

Falling Tone in Tanoan
David Leedom Shaul
School of Anthropology, University of Arizona

Hale (1967) used regular sound correspondences to show the validity of a Tanoan linguistic family. "Tanoan" is used here instead of "Kiowa-Tanoan" because Kiowa is no more distant from the other languages phonologically or grammatically than any other Tanoan language is to another.

Hale gave three kinds of data: regular sound correspondences for initial consonants; vowel formulas; and an inherited irregularity (a set of verbs with initial consonant variation which he curiously termed "ablaut"). Davis (1989), identified the values of the vowels in Hale's vowel formulas. Ortman (2012) extended Davis' vowel reconstructions, while also taking vowel length and nasalization into account.

Research for the present paper used the work of Hale, Davis, and Ortman, and applied it to the cognate sets collected in Hale (n.d.). About 150 additional cognate sets were added (for a total of 357). Final consonants (partly shown in Hale's and Davis' work, but systematically reconstructed by Ortman) were taken into account, along with vowel length and nasalization, continuing the work of Ortman. **In addition, tone was reconstructed.**

Changes in the vowels of Tanoan are fairly systematic. Vowel length (except in the Tiwan languages, Northern Tiwa and Southern Tiwa) is preserved. Nasal vowels are preserved in all four branches of Tanoan (Kiowa; Jemez; Tewa; Tiwan subfamily).

Three of the four branches have three tones (high, low, falling): Kiowa, Jemez, Tewa. (Development of phonemic tone in Tiwan is complicated, and does not involve falling tone; so it is not pursued here.) Following the "majority rules" rule-of-thumb, one would posit that all three tones (high, low, falling) were present in Proto-Tanoan. However, falling tone develops in the descendant varieties that have it. In the data below, underscore indicates nasal vowels; acute accent or H indicates high tone; circumflex or F indicates falling tone; grave accent or L indicates low tone. The digraph <au> in Kiowa represents a low, back vowel; <eu> represents a mid, back vowel.

Gloss	Proto-Tanoan	Kiowa	Jemez	Tewa	Taos
blood	*ó:m	ó:m	û	û	
earth 3	*déúám	dáúm, H	nô-pæ, FL, 'field';	nàn-ge	nā-me-
pine nut	*t'ów		t'â:, F	t'ò'	t'ow-
dream, to	*éy	â:		æ:, F	ay
lying (pl.)	*kw'úól ~ *kw'úó	k'úl	gyó:	kw'ôn ~ kw'ó	k'uo (Hale)

The conditions for falling tone are basically the same in Kiowa, Jemez, and Tewa: falling tone develops from loss of a final consonant (occasionally syllable) in a root that had high tone in Proto-Tanoan. Development of falling tone in Tewa is complicated by the shift of some final consonants to /n/ or glottal stop.

In Tanoan languages where falling tone occurs (Kiowa, Jemez, Tewa), falling tone on verbs may be used as a kind of ablaut to signal differences in tense/aspect, or for derivation. So, I will begin with the development of falling tone in non-verb roots (noun, numerals, stative verbs) where

the development of falling tone is uncomplicated.

Data for this paper comes from a variety of sources, mostly compiled by myself into dictionary databases. For Kiowa, I abstracted morphemes and words from Watkins (1984), supplemented by forms from Harrington (1928). For Jemez, I abstracted items from Yumitani (1998), supplemented by Sprott (1992). For Tewa, there is the dictionary compilation of Stubbs (n.d.). For Taos, there is a database made up of published works by Trager (1942, 1943, 1946), supplemented by transcription of Trager's card file dictionary.

Falling Tone in Tanoan Non-Verb Roots

In Tanoan languages that have falling tone (Kiowa, Jemez, Tewa), its development may be easily seen in two kinds of roots (both having high tone in Proto-Tanoan): CVV, and CVC -- where the first vowel may be long. Tanoan roots of the first shape are few in my dataset. Such roots do not always develop falling tone (day, earth 1, string 1), but most do:

cloud, father 2, fish, mother/aunt, to plant, spring (season),
stick 2, water.

