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THE INTERNAL DIVERSIFICATION AND SUBGROUPING OF CHATINO[1]

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Boas (1913) reported that the Chatino language area (Otomanguean) of southern Oaxaca State, Mexico, consists of three distinct varieties: (1) a group of 17 villages centered on Juquila and Yaitepec, (2) Tataltepec, and (3) Zenzontepec. Upson and Longacre (1965) compare data from the three groups and reconstruct 251 Proto-Chatino lexemes, but like Boas and all other extant work on Chatino, they do not provide any linguistic evidence that Boas's first grouping is a valid genetic unit nor do they give any account of the relationships between the three. This paper demonstrates not only that the first group is valid but also that it forms a higher level subgroup with Tataltepec. The comparison illustrates that even with a limited number of identifiable phonological innovations useful for subgrouping, a successful classification is achievable with supporting evidence from shared sporadic morphological and semantic innovations, and by taking advantage of comparative work in a sister sub-family (Zapotec) in order to filter out retentions.

[KEYWORDS: historical linguistics, language classification, subgrouping, Chatino, Zapotec]

1. Introduction. During a field trip to the southern part of the state of Oaxaca, Mexico, Franz Boas (1913) gathered some limited data from a speaker of an unspecified variety of Chatino. The speaker named all of the villages where he knew Chatino to be spoken, placing them into three groups. What Boas labeled the "first dialect" included 17 communities, centered on the economic and cultural centers of Santa Catarina Juquila and Santiago Yaitepec.[2] The second variety was limited to the western village of

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[2] As is often the case, the term "dialect" is problematic here. First of all, given the limited degree of mutual intelligibility between the three groups, "languages" is a more appropriate label, or at least "emergent languages" in Kaufman's (1987) terms. In fact, Boas's "first dialect" itself

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Tataltepec de Valdés, and the third consisted of the more northerly communities of Santa Cruz Zenzontepec, San Jacinto Tlacotepec, and Santa María Tlapanalquiahuitl. Boas recognized that Chatino was related to Zapotec and that the two together form the Zapotecan language family (see also Belmar 1902 and Mechling 1912). In Kaufman's (1987; 2006) classification, the Zapotecan family is coordinate with the Mazatecan family in the Zapotecan-Mazatecan branch of the Eastern division of the Otomanguean stock.

The earliest detailed work on Chatino was limited to Boas's first variety, particularly the village of Yaitepec (McKaughan and McKaughan 1951, McKaughan 1954, Upson 1956; 1960; 1968, K. Pride 1961, and L. Pride 1963). Then, half a century after Boas's paper, Upson and Longacre (1965) reconstructed 251 Proto-Chatino lexemes using data from Yaitepec, Tataltepec, and Zenzontepec, representing Boas's three groupings. However, following Orozco y Berra (1864) instead of Boas, they included data from the Papabuco language of San Juan Elotepec (ISO code: zte), mistakenly considering it to be Chatino. Papabuco is not part of Chatino but rather a language area within Zapotec (Kaufman 1993; 2006; see also Smith Stark 2007). Although Upson and Longacre outline some of the historical phonology of the three compared Chatino varieties, they do not discuss any relationships between them, nor do they provide any evidence that Boas's first grouping is valid. Recent comparative studies (Campbell and Cruz 2010 and Campbell and Woodbury 2010) cautiously make two assumptions: first, that Boas's "first dialect" is a valid genetic unit, which Woodbury (2009) calls Eastern Chatino; and, second, that Eastern Chatino and Tataltepec form an intermediate subgroup excluding Zenzontepec.

The purpose of this paper is to report the results of a study carried out to identify shared innovations among subsets of Chatino varieties in order to determine their subgrouping and gain insight into the history of this language area and its speakers. It is demonstrated first of all that all varieties of Chatino excluding Zenzontepec do in fact form a primary level subgroup, Coastal Chatino; therefore, Zenzontepec was the first to split off. It is also shown that within Coastal Chatino, Eastern Chatino is in fact a valid genetic unit coordinate with Tataltepec. Therefore, Boas's reported tripartite classification was accurate, despite lacking the intermediate detail, a remarkable fact given that it was based solely on the intuitions and experiences of one native speaker and not on any systematic comparison. *Ethnologue* (Lewis 2009) lists four distinct languages or subgroups that would fall in the Eastern Chatino area (Zacatepec, Nopala, Eastern Highland, and Western Highland) but does not refer to any data that would support those groupings, and they are not supported here either. New Proto-Chatino reconstructions are given

contains considerable dialectal variation between villages. Second, the associated colloquial Mexican Spanish term *dialecto* is used pejoratively to refer to any indigenous lect.

here for the compared lexemes, following the preliminary reconstructed tonal system in Campbell and Woodbury (2010). Finally, this work provides a much-needed, data-supported reference for genealogical statements in future studies of these languages.

Even though a lot more Chatino data has become available in recent years, the internal classification of the group had remained difficult to determine because there are fairly few identifiable shared sound changes. This is likely due to a relatively shallow time depth of diversification. Nevertheless, a robust classification is achieved by compiling additional evidence from sporadic morphological and semantic innovations and checking the Chatino isoglosses against Kaufman's (1993) Proto-Zapotec reconstructions in order to separate the innovations from retentions.

The data presented here and used to carry out the subgrouping are drawn from the following sources, most of which are part of the recent surge in Chatino documentation. The Zenzontepec Chatino (ZEN) data are from Campbell (2007–2011), building on Carleton (1995–2000). The Tataltepec (TAT) data are primarily from Sullivant (2010 and field notes) but supplemented by data from Pride and Pride (1970), whose forms are given in parentheses. The Zacatepec (ZAC) material is from Woodbury (2010), except for the forms in parentheses, which are from Villard (n.d.; 2010 and field notes). The San Juan Quiahije (SJQ) data are from Cruz et al. (2009 and accompanying field notes). The Yaitepec (YAI) data are from Rasch (1997–2011), and the Teotepec (TEO) material is from McIntosh (2009 and field notes).[3] The PCh reconstructions are based on the data given here. Parentheses around a PCh reconstruction indicate that the tone for that lexeme cannot yet be reconstructed with certainty and is therefore not reconstructed at all. The locations of the Chatino communities and subgrouping of the languages are represented on the map in figure 1.

Section **2** summarizes some basics of comparative Zapotecan linguistics. Section **3** presents phonological changes, **4** treats morphological developments, and **5** covers semantic and lexical changes. The results of the comparison, the subgrouping, and some final remarks are discussed in **6**.

2. Comparative Zapotecan basics. The time depth of Chatino diversification is fairly shallow, probably between 600 and 1,000 years,[4] and cognates are usually readily identifiable.[5] Of course, supposed cognates need to be verified as such with regular sound correspondences in order

[3] The ISO codes for these language varieties are as follows: ZEN = czn; TAT = cta; ZAC= ctz; SJQ, YAI = ctp; and TEO = cya.

[4] These figures are impressionistic; they are not reliable nor are they based on any glottochronological calculation.

[5] Native speakers can often identify isolated words even from more distant varieties. However, in natural speech, mutual intelligibility decreases quickly the further one goes from one's own variety, and in some cases there is almost none.

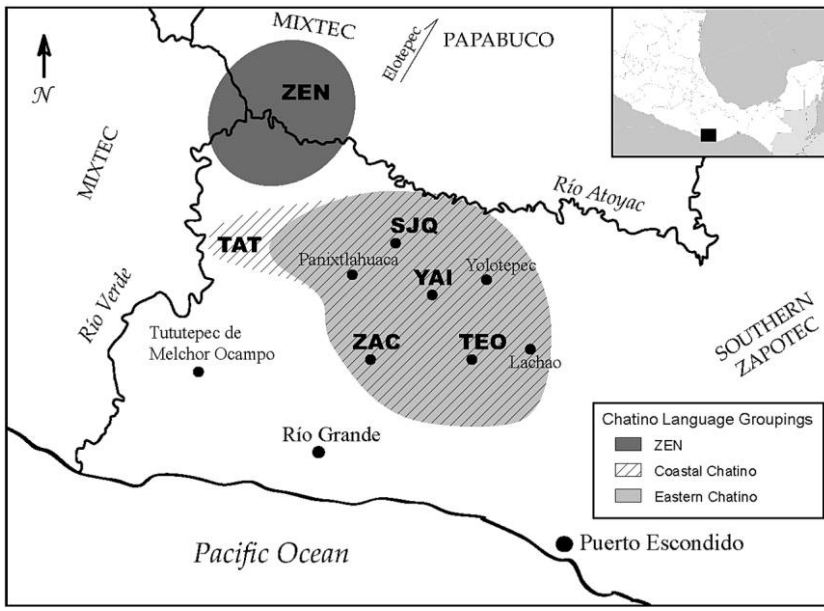

FIG. 1.—Location and subgrouping of Chatino languages.

to identify possible borrowings between varieties. Tone correspondences within Chatino are strong and almost exceptionless between certain varieties (H. Cruz and Woodbury 2006 and Campbell and Woodbury 2010), but their robustness decreases a bit between more distant varieties, particularly in morphologically complex words. This is likely due to two factors. First, it appears that Chatino lexemes may sporadically switch from one lexical tone class to another, perhaps via analogy, contamination, or reanalysis of post-sandhi phonetic pitch shapes. Second, although our understanding of comparative Chatino tonology is advancing, there may be some breakthroughs yet to be achieved in this area.

In some cases, it would not be possible to determine which Chatino forms reflect innovations and which are retentions without also considering Zapotec cognates.[6] Therefore, Kaufman's (1993) Proto-Zapotec reconstructions, when available, are cited along with the Chatino data. Where Chatino forms diverge from one another in some way, if one variant agrees with Proto-Zapotec (PZp), then that variant is taken to reflect a retention from Proto-Chatino (PCh) and even back to Proto-Zapotecan (PZn). All else being equal, any other variants

[6] Although Upson and Longacre (1965) were mistaken in treating Elotepec Papabuco as Chatino, in some cases having the Zapotec data assisted them in identifying innovations.

