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## A COUNTERINTUITIVE SOLUTION IN CENTRAL NUMIC PHONOLOGY<sup>1</sup>

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**1. Introduction.** From the dry valleys at the southern end of the Sierras in California northeast through Nevada, Utah, and Idaho to the arid high plains of central Wyoming stretches one of the longest dialect chains on the North American continent. The Central Numic subbranch of the Numic branch of the Uto-Aztecan language family includes only three recognized languages (Panamint,<sup>2</sup> Shoshoni, and Comanche),<sup>3</sup> but (excluding the noncontiguous Comanche) covers almost a thousand land miles from one end to the other. The dialect diversity within this territory is interesting because of the insights that it brings to the historical phonology of the most phonetically divergent of the languages—Comanche.

The Central Numic subbranch probably originated in the area between Owens Valley and Death Valley in eastern California. About a thousand years ago, the speakers of Proto-Central Numic began to move northeastward into the heart of the Great Basin in Nevada, eventually spreading into the Great Salt Lake drainage area of northern Utah, the Snake River plain of southern Idaho, and the upper Green River basin of western Wyoming. This expansion led to the differentiation of Panamint and Shoshoni. When the easternmost bands of Shoshoni acquired the horse in the early decades of the eighteenth century, they moved farther out onto the

<sup>1</sup> An earlier version of this paper was presented at the 1987 Friends of Uto-Aztecan Workshop/Hokan-Penutian Conference in Salt Lake City, Utah. I am grateful to Wick Miller, James Armagost, and Jean Charney for numerous discussions concerning Central Numic phonology and to the anonymous *IJAL* reviewers for their very constructive comments, but any failures herein are still my own.

<sup>2</sup> Dayley (1989a) refers to the language as Panamint in the technical introduction but explains that the name has no meaning for the Indians themselves. They call themselves “Shoshoni” and refer to the Shoshoni proper as “Nevada Shoshoni.” Dayley calls the language he describes “Tümpisa Shoshone,” but this only refers to the dialect spoken in Death Valley. This being a technical work, I retain the term Panamint here to avoid confusion with Shoshoni.

<sup>3</sup> Numic comprises seven languages divided into three groups: Western Numic (Mono, Northern Paiute), Central Numic (Panamint, Shoshoni, Comanche), and Southern Numic (Kawaiisu, Southern Paiute). Chemehuevi and Southern Ute are dialects of Southern Paiute. Bannock is a dialect of Northern Paiute. Tübatulabal is a related Uto-Aztecan language bordering the Numic area on the west.

high plains of central Wyoming. Some of these bands broke off and moved south, eventually reaching the Llano Estacado of northwestern Texas. This group became the Comanche. During the next three centuries, the language of the Texas bands underwent enough change to justify considering it a separate Central Numic language.<sup>4</sup>

The relevance of the spirantization problem in Central Numic discussed in this paper is in the apparently counterintuitive nature of the solution offered by Miller (1973). When the details of spirantization as found in Miller's Central Numic dialect survey are examined, however, each step in the "counterintuitive" partial rule loss can be shown as a natural process. It is only when the endpoints alone are considered that the partial rule loss appears to be counterintuitive.

**2. The consonant series in Numic.** Before we delve into the subtleties of Central Numic historical phonology, a brief overview and definition of the terms FINAL FEATURE and CONSONANTAL PROCESS is in order. When dealing with a Numic language, the linguist is confronted by data such as the following from Panamint,<sup>5</sup> where the postposition meaning 'on' follows different nouns and shows four different surface representations of its initial consonant. After many nouns, the initial consonant is a voiced bilabial fricative, as in:<sup>6</sup>

<sup>4</sup> See Miller (1986:102–4) for a more detailed bibliography and discussion.

<sup>5</sup> The description of Shoshoni phonology is based on Miller (1975). Shoshoni examples are from Miller (n.d.; 1972; 1975). The description of Panamint phonology is based on McLaughlin (1987) and Dayley (1989a). Panamint examples are from my field notes and Dayley (1989b). Interpretation of the phonology of Comanche is based on Charney (1989) and Robinson and Armagost (1990). Comanche examples are from Canonge (1958), Miller (n.d.), and Charney (1989).

Kawaiisu data are from Kroeber (1907), Zigmond (n.d.), and Zigmond, Booth, and Munro (1991). Chemehuevi data are from Press (1979) and Zigmond (n.d.). Kaibab Southern Paiute data are from Sapir (1931). Southern Ute data are from Anonymous (1979).

Mono data are from Lamb (n.d.; 1957) and Liljeblad (1964). Nevada Northern Paiute and Bannock data are from Steward (1938) and Nichols (1974).

Some Numic cognate sets are from Iannucci (1973).

Tübatulabal data are from Voegelin (1935) and Mace and Munro (n.d.).

<sup>6</sup> All forms have been retranscribed into a standard phonetic and phonemic transcription which follows McLaughlin (1987). The following standard Central Numic conventions are used: [V<sub>i</sub>V<sub>j</sub>] is a monosyllabic long vowel [V:]; [C<sub>i</sub>C<sub>j</sub>] is a long consonant [C:]; [V<sub>i</sub>V<sub>j</sub>] is a disyllabic vowel cluster (except for [ai], which is a diphthong); [r] is an alveolar tap; any capitalized segment is a voiceless equivalent of the lowercase character (for example, [R] is a voiceless [r]); [ʔ] is a glottal stop. /' / and /=/ in phonemic forms are final features (see discussion).

