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AN ALTERNATIVE RECONSTRUCTION OF
PROTO-TOTONAC-TEPEHUA¹

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This paper presents a reconstruction of the phonological inventory of Proto-Totonac-Tepehua (PTT) that differs significantly from previous reconstructions. The chief difference is that the PTT inventory proposed here includes a series of glottalized stops and affricates and does not include a series of laryngealized vowels. It is argued that it is easier to explain the correspondences among cognates in the Totonac and Tepehua languages if the protolanguage includes a series of glottalized stops and affricates. The diachronic changes that are required to account for the distribution of glottalized consonants in the Tepehua languages and laryngealized vowels in the Totonac languages are more natural and less marked under this proposal than under the alternative proposals involving laryngealized vowels in PTT.

[KEYWORDS: Totonac; Tepehua; Proto-Totonac-Tepehua; historical reconstruction; comparative method]

Proper reconstruction of Proto-Totonac-Tepehua, the ancestor of the Totonac and Tepehua languages of Mexico, has assumed greater urgency in recent years because of the publication of a number of claims regarding the relationship of these languages to other languages and language families in Mesoamerica and beyond.² Brown et al. (2011) propose that the Totonac and Tepehua languages are historically related to the Mixe-Zoquean languages and present a reconstruction of what they refer to as Proto-Totozoquean (PTz). Brown et al. (2014) go further and suggest that this putative protolanguage is also related to the ancestor of Chitimacha, an extinct language of Louisiana. All of these claims rest on a reconstruction of Proto-Totonac-Tepehua

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² We refer to the protolanguage as Proto-Totonac-Tepehua (abbreviated PTT) instead of Proto-Totonacan (PTn) as in Brown et al. (2011) and Brown et al. (2014).

(hereafter, PTT) that includes a vowel inventory containing contrasting modal and laryngealized vowels.³ Brown et al. (2014:438) explicitly state that “the main basis for reconstructing a laryngealized vowel for PCh-Tz [Proto-Chitimacha-Totozoquean] and PTz [Proto-Totozoquean] is the occurrence of a laryngealized vowel in PTh [Proto-Totonacan].” Much depends then on the correctness of their decision to include laryngealized vowels in the inventory of Proto-Totonac-Tepehua. Any threat to the status of these vowels in PTT constitutes a threat to both the Proto-Totozoquean and Proto-Chitimacha-Totozoquean hypotheses.⁴

In this paper, we propose an alternative to Brown et al.’s reconstruction of Proto-Totonac-Tepehua. We hypothesize that this protolanguage did not exhibit contrasting sets of modal and laryngealized vowels, as Brown et al. (2011) and Brown et al. (2014) claim, but instead exhibited contrasting sets of glottalized and non-glottalized stops and affricates. We argue that the contrast between modal and laryngealized vowels that is attested in the Totonac languages today is a consequence of the diachronic spreading of the laryngeal feature Constricted Glottis [CG] associated with glottalized stops and affricates in Proto-Totonac-Tepehua to adjacent vowel nuclei. This is the opposite of the mechanism which Brown et al. (2011) propose to account for the contrast between glottalized and non-glottalized stops and affricates in the Tepehua languages. We demonstrate that the reconstruction of a series of glottalized stops and affricates in PTT, and not a series of laryngealized vowels, affords the simplest and most straightforward account of the phonological developments that characterize the linguistic prehistory of the Totonac-Tepehua language family.

1. Preliminaries. The Totonac and Tepehua languages are spoken in central Mexico in a region that includes parts of three states—the southern part of Hidalgo, the northwestern part of Veracruz, and the Sierra Norte of Puebla. Figure 1 is a map of the Totonac-Tepehua language area showing

³ Brown et al. (2011:331) decline “to take a stand on the issue of what phonological feature or complex in PTz gave rise to laryngealized vowels in PTh [Proto-Totonacan]” but nevertheless maintain that “such a feature or complex pertained to PTz.” Brown et al. (2014:430) clarify their position and explicitly state that the PTz inventory included both modal and laryngealized vowels.

