PREASPIRATION AND GEMINATION IN CENTRAL NUMIC[1]

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The Numic (Uto-Aztecan) languages are well known for consonant gradation, which each language shows to some degree. Three consonantal series have been reconstructed for Proto-Numic: Geminating, Nasalizing, and Spirantizing. The Central Numic languages Timbisha, Shoshoni, and Comanche have preserved these three consonantal series and added a fourth, Aspirating. The Aspirating series is historically derived from the Geminating series, but it is synchronically distinct from it. On the basis of verb class behavior in Central Numic, we show that the Central Numic Aspirated series is a straightforward consequence of Proto-Uto-Aztecan stress patterns as reflected in pre-Proto-Central Numic.

[KEYWORDS: Uto-Aztecan, Numic, phonological change, lexical classes, consonant gradation]

1. Introduction. The Numic (Uto-Aztecan) languages are well known for consonant gradation, which each language shows to some degree. The extent to which consonant gradation was operative in Proto-Uto-Aztecan is not completely clear at present, so in this paper we confine our remarks to Proto-Numic generally and Proto-Central-Numic specifically. Numic scholars have reconstructed three consonantal series: Spirantized, Geminated, and Nasalized.[2] To illustrate, examples of each of these three series are shown

[1] This paper is an expansion and revision of a paper prepared by Wick Miller and presented at the 1993 Friends of Uto-Aztecan Conference held at Long Beach, California. It remained incomplete at the time of his death in 1994. We—Dirk Elzinga and John McLaughlin—have filled in the blanks, found cognates; we also wrote the discussion of Comanche and Timbisha, and provided additional historical and analytical detail. Both of us were mentored by Miller as M.A. students in Linguistics at the University of Utah and acquired our interest in the Numic languages "at his knee." We are indebted to him. The insights found herein are mostly his and the errors mostly ours. We express our appreciation to Alexis Manaster-Ramer, Tim Thornes, an anonymous reviewer, and an associate editor of *IJAL* for helpful comments which have improved this paper.

[2] We capitalize the names of the Numic consonantal series in order to distinguish them from more general phonetic and phonological processes which occur in the world's languages.

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from the Southern Paiute dialect of Colorado River Numic;[3] each of the forms in (1) contains an adjective followed by the stative suffix *-ka*. The Spirantized series causes the */k/* to surface as the voiced fricative [ɣ] (1*a*). The Geminated series causes the */k/* to surface as the geminate voiceless stop [kk] (1*b*). The Nasalized series causes the */k/* to surface as the nasal-stop cluster [ŋk] (1*c*).

(1) Numic consonantal series: CR:SP (Sapir 1930:63)[4]
(1*a*) Spirantized: *aŋkaɣa* 'be red' (*aŋka*^{s}- 'red', *-ka* STATIVE)
(1*b*) Geminated: *kuččakka* 'be gray' (*kučča*^{g}-)
(1*c*) Nasalized: *paɨŋka* 'be smooth' (*paɨ̃*^{n}- 'smooth')

[3] We use "Colorado River Numic" or "Colorado River" as a cover term for the language that comprises the mutually intelligible Chemehuevi, Southern Paiute, and Ute dialects. This language has usually been called "Southern Paiute," "Ute," "Ute-Southern Paiute," or "Southern Paiute-Ute." "Colorado River Numic" eliminates the inherent chauvinism of selecting one group of speakers over another as the primary name of the whole language. The language is so called because the Southern Paiute and Ute dialects encompass most of the Colorado River basin above Las Vegas. The Chemehuevi dialect is spoken on the banks of the lower Colorado River around Parker, Arizona, and Chemehuevi Valley in adjacent California. The labels "Chemehuevi," "Southern Paiute," and "Ute" reflect different cultural practices and settlement patterns rather than strict dialect divisions within the language.

[4] Throughout this paper, we have used phonetic symbols which generally follow "Americanist" transcription practice; i.e., *c* = [ts], *č* = [tʃ], *y* = [j], *ñ* = [ɲ], and *r* [ɾ]. Voiceless vowels and sonorants are represented by capitalization. When /^{n}/ follows a morpheme, it indicates the Geminating final segment and that the following consonant (with a few exceptions) is geminated. In the Central Numic languages, the affricate /c/ and its postalveolar allophone /č/ function in all ways as stops, so any statements made about stops also include these affricates. Abbreviations are: DSSUB = different subject subordinator; PASUB = prior action subordinator; PO = plural object; PS = plural subject; SO = singular object; SS = singular subject; SSSUB = same subject subordinator; ACC = accusative. Language abbreviations are PUA = Proto-Uto-Aztecan; PN = Proto-Numic; PWN = Proto-Western-Numic; PCN = Proto-Central-Numic; PSN = Proto-Southern-Numic; Mn = Mono; NP = Northern Paiute; Tm = Timbisha; Sh = Shoshoni; Cm = Comanche; Kw = Kawaiisu; CR = Colorado River Numic. Dialects are indicated by listing the language abbreviation, a colon, and the abbreviation of the dialect or variety. Cited dialects and varieties are: Tm:E = Eastern Timbisha (Beatty); Tm:C = Central Timbisha (Death Valley); Tm:W = Western Timbisha (Owens Valley); Sh:G = Goshute; Sh:W = Western Shoshoni; Sh:NW = Northwestern Shoshoni (Duck Valley): CR:Ch = Chemehuevi; CR:SP = Southern Paiute; CR:LVSP = Las Vegas Southern Paiute; CR:KSP = Kaibab Southern Paiute; CR:SJSP = San Juan Southern Paiute; CR:Ut = Ute; CR:SUt = Southern Ute; CR:NUt = Northern Ute; Mn:W = Western Mono (Monachi); Mn:E = Eastern Mono (Owens Valley); NP:SN = Southern Nevada Northern Paiute (Yerington); NP:NN = Northern Nevada Northern Paiute (McDermitt); NP:B = Bannock. Forms from Central Numic languages without citation information are from our field notes, including those of Wick Miller.

The raised lowercase letter at the end of each stem indicates the series selected by that stem.

The Central Numic languages—Timbisha,[5] Shoshoni, and Comanche—have preserved the three consonantal processes which have been reconstructed for Proto-Numic and illustrated in Colorado River above. However, the Central Numic languages also have a fourth series, Aspirated, which is historically derived from the Geminated series but is synchronically distinct from it (Miller 1980). The Aspirated series causes a following stop to surface as a voiceless fricative, usually preceded by a voiceless vowel. These four series in Timbisha are illustrated in (2).

(2) Central Numic consonantal series: Tm
(2*a*) Spirantized: [naɣaβaʔa] 'on the bighorn' (*naka* 'bighorn', *-paʔa* 'on')
(2*b*) Geminated: [tuappaʔa] 'on the son' (*tua"* 'son')
(2*c*) Aspirated: [haiñčIφaʔa] 'on the friend' (*haincih* 'friend')
(2*d*) Nasalized: [pɨyɨmbaʔa] 'on the duck' (*pɨyɨn* 'duck')

Sapir (1930) analyzed these series in Colorado River Numic as morphophonemic processes, each stem selecting a specific series on the initial consonant of most suffixes. In Central Numic, Miller (1972) and later specialists have analyzed these series as phonemic processes, being triggered by a final segment (final feature) on each stem; thus /. . . "/ triggers the Geminating series, /. . . h/ the Aspirating series, /. . . n/ triggers the Nasalized series, and a final vowel triggers Spirantization.

Miller (1980) described the historical origin of the Central Numic Aspirated series as a development of the Geminated series in Proto-Numic. The relevant Proto-Numic alternations are still found in Colorado River, where the Geminated series surfaces in two ways. After a stressed vowel, an affected stop surfaces as a geminated voiceless stop, as illustrated above in (1*b*), but after an unstressed vowel, it surfaces as a preaspirated voiceless stop. In the latter case, the unstressed vowel is also devoiced. (3) illustrates this in the Southern Paiute dialect with an example based on McLaughlin (1984), citing Cairns (1978).[6]

[5] Timbisha has previously been called "Panamint" in linguistic literature. This language was spoken in the Owens, Saline, Panamint, and Death valleys of eastern California. "Panamint" is not accepted by any speaker as a name for either the language or the people, including those originally from Panamint Valley. They tend to call their language "Shoshoni." "Timbisha Shoshone" historically referred only to the community in central Death Valley (*tɨmpisa"*) but is the official name (and spelling) that has been adopted by the community as a whole for Federal recognition.

[6] McLaughlin (1984) did not discuss the importance of preaspiration to the overall scheme of vowel devoicing and geminate reduction. The derivation shown here more accurately reflects the role of preaspiration in vowel devoicing.

(3)	/pattakkittui/	/pikkak^{w}ittɨa/
	'cause to burst'	'sore buttocks:ACC'
Stress:	**pattákkittúi*	**pikkáɣ^{w}ittɬ́a*
Preaspiration:	**pahtákkihtúi*	**pihkáɣ^{w}ihtɬ́a*
Devoicing:[7]	**pAhtákkIhtúI*	**pIhkáɣ^{w}Ihtɬ́A*
	[pAhtákkIhtúI]	[pIhkáɣ^{w}IhtɬA]

The Central Numic languages differ from Colorado River in three ways. First, in Colorado River such stops are phonetically preaspirated, while in the Central Numic languages they have become voiceless fricatives. Second, in Colorado River the preaspirated stops are entirely predictable variants of the Geminated series, while in the Central Numic languages the occurrence of the Aspirated series is no longer predictable. Third, in Colorado River the preaspirated stops are common within morphemes since they are produced by rule, while in the Central Numic languages the Aspirated series is rare morpheme-internally and mainly occurs at morpheme boundaries (synchronic or diachronic).

As part of the overall body of evidence adduced to explain the origin of the Proto-Central-Numic Aspirated series in the Proto-Numic Geminated series following unstressed vowels, Miller (1980) describes a class of verb suffixes which alternate between allomorphs that start with a Geminated or Aspirated consonant depending on the verb stem to which they are affixed. At that time, he was unable to explain the reason for the distinction or to predict which verb stems would take which of the two allomorphs except in a single case. This paper examines the two verb classes and uses more recent work on Proto-Uto-Aztecan stress by Manaster-Ramer (1993) to describe the phonological reasons for the patterns in the modern languages.

In **2**, we present data which show the patterns of the Geminated and Aspirated series as reflected in Shoshoni verb classes. In **3**, we present the comparative Central Numic data and show how these patterns are clearly reconstructible to Proto-Central-Numic. In **4**, we recast the generalizations in light of Manaster-Ramer's reconstruction of Uto-Aztecan stem-final consonants and stress, and show that this explanation provides better empirical coverage than Miller (1980). Finally, we note some remaining problems.

2. Shoshoni verbal gemination and aspiration. The easiest way to look at how the Proto-Numic Geminated series split in Central Numic is to look at a set of verb suffixes known as the Alternating Suffixes. While these suffixes and their interaction with the verb stem are consistent in all three of the

[7] Final vowels are also devoiced in Colorado River.

Central Numic languages, we concentrate on how they operate in Shoshoni first. Section **3** below describes the system in Timbisha and Comanche.