Gloss	Proto-Tanoan	Kiowa	Jemez	Tewa	Piro	Taos
cloud	*pheN'eN, HH	phaN-n, H 'sky'clouds'	faeN'aeN, FL			phèN-ne
day	*thèù'èùn	tha:, 'light' (Hale), T?	sho, H	tha:	hron	thèù'èù-na
earth 1	*pha'a, LL					phòN'òN-na
father 2	*to'o, HH	tau: (voc.) F	to:N, 'be a father' H			ta'a-
fish	*peu'eu		po, F	pa:	pu	pe'eu-na
mother/aunt	*kae'ae ~ *ko'o HH	kau:, 'maternal aunt' (voc.) F		ko'o:, 'youngerst aunt' HF		ka-na
plant, to	*kae'ae, HH		kye:, F	ko' ~ ko: (Hale)		kò-; ko'ò-ne, 'planting/cultiv ating'
spring (season)	*toN'oN-li, HH-		to:N-degyi FLM	taN'an-di LHL		toNweung-na
stick 2	sae'ae, HH	tye ~ tyi, 'stick/wood' F				lho'ò-ne
string 1	*pheuo'euo, T?	pho, L 'trap/snare'	fo:, H, 'rope/snare'	phe:, 'trap' (n.)		pheuo-, 'to catch'; pheu'eu-na, 'string'
water	*p'ae'ae, HH	p'au:, 'river', H	p'ae, F	p'o:, L	á	p'o'ò- ~ pa- (bound)

The V'V sequence may collapse into a long vowel with falling tone.

Tanoan roots of the shape CVC with high tone may develop falling tone in the varieties that have falling tone (Kiowa, Jemez, Tewa). There is one root where falling tone may occur that do not fit this pattern in the dataset (hair of the head). Roots with high tone in Proto-Tanoan where final consonant loss in a variety produces falling tone include the following:

antelope, blood, breath, buffako, dog, dry, grease/fat 2, hard, Indian, meat 2,
 medicine, night 1, nose, nut (pine), onion, road, seven, sick,
 stone, two, wood, young/new, yucca.

Gloss	Proto-Tanoan	Kiowa	Jemez	Tewa	Piro	Taos
antelope	*t'op, T?	t'ap, H 'deer'; t'au:-, L (bound)	t'a:, F	t'on		t'a (Is.)
bean(s)	*taNC, H		toN, L	tu:N, F		taN
blood	*o:Nm, H	o:Nm, H	uN, F	uNn, F	u-hem	
breath (n.)	*hiaNl, H	hau:N, H	i:N, H	ha:N, F		haN-nemaN (n.), haNla, (iv.)
buffalo	*kol OR *keul, T?	kaul, H (buffalo cow')		koN', F		kon-
cold 2	*t'VC, H	t'o:, H (weather)	we:-t'e, FM	t'i:, F		
dog	*tsun (T irr.)	tse:N, F, 'horse/dog'		tseh, H	tsu	tsùṅ-na, 'coyote'
dry	*t'ap, H	t'ap, H	t'ae:, H; t'ae:, F, 'dry out (iv.)'	t'a:		t'à-
grease/fat 2	*kieNy H	kauN- F		ka:N (Hale)		kaNy (Har:.)
hair (head)	*phon, H	phau:, 'body hair), L	fa, F	pho, H	fo-na	pho-na
hand	*maNn	mauNn, H	ma:n-te, FL (tone irr.)	man	man-nem	maNn- enemaN
hard	*keuot, H	kot, H	ko:, H 'difficult' (Hale)	ke:, F		
Indian/person	*taey, H		t'ae:, F	t'o-wa, LL	tai	t'oy-na
meat 1	*teu:w, H		to:-tya, 'buffalo' (lit. meat-big), FL	ta:, 'elk'	tawe	teu-, 'elk'
medicine	*gwol, H	dauy, H	kwa, F	wo:		wal (Ang.)
night 1	*neuoNh, H		noN, F, 'midnight'; i-noho (Hale) T?		no	*nu
nose	*pheuoy, H	phoN, L	fo:-se, FH		fu	pheu-