⁴ It should be noted that the proposed relationships between Proto-Totonac-Tepehua and Proto-Mixe-Zoque and between Proto-Totozoquean and Chitimacha are far from being established. Mora-Marín (2016:172) cites several problems with the data and methodology of Brown et al. (2011), including “narrow distribution of etyma in at least one of the two language families; unmatched segments without morphological justification; possible loanwords; and semantic leeway.” Campbell (2016:129–30) reports “serious methodological shortcomings” in Brown et al. (2014) that, in his view, render the Proto-Chitimacha-Totozoquean hypothesis “nonviable.” We hope that the present paper contributes to the investigation of these putative relationships, but nothing in the paper depends, in any way, on their correctness.

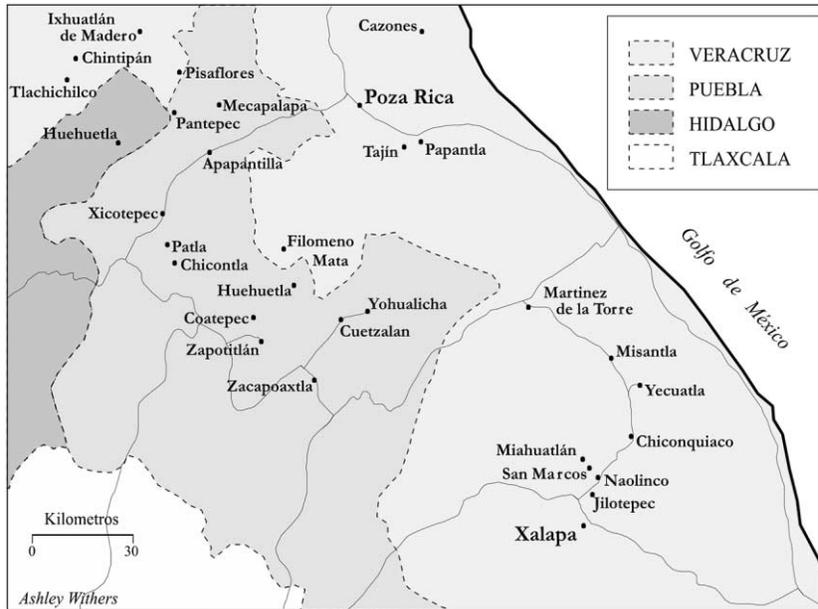


FIG. 1—Totonac-Tepehua Language Area

the location of many of the communities cited here in relation to the Gulf of Mexico and the area's two largest cities, Poza Rica and Xalapa, Veracruz.

The exact relationship of the Totonac and Tepehua languages is still a matter of debate. The traditional view is that the family is made up of two branches, Totonac and Tepehua, which each have their own sub-branches. Figure 2 recapitulates the views of McQuown 1940, 1990; Arana Osnaya 1953; Hasler 1966, 1993; García Rojas 1978; Smith-Stark 1983; Watters 1988, 1992; MacKay 1991, 1999, 2011; MacKay and Trechsel 2006, 2008b, 2012a, 2012b, 2014, 2015a, 2015b, forthcoming; and others. As more and better data for these languages are accumulated and published, the articulation of the family tree will almost certainly need to be revised.

As shown in figure 2, the Totonac branch is divided, minimally, into four branches conventionally identified as Sierra, Papantla, Northern, and Misantla. Most of these branches consist of a number of distinct, but closely related languages. Meanwhile, the Tepehua branch consists of three branches, identified as Pisaflores, Huehuetla, and Tlachichilco. Each of these is a separate language, with at least some dialectal variation. MacKay and Trechsel (2012a, 2012b, 2014, 2015a) offer an extensive set of phonological and morphological features that serve to differentiate the languages and provide a more formal and rigorous basis for their classification. However, further work needs to