In the Central Numic languages, virtually all final phonemic segments triggering the Geminating, Aspirating, and Nasalizing series have been lost at the end of verb stems. While there are some remnants of Nasalization with certain suffixes beginning with /t/, we can generally describe all verb stems as ending in vowels, so that the initial consonant of most suffixes is Spirantized. There are, however, a number of verb suffixes in these languages with a pair of allomorphs that begin with consonants which alternate between the Geminated and Aspirated series.[8] Since all verb stems end phonemically in a vowel, the choice for this set of suffixes depends on the CLASS of the verb stem, so that a given stem will only take either Geminated or Aspirated forms of these suffixes. These suffixes are called the Alternating Suffixes. It should be emphasized that the Geminated or Aspirated consonant is part of the suffix in these cases, not the stem; it is the CHOICE of the allomorph that is governed by the stem. Most of these suffixes clearly had an initial alternating (Geminated or Aspirated) consonant in Proto-Central-Numic and some had an invariable initial Geminated consonant reconstructible in Proto-Numic.

A comment about our class-marking conventions is in order at this point. Crapo (1976), Dayley (1989*a*; 1989*b*), Crum and Dayley (1993; 1997), and Crum, Crum, and Dayley (2001) use *h* at the end of a verb stem to mark the Aspirating class of verbs and " to mark the Geminating class because their analyses treat these as final segments of the verb rather than as class markers. Miller (1972) used uppercase *H* and *G* on verbs to mark class membership. We use the superscript uppercase ^{H} and ^{G} here for two reasons. First, in the most current analysis of Comanche (Charney 1993), the symbol *H* has a specific phonological definition independent of verb class marking, so a non-superscript character could lead to ambiguity in marking these characteristics in Comanche. Second, Sapir (1930) used lowercase superscript letters to mark the stem class in the Southern Paiute dialect of Colorado River Numic.

[8] The Shoshoni set includes: *-h/kkant̬in* STATIVE, *-h/pp̬inni* FREQUENTATIVE, *-h/kk^{w}an ~ h/kkun* MOMENTANEOUS, *-h/kkan* RESULTATIVE, *-h/ttai* TERMINATIVE, *-h/tt̬iki* INCEPTIVE, *-h/kka* DSSUB, *-h/kkanku* DSSUB, *-h/tt̬ii*" 'with difficulty', and *-h/pp̬ih* CONTINUATIVE (Crapo 1976 and Miller 1996). The Comanche set includes: *-h/Hkat̬i*$^{=}$ TEMPORARY STATE, *-h/Hp̬ini* FREQUENTATIVE, *-h/Hka*$^{=}$ STATIVE, *-h/Hkaku* DSSUB, *-h/Hki* 'come while', *-h/Hk^{w}a* 'go while', *-h/Hk^{w}ai* 'go around while', *-h/Hci* SSSUB, *-h/Ht̬iki* INCEPTIVE, *-h/Htai* TERMINATIVE, *-h/Hka* DSSUB, and *-h/Ht̬ini* 'tell' (Robinson and Armagost 1990, Charney 1993, and Armagost and Miller 2000). The Timbisha set includes: *-h/kkant̬in* STATIVE, *-h/kk^{w}an* MOMENTANEOUS, *-h/kkon* DEFINITE FUTURE, *-h/kkan* STATIVE, *-h/ttai* COMPLETIVE, *-h/tt̬iki* INCEPTIVE, *-h/kka* DSSUB, *-h/ccin* SSSUB, *-h/kk^{w}antuʔih* INTENTIVE, *-h/kkin* 'come while', and *-h/kk^{w}an* 'go while' (McLaughlin 1987 and Dayley 1989*a*).

The use of superscript lowercase letters could lead to confusion with stem-class notation in Colorado River Numic, since the Central Numic process described here is an innovation that only applies to verbs. Example (4) shows an "Aspirating" verb in Shoshoni with Alternating suffixes that begin with an Aspirated consonant and (5) shows a "Geminating" verb with the same suffixes.

(4) *tɨkka*^{H} 'eat'[9]
tɨkkahk^{w}*a* 'ate' (*-h/kk*^{w}*a* MOMENTANEOUS)
tɨkkahka 'have eaten' (*-h/kka* RESULTATIVE)[10]
tɨkkahpɨnni 'nibbling' (*-h/ppɨnni* FREQUENTATIVE)[11]

(5) *hipi*^{G} 'drink'
hipikk^{w}*a* 'drank'
hipikka 'have drunk'
hipippɨnni 'sipping'

There are other verbal suffixes that have an initial consonant that is invariably Spirantized or Nasalized without respect to the class of the verb (6). These suffixes do not enter into the alternations discussed here and are not mentioned further.

(6*a*) Spirantized suffixes
tɨkkatɨn 'is eating' (*-tɨn* HABITUAL)
hipitɨn 'is drinking'
tɨkkatuʔih 'will eat' (*-tuʔih* FUTURE)
hipituʔih 'will drink'

(6*b*) Nasalized suffixes
tɨkkaŋkɨ 'make eat' (*-ŋkɨ* CAUSATIVE)
hipiŋkɨ 'make drink'

Most of these suffixes have good cognates in the other Numic languages. The Alternating Suffixes in Shoshoni are cognate with suffixes in Western and Southern Numic languages that have invariably Geminated initial consonants, while the suffixes with initial consonants that are Spirantized or

[9] Unless otherwise indicated, all examples are given in a form corresponding to a classical phonemic level. Since stress in the modern languages is not relevant to the question under discussion, it is not marked in examples.

[10] We have consistently glossed the resultative suffix *-h/kka*(*n*) with an English perfective. While this may not be strictly accurate, it comes closer to the meaning in general for Central Numic than other possible glosses.

[11] This suffix has become a true progressive in at least one dialect of Shoshoni (Crum and Dayley 1993:90–91).

Nasalized are cognate with suffixes in the other Numic branches that also have initial Spirantized[12] or Nasalized[13] consonants, respectively:[14]

(7*a*) Alternating suffixes

**-pp̥inni*
Sh: *hipipp̥inni* 'drinking', *tɨkkahp̥inni* 'eating'
NP:B: *-punipp̥inni* 'be looking at'

**-kka*
Sh: *puikka* 'have seen (it)', *tɨkkahka* 'have eaten'
Kw: *ʔišaydɨ̥kadɨ̥* 'has been frying'[15]

**-kkʷa*
Sh: *hipikkʷa* 'drank', *tɨkkahkʷa* 'ate'
Kw: *yuweʔekʷweedɨ̥* 'is dying'

(7*b*) Spirantizing suffixes

**-tɨ̥(n)*
Sh: *tɨkkatɨ̥n* 'is eating'
CR:SP: *tɨkkatɨ̥* 'is eating'
NP:B: *tɨkkatɨ̥* 'is eating'

(7*c*) Nasalizing suffixes

**-ŋkɨ̥*
Sh: *tɨ̥ʔahwaiŋkɨ̥* 'tell to', *tɨ̥wɨ̥nɨ̥ŋkɨ̥* 'park (a car)'
CR:SP: *yaaŋkɨ̥ᵍ* 'bring to', *ciŋwɨ̥ʔɨ̥ŋkɨ̥ᵍ* 'knock down with a stick'
NP:SN: *yakaggɨ̥*[16] 'call for', NP:NN: *wɨ̥nɨ̥kkɨ̥* 'raise up'

The question arises: If the Aspirated series, as a series independent of the Geminated series, was an innovation in Proto-Central-Numic, then is there recoverable phonological evidence to determine which verb stems should be Geminating stems and which should be Aspirating? Miller (1980) noted that Shoshoni verb stems with medial Geminates (like *tɨkka*^{H} 'eat') always take the Aspirated forms of the Alternating Suffixes, but made no further generalizations. There is, in fact, a great deal of predictability based on stem

[12] "Spirantized" in the context of Southern Numic means that, generally speaking, the initial consonant of the suffix alternates according to the morphophonemic class of the verb stem.

[13] With the caveat that the Nasalized series in Western Numic has generally collapsed with the Geminated series.

[14] The reconstruction of verb morphology in Proto-Uto-Aztecan has not progressed to the point where any generalizations beyond Proto-Numic can be made.

[15] Kawaiisu *k*, *kʷ* are cognate with other Numic *kk*, *kkʷ*, respectively.

[16] Southern Nevada Northern Paiute, unlike the other dialects of Western Numic, maintains the distinction between the Proto-Numic Nasalized series (voiced geminates) and the Proto-Numic Geminated series (voiceless geminates).

shape to determine whether the stem takes the Geminated or the Aspirated forms. In the remainder of this section, we present verb stems of different prosodic shapes from Shoshoni and state the generalizations which can be made on the basis of these shapes.

2.1. Disyllabic stems with medial (C)C. Disyllabic stems with simple medial consonants take Geminated suffixes:

(8) (C)VCV

hipi^{G} 'drink'; *hipi-kk*^{w}*a* 'drank' (*-h/kkwa* MOMENTANEOUS)
ɨk^{w}*i*^{G} 'smell'; *ɨk*^{w}*i-kka* 'have smelled' (*-h/kka* RESULTATIVE)
ɨma^{G} 'rain'; *ɨma-kk*^{w}*a* 'rained'
wɨnɨ^{G} 'stand'; *wɨnɨ-kka* 'have stood'
yɨmɨ^{G} 'swallow'; *yɨmɨ-kk*^{w}*a* 'swallowed'
yɨk^{w}*i*^{G} 'sit (PS)'; *yɨk*^{w}*i-kk*^{w}*a* 'sat'

Disyllabic stems with medial geminates or clusters take Aspirated suffixes; (9*a*) shows stems with medial geminate stops, (9*b*) shows stems with medial geminate nasals, and (9*c*) shows stems with medial nasal–stop clusters.

(9*a*) (C)VCCV

tɨkka^{H} 'eat'; *tɨkka-hk*^{w}*a* 'ate' (*-h/kk*^{w}*a* MOMENTANEOUS)
nɨkka^{H} 'dance'; *nɨkka-hk*^{w}*a* 'danced'
uttu^{H} 'give'; *uttu-hk*^{w}*a* 'gave'

(9*b*) (C)VNNV

kamma^{H} 'taste'; *kamma-hka* 'have tasted' (*-h/kka* RESULTATIVE)
hanni^{H} 'do'; *hanni-hka* 'have done'
anni^{H} 'fall over'; *anni-hka* 'have fallen over'

(9*c*) (C)VNCV

naŋka^{H} 'hear'; *naŋka-hka* 'have heard'
mɨŋki^{H} 'fail'; *mɨŋki-hk*^{w}*a* 'failed'

Disyllabic stems with a long vowel or diphthong in one or both syllables take Aspirated suffixes:

(10) (C)VVCV, (C)VCVV, (C)VVCVV

niik^{w}*i*^{H} 'say'; *niik*^{w}*i-hka* 'have said' (*-h/kka* RESULTATIVE)
tɨmaa^{H} 'cheat'; *tɨmaa-hk*^{w}*a* 'cheated' (*-h/kk*^{w}*a* MOMENTANEOUS)
tɨpaa^{H} 'bet'; *tɨpaa-hpɨnni* 'was betting' (*-h/ppɨnni* FREQUENTATIVE)
tɨmɨɨ^{H} 'buy'; *tɨmɨɨ-hka* 'have bought'
wiyaa^{H} 'dangle'; *wiyaa-hk*^{w}*a* 'was dangling'
kotto^{H} 'make a fire'; *kotto-hk*^{w}*a* 'made a fire'

wat̥i^{H} 'be missing'; *wat̥i-hkant̥in* 'it was missing'
(*-h/kkant̥in* STATIVE)
t̥ipui^{H} 'wake up'; *t̥ipui-hk*^{w}*a* 'woke up'
naat̥a^{H} 'have a race'; *naat̥a-hk*^{w}*a* 'raced'

2.2. Other stem shapes. Monosyllabic stems and disyllabic stems with no medial consonants take Geminated suffixes (11). Monosyllabic stems have long vowels or diphthongs.