nut (pine)	*t'ow, H		t'a:, F	t'o' L		t'ow-, 'pinyon'
onion	*sVwV (irr.)	saul, F	tyiwe, HH	si:, F		lh _i w-na
road	*p'ieNn, H	aun, L	p'o:N, H	p'o:, F		p'ieN-na
seed	*teuNC	e:-doN, HL 'wheat'		tan, F		lhi-toN-na, 'grass seed'
seven	*tsul, H		seul, F		tsuw	
shoe 2	*to	to:-hi:N, LF, (lit. shoes-real)	i:N, F	an-to (lit. foot- shoe)		ta- (Is.)
sick	*heuol, H	hol, F	hho, F	he:		heuol-
stone	*k'uow, H	k'o-p, 'mountain', H	k'a:, F	k'u:	kiaw-[w]e	
sweet	*aNc, H	au:N (Hale)	oN, F	aN, H		aN-sime
two	*wiy, H	yi:, H	wi:, F	wiye, HL	wiy-[y]u	wi'i-
wolf	*kael, H	kuy, F ~ kuyaul, HL (tone irr.)	kyae-huN, 'dog', HH; kyaeNniN, HH, 'dog'	khu:N-yo, LH (lit. canid-big)	kia-le	kol-ena
wood	*saen OR *sian OR *sen, all H		tye, F	son, L	sa-	*lha (C)
young/new	*ts'an, H	syaun (sg.) ~ syau (pl.), both H	t'i:N, 'fresh/new', F	ts'an, 'new', L	tsem	ts'ém-maN (Hale)
yucca	*phuol, H (Tewa irr.)		fa:, F 'banana'; fwa:la, FM, 'banana yucca'	pha: L ~ pha:mu:, LH		phuol _e -nemaN

Additionally, there are four roots where a final consonant must be inferred for Proto-Tanoan (beans, cold 2, shoe 2, sweet).

The development of falling tone in Kiowa, Jemez, and Tewa from Proto-Tanoan roots with high tone and a final consonant following loss of the final consonant affects different kinds of roots (nouns, stative verbs, numerals). This pattern, then, operated across each language's set of lexical artifacts irrespective of part of speech.

The most important fact about development of falling tone in Tanoan, other than falling tone does not reconstruct for Proto-Tanoan, is that falling tone does not develop across the board. That is, where it does develop in a given language, it does not necessarily develop in any other language. More specific phonological environments that might trigger falling tone are not apparent from the available data. The development of falling tone in Tanoan verb roots is more complicated.

Falling Tone in Tanoan Verb Roots

Falling tone in verb root in Tanoan is more complicated than in Tanoan non-verb roots (nouns, stative verbs, numerals, adverbs). To begin with, there are some verb roots where a falling tone appears in Kiowa, Jemez or Tewa coming from a verb root that ended in a consonant in Proto-Tanoan. In my data, there are five such instances:

be, catch, dream, dwell/live, extinguish.

There is also one verb root with the shape CV'V (to plant), where deletion of the final syllable ('V) produces falling tone. (Data on this is in the appendix.)

Most of the verbs in my data that have falling tone in Kiowa, Jemez or Tewa had no final consonant in Proto-Tanoan, or else have falling tone despite the presence of falling tone in one of the descendent varieties. Verb roots ending in a vowel where falling tone may develop include:

break/sever, come, cut`, cut 2, descend,
explode, get/carry, give, go, kill, lay, work.

(Data on this is in the appendix.)