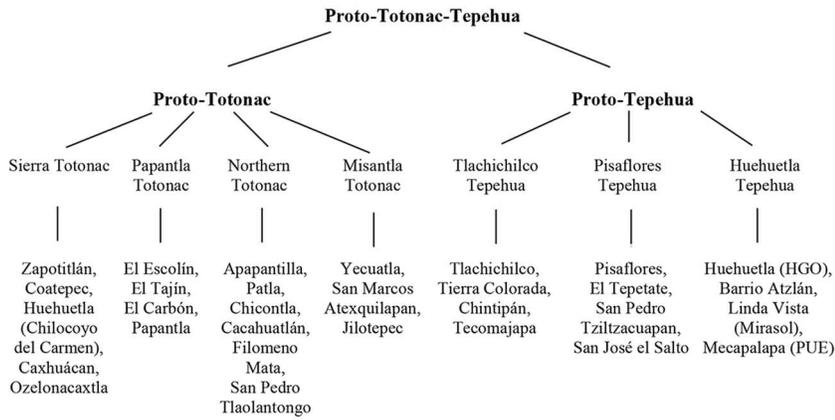


FIG. 2—The Totonac-Tepehua Language Family

TABLE 1
POPULATION OF MEXICO 5 YEARS OR OLDER THAT SPEAKS AN INDIGENOUS LANGUAGE*

	1970	1980	1990	1995	2000	2005	2010
Totonac	124,840	196,003	207,876	214,192	240,034	230,930	244,033
Tepehua	5,545	8,487	8,702	8,942	9,435	8,321	8,868
Total Indigenous Languages	3,111,415	5,181,038	5,282,347	5,483,555	6,044,547	6,011,202	6,695,228

* Sources: Secretaría de Industria y Comercio, IX Censo General de Población 1970; INEGI, X Censo General de Población y Vivienda 1980; INEGI, XI Censo General de Población y Vivienda 1990; INEGI, Censo de Población y Vivienda 1995; INEGI, XII Censo General de Población y Vivienda 2000; INEGI, II Censo de Población y Vivienda 2005; INEGI, Censo de Población y Vivienda 2010.

be done before the exact nature of the relationships among these languages can be established.

It is difficult to provide an accurate count of the number of native speakers of Totonac and Tepehua. According to the most recent census data (INEGI Censo de Población y Vivienda 2010), there are 244,033 speakers of Totonac, and 8,868 speakers of Tepehua. The census does not discriminate among the different varieties of Totonac and Tepehua, so it is difficult to be more precise. Comparison of census data over the past forty years or so in table 1 reveals a slight rise in the number of speakers of these languages overall, but this is likely due to improved methods of counting and not to any actual increase in the native speaker population. In fact, all of the languages are increasingly being replaced by Spanish.

The reconstruction of Proto-Totonac-Tepehua that we propose here is based on data from eight Totonac languages and all three Tepehua languages. We

identify these languages by the name of the town or population center where they are spoken. The eight Totonac languages are Misantla (Yecuatla/San Marcos Atesquilapan) (ISO: tlc), Apapantilla/Xicotepec de Juárez (ISO: too), Upper Necaxa (Patla/Chicontla) (ISO: tku), Filomeno Mata (ISO: tlp), Zapotitlán de Méndez (ISO: tos), Papantla (ISO: top), Coatepec, and San Juan Ozelonacaxtla.⁵ The three Tepehua languages are Pisaflores (ISO: tpp), Huehuetla (ISO: tee), and Tlachichilco /Chintipán/Tierra Colorada (ISO: tpt). These languages represent all of the major divisions within the family, including all four divisions within Totonac. They are also the languages for which we have sufficient lexical data to support the assembly of a large and varied list of cognates.⁶

2. Glottalized Consonants or Laryngealized Vowels. The key question that must be addressed in any reconstruction of PTT concerns the status of laryngealized vowels and glottalized consonants in the protolanguage. As illustrated in the numerous cognate sets presented in the **appendix** (A.1–A.9), there is a very broad and general correspondence between sequences of glottalized (ejective or implosive) stop or affricate + modal vowel, [C'V], in the Tepehua languages and sequences of non-glottalized stop or affricate + laryngealized vowel, [CV̆], in the Totonac languages. In addition, there is broad correspondence between sequences of a non-glottalized stop or affricate plus modal vowel in the Tepehua languages [CV] and sequences of non-glottalized stop or affricate + modal vowel [CV] in the Totonac languages. Both of these correspondences are illustrated in the cognate sets in **A.1**.