(11) (C)VV

pui^{G} 'see'; *pui-kka* 'have seen (it)' (*-h/kka* RESULTATIVE)
wai^{G} ~ *wee*^{G} 'get off, dismount'; *wee-kk*^{w}*a* 'got off'
(*-h/kk*^{w}*a* MOMENTANEOUS)[17]
sai^{G} 'melt (snow), to be slushy'; *sai-kka* '(it) is slushy'
naa^{G} 'be at'; *naa-kk*^{w}*a* 'was somewhere'
cua^{G} 'be used up'; *cua-kk*^{w}*a* 'was used up'
m̥i̥^{G} 'do'; *m̥i̥-kka* 'have done something'
p̥i̥a^{G} 'leave behind'; *p̥i̥a-kka* 'have left (it) behind'
too^{G} 'feed, graze'; *too-kka* 'have grazed'
n̥i̥ai^{G} 'blow (wind)'; *n̥i̥ai-pp̥i̥ni* 'blowing' (*-h/pp̥i̥nni* FREQUENTATIVE)

Stems of three or more syllables take Aspirated suffixes:

(12) (C)VCVCV(. . .)

kuhnekku^{H} 'run (SS)'; *kuhnekku-hka* 'have run' (*-h/kka* RESULTATIVE)
poyokka^{H} 'trot'; *poyokka-hp̥i̥nni* 'trotting' (*-h/pp̥i̥nni* FREQUENTATIVE)
y̥i̥m̥i̥kki^{H} 'move'; *y̥i̥m̥i̥kki-hka* '(it) moved'
want̥i̥k^{w}*ai*^{H} 'be anxious'; *want̥i̥k*^{w}*ai-hp̥i̥nni* 'being anxious'
k̥i̥noma^{H} 'be sore'; *k̥i̥noma-hka* 'be sore'
mat̥i̥ŋka^{H} 'finish'; *mat̥i̥ŋka-hk*^{w}*a* 'finished' (*-h/kk*^{w}*a* MOMENTANEOUS)

2.3. Morphologically complex stems. The canonical Numic verb root is disyllabic, so the forms in (12) are probably all, at least historically, composed of two morphemes. Clearly segmentable complex forms behave in a

[17] This form is listed as *wai*^{G} in all three of the current dictionaries of Shoshoni (Miller 1972, Crapo 1976, and Crum, Crum, and Dayley 2001), but *wee*^{G} is a more recently recorded alternative. There is unpredictable variation between *ai* and *e* along various lexical, dialectal, sociolectal, and idiolectal lines. Sometimes *ai* acts as a long vowel and sometimes as a short vowel. The variant *e* always acts as a short vowel (although unlike other short vowels, it is never devoiced). In many forms the *e* has been lexicalized and never occurs as *ai*. A few forms have been lexicalized with an invariable *ai* and never occur with *e*. The details are very complex and are beyond the scope of this paper. None of our arguments critically rely on *ai* ~ *e* forms. In *wee*^{G}, the *ai* of the dictionaries has been lexicalized as *e*, but since verb stems must minimally be (C)V_iV_i or (C)V_iV_j, the *e* has been lengthened.

similar fashion; thus all verb suffixes are followed by Aspirated suffixes, as shown in (13). This includes the auxiliary verbs, which are affixed after the main verb stem.

(13) *sua*^{G} 'think, feel'; *sua-kka* 'have felt' (*-h/kka* RESULTATIVE)
sua-ŋkɨ^{H} 'think about' (*-ŋkɨ* CAUSATIVE); *suaŋkɨ-hka* 'have thought about'

yɨkʷi^{G} 'sit (PS)'; *yɨkʷi-kka* 'have sat'
tɨkka-yɨkʷi^{H} 'eat sitting (PS) (*tɨkka*^{H} 'eat')'; *tɨkkayɨkʷi-hka* 'sitting eating'

tɨki^{G} 'place'; *tɨki-kka* 'have placed'
wɨnɨ-ttɨki^{H} 'start standing' (*wɨnɨ*^{G} 'stand'); *wɨnɨttɨki-hka* 'when (he) stood up' (*-h/kka* DSSUB)

When a prefix is added to a stem which normally takes Geminated suffixes, the new stem takes Aspirated suffixes, as shown in (14).

(14) *hipi*^{G} 'drink'; *hipi-kkʷa* 'drank' (*-h/kkʷa* MOMENTANEOUS)
nahipi^{H} 'be drunk' (*na-* PASSIVE); *nahipi-hkʷa* 'it was drunk'

yɨmɨ^{G} 'swallow'; *yɨmɨ-kkʷa* 'swallowed'
tɨyɨmɨ^{H} 'swallow (something)' (*tɨ-* DETRANSITIVE); *tɨyɨmɨ-hka* 'have swallowed (something)' (*-h/kka* RESULTATIVE)
nayɨmɨ^{H} 'be swallowed'; *nayɨmɨ-hka* 'got swallowed'

tɨki^{G} 'place'; *tɨki-kka* 'have placed'
cattɨki^{H} 'place with the hand' (*ca*"- 'by hand'); *cattɨki-hka* 'have placed with the hand'
nacattɨki^{H} 'be put away'; *nacattɨiki-hka* '(it) is put away'

ɨma^{G} 'rain'; *ɨma-kkʷa* '(it) rained'
paʔɨma^{H} 'rain' (*pa-* 'water'); *paʔɨma-hkʷa* 'it rained'

yaa^{G} 'carry (SO)'; *yaa-ttai* 'carried' (*-h/ttai* TERMINATIVE)
cayaa^{H} 'carry in the hand (SO)' (*ca*"- 'by hand'); *cayaa-htai* 'carried in the hand'

When a prefix is added to a stem which takes Aspirated suffixes, there is no change:

(15) *tɨkka*^{H} 'eat'; *tɨkka-hkʷa* 'ate' (*-h/kkʷa* MOMENTANEOUS)
natɨkka^{H} 'be eaten' (*na-* PASSIVE); *natɨkka-hka* 'it is edible' (*-h/kka* RESULTATIVE)

hanni^{H} 'do'; *hanni-hkʷa* 'did (it)'
cahanni^{H} 'do it by hand' (*ca*"- 'by hand'); *cahanni-kha* 'have done it with the hand'

2.4. Shoshoni summary. Verb stems in Shoshoni which contain a simple medial consonant or no medial consonant are Geminating and take the allomorphs of the Alternating Suffixes that begin with a Geminated consonant. Otherwise, stems are Aspirating and take the allomorphs of the Alternating Suffixes that begin with an Aspirated consonant. This is schematized in (16).

(16*a*) Geminating stems

(C)VCV
(C)VV

(16*b*) Aspirating stems

(C)VCCV
(C)VNNV
(C)VNCV
(C)VCVV
(C)VVCV
(C)VVCVV
(C)V(C/N)CV(C/N)CV . . .

It should be noted that none of the above generalizations are absolutes. There are a few exceptions to every one of them, making the marking of verb class in a Shoshoni dictionary a requirement rather than an optional convenience. (17) lists some of these exceptions.

(17) Exceptions

(17*a*) Geminating stems when Aspirating stems are expected

picci^{G} 'suckle'
k^{w}*akku*^{G} 'win'
ak^{w}*ati*ʔ*i*^{G} 'burp'
niwaci^{G} 'deny' (*ni-* 'by voice', *waci*^{G} 'be lost')
namapuisi^{G} 'cleanse oneself'; (*na-* REFLEXIVE, *mapuisi*^{G} 'cleanse')
nisua^{G} 'express' (*ni-* 'by voice', *sua*^{G} 'think, feel')
pihapi^{G} 'for a bloodline to flow' (*pii-* 'blood', *hapi*^{G} 'lie down (SS)')

(17*b*) Aspirating stems when Geminating stems are expected

himi^{H} 'give (PO)'
nuhi^{H} 'play'[18]

[18] Note the difference between Sh:G (Miller 1972) and Sh:W (Crapo 1976), which have *nui*^{G} 'play' in the expected Geminating class, and Sh:NW (Crum, Crum, and Dayley 2001), which has *nuhi*^{H} ~ *nui*^{H} in the unexpected Aspirating class. Such dialectal differences in verb class are not particularly difficult to find. Compare Sh:G *niik*^{w}*i*^{H} 'say' (expected) with Sh:W *niik*^{w}*i*^{G} (unexpected); Sh:G and Sh:W *pici*^{G} 'suck' (expected) with Sh:NW *pici*^{H} (unexpected); and

3. Aspiration and Gemination in Central Numic. In this section, we outline the historical development of Aspiration in Central Numic and show how the generalizations presented above fit into this historical development.

3.1. Aspiration and "Gemination" in Comanche. In order to determine whether the pattern of Geminating and Aspirating verb stems is a recent innovation or has deeper historical origins, we look at Shoshoni's sisters—Comanche and Timbisha. In terms of closeness, Comanche and Shoshoni are very close, having separated within the historical period. The earliest written document in Comanche is from 1786 (Thomas 1929). It clearly shows a language that is virtually Shoshoni but yet illustrates the early stages of the phonological and lexical shifts that would make the two into separate languages.

Comanche shows the same differentiation between verbs and non-verbs that Shoshoni does; that is, non-verbs have final segments which affect the initial consonant of a following morpheme, but verbs all end in vowels and are members of one of two classes. In Comanche, the verb classes are Preaspirating (= Shoshoni Geminating) and Aspirating (= Shoshoni Aspirating). This renaming of Geminating to Preaspirating reflects one of the main phonological differences between Comanche and Shoshoni—the geminated stops in Shoshoni are preaspirated stops in Comanche, written /HC/ [hC] in Comanche instead of /CC/ [CC] as in Shoshoni. This contrasts with the aspirated stops in both languages that surface as a voiceless fricative (in Comanche a simple voiceless stop in many environments) often preceded by a voiceless vowel, written /hC/ in both languages. The consonant series and verb classes in Comanche are illustrated in (18).

(18*a*) Nonverbs

Spirantization:[19]	[arɨkaβaʔa] 'on the deer' (*arɨka* 'deer', *-paʔa* 'on')
Preaspiration:	[tuahpaʔa] 'on the son' (*tuaH* 'son')
Aspiration:	[saapɬφaʔa] 'on the stomach' (*saapɨh* 'stomach')
Fortition:	[k^{w}asuʔupaʔa] 'on the dress' (*k^{w}asuʔu=* 'dress')

example is especially interesting since it yields Sh:G *niwɨnɨ^{G}* 'talk (PS)' (unexpected if formed from *wɨnɨ^{H}*, but the result of analogy if derived from *wɨnɨ^{G}*). Compare Sh:W and Sh:NW *niwɨnɨ^{H}* (expected). We suspect that a few of these differences may be the result of recording errors, analytical errors, or typographical errors, but the number of discrepancies is greater than would be the result of linguist error alone.