PCh	PZp
*t	*s, *ss, *ty, *tty
*tz	*tz, *ttz
(*ky)	(*k)
*k	*k, *kk
*kw	*kw, *kkw
*s	*x, *xx
*n	*n, *nn, (*l, *ll, *mm?)
*l	*l, *ll, *n, *nn
*y	*y
*w	*w, (*mm)
*j	*t, *tt
*?, ∅	*?

FIG. 2.—PCh and PZp consonant correspondences.

are taken to be innovations. The same applies to semantic isoglosses even if they reflect broadening or narrowing of polysemous lexemes.

Zapotec is more diversified than Chatino and spread over a larger geographic area. Kaufman (1987; 1993) estimates that Zapotec has a depth of 1,400–1,500 years and that Chatino and Zapotec separated some 2,400 years ago. The relatively shallow time depth of Chatino diversification suggests that either (*a*) the Chatino speech community remained small enough to avoid dialectal differentiation for quite some time, or (*b*) there were earlier branchings within the group that no longer exist and are unattested. Since even the time depth of diversification of the whole Zapotecan family is not very deep, finding cognates between Chatino and Zapotec is fairly straightforward once the sound correspondences are understood. Kaufman (1993) lays out the segmental correspondences between PCh and PZp as in figure 2 (consonants) and figure 3 (vowels). I have added some details, which are indicated by parentheses, and the figures are arranged based on the PCh phonemic inventory presented in Campbell and Cruz (2010).[7]

Since the purpose of this paper is to demonstrate the subgrouping of Chatino varieties and not to rigorously detail the development of PCh from PZn, the changes in PCh and PZp listed in the remainder of this section will not

[7] The orthography here differs from the IPA as follows: *kw* = [kʷ], *tz* = [ts], *r* = [ɾ], *ty* = [tʲ] or [t̠], *ly* = [lʲ] or [l̠], *ny* = [nʲ] or [n̠], *ch* = [ʧ], *x* = [ʃ], *y* = [j], *ky* = [kʲ], *j* = [h], V̨ = nasalized vowel, VV = long vowel, and CC = geminate consonant. For digraphs, geminates are written with only the initial letter doubled. For PCh and the varieties of ZEN, TAT, and ZAC, tone is represented as follows: V̀ = low, V̄ = mid, V́ = high, V̂ = falling, V̌ = rising, V̇ = super-high rising, Ṽ = falling plus floating, and V = unmarked. Note that not all varieties have the full set of contrasting tones. Tone in SJQ, YAI, and TEO is represented by superscript numerals: V^0 is the highest pitch, V^4 is the lowest, $^{+0}$ = floating tone, and ^{F} = resistance of a tone to sandhi or spreading effects. Initial portions of forms that are set off by a right-hand square bracket are not considered cognate.

be systematically laid out here (see Campbell 2011*b* for preliminary work on this). However, there is enough data in the figures in later sections for the skeptical or interested reader to verify the main points. Also, although the few remaining puzzles in the PZp and PCh correspondences will be left aside for now, the basic segmental correspondences are reliable enough to identify PCh and PZp cognates. This work is part of the early stages of a reconstruction of PCh vocabulary and grammar, and once that is further along these questions should clear up.

The major phonological changes that occurred from PZn to PZp were the loss of phonemic vowel nasalization and the shift of prominence from root-final to root-initial syllables (Kaufman 1993). The phonemic vowel length of PZn is retained only in the Southern Zapotec language area. PCh vowels in monosyllabic roots were phonetically long, and this has played a role in the (re)emergence of a limited vowel length contrast in some varieties. Glottalization is a suprasegmental feature that interacts with tone and/or phonation in Zapotec, but the glottal stop is a consonant in Chatino. Tone correspondences between Chatino and Zapotec have not yet been studied, and Kaufman does not reconstruct PZp tone. He reconstructs PZp **mm* and traces its rare occurrences to borrowings from other Mesoamerican languages. All PZn and PZp consonants except for **mm* and the semivowels **y* and **w* had a simple versus geminate contrast (Swadesh 1947 and Kaufman 1993). The two consonant series unconditionally merged in PCh.

Other changes that took place between PZn and PCh include a chain shift, beginning with **(t)t* > **j*, then **(s)s* > **t*, and finally **(x)x* > **s*. Another change, **(t)ty* > **t*, must have occurred after **(t)t* > **j* since it did not feed it. The glottal stop was lost before obstruents or **(l)l*, and the lateral subsequently became a nasal before nasalized vowels: **(l)l* > **n* / __ **V̨* (Campbell 2011*b*). Next, in words that still had two glottal stops after the loss of glottals before obstruents or **(l)l*, one of the two glottals was lost, though it is not yet clear what determined which one would be lost. There are about eight cognate sets between Chatino and Zapotec that have correspondences involving reflexes of PZn**(l)l* and **(n)n* that are still not accounted for, and the correspondences involving **o* and **u* are not fully worked out either.[8] A translaryngeal vowel harmony change occurred in PCh, giving rise to further, predictable vowel correspondences not listed in figure 3. Meanwhile, the PCh plain velar stop **k* had an allophone of [ky] only before **e*. The translaryngeal vowel harmony change drew vowels other than **e* into contact with the [ky] allophone, causing it to contrast with **k* and phonologize, albeit in a fairly small set of words. With this brief summary of comparative Zapotecan phonology, we can now move on to the changes within Chatino.

[8] The correspondences between **o* and **u* are also somewhat unclear within Zapotec, according to Kaufman (1993).

PCh	PZp
*i	*i, (*e)
*e	*e
*a	*a
(*o)	(*o, *u)
*u	*u, *o
*V̨	*V
*V	*VV

FIG. 3.—PCh and PZp vowel correspondences.

3. Phonological changes. There are a couple of notable phonological differences between Chatino varieties that do not shed any light on subgrouping since they do not reflect shared innovations. Nevertheless, they deserve mention here because they are quite salient and, if not handled with care, could lead one to erroneous or unjustified conclusions about the historical relationships between Chatino varieties. The first of these is the number of syllables a given word has, and the second is the set of reflexes of PCh **ky*. After that, several palatalization changes and a case of metathesis are discussed, and these do reflect shared innovations.

3.1. Shorter versus longer words. Nearly all Proto-Chatino roots were either monosyllabic or disyllabic, with the majority being disyllabic. Verbs were obligatorily inflected for aspect/mood by a set of prefixes, most of which were also syllabic. Thus, many inflected verbs in PCh, and a few nouns, were trisyllabic. In some varieties, such as YAI, SJQ, and TEO (among others not considered here), nearly all polysyllabic words have reduced to one syllable via the loss of non-prominent vowels, where prominent vowels are those in root-final syllables. TAT has lost all aspect prefix vowels and some non-prominent root vowels.[9] On the other end of the spectrum, ZEN and ZAC conserve nearly all non-prominent syllables, including those of aspect prefixes. Figure 4 presents some words that illustrate these varying degrees of syllable loss, with syllabically reduced forms shaded in gray.

Since both SJQ and TEO have undergone near total monosyllabification, they might initially appear to form a subgroup to the exclusion of the other varieties listed in figure 4. However, there are two reasons to suspect that they underwent monosyllabification independently and not during a period of common development. First of all, if SJQ and TEO were very closely related in a low-level subgroup, we would expect them to be relatively mutually intelligible. However, SJQ speakers find ZAC to be much more intelligible

[9] TAT preserves penultimate /a/, but monosyllabification is in progress, and there is inter-speaker variation with respect to loss of the other vowels in penultimate syllables.

	Gloss	ZEN	TAT	ZAC	SJQ	TEO	PCh	PZp
a.	'yellow'	*nkáchì*	*ngatzi*	*ngatzì*	*ktzi*^{2}	*ktzi*^{34}	(**katzi*)	**k-attzi*
b.	'flea'	*kwiʔyù*	*kwiʔyù*	*kwiʔyò*	*ʔyu*^{2}	*kwʔyu*^{23}	**kwiʔyù*	**kw=eʔyu*
c.	'squash'	*chojo*	*tyojo ~ tyjo*	*kyojō*	*yjo*^{42}	*yjo*^{3}	**kyòjò*	**kettu*
d.	'he will eat it'	*k-aku*	*k-aku*	*k-ako*	*ku*^{4}	—	**k-aku*	**k-aku*
e.	'tongue.of.3SG'	*lutzeʔ*	*ltzéʔ*	*lotzeʔ*	*tzeʔ*^{4}	*tzeʔ*^{3}	**lutzeʔ*	**luuʔtzeʔ*
f.	'net', 'mesh'	*kesu*	*kxu*	*kiso*	*ksu*^{4F}	*jso*^{2}	**kesu*	**kexxok*
g.	'milk'	*xityiʔ*	*styí*	*sityiʔ*	*stiʔ*^{4}	*stiʔ*^{23}	**sitiʔ*	**xityiʔ*
h.	'he swept it'	*nka-lukwà*	*nglyakwă*	*nga-lokwă*	*kwa*^{3}	—	(**nka-lukwa*)	**-ok=l-ooʔkwa*

FIG. 4.—Monosyllabification in Chatino varieties.

than TEO (Emiliana Cruz and Hilaria Cruz, personal communication), even though the ZAC cognates differ from SJQ considerably more than the TEO cognates do. The intelligibility of ZAC to SJQ speakers cannot be accounted for solely by its phonological conservatism because SJQ speakers find ZEN, which is phonologically conservative like ZAC, to be almost completely unintelligible. Second, throughout the entire Zapotecan language family, there is a tendency, or drift, toward monosyllabification, which apparently may happen rather rapidly. For example, within the Northern Zapotec language area, most varieties of the Sierra Juárez sub-area have retained non-prominent vowels, including those of aspect proclitics, while the varieties of the Villa Alta sub-area have lost aspect proclitic vowels and non-prominent root vowels in roots that did not contain a glottal stop.[10] Within the Central Zapotec language area, Juchitán (Isthmus) Zapotec (ISO code: zai) is very syllabically conservative, while most Central Valley varieties have undergone extensive monosyllabification. Monosyllabification is therefore not a reliable isogloss for subgrouping Chatino (or Zapotec) languages due to this tendency throughout the Zapotecan language family.