The verb roots that having a final consonant that remains intact in Kiowa, Jemez, and Tewa but which have falling tone in a descendent variety include:

bite, bring 2, command, cut 1, lying, pick 2, pick 3,
return, run 1, seek, use up.

(Data on this is in the appendix.)

Clearly, falling tone -- once available -- became a phonemic means of signalling a difference in meaning in the daughter varieties where it occurs (Kiowa, Jemez, Tewa).

Falling tone in Tanoan could also be used to derive nouns or other verbs from verb roots. The following such instances occur in my data:

freeze	-->	ice;
run	-->	be fast;
smoke	-->	smoke a cigarette;
sound	-->	bell.

(Data on this is in the appendix.)

Falling tone in Tanoan verb roots (and their tense/aspect ablauted forms) is complex, and most likely reflects individual developments in Kiowa, Jemez, and Tewa. This is a topic for future research, one which will need additional data.

Summary

Falling tone in Tanoan does not reconstruct for Proto-Tanoan, despite that three of the four best documented branches have phonemic falling tone (Kiowa, Jemez, Tewa). Rather, falling tone may develop in non-verb roots (nouns, stative, numerals) from two canonic shapes (CVC, CV'V) where the first vowel has high tone due to loss of the final consonant or glottal stop plus vowel sequence. However, falling tone is sporadic: where it appears in a variety, it does not necessarily appear in any other variety.

The development of falling tone in Tanoan verb roots is for the most part more complicated than in non-verb roots. Falling tone may occur in Tanoan roots ending in a vowel, or in roots

ending in a consonant. Falling tone is used in Kiowa, Jemez, and Tewa as part of an ablaut system in verb roots that marks different tense/aspect categories. Also, falling tone may be used for derivation (high tone verb roots producing variants with falling tone that are either nouns or intransitive verbs).

The marking of perfective (completed action) stems of verbs in Kiowa, Jemez, and Tewa may involve falling tone as the result similar to the general derivation of falling tone (shortening of a final long vowel; deletion of a final consonant or syllable).

Tone in Kiowa

High tone and low tone in Proto-Tanoan roots is inherited in Kiowa roots. Falling tone is mostly seen in verb roots (where it has, as mentioned above, grammatical meaning). However, the general pattern for falling tone in Kiowa is the same as in Jemez and Tewa: loss of a final consonant or syllable creates falling tone on the vowel preceding the shortening/deletion ('to dream', 'to extinguish', 'grease/fat 2', 'onion').

Roots of the shape CV'V in Proto-Tanoan become CV: (a single syllable with a long vowel), with falling tone ('father 1', 'stick 2'). In at least one instance, the loss of a diphthong (vowel cluster) produced the same result: CV: (with falling tone; 'sick').

Tone in Jemez

Roots in Jemez may end in: /p t ty b d s m n w y/. These final consonants appear only when a suffix that begins with a vowel follows. The conditions in Proto-Tanoan that result in the deletion of final segments or syllables in Jemez is not exactly known.

However, not all of the final consonants from Proto-Tanoan remain in Jemez. The following consonants as root-finals were sometimes lost in Jemez: /l n w y/. In some roots, syllable shapes were also deleted: /'V/, /IV/, /dzV/, and /wV/. When a final consonant or syllable is lost in Jemez, falling tone is the result.

Jemez reflections of roots of the shape CV'V in Proto-Tanoan either keep the glottal stop in the middle and have the tonal array of Falling-Low ('cloud', 'spring'). Or, the result may be a long vowel with falling tone ('to plant').

Tone in Tewa

In Tewa, roots may end in a short vowel, long vowel, /n/, or glottal stop. In Proto-Tanoan, roots could end in a consonant or a variety of consonants (including /n/ and glottal stop). In Tewa, high and low tone remain on roots ending in a vowel. If a proto roots ends in /n/, the final /n/ remains along with the original tone.