[19] Comanche Spirantization is more complicated than Shoshoni Spirantization since only /t/ after nonfront vowels and /p/ in all cases undergo the process. In order to keep certain points about Comanche Preaspiration and Aspiration in verbs clear, we use only suffixes which begin with /p/ or /t/ to illustrate our points (see McLaughlin 1992, Armagost and Miller 2000, and McLaughlin 2000 for detailed discussion of the developments). Additionally, Comanche cognates of nasal-stop clusters in Shoshoni (still evident in the earliest Comanche recordings) have lost the nasal component and are simply voiceless stops in modern Comanche. Since /t/ after

(18*b*) Verbs

Preaspirating stems (cognate with Shoshoni Geminating stems)
tek^{w}a^{P} 'talk'; *tek^{w}aHp̬ni* 'talking' (*-h/Hp̬nni* ONGOING)
k^{w}aβi^{P} 'lie down (PS)'; *k^{w}aβiHka$^{=}$* 'be lying down' (*-h/Hka$^{=}$* STATIVE)

Aspirating stems
noHko^{H} 'bake bread'; *noHkohp̬ni* 'baking bread'
poHpi^{H} 'jump (SS)'; *poHpihci* 'after jumping . . .' (*-h/Hci* SSSUB)

Comanche verbs usually fall into the same verb class as their Shoshoni cognates, as seen in (19).

(19*a*) Geminating/Preaspirating stems

(C)VCV < PCN *(C)VCV

Comanche	Shoshoni
hiβi^{P} 'drink'	*hipi^{G}*
ɨk^{w}i^{P} 'smell'	*ɨk^{w}i^{G}*
ɨma^{P} 'rain'	*ɨma^{G}*
yɨwi^{P} 'sit down (PS)'	*yɨk^{w}i^{G}*

(C)VV < PCN *(C)VV

wee^{P} 'get off'	*wee^{G}*
p̬a^{P} 'leave behind'	*p̬a^{G}*
too^{P} 'feed, graze'	*too^{G}*

(19*b*) Aspirating stems

(C)VCCV, (C)VNNV, (C)VNCV < PCN *(C)VCCV, *(C)VNNV, *(C)VNCV[20]

tɨHka^{H} 'eat'	*tɨkka^{H}*
nɨHka^{H} 'dance'	*nɨkka^{H}*

front vowels /c/, /k/, and /k^{w}/ is no longer Spirantized, this has led to the collapse of the Spirantized and Nasalized series of stops for these phonemes; thus 'ear' is Shoshoni *naŋka* but Comanche *naka*. With /t/ after nonfront vowels and /p/, the two series are still distinct, but there are now minimal pairs such as [paβi] 'older brother' and [papi] 'head' (Shoshoni [paβi] and [pambi], respectively). Following Charney (1993), at the end of morphemes we use a Fortition final feature symbol /$^{=}$/ to indicate that the initial consonant of a following morpheme is not spirantized (cognate with Shoshoni morpheme-final /n/). Morpheme-internally, we treat /β/ and /r/ as separate phonemes in Modern Comanche. It should be noted that this solution is the decision of the living writers and would not necessarily have been the solution preferred by Miller.

[20] Note that since Shoshoni Nasalization (with a surface nasal followed by a stop) has become Fortition (which simply blocks Spirantization of the following stop), forms such as Shoshoni *maka^{G}* 'feed' and *naŋka^{H}* 'hear' have Comanche cognates *maka^{P}* and *naka^{H}*, overtly identical forms in CVCV structure, but in different verb classes.

uHtu^{H} 'give (SO)'	*uttu*^{H}
kama^{H} 'taste'	*kamma*^{H}
hani^{H} 'to do'	*hanni*^{H}
naka^{H} 'hear'	*naŋka*^{H}
caka^{H} 'lead'	*caŋka*^{H}

(C)VVCV < PCN *(C)VVCV[21]

niik^{w}*i*^{H} 'say'	*niik*^{w}*i*^{H}

Monomorphemic trisyllabic and longer stems are also usually Aspirating in Comanche, whether historically segmentable or not:

(20) *iyaaʔi*^{H} 'guard'
ɨsuaki^{H} 'snore'
kuhiya^{H} 'spy on someone'
k^{w}*inuma*^{H} 'get dizzy'

However, unlike Shoshoni, where Geminating stems change to Aspirating stems with affixation, compounding, or noun incorporation, in Comanche when a prefix is added, the verb stem is the second member of a compound verb, or there is an incorporated nominal, most Preaspirating verb stems stay Preaspirating, no matter how many syllables the resulting stem has. This is due to analogical leveling so that, unlike Shoshoni, the root morpheme always belongs to the same verb class:

(21) *ɨkɨrek*^{w}*a*^{P} 'still be talking' (*ɨkɨ-* 'still', *tek*^{w}*a*^{P} 'talk')
kaak^{w}*aku*^{P} 'defeat by cheating' (*kaa-* 'deception', *k*^{w}*aku*^{P} 'defeat')
kɨHcia^{P} 'bite' (*kɨH-* 'by teeth', *-tsia*^{P} 'bite')
naβuni^{P} 'look at oneself' (*na-* REFLEXIVE, *puni*^{P} 'look at')
nacaHpuni^{P} 'be tested' (*na-* PASSIVE, *caH-* 'by extended hand', *puni*^{P} 'look at')
tosanaβuni^{P} 'appear white' (*tosaH-* 'white', *na-* PASSIVE, *puni*^{P} 'look at')
naahaβi^{P} 'continue lying down (SS)' (*naa*^{G}*-* 'continue', *haβi*^{P} 'lie down (SS)')
tɨHkanɨmi^{P} 'move about eating (SS)' (*tɨHka*^{H} 'eat', *nɨmi*^{P} 'move about (SS)')
huuhima^{P} 'carry sticks' (*huuH-* 'wood', *hima*^{P} 'carry (PO)')

[21] Due to syllable structure conditions in PCN, this is a rare sequence in stems which are not morphologically complex. Only **kooni*^{H} can be certainly reconstructed for PCN, but the Comanche cognate is only found in Robinson and Armagost (1990) without a verb class indication. The form *niik*^{w}*i*^{H} in Common Shoshoni-Comanche is from PCN **ni-* 'by voice' and **yɨk*^{w}*i*^{G} 'say'. This form is found in Tm:E as *niyɨk*^{w}*i*.

paho?ɨma^{P} 'hail' (*paho-* 'hail', *ɨma*^{P} 'rain')
tuHkanáai?rekʷa^{P} 'speak Wichita' (*tuHkanáai?* 'Wichita', *tekʷa*^{P} 'talk')

A small number of verb stems, however, have retained the alternation between Preaspirating stems without a prefix but Aspirating stems with a prefix:

(22) *tɨ?ahwe*^{P} 'talk'; *narɨ?ahwe*^{H} 'talk about oneself' (*na-* REFLEXIVE)
haβi^{P} 'lie down (SS)'; *pahaβi*^{H} 'swim' (*pa-* 'water')

But unlike Shoshoni, Comanche also has a few verb stems that are Aspirating without affixation but Preaspirating with affixation:

(23) *poHpi*^{H} 'jump (SS)'; *pohpia*^{P} 'jump (PS)'
piHka^{H} 'drum (SS)'; *piHpihku*^{P} 'drum (PS)'

Polysyllabic stems which end in (C)VV also behave differently in Comanche than they do in Shoshoni. These are uniformly Preaspirating stems in Comanche, while they are uniformly Aspirating stems in Shoshoni. This is probably an analogical shift. In both Comanche and Shoshoni, long vowels, vowel clusters, and diphthongs do not devoice before an underlying *h*, but in Shoshoni, a following stop still surfaces as a voiceless fricative, while it remains a voiceless stop preceded by [h] in Comanche. This phonetic realization is identical to what would be heard if the stem were Preaspirating. Verb stems that end in CVV therefore have been reanalyzed as Preaspirating stems in Comanche, while they remain Aspirating stems in Shoshoni:

(24)

Comanche	Shoshoni
tɨmɨɨ^{P} 'buy'	*tɨmɨɨ*^{H}
koHtoo^{P} 'make a fire'	*kottoo*^{H}
ɨHpɨi^{P} 'sleep (SS)'	*ɨppɨi*^{H}
tɨyaai^{P} 'die (SS)'	*tiai*^{H}

3.2. Aspiration and Gemination in Timbisha. Timbisha split from the common ancestor of Shoshoni and Comanche about 1,500 years ago. Impressionistically, there is about as much difference between Timbisha and Shoshoni as there is between Spanish and Portuguese. Lexicostatistic measurements, however, indicate that Timbisha and Comanche are about equidistant from Shoshoni (Miller, Tanner, and Foley 1971), but this masks the fact that Comanche and Shoshoni were physically separated by a wide distance for at least 250 years while Timbisha and the westernmost dialects of Shoshoni have had only a minimal amount of physical separation for the last millennium.

Timbisha also has the same distinction between verbs and non-verbs in terms of final segments and verb classes that is found in both Shoshoni and Comanche:

(25*a*) Nonverbs

Spirantizing: [naɣaβaʔa] 'on the bighorn' (*naka* 'bighorn', *-paʔan* 'on')
Geminating: [tuappaʔa] 'on the son' (*tua*'' 'son')
Aspirating: [muumbiččIφaʔa] 'on the owl' (*muumpiccih* 'owl')
Nasalizing: [pɨyɨmbaʔa] 'on the duck' (*pɨyɨn* 'duck')

(25*b*) Verbs[22]

Geminating stems
yaa^{G} 'take (SO)'; *yaattai* 'took away (SO)' (*-h/ttai* COMPLETIVE)
puni^{G} 'see'; *punikkan* 'having seen' (*-h/kkan* STATIVE)

Aspirating stems
pakka^{H} 'kill (SO)'; *pakkahtai* 'killed off (SO)'
pikk^{w}*a*^{H} 'break (SO)'; *pikk*^{w}*ahan* 'cracked (SO)'[23]

In Timbisha, we also see that individual verbs usually fall into the same verb classes as their Shoshoni and Comanche cognates:

(26*a*) Geminating stems

(C)VCV

Timbisha	Shoshoni/Comanche
hipi^{G} 'drink'	*hipi*^{G}*/hiβi*^{P}

[22] Neither McLaughlin (1987) nor Dayley (1989*b*) lists the verb class for all verbs in Timbisha, as Canonge (1958) does for Comanche and Miller, Crapo, and Crum and Dayley do in the various Shoshoni dictionaries. Despite this, there are enough marked verb stems in both sources for us to be confident of our analysis of Timbisha. One problem is that the various dialects of Timbisha are in different stages of losing postvocalic *h*, with the greatest loss in the west and the least loss in the east. This means that, in many cases, the Aspirated series of consonants is falling together with the Spirantized series. Because of this collapse, the Alternating suffixes show up on Geminating stems with initial Geminated consonants, but they show up on Aspirating stems with either Aspirated or Spirantized consonants depending on the extent to which postvocalic *h* has been lost for that form or for the speaker who was the source for that form. Thus, a stem without a final *h* in Dayley's (1989*b*) dictionary may be either a true Aspirating stem, where Dayley has recorded all Alternating suffixes on that form with an initial Spirantized consonant due to the loss of *h*, or it may be a form for which Dayley has no recording with an Alternating suffix. If a form has no class marker in McLaughlin (1987), then he recorded no form of that verb with an Alternating suffix and could not make a determination of its class, since his primary consultant generally retained postvocalic *h* more often than did Dayley's. The verb class of some forms has been identified by referring to Wick Miller's Timbisha field notes.

[23] In Timbisha, *h-k* and *h-k*^{w} across morpheme boundaries are reduced to *h* and *h*^{w}, respectively. We follow McLaughlin (forthcoming) in using *hw* for /hw/ and *h*^{w} for /h-k^{w}/.

