A NORTHERN UTO-AZTECAN SOUND LAW: *-*c*- → -*y*-[1]

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1.1. Within the Uto-Aztecan (UA) language family, the sound correspondences involving syllable-initial consonants and vowel qualities tend to be relatively straightforward. A comparison of the work of Sapir (1913–14) with those of Voegelin, Voegelin, and Hale (henceforth VVH) (1962), Miller (1967), or Campbell and Langacker (1978), for example, shows that, with respect to these phenomena, the main change has involved filling in correspondences for languages which had not been described in Sapir's day and figuring out the odd-conditioned sound shift. Much more remains to be done regarding the vowel quantities, syllable-final consonants, and prosody (Manaster Ramer, in preparation; cf. also Kaufman 1981). As it happens, it was in the process of working on these latter problems that I stumbled on a new sound law affecting syllable-initial consonants.

Specifically, in Proto-Northern-Uto-Aztecan (PNUA), the ancestor of the northern Uto-Aztecan languages, intervocalic *-*c*- changed to *-*y*-.[2] The importance of this sound law, which I refer to as *c*-LENITION, lies not only in the numerous etymologies which it enables us to sort out but also in the fact that it gives us perhaps the clearest argument for the reality of NUA as a valid classificatory unit in the UA family tree (Wick Miller, personal communication).

[1] Many thanks are due to Kenneth C. Hill, Wick R. Miller, and Terrence Kaufman for their careful comments and for making available to me unpublished works of theirs cited in the references.

In protoforms, *c* is used to represent a voiceless affricate whose precise point and manner of articulation are unknown. When dealing with attested languages, *c* stands for a voiceless dental or alveolar affricate and *ʒ* for a voiced one. In addition, *ï* denotes a high nonfront (central or back) vowel, *ç* a retroflex affricate, and *ş* a retroflex fricative. Otherwise, all symbols have conventional values.

[2] There have been further weakenings in some of the NUA languages. For example, intervocalic *-*y*- goes to -*h*- or disappears entirely in several NUA languages (notably Southern Paiute and Serrano). The details of these later sound changes are not clear, although it does seem that in Serrano *-*y*- → -*h*- just in case the preceding vowel was *i*, and -*y*- seems to be retained in both languages in case both the preceding and the following vowels are *ï*. However, all such changes are secondary and there seems to be little doubt that in PNUA the value was *y*.

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1.2. Earlier writers were not unaware of some of the cases where NUA has *-y-* (or some reflex of this) while Southern Uto-Aztecan (SUA) shows *-c-* (or some regular reflex thereof). For example, Sapir and Campbell and Langacker note some NUA reflexes with *-y-* for PUA **mïca* 'moon'.[3] In several cases, Miller (1967) and VVH reconstruct only the first syllable of an etymon that has **-c-* in SUA and **-y-* in NUA. In other cases, Miller gives parallel cognate sets and protoforms with **-c-* and with **-y-* (or hiatus) and lists them as subentries, and sometimes he simply reconstructs no protoform for a cognate set like this. All this indicates that the problem was tacitly acknowledged. Nevertheless, all these authors continued to treat PUA **-c-* as regularly surviving in NUA as **-c-*.[4]

Significant progress was made in unpublished work of Kaufman (1981). Although I was not aware of this at the time, Kaufman anticipated my conclusion about the inadequacy of the traditional view on PUA **-c-* in NUA but advanced a proposal quite different from mine. Kaufman distinguishes **-c-* and **-hc-*, and proposes the following changes in NUA:

PUA **-c-* → PNUA **-y-* after **ï*
PUA **-hc-* → PNUA **-hy* "apparently after high vowels generally"

Finally, he hypothesizes that in one particular group of NUA languages, namely, Numic, **-c-* subsequently went to **-h-* (or "preNumic **y*") before **i*, regardless of what the preceding vowel was. In other words, in the prehistory of Numic, *c*-lenition would have applied twice, each time in a different environment.

I shall argue that Kaufman's proposals are needlessly complex and phonetically unnatural. Also, they are factually incorrect inasmuch as they fail to account for a number of NUA forms with *c*-lenition which are cited below.[5]

[3] Sapir also listed two cases of NUA sibilants for PUA **-c-*. One involves a sibilant reflex of PUA **ʔc* in **paʔ-ci* in some of the Takic languages (such as Luiseño). As noted below, this is the regular reflex of the **-ʔc-* cluster but not of **-c-*. The second involves Ls *tooşi-qa-t* 'cottontail rabbit' (and similar forms in other Takic languages), which Sapir compares with Na *tooch-tli*. However, it is unlikely that this comparison is valid. The issues are complex because there is also a Ls form *toovi-t* 'brush rabbit' and because the Na form could be derived from **taapun-ci-tV*, a diminutive formation on PUA **taapun*, whereas there is no known way to derive the Takic forms from this root.

[4] VVH (1962:44–45, 67, 70, 72) also claimed that what we would write as **-c-* (but not what we would write as **-cc-*) went to zero in two of the Numic dialects they considered, viz., Southern Paiute and Comanche, but not in the other two, viz., Bannock and Mono (nor in the other Northern Uto-Aztecan languages). However, their argument was based on fragmentary data and arbitrary assumptions about the protoforms.