Language abbreviations are PN (Proto-Numic), Pn (Panamint), WS (Western Shoshoni), Go (Gosiute Shoshoni), NS (Northern Shoshoni), Co (Comanche), Kw (Kawaiisu), Ch (Chemehuevi), SP (Kaibab Southern Paiute), Ut (Southern Ute), Mo (Mono), NP (Nevada Northern Paiute), and Tb (Tübatulabal). Grammatical abbreviations are abs. (absolutive), dim. (diminutive), nom. (nominative), and acc. (accusative).

- (1) Pn [wossa]  
*wosa*  
 'burden basket'
- (2) [wossaβaʔa]  
*wosa-paʔan*  
 'on the burden basket'
- (3) [paa]  
*paa*  
 'water'
- (4) [paaβaʔa]  
*paa-paʔan*  
 'on the water'

The initial consonant of suffixes and postpositions is always a voiced fricative after these nouns, as shown in:

- (5) Pn [wossayuppa]  
*wosa-kuppan*  
 'in the burden basket'
- (6) [paayuppa]  
*paa-kuppan*  
 'in the water'

After other nouns, however, the initial consonant of the postposition is treated differently, as in examples (7)–(10), in which the initial consonant is [pp]. A geminate voiceless stop<sup>7</sup> is the phonetic realization of the initial consonant of suffixes and postpositions attached to these stems.

- (7) Pn [tiβa]  
*tipa''*  
 'pine nut'
- (8) [tiβappaʔa]  
*tipa''-paʔan*  
 'on the pine nut'

<sup>7</sup> Even though *c* is an affricate, it is affected by all the consonantal processes in a manner exactly parallel to the oral stops. Because of this parallelism, *c* is included in the cover term stop in this paper.

- (9) [tua]  
*tua*<sup>''</sup>  
 'son'
- (10) [tuappa?a]  
*tua*<sup>''</sup>-*pa?an*  
 'on the son'

After still another group of nouns, the initial consonant of the postposition is [ɸ]. Examples (11)–(14) illustrate this.

- (11) Pn [aŋɣimmui]  
*aŋimmuih*  
 'fly' (noun)
- (12) [aŋɣimmuiɸa?a]  
*aŋimmuih-pa?an*  
 'on the fly'
- (13) [muumbittʃɪ]  
*muumpiccih*  
 'owl'
- (14) [muumbittʃiɸa?a]  
*muumpiccih-pa?an*  
 'on the owl'

After one last group of nouns, the initial consonant is [b] and the noun ends in [m]. This is shown in:

- (15) Pn [hunna]  
*hunnan*  
 'badger'
- (16) [hunnamba?a]  
*hunnan-pa?an*  
 'on the badger'
- (17) [eŋɣwi]  
*eŋwin*  
 'squirrel'
- (18) [eŋɣwimba?a]  
*eŋwin-pa?an*  
 'on the squirrel'

The phonetic facts are quite regular. Four groups of nouns must be considered, based on how the initial consonants of suffixes and postpositions surface when following them. The first group is followed by a voiced fricative,<sup>8</sup> the second group is followed by a geminate voiceless stop, the third group is followed by a voiceless fricative, and the fourth group ends in a nasal followed by a voiced stop.

The initial consonant of the second member of a compound form is also subject to the changes illustrated above. This is illustrated in:

- (19) Pn [wɔŋgoβi]  
       *wɔŋko-pi*  
       ‘pine tree-abs.’
- (20) [toɣoa]  
       *tokoa*  
       ‘snake’
- (21) [wɔŋgoroɣoa]  
       *wɔŋko-tokoa*  
       ‘speckled rattlesnake’

<sup>8</sup> In this case, the term voiced fricative also includes [r]. It is a weakness of modern generative phonology at this time that there is no obvious way to write lenition rules that captures the generalization that, between vowels, /p/ → [β], /k/ → [ɣ], /t/ → [ð] after front vowels, and /t/ → [r] after back vowels. I have not found any languages where /t/ lenites to an alveolar fricative. In Hebrew, /t/ → [θ] and /d/ → [ð]. In Inupiaq Eskimo (Jeff Leer, personal communication), every stop in an unstressed syllable lenites to a homorganic voiced fricative except for /t/, which does not lenite. Other examples can be found in Kelly (1978).

In Numic as a whole, /t/ → [ð] after front vowels and [r] elsewhere in Western Mono, Panamint, and Shoshoni; /t/ → [r] after nonfront vowels and remains [t] elsewhere in Comanche; /t/ → [d] after front vowels and [r] elsewhere in Eastern Mono; /t/ → [d] or [r] in Northern Paiute; /t/ → [r] in Kawaiisu, Chemehuevi, and Southern Ute; and /t/ → [tʃ] after /i/ and [r] elsewhere in Kaibab Southern Paiute.