Root-final consonants other than /n/ in Tewa were dropped or changed to /n/; if the original root had high tone, then the Tewa tone is falling (either with a long vowel with falling tone, or falling toned short vowel followed by a glottal stop). If the original root tone is low, then the usual result is a long vowel with low tone. If an entire syllable was dropped ('meat 2', 'onion'), then the result was a long vowel with falling tone.

Taos Tones

Phonemic tone in Taos carries a low function load, with stress being more important. Trager states that middle tone, which he calls "normal" tone because it is neither higher or lower than a speaker's normal tone of voice. Middle tone "is by far the most common" (1946:190), with low tone fairly common in stems, and "high tone is limited to a few stems and suffixes" of high frequency (1946:90). He states that high tone is higher and sharper than normal (middle) tone, which is "the usual pitch level of an individual's" voice (1946:190). Low tone is "lower and drawling" (in recent Sandia speech, Brandt found that low tone was disappeared, with vowel length in its place).

In Taos, tonal prominence (on roots) may or may not occur with main (word) stress, creating a complex prosodic system. Low tone, for example may occur on the same syllable as main stress, or it may occur before the main stress, for example /p'òxwia-na/, 'egg', where the main stress is shown by underscore.

If Proto-Tanoan had only high and low tone, it follows that most of the high and low tones in Taos came from a high or low tone in the protolanguage. But since the majority of roots and middle tone, it remains to work out how some roots became middle in tonation. In the sample below, I picked items from the vocabulary section of Trager's 1946 sketch that match common items in the currently known body of Tanoan cognates.

For the most part, Taos low tone comes from an ancestral low tone. There seem to be more noun stems with low tone than verb stems with low tone. (The Proto-Tanoan meaning is given first, then the Taos meaning, if there is a difference.)

bluebird	sùl- <u>ena</u>	*tshèùòl
cedar	hùN-	*húN-
dog/coyote	tsùne- <u>na</u>	*tsú:
day	th/èù' <u>èù</u> -na	*thèù'èù
earth	p/òN' <u>òN</u> -na	*phà(l)
fish	p/iw- <u>ena</u>	*pèùòl
flower	pòb- <u>enema</u>	*pòbè
hand (bound)	màN-	*màN
see	mùN-mi	*múN ~ *púN
walk	m/eN	*màèn
water	p'ò' <u>o</u> -ne ~ p/o-	*p'àè'àè
woman	lhìw- <u>ena</u>	*sèùòl

Most Taos low tones come from ancestral low tones, but some come from high tones. The exact conditioning remains to be determined.

Few Taos nouns, such as 'tail' (below), have high tone, which is mostly found with a few verb stems and a few affixes. (In the data below, low tone is not marked.)

bad (be)	tsápu-maN
be	wá, wá-maN
cut (perf.)	t'éN
danced	t'ó
future suffix	-yá ~ á
hot (be)	lhí-ma
kill	h <u>u</u> tá
new/young (be)	tséNma-maN
sing	yotó
tail	xwéN-na

In this data set, the form for 'tail' has high tone in Proto-Tanoan: */kwhéúNn/

Here are some nominals with middle ("normal") tone. As may be seen, they come from both high and low tone in Proto-Tanoan.

breath	h <u>a</u> N-nemaN	*heualNl, H
buffalo	kone <u>ŋ</u> -na	*kVl (low tone)
eagle	tsiwe-na	*tsèwV
foul	li <u>l</u> -na	*delu (tone uncertain)
ground	naNme <u>ŋ</u> -ne	*dèuàNm
ripe/cooked	tsi-maN	*tsè
road	p'i <u>ŋ</u> eN-na	*p'VN5, H
sick	he <u>u</u> ol-	*hèuòl
skin/hide	xoy-na	*khàèy OR *khòy
song	yo'o-nema	*dzáé'áé
yucca	phuol <u>ŋ</u> -nemaN	*phVl (low tone)

The conditioning of the change from Proto-Tanoan high or low tone to Taos middle tone is at present unknown.