[5] While I normally try not to criticize unpublished work, I make an exception in the case of Kaufman (1981), because the author insisted, on seeing my original draft, that his proposals be discussed.

1.3. I shall show that there are indeed cases where *c*-lenition did not apply in NUA. However, these involve not simple *-*c*-, but the cluster *-*?c*-. There is also some sketchy evidence for a *-*cc*- and/or an *-*nc*-cluster in PUA, which also would not have undergone *c*-lenition. On the other hand, simple *-*c*- did undergo *c*-lenition, and this fate was shared by *-*c*- derived from *-*t*- via palatalization before **i* (and/or before **y*).[6]

1.4. In arriving at my conclusions, I took into account all the relevant cognate sets proposed by Sapir, VVH, Miller, and Kaufman. I have also consulted Campbell and Langacker, who, however, largely follow VVH and Miller on this point, as well as the draft of Miller (1988), who, however, offers no reconstructions (unlike Miller 1967). I have in addition examined all the data available to me on the following languages:

NUA: Shoshoni (Sh: Miller 1970; Crapo 1976)
Southern Paiute/Chemehuevi (SP: Sapir 1931; Ch: Laird 1976)[7]
Tubatulabal (Tu: Voegelin 1935*a*, 1935*b*, 1958)
Luiseño (Ls: Bright 1968)
Cahuilla (Ca: Seiler and Hioki 1979)
Serrano (Sr: Hill, in preparation)
Hopi (Hp: Albert and Shaul 1985; Hill et al., in preparation)

SUA: O'odham[8] (OO: Saxton, Saxton, and Enos 1983)
Guarijio (Gu: Miller 1984)
Tarahumara (Tr: Lionnet 1972; Brambila, n.d.)
Mayo (My: Collard and Collard 1962; Lionnet 1977)
Nahuatl (Na: Karttunen 1983)

In the interest of expository simplicity, I have omitted much data from additional languages that could have been included.

2.1. Below are listed all the items with medial *-*c*- that I have been able to find, with their reflexes in NUA and SUA languages. In each case I provide my reconstruction of the form and meaning of the PUA etymon, followed by references to VVH (1962), Miller (1967), and Kaufman (1981). These take the form "Vx," "Mx," and "K" where "x" is the number of the cognate set in the corresponding book. Next appear the reflexes

[6] This refers only to those words which existed at the time of the PNUA protolanguage. However, palatalization evidently continued to be a productive process in many UA languages, e.g., Hopi (Whorf 1946:162). Forms which arose after the *-*c*- → *-*y*- shift were, needless to say, not affected by the latter, e.g., Hopi *qaci* 'life' ← *qatï* 'to live'.

[7] SP and Ch are dialects, in fact extremely similar dialects, of the same language, albeit spoken in different cultural and geographic settings. However, the two lexical sources cited are largely complementary, and there is no comprehensive dictionary of this language.

[8] This language used to be called "Papago."

in the NUA and SUA languages. Last of all come any necessary comments, including ones regarding differences between my reconstructions and those of VVH, Miller, and Kaufman.[9]

In general, any phonological reflexes that are not known to be regular are explicitly footnoted. Thus, when OO forms like *ïş* and *ïs* are listed without comment as reflexes of PUA **ïca* and **ïci*, respectively, the reader may safely assume that the sibilants are the regular reflexes of PUA **c* in OO (and indeed in the whole Tepiman group of SUA) and that the distribution of *s* vs. *ş* is as expected (*s* before **i* and *ş* before **a*). Likewise, when Ls *oyi-l* is given without comment as a reflex of PUA **ïca*, this indicates that the morphemic analysis is independently motivated, that Ls *o* is known to be the regular reflex (under stress) of PUA **ï*, and that the loss of the second vowel **a* and the appearance in its place of an epenthetic *i* are also well-known phenomena. An equals sign (instead of a hyphen) is used to mark conjectural morpheme boundaries, ones for which I have no independent evidence. Finally, I should mention that the syllable-final consonants I write in various places (or, when the place of articulation is unknown, just the symbol "*C*") will be justified in Manaster Ramer (in preparation). Only where the present argument is affected do I provide the evidence here.

2.2. I now turn to the two clear examples of **-ʔc-*. Both involve the diminutive suffix **-ci* after a stem ending in a *ʔ*.

(1) **koʔ-ci* 'older sister' (M492b **koci*, **kuci*)

→ NUA:[10]	Tu	*kuuʒii-*
	Ls	*-qeeʔis*
	Ca	*-qis*
	Sr	*-qöör*, *-qööh-*
→ SUA:	Gu	*koʔci*
	Tr	*goʔci*

(Cf. Hp *qööqa*, which probably comes from a form like **koʔ-ka*, i.e., the same root followed by a different [and this time obscure] suffix.)

(2) **paʔ-ci* 'older brother' (M489b **paci*)

→ NUA:	SP	*paci-* 'older sister'
	Tu	*paaʒii-*
	Ls	*-paaʔaş*, *-paaş*
	Ca	*-pas*
	Sr	*-paar*, *-paah-*

[9] I have changed transcriptions found in other sources to fit in with mine on a number of inessential points. Thus, I omit initial glottal stops and use the symbol *ï* instead of *e* or *i*.