3.2. Reflexes of PCh **ky*. The second salient phonological characteristic that is of little help in the internal classification of Chatino but worth mentioning is the set of reflexes of PCh **ky*:[11]

(1)		ZEN	TAT	ZAC	SJQ
	PCh **ky* >	*ch* :	*ty* :	*ky* :	*ky*, *k*, *y*

Although PCh **ky* was a fairly rare phoneme, it nevertheless occurred in some of the most basic and culturally important vocabulary: 'rain'; 'tortilla'; 'squash'; 'century plant'; the progressive aspect prefix **nky-* (Campbell 2011*a*); and 'lime (stone)', which is used daily to leach dried corn so it may be made into tortillas. Also, in verb stems that began with /y/, the stem /y/

[10] As previously mentioned, in Zapotec prominence falls on the initial syllable of roots, the opposite of Chatino and PZn (Kaufman 1993).

[11] The variation in the SJQ reflexes of **ky* is due to erosion of consonants in clusters created by monosyllabification.

	Gloss	ZEN	TAT	ZAC	SJQ	PCh	PZp
a.	'rain'	***ch**oo*	***ty**oo*	***ky**oo*	***ky**o*^{4}	**kyoo*	**kiyok*
b.	'tortilla'	***ch**aja*	***ty**aja*	***ky**aja*	***y**ja*^{4}	**kyaja*	**ketta*
c.	'squash'	***ch**ojo*	***ty**ojo*	***ky**ojō*	***y**jo*^{42}	**kyòjò*	**kettu*
d.	'lime (stone)'	***ch**oʔo*	***ty**oʔo*	(***ky**oʔo*)	***ky**ʔo*^{4}	**kyoʔo*	**keʔyo*
e.	'century plant'	***ch**oòʔ*	***ty**oòʔ*	***ky**oòʔ*	***ky**oʔ*^{2}	**kyoòʔ*	—
f.	PROG (prefix)	***nch**-*	***ndy**-*	(***ngy**-*)	(various)	**nky-*	**kkay=*
g.	POT of *y*-verbs	***ch**...*	***ty**...*	(***k-y**…*)	(various)	**k(i)-y...*	—
h.	's/he will stay'	***ch**ano*	***ty**anú*	(***k-y**anǫ́*)	***kno***^{1}	**k-yanǫ́*	**k(i)=y-aʔana*

FIG. 5.—Reflexes of PCh **ky*.

combined with the potential prefix **k(i)-* to yield the same correspondence set, as exemplified in figure 5.

The correspondences in figure 5 might appear to support the idea that there are three distinct types of Chatino—ZEN, TAT, and the others—just as Boas's consultant reported. However, if the Zapotec cognates are taken into consideration, it is clear that the PZn sound was velar. As already discussed, PCh **ky* phonemicized as a result of the translaryngeal vowel harmony change in PCh (as in lines *b*, *c*, and *d* of figure 5). Therefore, SJQ and ZAC, among others, have retained something like the PCh sound, while ZEN (**ky* > *ch*) and TAT (**ky* > *ty*) have innovated. One might wonder if the ZEN change was partially shared with TAT via a series of changes such as **ky* > **ty* > *ch*, but this is ruled out since other instances of ZEN *ty* have not changed. Therefore, there are no shared innovations among any of the reflexes of PCh **ky*.

3.3. Palatalization. Alveolar consonants have undergone several palatalization changes. The earliest of these took place in Proto-Chatino, where **t*, **n*, and **l* palatalized after the high front vowel **i*, yielding allophones [ty], [ny], and [ly], respectively (fig. 6). The reflexes of PCh **kìʔnà* 'bed' and **tíʔnų* 'fifteen' (lines *g* and *h* in figure 6) show that the glottal stop did not block this palatalization.

Though the palatalized coronals were allophones of their non-palatalized counterparts in PCh, they have since phonemicized in all varieties (Campbell 2011*a*).[12] For example, ZEN *lyoʔo* 'spouse' (line *l* in figure 6) has dropped the animacy classifier prefix *kwi-* that contained the vowel that conditioned the palatalization. ZAC preserves the conditioning vowel in that case (*kwi-lyoʔo*) but does not preserve it in *lyaāʔ* 'bitter' (line *n*), from PCh **ti-lààʔ*.[13]

[12] It remains a possibility that the palatalized alveolars phonemicized in PCh, but at this time there is not enough evidence in support of this.

[13] No reflexes of PCh **ti-lààʔ* conserve the palatalizing vowel in the adjectivizer prefix **ti-*. In ZEN, $C_1V_1C_2V_2 > jC_2V_2$ if C_2 was *n* or *l* and V_1 was a high vowel. Upson and Longacre (1965:315) point this out but recognize only /i/ as V_1. The change has not yet affected all lexemes, for example, *kinyì* 'bird'. The change has extended furthest in the Santa María Tlapanalquiahuitl area of ZEN, which has *jlu* 'prickle', while the central ZEN area retains *sulu*.

	Gloss	ZEN	TAT	ZAC	SJQ	YAI	PCh	PZp
a.	'pine'	*kityè*	*ktyeè*	*kityè*	*kytye*^{2}	*kityee*^{23}	**kitè*	**ketye*
b.	'feather'	*kityę*	(*kityį*)	*kityį*	*s-tyį*^{4F}	*kityį*^{3}	**kitį*	—
c.	'ant'	*kwityeeʔ*	*kwtyèʔ*	*kwityeēʔ*	*kwtyeʔ*^{42}	*kwtyeʔ*^{12}	**kwi-tèèʔ*	**kwe=tyeʔ*
d.	'squirrel'	—	*tityá*	*tityá*	*tya*^{1}	*tya*^{1}	**titá*	**kwe=tyiiʔ(s)sa*
e.	'several'	*tityǫ̀*	*tityǫ̀*	(*tyų*)	*tyǫ*^{2}	*tyų*^{23}	**titǫ̀*	**sityo* 'more'
f.	'honey'	*kwinyaʔ*	*kwinyàʔ*	*kwinyą̄ʔ*	*knyaʔ*^{42}	*kwnyaʔ*^{12}	**kwì-nàʔ*	**(kwe=)tzinaʔ*
g.	'bed'	*kiʔnya*	*kiʔnyà*	*kiʔnyą̄*	*kʔnya*^{42}	*kiʔyą*^{12}	**kìʔnà*	**kiʔna*
h.	'fifteen'	*tíʔnyu*	*tiʔyǫ́*	*tiʔnyǫ*	*ʔnyǫ*^{24}	*tʔyų*^{1}	**tíʔnų*	**k-tyiiʔnuʔ*
i.	'chili'	*jnyáʔ*	*knyáʔ*	*kinyą̌ʔ*	*kynyaʔ*^{3}	*kinyaʔ*^{32}	**kìnáʔ*	**kiiʔnaʔ*
j.	's/he sees'	*nyaʔa*	*nyaʔá*	*ndi-nyaʔą̂*	*ntyʔą*^{24}	*ntyʔą*^{24}	**nti-nàʔą*	**tyi=naʔ*
k.	'griddle'	*jnya*	*nya*	*ndinyą*	*nnya*^{4F}	*nya*^{3}	**ntinq*	**tyiʔla*
l.	'spouse'	*lyoʔo*	*klyoʔo*	*kwi-lyoʔo*	*ʔo*^{4}	*kwʔo*^{3}	**kwi-loʔo*	—
m.	'it boils'	*nti-lyákwi*	*ng-lyakwí*	*ndi-lyakwi*	*ntykwi*^{20}	*njykwi*^{21}	**nti-lakwí*	**tyi=llaaʔkwi*
n.	'bitter'	*jlyaaʔ*	*klyaàʔ*	*lyaāʔ*	*tlyaʔ*^{42}	*tlyaáʔ*^{12}	**ti-lààʔ*	**(na=)llaʔ*
o.	'big'	*jlyù*	*klyuù*	*tilyò*	*tlyu*^{2}	*tlyuu*^{23}	**ti-lù*	—

FIG. 6.—Palatalization of **t*, **n*, and **l* after **i*.

	Gloss	ZEN	TAT	ZAC	SJQ	PCh	PZp
a.	'thorn'	*kitzeʔ*	***ch**eʔ*	*ki**ch**êʔ*	*k**ch**eʔ*$^{14+0}$	**kitzeʔ*	**kettzeʔ*
b.	'sun'	*kwitzaà*	*kw**ch**aà*	*ko**ch**ā*	*k**ch**a*^{42}	(**kwitzaa*)	**kwitza*
c.	'illness'	*kitza*	*k**ch**a*	*ki**ch**a*	*k**ch**a*^{4}	**kitza*	**kitza*
d.	'village'	*kitzę*	*ki**ch**ę*	*ki**ch**ę*	*k**ch**į*^{4}	**kitzę*	**keetze*
e.	'hair.of.3SG'	*kitząʔ*	*ki**ch**ą̀ʔ*	*ki**ch**ą̄ʔ*	*k**ch**ąʔ*^{42}	**kìtzą̀ʔ*	**kittza(ʔ)*
f.	'pineapple'	*nkwi-títzùʔ*	*n**ch**uʔ*	*ti**ch**ôʔ*	*ch**u**ʔ*$^{14+0}$	(**kwi-titzuʔ*)	**xitzuʔ*
g.	'back.of.3SG'	*itzǫʔ*	*ch**ǫ̀**ʔ*	*ti**ch**ǭʔ*	*ch**ǫ**ʔ*^{42}	**tìtzį̀ʔ*	**kku-]tzuʔ*
h.	'coatimundi'	*kwìtzúʔ*	*ch**û**ʔ*	*ti**ch**ǒʔ*	*ch**u**ʔ*^{3}	**kw/t-ìtzúʔ*	**kwe=xiiʔtzuʔ*
i.	'sharp'	*titza*	*ch**a***	*ti**ch**a*	*ch**a***^{4}	**titza*	—
j.	'rough'	*titzeʔ*	*ch**e**ʔ*	*ti**ch**èʔ*	—	(**titzeʔ*)	—
k.	'word'	*ìtzáʔ*	*ch**á**ʔ*	*ch**ǎ**ʔ*	*ch**a**ʔ*^{3}	**ìtzáʔ*	**tiiʔtzaʔ*
l.	'day after tomorrow'	*witza*	*jw**ch**á*	*wi**ch**a*	*ch**a***^{4}	**witza*	**witzak*
m.	's/he lies down'	*nti-sukwà*	*n**x**kwà*	*ndi-**x**okwâ*	*n**x**kwa*$^{14+0}$	**nti-sukwà*	—
n.	'raccoon'	*kwiseeʔ*	*kw**x**eeʔ*	*kwi**x**eēʔ*	*x**e**ʔ*^{42}	**kwi-sèèʔ*	**kwe-xeʔ*
o.	'tasty'	*tisǫʔ*	*ch**ǫ**ʔ*	*ti**x**ǫ̂ʔ*	*x**ǫ**ʔ*$^{14+0}$	**tisǫʔ*	—
p.	'vulture'	*l-ísù*	*kw-l-e**x**u*	*la-**x**õ*	*la*^{4} *x**u***^{3}	**(la-isu)*	—

FIG. 7.—Reflexes of **tz* and **s* after **i*.