James Armagost (personal communication) has suggested that Proto-Numic \*/t/ → [r] may be a development separate from lenition for the other stops which uniformly results in voiced spirants at the same point of articulation in all the Numic languages (only /p/ → [β] in Comanche). The evidence from Western Numic and Southern Numic suggests that Proto-Numic \*/t/ → \*[r] between vowels and that the fronting of \*/t/ to \*[ð] after front vowels in Central Numic and Western Mono and /t/ to [tʃ] in Kaibab Southern Paiute are later developments. Rather than postulating an originally separate rule for \*/t/ → [r], however, all pre-Proto-Numic stops may have simply been voiced between vowels (as is the case in Tübatulabal). Later, \*[d] became flapped and the other voiced stops became fricative in the same point of articulation—all as part of a single process of lenition. The question begs for an answer but is beyond the scope of this paper.

- (22) [waappi]  
*waa''-pi*  
 'pinyon pine-abs.'
- (23) [toyaβi]  
*toya-pi*  
 'mountain-abs.'
- (24) [waattoyaβi]  
*waa''-toya-pi*  
 'pinyon country-abs.'
- (25) [tsaippittʃI]  
*caippiccih*  
 'pinyon jay'
- (26) [puŋgu]  
*puŋku*  
 'pet'
- (27) [tsaippittʃiɸuŋgu]  
*caippiccih-puŋgu*  
 'pet pinyon jay'
- (28) [yooyombi]  
*yookon-pi*  
 'valley-abs.'
- (29) [kammu]  
*kammu*  
 'jackrabbit'
- (30) [yooyoŋgammu]  
*yookon-kammu*  
 'black-tailed jackrabbit'

Nouns also affect the initial nasal of a suffix or postposition which begins with a nasal. Examples (31)–(42) illustrate what happens to the initial nasal of the postposition 'with' when it follows these four types of nouns.

- (31) Pn [taβe]  
*tape*  
 'sun'

- (32) [taβeβaʔa]  
*tape-paʔan*  
 'on the sun'
- (33) [taβeṽwa]  
*tape-ma*  
 'with the sun'
- (34) [tiβa]  
*tipa*  
 'pine nut'
- (35) [tiβappaʔa]  
*tipa*''-*paʔan*  
 'on the pine nut'
- (36) [tiβamma]  
*tipa*''-*ma*  
 'with the pine nut'
- (37) [muumbittʃI]  
*muumpiccih*  
 'owl'
- (38) [muumbittʃiφaʔa]  
*muumpiccih-paʔan*  
 'on the owl'
- (39) [muumbittʃihṽa]  
*muumpiccih-ma*  
 'with the owl'
- (40) [piyi]  
*piyin*  
 'duck'
- (41) [piyimbaʔa]  
*piyin-paʔan*  
 'on the duck'
- (42) [piyima]  
*piyin-ma*  
 'with the duck'



In these examples, the nouns which condition voiced fricatives are followed by nasalized semivowels, the nouns which condition voiceless stops are followed by geminate nasals, the nouns which condition voiceless fricatives are followed by an *h*-nasalized semivowel cluster, and the nouns which condition nasal-voiced stop clusters are followed by a geminated nasal. It is the effect of a stem on the initial consonant of a following suffix that is called the FINAL FEATURE in Numic phonology.<sup>9</sup>

At morpheme boundaries, the phonological alternation in the initial consonant of a suffix or second element of a compound is evident, but the same four types of consonant also occur in the middle of morphemes, where no morpheme boundary can be postulated in contemporary forms or reconstructed for protoforms. Examples (43)–(46) illustrate the four types of consonant in morpheme-medial position where no morpheme boundary can presently be drawn.

- (43) Pn [waiβo]  
       *waipo*  
       ‘common nighthawk’
- (44) [yippe]  
       *yippe*  
       ‘kit fox’
- (45) [oφi]  
       *ohpin*  
       ‘mesquite bean’
- (46) [yamba]  
       *yampa*  
       ‘mockingbird’

It has long been recognized that the morpheme-medial stops must reflect the same phonological processes that are transparent at morpheme boundaries. The synchronic nature of these processes in different Numic languages is controversial, but at least their historical derivation from the processes seen in the final features is clear. These two sets of data—morpheme-medial consonants and morpheme-final consonant alternations—are together known as the CONSONANTAL PROCESSES and the four types of consonant are the CONSONANT SERIES. The four consonant series are usually

<sup>9</sup> The final features are written in underlying forms as /ʔ/ for a geminating stem in all languages except Comanche and Mono, where it is /H/; /h/ for a preaspirating stem; and /n/ for a nasalizing stem in all languages except Comanche and Nevada Northern Paiute, where it is /=/. A vowel-final stem (with no final feature) allows the following consonant to be spirantized.

referred to as SPIRANTIZED<sup>10</sup> (the initial stop of the following suffix changes to a voiced fricative), GEMINATED<sup>11</sup> (the initial stop of the following suffix changes to a geminated or, in some of the languages, preaspirated voiceless stop), PREASPIRATED<sup>12</sup> (the initial stop of the following suffix changes to a voiceless fricative and the preceding vowel is usually voiceless), and NASALIZED<sup>13</sup> (the initial stop of the following suffix changes to a nasal-stop cluster—the oral stop being either voiceless, as in Southern Numic, or voiced, as in Central Numic). The terms spirantized, geminated, and nasalized date from Sapir (1930) and the term preaspirated was coined by Miller. Within Central Numic, the majority of linguists are in agreement that these consonant alternations are synchronic in nature and thoroughly productive.