ɨkʷiᴳ ‘smell’	*ɨkʷiᴳ/ɨkʷiᴾ*
ɨmaᴳ ‘rain’	*ɨmaᴳ/ɨmaᴾ*
yɨkʷiᴳ ‘sit down (PS)’	*yɨkʷiᴳ/yɨkʷiᴾ*

(C)VV

naaᴳ ‘be’	*naaᴳ/naaᴾ*
siiᴳ ‘urinate’	*siiᴳ/siiᴾ*
kɨaᴳ ‘emerge (PS)’	*kɨaᴳ/kɨaᴾ*
caiᴳ ‘catch’	*caiᴳ/caaiᴾ* ‘hold’

(26*b*) Aspirating stems

(C)VCCV, (C)VNNV, (C)VNCV

tɨkkaᴴ ‘eat’	*tɨkkaᴴ/tɨHkaᴴ*
nɨkkaᴴ ‘dance’	*nɨkkaᴴ/nɨHkaᴴ*
uttuᴴ ‘give (SO)’	*uttuᴴ/uHtuᴴ*
kammaᴴ ‘taste’	*kammaᴴ/kamaᴴ*
hanniᴴ ‘do’	*hanniᴴ/haniᴴ*
naŋkaᴴ ‘hear’	*naŋkaᴴ/nakaᴴ*
caŋkaᴴ ‘lead’	*caŋkaᴴ/cakaᴴ*

(C)VVCV, (C)VCVV, (C)VVCVV[24]

kooniᴴ ‘come and go’	*koonniᴴ* / —
tɨmɨɨᴴ ‘buy’	*tɨmɨɨᴴ/tɨmɨɨᴾ*
kottooᴴ ‘make a fire’	*kottooᴴ/koHtooᴾ*
ɨppɨiᴴ ‘sleep (SS)’	*ɨppɨiᴴ/ɨHpɨiᴾ*
tiaiᴴ ~ *tiyaiᴴ* ‘die (SS)’	*tiaiᴴ/tɨyaaiᴾ*
koicoiᴴ ‘wash’	*kʷaicoiᴴ* ~ *koicoiᴴ* / —

As in Shoshoni, and for monomorphemic stems in Comanche, trisyllabic and longer verb stems in Timbisha are also usually Aspirating, whether morphemically complex or not:

(27) *hɨccawɨᴴ* ‘be cool’; *hɨccawɨhʷan* ‘got cool’ (*-h/kkʷan* MOMENTANEOUS)
matɨŋkaᴴ ‘finish’; *matɨŋkahʷan* ‘finished’
noʔiccaᴴ ‘bend’; *noʔiccahan* ‘be bent’ (*-h/kkan* STATIVE)

There are, however, many trisyllabic and longer forms which are Geminating. These are almost all morphemically complex with the ultimate verb

[24] Robinson and Armagost (1990) do not list the verb class for Comanche verbs. The only sources for Comanche verb classes in this paper have been Canonge (1958) and Charney (1993). Within these three-language cognate sets, there are Comanche cognates for all of them; but when the only source is Robinson and Armagost (1990), we have no good evidence for the verb class and thus leave the Comanche entry blank.

root also being Geminating. In fact, this appears to happen more often than not, but the lack of verb class markings on many verbs in the Timbisha sources makes an absolute statement impossible. This appears to be due to the same type of analogy that occurs in Comanche, so that a verb stem stays in the same class despite affixation:

(28) *pihyakai*^{G} 'itch'
ponco?e^{G} 'bounce'
k^{w}*itasuu*^{G} 'break wind' (*k*^{w}*ita* 'excrement', *suu*^{G} 'blow')
paŋ^{w}*iy-k*^{w}*i*^{G} 'fish' (*paŋ*^{w}*i* 'fish', *y-k*^{w}*i*^{G} 'do')
mokose^{G} 'smash' (*ma-* 'by hand', *-kose*^{G} 'smash')
niŋ^{w}*-ni-*^{G} 'talk (PS)' (*ni"-* 'by voice', *w-ni-*^{G} 'stand')
nak^{w}*aa*^{G} 'lose' (*na-* PASSIVE, *k*^{w}*aa*^{G} 'defeat')
nat-tiiŋ^{w}*a*^{G} 'learn' (*t-tiiŋ*^{w}*a*^{G} 'teach')
nasuwaci^{G} 'be forgotten' (*su-* 'by mind', *waci*^{G} 'be hidden')

While many of these verb stems maintain their exceptional Geminating verb class no matter what the prefix or incorporated noun, there are some exceptional forms:

(29) *-ima*^{G} 'rain'
na?-ima^{H} 'be rained on' (*na-* PASSIVE)
taha?-ima^{G} 'snow' (*taha-* 'snow')

Unlike in Comanche, however, compounding of verb stems changes a Geminating stem in second place into an Aspirating stem (examples like *taha?-ima*^{G} 'snow' notwithstanding). The following example shows prefixing, where the stem is still Geminating, and compounding, where the same stem becomes Aspirating:

(30) *naa*^{G} 'be'
wakanaa^{G} 'get married to' (*waka-* 'toward')
pacainnaa^{H} 'fetch water' (*pa-* 'water', *cai*^{G} 'grasp')

As in Shoshoni, adding a prefix to some Geminating stems yields an Aspirating stem. These stems are not particularly common in terms of numbers of forms listed in a dictionary, but they are quite common in terms of usage:

(31) *k-ia*^{G} 'emerge (PS)'; *cakk-ia*^{H} 'take out' (*ca"-* 'by grasping')
t-iki^{G} 'put away (SO)'; *nat-iki*^{H} 'be put away')
ko?i^{G} 'die (PS)'; *s-ikko?i*^{H} 'die from cold' (*s-i"-* 'by cold')
ko?i^{G} 'die (PS)'; *takukko?i*^{H} 'thirst (PS)' (*taku"-* 'thirst')
puni^{G} 'look at'; *t-ipuni*^{H} 'wake up' (*t-i-* DETRANSITIVE)

puni^{G} 'look at'; *napuni*^{H} 'appear' (*na-* PASSIVE)
puni^{G} 'look at'; *t̬impuni*^{H} 'spy on' (*t̬in-* 'rock')

Like Shoshoni, but unlike Comanche, Timbisha has no stems which change from Aspirating to Geminating with affixation.

3.3. Central Numic summary. The three Central Numic languages show a great degree of similarity in terms of the verb classes of disyllabic stems. This similarity indicates that we are looking at patterns which are reconstructible to PCN; Appendix A illustrates verb class marking in the three languages with a reconstruction for PCN.

4. Proto-Uto-Aztecan final consonants and stress. Manaster-Ramer (1993) provides an overview of the reconstruction of syllable-final consonants in Proto-Uto-Aztecan. He argues for the existence of final consonants in a class of Proto-Uto-Aztecan stems and shows that these final consonants will account for the development of stress and vowel length in many of the daughter languages. The proposal is essentially as follows. Vowel-final stems have initial stress (32*a* and 32*b*). Stress is attracted to the second syllable in disyllabic stems ending in consonants (32*c*); however, second syllable stress on consonant-final stems is blocked by an intervening consonant cluster (32*d*).

(32*a*) *(C)V́CV (no final C, stress on first syllable)
(32*b*) *(C)V́CCV (no final C, stress on first syllable)
(32*c*) *(C)VCV́C (final C, stress shifts to second syllable)
(32*d*) *(C)V́CCVC (final C, stress shift blocked by *-CC-)

While Manaster-Ramer (1993) is primarily concerned with the quality of these syllable-final consonants, our interest is in the predictability of stress placement in pre-PCN which follows from his theory. In precisely those places where stress falls on the second syllable in pre-PCN, verb stems are Geminating; otherwise, verb stems are Aspirating.

Consider first the Aspirating stems in Central Numic of the shape CVCCV, where the intervocalic consonant cluster is either a geminate or a nasal-stop sequence (16*b*). Attaching a geminate-initial suffix to the pre-PCN stems would not shift stress, since this was blocked by the medial cluster (see 32*d*). This means that the geminate follows an unstressed vowel, which is precisely the environment in which geminates are degeminated and preaspirated in Colorado River Numic. The Further PCN development of a voiceless fricative from the preaspirated geminate is a later phonetic refinement (see Elzinga 2004). Example (33) shows the development process for PCN.

(33) PN:[25] **tɬkka-kk^{w}a* ‘eat up’
**tɬkakk^{w}a* after stress assignment
**tɬkkahk^{w}a* after degemination and preaspiration
**tɬkkAk^{w}a* after vowel devoicing

PCN: **tɬkkAx^{w}a* after frication
> Sh *tɬkkAx^{w}a*; Tm *tɬkkAh^{w}a*; Cm *tɬkɬk^{w}a*

Now consider the Geminating stems. These stems come in two phonotactic shapes: (C)VCV and (C)VV (16*a*). If a geminate-initial suffix is attached to a (C)VCV stem, this creates a closed second syllable; it is precisely this environment which attracted stress according to Manaster-Ramer (1993), as shown in (32*c*). With stress on the vowel immediately preceding the geminate, the geminate would not degeminate or preaspirate. In PCN, stress became fixed on the initial syllable so this stress shift—the conditioning factor for retaining the geminate consonant at the end of the second syllable—was eliminated, yet the Geminated consonant on the suffix remained. Example (34) shows this development in PCN.

(34) PN: **hipi-kk^{w}a* ‘drink up’
**hiβikk^{w}a* after Spirantization
**hiβíkk^{w}a* after stress assignment
**hiβíkk^{w}a* no degemination or preaspiration
**hiβíkk^{w}a* no vowel devoicing

PCN: **híβikk^{w}a* stress shift
> Sh *híβikk^{w}a*, Tm *híβikk^{w}a*, Cm *híβihk^{w}a*

For (C)VV stems, the geminate suffix remained a geminate for one of two reasons. First, if the stem was (C)V_iV_i, then stress was assigned equally to the entire long vowel sequence on a monosyllabic word (as it still is in the daughter languages) and, thus, the geminate followed a stressed vowel. Second, if the stem is synchronically (C)V_iV_j in any given daughter language, there was usually a glottal, semivowel, or nongeminate nasal between the two nonidentical vowels in the PN form that can often be discovered by comparing cognates in the other daughter languages. This would automatically put the (C)V_iV_j stems in the (C)VCV category discussed in the preceding paragraph. Even in those forms where a medial consonant has not been preserved in any of the daughter languages, (C)V_iV_j stems all behaved in PN as if there were one. Examples (35) and (36) show these developments.

[25] Throughout the charts in this section, we have chosen to represent the reconstructed and actual broad phonetics of the forms involved in order to demonstrate more clearly the combined effects of stress placement, preaspiration, and vowel devoicing.

(35) PN: **yaa-kk^{w}a* ‘carry away (SO)’
**yáákk^{w}a* after stress assignment
**yáákk^{w}a* no degemination or aspiration
**yáákk^{w}a* no vowel devoicing

PCN: **yáákk^{w}a* no stress shift
> Sh *yáákk^{w}a*, Tm *yáákk^{w}a*, Cm *yááhk^{w}a*

(36) PN: **caʔi-kka* ‘hold’
**caʔíkka* after stress assignment
**caʔíkka* no degemination or aspiration
**caʔíkka* no vowel devoicing

PCN: **cáikka* stress shift and medial glottal deletion
> Sh *cáikka*, Tm *cáikka*, Cm *cáihka*
(compare CR:SP *čaʔi-*, NP:SN *caʔi-*)

Since Manaster-Ramer’s reconstruction of PUA places stress on one of the first two syllables of a stem, verb stems of more than two syllables will invariably end in an unstressed syllable. When a geminate-initial suffix is attached to such a stem, it will degeminate and preaspirate as expected.[26] Example (37) illustrates this.

