

# The Genetic Unity of Southern Uto-Aztecan

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## Abstract

The internal structure of the Uto-Aztecan language family has been debated since the late 19th century, when the historical relationships among all of its major subdivisions were first recognized. Alexis Manaster Ramer's identification in 1992 of a phonological innovation shared by languages belonging to the four northernmost subfamilies led to the acceptance of these languages as a genetic linguistic unit called Northern Uto-Aztecan, but no consensus has emerged regarding the organization into higher-level subgroups of the remaining five subfamilies. In this essay, I argue in support of a perspective, originally developed by Terrence Kaufman, that the languages in these subfamilies also constitute a genetic unit, Southern Uto-Aztecan, based on two shared, sequential innovations: \*-n- > \*-r- and \*-ŋ- > \*-n-. Key to my argument is the reconstruction of a Proto-Uto-Aztecan liquid phoneme with \*\*[-r-] and \*\*[-l-] as its allophones, which clarifies the diachronic relationships among reflexes of \*\*-n-, \*\*-ŋ-, and \*\*-r- in the daughter languages. The model that I propose offers a parsimonious solution to several perennial issues in Uto-Aztecan historical phonology and a possible explanation for the absence of a liquid phoneme in the Numic languages.

## Keywords

Uto-Aztecan; Numic; subgrouping; shared innovation; typology

## 1. Introduction

The Uto-Aztecan language family comprises thirty languages that, at the time of initial European contacts, were spoken from Central America to just north of the Great Basin of western North America (Fig. 1). A number of other languages, now extinct, may also have been Uto-Aztecan, but insufficient documentation exists to determine their affiliation (Sauer, 1934; Lastra de Suárez, 1973: 355–360; Miller, 1983a, b; Campbell, 1997: 133–135; Caballero, 2011).

A conservative classification of the Uto-Aztecan (UA) languages organizes them into nine subfamilies (Table 1). The four northernmost subfamilies—Numic, Hopi, Tubatulabal, and Takic—can be grouped into a single, higher-level branch known as Northern Uto-Aztecan (NUA) on the basis of a shared phonological innovation: the shift, in intervocalic position, of the affricate \*-c- to the

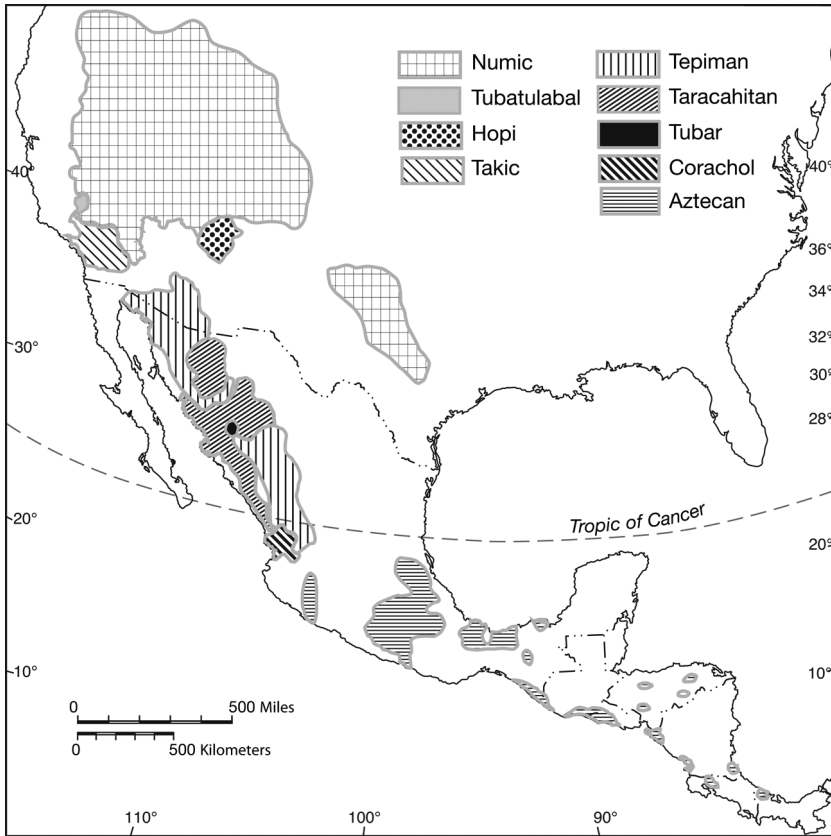


Figure 1. The distribution of the Uto-Aztecan subfamilies at initial European contacts

glide \*-y- (Manaster Ramer, 1992). The languages in the other five subfamilies—Tepiman, Tarachitan, Tubar, Corachol, and Aztecan—are frequently classified together as Southern Uto-Aztecan (SUA) because of phonological and lexical similarities among them (Miller, 1984; Cortina-Borja et al., 2002). To date, however, no shared phonological, morphological, or syntactic innovations have been identified that Uto-Aztecanists agree definitely establish SUA as a genetic unit (Miller, 1983b: 117–118; Campbell, 1997: 136–137; Hill, 2001: 917–919; Stubbs, 2003: 1–7). In the absence of such evidence, the default conclusion is that the ancestral language of each of the SUA subfamilies descended, along with Proto-Northern Uto-Aztecan (PNUA), directly from Proto-Uto-Aztecan (PUA).

**Table 1.** The Uto-Aztecan language family

## NORTHERN UTO-AZTECAN

## Numic

## Western Numic

Northern Paiute

Mono

## Central Numic

Timbisha Shoshone

Shoshone

Comanche

## Southern Numic

Kawaiisu

Colorado River Numic (Southern Paiute, Chemehuevi, Ute)

## Tubatulabal

## Hopi

## Takic

## Cupan

Cahuilla

Cupeño

Luiseño

## Gabrielino-Fernandeño

## Serran

Kitanemuk

Serrano

## SOUTHERN UTO-AZTECAN

## Tepiman

Upper Pima (Tohono O'odham and other variants)

Lower Pima (Néovome, Yepachi Pima, and other variants)

Northern Tepehuan

Southern Tepehuan

## Tarachitan

## Cahitan

Yaqui-Mayo

## Ópatan

Eudeve

Ópata

## Tarahumaran

Rarámuri

Warihó

## Tubar

## Corachol

Cora

Huichol

- Aztecán
  - Pochutec
  - General Aztecán
    - Nahuatl
    - Pipil

In this essay, I offer evidence in support of a perspective advocated by Kaufman (1981: 156–172) and accepted by Miller (1994: 315–316) that the SUA languages derived from a common ancestral language, Proto-Southern Uto-Aztecán (PSUA), the existence of which is indicated by two phonological innovations shared across the SUA subfamilies: 1) the shift in non-initial position of \**n-* to \**r-* (which could also be represented as \**l-*) and 2) the shift in both initial and non-initial position of the velar nasal \**ŋ* to \**n*. The possibility of these shifts is suggested by well-established correspondences between the NUA and SUA languages: 1) *-n-* in the NUA languages regularly corresponds with a liquid phoneme, either *-r-* or *-l-*, in the SUA languages, and 2) /*ŋ*/ in the NUA languages regularly corresponds with /*n*/ in the SUA languages.

The significance of these correspondences for an understanding of the history of the Uto-Aztecán languages varies, depending upon which of these liquid and nasal phonemes are reconstructed for the phonemic inventory of Proto-Uto-Aztecán and the reflexes of these phonemes that are postulated for the NUA and SUA languages. The three principal alternatives that have been proposed previously are summarized in Table 2, along with a fourth alternative I will explore in this essay.

**Table 2.** Alternative reconstructions of \*\**ŋ*, \*\**n-*, and \*\**-r/l-*

	PUA	PNUA	PSUA
Alternative 1	** <i>ŋ</i>	* <i>ŋ</i>	* <i>n</i>
	** <i>-r/l-</i>	* <i>n-</i>	* <i>-r/l-</i>
Alternative 2	** <i>n</i>	* <i>ŋ</i>	* <i>n</i>
	** <i>-r/l-</i>	* <i>n-</i>	* <i>-r/l-</i>
Alternative 3	** <i>ŋ</i>	* <i>ŋ</i>	* <i>n</i>
	** <i>n-</i>	* <i>n-</i>	* <i>-r/l-</i>
Alternative 4	** <i>ŋ</i>	* <i>ŋ</i>	* <i>n</i>
	** <i>n-</i>	* <i>n-</i>	* <i>-r-</i>
	** <i>-r-</i>	* <i>-r-</i>	* <i>-r-</i>

In the first alternative, \*\**ŋ* and \*\**-r/l-* are reconstructed for PUA.<sup>1</sup> PUA \*\**ŋ* is retained in the NUA languages, shifting to *n* in the SUA languages, while

<sup>1</sup> The grapheme ⟨*-r/l-*⟩ is used to indicate that a single phoneme is involved, usually represented in the Uto-Aztecán literature by ⟨*l*⟩ but sometimes by ⟨*r*⟩. In keeping with standard

PUA  $**r/l-$  is retained in the SUA languages, merging in the NUA languages with  $-n-$  derived from PUA  $**n-$  (Sapir, 1915: 315–318; Voegelin et al., 1962: 122–124). In the second alternative,  $**n$  and  $**r/l-$  are reconstructed for PUA and both are retained in the SUA languages, shifting to  $\eta$  and  $-n-$  respectively in the NUA languages (Hill, 2011: 263–264). In the third alternative,  $**\eta$  and  $**n-$  are reconstructed for PUA and both are retained in the NUA languages while in the SUA languages  $**\eta$  shifts to  $n$  and  $**n-$  shifts to  $-r/l-$  (Kaufman, 1981: 156–172; Miller, 1994: 315–316).<sup>2</sup>

Sorting out the historical relationships among  $\eta$ ,  $n$ ,  $r$ , and  $l$  has been a perennial challenge in UA comparative linguistics, and no consensus has emerged regarding which alternative is preferable (Campbell, 1997: 136–137; Dakin, 2001, 2007; Hill, 2001: 919; Hill, 2011: 260; Stubbs, 2011: 20–30). Here I offer a way of moving beyond this impasse by arguing that a liquid phoneme must be reconstructed for Proto-Uto-Aztecan, based on the regular correspondence of medial  $-r-$  and  $-l-$  in all Uto-Aztecan languages except those of the Numic subfamily. As suggested by Whorf (1935), Voegelin et al. (1962: 128), Kaufman (1981), and Stubbs (2011: 26–28), this liquid phoneme is distinct diachronically from the liquid phoneme in the SUA languages that regularly corresponds with  $-n-$  in the NUA languages. I label it PUA  $**r$  to avoid confusion with the PUA  $**l$  proposed in previous studies, but it could equally be labeled  $**l$  because the available evidence indicates that both  $*[-r-]$  and  $*[-l-]$  were its allophones.

By my analysis, PUA  $**r$  was the primary source of  $-r/l-$  in the NUA languages.<sup>3</sup> In the SUA languages,  $-r/l-$  regularly corresponds with both NUA  $-r/l-$  and NUA  $-n-$ . The most parsimonious accounting for the correspondence of NUA  $-n-$  and SUA  $-r/l-$  is that PUA  $**n-$  shifted to PSUA  $*r/l-$ . Because this shift precludes PUA  $**n-$  as the source of PSUA  $*n-$ , the logical source of PSUA  $*n-$  is PUA  $**\eta-$ , given the regular correspondence of SUA  $-n-$  and NUA  $-\eta-$ . These three sets of regular correspondences, presented as Alternative 4 in Table 2, thus require that  $**r$ ,  $**\eta$ ,  $**n$  be reconstructed for the PUA phonemic inventory and that the shifts of PUA  $**n-$  to PSUA  $*r/l-$  and PUA  $**\eta$  to PSUA  $*n$  be

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practice in UA historical linguistics, a double asterisk marks sounds and etyma reconstructed for PUA while a single asterisk marks sounds and etyma reconstructed for the intermediate proto-languages.

<sup>2</sup> Another alternative is possible but I am not aware that anyone has proposed it. The derivations and correspondences are: a) PUA  $**\eta$  > NUA  $*\eta$  :: SUA  $*n$  and b) PUA  $**n-$  > NUA  $*r/l-$  :: SUA  $*n-$ .

<sup>3</sup> Several attestations of intervocalic  $-l-$  in Tubatulabal and the Cupan languages derive from PNUA  $*-t-$ , with Tubatulabal and Cupan  $-l-$  regularly corresponding to  $-t-$  in SUA cognates. In addition, a shift of  $/w/$  to  $/l/$  occurred in some Hopi words in the environment of the low vowels  $/a/$  and  $/\ddot{o}/$  (Voegelin et al., 1962: 53). Where SUA cognates are attested for these words, the regular correspondence in most languages is  $-w-$ .

identified as two phonological innovations shared by the SUA languages.<sup>4</sup> These shared innovations in turn establish the genetic unity of the SUA languages and Proto-Southern Uto-Aztecan as the daughter language of Proto-Uto-Aztecan, coordinate with Proto-Northern Uto-Aztecan.

In the next section, I summarize the evidence supporting the reconstruction of PUA **\*\*r**. I then present, in Sections 3 and 4, cognate sets that document the correspondences of NUA *-n-* :: SUA *-r/l-* and NUA *ŋ* :: SUA *n*. In Section 5, I review the principal counter-evidence to my perspective: six cases in which *-n-* in some NUA languages appears to correspond with *-n-* in some SUA languages. I conclude the essay with a consideration of the implications of my analysis for an understanding of the early diversification of the Uto-Aztecan language family.