[10] The *-uu-* vowel in Tb is irregular; we would expect *-oo-*.

→ SUA:	Gu	*pa?ci*
	Tr	*ba?ci*
	My	*a=baci*
	Na	*aač-tli*

(Cf. SP *pa-pi* 'older brother', with the same root but a different suffix.)

These data appear to indicate that PUA *-*?c*- gives SP/Ch -*c*-, Tu -*ʒ*-, Ls -*?Vs-/-?Vṣ*-,[11] Ca -*s*-, and Sr -*r-/-h*-.[12] In other words, the *-*c*- does not lenite. In principle, the absence of lenition might be due either to the morpheme boundary or to the glottal stop. In reality, there are examples where a morpheme boundary (between a vowel-final stem and a **c*-initial suffix) appears not to impede *c*-lenition, so the relevant factor seems to be the *-*?c*- cluster, after all.

There is one etymon in which a *-*?c*- cluster does look like it lenites. However, this example involves a special phonological environment, in which I believe that *-*?c*- had simplified to *-*c*-. The example is:

(3) **ma?ci?* 'to emerge, come out'

→ NUA:	Sh	*mai=ttïnka* 'outside'
	SP	*may=aŋa* 'to appear, come to view (pl.)'
	Ch	*ma=(w?)wisi* (sg.) 'said of the sun, star, etc., emerging as an animal from its den'
		may=aaŋa (pl.) 'said of a constellation or group of stars'
	Ca	*mayl^{y}u* 'to give birth, lay eggs'
	Sr	*-mair*, *-maih-* 'son'
		maih-ç 'young one, child'
		maiha? 'to bear (a child)'
→ SUA:	OO	*maas-i* 'to emerge, appear (as a newborn or as the sun at dawn)'
	Gu	*ma?ci* 'outside'
		ma?ci=hena- 'to come out, for the sun to come out'
		ma?ci=reba-ni- 'to dawn'
	Tr	*ma?ci* 'outside'
		ma?ci-na 'to come out, to be born'
		ma?ci-ra 'to discover'

[11] With epenthetic vowels. The distinction between *s* and *ṣ* has not been accounted for.

[12] With *-r* in absolute-final position and *-h-* otherwise. It should be noted that this is not the only source of Sr *r* or Sr *h*. Both can also derive from an earlier sibilant, with which **?c* presumably merged before undergoing these further changes.

Despite the wide range of synchronic meanings and forms, this appears to be a genuine PUA etymon. As far as the meaning is concerned, the bridge between the senses we find in, say, Sh 'outside' and Ca 'to give birth, to lay eggs' is assured by the range of meanings in such languages as OO and Tr.

Formally, the NUA reflexes would seem to counterexemplify the claim that PUA *-ʔc- does not lenite. But, in this etymon *-ʔc- occurs in a different environment than in *ko?-ci and *pa?-ci above. Specifically, the second syllable is closed, ending in ʔ. The crucial evidence for the final *-ʔ comes from the Sr forms. In order to get the -r/-h- alternation in -mair/-maih-, we must assume that these come from something of the form *maXiʔ-ci, just as -qöör/-qööh- derives from *koʔ-ci and -paar/-paah- from *paʔ-ci. And, of course, if there is a genuine kinship here with the SUA forms cited, then *X* must equal *-ʔc- also. Thus we end up with *maʔciʔ-ci as the ancestor of the Sr form and hence *maʔciʔ as the PUA root.

I would now argue that *-ʔc- regularly simplified to *-c- in the relevant environment. Unfortunately, since this is the only example of its kind, it is difficult to be sure what the precise conditions for the simplification rule were. The most obvious possibility is dissimilation of two glottal stops in the same morpheme. But perhaps the relevant condition was the closed syllable. It is impossible to tell at present.

2.3. I now turn to the examples of lenited *-c-, the first of which seems to indicate that the presence of a boundary is not enough to inhibit *c*-lenition.

(4) *hu-ci 'tree (dim.)' (M474 *hu 'wood', K *hu-ci 'tree')
→ NUA:[13] SP -u=iC-pi 'stalk'
→ SUA:[14] OO uu=s 'tree'

(5) *icu 'cold'[15]
→ NUA: Hp iyo-hoʔo 'to be cold'
→ SUA: Na iic-tik 'something cold'
iic-tiya 'to be cold'

[13] The treatment of the SP form as derived from a diminutive formation is due to Kaufman. Kaufman also gives some other Numic forms, but they are not as clearly cognate. He also cites Tu *uuʔu-t* 'tree', but this also seems to be unrelated or at least not directly related.

[14] Miller and Kaufman also cited Cora *ëca=ri* 'pole'.

[15] Such NUA forms as Sr *ïčï*, Tb *ïʒïïʔï-* (Lamb and Seiler 1954) are probably unrelated to this etymon, as shown by the discrepancy in the vowels. These words may instead derive from a stem like *cï- (M94d *cï, cïp*), which may also be reflected in Ca *če-* (in *če-táxal-* 'to feel, be cold') and perhaps in Tb *cïyʔ-ʒïyʔV-* 'to shake from the cold'. There could also conceivably be a relationship with Tb *cïnïnïïʔV-* 'to shake in fright' and *cïnïnʔcïnïnʔV-* 'it twitches', which in turn look like cognates of Na *ceceloa* 'to shake, wave something; to sift something', *cecelwiyaa* 'to shake out or beat something for someone'.