In some Taos verbs ("ablauting;" Trager 1946:198), high and low tone alternate with middle tone.

he blew (iv.)	ph <u>u</u> y
he blew (tv.)	ph <u>ù</u> tsi
s/he danced	t' <u>ó</u>

a dance	t'o'one
s/he cut	t'ēN
act of cutting	t'eN-'ene
s/he found	t'òN
act of finding	t'òN-ne

So, there are two outstanding problems (historically) with regard to Taos tones: (a) what exact circumstances produced high, low, and middle tone in Taos; and (b) the exact nature of tone ablauting verbs in Taos.

Appendix: Additional Tanoan Data

Gloss	Proto-Tanoan	Kiowa	Jemez	Tewa	Piro	Taos
be, to	*den, H	dau:, H	noN, F	na, H, 'be at a time'		naN, 'be situated'
bite, to	*kwhuo, T?		ha:tse, HF; ha:we'iN, FLL (impf.)	khu:-gi; khun (AZ)		
break/sever, to	*theum, H	the:Nm, F (pf.), theNmau, HL (imp.)	sho, H, 'break', sha:, H, 'broken'	tha:, H, 'break a stick'; than-de, FL		theum (iv.), theu (tv.)
bring 2	*kVN	kaun, F, 'carry/convey'	khyiN, H (pf.)	kan, H		
catch, to	*dzeuNI OR *dzeuaNI ~ tseuNI OR *tseuaNI; all HT	te:, F 'grab/catch' (pf.; vowel irr.)	zi:Nd (root); zi:N-niN, HH (pf.)			tsaNlaN
come	*e:N, H	a:N, H	aeN, F; iN, H (impf.)	ae:N ~ aeN	e	eN
command, to	*dzae		zae:'-yo, HL (pf.)	-tson; yon F ~ yomae', HL		
cut, to 1	*ts'eudV ~ tseudV	t'al, H; t'a:l, F (root)	t'ole, HH (pf.); sole, 'something cut' HL	ts'a' ~ tsa' H; ts'a', F		
cut, to 2	*k'ae:p, H	k'au:, F 'cut/slash'; k'au:-gu, FL (impf.)	k'ipe, HL 'cut cloth'	k'o-wa LL 'cut hair/shear'		k'a, 'cut hair'
descend, to	*sV	se-p, H (pf.); so:, H (root); so:ya, FL (impf.)	tyo, L			tuliaN, 'rain drop'
dream, to	*eNy, H	a:N, F;		ae:N, F		aNy

		a:N-dep, FL (impf.)				
dwel/live	*theuol H	thol, 'cohabit' (Hale), T?	sho, F (Ort.)	tha:	hro	theuo
explode/pop	*p'a:, H	p'e-thaN, 'laugh' (Har.)	p'ae: (iv.) H	p'a:, F		
extinguish, to	*peuaNsV, LL	pau:-mau, FL (impf.)	piNtyi (tv.); pi:N, 'go out' (iv.)	pa:N, F		
freeze	*dzú		zeu, 'snow/ice', H	yi:, F, 'ice'	a-tse, 'ice' (lit. water-frozen)	tsie- (C)
get/carry, to	*hon ~ *khon, L	hau:-, H (imp.) ~ khau:, H (abl.) H, 'get/buy';	hha:, F (root), 'take'; hha:wa- HL 'take' (impf.); hha', L 'wagon' (Hale)	hon ~ xon, 'carry'		hoy ~ xoy
give, to	*maeN-gV, HL	maN-gau (Hale)	mae:, F (pf.)	maeN'-	mawe	
go, to	*beN ~ *meN, T?	ba:, H (root)	maeN, F ~ mi:N, F (imp.)	mae: ~ maen	me	mèN-, 'walk'
kill	*hu:, H	ho:, H	hheu:N, F	he:	hu	hū
lay, to (tv.)	*k'uo, H	k'o-p, H; k'u:, H; k'ul, H		k'u', F, 'lay down'		k'uo, 'put/place/lay' (Ta.); k'ua (Is.)
lying, be (pl.)	*kw'uol ~ *kw'uo	k'ul H	gyo: H	kw'o H ~ kw'on F		k'uo (Hale)
pick 2	*salV OR *saelV LL	set, 'pick fruit' (Har.); se:l, pick off (root, impf.) F	tyaede (Hale)			
pick 3	*theuo(-pi) HH	ha:pe, 'rise/get picked up' (iv.) HL; tha:pe (abl.) ~ ha:pe, 'raise/pick up' (tv.) FL	shi:, 'pick cotton' H	the-gi HL~ the:'eh HH, 'pick corn'		theuo, 'gather'; theua, 'pick from a bush'
return, to	*buon	bo:N-ya, HL 'return' (impf.); bo:N, H 'get bent'; bon, F 'bend' (tv.); boN, F 'be bent'; -boN, F (bound)		bun 'return/turn'		muoli
run 1	*ay	ay, 'run and shut' (Har.)	ae, 'be fast' H; ae:, fast (n.) F			