(37) PN: **watɨki-kk^{w}a* ‘want, be in need of’
**warɨɣikk^{w}a* after Spirantization
**warɨ́ɣikk^{w}a* after stress assignment
**warɨ́ɣihk^{w}a* after gemination and preaspiration
**warɨ́ɣIhk^{w}a* after vowel devoicing

PCN: **wárɨɣix^{w}a* after frication[27]
> Sh *wárɨɣix^{w}a*, Tm *wárɨɣih^{w}a*, Cm *wárɨʔIk^{w}a*

When a prefix is added to a Geminating root, the stress will shift to fit into the two-syllable window at the front of the word according to the stress

[26] It should be noted that the Central and Southern Numic languages have an alternating stress system which assigns secondary stress to every other vowel mora after the primary stress. The Western Numic languages differ somewhat but still illustrate alternating stress on words of four or more syllables. This secondary stress does not affect the verb class of Central Numic verbs, so it is not relevant to the discussion here. The secondary stress does, however, block the devoicing of vowels in languages with voiceless vowels. Despite the fact that all three branches of Numic have alternating stress patterns in one form or another, it does not seem to be reconstructible to PN.

[27] Because of the development of PCN alternating stress which stresses odd-numbered vowel morae, the **i* is in a stressed syllable and is no longer devoiced, except in Comanche which has lost the alternating stress pattern and only retains initial stress. See Armagost and Miller (2000) for details.

patterns predicted by Manaster-Ramer. This leaves the final syllable of the verb root unstressed, which is the environment for Aspiration. This is especially fertile ground for modern reanalysis of verb roots so that, as in the Comanche examples in (21), the verb root remains in the same verb class whether it has a prefix or not. Example (38) shows the development of these complex stems in PCN.

(38)

PN:	**puni-kka* 'see'	**na-puni-kka*	'appear'
	**puni-kka*	**naβunikka*	after Spirantization
	**puníkka*	**naβúnikka*	after stress assignment
	**puníkka*	**naβúnihka*	after degemination and preaspiration
	**puníkka*	**naβúNIka*	after vowel (and sonorant devoicing)
PCN:	**púnikka*	**náβunixa*	after stress shift and frication

**púnikka* > Sh *púnikka*, Tm *púnikka*, Cm *púnihka*
**náβunihka* > Sh *náβunixa*, Tm *náβuniha*, Cm *náβunihka*

Finally, forms with VV in either or both syllables of a disyllabic root behave like trisyllabic stems, so the third (as well as the fourth) V is always unstressed. Examples (39)–(42) illustrate stems with VV in either the first or second syllable.

(39)

PN:	**koonni-kk^{w}a*	'return'
	**koonnikk^{w}a*	no Spirantization
	**kóónnikk^{w}a*	after stress assignment
	**kóónnihk^{w}a*	after degemination and preaspiration
	**kóónnIk^{w}a*	after vowel devoicing
PCN:	**kóónnIx^{w}a*	after frication

> Sh *kóónnIx^{w}a*, Tm *kóónnIh^{w}a*, Cm *kóónIk^{w}a*

(40)

PN:	**tɬaka-kk^{w}a*	'paint'
	**tɬaɣakk^{w}a*	after Spirantization
	**tɬáɣakk^{w}a*	after stress assignment
	**tɬáɣahk^{w}a*	after degemination and preaspiration
	**tɬáɣAk^{w}a*	after vowel devoicing
PCN:	**tɬáɣax^{w}a*	after frication

> Sh *tɬáɣax^{w}a*, Tm *tɬáɣax^{w}a*, Cm *tɬ?ekɬk^{w}a*

(41)

PN:	**kottoo-kk^{w}a*	'make a fire'
	**kottookk^{w}a*	no Spirantization
	**kóttookk^{w}a*	after stress assignment
	**kóttoohk^{w}a*	after degemination and preaspiration
	**kóttoohk^{w}a*	no vowel devoicing (blocked by long vowel)

PCN: **kóttoox^{w}a* after frication
> Sh *kóttoox^{w}a*, Tm *kóttooh^{w}a*, Cm *kóhtoohk^{w}a*

(42) PN: **ɨppɨi-kk^{w}a* 'sleep (SS)'
**ɨppɨikk^{w}a* no Spirantization
**ɨ́ppɨikk^{w}a* after stress assignment
**ɨ́ppɨihk^{w}a* after degemination and preaspiration
**ɨ́ppɨihk^{w}a* no vowel devoicing (blocked by vowel cluster)

PCN: **ɨ́ppɨix^{w}a* after frication
> Sh *ɨ́ppɨix^{w}a*, Tm *ɨ́ppɨih^{w}a*, Cm *ɨ́ppɨihk^{w}a*

An apparent exception arises with CVCV$_i$V$_i$ roots, which are always in the Aspirating class in Central Numic. The problem is that both morae of long vowels are equally stressed in Numic languages. There are three possible historical solutions to this. First, since the canonical root in Numic is (C)V(C/N)CV, (C)VCVV roots automatically suggest the possibility of previous affixation or the loss of an intervocalic C, which would generally place the stem in the Aspirating class. Second, VV sequences in the second syllable of a root might not be evenly stressed as they are in monosyllabic roots. This would especially be the case if the V$_i$V$_i$ sequence were the result of the loss of a C between two identical vowels. Finally, Manaster-Ramer's rule of stress shift might be constrained to prohibit the movement of stress to long vowels. This seems unnatural, however, for typological reasons. The extreme rarity of these roots in reliably reconstructed PN makes the determination difficult. Examples (43)–(45) illustrate the development of disyllabic stems with a single C and a long vowel in the second syllable. (43) shows the loss of a single *C between identical vowels to yield PCN *CVCVV. (44) illustrates the restructuring of a PN *CVCCVNV stem to *CVCVV in PCN. (45) shows how a PN vowel cluster has been reduced to a long vowel in PCN.

(43) PN: **tɨmɨʔɨ-kk^{w}a* 'trade'
**tɨw̃ɨʔɨkk^{w}a* after Spirantization
**tɨ́w̃ɨʔɨkk^{w}a* after stress assignment
**tɨ́w̃ɨʔɨhk^{w}a* after degemination and preaspiration
**tɨ́w̃ɨʔɪ̈k^{w}a* after vowel devoicing

PCN: **tɨ́w̃ɨɨx^{w}a* after frication and glottal deletion
> Sh *tɨ́w̃ɨɨx^{w}a*, Tm *tɨ́w̃ɨɨh^{w}a*, Cm *tɨ́mɨɨk^{w}a*

(44) PN: **taccɨmɨ-kk^{w}a* 'count'
**taccɨw̃ɨkk^{w}a* after Spirantization
**táccɨw̃ɨkk^{w}a* after stress assignment
**táccɨw̃ɨhk^{w}a* after degemination and preaspiration
**táccɨw̃ɪ̈k^{w}a* after vowel devoicing

TABLE 1
(C)V*h*RV STEMS

PCN	Timbisha	Shoshoni	Comanche	Gloss
**nahna*^{G}	*nahna*^{G}	*nahna*^{G}	*nahna-*	'grow'
**kuhna*^{G}	*kuhnakkun*	*kuhnai*^{G}		'start running'[1]
**yahni*^{G}	*yahi*^{G} ~ *yahe*^{G}	*yahne*^{G}	*yahne*^{P}	'laugh'
**tahna*^{G}	*taha*^{G}	*tahna*^{G}	*tahna*^{P}	'put (PO)'
**ohni*^{G}	*ohii*^{G} ~ *ohoi*^{G}	*ohni*^{G} ~ *ohoi*^{G} ~ *ohai*^{G} ~ *ohi*^{G}	*ohni*	'cough'
**ahwai*^{G}		*ahwai*^{G} ~ *ahwi*^{G} ~ *awi*^{G}	*ahwe*^{G}	'dig'
**waihya*^{G}	*waiya*^{G} ~ *weya*^{G} ~ *waya*^{G}	*waihya*^{G} ~ *waiha*^{G}	*weha*^{P} ~ *we?ha*^{P}	'burn'
**patɨhwi*^{G}	*patuhi*	*patɨhwi*^{G} ~ *patuhi*^{G}	*parɨhwi*	'melt'[2]

[1]The Timbisha form shows PCN **kuhna*^{G} and *-h/kk*^{w}*an* MOMENTANEOUS.
[2]The initial syllable is the incorporated noun **pa-* 'water'.

PCN: **tɬ́zɨɨx*^{w}*a* after frication[28]
> Sh *tɬ́zɨɨx*^{w}*a*, Tm *tɬ́zɨɨh*^{w}*a*, Cm *tɬ́cɨhk*^{w}*a*[29]

(45) PN: **wiyua-kk*^{w}*a* 'hang'
**wiyuakk*^{w}*a* no Spirantization
**wiyúakk*^{w}*a* after stress assignment
**wiyúahk*^{w}*a* after degemination and preaspiration
**wiyúahk*^{w}*a* no vowel devoicing (blocked by vowel cluster)

PCN: **wíyuax*^{w}*a* after stress shift and frication
> Sh *wíyaax*^{w}*a*, Tm *wíyaah*^{w}*a*

5. Counterexamples. Stems of the form (C)V*h*RV (where R is any sonorant) and (C)VCV*h*V are anomalous since they are Geminating stems rather than the Aspirating forms that we would predict from an initial closed syllable or from a trisyllabic stem. In this section, we attempt to account for these apparent exceptions to the general rules.

5.1. Medial Aspirated sonorants. Stems of the form (C)V*h*RV are Geminating stems, as shown in table 1. These forms are poorly represented

[28] The PCN form is the result of some restructuring of the PN form. PN **m* is lost to leave PCN **ɨɨ*; PN **cc* is shortened to PCN **c* (*z* is the result of Spirantization); and the initial vowel has been changed as the result of regressive assimilation.

[29] The Comanche form, which on the surface appears to adhere to the PCN *(C)VCV pattern for stems that take the Geminating (Comanche Preaspirating) allomorphs of the Alternating suffixes, instead shows that when pre-Comanche *(C)VCVV Aspirating stems were being reanalyzed as Preaspirating, this particular verb ended in a long vowel which has later been shortened.

TABLE 2
NUMIC *hn* COGNATES

Proto-Numic	PCN	PSN	PWN	Gloss
**nahna*	**nahna*^{G}	*nahna*" (Kw) *nanna* (CR)	**nana*	'grow'
**tahna*	**tahna*^{G}	*tahna* (Kw)		'put (PO)'
**ohni*	**ohni*^{G}	*ohni* (Kw)	**ohi*	'cough'
**pohnia*	**pohnia*	*pohniya* (Kw) *ponnia* (CR)	*pohitta* (Mn:W) *ponina* (NP:SN)	'skunk'

in the other Numic languages. Nichols (1974) reconstructs **hR* clusters in Proto-Numic, but the comparative evidence he adduces is slim and somewhat contradictory. We are left with the question of what distinguishes these stems from other stems with medial consonant clusters.

One possible solution is to argue that the medial *hR* is underlyingly a single segment characterized by both vocal fold abduction (aspiration) and sonorant voicing. The realization of this segment as a cluster reflects the phonetic conditions under which this combination of features is optimally realized; that is, the perception of aspiration on these segments is facilitated by "staggering" it with respect to voicing (Silverman 1997). In this way, the contradictory specifications (aspiration and voicing) are both audible. Thus, PCN verb stems of the shape *(C)V*h*RV are really (C)V$\underset{\circ}{\text{R}}$V (where $\underset{\circ}{\text{R}}$ is a voiceless sonorant) and fall together with the CVCV stems and like them are expected to be Geminating (see 8).