## 2. Proto-Uto-Aztecan **\*\*r**

All Uto-Aztecan languages except those of the Numic subfamily have a liquid phoneme, either a rhotic /r/, a lateral /l/, or both.<sup>5</sup>

**Table 3.** The distribution of /-r-/ and /-l-/ in the Uto-Aztecan subfamilies

Subfamily	/-r-/ and /-l-/	/-r-/ only	/-l-/ only
Numic	—	—	—
Tubatulabal	—	—	Tb
Hopi	Hp	—	—
Takic	Ls	Kt	Ca, Cp
Tepiman	UP, LP, NT, ST	—	—
Tarachitan	My, Yq	Ed	Wr, Rr
Tubar	—	Tbr	—
Corachol	—	Cr, Hc	—
Aztecan	—	—	Po, Na-Cl, Pp

<sup>4</sup> Kaufman (1981: 156–172) also reconstructed PUA **\*\*r**, **\*\*ŋ**, **\*\*n**, but he did not link the two SUA innovations modeled in the third alternative to the reconstruction of PUA **\*\*r**, which in my scenario is key. Another difference is that I reconstruct **\*\*[-r/l-]** as an allophone of **\*\*/r/**, while Kaufman (1981: 162–163, 166–167) reconstructed **\*\*[-r/l-]** as the medial allophone of **\*\*/n/**, which had **\*\*[n-]** as its allophone in initial position. At the same time, he entertained the possibility that PUA **\*\*[-n-]** rather than **\*\*[-r/l-]** was the medial allophone of PUA **\*\*/n/** and that PUA **\*\*[-n-]** shifted to SUA **\*\*[-r/l-]**, a view that corresponds to mine. However, he offered no suggestions for determining whether **\*\*[-n-]** or **\*\*[-l-]** was the more likely reconstruction, simply observing that both were plausible (1981: 166). In my model, only **\*\*n- > PSUA **\*\*[-r/l-]**** is possible.

<sup>5</sup> In the Numic languages, [r] is an allophone of the phoneme /r/. Realized in most cases as a tap or flap, it is the result of the lenition of [r] in intervocalic contexts (Armagost and McLaughlin, 1992, 1993).

As seen in Table 3, the distribution of /r/ and // crosscuts subfamily boundaries, and the Takic and Taracahitan languages vary among themselves in which of these phonemes are represented in their phonemic inventories. Three categories emerge:

- Languages with both /r/ and //. NUA: Hopi, Luiseño. SUA: Tepiman, Mayo, Yaqui
- Languages with /r/ only. NUA: Kitanemuk. SUA: Eudeve, Tubar, Cora, Huichol
- Languages with // only. NUA: Tubatulabal, Cahuilla, Cupeño. SUA: Warihó, Rarámuri (18th century), Aztecan

A single liquid phoneme with rhotic and lateral allophones is reported for Warihó and Tubar<sup>6</sup> (Miller, 1996: 36–38; Lionnet, 1978: 18–19) and can be reconstructed for eighteenth-century Rarámuri based on data collected between 1761 and 1767 by the Jesuit missionary Matthäus Steffel (Steffel, 1809).<sup>7</sup> A comparable relationship likely existed in Proto-Tepiman. Bascom (1965: 7) reconstructs P<sup>T</sup>Tep \*/r/, with the allophone \*[l] occurring before \*/i/ and the allophone \*[r] in other contexts. These allophones were phonemicized in the Tepiman languages as // and /r/, with /r/ replaced in Upper Piman by the voiced retroflexed alveolar stop /ɖ/.

The phonemicization of \*[r] and \*[l] may also have taken place in Hopi, Luiseño, Mayo, and Yaqui, the only other UA languages with both /r/ and // phonemes. In Hopi, /r/ and // display near-complementary distribution in some contexts; in initial position, for example, /r/ occurs before /i/ and /i/ while // does not. In Luiseño, // has a broader distribution than /r/. Luiseño // is attested before and after all five Luiseño vowels and occurs in initial, medial, and final positions. In contrast, /r/ does not appear in final position at all nor in word-initial position before /u/; intervocalically in root morphemes, /r/ is attested almost exclusively following /a, o, u/. In Mayo and Yaqui, the two phonemes

<sup>6</sup> In Warihó, the allophone [r], realized as a flap, is in complementary distribution with [l] in intervocalic, pretonic position: [r] occurs before /e, i, u/ and [l] before /a, o/ (Miller, 1996: 38).

Tubar /r/ is reported to have had three allophones: [r], [l], and [ɖ]. Their distribution and the sound value of [ɖ] cannot be precisely determined because Tubar is no longer spoken. C.V. Hartman, who compiled the only detailed record of the language, described [ɖ] as a “thick l nearly as r” (Lionnet, 1978: 14, 18–19).

<sup>7</sup> The derivation of rhotic and lateral segments in modern Rarámuri remains to be clarified (Burgess, 1970: 47–49, 1984: 7–8; Lionnet, 1972: 12–13; Caballero, 2008: 26, 42–44). Some reworking of the relationships among \*[-r-], \*[-l-], and \*[-t-] is suggested, as apparently occurred in Warihó (Miller, 1996: 36–38).

precede and follow all vowels, but they also alternate with one another in a number of words (e.g., My *čóoli* ~ *čóóri* ‘wrinkled,’ Yq *tú?ule* ~ *tú?ure* ‘to like’).<sup>8</sup> In addition, /l/ occurs in geminates and in syllable- and word-final position while /r/ does not.

### 2.1. PUA *\*\*r* in Medial Position

The reconstruction of a PUA liquid phoneme in medial position is supported by ten cognate sets that document the regular correspondence of *-r/l-* in both NUA and SUA languages. Six verbal etyma are represented in the sets, along with four nominal etyma that are all associated with birds. The possibility that the nominal etyma are not cognates but rather independent innovations that simply imitate the birds’ characteristic sounds is considered in Section 2.3 and in Appendix 2: BIRD.

Five of the ten sets are presented in this section. The other five sets, included in Appendix 2 under BIRD, LOOK FOR, RATTLE, SHAKE, and SWALLOW, include fewer cognates but they display the expected NUA-SUA correspondences in *-r/l-* and other sound segments. The cognates in each set are organized by subfamily. The abbreviations used for the Northern Uto-Aztecan subfamilies are NUM (Numic), TUB (Tubatulabal), HOP (Hopi), and TAK (Takic), and for the Southern Uto-Aztecan subfamilies, TEP (Tepiman), TRC (Taracahitan), TBR (Tubar), CRC (Corachol), and AZT (Aztecan). The abbreviations for specific languages and the source or sources of the data for each are found in Appendix 1.<sup>9</sup> Glosses are included only when they differ from those assigned to the reconstructed etyma. The “S-” followed by a number that appears in parentheses after each reconstructed PUA etymon indicates the number of the relevant set or sets in Stubbs (2011) (see Appendix 2). These reconstructions should be regarded as approximations. Many regular phonological correspondences among

<sup>8</sup> For Arizona Yaqui, Molina et al. (1999: 284) report an expressive application of the */-r-/* ~ */-l-/* alternation, in which */-l-/* conveys a sense of affection while */-r-/* has derogatory connotations. In Huichol, */r/* is replaced by lateral and alveolar flap allophones in songs, baby talk, and “any context involving diminution, endearment, or cuteness” (Grimes, 1955: 31). In contrast to Arizona Yaqui, this stylistic alternation also involves the palatalization of three other alveolar phonemes */t/*, */c/* and */n/*, as well as multiple shifts of the voiced retroflex sibilant */z/*: to the voiceless retroflex sibilant [ʂ], the voiced and voiceless alveolar sibilants [z] and [s], and the dental fricative [θ].

<sup>9</sup> The subfamily abbreviations but not the specific language abbreviations are used for the Tubatulabal, Hopi, and Tubar words, because these languages are the only documented members of their subfamilies. Citations of the principal published compilations of Uto-Aztecan cognate sets are given in Appendix 2, where I explain the criteria I have used to identify cognates and my orthographic conventions.



the UA languages remain unidentified, especially in the second syllables of disyllabic morphemes. In addition, the reconstruction of several basic features of PUA phonology, like stress and vowel length, remain problematical.

The first three sets have cognates in at least two NUA subfamilies and two SUA subfamilies.

- (1) ‘to bend, curve, turn, return.’ PUA \*\**ɲora* (S-455). TUB: *noʔlat* ~ *ʔono:l* ‘to go home.’ HOP: *ɲölöla* ‘to bend, to crook’; *ɲöla* ‘hoop, ring (n).’ TAK: Ls *ɲé:la* ‘to be turned, be curved.’ TEP: To *noɬ* ‘to turn, bend, return.’ PYp *nor* ~ *norgia* ‘to turn’; *norag* ‘to return.’ NT *norági-* ‘to go back.’ ST *nórgi-* ‘to go back.’ TRC: Ed *norón* ‘to go back, come back.’ Wr *noʔláni* ~ *noʔáni* ‘to go someplace and return.’ Rr *norína* ‘to come back.’ AZT: Na-Cl(M) *noloa* ‘to bend (vt)’; *noliwi* ‘to become bent.’
- (2) ‘to open.’ PUA \*\**pírV*<sup>10</sup> (S-1578). TUB: *pele:winat* ~ *?epele:win*. HOP: *píríkna* ‘to unfold, open up, unwrap.’ TAK: Ca *péla:n* ‘to spread open.’ Cp *péle* ‘to spread apart.’ TRC: Ed *périna* ‘to open the hand or a book.’ AZT: Pp *pe:lua*.
- (3) ‘owl.’ PUA \*\**tukori* (S-1591). TUB: *tukluluh* ‘screech owl.’ HOP: *tokori* ‘flamulated owl.’ TEP: To(M) *cukud* ‘screech owl, western horned owl.’ Nv *tukuu*. PYp *tukor*. NT *tukúrai*. ST *tukú:r*. TRC: Rr *tutúguri* ‘great horned owl.’ CRC: Cr(P) *tukurú*. AZT: Na-Cl *tekolo:tl*. Pp *tekulu:t*. Po *tekolot*.

Terms for ‘owl’ that are clearly related to PUA \*\**tukori* are found in non-UA languages spoken in California and across Mesoamerica (Gursky, 1967; Hunn, 1975; Campbell, 1988: 343, #38; Kaufman and Justeson, 2003: 610–611). The ultimate origin of this etymon is unknown, but its presence in the PUA lexicon is assumed because cognates in both NUA and SUA languages show the expected sound changes that occurred after the breakup of the ancestral PUA speech community, for example \*\**u* > Hp /o/ and \*\**t* > To /ç/.<sup>11</sup>

Set (4) includes cognates from three SUA subfamilies but only one definite NUA cognate, from Kitanemuk.

- (4) ‘turkey vulture.’ PUA \*\**wiruku* (S-343). TAK: Kt *wirukubt*. TrC: Yq *witru*. My *witru*. Rr *wirú*. TBR: *wilú*. CRC: Hc *wirikí*.

<sup>10</sup> The “V-” indicates that the final vowel of this syllable, as well as the following segments of the PUA etymon, cannot be reconstructed.

<sup>11</sup> The expected Cora reflex of \*\**tukori* is *tikuri*. The attested *tukurú* could be the result of vowel harmonization or influence from Southern Tephuan. PUA \*\**u* usually is reflected in General Aztec as /i/ and in Pocatec as /o/, but other exceptions exist (Campbell and Langacker, 1978: 198–199).

The Kitanemuk and Huichol cognates provide one of the more compelling examples of the correspondence of medial /r/ in NUA and SUA languages. These terms show the expected sound correspondences for six segments, given that /i/ is the Huichol reflex of \*\*u. Possible cognates from the other three NUA subfamilies and Aztecan are presented in Appendix 2: TURKEY VULTURE.

Set (5), also associated with a kind of bird, includes clear cognates in Hopi and the Taracahitan subfamily, with possible cognates in some Numic languages:

- (5) ‘a kind of hawk.’ PUA \*\*kiri (S-743). NUM: NP *kini?i* ‘marsh hawk.’ TSh *kinni?* ‘falcon.’ WSh-D *kini?* ‘hawk, falcon.’ WSh-G *kiniib* ‘chicken hawk.’ HOP: *k'e:le* ‘sparrow hawk.’ TRC: My *keré?ere* ‘a raptor (possibly a species of *Caracara*).’ Op *keere* ‘kind of hawk.’ Wɪ *kereci* ‘small hawk.’ Rr *kiriči* ‘small hawk.’

Some of the vowels attested (5) are not regular correspondences: Numic /i/ reflects PUA \*\*i, Mayo and Opata /e/ reflects PUA \*\*i, Rarámuri /i/ reflects both \*\*i and \*\*i, and Hopi /e/ reflects all PUA vowels. The Hopi and Taracahitan cognates indicate a reconstruction of PUA \*\*kiri while the Numic terms support \*\*kiri. I reconstruct the PUA etymon as \*\*kiri but \*\*kiri also is possible, with vowel harmonization in opposite directions producing these alternate antecedent forms.

The discrepancy in vowels challenges the validity of this set, but the correspondence of Numic -n- and -r/-l- in other UA languages is documented in (6), (7), and (8), where the vowels correspond as expected. Together these three sets include cognates from all three Numic subdivisions and the other three NUA subfamilies. Set (6) also includes a cognate from the SUA language Warihó.

- (6) ‘concavity.’ PUA \*\*koro. NUM: WSh-D *kono?ih* ‘to be hollow.’ WSh-G *konoih* ‘to be hollow.’ HOP: *qölö* ‘hole (in ground).’ TRC: Wɪ *koláci* ‘bowl-like hollow in a rock wall.’
- (7) ‘to enter.’ PNUA \*curu (S-1244). NUM: NP *cunua*. Kw *cununuki-*. TAK: Cp *čulupe-yaxe* ‘to go in.’ Ls *čulúpa* ‘to go inside.’ Kt *curupik*.
- (8) ‘to bend.’ PNUA \*pora (S-432). NUM: SP *poni* ~ *ponaa-* ‘to bend over.’ Kw *noponi* ‘to be bent over.’ TUB: *polo?mat* ~ *poloom* ‘to bend (vi).’