seek, to	*duN ~ *tuN, T?>	do:Nn, H ~ to:Nn, H; don, F (imp.)	teuwi-'e, 'be seeking' (Hale) T?	tuNwaeN		núN ~ tuN
smoke, to	*phi:, H		fi:, F, 'smoke a cigarette'	phi: (n.); phi:-de (tv.); phi-pa, 'cigarette'		phi-wi (tv.); phi-wéN-ne (n.)
sound, to	*poN	po:N, H 'amke a noise'; po:Ny, H 'sounding'	poN, 'noise' (Hale); po:N, H 'drum' (Hale)	pu:N, F 'bell' (Hale; O. says it means 'sound')		puN- (Hale)
use up, to	*heuaNn, H	han, F (root, pf.)		han-e, HL, 'be used up';		hóNwa-maN
work, to	*tsae (irr.)	sau:te-, HH (bound)	sae:, F (refl. verb)	t'o:-, F		tsay-

References Cited (Falling Tone in Tanoan):

- Davis, Irvine. 1989. "A New Look at Azteco-Tanoan." In *General and Amerindian Ethnolinguistics: in Remembrance of Stanley Newman*, edited by M. R. Key and H. M. Hoenigswald, pp. 365-379. Berlin and New York: Mouton de Gruyter.
- Hale, Kenneth. 1967. "Toward a Reconstruction of Kiowa-Tanoan Phonology." *IJAL* 33(2):112-120.
- _____. n.d. "Proto-Tanoan Cognate Sets." Ms.
- Harrington, John Peabody. 1928. *Vocabulary of the Kiowa Language*. BAE Bulletin 84.
- Ortman, Scott. 2012. *Winds from the North: Tewa Origins and Historical Anthropology*. Salt Lake City: University of Utah Press.
- Sprott, Robert W. 1992. *Jemez Syntax*. Dissertation, University of Chicago.
- Stubbs, Brian. n.d. *Tewa Dictionary*. Ms.
- Trager, George L. 1942. "The Kinship and Status Terms of the Tiwa Languages." *American Anthropologist* 45(4):557-571.
- _____. 1943. "The Comparative Phonology of the Tiwa Languages." *Studies in Linguistics* 1:173-181.
- _____. 1946. "A Sketch of Taos Grammar." In *Linguistic Structures of Native America*, edited by Harry Hoijer et al., pp. 184-221. *Viking Fund Publications in Anthropology* 6.
- Watkins, Laurel J. 1984. *A Grammar of Kiowa*. With the assistance of Parker McKenzie. Lincoln: University of Nebraska Press.

Yumitani, Yukihiro. 1998. *A Phonology and Morphology of Jemez Towa (Kiowa-Tanoan, New Mexico)*. Dissertation, University of Kansas.