**3. Central Numic spirantization.** Between vowels, the simple oral stops in Panamint and Shoshoni are voiced and lenited. Examples (47)–(53) illustrate spirantization of the oral stops in Panamint. Spirantization in Western Shoshoni and Gosiute Shoshoni is nearly identical. Tables 1 and 2 show the full set of spirantized consonants for Panamint and Shoshoni.

- (47) Pn [tiβa]  
           *tipa*  
           ‘pine nut’

<sup>10</sup> Charney (1989) uses the term LENIS in her description of Comanche. Underlying spirantized consonants are written /C/ here.

<sup>11</sup> Charney (1989) and Robinson and Armagost (1990) use the term PREASPIRATED for this series in Comanche because it surfaces as a preaspirated voiceless stop. Underlying geminated consonants are written /CC/ in all languages here except Comanche and Mono where they are written /HC/. This is in contrast to Nichols (1974), who uses /C/ for this series.

<sup>12</sup> This series only occurs in Central Numic and is the result of a split in the geminated series due to a stress shift in pre-Proto-Central Numic (Miller 1980). The preaspirated series consonants are lenited just like spirantized series consonants except they are voiceless and usually preceded by a voiceless vowel.

Charney (1989) uses the term *aspirated* for this series in Comanche. Underlying preaspirated consonants are written /hC/ here.

<sup>13</sup> This series has undergone a variety of changes throughout Numic. In Mono, Oregon Northern Paiute, and Bannock, it has completely merged with the geminated series. In Nevada Northern Paiute, the nasal assimilated to the stop to become a voiced geminate stop (which contrasts with the voiceless geminate stops of the geminated series). In Kawaiisu, the nasal has been lost, but the stop is voiced and does not lenite to a spirant (thus [β] and [r] of the spirantized series contrast with [b] and [d] of the nasalized series). In Comanche and Southern Ute, the nasal has been lost and the stop is voiceless (resulting in a complete merger with the geminated series in Southern Ute and a partial merger with the spirantized series in Comanche).

Charney (1989) uses the term FORTIS for this series in Comanche. Underlying nasalized consonants are written /NC/ in all languages here except Comanche and Nevada Northern Paiute where they are written /=C/. This is in contrast to Nichols (1974), who uses /ʹC/ for this series.

TABLE 1  
THE SPIRANTIZED CONSONANTS IN PANAMINT\*  
(V \_\_ V)

	Labial	Alveolar	Affricate	Velar	Labiovelar
Underlying. . . . .	<i>p</i>	<i>t</i>	<i>c</i>	<i>k</i>	<i>kw</i>
Surface. . . . .	<i>β</i>	<i>ð, r</i>	<i>ʒ, z</i>	<i>γ</i>	<i>γw</i>

\*Under the columns for /t/ and /c/, the first form occurs after a front vowel and the second form occurs after a nonfront vowel.

TABLE 2  
THE SPIRANTIZED CONSONANTS IN SHOSHONI\*  
(V \_\_ V)

	Labial	Alveolar	Affricate	Velar	Labiovelar
Underlying. . . . .	<i>p</i>	<i>t</i>	<i>c</i>	<i>k</i>	<i>kw</i>
WS Surface. . . . .	<i>β</i>	<i>ð, r</i>	<i>ʒ, z</i>	<i>γ</i>	<i>γw</i>
Go Surface. . . . .	<i>β</i>	<i>ð, r</i>	<i>ʒ, ð</i>	<i>γ</i>	<i>γw</i>

\*Under the columns for /t/ and /c/, the first form occurs after a front vowel and the second form occurs after a nonfront vowel.

- (48) [poro]  
*poton*  
‘staff’
- (49) [piði]  
*piti*  
‘arrive’
- (50) [wazia]  
*wacia*  
‘gray fox’
- (51) [piʒa]  
*pica*  
‘bitch’
- (52) [yayai]  
*yakai*  
‘cry’
- (53) [saywaβi]  
*sakwapi*  
‘green’

TABLE 3  
THE SPIRANTIZED CONSONANTS IN COMANCHE\*  
(V \_\_ V)

	Labial	Alveolar	Affricate	Velar	Labiovelar
Underlying. . . . .	<i>p</i>	<i>t</i>	<i>c</i>	<i>k</i>	<i>kw</i>
Surface. . . . .	<i>β</i>	<i>t, r</i>	<i>ts</i>	<i>k</i>	<i>kw</i>

\*Under the column for /t/, the first form occurs after a front vowel and the second form occurs after a nonfront vowel.

Spirantization in Comanche is different than in Panamint and Shoshoni. Only /p/ is spirantized in all environments. After a nonfront vowel /t/ is spirantized but not after a front vowel. Examples (54)–(60) illustrate Comanche spirantization. Table 3 shows the full set of Comanche spirantized consonants.