## 2.2. PUA \*\*r in Initial Position

Only Whorf and Trager (1937) and Voegelin et al. (1962) have proposed that a liquid phoneme occurred in PUA in word-initial position and also presented evidence to support their view, in each case a single cognate set. Whorf and Trager (1937: 621, #28) reconstructed PUA \*\*lawa ~ \*\*lěw ‘speak, say,’ but the only

term showing initial *l*- in the accompanying cognate set is the Hopi noun *lavayi* ‘speech, talk.’ Voegelin et al. (1962: 141, #94) proposed **\*\*liŋi** as the PUA term for ‘tongue’ but, as indicated in (27) below, this etymon should be reconstructed as **\*\*niŋi**.

Although a few words with initial *r*- or *l*- are found in the lexica of all of the Uto-Aztecan languages that have these phonemes, they tend to be encountered in single languages or in closely related languages within the same subfamilies and thus can be interpreted as innovations. When cognates exist in separate subfamilies, they indicate that the *r*- or *l*- likely derived from other consonants, usually *t*- but sometimes *y*- or *n*-, or has shifted from medial to initial position through metathesis or the loss of a preceding syllable. In fact, the only evidence that word-initial *r*- or *l*- should be reconstructed for PUA is three sets with cognates from the Cupan languages of the Takic subfamily and Yaqui and Mayo of the Taracahitan subfamily. Set (9) has cognates in all three Cupan languages and Yaqui, but not Mayo. Set (10) has cognates from Luiseño and Mayo and possibly Cahuilla, but not Yaqui or Cupeño. Set (11) has only Luiseño and Mayo cognates.

- (9) ‘bumpy’ (S-1405). TAK: Ca *lúmu* ‘to have small pox, chicken pox, measles.’ Cp *lúmi?il* ‘measles.’ Ls *lamúlama* ‘to have bumps, have sprouts.’ TRC: Yq *rumui* ‘bumpy.’ Yq-Az *rumui* ‘uneven.’
- (10) ‘collapse.’ TAK: Ca *lúmaš* [expected: *lémaš*] ‘to knock down, crumple (as a house).’ Ls *lóma* [< \*lím-] ‘to collapse (vi).’ TRC: My *rémték* [< \*rím-] ‘to collapse (vi).’
- (11) ‘to be soft, tender (adj).’ TAK: Ls *lé:pa* [< \*ló:p-] ‘to be soft.’ TRC: My *loóbo* ‘tender (adj).’

The Luiseño and Mayo cognates in (10) and (11) are particularly intriguing because the correspondences conform precisely to the expected, including even vowel length in (11). Moreover, the cognates involved cannot be interpreted as recent loans because the first vowels reflect the shifts that occurred from PUA **\*\*o** to Ls /e/ and from PUA **\*\*i** to Ls /o/ and My /e/. The timing of these innovations is unknown, but in the case of Luiseño, they would have taken place after its separation from Cahuilla and Cupeño. Although shifts in PUA **\*\*o** and **\*\*i** also occurred Cahuilla and Cupeño, the outcomes were different from those in Luiseño: **\*\*o** shifted to /i/ in both Cahuilla and Cupeño while **\*\*i** shifted to /e/ in Cahuilla and /ə/ in Cupeño (represented as ⟨e⟩ in Hill and Nolasquez, 1973). The shift of **\*\*i** to Mayo /e/ also is likely to have occurred relatively early in the history of the SUA languages because it is an innovation shared by all SUA languages except those of the Tepiman subfamily (Hill, 2011: 254–255).

The PUA forms \*\*ramu, \*\*rīm-, \*\*roop- could be reconstructed on the basis of these three sets, which in turn would support the reconstruction of PUA initial \*\*r-. While this possibility cannot be discounted entirely, it seems unlikely given the absence of cognates for any of these sets in other UA subfamilies, as well as additional sets with cognates from both NUA and SUA subfamilies that show an initial liquid. An alternative explanation is that these cognates derive from interaction between pre-Cupan and pre-Yaqui-Mayo speakers that took place before the shifts in the vowels occurred.

### 2.3. Discussion

Even if the four cognate sets associated with birds are excluded, the postulation of \*\*r as a PUA phoneme is possible based on the regular correspondence of medial -r/-l- in the NUA and SUA cognates in the other six sets. In contrast, the limited distribution of cognates in the few sets that document the correspondence of initial r- or l- indicate that this phoneme can be reconstructed with confidence only in non-initial position, suggesting that it was defective (Langacker, 1976: 160–161).

The onomatopoeic origin of the avian terms in (3), (4), and (5) is a possibility, but except as noted for (5), they display the sound correspondences that are expected for reflexes of PUA etyma and should be regarded as cognates.<sup>12</sup> The regular correspondences and broad distribution of several of these cognates within the UA language family may indicate that members of the PUA speech community relied on onomatopoeia to create names for birds and that portions of the ancestral PUA ornithological lexicon descended into the lexica of the daughter languages. Alternative explanations are less feasible, for example, that names for birds diffused more widely than nouns in other semantic classes or that the labels were independent innovations in different UA subfamilies, created in each case prior to sound changes that distinguish the subfamilies from one another.

The conclusion that PUA \*\*/r/ had \*\*[r] and \*\*[l] as its allophones is warranted, based on three considerations: a) /r/ and /l/ regularly correspond in both the NUA and SUA languages; b) [r] and [l] are allophones of /r/ or /l/ in the Taracahitan and Tubar subfamilies and probably in proto-Tepiman as well, and c) allophonic-like relationships between /r/ and /l/ are attested in Hopi, Luiseño, Mayo, and Yaqui. Additional support for this interpretation is found in

<sup>12</sup> The Western Mono suffix *-na?* ‘it says X’ is attached to onomatopoeic stems to create names for birds and other animate beings (Bethel et al., 1993: 102; see Appendix 2: BIRD).

the absence of a fixed correspondence between *-r-* and *-l-* in Hopi and Luiseño cognates. Four pairs of cognates illustrate this point:

- (12) Hp *-l-* = Ls *-l-*. Hp *ȳöla* [*< \*ȳöla*] ‘hoop, ring (n).’ Ls *ȳé:la* [*< \*ȳö:la*] ‘to be turned, be curved’
- (13) Hp *-r-* = Ls *-r-*. Hp *mĩri(k)* ‘to curl around, twist around (vi).’ Ls *móra* [*< \*mĩra*] ‘to be curled, be rolled’
- (14) Hp *-l-* = Ls *-r-*. Hp *qalalata* ‘to be clanking, clinking, ringing.’ Ls(B) *kára* ‘to croak, belch, ring’
- (15) Hp *-r-* = Ls *-l-*. Hp *ȳĩri* ‘to gnaw (re rodents).’ Ls *ȳó:la* [*< \*ȳĩ:la*] ‘to gnaw’

Medial *-n-* can be proposed as the Numic reflex of PUA *\*\*r-* because *-n-* in words from all three Numic subdivisions corresponds with *-r/l-* in other UA languages. Although limited, this evidence suggests that PNUA *\*r-* shifted in Proto-Numic (PNum) to *\*n-*, merging with a pre-existing PNum *\*n-* derived from PNUA *\*n-*. Postulating this sound change accounts for the anomalous absence of a liquid phoneme in the Numic languages and, if it in fact occurred, represents a phonological innovation shared by the Numic languages that has not been previously identified (Hill, 2011: 265–267).

### 3. The Correspondence of NUA *-n-* and SUA *-r/l-*

Recognition of the regular correspondence of *-n-* in the NUA languages with *-r/l-* in the SUA languages dates to Sapir’s pioneering studies in Uto-Aztec comparative linguistics of the early twentieth century, and this correspondence is generally accepted among Uto-Aztecans today (Sapir, 1915: 316–317; Shaul, 1985; Dakin, 2001, 2007; Stubbs, 2011: 26). Twelve cognate sets clearly document this correspondence. Five sets are presented here, all of which have cognates from at least two NUA subfamilies and two SUA subfamilies. The other seven sets appear in Appendix 2 under CHILD, FOOT, GENTLE, NECKLACE, PITCH, POUR, and SMALL.<sup>13</sup>

#### 3.1. Cognate Sets

Between (16) and (17), the regular correspondence of NUA *-n-* and SUA *-r/l-* is demonstrated for all nine UA subfamilies.

<sup>13</sup> Langacker (1977: 146; cf. Dakin, 2001: 328–333) suggests that the correspondence of NUA */n/* and SUA */l/* in suffixes may be found in the NUA causative suffix *\*-ni* and the initial element of the SUA applicative suffix *\*-li-ya*.

- (16) ‘to stand.’ PUA \*\*wini (S-2158). NUM: NP *wini*. WMn *wini*. TSh *wini*. WSh-D *wini*. WSh-G *wini*. Cm *wini*. Kw *wini*. SP *wini*. SUt *winiwi*. TUB: *winiṭ* ~ *?iwin* ‘to be located, to exist.’ *i:winiṭ* ~ *i:?:win* and *?i:win* ‘to stand up.’ HOP: *winiṭ*. TAK: Ca *wéwen*. Ls *wón* ‘to be at a place.’ TRC: Yq *weyek*. My *wéiyek*. Ed *vehren*. Wf *werí*. Rr *wiri*. TBR: *weré* ‘to be, to be standing.’
- (17) ‘to know, recognize, remember, think.’<sup>14</sup> PUA \*\*i?na (S-2284). HOP: *i?na*. TAK: Ca *e?nan*. Ls *ó?na*. Kt *in*. TEP: To *ilið*. NT *ilidi*. ST *il’iid’*. TRC: Yq *ea*. My *eiya*. Ed *erám*. Wf *e?láni*. CRC: Hc *erie*. AZT: Na-Cl *ilna:miki*. Pp *elna:miki*.

These two sets illustrate the loss of intervocalic *-r/l-* in both Yaqui and Mayo, which occurs more frequently in Yaqui than in Mayo (Dedrick and Casad, 1999: 30; Dakin, 2001: 328–331; Stubbs, 2011: 29). In some cases, *-y-* is inserted to eliminate the resulting vowel cluster, as seen in the Yaqui and Mayo cognates in (16), *weyek* and *wéiyek* respectively, and the Mayo cognate in (17), *eiya*. The loss of the intervocalic liquid without *y*-insertion is documented in the Yaqui cognate in (17), *ea*, and in the Yaqui and Mayo reflexes of PUA \*\*konaka ‘necklace’ (Appendix 2: NECKLACE).

The retention of *-r/l-* in Yaqui and Mayo is seen in (18) to (20). Combined, these three sets include cognates from all nine UA subfamilies. Set (18) shows the expected shift of \*\*s to /h/ in Kitanemuk and the Tepiman languages, with the *h-* lost in the Northern Tepehuan cognate. Set (19) includes examples of the loss of initial \*\*h- in cognates in Southern Paiute, Southern Ute, Tubatulabal, and Corachol and the shift of \*\*/u/ to /i/ in the Southern Paiute and Corachol cognates. Both phonological changes are regular developments in Huichol and also are encountered in some reflexes of PUA etyma attested in many other UA languages.

- (18) ‘heart.’ PUA \*\*suna (S-1165). TUB: *su:nal*. HOP: *so:na* ‘kernel, edible part of any seed.’ TAK: Ca *súnil*. Cp *šúun*. Ls *šúnla*. Kt *hunac* ‘heart, spirit, middle.’ TEP: Nv *huradi*. NT *ura*. ST *húr*. TRC: My *suúla*. Ed *surát* ‘kernel, seed.’ Wf *sulá*. Rr *surá*. TBR: *suranyi* ‘with the heart.’
- (19) ‘badger.’ PUA \*\*hu?na (S-107). NUM: NP *hunana*. TSh *hunan* ~ *hunaci*. WSh-G *hunan*. Cm *huuna?* ‘groundhog, woodchuck.’ Kw *hunaci*. SP *inámpici*. Ch *huna*. SUt *unáppüci*. TUB: *u:nal* ‘black bear.’ HOP: *honani*. Hp *ho:naw* ‘bear.’ TAK: Ca *húnal*. Cp *húnwet* ‘bear.’ Cp *húnal*. Ca *hún-*

<sup>14</sup> The glosses associated with each of these cognates are presented in Appendix 2 under THINK.

*wet* ‘bear.’ Ls *hú:nal*. Kt *hunavít*. Kt *hunawít* ‘grizzly bear.’ TRC: Yq *huíri*. My *huíri*. Ed *húrve* ‘wolf.’ Wɪ *u?lá* ‘skunk.’ CRC: Cr *üra?abe* ‘wolf.’ Hc *irve* ‘wolf.’

Set (19) offers interesting examples of the semantic shifts that have occurred in many PUA etyma that label biological taxa. The cognates indicate that \*\*hu?na originally designated ‘badger’ but came to label ‘black bear’ in Tubatulabal and ‘skunk’ in Warihó.<sup>15</sup> A term for ‘bear’ in Hopi, Cahuilla, Cupeño, and Kitane-muk was derived from \*hu?na by the addition of the PUA augmentative suffix \*\*-wĩ, reflexes of which constitute the final syllables of the Eudeve, Cora, and Huichol labels for ‘wolf’:

- (20) ‘house.’ PUA \*\*kahani (S-1213). NUM: TSh *kabni*. WSh-D *kabni*. WSh-G *kabni*. Cm *kabni*. Kw *kabni*. SP *kanní*. Ch *kaní*. SUt *káni*. TUB: *hani:l*. HOP: *qeni* ‘place, room, space.’ TRC: Yq *kári*. My *kaari*. Wɪ *kari*. Rr *kari*. TBR: *katín* ‘village.’ AZT: Na-Cl *kalli*. Pp *kal*.