Next, in all varieties of Chatino except for ZEN, the palatalization of alveolars after **i* extended to target the sibilants **tz* and **s*, as the data in figure 7 show. This change suggests that all varieties except ZEN shared a period of common development and thereby form a subgroup. However, since this change can be viewed as an extension of the class of sounds targeted by the earlier palatalization change that affected **t*, **n*, and **l* in PCh (fig. 6), it alone does not provide very strong evidence for subgrouping since the similar developments could have been due to drift. Nevertheless, as we shall see, the

	Gloss	ZEN	TAT	ZAC	SJQ	PCh	PZp
a.	'yellow'	*nká**ch**ì*	*ngatzi*	*ngatzì*	*ktzi*^{2}	(**katzi*)	**k-attzi*
b.	'nance'	*nta**ch**i*	*ndatzi*	*ndatzī*	*ntzi*$^{14+0}$	(**ntatzi*)	—
c.	'tick'	***ch**inya?*	*xnya?*	*tzinąʔ?*	*snya?*$^{14+0}$	**tzinąʔ*	—
d.	'smoke'	***ch**inyi*	*snyii*	(*tzinyi*)	*sni*^{4}	**tzini*	**tzeni*
e.	's/he buried it'	*nka-ka**ch**ìʔ*	*nx]katzĭʔ*	*nkwatzĭʔ*	*ntziʔ*^{3}	(**-u-katziʔ*)	**o(k)=kaaʔttziʔ*
f.	'iguana'	*kwà**ch**íʔ*	*kwatzíʔ*	*kwatzĭʔ*	*ktziʔ*^{3}	**kwàtzíʔ*	**(ko=)wattziʔ*
g.	'side.of.3SG'	***x**iiʔ*	*sìiʔ*	*siiʔ*	*siʔ*^{4}	**siiʔ*	—
h.	'milk'	***x**ityiʔ*	*styí*	*sityiʔ*	*styiʔ*^{4}	**sitiʔ*	**xityiʔ*
i.	'afternoon'	*nku**x**ę*	*ngwseę̀*	*ngosì*	*sę*^{42}	**nkùsì*	—
j.	's/he cut it'	*nka-**x**ùʔú*	*nk-siʔyú*	*nga-siʔyó*	*sʔyu*^{1}	(**nka-siʔyu*)	—
k.	's/he laughed'	*nka-**x**ityi*	*ngw-stí*	*nga-sityí*	*styi*^{1}	(**nka-siti*)	**o=xityi*
l.	'arm.of.3SG'	***x**ikǫ̀*	*skǫ̀*	*sikǭ*	*skǫ*^{2}	**sikǫ̀*	**xikkok*
m.	'gourd'	***x**ikaʔ*	*skàʔ*	*sikāʔ*	*skaʔ*^{42}	**sìkàʔ*	**xikaʔ*

FIG. 8.—Reflexes of **tz* and **s* before **i*.

change bundles with other isoglosses that do support such a subgroup, so the simplest solution is to treat the change as a single shared innovation instead of multiple parallel developments.

Furthermore, though the ZEN reflexes of **tz* and **s* did not palatalize after *i*, they did palatalize BEFORE it, a change that no other variety underwent (fig. 8). Though this change restricted to ZEN does not directly help in determining subgrouping, it perhaps adds evidence that the palatalization of sibilants after *i* found in all other varieties (fig. 7) was a single shared innovation and not a result of drift. If the languages were primed for the sibilants to palatalize after *i*, then we would not expect to see the ZEN palatalization operate in the opposite direction, where the sibilants palatalized before *i*.

Where PCh **tz* and **s* were not adjacent to **i* on either side, all varieties retain the non-palatalized sibilants (fig. 9). In the case of SJQ *ska*^{4} 'one' (line *a* in figure 9), the affricate weakened to the fricative due to being part of a consonant cluster created by monosyllabification.

Since PCh **tz* and **s* palatalized only before *i* in ZEN and only after *i* in the other varieties, where these sounds were preceded as well as followed by **i* in PCh we find the palatalized reflexes in all varieties (fig. 10). Despite all varieties now having the palatalized sounds *ch* and *x* in these lexemes, it is not necessary to reconstruct the palatals to PCh since they are fully accounted for by the sound changes just detailed. Upson and Longacre (1965:316) do reconstruct all four sibilants (**tz*, **s*, **ch*, and **x*) and suggest an elaborate set of environments to explain the distribution of their reflexes. Had they had data from the conservative ZAC, which preserved the penultimate *i* that conditioned the palatalization, they might have arrived at a more parsimonious solution. In a footnote to a discussion about Zapotec historical phonology, Suárez (1973) points out that likely only one affricate needs to be reconstructed for Chatino.

	Gloss	ZEN	TAT	ZAC	SJQ	PCh	PZp
a.	'one' (number)	*tzaka*	*tzaka*	*tzaka*	*ska*^{4}	**tzaka*	—
b.	'tongue.of.3SG'	*lutze?*	*ltzé?*	*lotze?*	*tze?*^{4}	**lutze?*	**luu?tze?*
c.	'it got wet'	*nku-tza?*	*nkw-tza?*	*ngo-tzā?*	*ntza?*^{42}	**nkù-tzà?*	**-atza(k)*
d.	'it rotted'	*nkù-tzú?*	*nkwtzǔ?*	*ngo-tzǒ?*	*ntzu?*^{3}	**nkù-tzú?*	**-(y)uu?tzu?*
e.	'day'	*tzáą*	*tzaą*	*tzaą*	*tzą*^{4F}	(**tzaą*)	**tza*
f.	'warm'	*ti-katzǫ*	*x]katzǫ*	*tikatzǫ̂*	*n]tzǫ*$^{14+0}$	**ti-katzǫ*	—
g.	's/he opened it'	*nka-sàná*	*nsla*	*nga-salá*	*sla*^{1}	(**nka-s-ala*)	**-ok=x-ala*
h.	's/he shelled it'	*nka-súkwà?*	*nskwá?*	*nga-sokwá?*	*skwa?*^{1}	**nka-sukwá?*	**-x-oo?kwa*
i.	'Juquila'	*sukù?wé*	*sku?wẽ*	*sko?wě*	*s?we*^{3}	**sukù?wé*	—
j.	'six'	*súkwa*	*skwá*	*sokwa*	*skwa*^{24}	**súkwa*	**k-xoo?kkwa*
k.	'sand'	*yusę*	*yuseę*	*yosį*	*sę*^{4F}	**yusę*	**yu-xi*

FIG. 9.—Reflexes of PCh **tz* and **s* not adjacent to **i*.

	Gloss	ZEN	TAT	ZAC	SJQ	YAI	PCh	PZp
a.	'jaguar'	*kwì**ch**í*	*kw**ch**í*	*kwi**ch**ǐ*	*k**ch**i*^{3}	*kw**ch**i*^{32}	**kwìtzí*	**kw=ee?tzi(k)*
b.	'quern'	*ki**ch**i*	*ky**ch**í*	*ki**ch**i*	*ky**ch**i*^{4F}	*ki**ch**i*^{3}	**kitzi*	**kii?ttzi*
c.	'chick'	*ki**ch**i?*	*ky**ch**ì?*	*ki**ch**i̍?*	*k**ch**i?*^{20}	*ki**ch**i?*^{21}	**(kitzi?)* gloss?	—
d.	'sweet'	*ti**x**i*	***ch**ji*	*ti**x**i*	***x**i*^{4}	***x**i*^{3}	**tisi*	**-ixxi*
e.	'tomato'	*nkwì**x**í*	*ngu**x**î*	*ngwi̍**x**î*	***x**i*$^{14+0}$	*nw**x**i*^{24}	**nkwìsí*	**kwe=ttyuuxxik*
f.	'herb'	*ki**x**ę̀?*	*ki**x**ę̀?*	*ki**x**ì?*	*k**x**į̀?*^{2}	*k**x**į̀?*^{23}	**kisì?*	**ki?xxi?*
g.	's/he laughs'	*nti-**x**ityi*	*n-**x**tyì*	*ndi-**x**ityi̍*	*n**x**tyi*^{20}	*n**x**tyi*^{21}	(**nti-siti*)	**tyi=o=xityi*

FIG. 10.—Reflexes of PCh **tz* and **s* preceded and followed by **i*.

In TAT, the palatalization of all of the alveolar consonants (*t*, *n*, *l*, *tz*, and *s*) has extended one step further. The conditioning environment has broadened to include the vowel *e*. In other words, the conditioning environment has changed from *i* to V [−back] (fig. 11). At the same time or later in TAT, the vowel *e* that conditioned the palatalization assimilated in height to the following vowel, becoming either [i] or [a]:

(2) Vowel harmony in TAT
**e* > *i* / __ C V[+high]
> *a* / __ C V[−high]

After the TAT vowel harmony change, most cases of penultimate /i/ were lost completely. The /s/ in the TAT reflex of **kw-èsà* 'weevil' (line *n* in figure 11) avoided palatalization due to a sporadic innovation in which the classifier *la-* replaced the classifier *kwi-*.