(6) *ïca 'to plant' (M323 *e, *ei, M324 no form, V119 *ï(ca), K ïïcă)

→ NUA:	SP	*ïa-*
	Hp	*ïïya*
→ SUA:	OO	*ïş*
	Gu	*eca-/eci-*
	Tr[16]	*i?ci-, e?ca*
	My	*eeca*

(7) *ïci 'to steal' (M414a *eye, M414b *eci, V120 *ï-, K *ïïhcï/i)

→ NUA:	SP	*ïyï=ŋka-*
	Tu	*ïïyV-*
	Ls	*uyo-t* 'thief'
	Ca	*eyet* 'robber'
	Sr	*ïyï-i, ïyïï-t* 'thief'
	Hp	*ïï?ïyi, ïïyi-ŋw* 'thief'
→ SUA:	OO	*ïïs* 'stealth'
	Gu	*ici=koani*

(8) *ïcaC 'sore, wound' (M402 *eya)

→ NUA:	SP	*ïa-vï* 'wounded animal'
	Sh	*ïa*
	Hp	*ïya*
→ SUA:	Gu	*ehca*

(9) *ïcaC 'jaw, chin' (M88 *oyi)

→ NUA:[17]	Ls	*oyi-l*
	Ca	*-eye=wak?a*
→ SUA:	OO	*ïş*
	Gu	*ehca-poa* ('beard', lit. 'chin hair')[18]

(10) *kïcuC 'fish' (M173 no form)

→ NUA:[19]	Sh	*pen-kwi*
	SP	*pa-kïu*
	Tu	*kuyuu-l*
	Ls	*kiyuu-l*
	Ca	*kiyu-l*
	Sr	*kihuu-ç*
	Hp	*paa-kiw*
→ SUA:	My	*kucci*

[16] The glottal stop in the Tr form is unexplained.

[17] Hp *öyi* is unexpected according to currently established correspondences, and so presumably does not derive from this etymon. Perhaps it is a borrowing from some other UA language. The expected form in Hp would be **ïya.

[18] The same compound is attested in OO *ïş-po* 'beard'.

[19] The Hp and SP forms are compounded with the PUA root *pa 'water'.

(11) **kociC* or **koci* (M129b **koci*, V34 **koci*) 'to sleep'[20]

→ NUA:	SP	*koʔi* ('to go to sleep [pl. subj.]')
→ SUA:	OO	*kooş*, *koosi-*
	Gu	*koci-*
	My	*kocce*
	Na	*kočі*

In this case, Miller, but not VVH, lists the SP form under a different root, M129a *koi*. This root, which I would reconstruct as **koʔyi*, means 'to kill (pl. obj.)'. While the SP form has both meanings, at the PUA level there was no connection between the two roots. Other UA languages clearly contrast the reflexes of these etyma, e.g.:

PUA	**koʔyi* 'to kill (pl. obj.)'	**koci(C)* 'to sleep'
OO	*koʔo*	*kooş*
Gu	*koʔya-*	*koci*
Na	*kokoa*	*kočі*

Note that **koci(C)* is one of the cases where Kaufman must postulate a retention of the **-c-* in PNUA, with a subsequent *c*-lenition in Numic only. Since the only known NUA reflex is a Numic one, this can hardly count as a probative example. Moreover, the very next set shows that it is impossible to maintain that *c*-lenition after nonhigh vowels is restricted to Numic.

(12) **koci* 'ankle(bone)'

→ NUA:[21]	Hp	*qöyi*
→ SUA:	Tr	*baca-koci*

Here at last we have a clear example of *c*-lenition after a nonhigh vowel in a NUA language outside of Numic, contrary to Kaufman's hypothesis.

(13) **kwici* 'smoke' (M392a **kwi* [**kuhi*?], M393b **kwici*, M393c **kuci*, V35 **kwici*, K **kwiicin*)

→ NUA:[22]	Sh	*kwi-ppï*
	SP	*kwii*
	Hp	*kwiita-n-ta* 'to be fumigating'
		kwiic-i-ŋw 'smoke'
→ SUA:[23]	OO	*kuu-bs*
	My	*bwicia*

[20] While this point is tangential to the concerns of the present paper, note that the Gu and My data conflict in this (so far unique) case regarding whether there was a final consonant or not.

[21] Perhaps also Sh *koi* 'point, top'.

[22] Miller includes Ls *kuumi-t* here as well, but this is almost certainly a derivate of the root **kut* 'fire' and should be excluded.

[23] It is the *-bs* which is being compared here. The *kuu-* part reflects PUA **kut* 'fire'.

At first glance, the Hp noun *kwiiciŋw* might seem to represent a retained *-*c*-, which would contradict the evidence provided by the SP form that this etymon did undergo the *-*c*- → *-*y*- shift in PNUA. However, comparison with the related verb *kwiitanta* shows that the -*c*- in the Hp noun arose from a palatalized *-*t*- productively after *c*-lenition.