The reconstruction of \*\*kahani is indicated by the stress on the first vowel of the identical vowel sequence in the Mayo cognate and the *-hm-* cluster in the Central Numic languages and Southern Numic Kawaiisu. Tubatulabal *h-* and Hopi *q-* are the regular reflexes of PUA \*\*k- in this environment. Hopi /e/ is encountered as a reflex of all PUA vowels.

### 3.2. Initial \*\*n-

In contrast to the postulated PUA \*\*r, PUA \*\*n- definitely can be reconstructed in word-initial position. Sets (21) to (23) support the reconstruction of \*\*n- preceding \*\*a and \*\*i and probably \*\*o, but I have been unable to identify cognates from both the NUA and SUA languages that indicate that PUA \*\*n- also occurred before \*\*i and \*\*u.

- (21) ‘ear.’ PUA \*\*naka (S-752). NUM: NP *naka-*. WMn *náqa*. WSh-G *nainkih*. Cm *naki*. TSh *naŋki*. Kw *nagavivi*. SP *nanka-*. TUB: *naŋhal*. HOP:

<sup>15</sup> Jane Hill discovered that C. Hart Merriam collected a Tubatulabal term for ‘badger,’ which is found in his unpublished “Natural History Word Lists” preserved at the Bancroft Library, University of California, Berkeley (BNEG 1556:60, frame 483; available online at [http://archive.org/details/bancroft\\_chartmerriam\\_1556\\_60](http://archive.org/details/bancroft_chartmerriam_1556_60); accessed February 9, 2013). Merriam recorded the alternate forms “Ben'-ně | Pen'-ně.” Whether this term is a Tubatulabal innovation or a loan from a non-UA language is unknown (Jane Hill, personal communication, 2011).

*naqvī*. TAK: Ca *náqal*. Cp *-naqʔa*. Ls *-naq*. TEP: To *naak*. Nv *naka*. PYp *naaka*. NT *naáka*. ST *náak*. TRC: Yq *nákam*. My *nákkam*. Wt *nabká*. Rr *naká*. TBR: *nakár*. CRC: Cr *nasath*. Hc *naaká*. AZT: Na-Cl *nakastli*. Pp *-nakas*.

- (22) ‘liver.’ PUA \*\**níma* (S-1366). NUM: NP *nīmī*. WMn *niwī*. WSh-G *niwīn*. Cm *nīmī*. TSh *nīmī*. Kw *niwībi* ~ *niwīmbi*. SP *niḡwīmpi*. TUB: *nīimal*. HOP: *nīima*. TAK: Ca *-némʔa*. Cp *-nema*. Ls *-nó:ma*. Kt *nīmac*. TEP: To *nīm*. Nv *numadi*. PYp *nīmar*. NT *-níma* ~ *nīmádi*. ST *-lumáad*. TRC: Yq *heéman*. My *heémam*. Ed *hemát*. Wt *emá*. Rr *emará* ~ *imará*. TBR: *yamát*. CRC: Cr *neemwa*. Hc *néma*.
- (23) ‘egg.’ PUA \*\**no-* (S-804). NUM: NP *nobo-*. WMn *nóyo*. WSh-G *noyo*. Cm *nooyo*. TSh *noyopin*. Kw *nopavi* ~ *nopovi*. Ch *nopávi*. SUt *napáavi*. HOP: *nóhī*. TEP: To *nonha*. Nv *nono*. NT *-nóno*. ST *nanóoo*.

The loss or replacement of initial *n-* in some of the SUA languages in (22) is unexplained. However, their retention of initial *n-* before \*\**i* is seen in their reflexes of \*\**nīni* ‘tongue’ (27), with the exception of Warihó, where *y-* appears instead of *n-*. The SUA languages are represented in (23) only by Tepiman cognates, but the regular correspondences indicate that it is a valid set.

### 3.3. Discussion

The evidence presented in this section and in Section 2 above demonstrates that *-r/-l-* is the regular SUA correspondence of both NUA *-n-* and *-r/-l-*. This pattern suggests that PUA medial \*\**-n-* descended into PSUA as \**-n-* and then, before the breakup of the PSUA speech community, merged with a pre-existing PSUA \**-r-* that derived from PUA \*\**-r-* and retained its allophones of \*\**[-r-]* and \*\**[-l-]*. During the subsequent diversification of the SUA languages, three distinct secondary developments occurred:

- *[-r-]* and *[-l-]* remained as allophones in Warihó, Rarámuri, and Tubar;
- *[-r-]* and *[-l-]* merged under /*r/* in Eudeve and under /*l/* in the Aztecan languages; and
- *[-r-]* and *[-l-]* were phonemicized in Yaqui, Mayo, and the Tepiman languages.

According to my analysis, the shift of PSUA \**-n-* to \**-r-* set the stage for a second SUA phonological innovation, the shift of PUA \*\**-ŋ-* to PSUA \**-n-*, as part of a pull-chain process of phonological change. The evidence for this innovation is considered in the next section.



#### 4. The Correspondence of NUA /ŋ/ and SUA /n/

The Northern Uto-Aztecan languages are among the very few Indigenous languages of North America that include the velar nasal /ŋ/ in their phonemic inventories (Anderson, 2011; Whistler and Golla, 1986). In Hopi and the Takic languages, /ŋ/ is encountered in both initial and medial positions, while in Tubatulabal and the Numic languages, it is attested only medially. Phonemic /ŋ/ is entirely absent in the Southern Uto-Aztecan languages, but several cognate sets indicate a regular correspondence between SUA /n/ and NUA /ŋ/.

##### 4.1. The Velar Nasal in Medial Position

Eight sets document the regular correspondence of NUA -ŋ- and SUA -n-. Four sets are included in Appendix 2 under CONTAIN, HUSBAND, LUNG(S), and PULVERIZE. The other four sets, which have cognates from at least two NUA and two SUA subfamilies, are presented here. These sets indicate that medial \*-ŋ- must be reconstructed for Proto-Northern Uto-Aztecan. They also document the diversity of Numic reflexes of PNUA \*-ŋ-, discussed in more detail in Section 4.2.

- (24) ‘salt.’ PUA \*\*oŋa (S-1865). NUM: NP *oŋabi*. WMn *omábi*. TSh *oŋwapi*. WSh-D *ohapin*. WSh-G *onapin*. Cm *onaabi*. Kw *owavi*. SP *oavi*. SUt *óavi*. TUB: *uŋa:l*. HOP: *ö:ŋa*. TAK: Ca *íŋilʷ*. Cp *íŋeyu* ‘to salt.’ Ls *éŋla*. TEP: Nv *ona*. PYP *ona*. NT *onai*. TRC: Yq *oóna*. My *oóna*. Ed *onát*. Wf *woná*. Rr *oná ~ koná ~ noná*. TBR: *onát*. CRC: Cr *unáb*. Hc *úna*.
- (25) ‘knee.’ PUA \*\*toŋa (S-941). NUM: NP *taŋapisa ~ taʔŋapisa* ‘kneecap.’ WMn *tonobódo ~ tanobódo ~ tanabódo*. TSh *taŋappih*. WSh-G *tankappih ~ tannappih*. Cm *tana*. Kw *tanavi*. SP *taŋavi*. Ch *taŋa*. SUt *táavi*. TUB: *toŋo:l*. TEP: To *toon*. Nv *tona*. PYP *toni*. NT *toona*. ST *toon*. TRC: Yq *tonom*. My *tónnom*. Ed *tonót*. Wf *tonó* ‘foot.’ Rr *ronó* ‘foot, leg.’ TBR: *tonor*. CRC: Cr *tunú*. Hc *tunú*.
- (26) ‘hot, hot season, sun.’ PUA \*\*toŋV- (S-1207). HOP: *tö:ŋi* ‘heat, hot weather, heat of the day.’ TAK: Ca *tíŋiʃ* ‘warm.’ Cp *tíŋe* ‘to be hot.’ Kt *toŋavaʔ ~ tuŋavaʔ* ‘hot season.’ TEP: Nv *tonoŋo* ‘for the sun to shine.’ PYP *tono* ‘hot.’ NT *tonóli* ‘sunshine.’ NT *tóni* ‘hot.’ TRC: Ed *tonó* ‘to be hot, to boil.’ Wf *tono ~ toni* ‘to boil.’ Rr *ronó* ‘to boil, to ferment.’ TBR: *tonó* ‘to be hot.’ AZT: Na-Cl *to:na* ‘to be warm, for the sun to shine.’ Pp *tu:nal* ‘sun.’ Po *tunél* ‘sun.’
- (27) ‘tongue.’ PUA \*\*niŋi (S-2364). HOP: *leŋi*. TAK: Ca *náŋilʷ*. Cp *neŋʔa*. Kt *níŋiç*. TEP: To *níni*. PYP *neeni*. NT *níni*. ST *níin*. TRC: Yq *níni*. My *ninni*. Ed *nenét*. Wf *yení*. TBR: *níntr*. AZT: Na-Cl *nenepilli*. Pp *nenepil*.

Despite showing initial *l*-, Hopi *leji* is assumed to belong in (27) because the other three segments show the expected correspondences. The Warihó cognate also has an aberrant initial consonant, and /*e*/ rather than /*a*/ is the first vowel expected for the Cahuilla cognate.

#### 4.2. Numic Reflexes of \*-ŋ-

The Numic subfamily is divided into three subdivisions (see Table 1): 1) Western Numic, with Northern Paiute and Mono as its constituent languages, 2) Central Numic, which includes Timbisha Shoshone, Shoshone, and Comanche, and 3) Southern Numic, comprising Kawaiisu, Southern Paiute, Chemehuevi, and Ute, the last three representing dialects of a single language that Miller et al. (2005: 414) label Colorado River Numic. Medial *-ŋ-* is attested in at least one language in each of the three subdivisions, indicating that PNUA *\*-ŋ-* descended into Proto-Numic (PNum) and subsequently into the ancestral languages of these subdivisions. However, following the emergence of these subdivisions, medial *\*-ŋ-* underwent a series of secondary developments in which it shifted in most of the daughter languages to other consonants or was lost entirely.

The attested reflexes of PNum intervocalic *\*-ŋ-* in the modern Numic languages are presented in Table 4.<sup>16</sup> Words that reflect only seven etyma are considered, and cognates are not attested in all the Numic languages for four of them. In addition, cognate sets cannot be compiled in which *-ŋ-* is attested in all intervocalic contexts. Five vowels are reconstructed for PNumic: *\*/a, i, ī, o, u/* (Babel et al., 2009: 9–10). The cognate sets represented in Table 4 document the reflexes of PNum *\*-ŋ-* following *\*/a, i, ī, o, u/* and preceding *\*/a, i, o/*, but not following *\*/i/* or preceding *\*/ī/* or *\*/u/*. Despite these problems, these seven cognate sets represent the best data I have found for documenting and analyzing the Numic reflexes of *\*-ŋ-*.

The diversity of these reflexes is too complex to be discussed in detail here, but the principal secondary developments involving *\*-ŋ-* can be summarized as follows:

- **Western Numic:** 1) *-ŋ-* is retained in Northern Paiute and probably Eastern Mono in all contexts; 2) in Western Mono *-ŋ-* shifted to *-n-* except in the environment of */o\_a/*, where it shifted to *-m-*.<sup>17</sup>

<sup>16</sup> The words in which these reflexes occur are included in Appendix 2 under the referents given in Table 4. The reconstructed etyma are Proto-Numic. The etyma for ‘knee’, ‘salt’, and ‘lung(s)’ are reflexes of PUA etyma, while cognates for the remaining four words are attested only in Numic languages.

<sup>17</sup> I use “Eastern Mono” and “Western Mono” here simply for convenience. Babel et

Table 4. Nomic reflexes of Proto-Nomic \*-ŋ-

	*/a_a/	*/a_i/	*/i_a/	*/i_a/	*/o_a/	*/o_o/	*/u_a/
	*tana	*aŋi	*niŋa	*siŋa	*oŋa	*soŋo	*yuŋa
	'knee'	'fly (n)'	'chest'	'aspen'	'salt'	'lung(s)'	'scoop (v)'
WESTERN							
NP	-ŋ-	-ŋ-	-ŋ-	-ŋ-	-ŋ-	-ŋ-	-ŋ-
EMn	-ŋ-	—	-ŋ-	-ŋ-	-ŋ-	-ŋ-	—
WMn	-n-	-n-	—	—	-m-	-n-	—
CENTRAL							
TSh	-ŋ-	-ŋ-	-ŋ-	-ŋ-	-ŋ <sup>w</sup> -	-ŋ <sup>w</sup> -	-ŋ <sup>w</sup> -
WSh-B	-nk-	-nk- ~ -n-	-nk-	-nk-	-h-	-nk-	—
WSh-D	-nk- ~ -nn-	==	-nk- ~ -nn-	-nn-	-h-	-nk-	-nn-
WSh-G	-nk- ~ -nn-	==	-nk- ~ -nn-	-nk- ~ -nn-	-n-	-nk- ~ -nn-	-nn-
ESh	-nk-	-n-	-n-	-n-	-n-	-nk-	—
NSh	-nn-	==	-n-	-n-	-n-	-w-	—
Cm	-n-	==	-n-	—	-n-	-m-	-n-
SOUTHERN							
Kw	-n-	-n-	—	—	-∅-	-∅-	—
SP	-ŋ-	-ŋ-	==	-∅-	-∅-	-∅-	—
Ch	-ŋ-	-ŋ-	-ŋ-	—	==	-∅-	—
SUt	-∅-	==	-∅-	-∅-	-∅-	-∅-	—

codes: term not attested: —; attested word not cognate: ==; loss of -ŋ-: -∅-

- **Central Nomic:** 1) -ŋ- is retained in Timbisha Shoshone, being labialized as [ŋ<sup>w</sup>] following round vowels; 2) PNum \*-ŋ- is doubly reflected in Western Shoshone as -nk- and -nn-, which seem to be in free variation, except in the context /o\_a/, where -ŋ<sup>w</sup>-, -n-, and -h- are attested in different variants; 3) in Eastern Shoshone, -nk- and -n- are attested as alternate reflexes of \*-ŋ-; 4) in Northern Shoshone, the alternate reflexes are -nn- and -n- except in the environment of /o\_o/, where the reflex is -w-; 5) in Comanche, -m- is the reflex of \*-ŋ- in the context /o\_o/ and -n- in all other attested environments.<sup>18</sup>
- **Southern Nomic:** 1) -ŋ- apparently is retained in Southern Paiute and Chemehuevi in the context of non-round vowels and lost following /o/, although

al. (2009) provide the best overview of the dialectal diversity within the Western Nomic subdivision. They argue that Proto-Mono never existed, proposing instead that both “Mono” and “Northern Paiute” descend directly from Proto-Western Nomic.