(54) Co [paβi]  
*papi*  
‘brother’

(55) [ara]  
*ata*  
‘uncle’

(56) [siti]  
*siti=*  
‘this’

(57) [kotse]  
*koce*  
‘wash’

(58) [pitsi]  
*pici*  
‘breast’

(59) [maka]  
*maka*  
‘feed’

(60) [yikwi]  
*yikwi*  
‘say’

Northern Shoshoni spirantization is similar to both Comanche and Western Shoshoni spirantization. The consonants /c/, /k/, and /kw/ in all environ-

TABLE 4  
THE SPIRANTIZED CONSONANTS IN NORTHERN SHOSHONI\*  
(V \_\_ V)

	Labial	Alveolar	Affricate	Velar	Labiovelar
Underlying. . . . .	<i>p</i>	<i>t</i>	<i>c</i>	<i>k</i>	<i>kw</i>
Surface. . . . .	<i>β</i>	<i>d/t, r</i>	<i>č/tš, z/ts</i>	<i>γ/k</i>	<i>γw, kw</i>

\*Under the columns for /t/ and /c/, the first form occurs after a front vowel and the second form occurs after a nonfront vowel. The forms separated by a slash are optional variants.

ments and /t/ after front vowels are optionally nonspirantized, but when they are spirantized, they are spirantized just like the stops in other Shoshoni dialects. Examples (61)–(66) illustrate Northern Shoshoni optional nonspirantization. Table 4 shows the full set of spirantized consonants in Northern Shoshoni.

- (61) NS [taβe]  
*tape*  
 ‘sun’
- (62) [kari]  
*kati*  
 ‘sit’
- (63) [eði] or [eti]  
*eti*  
 ‘gun (acc.)’
- (64) [tazinompl] or [tatsinompl]  
*tacinompi*  
 ‘star’
- (65) [piža] or [pitša]  
*pica*  
 ‘milk’
- (66) [eγo] or [eko]  
*ekon*  
 ‘tongue’

We are thus left with a distribution of spirantized consonants that leaves a tantalizing question mark. In the easternmost language, Comanche, spirantization is completely absent with /c/, /k/, and /kw/, and with /t/ after a front vowel; in Northern Shoshoni, nonspirantization of these stops is optional; and in Panamint and Western Shoshoni, spirantization is mandatory

for all stops. There are two possible explanations for this distribution of spirantization in Central Numic. The first explanation is that Shoshoni and Panamint represent the original pattern and that Comanche has narrowed the scope of the rule to include only /p/ and some instances of /t/. Partial rule loss, however, is intuitively unnatural. The second possible explanation is that Comanche represents the original Central Numic pattern of spirantization and that Panamint and Western Shoshoni represent the spread of spirantization to all the stops. This seems to be an intuitively more natural explanation. In either case, Northern Shoshoni represents the rule loss or rule spread in progress.

**4. The natural solution.** There are good linguistic reasons for selecting the spread of a restricted Comanche spirantization pattern to a more general Panamint/Shoshoni pattern as the explanation for the distribution of spirantization rules in Central Numic. The first, and best, reason is that analogy is a very productive process in historical change. Once spirantization is entrenched in the labials, it is a simple matter for the specification of the phonological rule to be widened in scope to include all other stops.

Another reason for selecting the Comanche pattern as original is the fact that Comanche is separated from the other languages while Panamint and Shoshoni are in contact with one another. Any change in Shoshoni would also be likely to occur in Panamint, and vice versa. The Numic region of the Great Basin has several examples of phonological changes occurring in one language and then spreading to other languages in the area. For example, initial /h/ was lost in Kaibab Southern Paiute and Southern Ute and also lost in neighboring Gosiute Shoshoni. Example (67) illustrates this loss of initial /h/ in contiguous Numic languages.

(67) Western Numic

Mo: *hipi*

‘drink’

NP: *hipi*

Central Numic

Pn: *hipi*

Go: *ipi*

WS: *hipi*

NS: *hipi*

Co: *hipi*

Southern Numic

Kw: *hipi*

SP: *ipi*

Ch: *hipi*

Ut: *ipi*

There are other examples of not only phonology but also grammar being borrowed among the languages of the Great Basin. Jacobsen (1986) includes an extensive bibliography of Great Basin grammatical diffusion.

The data from Miller's Central Numic dialect survey conducted in the late 1960s show the distribution of nonspirantization in Shoshoni. A clear isogloss can be drawn between the Ruby Valley and Elko settlements that separates Western Shoshoni and Gosiute Shoshoni, which have a very low degree of optional nonspirantization, from Northern Shoshoni, which exhibits a much higher degree of nonspirantization.

The easiest, and most natural, explanation for the distribution of spirantization rules in Central Numic is to postulate a Proto-Central Numic rule that spirantized *\*p* in all environments and *\*t* after a nonfront vowel. This is the present state of affairs in Comanche. This rule would then have been generalized in Shoshoni and Panamint to include all the stops in its scope. Spirantization is optional in Northern Shoshoni but mandatory in Panamint and Western Shoshoni, possibly indicating that the broader, mandatory rule originated in the Panamint area and is spreading eastward.