(14) **maci* 'scorpion'

→ NUA:	Ca	*mani=sa*
→ SUA:	Gu	*maci=ri*
	My	*maaci=l*

This set, if valid, would be another example of *c*-lenition after a low vowel outside of Numic. The nasal in the Ca form is the same as that found in the reflex of **mïca* in this language (see below).

The next etymon is particularly interesting because there has been some confusion about exactly what belongs to it. A comparison of NUA forms like SP *mai* 'to find, discover', Hp *maac-i-w-ta* 'to be visible', *maac-iwa* 'to get named', etc., with such SUA forms as OO *maaşi* 'to emerge, appear (as a newborn or as the sun at dawn); to dawn', *maas* 'to have a certain appearance; to be bright or radiant; to be clear', Tr *maci* 'light, visibility', and My *maaci* 'to be visible, for there to be light, to dawn', would seem to suggest a PUA *-*c*- which survives in NUA and lenites only in Numic.

There may indeed have been a SUA etymon **maci* having to do with light (M261 **maci*, **masi* 'light in color', V36 **maci* 'to appear, come to light', K *maaci* 'to be visible; light').[24] However, neither the HP nor the SP forms have anything to do with it. A comparison with Hp *maata-q* 'visible', *ma*^{h}*ta-k-na* 'to display', etc., shows the forms with -*c*- are derived, perhaps quite recently, by the same productive process of palatalization as in the word for 'smoke' discussed above. The root is, therefore, **mata* 'to know', which must also underlie Sr *maaç-* 'to hear'.

The SP form *mai* 'to find, discover', on the other hand, does appear to derive from a PUA **maci* 'to know', which would also be the source of such SUA forms as OO *maaş-cam* ('to teach'),[25] Gu *maci-* 'to know', Tr *maci* 'to see, know, read', My *maaci* 'to know, feel', *mah-tia* ('to teach'),[26] and Na *mač-tia* ('to teach').

[24] However, I do not believe (pace Miller) that Hp *maasi* 'gray', *masivi* 'blind', and *masiphi* 'it became dusk' have any relation to this etymon.

[25] Normally, we do not expect OO *ş* as a reflex of **c* before **i*. However, it is perfectly possible that the retroflex is regular when clustered with a following *c* (which comes from **t* before **i*).

[26] I am assuming that the *h* in the My form is a regular reflex of **c* before *t* (in clusters resulting from syncope).

It should also be noted that there is evidence for a SUA root **mati* 'to know', e.g., OO *maac* (← **mati*) 'to know' and Na *mati* 'to know'. We thus end up with the following set of etyma:

(15*a*) **maci* 'to know' (M249 **ma*, **mai*, **mati*, **maci*,
V25 **mati* 'to know', K **maaci* 'to be visible/light')
→ NUA: SP *mai* 'to find, discover'
→ SUA: OO *maaş-cam* ('to teach')
Gu *maci* 'to know'
Tr *maci* 'to see, know, read'
My *maaci* 'to know, feel'
mah-tia ('to teach')
Na *mač-tiaa* 'to learn; to teach'
mačiaa 'to be known, to be apparent'

(15*b*) PNUA **mata* 'to perceive' or 'to be perceptible'(?)
→ Hp *maata-q* 'visible'
ma^{h}ta-k-na 'to display'
maac-i-w-ta 'to be visible'
maac-iwa 'to get named'
Sr *maaç-* ('to hear')

(15*c*) PSUA **mati* 'to know'
→ OO *maac* (← **mati*)
Na *mati*

We thus have three similar-looking roots with similar meanings, which seems to be two too many. However, **mata* is only NUA and **mati* only SUA, while **maci* is found in both branches. Given the frequent alternation between final **a* and final **i* in PUA verb stems plus the palatalization of **t* before **i*, it would seem that we should assume PUA **mata* ~ **maci* (← **mati*). The retention of **mati* in certain cases in SUA languages (often alongside **maci*) is something which I cannot explain at the moment. Thus, while both OO and Na clearly point to an alternation between **mac-tia-* ← ***macV-tia-* 'to teach' and **mati* 'to know' in PSUA, I cannot begin to guess at the precise rule involved.

For our purposes it is enough to observe that SP *mai* derives regularly from PUA **maci* without any need for a special *c*-lenition process in Numic, and that Hp forms like *maac-iwa* are recent productive derivatives from **mata*.[27]

It may be noted that a similar situation arises with another etymon which might have seemed to show a nonlenited **-c-* in NUA: Ca *maci-l*

[27] This would be an example of the phenomenon noted above: the SP form reflects a **-c-* that arose via the palatalization of **-t-* in PUA times, whereas the Hp form shows evidence of a much more recent palatalization.

'tick, flea' and Tr *maca* 'tick' would seem to point to **macV*, were it not for forms such as Ch *matavi* (< **matta-pi*) 'tick, flea' and Sr *maça-ç* (< **mata-tV*) 'wood tick', which attest to an ultimate source with a **t*, although the details are somewhat murky. Thus, none of the forms cited is a counterexample to *c*-lenition.