<sup>18</sup> Miller et al. (2005: 439, n. 34) suggest that the shift of Proto-Central Nomic (PCN) \*-ŋ- to Common Shoshone/Comanche -nk- ~ -nn- was “not very tidy” and that “the reflexes of PCN \*ŋ were still in a state of flux during the late Common Shoshone/Comanche period.”

its loss is attested in Southern Paiute both following /o/ and in the context of /i\_a/; 2) in Kawaiisu, -ŋ- also is lost following /o/, shifting to /-n-/ following /a/; 3) in Southern Ute, -ŋ- is lost in all environments.

The Numic languages display a general trend toward the loss of the velar nasal as a phoneme. The first step in this process likely occurred in Proto-Numic with a shift of \*ŋ- to \*n- in morpheme-initial position, a sound change discussed in Section 4.3. Subsequent secondary developments in languages from all three Numic subdivisions resulted in the retention of medial -ŋ- only in Northern Paiute, Eastern Mono, Timbisha Shoshone, and the Southern Paiute and Chemehuevi variants of Colorado River Numic. However, as seen in (28) and (29), there is some indication that a shift from -ŋ- to -n- was underway in Northern Paiute, Southern Paiute, and Chemehuevi as well.

- (28) ‘younger sibling, youngest.’ PNum \*piŋa (S-2001). NP *pinagi* ‘younger sibling.’ TSh(M) *piŋŋa* ‘youngest sibling.’ SP *pinnappici* ‘youngest, last.’ Ch *piŋatim* ‘youngest.’
- (29) ‘to tell.’ PNum \*tiŋV- (S-1877). NP-Y *tiiŋi* ‘to tell to.’ TSh *tiiŋa* ‘to tell to.’ SP(S) *tinnia* ‘to tell, to tell on.’ Ch *tinia* ‘to tell.’

Set (28) shows a correspondence of -ŋ- in Timbisha Shoshone and Chemehuevi with -n- in Northern and Southern Paiute, while (29) shows a correspondence of -ŋ- in Timbisha Shoshone and Northern Paiute with -n- in Southern Paiute and Chemehuevi.<sup>19</sup>

A comparable shift may also have been taking place in some variants of Western Shoshone, in the -nn- ~ -nk- reflex of \*ŋ-:

- (30) ‘high, up.’ PNum \*paŋa (S-77). NP *paŋaadi* ‘high.’ TSh *paŋe* [< \*paŋai] ‘up.’ WSh-B *pankai* ~ *panai* ~ *pan* ~ *paʔai* ‘up, high, above.’ WSh-D *panai* ‘up, upwards.’ WSh-G *panai* ~ *paʔa* ‘up, high.’ WSh-R *panki* ‘up, high.’

The cognate in the Ruby Valley (WSh-R) variant of Western Shoshone shows -nk-, as does one of the alternate forms in the Big Smokey Valley variant (WSh-B). The other Big Smokey Valley forms show -n- or -ʔ-, also seen in the

<sup>19</sup> The nasals in the words presented in (28) vary between plain and lengthened (geminated), but differences in consonantal length do not preclude the correspondences from being regular. Based on research in progress, I interpret the geminates in TSh *piŋŋa* and SP *pinnappici* as synchronic vestiges of antecedent unstressed syllable coda.

Duck Valley and Gosiute variants (WSh-D, WSh-G). The following sequence of sound changes in the Western Shoshone variants can be proposed: \*paŋai > paŋkai ~ paŋnai > panai > pan ~ paʔai ~ paʔa.

#### 4.3. The Velar Nasal in Initial Position

I have identified four sets in which Hopi or Takic terms with initial *ŋ*- have cognates in languages that belong to other UA subfamilies. Three of these sets include cognates from at least two SUA languages. An additional three sets have cognates from Hopi and the Takic languages alone. Taken as a whole, these sets indicate a regular correspondence between initial *ŋ*- in Hopi and Takic and initial *n*- in all the other UA subfamilies.

This correspondence is most clearly seen in (31), in which initial *ŋ*- in Hopi and Luiseño corresponds with initial *n*- in Tubatulabal and the Tepiman, Tarachitan, Corachol, and Aztecan subfamilies.<sup>20</sup> This set lacks cognates from Tubar and the Numic languages. A Tubar cognate exists for (32), but I have found no Numic words that are unquestionably cognate with terms in Hopi or the Takic languages that show the initial velar nasal. However, (32) and (33) suggest that, as in Tubatulabal and the SUA subfamilies, initial *n*- in the Numic languages corresponds with initial *ŋ*- in Hopi and Takic.<sup>21</sup>

- (31) ‘to bend, curve, turn, return.’ PUA \*\*ŋora (S-455). TUB: *noʔlat* ~ *ʔono:l* ‘to go home.’ HOP: *ŋölöla* ‘to bend, to crook.’ TAK: Ls *ŋé:la* ‘to be turned, be curved.’ TEP: PYp *norag* ‘to return.’ NT *norági-* ‘to go back.’ TRC: Ed *norón* ‘to go back, come back.’ Wɿ *noʔláni* ~ *noʔáni* ‘to go someplace and return.’ Rr *norína* ‘to come back.’ AZT: Na-Cl(M) *noloa* ‘to bend (vt); *noliwi* ‘to become bent.’
- (32) ‘root.’ PUA \*\*ŋa- (S-1832). NUM: WSh-G *nappih* ‘edible part of the cattail between the stem and the root.’ HOP: *ŋa-*. TAK: Kt *ŋakawi*. TRC: Yq *naáwa*. My *naágwam*. Ed *náva*. Wɿ *nawá*. Rr *nawá*. TBR: *namustr*. CRC: Cr(O) *nanat* ‘tree root.’ Hc *naná* ‘tendrils, kinds of climbing vines.’ AZT: Na-Cl *nelwatl*. Pp *nelwat*.
- (33) ‘to cry.’ PUA \*ŋa- (S-607, S-608, S-609). NUM: TSh *namoʔi* ‘to cry, make noise (of animals)’. WSh-G *nawoih*. Cm *nawooʔi*. TUB: *ʔanaŋat* ~ *ʔanaŋ*.

<sup>20</sup> Not all cognates are included in (31). The complete set is presented in (1).

<sup>21</sup> No Southern Numic cognates exist for any of these sets, but Kawaiisu *nohopi* ‘to unravel’ may be cognate with Hopi *ŋa:ha* ‘to unravel, untie.’ If so, the reconstruction of PNUA \*ŋoha- or \*ŋaho- is indicated, with vowel harmonization occurring in both languages but in opposite directions.

Tb *anaŋ- ~ naŋ-* (Voegelin, 1935: 169). TAK: Ca *ŋáŋ*. Cp *ŋaŋa*. Ls *ŋáaŋi* ‘to cry about someone or something.’ TRC: Op *narak*. Wr *naláni*. Rr *nará*.

The Numic terms in (33) come from languages that belong to the Central subdivision of the subfamily, and all are the non-singular suppletive forms of the verb ‘to cry,’ which can be reconstructed for Proto-Numic as \*yaka (Stubbs, 2011: #610). The initial syllable *na-* may be cognate with the *ŋa-* in the Takic languages, while the following two syllables in the Numic forms may be a separate morpheme related to terms in these Numic languages for ‘bark’ or ‘howl’: TSh *wohi*, WSh-G *woʔai*, Cm *woorĩ*. The proposed cognates from other languages in (32) and (33) also show the expected correspondences only for the initial syllable \*ŋa-, suggesting considerable reinterpretation of the etyma from which they presumably derived.

An additional cognate set that is relevant to analyzing the velar nasal in PUA involves a locative morpheme that is encountered throughout the UA language family as a bound or unbound postposition. It shows the same correspondences of initial *ŋ-* and *n-* seen in word-initial position.

- (34) [Locative postposition]. PUA \*\*ŋa- (S-1980). NUM: NP(T) *-na* ‘from, out from’ (Thornes, 2003: 229). NP *-nakwa* ‘side’; *-nakwaana* ‘from direction.’ TSh *-naŋkwa* ‘in the direction of, beside.’ Cm *-nakwĩ* ‘side, direction.’ SP *-naŋkwa* ‘direction.’ HOP: *-ŋaqw* ‘from, away from, inside of.’ TAK: Ca *má-ŋax* ‘on or by the side of, near.’ Cp *-ŋa* ‘in, in the way that’; *-ŋax* ‘from, because of’; *-ŋaʔaw* ‘on, on top of.’ Ls *-ŋa* ‘in, inside, about, by, on, at, to.’ Kt *-ŋa*.<sup>22</sup> TRC: Yq-Az *-napo* ‘near.’ Wr *-na ~ -ena* ‘on this side, closer.’ Rr *-na* ‘towards’ [*aki-ná* ‘towards here,’ *wami-ná* ‘towards there’]. TBR: *-ná* ‘towards.’ CRC: Cr =*na* [an enclitic that marks a particular point in space or time (Casad, 1977: 229–230)]. Hc *-na* [bound locative postposition: *é-na* ‘here,’ *má-na* ‘there’]. AZT: Na-Cl *-nal* ‘across, through, to the other side.’

A shift of \*ŋ- to *n-* in Numic postpositions is suggested by the retention of /ŋ/ in the morpheme *-ŋa-* when it occurs in independent words, for example, NP *paŋaadi* ‘high’ and TSh *paŋe* [< \*paŋai] ‘up,’ both of which are cognate with the Tubatulabal locative *paŋa* ‘up, above.’

<sup>22</sup> Anderton (1988: 436) does not gloss Kt *-ŋa*, simply noting that it is a “locative suffix used in placenames and ‘left’ and ‘right.’” She suggests (p. 146), following Harrington, that it may be a loan from other Takic languages, specifically Gabrielino or Fernandoño.

The final three sets presented in this section have cognates only in Hopi and some Takiic languages.

- (35) ‘to coil.’ PNUA \**ɲawi* (S-457). HOP: *ɲawi* ‘coil, skein, strand (n)’; *ɲawita* ‘to be coiling, be making into strands, skeins.’ TAK: Cp *ɲáwe* ‘to coil, as rope.’ Ls *ɲáwi* ‘to coil, tangle.’
- (36) ‘to sway.’ PNUA \**ɲaya* (S-1936). HOP: *ɲayámti* ‘shift, sway, rock (one movement)’; TAK: Ca *ɲáya* ‘to shake head.’ Cp *ɲáye* ‘to shake head.’ Ls(B) *ɲáya* ‘to be winnowed with a rotary movement.’
- (37) ‘to gnaw.’ PNUA \**ɲiri*. HOP: Hp *ɲirita* ‘to be gnawing.’ TAK: Ls *ɲó:li* [< \**ɲi:li*] ‘to gnaw.’

Table 5. The regular correspondence of NUA-*ɲ-* and SUA-*n-*.

	**oɲa ‘salt’	**toɲa ‘knee’	**toɲo ‘hot’	**niɲi ‘tongue’	**taɲa ‘contain’	**kuɲa ‘husband’	**soɲo ‘lung(s)’	*piɲa ‘pulverize’
NUA								
NUM	*-ɲ-	*-ɲ-	—	—	*-ɲ-	*-hm-	*-ɲ-	—
TUB	*-ɲ-	*-ɲ-	—	—	—	*-ɲ-	—	—
HOP	*-ɲ-	—	*-ɲ-	*-ɲ-	*-ɲ-	*-ɲ-	—	*-ɲ-
TAK	*-ɲ-	—	*-ɲ-	*-ɲ-	*-ɲ-	*-ɲ-	*-ɲ-	*-ɲ-
SUA								
TEP	*-n-	*-n-	*-n-	*-n-	—	*-n-	—	—
TRC	*-n-	*-n-	*-n-	*-n-	—	*-n-	*-n-	—
TBR	*-n-	*-n-	*-n-	*-n-	—	*-n-	—	—
CRC	*-n-	*-n-	—	—	—	*-n-	—	—
AZT	—	—	*-n-	*-n-	*-n-	—	—	*-n-

#### 4.4. Discussion

The regular correspondence in medial position of NUA *-ɲ-* and SUA *-n-* is documented in eight cognate sets that, when combined, include cognates from all the UA subfamilies (see Table 5). These sets, together with those considered in Sections 2 and 3, support the reconstruction of medial \**-ɲ-*, \**-n-*, and \**-r-* for Proto-Northern Uto-Aztecan but only medial \**-n-* and \**-r-* for Proto-Southern Uto-Aztecan (see Table 6).

Table 6. The PNUA and PSUA correspondences of medial \**-ɲ-*, \**-n-*, and \**-r-*.