The data in figure 11 also show that penultimate **e* became *i* in ZAC, without vowel harmony, and antepenultimate **e* became *a*.[14] This change is

[14] There are cases where ZAC has *i* instead of *a* in what would appear to be antepenultimate syllables in verbs. In those cases, the verbs actually have an incorporated auxiliary prepound or they are a lexicalization of such a construction.

	Gloss	ZEN	TAT	ZAC	SJQ	PCh	PZp
a.	'fish'	*kwela*	*kwa**l**ya*	*kwila*	*kwla*^{4F}	**kwela*	**kw=ella*
b.	'hard', 'stiff'	*tikélà*	*ka**l**ya*	*tikīla*	*tla*^{32}	(**ti-kela*)	—
c.	'bee'	*kwetǫ*	*kw**ty**ǫ*	*kwitǫ*	*ktǫ*^{4}	**kwetǫ*	**kw=eson?*
d.	'tobacco'	*keta*	*ka**t**ya*	*kita*	*kta*^{4F}	**keta*	**ke?sa*
e.	's/he is burning it'	*nte-t-àkɇ́*	***nd**yakɨ́*	*ndatakɨ́*	—	(**nte-t-akę*)	—
f.	'flesh'	*kwénà?*	*kwa**ny**á?*	*kwiná?*	*kna?*^{1}	**kwená?*	**kwee?la?*
g.	'caiman'	*kwe?na*	*kwa?**ny**a*	*kwi?na*	—	**kwe?na*	**kw=e?nak*
h.	'blood'	*tene*	*ta**ny**ì*	*tinē*	*jne*^{42}	**tènè*	**tyene*
i.	'tight'	*tetza*	*ta**ch**a*	*titza?*	*tza*^{4}	**tetza*	—
j.	's/he informed him/her'	*nkw-]etzà?*	*nd-]a**ch**á?*	*ng-]itzǎ?*	*y-]tza?*^{3}	(**-etza?*)	—
k.	'pimple'	*kètzú?*	*k**ch**ú?*	*kitzṍ?*	*ktzu?*^{3}	**kètzú?*	**ke?tzu?*
l.	'avocado'	*li-sù*	*k**x**uù*	*kisò*	*ksu*^{2}	**k/l-esù*	**y/k/l-exxu*
m.	'net', 'mesh'	*kesu*	*k**x**u*	*kiso*	*ksu*^{4F}	**kesu*	**kexxok*
n.	'weevil'	*nkwesa*	*la-]sà*	*kwisaá*	*sa*^{20}	(**kw-esa*)	—
o.	'school'	*sukwelà*	*skwalya*	*xkwîlà*	*xla*^{10}	—	—
p.	'peso'	*pesū*	*paxú*	*pîxò*	*xu*^{10}	—	—

FIG. 11.—Alveolar consonants after **e*.

different from, and therefore independent of, the change that affected penultimate **e* in TAT. It is clear that the change of penultimate **e* > *i* in ZAC postdated the PCh palatalization of alveolars after **i* since it would have fed it otherwise. SJQ has lost almost all penultimate syllable vowels, so the data in figure 11 provide no evidence of whether or not it underwent the change along with ZAC. I shall have more to say about this in the conclusion when we look again at all of the isoglosses and some of Boas's data. The final two lines of figure 11, 'school' and 'peso', are Spanish loans, and this shows that the changes involving penultimate **e* in TAT and ZAC both occurred after these words were borrowed—so less than about 500 years ago—unless the loans were adapted into Chatino so as to conform to the established patterns, invoking the changes retroactively.

To summarize the various palatalization changes: first of all, the PCh alveolars **t*, **n*, and **l* palatalized after **i*. Then, in TAT, ZAC, and SJQ, the alveolar sibilants **tz* and **s* also palatalized in that environment. Note that YAI, TEO, and Panixtlahuaca Chatino (Pride and Pride 2004), among all other documented varieties excluding ZEN, shared this innovation, though the data were not included for reasons of space. This palatalization of the sibilants was likely a shared innovation, which would suggest that all varieties except ZEN form an intermediate subgroup. In ZEN alone, **tz* and **s* palatalized before *i*; and in TAT alone, all five alveolar consonants palatalized after *e*. Figure 12 lists these changes, with the only likely subgroup-shared innovation shaded in gray.

3.4. Metathesis. Metathesis is often a sporadic change, affecting only one or a few words. Sporadic innovations are quite useful for subgrouping

	ZEN	TAT	ZAC	YAI	SJQ	TEO
Alveolars **t*, **n*, and **l* palatalize after **i*	x	x	x	x	x	x
Alveolar sibilants palatalize after *i*	—	x	x	x	x	x
Alveolar sibilants palatalize before *i*	x	—	—	—	—	—
All alveolars palatalize after *e*	—	x	—	—	—	—

FIG. 12.—Summary of Chatino palatalization changes.

	ZEN	TAT	ZAC	SJQ	YAI	TEO	PCh	PZp
'water'	*ítyà*	*itya*	*tiʔa*	*tiʔa*^{4F}	*tiʔa*^{3}	*tyʔa*	(**ʔita*)	**n*]*issa*

FIG. 13.—Metathesis in the word for 'water'.

because if shared, they produce results that are unlikely to be due to drift or chance. Upson and Longacre (1965:315) point out that the **ʔ* and **t* of PCh **ʔita* 'water' underwent metathesis in YAI. Since they included the Papabuco Zapotec data, they were able to determine that it was YAI that had innovated rather than ZEN and TAT. The varieties of ZAC, SJQ, and TEO underwent the metathesis along with YAI, making it a shared innovation among what Boas called the first dialect. Kaufman (1993) reconstructs PZp **nissa* 'water', of which all but the initial *n* is cognate to the Chatino forms (fig. 13).

ZEN and TAT have lost the initial glottal stop that was present in the PCh word for 'water', probably due to an earlier phonotactic restriction on glottal-stop-initial words. According to the available data from the conservative varieties of ZEN and ZAC, PCh had very few words of the shape **ʔVCV* like 'water'. In monosyllabic varieties, there are now many glottal-stop-initial words, but they are from PCh words of the shape **CVʔ(S)V* (where *S* = sonorant glide or nasal) that have lost their initial *CV* sequence. The phonotactic restriction against **ʔVCV* words was probably the impetus that brought about the metathesis. No glottal-stop-initial words are found in Kaufman's Proto-Zapotec reconstructions, and the origin of the initial glottal in PCh **ʔita* 'water' remains unknown.

It should be mentioned that the word for 'water' has undergone metathesis in at least two varieties of Zapotec as well: *ínza* Lachixío (Western) (ISO code: zpl) (data from Sicoli 2007) and *inda* Sierra Juárez (Northern) (ISO code: zaa) (data from Nellis and Goodner de Nellis 1983); cf. PZp **nissa*. Given that these two types of Zapotec belong to separate Zapotec language areas and there are also two shapes for the word 'water' in Chatino, an alternate approach would be to reconstruct multiple forms for the word for 'water' in PZn. However, the Zapotec metathesis involves the sounds *i* and *n*, which do not correspond regularly to the *ʔ* and *t* in the Chatino metathesis, so one would need to posit more than two variants of the word for 'water' in PZn. To avoid this unnecessary complication, the simplest solution is to reconstruct one

	Gloss	ZEN	TAT	ZAC	SJQ	YAI	PCh	PZp
a.	'cacao'	*ya* ***n****tuya?*	*si?yù*] ***n****dyiya?*	***n****doya?*	***n****dya?*^{4}	***n****tiya?*^{3}	**n-tuya?*	**(kwe=)si?ya*
b.	'bean'	***n****táà*	***n****daa*	***n****daa*	***n****da*^{4F}	***n****ta*^{3}	(**n-taa*)	**(kwe=)sa:?*
c.	'turtle'	***n****koǫ*	***n****kǫ*	***n****gǫ̂ ~ kǫ̂*	***n****kǫ*$^{14+0}$ *~ kǫ*$^{14+0}$	***n****jkiɻ*^{24}*~ kiɻ*^{24}	**(n)-k(o)ǫ*	—
d.	'maize'	***n****tzukwà?*	***n****skwà?*	***n****dzokwâ?*	***n****tzkwa?*$^{14+0}$	***n****skwa?*^{24}	**n-sukwà?*	**x-okwa?*
e.	'plum'	***n****tzátę̀*	***n****tzatɛ́*	***n****dzatį*	*stɛ*^{4F}	***n****stį*^{3}	(**n-tzatę*)	—
f.	'soot'	***n****tana*	***n****tanà*	***n****daną*	*yna*^{2}	***n****a*^{3}	(**n-lana*)	**lana*
g.	'fresh corn'	***n****ta?ą*	***n****da?ą*	***n****da?ą*	***n****t?ą*^{4F}	***n****t?ą*^{3}	**n-ta?ą*	**se?ą*

FIG. 14.—Nasal accretion on nouns in PCh.

PZn form with two variant initial segments **?/n-issa*. This is quite common in Zapotecan languages, as seen in PZp **y/k/l-exxu* 'avocado' (see line *l* in figure 11 in **3.3** above) and in the Chatino cognates meaning 'weevil' (line *n* in figure 11), where we find *la-* in TAT and *kwi-* in ZAC.

4. Morphological changes. Three types of morphological change useful for subgrouping Chatino languages are presented here: sporadic accretion of initial nasal consonants on nouns, the formation of a new compound meaning 'face', and a change in causative derivation for the verb meaning 'to stay' or 'to be left'.

4.1. Nasal accretion on nouns. Many Chatino nouns have a nasal consonant accreted onto their initial consonant. The occurrence of the nasal is not predictable; some of the nouns that have it are animal names, others are plants, and others are neither.[15] Some lexemes can be reconstructed to PCh with the nasal since all varieties have it, as in figure 14. Note also that **l > t / n __*.

In some cognate sets, only one variety has the nasal; and in still other cases, some but not all varieties have the accreted sound. Therefore, the addition of nasals to nouns began in PCh and has continued probably up to the present. Since each instance of the change happens sporadically, a nasal found on a particular lexeme in a subset of varieties must reflect either a shared change during a period of common development, diffusion between varieties, or chance independent innovation. Figure 15 lists some nouns where the accreted nasal occurs on various subsets of Chatino varieties.