(16) **mïca* 'moon' (M286a **meya*, *mea*, M286b **meca*, V158 **mïya*,[28] K *mïïca*)

→ NUA:	Sh	*mïa*
	SP	*mïa-toko-ci*
	Tu	*mïïya-l*
	Ls	*moy-la*
	Ca	*meni-l^{y}*
	Sr	*mïaa-ç*
	Hp	*mïïya-w*
→ SUA:	Gu	*meca*
	My	*meeca*
	Na	*meec-tli*

(17) **moci* 'grandchild' (M498 no form)

→ NUA:	Hp	*mööyi*
→ SUA:	OO	*moos* 'woman's daughter's child'

This is another clear counterexample to Kaufman's theory that *c*-lenition did not apply in NUA (outside of Numic) after a nonhigh vowel. Interestingly, this cognate set is reported by Miller (1967). Kaufman appears to have missed it, perhaps because it does not figure in the index to that work. Incidentally, it seems likely, although I have no direct evidence for this, that we are really dealing with **mo-ci*, consisting of a root **mo* plus the same diminutive suffix we have seen with such kinship terms as **paʔ-ci* and **koʔ-ci*.

(18) **pacaC* 'front'

→ NUA:	Tu	*paya-waʔi-n* 'its front'
	Sr	*-paa=mkw* 'front, before'
→ SUA:	Gu	*pahca* 'older'; 'first, ahead'[29]
	Tr	*pahca*
	Na	*ač=to* 'first'

This cognate set, which again shows *c*-lenition after a low vowel, does not appear to have been noticed in the literature but seems absolutely clean, both formally and semantically.

[28] VVH did not include any of the SUA forms.

[29] In the sense of 'first, ahead', Gu *paʔca* and *paca* are also attested.

(19) **puca* 'to blow' (M49a **puc*, M49b **puhi*, K **puhca*)

→ NUA:[30]	Ca	*-pu?an-*
	Hp	*póya-k-na*
→ SUA:	OO	*wus* 'exhalation'[31]
	Tr	*puca*
	My[32]	*puh-tia*
	Na	*piica*

(20) **wicaC* 'thorn' (M14 **wi* 'awl', K *wihca/u*)

→ NUA:[33]	Ls	*wiyaa-la* 'quartz crystal'
	Ca	*wiya-l* 'pencil cactus'
	Sr	*wihaa-ç*
→ SUA:	Gu	*wehca*
	Tr	*weca, wica-*
	My	*wicca*
	Na	*wic-tli*

(21) **wïcïC* 'to fall' (M 163 **we* ("Perhaps **wesi* or **wese* ~ **weci* or **wece*"), V101 **wïcï*, K *wïcï/i*)

→ NUA:	SP	*wïï*
→ SUA:	OO	*gïïş*
	Gu	*wihci-*
	Tr	*wici*
	My	*wecce*
	Na	*weci*

Throughout, we see that Miller either offers no reconstruction, reconstructs just the first syllable, or, finally, reconstructs two variant etyma, one for the NUA language and the other for the SUA ones. As for VVH, they also sometimes reconstruct just the first syllable, while in other cases they simply ignore certain forms. In other words, the unrecognized regular correspondence between PUA **-c-* and PNUA **-y-* led to the suboptimal treatment of many of these cognate sets. Finally, Kaufman does not note any of the cognate sets that would be counterexamples to his theory, namely, ones with *c*-lenition after a nonhigh vowel in a NUA language outside of Numic—not even the one such cognate set that was recognized by Miller: **moci* (or **mo-ci*).

[30] Note also Tb *puskV-*, Ls *puxi*, and Sr *puih-kin*, all of which remain formally mysterious.

[31] Since the OO form is *wus* and not **wuş*, it must come from **puci*, which is presumably a nominalization of **puca*.

[32] Here, as also in My *mah-tia* ← PUA **maci*, we find that this language apparently changes (certain?) consonants to *h* at the end of a syllable (after syncope?).

[33] That the Ls form belongs here is suggested by Hill (in preparation). Formally, the fit is perfect, and the semantic shift makes sense given the sharpness of quartz crystals. There may also be a connection with SP *wii-*, SH *wii* 'knife'.

2.5. This brings me to a detailed discussion of those examples which might appear to support Kaufman's proposal that after a nonhigh vowel the affricate (*-*c*- or *-*hc*- in his notation) survived in PNUA.

There are three kinds of examples involved. The first set encompasses forms where *-*c*- is supposedly retained in PNUA but then lost in Numic. These are **kwiicin* 'smoke', **maaci* 'to be visible; light', and **hu-ci* 'tree'. In the first two, the crucial forms are Hp words with -*c*-. I, of course, claim that these are derived by a productive process of palatalization before suffixes starting with *i*. The underlying stems ending in -*ta* are attested in both cases. Finally, **hu-ci* is only reflected in Numic, so that the only question here is whether *c*-lenition took place in PNUA (as I would claim) or in Proto-Numic (as per Kaufman). And there is no way of deciding this on the basis of this form alone. Hence, this is not a crucial example.

The second set consists of two forms where *-*c*- is retained even in Numic. These are **taacah* 'sun, summer' and **wih-ci?* (M40 **wici*, *wiki*) 'bird'. In both cases, however, there is evidence for a morpheme boundary, which on Kaufman's account would be enough to impede *c*-lenition.