**5. The counterintuitive solution.** Miller (1973), however, takes the opposite, seemingly counterintuitive, position that Comanche and Northern Shoshoni are the innovators and that Panamint and Western Shoshoni preserve the older pattern. He bases his conclusion on two arguments. First, Comanche only separated from Northern Shoshoni within the past 300 years and it would be difficult for such a change as consonant spirantization to spread throughout Panamint and Shoshoni in such a short time. However, if the change originated in the west, it would have been moving eastward before the Comanche separation. The Comanche could have left Wyoming after the rule had been broadened and become mandatory in the west, but before it reached the eastern edge of the dialect chain. Thus, the argument based on Comanche's recent separation is not conclusive by itself.

Miller's second argument is that mandatory intervocalic spirantization of all stops is a pan-Numic feature and must be reconstructed for Proto-Numic. Examples (68)–(75) illustrate spirantization in Mono and Southern Paiute while Table 5 shows the results of spirantization throughout Numic (*/c/* is problematic in the group and is not included).

- (68) Mo [haβi]  
       *hapi*  
       'lie down'
- (69) [kura]  
       *kuta*  
       'neck'
- (70) [toyo]  
       *toko*  
       'grandfather'

TABLE 5  
SPIRANTIZATION IN NUMIC\*  
(V \_\_ V)

Proto-Numic:	*/p/	*/t/	*/k/	*/kw/
Western Numic				
Mo:	[β	r	ɣ	ɣw]
NP:	[β	r	ɣ	ɣw]
Southern Numic				
Kw:	[β	r	ɣ	ɣw]
Ch:	[β	r	ɣ	ɣw]
SP:	[β	tʃ, r	ɣ	ɣw]
Ut:	[β	r	ɣ	ɣw]
Central Numic				
Pn:	[β	ð, r	ɣ	ɣw]
WS:	[β	ð, r	ɣ	ɣw]
Go:	[β	ð, r	ɣ	ɣw]
NS:	[β	ð/t, r	ɣ/k	ɣw/kw]
Co:	[β	t, r	k	kw]

\*Under the column for /t/ among the Central Numic languages and Kaibab Southern Paiute, the first form occurs after a front vowel (just /i/ in the case of Kaibab Southern Paiute) and the second form occurs after a nonfront vowel. The forms separated by slashes are optional variants.

(71) [yaywadza]  
yakwaca

‘frog’

(72) SP [aβi]  
api

‘lie down’

(73) [qura]  
quta

‘neck’

(74) [toɣo]  
toqo  
‘grandfather’

(75) [uɣwi]  
uqwi  
‘smell’

This argument is much more convincing because every Numic language except Comanche and Northern Shoshoni exhibits mandatory spirantization of all intervocalic stops. However, because of the ease with which grammar and



phonology have been borrowed across language boundaries in the Great Basin, this argument is not completely convincing when considering just Numic.

When looking at Uto-Aztecan languages outside Numic, it becomes clearer that lenition of intervocalic stops is a Uto-Aztecan feature and must be reconstructed for some level of Proto-Uto-Aztecan older than Proto-Numic. For example, Voegelin (1935:80) states concerning Tübatulabal, “Plosives and affricates which are in initial position become voiced when in medial position and preceded by a two-morae vowel.” Examples (76)–(85) illustrate this alternation.

- (76) Tb *pawiligant*  
‘goose’
- (77) *aabawiligant*  
‘many geese in one place’
- (78) *tuukt*  
‘mountain quail’
- (79) *uuduukt*  
‘many mountain quail in one place’
- (80) *kuuhupil*  
‘elderberry’
- (81) *uuguuhupil*  
‘many elderberries in one place’
- (82) *caainaanat*  
‘he is making lace’
- (83) *aadzaainaniša*  
‘he will make lace’
- (84) *čiinal*  
‘hailstones’
- (85) *iidžiinal*  
‘many hailstones in one place’

Tübatulabal lenition differs from Numic lenition by linking the application of the rule to mora counting in the vowels and not just to simple intervocalic position as in Numic.<sup>14</sup> Therefore, some intervocalic simple stops are not lenited in Tübatulabal, as in:

<sup>14</sup> This may reflect an older simple stop versus geminated stop contrast which is now a short vowel-stop versus long vowel-stop contrast. This would then be cognate with the Numic spirantized and geminated consonant series. Much work remains to be done before the Numic consonantal processes are fully described in terms of Proto-Uto-Aztecan phonology.

- (86) Tb *wopul*  
       'gooseberry'
- (87) *pidiitat*  
       'he is turning over'
- (88) *tohaki*  
       'I am hunting'
- (89) *pacaahil*  
       'blackened pine nuts'
- (90) *pičooğišt*  
       'horsefly'

**6. The dialect evidence.** In examining the materials from Miller's dialect survey, it is possible to reconstruct the specific changes which could have brought about the partial loss of the spirantization rule in Comanche. There is a Central Numic rule by which a final vowel is optionally devoiced in prepausal position. When the final vowel is devoiced, the preceding consonant is also devoiced. Examples (91)–(93) illustrate this.