The first two lines of figure 15 show that SJQ alone innovated nasal accretion in the words meaning 'yesterday' and 'leaf'. The next four lines are cases where ZEN alone has the nasal. Both ZEN and TEO have a nasal on

[15] There are also nasals that have accreted onto verbs and adjectives, but they are not from the same source as the nasals on nouns. All verbal aspect/mood inflectional prefixes except for the potential mood prefixes and the *y-* completive prefix have accreted nasals (Campbell 2011*a*). Kaufman (1987) suggests that they may have come from the POM adverb **na* 'now'. Nasals are found on many adjectives as well, but most of those were ultimately derived from verbs by the stative aspect prefix: PCh **n-*, PZp **na=*.

	Gloss	ZEN	TAT	ZAC	SJQ	YAI	TEO	PCh	PZp
a.	'yesterday'	*là]ká*	*kaá*	*la]kǎ*	***n**ka*^{3}	*kaa*^{32}	*ka*^{23}	**kàá*	**nq:ʔka(k)*
b.	'leaf'	*lakaʔ*	*lakaʔ*	*lakaʔ*	***n**kaʔ*^{4F}	*kaʔ*^{3}	*kaʔ*^{23}	**lakaʔ*	**llakaʔ*
c.	'worm'	***n**kunùʔ*	*konòʔ*	*konǫ̀ʔ*	*knoʔ*^{2}	*kwnuʔ*^{23}	*knoʔ*^{34}	**kunǫ̀ʔ*	—
d.	'fruit'/'seed'	***n**chìʔyú*	*siʔyù*	*siʔyó*	*sʔyu*^{2}	—	—	(**siʔyu*)	—
e.	'ring'	***n**kwìʔ*	*kwiiʔ*	*kwìʔ*	*kwiʔ*$^{14+0}$	*kwiiʔ*^{24}	—	(**kwiiʔ*)	—
f.	'tooth'	***n**teʔya*	*laʔya*	*liʔya*	*ke-]lʔya*^{4}	*lʔya*^{3}	*lʔya*^{23}	**leʔya*	**(l)leʔya*
g.	'weevil'	***n**kwesa*	*la-]sà*	*kwisaá*	*sa*^{20}	*kwsa*^{43}	***m**saa*^{2}	(**kw-esa*)	—
h.	'wart'	*kwinyǫʔ*	***n**gwiyǫʔ*	***n**gwinyǫ̀ʔ*	*jyǫʔ*$^{14+0}$	*pyųʔ*^{24}	*kyǫʔ*^{23}	**kwiyǫʔ*	—
i.	'wax'	***n**kinyaʔ*	***n**ginyaʔ*	(*kinyąʔ*)	*knyaʔ*^{4} 'earwax'	*kinyaʔ*^{3}	—	**kinaʔ*	**kinaʔ*
j.	'Piper sp.'	*yuwaʔ*	*yuwaaʔ*	***n**dzowaâʔ*	***n**tzwaʔ*$^{14+0}$	***n**zwaʔ*^{24}	***n**dzwaʔ*^{2}	**yuwaaʔ*	—
k.	'goosefoot'	*kweje*	***n**kwje*	***n**gweje*	*wje*^{4F} ~ *je*^{4F}	***n**kwje*^{3}	***n**gwje*^{2}	**kweje*	**kwette*
l.	'spider'	*kwiyuʔ*	***n**gwyuʔ*	***n**gwiyòʔ*	*wyuʔ*^{4F} ~ *yuʔ*^{4F}	*wyuʔ*^{3}	***m**byuʔ*^{34}	**kwiyuʔ*	**kw=eyuʔ*

FIG. 15.—Nasal accretion on nouns in subsets of Chatino varieties.

'weevil' (line *g*), and only ZAC and TAT have one in 'wart' (line *h*). The word for 'wax' (line *i*) has the nasal in ZEN and TAT exclusively. ZAC, SJQ, YAI, and TEO have nasals on their reflexes of PCh **yuwaaʔ*, 'Piper sp.' (Spanish *hierba santa*) (line *j*), which would support the existence of a subgroup corresponding to Boas's first dialect. Finally, the reflexes of **kweje* 'goosefoot' (*Chenopodium ambrosioides*) and **kwiyuʔ* 'spider' present a more complex picture. TAT, ZAC, YAI, and TEO have the nasal on the former, and only TAT, ZAC, and TEO have it on the latter. However, it is possible that both SJQ and YAI once had nasals in both of these cases but have since lost them through onset consonant cluster simplification following monosyllabification.[16] It would not be surprising that, if this were to happen, it would be in cases like these where the nasal would have come into contact with continuants that have minimal air flow obstruction such as *j* ([h]) and *w*. If this were the case, nasal accretion on 'goosefoot' and 'spider' would be innovations shared by all varieties except for ZEN; I take this up again in the conclusions.

The most likely source of the accreted nasals is a reduced form of the definite/specific article *na*, which is still found in ZEN, as shown preceding the word 'ivy' in (3), which itself has an accreted nasal.[17]

(3) ZEN

nkwi-tzoʔo=yu	*lóʔò*	***na***	***n**chíyàʔ*	*joʔò=ó*	*nu*
CPL-get.high=3SG.M	RN.with	ART	ivy	sacred=DEM	NOM

nkay-oʔò=yu
CPL-drink=3SG.M

'he got high from the sacred ivy that he drank'

[16] Though a detailed study of how consonant clusters have been reduced in SJQ and YAI remains to be done, cluster simplification can be seen in cognate sets such as: ZEN *kwana*, SJQ *kna*^{4F} 'mirror' (loss of labialization on the velar stop); ZEN *kwiʔyù*, SJQ *ʔyu*^{2} 'flea' (loss of the entire labialized velar); ZEN *yusę*, SJQ *sę*^{4F} 'sand' (loss of the glide); and many others.

[17] Abbreviations are as follows: CPL = completive aspect, RN = relational noun, ART = article, DEM = demonstrative, NOM = nominalizer.

Gloss	ZEN	TAT	ZAC	SJQ	YAI	TEO	PCh	PZp
'face.of.3SG'	*ntoo*	***k**loo*	***ta-**loó*	*tlo^{1}*	*tlo^{1}*	*tlo^{31}*	**loo*	**lawo*
'on top of'	*ntoo*	*loo*	*loo*	*lo^{4F}*	*lo^{3}*	*loo^{23}*	**loo*	**lawo*
'eye.of.3SG'	(*kee*) *ntoo*	*si?yù kloo*	*ki-loo*	*s?yu^{2} tlo^{1}*	*ki-loo^{3}*	*jlo^{23}*	**kee loo*	**keyek lawo*

FIG. 16.—'Face' and related words.

This definite/specific article is not documented in other Chatino varieties, so if it is the source of the accreted nasal on nouns, it has since been lost in all varieties other than ZEN. It is possible that in some cases, the nasal prefix has spread via analogy after being established on some nouns in one variety or another. In that way, it may continue to come about even in varieties that no longer have the pre-nominal article.

4.2. The word 'face'. Zapotecan and other Otomanguean languages use body-part terms to encode spatial relations (Brugman 1981, MacLaury 1989, Lillehaugen 2006, and Pérez Báez 2012). In PCh, **loo* 'face.of.3SG' was an intimately possessed body-part term that also functioned as a relational noun meaning 'on top of, on the top surface of' or 'in front of'. The PCh word for 'eye' was **kee loo*, literally 'stone of face', cognate with PZp **keyek lawo* of the same composition and meaning.

The only change in these lexemes that has occurred in ZEN is that PCh **loo* 'face' is another example of a noun that has had a nasal consonant accreted onto it, yielding ZEN *ntoo*. The relational noun 'on top of' 'in front of' likewise has the accreted nasal in ZEN. The other varieties do not have the nasal, but they have all undergone a shared innovation whereby 'face' is now a compound while the relational noun derived from it remains simplex. The prepounded element on 'face' has the form *ta-* in ZAC and has lost the vowel in the other varieties. The *t* of this element has become *k* in TAT due to a regular dissimilation change: *t* > *k* / __ *l* (Sullivant 2011). The source of the prepound **ta-* is not yet determined. Figure 16 shows these lexemes, with the shared innovation shaded.

As figure 16 illustrates, the word for 'eye' varies as well. In ZAC and YAI, the vowel in the initial part, from PCh **kee* 'stone', has shortened and changed in quality to *i*, as expected due to the penultimate **e* > *i* change. Unless one looks at comparative data, this element would no longer appear to be transparently descended from 'stone' as it remains in ZEN. In TAT and SJQ, 'eye' is expressed by compounds whose literal meaning is 'seed of face', containing reflexes of PCh **si?yu* 'seed/fruit' followed by their now compound words for 'face'. The complex lexeme 'seed of face' meaning 'eye' is one of the common Mesoamerican linguistic area calques mentioned by Campbell, Kaufman, and Smith Stark (1986), though not of pan-Mesoamerican distribution. As such, it is likely that the TAT and SJQ 'seed of face' lexemes reflect a variational form going back to PCh that coexisted with 'stone of face', and it therefore seems quite unlikely to be a shared innovation among TAT and SJQ.

Gloss	ZEN	TAT	ZAC	SJQ	YAI	PCh	PZp
'she/he/it will stay'	*ch-ano*	*tyanú*	*k-y-anǫ́*	*kno*^{1}	*kinu*^{1}	**k-y-anǫ́*	**-y-aʔana*
's/he will leave it'	*k-u-t-ano*	***x**tyanú*	***x**-anǫ́*	***x**no*^{20}	***x**nu*^{1}	**k-u-t-ano*	**-ok=s-a:ʔnna*

FIG. 17.—Shift of the verb 'to leave it' to the *xi-* causative alternation.

4.3. Derivational change in the verb 'to leave it'. There are several causative derivations in Chatino. The most widespread is the *u-* causative, in which a causative verb stem is derived from an inactive or intransitive root/stem by the prefix *u-* (Campbell 2011*a*). This pattern is well preserved in ZEN and ZAC, but monosyllabified varieties have almost completely lost it since the causative *u-* vowel was not in the prominent (i.e., final) syllable of the word. The causative *u-* has cognates in conservative varieties of Zapotec that are descended from PZp **o(k)=*, so it is older than PCh. The second most widespread causative derivation is the *xi-* causative alternation (ZEN *è-*), which operates on a different class of verbs from the *u-* causative. The *xi-* causative derives causative verbs from unergative intransitive verbs and a few transitive verbs. In Otomanguean languages, it is typical for causatives to be auxiliary verbs or originate in auxiliary constructions (Kaufman 1987). The *xi-* causative began as an auxiliary but has since reduced to a prefix in innovative varieties.