Specifically, **wihci?* exhibits an unlenited -(*h*)*c*- before **i* in Numic, contrary to Kaufman's general rule. Kaufman explains this by the presence of the morpheme boundary. With regard to **taacah*, Kaufman, in agreement with VVH (cf. V27 **taca* 'sun, summer'), postulates a connection between the Numic forms meaning 'summer' such as SP *taca* and the OO form *taş* 'sun, day'. Given that everybody recognizes a PUA root **ta* 'sun', it is obvious that the OO form is derived from this by means of some, now obscure, suffix whose PUA form would have been *-*ca*. If Proto-Numic **taca* 'summer' is a cognate of this formation, then we would indeed have to postulate the derived form **ta-ca* at the PUA stage (although Miller's notations are unclear, this appears to be his proposal; cf. M423c). But, if we accept **ta-ca* as a PUA etymon, Kaufman's idea that morpheme boundaries impeded *c*-lenition would apply here as well.

Thus, in both of these words, we could explain the survival of the medial *-*c*-, while still allowing *c*-lenition after low vowels. By Kaufman's own logic, neither of these examples should cause us to exempt any phonetic environment from the operation of *c*-lenition. Note that if we adopt this line of reasoning, then we must also follow Kaufman in assuming that in **hu-ci* "the identity [of the suffix] was lost in pNum times" and we must extend the same argument to **mo-ci*.

I might add that I myself do not accept either of the two words at issue as anything but a Numic innovation. Thus, the semantic connection between Numic *taca* 'summer' and PUA **ta* 'sun' seems weak (so much so that Sapir 1931 and Lamb, n.d. treat the Numic forms as underived). As for **wih-ci?*, I believe that this, too, represents unrelated NUA and SUA formations (though the root may well be the same). The comparison of

Na *wiicil-in* 'hummingbird' with SP *wici?-ci* (Ch *wici?i-ci*) 'bird' (first made by Sapir 1914:461) and with Sr *wičit* 'bird' is seductive. But such forms as Ca *wikit-ma-l* ~ *wikik-ma-l*, My *wiikit* 'bird', Sh *huiccu* 'small bird (generic)' argue against a simple equation. Thus, I would argue that neither of Kaufman's examples is relevant to the issue at hand, and so I would conclude that morpheme boundaries did not stymie the application of *c*-lenition, after all.

The remaining set of examples is a singleton: Kaufman's **pahci* 'seed' (M103 **paci* 'corn'). This case is more complex than the previous ones. While there is no doubt that such an etymon existed in PSUA (cf. Gu *pahci*, My *baccia*, Na *ač-tli*), it is not clear that Tu *pacis-t* 'little purple seed', cited here by Kaufman, is related. Indeed, if Campbell and Langacker are right in postulating that the SUA etymon is a loanword of Mixe-Zoquean origin, then it could not very well have been borrowed at the PUA stage. This would imply that the Tu form cannot be related to the SUA words for 'corn'.

If, however, this is all wrong and the Tu form IS related, then the obvious conclusion to my mind is quite different from Kaufman's. His distinction between **-c-* and **-hc-* could be used in this case to do precisely the opposite of what he uses it for. Kaufman, as noted, believes that in certain cases **-hc-* lenites, whereas **-c-* does not. It would be more natural to assume that the cluster (which I would write **-cc-*) did not lenite, while the simple affricate did.

Now if we assume PUA **pacci*, we can readily explain all the attested NUA as well as the SUA forms. Note that this analysis is NOT ad hoc, since here, unlike in the case of **-?c-*, there is no voicing in Tu (cf. *paaʒi*, *kuuʒi* vs. *pacis-t*). Thus, on my theory an original three-way contrast between **-c-*, **-?c-*, and **-cc-* would have yielded in Tu *-y-*, *-ʒ-*, and *-c-*, respectively. This seems to me to be consistent with what we expect sound changes in languages to be like. However, despite the availability of such a natural analysis, we must await more evidence both as to the existence of geminates in PUA and the fate of this particular one in NUA.

To conclude this review of Kaufman's hypothesis, it is needlessly complex in that he assumes that the same sound change first applied in PNUA in a rather complicated set of environments and then again in Proto-Numic in a further environment. It is phonetically unnatural in that it assumes that a simple medial affricate lenited less readily than a cluster which he writes **hc* but which could also have been a geminate, and in addition assumes rather unusual connections between the qualities of both preceding and following vowels and the presence or absence of *c*-lenition. Finally, it fails to account for *c*-lenition in NUA reflexes of such clear PUA etyma as **koci* 'ankle(bone)', **ma?ci?* (→ **maci?*) 'come out', **mo-*

ci (or **moci*) 'grandchild', and **paca* 'front' and the less clear example of **maci* 'scorpion'.