There is some suggestive comparative evidence that this may indeed be the case based on the cognate sets in table 2, which illustrate the correspondence between PCN **hn*, PWN or Western Mono **h* or *h*, and Kawaiisu *hn* intervocalically. The Kawaiisu cognates which correspond to PCN **hn* have preaspirated nasals in all environments. The Western Numic cognates which have **h* precede **i*.

Even if one does not postulate a phonologically voiceless sonorant in these forms, Manaster-Ramer's stress placement rule, which has explained so much about the prediction of Aspirating and Geminating stems in Central Numic, could simply be constrained to treat these medial **hR* clusters in the same manner as simple consonants, allowing stress to shift to the second syllable.

5.2 Stems with final *hV*. Stems of more than two syllables in which the final syllable starts with *h* are also Geminating stems. These stems present a more serious problem for the generalizations observed above since the stem-final stress which triggers Geminating stems should never fall later than the second syllable. The examples in table 3 illustrate these stems. The majority are in very problematic cognate sets with the questionable form limited to Shoshoni and not always reflected in all dialects. Because of the comparative

TABLE 3
FINAL *hV* STEMS

Timbisha	Shoshoni	Comanche	Gloss
**k^{w}aa^{G}*	*k^{w}akku^{G} ~ k^{w}akkuhu^{G} ~ k^{w}akkuhu^{H}*	*k^{w}aku^{P}*	‘win; defeat (in a game)’
	tɨmahai^{G} ~ tɨmahe^{G}	*tɨme^{P}*	‘challenge; gamble’
**tɨpaa*	*tɨpaa^{H} ~ tɨpaha^{G} ~ tɨpaha^{H}*	*tɨβa^{P}*	‘bet’
	mak^{w}ahai^{G}	*mak^{w}ɨye*	‘chase’
-puttuhi	*putuhi^{G}*	*purua ~ -poroo*	‘scatter’
-coko?e^{G}	*sihuhi^{G}*	*- sik^{w}anuu?i^{H}*	‘slide’

problems associated with these Shoshoni stems at the present time, little more can be said about them other than to note their exceptional nature.

6. Conclusion. In this paper, we have provided an account to explain the origins of the Central Numic verb class system. We have shown that the development of voiceless fricatives from geminated voiceless stops in Central Numic follows straightforwardly from the facts of stress placement in pre-Proto-Central-Numic. Evidence for this development is drawn from cognate processes at work in Colorado River Numic.

We have further shown that the choice of a Geminated or Aspirated suffix in Central Numic ultimately depends on the stress placement predicted by Manaster-Ramer’s reconstruction of Proto-Uto-Aztecan syllable-final consonants. In those places where pre-Proto-Central-Numic stress falls on the second syllable, verb stems select Geminated suffixes; otherwise, verb stems select Aspirated suffixes. While a handful of problematic cases remain, the explanatory power of this analysis leads us to a better understanding of the interrelation of Proto-Uto-Aztecan stress and Central Numic verb classes.

APPENDIX A
RECONSTRUCTIBLE PROTO-CENTRAL-NUMIC VERB CLASSES

PCN	Timbisha[30]	Shoshoni[31]	Comanche[32]	Gloss
Geminating Stems				
(C)VCV				
**hapi^{G}*	*hapi^{G}*	*hapi^{G}*	*haβi^{P}*	‘lie down (SS)’
**hima^{G}*	*hima^{G}*	*hima^{G}*	*hima^{P}*	‘take (PO)’
**hipi^{G}*	*hipi^{G}*	*hipi^{G}*	*hiβi^{P}*	‘drink’

[30] A few of the Timbisha forms included here do not have their verb class marked in either McLaughlin (1987) or Dayley (1989*a*; 1989*b*).

[31] Due to the dialectal variation which exists in the verb class of some Shoshoni stems, we have selected the form which is clearly cognate with the forms in the other two Central Numic languages. Much work remains to be done to explain the variation among the Shoshoni dialects.

[32] While in earlier example sets we did not list the Comanche form when it occurred only in Robinson and Armagost (1990) without a verb class indication, here we include it to show the completeness of the cognate sets, even though we cannot use it for reconstructing the verb class.

PCN	Timbisha[30]	Shoshoni[31]	Comanche[32]	Gloss
*hota^{G}	hota^{G}	hota^{G}	hora^{P}	‘dig’
*ika^{G}	ika^{G}		ika^{P}	‘enter (SS)’[33]
*ɨkʷi^{G}	ɨkʷi^{G}	ɨkʷi^{G}	ɨkʷi^{P}	‘smell’
*ɨma^{G}	ɨma^{G}	ɨma^{G}	ɨma^{P}	‘rain’
*katɨ^{G}	katɨ^{G}	katɨ^{G}	karɨ^{P}	‘sit (SS)’
*koʔi^{G}	koʔi^{G}	koi^{G}	kooi^{P}	‘die (PS)’
*kʷapi^{G}	kʷapi^{G}	kʷapi^{G}	kʷaβi^{P}	‘lie down (PS)’
*kʷasɨ^{G}	kʷasɨ^{G}	kʷasɨ^{G}	kʷasɨ^{P}	‘cook; ripen’
*kʷisi^{G}	kʷisi^{G}	kʷisi^{G}	kʷisi^{P}	‘braid’
*kʷɨhɨ^{G}	kʷɨɨ^{G}		kʷɨhɨ^{P}	‘catch’
*maka^{G}	maka^{G}	maka^{G}	maka^{P}	‘feed’
*mɨŋi^{G}	mɨi^{H}	mɨŋki^{G}	mɨni^{P}	‘fail’[34]
*naha^{G}	naa^{G}	naha^{G} ~ naa^{G}	naha^{P}	‘be; to happen; to become’
*nɨmi^{G}	nɨmi ~ nuwi	nɨmi^{G}	nɨmi^{P}	‘move about (SS)’
*nuhi^{G}	nui^{G}	nui^{G}	nohi^{P}	‘play’
*pakʷi^{G}	pakʷi^{G}	pekʷi^{G}	pekʷi^{P}	‘swell’
*pasa^{G}	pasa^{G}	pasa^{G}	pasa^{P}	‘dry’
*pitɨ^{G}	pitɨ^{H}	pitɨ^{H}	pitɨ^{P}	‘arrive’[35]
*puni^{G}	puni^{G}	puni^{G}	puni^{P}	‘see’
*tɨki^{G}	tɨki^{G}	tɨki^{G}	tɨki^{P}	‘put (SO)’
*tusi^{G}	tusi^{G}	tusi^{G}	tusi^{P}	‘spit’
*uta^{G}	utaa^{H}	taʔuta^{H}	ura^{P}	‘find’[36]
*wasɨ^{G}	wasɨ^{G}	wasɨ^{G}	wasɨ^{P}	‘kill (PO)’
*wɨnɨ^{G}	wɨnɨ^{G}	wɨnɨ^{G} ~ wɨnɨ^{H}	wɨnɨ^{H}	‘stand’[37]

[33] While this list focuses on reconstructible forms which occur in all three Central Numic languages, forms which only occur in Comanche and Timbisha, at the extreme ends of the nearly 2,000-mile long Central Numic range, can also be reliably reconstructed.

[34] The development of PCN *η and *η^{w} is somewhat problematic since there is some evidence (as this form illustrates) that the change *η > ηk ~ nn in Common Shoshoni/Comanche was not very tidy. If Common Shoshoni/Comanche had *nn, then the Shoshoni cognate would be *mɨnni^{G}. This form seems to indicate that reflexes of PCN *η were still in a state of flux during the late Common Shoshoni/Comanche period. The Timbisha cognate is in the Aspirating verb class, an unexpected class, but probably due to analogical leveling, since the most common use of this verb is as an auxiliary verb, which are all Aspirating; e.g., *tɨkkammɨɨ^{H}* ‘failed to eat’. The development of PCN *η > $\tilde{w}$ > $\emptyset$ between nonround vowels in Timbisha is also somewhat exceptional, except for the fact that the use of the root as an auxiliary verb places the stem in a position further from the primary word stress (initial syllable) and thus makes it more susceptible to phonological reduction.

[35] This verb is not typical of Central Numic verbs in terms of its usage. While it can be used as a main verb, its usual occurrence is as an auxiliary where its meaning is not exactly ‘arrive’. In all three languages, it marks completion with emphasis on the point of completion (or the point of initiation in Comanche); for example, in Timbisha, *katɨ^{G}* ‘sit (SS)’ with *-pitɨ^{H}* yields *katɨpitɨ^{H}* ‘land’. Since the auxiliary is always Aspirating, the less common main verb version of *pitɨ^{H}* in both Timbisha and Shoshoni has become Aspirating as well. The use of the auxiliary verb *-pitɨ^{H}* appears to be more restricted in Comanche; thus the main verb stem has retained its position in the Geminating verb class.

[36] The unexplained lengthening of the final vowel in Timbisha changes the basic form of the stem to (C)VCVV, thus changing the verb class to Aspirating. The addition of the element *ta-* (of uncertain meaning) in Shoshoni changes the verb class to Aspirating. Comanche retains the original form and verb class.

[37] Like *pitɨ^{G}*, the most common use of *wɨnɨ^{G}* in Central Numic is as an auxiliary, and thus it is a member of the Aspirating class. This class membership has been generalized in Comanche and in some dialects of Shoshoni to the main verb as well.

PCN	Timbisha[30]	Shoshoni[31]	Comanche[32]	Gloss
**wohi^{G}*	*wohi*	*wo?ai^{G}*	*nahwooi^{P}*	'bark'[38]
**yɨcɨ^{G}*	*yɨcɨ^{G}*	*yɨcɨ^{G}*	*yɨcɨ^{P}*	'fly'
**yɨkʷi^{G}*	*yɨkʷi^{G} ~ yukʷi^{G}*	*yɨkʷi^{G}*	*yɨkʷi^{P}*	'say (SS)'
**yɨkʷi^{G}*	*yɨkʷi^{G}*	*yɨkʷi^{G}*	*yɨkʷi^{P}*	'sit (PS)'
**yɨŋʷi^{G}*	*yuŋʷɨ^{H} ~ yuŋu^{H}*	*yɨmɨ^{G} ~ yɨwɨ^{G}*	*yɨwi^{P}*	'swallow'[39]
**yoti^{G}*	*yoti^{G}*	*yoti^{G}*	*yori^{P}*	'fly (PS)'
(C)VC*ai* or (C)*ai*CV as (C)VCV				
**okʷai^{G}*	*okʷai^{G} ~ okʷe^{G}*	*ok(ʷ)ai^{G} ~ ok(ʷ)e^{G}*	*okʷe^{P}*	'flow'
**pahai^{G}*	*pahe^{G}*	*pahai^{G} ~ pahe^{G}*	*pahi^{P}*	'fall'
**paicɨ^{G}*	*pecɨ^{G}*	*paicɨ^{G} ~ pecɨ^{G}*	*pecɨ^{P}*	'take along'
**waiku^{G}*	*weeki^{G}*	*waiku^{G} ~ weku^{G}*	*wekʷi^{P}*	'go in (PS)'
**yakai^{G}*	*yakai^{G} ~ yake^{G}*	*yakai^{G} ~ yake^{G}*	*yake^{P}*	'cry (SS)'
(C)VV				
**cai^{G}*	*cai^{G}*	*cai^{G}*	*caai^{P}*	'grasp'
**kɨa^{G}*	*kɨa^{G}*	*kɨa^{G}*	*kɨa^{P}*	'emerge (PS)'
**noo^{G}*	*noo^{G}*	*noo^{G}*	*noo^{P}*	'carry on the back'
**saa^{G}*	*saawa^{H}*	*saa^{G}*	*saa^{P}*	'boil'[40]
**sii^{G}*	*sii^{G}*	*sii^{G}*	*sii^{P}*	'urinate'
**sua^{G}*	*sua^{G} ~ suwa^{G}*	*sua^{G}*	*sua^{P}*	'think'
**sɨa^{G}*	*sɨa^{G}*	*sɨa^{G}*	*sɨa^{P}*	'grow'
**tua^{G}*	*tua^{H}*	*tua^{G}*	*tua^{P}*	'have a child'[41]
**yaa^{G}*	*yaa^{G}*	*yaa^{G}*	*yaa^{P}*	'carry (SO)'
Aspirating Stems				
(C)VCCV(V)				
**ɨkkoi^{H}*	*ɨkkoi^{H}*	*ɨkkoi^{H}*	*ɨHkooi^{P}*	'sleep (PS)'
**ɨpɨi^{H}*	*ɨpɨi^{H}*	*ɨpɨi^{H}*	*ɨHpɨi^{P}*	'sleep (SS)'
**kottoo^{H}*	*kottoo^{H}*	*kottoo^{H}*	*koHtoo^{P}*	'make a fire'
**kʷɨtti^{H}*	*kutti^{H}*	*kʷɨtti^{H}*	*kʷɨHti^{H}*	'shoot'
**nɨkka^{H}*	*nɨkka^{H}*	*nɨkka^{H}*	*nɨHka^{H}*	'dance'