PNUA		PSUA
*-ɲ-	::	*-n-
*-n-	::	*-r-
*-r-	::	*-r-

The most likely source of PNUA medial \*-ŋ- is PUA \*\*-ŋ-, but Hill (2011: 263) favors an alternative source. She supports a perspective suggested to her by Manaster Ramer, that PNUA \*-ŋ- derives from PUA \*\*-n-, with PNUA \*-n- deriving from PUA \*\*-r-, which she represents as \*\*-l/r-. However, PNUA \*-n- could not reflect PUA \*\*-r- because of the regular correspondence of -r/l- in both SUA languages and all NUA languages except Numic (see Section 2). With PUA \*\*-r/l- eliminated as the source for PNUA \*-n-, PNUA \*-n- would derive from PUA \*\*-n-, given the regular correspondence of -n- :: -n- in all the NUA languages—see sets (16) to (20) in Section 3.1.<sup>23</sup> It is improbable that PUA \*\*-n- is doubly reflected in PNUA because PNUA \*-n- and \*-ŋ- occur in overlapping intervocalic contexts.

Table 7. Attested intervocalic contexts of PNUA \*-ŋ- and \*-n-.

	*-ŋ-	*-n-
*-ŋ- and *-n-		
*a_a	*taŋa ‘contain’	*tana ‘foot’ *mana ‘child’ *sana ‘pitch’
*o_a	*oŋa ‘salt’ *toŋa ‘knee’	*konaka ‘necklace’
*u_a	*kuŋa ‘husband’	*suna ‘heart’
*-ŋ- Only		
*i_a	*piŋa ‘pulverize’	
*i_i	*niŋa ‘tongue’	
*o_o	*toŋo ‘hot’ *soŋo ‘lungs’	
*-n- Only		
*a_i		*kahani ‘house’ *ani ‘small’
*i_i		*wini ‘stand’
*u_i		*yuni ‘gentle’ *yu?ni ‘pour’

In Table 7, I present all the etyma that can definitely be reconstructed for PNUA in which PNUA intervocalic \*-ŋ- and \*-n- appear. The table shows that both \*-ŋ- and \*-n- can be reconstructed following \*a, \*i, \*o, and \*u and preceding \*a, \*i. Neither can be reconstructed before \*u. The only difference in their intervocalic

<sup>23</sup> PNUA \*-ŋ- obviously cannot be interpreted as a PNUA innovation. It is attested in NUA words with clear cognates in the SUA languages, which document the regular correspondence of NUA -ŋ- :: SUA -n- (see Section 4.1).



distribution is that \*-n- cannot be reconstructed following /i/ or preceding /o/ and \*ŋ- cannot be reconstructed preceding /i/.

The evidence that the velar nasal occurred in initial position in PNUA is far less robust than that indicating its occurrence in medial position: initial *ŋ-* is attested only in Hopi and the Takic languages and only preceding reflexes of \*a (32–36), \*i (37), \*o (31). Nonetheless, the reconstruction of PNUA initial \*ŋ- seems to be necessary because no other source for initial *ŋ-* in Hopi and Takic exists. A shift of PNUA initial \*n- to *ŋ-* in Hopi and Takic is precluded by the fact that they occur in the same contexts (Kaufman and Justeson, 2009: 225; see Section 3.2). In fact, both initial \*n- and \*ŋ- can be reconstructed before \*a, \*i, and \*o and neither can be reconstructed before \*i or \*u; see sets (21) to (23) and sets (31) to (33).

The most likely scenario is that the velar nasal occurred in initial and medial position in both PUA, PNUA and early PSUA, being retained in both positions in Hopi and the Takic languages, in medial position only in Tubatulabal and the Numic languages, and in neither position in PSUA. The geographical proximity of Tubatulabal and Numic speakers raises the possibility that the shift of PNUA initial \*ŋ- to *n-* was an areal phenomenon. The same shift in PSUA is best interpreted as a parallel but independent innovation that involved the merging of PUA \*\*ŋ with PSUA \*n in all contexts.

## 5. Counterevidence

By my analysis, all attestations of medial *-n-* in SUA reflexes of PUA etyma languages should derive from PUA \*\*ŋ-. The principal challenge to this perspective is presented by a few cases in which cognates in both NUA and SUA languages show *-n-* (Dakin, 2001: 325; Dakin, 2007: 298; Stubbs, 2011: 20–24).

Stubbs (2011: 24, *passim*) has noted the possible correspondence of NUA *-n-* and SUA *-n-* in several cognate sets, which I have analyzed to determine if an explanation for them can be provided. Sets in which the NUA terms come exclusively from Numic languages in which *-ŋ-* shifted to *-n-* can be eliminated because they could represent the correspondence of NUA *-ŋ-* and SUA *-n-*, for example, Kawaiisu *tii?niya* ‘to trap’ and Southern Tepehuan *tüü?ñja* ‘to set a trap’ (Stubbs, 2011: #2407) (see Section 4.2). Also excluded for the same reason are sets that involve postpositions in Tubatulabal and the Numic languages (see set 34 above). Six examples remain that cannot be as easily dismissed.

For two of these sets, a single explanation can be proposed for the apparent correspondence of NUA *-n-* and SUA *-n-*: the medial *-n-* actually represents an initial *n-* in a morpheme that is preceded by a monosyllabic root, in which case the regular correspondence of NUA *n-* and SUA *n-* is encountered (Kaufman, 1981: 162–163).

- (38a) ‘son-in-law.’<sup>24</sup> (S-2085). NUM: WSh-G *monappi*. Kw *mono*. SP *monna*-. HOP: *mö?ónayw* ‘son-in-law, in-marrying male.’ TRC: Yq *mo?one*. My *mó?one*. Ed *mong<sup>w</sup>a*. Wɾ *mo?né*. Rr *mo?né*. CRC: Cɾ *mu?un* ‘son-in-law, daughter-in-law, father-in-law.’ Hc *muune* ‘daughter’s husband, wife’s father.’ AZT: Na-Cl *mo:ntli*. Pp *mu:nti*.

The possibility that *mo?o-* or *mo?-* represents a separate morpheme is suggested by terms for other affinal relatives in some of these same languages:

- (38b) [affinal relative]. HOP: *mö?wi* ‘daughter-in-law; sister-in-law.’ TRC: Wɾ *mo?óri* ‘daughter-in-law.’ Rr *mo?óri* ‘daughter-in-law.’ CRC: Hc *mu?ee* ‘husband’s parent, son’s wife’ (Grimes and Grimes, 1962: 110).

Separate morphemes may also be involved in the next set, which includes cognates in Hopi and Yaqui-Mayo only:

- (39a) ‘to make a circuit around.’ (S-435). HOP: *qönilti* ‘to make a circuit, go all the way around.’ TRC: Yq-Az *konte* ‘to go around, surround (vi)’; *konta* ‘to surround (vt).’ Yq *konila* ‘around.’ My *koónte* ‘to go around.’

Both Hopi and Yaqui-Mayo include semantically related words that show *qö-* ~ *ko-* followed by elements that do not include *-n-*, and related words in the Numic languages and Nahuatl show the regular correspondence of NUA *-n-* and Nahuatl *-l-*:

- (39b) HOP: *qövivita* ‘to be whirling, swirling about.’ TRC: Yq-Az *kowila* ‘around (circumference).’  
 (39c) \*koni (S-435). NUM: WMn *qooni* ‘to return (vi).’ WSh-D *kooni* ‘to come and go.’ WSh-G *koonih* ‘curved, bent.’ Cm *kooniti* ‘to turn around.’ SP *koonni* ‘to return, come back by the same road.’ AZT: Na-Cl *ko:liwi* ‘to curve, to turn’; *ko:loa*: ‘to twist, change direction.’

In the remaining four sets, the medial *-n-* appears to occur within disyllabic morphemes:

<sup>24</sup> A similar term is Ca *-mínkiw?a* ‘son-in-law.’ Although Cahuilla /i/ is the regular correspondence of \*\*o as well as \*\*i, Ca *-mínkiw?a* may not be cognate with the kinterms in (38a) (Jane Hill, personal communication, 2011). It presumably is related to Ca(SH) *mínik?i* ‘relative,’ with the medial *-ŋ-* resulting from the assimilation of *-n-* to *-k-* in a *-nk-* cluster created by vowel syncope. Such assimilation, however, appears not to be inevitable in Cahuilla, e.g., *hunkat* ‘elderberry.’

- (40) ‘thin, flat’ (S-2278). NUM: WSh-G *kanah* ‘thin (of an animal or person).’ AZT: Na-Cl *kana:wak* ‘something flat and thin.’
- (41) ‘hill’ (S-1456). NUM: SP *tonnokkiči* ~ *tunnukkiči* ‘knoll, swell in the ground.’ TEP: To(M) *toonk* ‘ridge, dike.’ Nv *tonika* ‘hill.’
- (42) ‘to be’ (S-1317). NUM: NP *mannai* ‘to be, to do.’ TRC: Yq *manek* ‘to be situated (containers, liquids, or massed objects): My *manne* ‘to be (of a liquid or gathered objects).’ Wr *mani* ‘to be, to exist.’ Ed(L) *mani* ‘to be.’ Ed(L) *mane* ‘to be in a container.’ Rr *mani* ‘to be in a container.’ CRC: Hc *mana* ‘put, hang, spread (plural objects).’ AZT: Na-Cl *mana* ‘to spread something out flat and smooth.’
- (43) ‘younger sister’<sup>25</sup> (S-2001). NUM: NP *pini?i*. WMn *pini?*. TRC: Ed *ving<sup>w</sup>a*. Wr *pini*. Rr *bini*.

The distribution of the cognates among the UA subfamilies in (40) to (43) may provide a key to explaining the NUA *-n-* :: SUA *-n-* correspondence that they appear to document. The NUA cognates come only from Numic languages—in the case of each set from a single subdivision, but with all three Numic subdivisions represented—while the SUA cognates are from languages in four separate subfamilies; only the Tubar subfamily is not represented. I cannot offer a definitive explanation for these sets, but a plausible possibility is that the *-n-* in the Numic cognates actually derives from *-ŋ-*, as discussed in Section 4.2. This possibility is especially likely in the case of (43), given the phonological and semantic similarities of the Northern Paiute and Western Mono terms to Timbisha Shoshone *piŋŋa* ‘youngest sibling’ and Chemehuevi *piŋatim* ‘youngest’ (see set 28).

## 6. Conclusion

In his overview of the Uto-Aztecan language family, Campbell (1997: 136–137) notes that Uto-Aztecan historical linguists generally agree on the reconstruction for the Proto-Uto-Aztecan phonemic inventory of five vowel phonemes *\*\*/i, a, i, o, u/* and eleven consonant phonemes *\*\*/p, t, c, k, k<sup>w</sup>, ʔ, s, h, m, w, y/*, disagreeing only on how best to reconstruct the PUA consonants that are reflected in the UA daughter languages as */ŋ, n, r, l/*. The data and analyses presented in this essay support the model shown in Table 8, which I propose as the most parsimonious resolution of the issue.

<sup>25</sup> As in (38) and (39), the initial *pī-* ~ *pi-* here may represent a separate morpheme. This is suggested by Ls *-pi:t* ‘younger sister’ and Kt *-pit* ‘younger brother or sister’ (cf. Kt *pita-č* ‘youngest, last’), as well as Na-Cl *pi?-tli* ‘older sister (female speaker).’

Table 8. Proposed reconstruction of PUA  $**\eta$ ,  $**n$ , and  $**r$ .

PUA		PNUA		PSUA	
Initial	Medial	Initial	Medial	Initial	Medial
$**\eta$ -	$**\text{-}\eta$ -	$*\eta$ -	$*\text{-}\eta$ -	$*n$ -	$*\text{-}n$ -
$**n$ -	$**\text{-}n$ -	$*n$ -	$*\text{-}n$ -	$*n$ -	$*\text{-}r$ -
—	$**\text{-}r$ -	—	$*\text{-}r$ -	—	$*\text{-}r$ -

In this model, PUA  $**\eta$  and  $**n$  are reconstructed in both initial and medial positions with no allophones, while  $**r$  is reconstructed only in medial position but with  $**[r]$  and  $**[l]$  as its allophones. All three PUA phonemes were retained in Proto-Northern Uto-Aztecan and early Proto-Southern Uto-Aztecan, but during the period when the PSUA speech community was still intact, PSUA medial  $*\text{-}n$  merged with pre-existing  $*\text{-}r$  and the velar nasal  $*\eta$  shifted to  $*n$  in all positions. Because these sound changes are documented in all the SUA languages, they can be identified as shared phonological innovations that establish the genetic unity of these languages and the existence of Proto-Southern Uto-Aztecan as the common ancestral language out of which they emerged.

During the course of the diversification of the SUA languages, the most significant changes that occurred in these phonemes were the phonemicization of the allophones of  $*\text{-}r$  in Yaqui, Mayo, and the Tepiman languages and the loss of either  $[-l-]$  or  $[-r-]$  in Eudeve, Huichol, and the Aztecan languages. Similar changes took place in the NUA languages, with one major exception: PUA  $**\text{-}r$  apparently merged with pre-existing  $*\text{-}n$  in Proto-Numic. Although the evidence for this innovation is limited, its postulation accounts for the absence of a liquid phoneme in the Numic languages, just as the shift of PUA  $**\eta$  to  $*n$  in PSUA accounts for the absence of the velar nasal in the SUA languages. In the NUA languages, initial  $*\eta$ - merged with  $*n$ - in Tubatulabal and the Numic languages while medial  $*\text{-}\eta$ - was retained in all subfamilies, although a shift from medial  $-\eta$ - to  $-n$ - also occurred in some Numic languages.