There is one clear case where a verb that originally only participated in the *u-* causative alternation switched to participate exclusively in the *xi-* causative alternation. This sporadic change occurred in all varieties except for ZEN. Figure 17 shows this verb, 'to leave it', below its intransitive alternant 'to stay', 'to be left'.

It is clear in figure 17 that the PZp reconstruction shares the same structure as its ZEN cognate, even though the final vowel of the root does not correspond as expected. The PZp causative **o(k)=* corresponds to the ZEN *u-* causative prefix, and the PZp **s-* prefix is cognate with the ZEN transitivizer prefix *t-*. The shift of the verb 'to leave it' from the *u-* causative to the *xi-* causative was therefore likely a shared innovation in all Chatino varieties except for ZEN. The change may have come about as a result of a subtle shift in the lexical semantics of the intransitive counterpart verb. In ZEN, and perhaps PZp, the verb's most basic sense is/was that of an inactive verb 'to be left' or 'to remain', while in the other Chatino varieties its basic sense may be that of an active verb or volitional action, as in 's/he stayed'. A semantic shift like this could trigger the morphological change, since the *xi-* causative applies to active intransitive verbs.

5. Semantic and lexical changes. In this section, semantic shifts that illustrate shared innovations are discussed in words involving the meanings 'rope', 'to sleep', and 'to get lost'. Finally, a couple of Chatino words of Mixtec origin are identified and discussed, though they end up not shedding any light on Chatino subgrouping.

Gloss	ZEN	TAT	ZAC	SJQ	YAI	TEO	PCh	PZp
‘thread’	*júų̀*	*juų́*	*juų́*	*jų*^{3}	*jų*^{1}	*juų*^{31}	(**juų*)	**to*(*ʔ*)
‘rope’	*júų̀*	*juų́*	*lotǐ*	*ti*^{3}	*ti*^{32}	*ti*^{13}	(**juų*)	**to*(*ʔ*)
‘vine’	*lùtí*	(*lti*)	*lotǐ*	*ti*^{3} *kxįʔ*^{2}	*ti*^{32}	—	**lùtí*	**luttyi*

FIG. 18.—Chatino words for ‘thread’, ‘rope’, and ‘vine’.

5.1. Chatino words for ‘rope’ and ‘vine’. Kaufman (1993) reconstructs PZp **to(ʔ)* ‘string/thread/rope’ and **luttyi* ‘vine’, and all documented varieties of Chatino retain cognates of both. The ZEN and TAT cognates have the same semantics as in PZp and, therefore, Kaufman’s reconstructions for these two lexemes and their meanings can be pushed back to Proto-Zapotecan. However, in ZAC, SJQ, YAI, and TEO, the meanings of the reflexes of the original word for ‘vine’ have widened to include ‘rope’, while the original term for ‘rope/thread’ has narrowed in meaning to just ‘thread’. This semantic shift was most likely a shared innovation particular to Boas’s first grouping (Eastern Chatino) (fig. 18). In SJQ, the modifier *kxįʔ*^{2} ‘wild’ is added to disambiguate ‘vine’ from ‘rope’, which shows that the more basic sense of the lexeme in that variety is now in fact ‘rope’.

5.2. Semantic shift in the verb ‘to lie down’. The ZEN verb *-yatę* ‘to sleep’ has no Chatino cognates, but excluding the stem-initial *y* (perhaps an accretion of the intransitivizer prefix *y-*) it is cognate with PZp *-assi* ‘to sleep’. The verbs that mean ‘to sleep’ in all other Chatino varieties are cognate to the PZp verb **-aʔttaʔ* ‘to lie down’. Therefore, all varieties except ZEN underwent a common innovation in which the PCh verb ‘to lie down’ shifted to mean ‘to sleep’ and the original verb meaning ‘to sleep’ was lost. Figure 19 shows the verbs meaning ‘to sleep’ inflected for potential mood (POT), habitual aspect (HAB), and completive aspect (CPL), with the innovation shaded in gray.

Since the verb that now means ‘to sleep’ in all Chatino varieties besides ZEN is cognate with PZp **-aʔttaʔ* ‘to lie down’, this verb was certainly found in PCh. It can be reconstructed as **-àjáʔ* ‘to lie down’. Even though the verb was lost in ZEN, the ZEN adjective *kwajaʔ* ‘semi-flat’ may contain the same root.[18]

5.3. Shift involving the verb ‘to get lost’. Another semantic shift that is shared by all Chatino varieties except for ZEN is apparent when comparing the verbs that mean ‘to get lost’. The ZEN verb *-líj̀ì* ‘to get lost’ is cognate with PZp **-nnitti* ‘to be lost’. The other Chatino varieties do not retain cognates of this verb but instead express the meaning ‘to get lost’, with reflexes of a PCh verb whose phonological form was **-kùnáʔ* or **-kunáʔ*.[19] The ZEN reflex of this verb is *-kùnáʔ* ‘to get thrown out (as in

[18] This adjective is used for things that are not spherical and not very flat but somewhere in between, such as a mattress, a book, a guitar (*sèné kwajaʔ*), a thick board, or a person lying down.

[19] Though only ZEN retains a reflex of the original intransitive verb meaning ‘to get lost’ (**-liji*), its counterpart transitive verb still exists in all varieties, and it is a *u-* causative derived

	ZEN	TAT	ZAC	SJQ	YAI	TEO	PCh	PZp
POT	*k-yatę*	*k-ajaʔ*	*k-ajâʔ*	*kjaʔ*$^{14+0}$	*kjaʔ*^{24}	*kjaʔ*$^{2+0}$	**ki-(y)atį*	**k=assi*
HAB	*nt-yatę*	*nty-jaʔ*	*ndi-jyâʔ*	*ntyjaʔ*$^{14+0}$	*ntijaʔ*^{24}	*ntjyaʔ*$^{2+0}$	**nti-(y)atį*	**tyi=assi*
CPL	*nk-yatę*	*nkw-jáʔ*	*y-ajǎʔ*	*yjaʔ*^{3}	*yjaʔ*^{32}	*yjaʔ*^{31}	**nk(u)-(y)atį*	**ko=assi*

FIG. 19.—Verbs meaning ‘to sleep’.

Gloss	ZEN	TAT	ZAC	SJQ	YAI	PCh	PZp
‘to get lost’	*nku-líjì*	*n-gunáʔ*	*n-gonáʔ*	*jnaʔ*^{1}	*nwnaʔ*^{1}	(**-liji*)	**nnitti*

FIG. 20.—Verbs meaning ‘to get lost’.

trash)’. No Zapotec cognates are definitively identified for this verb yet, so a PCh gloss will not be proposed here, though it may have been the same as it is now in ZEN.[20] The verbs meaning ‘to get lost’ are given in figure 20, with the semantic shift innovation highlighted in gray.

The shift in meaning of the reflex of PCh **-kùnáʔ/-kunáʔ* to mean ‘to get lost’ and the accompanying loss of the original verb with that meaning (**-liji*) reflect a shared innovation among all varieties barring ZEN.

5.4. Lexemes of Mixtec origin. In the Chatino data gathered in recent years, several words have appeared to be Mixtec loans, particularly in ZEN and TAT, the varieties that currently border the Coastal Mixtec area. Of these possible borrowings, two can be identified as such with a good degree of certainty: ‘toad’ in TAT and ZAC, and ‘squirrel’ in ZEN and TAT.[21] Under further examination, it becomes evident that neither of these borrowings were shared innovations among these subsets of Chatino varieties and, therefore, they do not shed any light on the history of Chatino diversification.

Josserand (1982) reconstructs Proto-Mixtec (PMx) **laʔwa* ‘frog’, whose Coastal Mixtec reflexes mostly begin in /s/ rather than /l/, consistent with regular sound changes. This was borrowed from a Coastal Mixtec variety into

verb. In ZEN, the transitive verb means ‘to lack it’ and ‘to waste it’; in TAT, SJQ, and YAI, it means ‘to lack it’ and ‘to spend it’; and in ZAC, it means ‘to lose it’ and ‘to spend it’. Kaufman does not reconstruct the transitive verb for PZp, but it existed even as early as PZn because it is found in Juchitán Central Zapotec, where it is also a *u-* causative verb: *-u-niti* ‘to lose it’, ‘to lack it’ (datum from Pérez Báez and Kaufman 1995–2011).

[20] The Sierra Juárez Northern Zapotec verb *-rúʔná* ‘to get thrown out’ (datum from Nellis and Goodner de Nellis 1983) may be cognate in all but the initial consonant. In this variety of Zapotec, *r* regularly corresponds to Chatino *t* and not to *k* as found in the Chatino verbs. Nevertheless, initial consonant alternations often develop through the accretion of reduced morphological elements in these languages, as already discussed.

[21] ZEN *nkolò* and TAT *koloʔ* ‘turkey’ resemble the Mixtec word for ‘turkey’, but they are likely onomatopoeic, so it is not possible to make a strong case for borrowing from Mixtec or even cognacy between the ZEN and TAT forms.

Gloss	ZEN	TAT	ZAC	SJQ	YAI	TEO	PCh	PZp	Coastal Mx
'toad'	*sèné*	*saʔwa*	*saʔwā*	*sne*^{1}	*sne*^{1}	*sne*^{31}	(**sene*)	**xene*	*saʔwa* 'frog'
'squirrel'	*kwanyo*	*tityá*/***kwayǫ***	*tityá*	*tya*^{1}	—	*tya*^{31}	**titá*	**kwe=tyiiʔ(s)sa*	*kwąnyų*

FIG. 21.—Mixtec words in Chatino languages.