[38] The Comanche form means 'cry (PS)'. It has *na-* REFLEXIVE prefixed to unattested *woohi^{P}* with predictable metathesis of *w* and *h*. The PCN form is also found in the noun *woo?etɨ*$^{=}$ 'howl' (*-tɨ*$^{=}$ nominalizer) and the verb *woo* 'howl' (unmarked verb class).

[39] The Timbisha Aspirating verb class is not explained. The reconstruction of the initial vowel is confirmed by PSN **yi?ɨki* and PWN **yɨ*$^{=}$*kʷi*. (We have used Charney's Comanche fortition symbol $^{=}$, which represents a PCN nasal that does not surface as such in Comanche, to represent a PN nasal in Western Numic that also does not surface as such. In Comanche $^{=}$ blocks Spirantization; in Mono and the northern dialects of Northern Paiute $^{=}$ geminates a following stop, making it indistinguishable from a PWN geminated stop, while in the southern dialects of Northern Paiute $^{=}$ voices and geminates a following stop.) The Timbisha Aspirating class might be explained if we reconstruct PN **yiŋkʷi*, which became (regularly) PWN **yɨ*$^{=}$*kʷi* and (irregularly) PCN **yiŋʷi*. The pre-PCN verb class would then have been regularly Aspirating but then would have changed to Geminating with the loss of the medial cluster. If this change from pre-PCN ***yiŋkʷi* to **yiŋʷi* occurred in very late PCN times or in Common Shoshoni-Comanche with borrowing into Timbisha, then the Timbisha Aspirating class would be a retention from the early PCN **yiŋkʷi^{H}*, while the Common Shoshoni-Comanche Geminating class would be the innovative form following the (at least partially) productive rules of verb class assignment under discussion here. The Southern Numic cognates, however, lead to some serious problems that sound symbolism and onomatopoeia always add to this particular meaning.

[40] The Timbisha form is complex. The derived noun *saattontsi* 'foam' shows the PCN Geminating stem **saa^{G}*.

[41] It is not clear why the Timbisha form is Aspirating.

PCN	Timbisha[30]	Shoshoni[31]	Comanche[32]	Gloss
*nokko^{H}	nokko^{H}	nokko^{H}	noHko^{H}	‘roast’
*nukki^{H}	nukki^{w}i^{H}	nukki^{H}	nuHki^{H}	‘run (SS)’
*pakka^{H}	pakka^{H}	pekka^{H}	peHka^{H}	‘kill (SO)’
*pikka^{H}	pikka^{H}	pikka^{H}	piHka^{H}	‘make noise’
*t̵ikka^{H}	t̵ikka^{H}	t̵ikka^{H}	t̵iHka^{H}	‘eat’
*uttu^{H}	uttu^{H}	uttu^{H}	uHtu^{H}	‘give (SO)’
(C)VNNV(V)				
*hanni^{H}	hanni^{H}	hanni^{H}	hani^{H}	‘do’
*kamma^{H}	kamma^{H}	kamma^{H}	kama^{H}	‘taste’
*kimma^{H}	kimma^{H}	kimma^{H}	kima^{H}	‘come’
(C)VNCV(V)				
*caŋka^{H}	caŋka^{H}	caŋka^{H}	caka^{H}	‘lead’
*naŋka^{H}	naŋka^{H}	naŋka^{H}	naka^{H}	‘hear’
(C)VVCV				
*koonni^{H}	kooni^{H}	koonni^{H}	kooni	‘go and come back’
*t̵iaka^{H}	t̵iaka^{H}	t̵iaika	t̵iʔeka^{H}	‘paint the face’[42]
(C)VCVV				
*nutaa^{H}	nutaa^{H}	nutaa^{H}	nuraa^{P}	‘run (PS)’
*t̵imi̵i^{H}	t̵imi̵i^{H}	t̵imi̵i^{H}	t̵imi̵i^{P}	‘buy’
*t̵ici̵i^{H}	t̵ici̵i^{H}	t̵ici̵i^{H}	t̵ici̵^{P}	‘count’
*t̵ipoo^{H}	t̵ipoo^{H}	t̵ipoo^{H}	t̵iβoo^{P}	‘to mark’
(C)VC*ai* as (C)VCVV				
*t̵iyai^{H}	tiai^{H} ~ tiyai^{H}	tiai^{H}	t̵iyaai^{P}	‘die (SS)’[43]
*toʔai^{H}	toʔe^{H}	toʔai^{H} ~ toʔi^{H}	toʔi^{H}	‘emerge (SS)’
*yuʔai^{H}	yuwai^{H}	yuai^{H}	yuʔa^{P}	‘be warm’[44]
(C)VVCVV				
*k^{w}aicoi^{H}	koicoi^{H}	k^{w}aicoi^{H} ~ koicoi^{H}	koce^{P}	‘wash’
(C)V(C/N)CV(C/N)CV . . .				
*mat̵iŋka^{H}	mat̵iŋka^{H}	mat̵iŋka^{H}	mar̵ika^{H}	‘finish’
*nat̵imuʔi^{H}	nat̵imui		nar̵imuʔi^{H}	‘tell a story’
*sumpanaʔi^{H}	sumpanai^{H}	sumpanai^{H}	supanaʔi^{H}	‘know (someone)’
*tukani^{H}	tuk^{w}ani^{H} ~ tuk^{w}anni^{H} ~ tuk^{w}awani^{H}	tukani^{H}	tukani^{H}	‘be night’

[42] In this case, the glottal stop in the Comanche form is not reconstructible. It is the result of the reanalysis (through folk etymology) of the Common Shoshoni-Comanche *t̵iaika (with its common alternate form *t̵ieka) as consisting of the prefix t̵i- INDEFINITE OBJECT and the root *eka* ‘red’. Glottal stops are commonly inserted between vowel-final prefixes and vowel-initial stems. Common Shoshoni-Comanche ‘red’, however, was *aiŋka- (or *eŋka-) and it is only the loss of the nasals in nasal-stop clusters in Comanche that has allowed the reanalysis and insertion of the glottal stop.

[43] Note Colorado River *yaʔai*, Northern Paiute *yaʔi*, Mono *t̵iyaʔi*, and the PN *t̵i- DETRANSITIVE. Why Mono and the Central Numic languages have added an apparent object marker on an intransitive verb is unexplained at this time.

[44] The Comanche form reflects a common Central Numic pattern of vowel harmony, in this case changing *ai* to *a* after the *u*. The verb class was assigned in pre-Comanche when all final long vowels and vowel clusters took the Preaspirating class.

PCN	Timbisha[30]	Shoshoni[31]	Comanche[32]	Gloss
*waẗiki^H	waẗiki^H	waẗiki^H	war̈i?i^H	'miss'
*wittuhii^H	wiẗẗihii^H		wi̊Htui^P	'wait for'
CV(*h/n/*ˀ)-(C)V(C)V, Geminating Stem to Aspirating Stem[45]				
*puni^G	puni^G	puni^G	puni^P	'look at'
*na-puni^H	napuni^H	napuni^H	naβuni^P	'appear' (*na- PASSIVE)
*sipai^G (*ai* = V)			siβe^P	'scrape off'
*wi̊ˀ-sipai^H	wi̊sipe^H	wi̊sipi^H		'scrape off' (*wi̊ˀ- 'with something')
*ẗiki^G	ẗiki^G	ẗiki^G	ẗiki^P	'put away (SO)'
*na-ẗiki^H	naẗiki^H	naẗiki^H	nar̈iki^H	'be put away (SO)'
*ma-ẗiki^H	maẗiki^H	maẗiki^H	mar̈iki^H	'put a hand on (SO)' (*ma- 'by hand')
*caˀ-ẗiki^H	catẗiki^H	catẗiki^H	caHẗiki^H	'set down (SO)' (*caˀ- 'by hand')
*yi̊k^{w}i^G	yi̊k^{w}i^G	yi̊k^{w}i^G	yi̊k^{w}i^P	'sit (PS)'
*na-yi̊k^{w}i^H	nayuk^{w}i	nayi̊k^{w}i^H	nayi̊k^{w}i^H	'move around (PS)' (*na- PASSIVE)
*yi̊k^{w}i^G	yi̊k^{w}i^G	yi̊k^{w}i^G	yi̊k^{w}i^P	'say (SS)'
*niˀ-yi̊k^{w}i^H	niyi̊k^{w}i	niik^{w}i^H	niik^{w}i^H	'say' (*niˀ- 'by voice')
*wi̊nẗi^G	wi̊nẗi^G	wi̊nẗi^G	wi̊nẗi^H	'stand (SS)'
*niˀ-wi̊nẗi^H	niŋ^{w}i̊nẗi^G	niwi̊nẗi^H	niwi̊nẗi^H	'say (PS)'
Exceptions				
*cuma^H	cuma^H ~ cuma^G	cua^H ~ cuʔa^H ~ cuma^H	cuʔma^H	'run out of something'[46]
*koʔi^H	koʔi^H	koi^H	koʔi^H	'return (SS)'

[45] Because of the leveling that is going on in the Central Numic languages, so that a given verb root is always either Geminating or Aspirating, the forms given are most of those which show the alternation between prefixed and nonprefixed stems in all three of the modern languages. There are also a few stems included here which show the alternation in Shoshoni and Comanche but do not have the verb class marked in the sources for Timbisha. There are many other reconstructible stems which show the alternation in one or more of the languages but which have been leveled to one verb class in the other(s); the last example illustrates this case, where the Timbisha form shows leveling of verb class.

[46] It is possible that either the alternate Timbisha form *cuma^G* (in the expected Geminating class) or the Comanche form *cuʔma^H* (with an internal cluster which would trigger Aspirating) reflects a more accurate rendering of the PCN form. The latter is unlikely since clusters with *ʔ* (as either element) are extremely rare in Central Numic. The former is possible, but the complete agreement of all three Shoshoni dictionaries on an Aspirating stem makes it much less than certain.

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