Apart from contributing to a clarification of the PUA phonemic inventory, this analysis establishes Proto-Southern Uto-Aztecan as a first-level daughter language of PUA, coordinate with Proto-Northern Uto-Aztecan. The principal implication of demonstrating that PSUA and PNUA were coordinate intermediary languages is that a split of PUA into two branches can be identified as the first step in the diversification of the language family. Both phonological and lexical data suggest that, following this split, the NUA and SUA branches diversified independently—although, as noted in Section 2.2, some interaction may have occurred among speakers of the southernmost NUA languages and the northernmost SUA languages (Miller, 1984; Cortina-Borja and Valiñas Coalla, 1989; Fowler, 1983; Valiñas Coalla, 2000; Cortina-Borja et al., 2002). In contrast, the

internal diversification of the NUA and SUA branches likely involved considerable interaction among speakers of languages and dialects belonging to different genetically related subgroups (Shaul, 1983; Babel et al., 2009).

Babel et al. (2009) propose that the diffusion of linguistic innovations across language boundaries was a significant factor in the differentiation of the Numic subdivisions. The shift of initial *\*\*ŋ-* to *\*n-* in Tubatulabal and the Numic languages may indicate that such diffusion occurred across subfamily boundaries, another instance of which could be the shift of medial *\*\*-t-* to *\*-l-* that Tubatulabal shares with the Cupan subdivision of the Takic subfamily (Hill, 2011: 269–270). A comparable example from the SUA branch involves the Tepiman and Taracahitan languages. Tepiman is defined as a genetic unit based on a number of innovations in its consonant phonemes and by the retention of *\*/i/*, which shifted to */e/* or */e ~ i/* in all the other SUA subfamilies. Yet, Tepiman shares some of the consonant innovations with neighboring Taracahitan languages, for example *\*w > /g/*, *\*y > /d/*, and *\*k<sup>w</sup> > /b/*, all three of which also are found in Eudeve and Ópata (Shaul, 1983: 97–99; 2010: 270–271).

In general, the distribution of phonological innovations within and among genetically related subgroups of the UA language family indicates that some innovations diffused across linguistic boundaries while others did not. This pattern implies alternating periods of interaction and isolation. In addition, the status of Nahuatl and probably one or more of the Tepiman languages as *lingua francae* (Riley, 1971; Silverstein, 1996: 118) could have led to the diffusion of innovations in these languages to other UA languages, without innovations in these other languages diffusing at all. Multilingualism of speakers of adjacent languages also would have created the conditions in which selective diffusion of innovations between the languages could have taken place. Recognizing the range of possibilities is crucial in defining more precisely the internal structure of the UA language family and in reconstructing the processes that produced it.

### Online Appendix

Cognate sets not presented in their entirety in the main text are provided in Appendix 2, available at the following URL: <http://dx.doi.org/10.1163/22105832-13030102>. The introduction to this online appendix explains my orthographic conventions and the criteria I have used to identify cognates. It also includes citations of the principal published compilations of Uto-Aztecan cognate sets.

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**Appendix 1. Language Abbreviations and Sources**

Ca	Cahuilla: Seiler and Hioki, 1979
Ch	Chemehuevi: Press, 1979
Cm	Comanche: Robinson and Armagost, 1990
Cp	Cupeño: Hill and Nolasquez, 1973
Cr	Cora: McMahon and McMahon, 1959
Cr(O)	Cora: Ortega, 1860 [1732]
Cr(P)	Cora: Preuss, 1934
Ed	Eudeve: Pennington (ed.), 1981
Ed(L)	Eudeve: Lionnet, 1986
EMn	Eastern Mono: Steward, 1933
ESh	Eastern Shoshone: Davis, 1966
Hc	Huichol: McIntosh and Grimes, 1954
Hp	Hopi: Hopi Dictionary Project, 1998
Kt	Kitanemuk: Anderton, 1988
Kw	Kawaiisu: Zigmond et al., 1991
LP	Lower Pima: Bascom, 1965
Ls	Luisiño: Elliott, 1999
Ls(B)	Luisiño: Bright, 1968
My	Mayo: Collard and Collard, 1962
Na-Cl	Classical Nahuatl: Karttunen, 1992
Na-Cl(M)	Classical Nahuatl: Molina, 1970 [1571]
NP	Northern Paiute: Liljeblad et al., 2012
NP(T)	Northern Paiute: Thornes, 2003
NP-Y	Northern Paiute, Yerington: Poldervaart (ed.), 1987
NSh	Northern Shoshone: Gould and Loether, 2013
NT	Northern Tepehuan: Bascom, 1965
Nv	Névome: Pennington (ed.), 1979
Op	Opata: Lombardo, 1702
Po	Pochutec: Boas, 1917
Pp	Pipil: Campbell, 1985
PYP	Pima, Yepachi, Chihuahua: Shaul, 1994
Rr	Rarámuri: Brambila, 1976
SP	Southern Paiute: Sapir, 1931
ST	Southern Tepehuan: Bascom, 1965
SUt	Southern Ute: Givón (ed.), 1979
Tb	Tubatulabal: Munro and Mace, 1995
Tb(V)	Tubatulabal: Voegelin, 1958
Tbr	Tubar: Lionnet, 1978
To	Tohono O'odham: Saxton et al., 1983

To(M)	Tohono O’odham: Mathiot, 1973
TSh	Timbisha Shoshone: Dayley, 1989
TSh(M)	Timbisha Shoshone: McLaughlin, 1987
UP	Upper Pima: Bascom, 1965
WMn	Western Mono: Bethel et al., 1993
Wr	Warihó: Miller, 1996
WSh-B	Western Shoshone, Big Smokey Valley: Crapo, 1976
WSh-C	Western Shoshone, Cherry Creek: Crapo, 1976
WSh-D	Western Shoshone, Duck Valley: Crum and Dayley, 1993
WSh-G	Western Shoshone, Gosiute: Miller, 1972
WSh-R	Western Shoshone, Ruby Valley: Miller, 1972
Yq	Yaqui, Sonora: Estrada Fernández et al., 2004
Yq-Az	Yaqui, Arizona: Molina et al., 1999

## Online Appendix 2 Cognate Sets

The majority of the cognate sets presented here have been proposed in other studies of Uto-Aztecan historical linguistics. The principal published compilations of Uto-Aztecan cognate sets are Voegelin et al. (1962), Miller (1967), and Stubbs (2011). Stubbs (2011), the most detailed compilation, includes numerous cognate sets not found in the other sources, as well as additional cognates or resemblants for sets previously identified. The author also provides analyses of the regular and irregular correspondences attested, cross-references to other relevant sets, and an extensive bibliography of previous studies.

The cognate sets in this appendix are intended only to document regular correspondences, in particular the three correspondences that are the focus of this essay: 1) NUA *-r/l* :: SUA *-r/l*; 2) NUA *-n* :: SUA *-r/l*; and 3) NUA *-ŋ* :: SUA *-n*. I do not include reconstructions of the etyma that the cognates reflect nor, in the case of some sets, all of the cognates attested in the UA languages. In most instances, the cognates I leave out can be found in Stubbs (2011). I provide, in parentheses following the header gloss of each set, the number of the corresponding set in Stubbs (2011).

The words included in each cognate set show the regular correspondences expected of cognates in the initial syllable or, in the case of disyllabic morphemes, in the initial syllable plus the initial segment of the second syllable. Major deviations from the expected are noted in the “Comments.” Glosses are given for individual cognates only when they deviate from the header term or terms that I have assigned to the set. When a cognate has multiple referents and one corresponds to that of the header, the other referents usually are not indicated. The principal source of data for each language is the first source listed in Appendix 1. Data from other sources are included when cognates are not attested in the principal sources or when the data differ between the principal and secondary sources.

My orthography corresponds to that of the Americanist phonetic notation, in which <c> represents the voiceless alveolar affricate, <č> the voiceless post-alveolar and alveopalatal affricates, and <š> the voiceless alveopalatal fricative. I retain the modern technical orthographies developed for each of the languages considered with a few exceptions. I use <ɕ> to represent a voiceless retroflex sibilant and <ï> instead of <i> as the grapheme for a high, central or back unrounded vowel. I have adopted <ɾ> as the grapheme for the Névome sound represented in the original source with the digraph <rh>. In his study of Tubar, Lionnet (1978) uses <o> as the symbol for an allophone of the phoneme /u/ and <q> to represent the phoneme /o/. Here I represent the Tubar phoneme /o/ as <o>; there are no attestations of the Tubar allophone of /u/ in these sets. I retain Hill and Nolasquez’s (1973) grapheme <e> to represent Cupeño /ə/.

For the most part, I use the citation forms of the original sources, which in the case of nouns often include non-possessed (“absolute”) noun suffixes. Here these suffixes are not separated from the stems to which they are attached. Stress usually is indicated if it is marked in the original sources or is relevant to the analysis. The grave accent in Third Mesa Hopi words represents falling tone. Identical vowel sequences in Yaqui, Mayo, and the Tepiman languages are retained as such: -VV-. Vowel length in Tubatulabal, Hopi, Luiseño, Nahuatl, and Pipil is denoted by a colon following the

lengthened vowel: <-V:->. I eliminate initial glottal stops preceding vowels except in the case of Tubatulabal verbs.

The cognates in each set are organized by subfamilies in the following order: 1) Numic (NUM), 2) Tubatulabal (TUB), 3) Hopi (HOP), 4) Takic (TAK), 5) Tepiman (TEP), 6) Taracahitan (TRC), 7) Tubar (TBR), 8) Corachol (CRC), and (9) Aztecan (AZT). Most sets lack cognates from several subfamilies, but the order and numbering are retained. The abbreviations for all of the languages and subfamilies are found in Appendix 1.

**ASPEN** (S-559). 1) NUM: NP *kaibasijabi* ~ *kaibassijaabi* 'quaking aspen' [*kaiba* 'mountain' + *sijaabi* 'willow']. NP-Y *sijjabi* 'cottonwood.' EMn *sujaava* 'cottonwood.' TSh *sijapin*. WSh-B *sinkappin* ~ *sinkappih*. WSh-D *sinnapin*. WSh-G *sinkapin* ~ *sinnapin*. NSh *sinaa?bi* ~ *sanaa?bi*. ESh *sina* (Shimkin, 1949: 208). SP *šivvi*. SUt *šivi*.

**BIRD** (S-210). 1) NUM: WMn *coocooná?* 'western bluebird.' 2) TUB: *culušt* 'woodpecker'; *čilust* 'type of woodpecker.' 3) HOP: *co:ro* 'bluebird, mountain bluebird.' 6) TRC: Wr *cu?ru* 'kind of blue bird with a long tail, perhaps a kind of jay'; *cu?rukí* 'bird (generic)'. Rr *čurugi* 'bird (generic).'

**Comments:** a) Based on the Hopi and Warihó words, PUA *\*\*cu?ru* could be reconstructed as the label for some kind of 'blue bird.' Hp /o/ :: Wr /u/ is a regular correspondence, and while Warihó usually retains -ʔ as the reflex of an antecedent morpheme-internal, preconsonantal glottal stop, Hopi seldom does. b) This etymon is the best example I have found for concluding that at least some PUA labels for 'birds' could be onomatopoeic in origin.

Western Mono /o/ reflects PNUA \*o, so WMn *coocooná?* cannot be identified as a cognate in this set. However, it is analyzed by Bethel et al. (1993: 261) as combining a sound-imitative stem, *cooco-*, and the suffix *-na?*, which denotes 'it says X,' "X" being the sound imitated in the stem. In Western Mono, this construction is not restricted to labels for birds. It is attested, for example, in *máá?-na?* 'mosquito' and in two different names for Bigfoot: *qasiqasi-ná?* 'white-coated Bigfoot' and *qauqau-ná?* 'brown-coated Bigfoot.' According to Bethel et al. (1993: 164-166), "*qasiqasi*" is the sound made by Bigfoot's feet walking on snow and "*qauqau*" when the creature walks on dry leaves. c) It is impossible to determine if the second syllable of the other words in this set could be reflexes of a PUA suffix *\*\*ru* with a morphological function comparable to WMn *-na?*. The final syllable in PUA *\*\*wiruku* 'turkey vulture' [see (4)] definitely reconstructs as *\*\*ru*, but *\*\*ri* appears to be the required reconstruction for the final syllable of *\*\*tukori* 'owl' [(3)] and possibly *\*\*kiri* 'a kind of hawk' [(5)]. Perhaps *-ru-* in reflexes of *\*\*cu?ru* and *\*\*wiruku* is the result of vowel harmonization, and a PUA onomatopoeic suffix should be reconstructed as *\*\*ri* or *\*\*ti*. It is suggestive that /t/ is the initial consonant of words meaning 'to say,' 'to talk,' or 'mouth' in languages in all UA subfamilies. In addition, intervocalic \*-t- (as the initial \*/t/ of a suffix would be) has shifted to lenited \*-r/l- in the ancestral languages of Tubatulabal and the Cupan subdivision of the Takic subfamilies, and -t- continues to lenite in the Numic languages (Stubbs, 2011: 15, passim, #1876a-#1878, #1882; Bright and Hill, 1967: 360; Voegelin et al., 1962: 41, 63; McLaughlin, 1992: 172).