TAT and ZAC as 'toad'. It is doubtful that they borrowed it at the same time, since there is little other evidence in support of an exclusive subgrouping of TAT with ZAC. Tataltepec currently borders Coastal Mixtec communities, and Mixtec influence in the ZAC area was likely greater in the past than it is today, during and after the Coastal Mixtec kingdom of Tututepec (see Spores 1993 and Joyce et al. 2004). Therefore, it is possible that this word was borrowed separately into TAT and ZAC. Alternatively, it may be that TAT borrowed it from Mixtec and it later diffused from TAT to ZAC. The word for 'toad' in the rest of the Chatino varieties has Zapotec cognates, so it is reconstructible to PCh (**sene*) and also back to PZn (fig. 21).

The other Mixtec loan is ZEN *kwanyo*, TAT *kwayǫ* 'squirrel'. Josserand (1982) reconstructs PMx **kweyų́?*, and all Coastal Mixtec varieties have reflexes like *kwąnyų*. In other Chatino varieties, the principal words for 'squirrel' are reflexes of PCh **tityá* 'squirrel', which has Zapotec cognates; cf. PZp **kwe=tyiiʔ(s)sa* (fig. 21).

TAT has both words for 'squirrel', *tityá* and *kwayǫ*, and speakers disagree on which one is the "genuine" Chatino form (Ryan Sullivant, personal communication). Furthermore, in the village of Teotepec, *cuaño* [kwanyo] is a vernacular Spanish term for 'squirrel' (Justin McIntosh, personal communication), and since it is disyllabic, it most likely did not first pass through Teotepec Chatino before entering the local Spanish. If it had done so, we would expect it to be monosyllabic since TEO is highly monosyllabified. On the other hand, the ZEN word *kwanyo* has the default (or unmarked) tone, which is strong evidence that the word there did not enter Chatino via Spanish. If it had passed through Spanish first, it would likely have a low tone on the final syllable in ZEN. Though the whole story of this Mixtec word's adoption in the Chatino area is not yet clear, as of now it also fails to provide any conclusive insight into the classification of Chatino languages.

6. Conclusions. Figure 22 lists the phonological, morphological, and semantic changes discussed in the preceding sections which are potentially useful for subgrouping since they occurred in more than one but less than all varieties. The status of the change of penultimate **e* > *i* in ZAC (line *k* in figure 22) in this respect was not clear, but I consider it further below. In most cases, the changes were demonstrated to be shared innovations. In a few cases, such as the palatalization of sibilants after *i* in all varieties except ZEN, there remained a question about whether or not drift may have

		ZEN	TAT	ZAC	SJQ	YAI	TEO	
a.	Alveolar sibilants palatalize after *i*	—	+	+	+	+	+	Coastal Chatino
b.	*n-* accretion on 'spider'	—	+	+	+	+	+	
c.	*n-* accretion on 'goosefoot'	—	+	+	+	+	+	
d.	**loo* 'face' becomes compound with **ta-*	—	+	+	+	+	+	
e.	**-u-t-anó* 'to leave' shifts to *xi-* causative	—	+	+	+	+	+	
f.	(**-ajaʔ*) 'to lie down' shifts to 'to sleep'	—	+	+	+	+	+	
g.	**-kùnáʔ* shifts to 'to get lost'	—	+	+	+	+	+	
h.	Metathesis in 'water'	—	—	+	+	+	+	Eastern Chatino
i.	*n-* accretion on 'Piper sp.'	—	—	+	+	+	+	
j.	**lùtí* 'vine' shifts to 'rope'	—	—	+	+	+	+	
k.	penult. **e* > *i*	—	—	+	+	+	+	
l.	'toad' borrowed from Mixtec **laʔwa* 'frog'	—	+	+	—	—	—	Chance or diffusion
m.	*n-* accretion on 'wart'	—	+	+	—	—	—	
n.	*n-* accretion on 'wax'	+	+	—	—	—	—	
o.	*n-* accretion on 'weevil'	+	—	—	—	—	+	

FIG. 22.—Shared innovations and subgrouping of Chatino varieties.

been responsible rather than shared innovation. However, since that change bundles with the other isoglosses in lines *b* through *g* of figure 22, it falls in line with a significant body of evidence that all varieties of Chatino except ZEN shared a period of common development. The label Coastal Chatino, suggested by Tony Woodbury (personal communication), is fitting for this group, since its members are all located closer to the Pacific coast than is ZEN. There was also some uncertainty about whether 'spider' previously had the accreted nasal in SJQ and YAI and then lost it later through onset cluster reduction following monosyllabification. This was likely the case, or else one would have to propose three independent nasal accretion innovations for that word (one each in TAT, ZAC, and TEO). Though SJQ now lacks the accreted nasal in 'goosefoot', we can assume it was previously there for the same reason.

The other distinct bundle of more than two isoglosses visible in figure 22, lines *h* through *k*, includes changes that occurred in all Coastal Chatino varieties except for TAT. The first three, lines *h* through *j*, reflect innovations discussed above that are sufficiently random and unlikely due to drift, so they almost certainly were shared. The fourth, line *k*, is the change of **e* > *i* in penultimate syllables that was only evidenced in ZAC among the varieties included in this study. There remained the question of whether or not SJQ, YAI, and/or TEO underwent the change, because any evidence of it would have been obscured by monosyllabification in those varieties. During a pilot field trip to San Juan Lachao, a village that lies in the easternmost part of the Chatino region, Tony Woodbury (personal communication) documented *kwila* 'fish' and *kiʔnạ* 'plate' (< PCh **keʔna*). These lexemes, among others, show

that Lachao conserves some non-prominent vowels and underwent the **e* > *i* change like ZAC. Elsewhere, Woodbury's Lachao data fit with the ZAC, SJQ, YAI, and TEO group since he records *ti*^{45} 'rope', reflecting the semantic shift of 'vine' to 'rope', and *la* ***n****dzowa?*, showing the accreted nasal on 'Piper sp.'. Therefore, the **e* > *i* change represents a likely fourth isogloss in the second bundle. With this bundle, we can safely conclude that Boas's "first dialect"—what Woodbury (2009) calls Eastern Chatino—is in fact a valid genetic entity.[22]

The innovations in lines *l* and *m* are found only in TAT and ZAC. These two varieties do not form a genetic subgroup since the second bundle of isoglosses presents stronger evidence in favor of grouping ZAC with SJQ, YAI, and TEO. Therefore, the similar features between TAT and ZAC are more likely due to chance or language contact. Finally, the last two sets of possibly shared innovations in figure 22 each involve a different pair of varieties with no other evidence for being a subgroup. Therefore, they are more likely due to chance or diffusion than to shared innovation.

Ethnologue's (Lewis 2009) classification of Chatino contains six "languages" with no high-level subgrouping: ZEN, TAT, ZAC, Nopala (including TEO and others), Western Highland (SJQ, YAI, Panixtlahuaca, and others), and Eastern Highland (Lachao and others) (ISO code: cly). So, *Ethnologue* identifies four distinct groupings within what is here demonstrated to be Eastern Chatino but does not refer to any shared innovations that would support those low-level subgroups. None of the data presented here supports any finer subgrouping within Eastern Chatino either, and therefore the distinctions between the Nopala, Western Highland, and Eastern Highland purported groupings are not justifiable at this time and should be rejected until proven valid with the comparative method.

Since the time depth of Chatino diversification is fairly shallow, the languages have not undergone a large number of distinct sound changes since PCh.[23] Also, not enough time has passed for there to be substantial evidence for subgrouping in submerged morphological patterns, which Meillet (1925) emphasizes in carrying out genealogical linguistics. The majority of Chatino morphology takes place on the verb, and the phonologically conservative varieties of ZEN and ZAC, which are about as distantly related as any two known Chatino varieties can be, differ little in their morphology (see Campbell 2011*a* and Villard 2010). Nevertheless, even though there is not a very large pool of evidence for subgrouping in the significantly large corpus of Chatino

[22] The tightness of the tone correspondences in these varieties also points to their very close affiliation and recent diversification.

[23] One could argue, however, that monosyllabification has led to and continues to lead to rapid, extensive phonological and morphological change in certain varieties.

data now available, a fairly robust classification has been possible by also considering sporadic morphological changes and semantic shifts.

Nearly all descriptive and typological works in linguistics include a statement on the genetic affiliation of the language(s) under investigation. As Haspelmath (2004:216) highlights, in some cases cited subgroupings do not have a solid foundation, and often they have been adopted and passed along without further scrutiny. At the moment, much research is being done on Chatino and Zapotec and, moving forward, the current classification should provide a reliable base for genealogical statements about the Chatino language area.

As a final note, Boas does not tell us exactly where his Chatino consultant was from, but we can narrow it down by checking his data against the changes that have been outlined here. First of all, he lists the verbs *guna?* 'to be lost' (must have been [ŋguna?]) and *kaja?* 'he will sleep', ruling out ZEN.[24] Additionally, forms like *tichu?* 'coatimundi' and *cha? tinyǫ* 'Chatino', whose first element comes from PCh **ìtzá?* 'word', rule out ZEN since the affricates have been palatalized after *i*. Next, his consultant could not have been a TAT speaker due to his metathesized word for 'water' *tia* (the transcription is missing the glottal) and his pronunciation of *kwila* 'fish' and *kwina?* 'flesh'. If the speaker were from TAT and the penultimate **e* of the PCh words **kwela* 'fish' and **kwená?* 'flesh' had changed by that time, it would have become /a/ due to vowel harmony, not /i/, and the following alveolar consonants would have palatalized. Finally, forms such as *l:ka?* 'leaf', *nxkwa?* 'maize', and *l?ya* 'tooth' are monosyllabic, and thus rule out ZAC (cf. ZAC *laka?*, *ndzokwâ?*, and *li?ya*). Therefore Boas's consultant was a speaker of an Eastern Chatino variety other than ZAC and likely not one of the now totally monosyllabic varieties like SJQ, YAI, or TEO. Perhaps he was from Lachao or the other far eastern village of Yolotepec, which reportedly preserves some non-prominent vowels. This would not be surprising, since Boas was on his way to study the now extinct Pochutec Nawa, which was spoken along the coast to the east of the Chatino area.

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[24] I have simplified Boas's orthography to bring it more in line with the orthography used here.

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