- (91) Co [yikwiyu] or [yikwiiYU]  
       *yikwiyu*  
       'he says'
- (92) WS [siyi] or [sixI]  
       *siki*  
       'leaf'
- (93) Pn [piðippłandi] or [piðippłantɬ]  
       *pitippihanti*  
       'arrived'

When the consonant preceding the vowel is spirantized intervocalically and then devoiced by the final voiceless vowel, this leads to voiceless fricatives preceding the vowels, as in:

- (94) WS [toyaβi] or [toyaɸI]  
       *toyapi*  
       'mountain'
- (95) [paʔiɰwari] or [paʔiɰwaRɬ]  
       *paʔimati*  
       'rain'

- (96) [eʏo] or [exO]  
*ekon*  
 ‘tongue’

When examining the data in the dialect survey, one very interesting fact presents itself—one of the most common variants of a voiceless fricative preceding a final voiceless vowel is a voiceless stop. This optional nonspirantized stop is especially common in Northern Shoshoni. Examples (97)–(101) show this alternation between voiced fricative and voiceless stop.

- (97) NS [toyaβi] or [toyapI]  
*toyapi*  
 ‘mountain’
- (98) [iṵwari] or [iṵwatʰ]  
*imati*  
 ‘rain’
- (99) [niaiði] or [niaitʰ]  
*niaiti*  
 ‘wind’
- (100) [taza] or [tatsA]  
*taca*  
 ‘summer’
- (101) [eʏo] or [ekO]  
*ekon*  
 ‘tongue’

The frequency of optional nonspirantized stops before a final voiceless vowel decreases as one moves westward through the Shoshoni dialects.

Northern Shoshoni also has a second variant for a voiceless fricative before a final voiceless vowel. The voiceless fricative preceding a final voiceless vowel is often preglottalized (Miller 1975:18). Examples (102)–(105) show the preglottalization of Northern Shoshoni voiceless fricatives.

- (102) WS [paʔiṵwaRʰ]  
*paʔimati*  
 ‘rain’
- (103) [taʔE]  
*tape*  
 ‘sun’

- (104) NS [iʷaʔRɬ] or [iʷatɬ]

*imatɬ*

'rain'

- (105) [taʔɸE] or [tapE]

*tape*

'sun'

If the glottal-fricative sequence is coalesced at some point into a unit phoneme, then the [–continuant] feature of the glottal would make the cluster [–continuant], or in other words, the cluster would become a stop at the same point of articulation. This would lead to such pairs as shown in (97)–(101).

From these alternations, it is a natural step of analogy to expand the possible environment of the voiceless stop and create such triplets as illustrated in (106), where a conditioned alternation between voiced fricative and voiceless stop has given way to optional nonspirantization.

- (106) NS [siyi] or [sikI] → [siyi] or [sikI] or [siki]

*siki*

'leaf'

After the alternation between voiced fricative and voiceless stop was established for nominals<sup>15</sup> and verbs in prepausal position, as in (107), then an additional analogical pressure for the spread of optional nonspirantization would be provided by the accusative form which very rarely ends in a voiceless vowel, yet has the same consonant before the final vowel as the nominative form with the alternation between voiced fricative and voiceless stop. Example (108) shows the resulting accusative form with optional nonspirantization of the stop.

- (107) NS [eɬi] or [etɬ] or [eti]

*eti*

'gun (nom.)'

- (108) [eɬi] → [eɬi] or [eti]

*eti*

'gun (acc.)'

<sup>15</sup> Since the Central Numic languages are predominately SOV, the accusative is very rarely utterance-final and, therefore, not often subject to final vowel devoicing. The nominative form often occurs in isolation or in sentence positions subject to brief pauses after it, so there are more opportunities for it to be subject to final vowel devoicing.

One final, but very suggestive, note is that the evidence in the dialect survey indicates that optional nonspirantization is firmly established for the velar stops and /c/ in all environments and for /t/ after front vowels—just those environments where spirantization does not occur in Comanche—but it also indicates that /p/ in all environments and /t/ after nonfront vowels are beginning to be affected by optional nonspirantization before a final voiceless vowel. Examples (109) and (110) illustrate this incipient nonspirantization.

- (109) NS [taβe] or [tapE]

*tape*

‘sun’

- (110) [iṽari] or [iṽatʰ]

*imati*

‘rain’

This indicates that optional nonspirantization of stops is being treated intuitively after all—spreading from an isolated occurrence with stops produced at the back of the mouth before voiceless vowels to eventually include all the stops between vowels in its scope.

The naturalness of a change which begins with the velars and leaves the labials until last is also attested in Kawaiisu by Zigmond. He states (Zigmond, Booth, and Munro 1991:ix), “The nasalized *-mb-* and *-nd-*, which could be heard in the speech of the older people in the 1930s, have practically disappeared.” The Numic nasalized series (*\*mp*, *\*nt*, *\*nc*, *\*ŋk*, *\*ŋkw*) has changed in Kawaiisu from the Proto-Numic nasal-stop cluster to a simple voiced stop. This change was completed last in the labials and dentals. Examples (111)–(116) show this change comparing Kroeber’s recordings (1907) with Zigmond’s recordings (Zigmond, Booth, and Munro 1991). Cognate forms are given to illustrate the Proto-Numic nasalized consonant.