**CHEST (OF THE BODY)** (S-427). 1) NUM: NP *nijaabi*. EMn *nújava*. TSh *nijappih* 'rib cage area just

- below the breasts.' WSh-B *nenkappih*. WSh-D *ninkappih* ~ *ninnappih*. WSh-G *ninkappih* ~ *yinkappih*. NSh *ninapi*. ESh *ninapi*. Cm *ninapi*. Ch *niŋapi*. SUt *niávi*.
- CHILD** (S-140). 3) HOP: *ma:na*. 5) TEP: To *mad(i)*. PYp *mar*. NT *már(a)*. 6) TRC: Yq *maára* 'daughter (male speaker)'; *maála* 'mother.' Yq-Az *maala* 'daughter (male speaker), mother.' My *maála* 'daughter (male speaker).' Ed *márwa* 'daughter (male speaker).' Wr *malá* 'daughter.' Rr *mará* 'daughter of a man.'
- CONTAIN, CONTAINER** (S-111). 1) NUM: SP *taŋi* 'to put into.' 3) HOP: *taŋata* 'put into a rigid and/or enclosed container or structure.' 4) TAK: Kt *taŋatat* 'bag, box, quiver, tobacco bag.' 9) AZT: Na-Cl *ta:na?tli* 'basket with a handle, woven of palm.' Pp *ta:nah* 'traveling bag, bundle, pack.'
- FLY** (S-43; S-915). 1) NUM: NP *aŋibi* 'gnats.' WMn *anípi* 'big mosquito found in the mountains.' TSh *aŋipi* ~ *aŋimmuih*. WSh-B *anamuih* ~ *ankamuih*. ESh *ániwu?i* (Shimkin, 1949: 203). Kw *anivi* 'gnat, fruitfly.' SP *aŋívi* 'mosquito.' Ch *aŋivi* 'gnat.'
- FOOT, HOOF** (S-937). 2) TUB: *tana?pit* ~ *tana?pil* 'little baby heel, knuckle.' 3) HOP: *tana*. 5) TEP: To *tađ*. Nv *taŋa*. PYp *tar*. NT *tára*. 6) TRC: Ed *tarát*. Wr *talá* 'sole of the foot.' Rr *íará* 'foot, sole of the foot, footprint.'
- GENTLE** (S-2083). 1) NUM: WSh-D *yuun-*. WSh-G *yuun*; WSh-G *yuni* 'soft, spongy.' 8) CRC: Hc *yíiríme* 'soft, tender, young.'
- HUSBAND** (S-1240). 1) NUM: NP *kuma*. EMn: *gúma?a* 'son's wife's father, daughter's husband's father (female speaker).' WMn *kúwa*. TSh *kuhma*. WSh-D *kuhma* ~ *kuha* 'male, gelding'; *kuhmappi* ~ *kuhappi* 'husband.' WSh-G *kuhma* ~ *kuha* 'husband, male animal'; *kuhmaŋi* 'husband.' Cm *kuhma* 'male, man'; *kumahpi?* ~ *kuhmapi?*. Kw *kuhma*. SP *kummá*. Ch *kuma*. SUt *kumáavi* 'macho.' 2) TUB: *ku:ŋan*. 3) HOP: *ko:ŋya*. 4) TAK: Ca *kúŋlu* 'to propose to marry (of a woman); to have intercourse.' Cp *kuŋ*. Ls *kú:ŋ*. 5) TEP: To *kun*. Nv *kuna*. PYp *kun*. NT *kúna*. ST *kun*. 6) TRC: Yq *kuna*. AYq *kuuna*. My *kuúna*. Ed *kúŋ<sup>v</sup>a*. Wr *kuná*. Rr *kuná*. 7) TBR: *kuna* 'to marry (of a woman).' 8) CRC: Cr *kíin*. Hc *kína*. **Comment:** The Numic cognates reflect Proto-Numic \**kuma*, while all the other cognates reflect PUA \*\**kuŋa*. Kaufman (1981: 118, 237) interprets the \*-m- in the PNumic etymon as the result of assimilation to the round vowel \*u in the first syllable. Based on research in progress, I reconstruct Proto-Central Numic (PCN) \**kuhma* and attribute the \*h to a shift from antecedent vowel length to preaspiration (\**kú:mi* > \**kuhmi*) that occurred in Proto-Eastern Numic (PEN), the ancestral language that gave rise to Proto-Central Numic and Proto-Southern Numic (Freeze and Iannucci, 1979; Babel et al., 2009). Central Numic -*hC*- clusters regularly correspond with Southern Paiute lengthened (or "geminated") consonants, including when these clusters derive from vowel loss. An example of the latter is seen in (20): PNUA \**káhani* > PEN \**kahni* > PCN \**kahni* > SP *kanní*.
- KNEE** (S-941). 1) NUM: EMn *taŋadovo*. WMn *tanabódo* ~ *tanobódo* ~ *tonobódo*. TSh *taŋappih*. WSh-G *tankappih* ~ *tannappih*. NSh *dannapi*. ESh *tankapi*. Cm *tana*. Kw *tanavi*. SP *taŋávi*. Ch *taŋa*. SUt *táavi*. 2) TUB: *toŋo:l*. 5) TEP: To *toon*. Nv *tona*. PYp *toni*. NT *toona*. ST *toon*. 6) TRC: Yq *tonom*. My *tónnom*. Ed *tonót*. Wr *tonó* 'foot.' Rr *íonó* 'foot, leg.' 7) TBR: *tonór*. 8) CRC: Cr *tunú*. Hc *tunú*.
- LOOK FOR** (S-1898). 4) TAK: Ca *hál*. Cp *hále*. Ls *há:l*. 6) TRC: Yq *haríwa*. AYq *hariwa*; AYq *haliwaka* 'to look for tracks.' My *haría*.



**LUNG(S)** (S-1409). 1) NUM: NP *soŋo*. EMn *jŷŷ* ~ *jóno*. WMn *sóno*. TSh(M) *soŋo*. WSh-G *sonko* ~ *sonno*. NSh *sooʔwoN*. ESh *soonko*. Cm *soomo*. Kw *soovi*. SP *soóvi*. Ch *soovi*. SUT *sóóvi*. 4) TAK: Kt *šoŋač*. 6) TRC: Rr *sono*.

**NECKLACE** (S-1505). 4) TAK: Ca *qénxa(t)*. Cp *qínxat*. Ls *qénxat*. Kt *konakat*. 6) TRC: Yq *koókam*. My *koókam*. Ed *kórka*. Wr *koloká*. Rr *gorogá*. 9) AZT: Na-Cl *ko:skatl*. Pp *ku:skatl*. **Comments:** a) The Yaqui and Mayo cognates show the loss of *-r-*. b) The occurrence of *-s-* instead of *-l-* in the Aztecan terms for 'necklace' is an expected secondary development. In Proto-General Aztecan or an earlier post-PSUA ancestral language, the vowel following *\*-r-* was lost, resulting in the juxtapositioning of *\*-r-* and *\*-k-* and the subsequent replacement of *\*-r-* by *\*-s-*. The same vowel loss is encountered in the Eudeve cognate *kórka* but without the shift of *-rk-* to *-sk-*.

**PITCH, GUM, GLUE, SAP** (S-1634). 1) NUM: NP *sanapi*. WMn *sanápi*. TSh *sanappin*. WSh-D *sanappin*. WSh-G *sanappin*. Cm *sana* 'sticky.' Kw *sanapi*. SP *sanáppi* ~ *sannáppi*. Ch *sanapi*. SUT *sanápi*. 2) TUB: *sa:nat*. 3) HOP: *sa:na*. 4) TAK: Ca *sáanat*. Cp *sáanat*. Ls *šá:nat*. Kt *hanat* 'tar.' 9) AZT: Na-Cl *sa:loaa* 'to glue.' Pp *sa:luaa* 'to glue.'

**POUR** (S-2319). 1) NUM: Cm *payuniti* 'pour water on.' Kw *yuniʔi* ~ *yiniʔi*. SUT *yunáy* 'to scatter, put (plural objects).' 4) TAK: Ls *yuniʔi* 'to sprinkle.' 6) TRC: Ed *dúridaan* 'to be emptied.' Wr *yuʔripúna* 'to empty, throw out a liquid.' **Comment:** The initial syllable *pa-* in Comanche *payuniti* is the reflex of the PUA etymon for 'water.'

**PULVERIZE** (S-1080). 3) HOP: *pi:ŋya*. 4) TAK: Ca *píŋ* 'to get pulverized, to grind.' Kt *piŋan* 'to crumble (vi).' 9) AZT: Na-Cl *pinolli* 'flour, something ground.' Pp *pinu(u)l* 'powder or flour for eating or drinking.'

**RING, RATTLE.** 2) TUB: *halala:ʔit* ~ *ʔahalala* 'to rattle.' 3) HOP: *qalalata* 'to be ringing, clanking, clacking, tinkling.' 4) TAK: Ls *ká:ri* 'to ring, croak, belch.' 9) AZT: Na-Cl *kala:ni* 'to jingle, rattle.' Na-Cl *kakalaka* 'to rattle.'

**SALT** (S-1865). 1) NUM: NP *oŋabi*. EMn *oŋávi*. WMn *omábi*. TSh *oŋ<sup>w</sup>api*. WSh-G *onapin*. NSh *onaaʔbi*. ESh *ónaabi*. Cm *onaabi*. Kw *owavi*. SP *oávi*. SUT *óávi*. 2) TUB: *uŋa:l*. 3) HOP: *ö:ŋa*. 4) TAK: Ca *íŋiʔ*. Cp *íŋeyu* 'to salt.' Ls *éŋla*. 5) TEP: To *on*. Nv *ona*. PYP *ona*. NT *onai*. ST *on*. 6) TRC: Yq *oóna*. My *oóna*. Ed *onát*. Wr *woná*. Rr *oná* ~ *koná* ~ *noná*. 7) TBR: *onát*. 8) CRC: Cr *unáh*. Hc *úna*.

**SCOOP.** 1) NUM: NP-Y *yuŋaʔhu* 'to scoop fish.' TSh *yuy<sup>w</sup>ah* 'to scoop or dip up.' WSh-D *yunnah* 'to scoop or dip a liquid, to ladle.' WSh-G *yunnah* 'to scoop or dip up a liquid.' Cm *yunari* 'to skim from the surface.'

**SHAKE, SWING** (S-1928). 2) TUB: *wilikoʔyat* ~ *ʔiwilikooy* 'to swing.' 3) HOP: *wi:wila* 'to shake, swing or wave around.' 7) TBR *wimwirá* 'to shake, tremble.'

**SMALL** (S-1356). 4) TAK: Ca *ínišilʔ* ~ *ínišmal* 'small one.' Ls *alúʔmal*. Kt *anuciʔ* 'small; baby, little finger.' 5) TEP: To *al* 'little'; *ali* 'baby, child.' PYP *laʔali* ~ *lahali* 'boy, youth.' NT *áli*. ST *álʔii*. 6) TRC: Yq *ili*. My *iliči* ~ *iliʔiči*. **Comment:** The *-l-* in the Luiseño term probably is a secondary development in which *-n-* was denasalized to *-l-*. A similar denasalization of *-n-* is attested in the Luiseño term *čóri* 'to roll,' which is derived from PCupan *\*čini*. The other Cupan cognates are Cahuilla *čénen* and Cupeño *čéne*.

**SWALLOW** (S-785). 2) TUB: *welihat* ~ *ʔeweleh*. 3) HOP: *kwelok* 'sample by tasting.' 6) TRC: Ed *béruʔu*.

**THINK** (S-2284). 3) HOP: *i?na* ‘to recall, remember.’ 4) TAK: Ca *e?nan* ‘to know, recognize, learn, find out.’ Ls *ó?na* ‘to know, recognize, be acquainted with.’ Kt *in* ‘to know, know how, understand.’ 5) TEP: To *ilið* ‘to think (about), decide, conclude, wish.’ NT *ilíídií* ‘to think, believe, want.’ ST *il’iid’* ‘to think.’ 6) TRC: Yq *ea* ‘to think, reflect, want.’ My *eija* ‘to think.’ Ed *erám* ‘to think, feel, want.’ Wr *e?láni* ~ *elamá* ‘to think about, think to be so, be concerned about, be considerate.’ 8) CRC: Hc *érie* ‘to think, believe, feel.’ 9) AZT: Na-Cl *ilna:miki* ‘to remember, reflect on something.’ Pp *elna:miki* ‘to remember.’ **Comments:** a) The Yaqui and Mayo cognates show the loss of *-r-*. b) In the Mayo cognate, the */i/* is unexpected while the */y/* is inserted to break up a three-vowel cluster.

**TURKEY VULTURE** (S-343). 1) NUM: NP *wiho*. EMn *wihópi*. WMn *wího*. TSh *wihnumpicci*. TSh(M) *wihumpiccih*. Kw *wikumahaazi*. SP *wikkumpici*. SUt *wĥkúciġeti*. 2) TUB: Tb(V) *wišokombišť* ‘song of the turkey buzzard.’ 3) HOP: *wisoko*. 4) TAK: Kt *wirukuht*. 6) TRC: Yq *wíru*. My *wíru*. Rr *wirú*. 7) TBR: *wilú*. 8) CRC: Cr *viski*. Hc *wirikí*. 9) AZT: Na-Cl *wi:lo:tl* ‘dove.’ Pp *wi:lut* ‘bird, dove.’ **Comments:** a) PUA *\*\*wiruku* can be reconstructed based on the Kitanemuk and Huichol cognates; Huichol */i/* reflects PUA *\*\*u*. b) Except for the medial *-s-*, the Hopi term corresponds precisely to the Kitanemuk and Huichol terms (Hopi */o/* is the reflex of PUA *\*\*u*), but a shift of medial *\*-r-* to Hopi *-s-* is unusual, suggesting that it is not cognate. c) The distinct referents of the Aztecan terms also raise doubts about their cognacy, despite their phonological similarities to *\*\*wiruku* (Jane Hill, personal communication, 2011). d) The Numic terms show a variety of secondary developments, including the shift of the intervocalic *\*-r-* to other consonants and the loss of the final or medial syllables. A medial *-r-*, postulated as the regular Numic correspondence of *-r-* or *-l-* in the other UA languages, is attested only in Timbisha Shoshone.