specified [–cont], and the result is s. In (24), the inverse direction marker is -*t*-. This suffix's t obviously cannot trigger palatalization of the stem-final t, so palatalization fails. Default segment insertion then applies to create legal syllables. Now there are is in the string, but palatalization has already come and gone, so it is too late for them to have any effect. Strict cyclicity will prevent them from triggering palatalization during stratum 2. The following summarizes the stratum 1 processes that

apply in the two words:

(25)

Concatentation:	ki-nât-i-n	ki-nât-t-n
Palatalization:	ki-nâs-i-n	N/A
Epenthesis:	N/A	ki-nâti-ti-n

Rather than extrinsically ordering all these rules, another possible way of looking at the situation is that the syllable structure requirements do not begin to apply until the end of stratum 1. Once they begin to apply at the end of stratum 1, they are immediately met there, and they continue to hold forever after. The effect is that some stratum 1 rules such as palatalization can operate in a syllable-free environment. Stratum 2 does not have this luxury—there, the syllable structure conditions have to be met right away, through epenthesis if necessary, before any segmental processes can take place.

5 Conclusion

I have shown that the facts of Plains Cree do not require us to propose abstract phonemes and absolute neutralization. Abstract short /e/ was reanalyzed as the default vowel *i* inserted during stratum 1 to save a defective syllable. The difference between putative /θ/ and plain /t/ was accounted for as being a result of which stratum the palatalization rule applies in. All remaining phonemes in the inventory are directly realized on the surface.

This analysis cannot be translated directly into Ojibwe, so I cannot claim to have given a counterexample to Piggott's claim for the necessity of absolute neutralization. One complicating factor is that Ojibwe S-palatalization does not result in alternations between *s* and *t*, but between *š* and *n*. At the very least, this would require some fancier footwork in the area of radical underspecification. Nevertheless, it would be interesting to see if this type of analysis could work for Ojibwe.

I have also shown that the sorts of incomplete syllables that have been used in some recent phonological frameworks are not only possible, but sometimes also necessary. The data of Plains Cree could not be accounted for satisfactorily by either a purely segmental approach to epenthesis or by an account that relies solely on extrametricality. Only the existence of incomplete syllables can explain the distribution of short *i*s in inflection morphology and their behaviour with respect to palatalization.

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