2.6. In the previous section, I noted the possibility of a *-*cc*- cluster in PUA. Here I would like to speculate about the possibility of *-*nc*-. The best evidence seems to be provided by the following etymon:

(22): **ponca*, pl. *po-poca* 'mouse, rat' (M292 no reconstruction)

→ NUA	'mouse':	Sh	*pone*
		SP	*puʔi=ca*
		Hp[34]	*pöʰsa*, pl. *pö-vöya-m*
→ SUA	'rat':	OO	*woşo*, pl. *wopşo*

It should be noted that this is not a case where *-*c*- is retained in NUA, but rather where it might seem to alternate with *-*s*-. The Hp forms seem to hold the key to the explanation, since the cluster ^{h}s in the singular form could very well derive from **nc*. On the other hand, the plural would reflect a medial *-*c*-, which goes to -*y*- just as predicted and thus gives us the twentieth example of this sound change. Note that this means that the alternation between *-*nc*- in the singular and *-*c*- in the plural would have to have existed in PNUA as well. At the moment, I have no other support for such an alternation in PNUA, but it is suggestive, especially given the fact that the Hp reduplicated plural could well be directly cognate with the OO one (which would push this alternation even further back, into PUA).

All this would be consistent with the fact that Hp systematically represents **n* as ^{h} before a plosive (e.g., *poʰko* 'dog' ← **punku*, *kïʰkï* 'tracks' ← **kïnkï*). This would be especially interesting because (pace Kaufman) it would mean that PUA had distinct *-*nc*- and *-*ns*- clusters. In the case of the latter, Hp does not show a ^{h} (e.g., *poosi* 'eye' ← **punsi*, *yeese* 'sit [pl.]' ← **yansi*).

The SP form is not entirely clear, but I would assume that the *-ca* part is a suffix, and that the *-*nc*- cluster is reflected by the medial ʔ. This would be consistent with what we know of the fate of PUA *-*ns*- in this language (cf. *puʔi*- 'eye' ← *punsi*). Sh -*n*- could simply be the regular reflex of *-*nc*-, but since in this language *-*ns*- is realized as zero (cf. *pui* 'eye'), we would then have to assume that Numic had also retained the contrast between *-*nc*- and *-*ns*- into quite recent times.

2.7. Finally, I should note certain cases of medial *-*c*- which are not relevant to the present topic but might appear to be, at first glance. These include sporadic alternations of *-*c*- with *-*s*- in such cases as **kwasi* 'tail' (M 430 **kwasi*, **kwaci*, V51 **kwasi*), where only Mono (Lamb,

[34] K. C. Hill, personal communication.

n.d.) *qwaci* has *-c-*, whereas all other NUA as well as SUA languages have *-s-*. Now, it so happens that Mono, like some other Numic languages, has a sporadic alternation between "normal" *-ss-* (Lamb writes this *-hs-*) and expressive *-c-*, e.g., *issa?* 'coyote', *ica?* 'coyote (obscene term)'. It would seem that *qwaci* could be in its origin such an "obscene" form of hypothetical **qwassi*.

Even less clear is the situation involving another set which appears to involve both sibilant and affricate values:

(23) (?)**poCa* 'to swell' (M429 **posa*, **poca*)

→ NUA:	Hp	*pös-ti*, *pöösa-ŋw* ('swelling')
→ SUA:	Gu	*poci-*, *posa-*
	Tr	*bisu-*, *bosawa*
	Na	*posaawi*
		ooc-tli ('pregnant')

In any event, none of these forms involves retention of **-c-* in NUA, and hence they do not contradict the theory under discussion.

I should also mention those cases of *-c-* which are found only in NUA, e.g., **paca* 'bat' (M25 **paca*), or only in SUA, e.g., **tïpu-ci* 'flea' (M175 **tepu*, **tepuci*, V146 **tïpu*). Finally, Miller lists a couple of cognate sets which would appear to exhibit the retention of **-c-* in NUA, but where the cognate set itself is questionable. These are M475 **kwic* 'worm', attested in NUA: SP *nakkwicu-* and SUA: My *bwiccia*, Gu *ih=kuci=wa*,[35] and M302 **poci* 'navel', which is based on NUA: Mono *poci* and SUA: Cora *sipuci*. In neither case is it at all obvious whether the morphological analyses required to make these comparisons valid are themselves correct.

3. In conclusion, there are at least twenty examples of the shift of PUA **-c-* to **-y-* in PNUA, of which no more than two or three are doubtful. This lays to rest the traditional theory that **-c-* stayed put in NUA. Kaufman's highly complex and unnatural theory, which restricts *c*-lenition to certain environments and makes it take place twice in certain languages, fails to account for five examples, only one of which is less than certain, and all of which work as predicted by my hypothesis. Finally, to my mind, there are no clear counterexamples to my proposal. In addition, the new theory has helped to sort out some etymologies that had been confused before and has led to the recognition of several new PUA etyma.

It is possible that we may need to recognize certain consonant clusters. Of these, **-cc-* and **-nc-* are still tentative, but **-ʔc-* appears to be a cer-

[35] It is not clear whether Na *okwi=l-in* 'worm, caterpillar' and Na *kwit-koa-tl* 'tapeworm', cited by Miller in this connection, are at all related.

tainty. All this will feed into the work on recovering the syllable-final consonants in PUA, which is what I was working on when I got distracted by the topic of the present paper (see Manaster Ramer 1991; 1992; forthcoming *a*; forthcoming *b*; in preparation). For, we now have some clear examples of syllable-final *ʔ*. Especially important is **maʔciʔ*, the first PUA verb stem with a clearly identifiable final consonant. The circle is complete.

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