- (111) Kw Kroeber: [timbi]    Zigmond: *tibi* [tibi]

PN *\*timpe*

‘mouth’

SP *timpa* [timpa]

Ut *tippa* [tipa]

Pn *timpe* [timbe]

Co *tɪ=pe* [tipe]

Mo *tɪHpe* [tihpe]

NP *tɪ=pa* [tibba]

- (112) Kw Kroeber: [nabi]      Zigmond: *nabi* [nabi]  
 PN \**nampe*  
       'foot'  
 SP *nampa* [nampa]  
 Ut *nappa* [napa]  
 Pn *nampe* [nambe]  
 Co *na=pe* [nape]
- (113) Kw Zigmond: *ondo*, *odo* [ondo, odo]  
 PN \**onto*('')  
       'brown'  
 SP *onto*'' [onto]  
 Ut *öttö*'' [ötö]  
 Pn *ontin* [ondo]  
 Co *o=ti=* [oti]
- (114) Kw Zigmond: *yadu* [yadu]  
 PN \**yantu*  
       'winnowing basket'  
 SP *yanta* [yanta]  
 Ut *yatta* [yata]  
 Pn *yantu* [yandu]  
 Mo *yaHta* [yahta]
- (115) Kw Zigmond: *wazi* [wazi]  
 PN \**wanci*  
       'antelope'  
 SP *wanci* [wantsi]  
 Ut *wacci* [waci]  
 Pn *wanci* [wandzi]  
 NP *wa=ci* [waddzi]
- (116) Kw Kroeber: [naxa]<sup>16</sup>      Zigmond: *naga* [naɣa]  
 PN \**naŋka*  
       'ear'  
 SP *naŋqa* [naŋqa]  
 Ut *nikka* [nika]

<sup>16</sup> The voiceless fricative here is not explained. Elsewhere (in Kroeber 1907) he has listed Kawaiisu 'dog' as [puku]. Based on Panamint /puŋku/, Southern Paiute /puŋqu/, and Mono /puHku/, this should match Zigmond's *pugu* with a voiced stop. The voicelessness of Kroeber's forms is unattested elsewhere.

Pn	<i>naŋki</i>	[naŋgi]
Co	<i>naki</i>	[naki]
Mo	<i>naHka</i>	[nahka]
NP	<i>nakka</i>	[nakka] <sup>17</sup>

Antilla affirms the relative stability of labials with the comment (1972:77), "On the whole, there is more play in the dental and velar areas than in labial articulation."

**7. Conclusion.** We have thus seen that a seemingly counterintuitive partial rule loss can be intuitively motivated given sufficient dialect data. The changes can now be summarized for the different stages of development. First, the Proto-Central Numic spirantization pattern was like the modern Panamint and Western Shoshoni pattern, i.e., all nongeminated oral stops between vowels were spirantized by a rule such as:

$$(117) \text{ oral stop} \rightarrow \left[ \begin{array}{c} +\text{continuant} \\ +\text{voice} \end{array} \right] / \text{V} \_\_\text{V}$$

In Proto-Central Numic (as is the case with all the modern Central Numic languages), utterance-final vowels could be optionally devoiced by a rule such as:

$$(118) (\text{V} \rightarrow [-\text{voice}] / \_\_\#)$$

In the northern dialects of Shoshoni, the optional, utterance-final devoicing of vowels became more common.

Before a final voiceless vowel, a voiced segment was devoiced by a rule such as:

$$(119) \text{C} \rightarrow [-\text{voice}] / \_\_\text{V} \_\_\# \\ [-\text{voice}]$$

In the northern dialects of Shoshoni, a devoiced fricative before a final voiceless vowel sometimes had a glottal stop inserted in front of it. If this glottal-fricative cluster were reinterpreted as a unit, then the [-continuant] nature of the glottal would make the unit [-continuant], or a stop. In any case, an alternation developed between voiced fricatives preceding voiced final vowels and voiceless stops preceding voiceless final vowels on prepausal words such as nouns in isolation and verbs. The optional non-spirantization of stops before final voiceless vowels then spread to

<sup>17</sup> Since Oregon Northern Paiute and Bannock have completely merged the nasalized series with the geminated series, this form may be the result of dialect borrowing. Nevada Northern Paiute generally retains the distinction between nasalized and geminated series in the velars, for example, Nevada Northern Paiute /ki=ki/ [kiggi], Bannock /kikki/ [kikki], Mono /kiHki/ [kihki] 'foot'.

occurrences of the same form without a final voiceless vowel. Analogical pressure finally extended the optional nonspirantization to other forms that never have final voiceless vowels, such as accusative nouns. These changes are moving by stages from velar to labial.

Comanche separated from Northern Shoshoni before /p/ and /t/ after back vowels began to undergo the first steps toward optional nonspirantization. In Comanche the optional nonspirantization of /t/ (after front vowels), /c/, /k/, and /kw/ became mandatory. A restructuring of the phonological rules of Comanche restricted the rule of spirantization to only /p/ and /t/ after back vowels.

When viewed from a distance, the Central Numic change from full spirantization of all intervocalic, nongeminated stops to the Comanche rule of spirantizing only /p/ and some occurrences of /t/ is unnatural and counterintuitive. However, when viewed in the light of the dialect data it is no longer quite so counterintuitive. Indeed, when each individual step in the change is illuminated, each step is quite natural. It is only when the endpoints alone are seen that the process seems counterintuitive.

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