The words for ‘spicy’ and ‘ashes’ constitute a minimal pair in all of the extant Totonac and Tepehua languages. Reconstruction of the proto-word for ‘spicy’, with non-glottalized consonants in Tepehua and non-laryngealized vowels in Totonac, is trivial. Researchers agree that this word should be reconstructed as /*kaka/. Differences emerge, however, regarding the reconstruction of words like ‘ashes’ with glottalized consonants followed by modal vowels in Tepehua and non-glottalized consonants followed by laryngealized

⁵ Coatepec Totonac and San Juan Ozelonacaxtla Totonac both belong to the Sierra branch of Totonac. They have not yet been assigned their own separate ISO codes.

⁶ The languages and sources of our data include Misantla Totonac (MacKay 1991, 1994, 1999; MacKay and Trechsel 2003, 2005, 2008a, and fieldnotes); Apapantilla/Xicotepec de Juárez Totonac (Reid and Bishop 1974; Reid 1991); Upper Necaxa Totonac (Beck 2004, 2011); Filomeno Mata Totonac (McFarland 2009; MacKay and Trechsel fieldnotes); Zapotitlán de Méndez Totonac (Aschmann 1983 [1962], dictionary ms. in the authors’ possession); Coatepec Totonac (McQuown 1940, 1990); Ozelonacaxtla Totonac (Román Lobato 2008; MacKay and Trechsel fieldnotes); Papantla Totonac (Aschmann 1973, dictionary ms. in the authors’ possession; Levy 1987, 1990; García Ramos 1979, 2007); Pisaflores Tepehua (MacKay and Trechsel 2010, 2012a, 2012b, 2013, and fieldnotes); Huehuetla Tepehua (Smythe Kung 2007; García Agustín 2012); and Tlachichilco Tepehua (Watters 1987, 1988, 1994, 2007, forthcoming; de la Cruz Tiburcio et al. 2013).

vowels in Totonac. Should the protoform be */*kaka/*, with laryngealized vowels, as in the Totonac languages, or should it be */*k'ak'a/*, with glottalized stops, as in the Tepehua languages? Both Arana Osnaya (1953) and Brown et al. (2011) opt for the former solution, whereas McQuown (1942:37) and MacKay and Trechsel (2015b, forthcoming) opt for the latter.⁷ In this section, we review the distribution of glottalized vs. non-glottalized consonants in the Tepehua languages and the distribution of laryngealized vs. non-laryngealized vowels in the Totonac languages. This discussion serves to contextualize the evidence and argumentation presented in support of our hypothesis in 5, 6, and 7.

2.1. Glottalized Consonants in the Tepehua Languages. All three Tepehua languages exhibit a series of glottalized stops and affricates. Pre-voically, these consonants are realized as either ejectives or implosives, depending on the language. Syllable-finally, they lose their glottalization and are realized as non-glottalized stops or affricates. Such syllable-final neutralization is common in languages that contain glottalized stops and affricates. Essentially, neutralization limits the distribution of glottalized stops and affricates to prevocalic position and prohibits them from appearing syllable-finally. The examples in (1) and (2) illustrate the neutralization of glottalized /p'/ (phonetically [b] prevocalically) in syllable-final position in Pisaflores Tepehua.

Pisaflores Tepehua

- | | | | | |
|-----|-------------|-----------|----------------------------|----------------------------|
| (1) | [k'ábá] | [ǰǰábá] | /k'ap'-ya/ ⁸ | 's/he forgets about X' |
| | [k'ábáan] | [ǰǰábáan] | /k'ap'-ya-ni/ ⁹ | 's/he forgets about you' |
| (2) | [k'ápd̥i] | | /k'ap'-t'i/ | 'you forget about X' |
| | [k'ápd̥iti] | | /k'ap'-t'iti/ | 'you (pl.) forgot about X' |

There are no glottalized fricatives or sonorants in the Tepehua languages, and there are no laryngealized vowels following fricatives or sonorants. The

⁷ Brown et al. (2011) do not include the word for 'ashes' in their list of reconstructed forms for Proto-Totonacan. However, there can be no doubt that this is the reconstruction they would have provided had their list been more extensive. Arana Osnaya (1953:128) reconstructs the word as */*ka?ka?n/*, with a final -n. The point is that both sources posit laryngealized vowels in this instance and neither posits glottalized stops. This is the aspect of their proposed reconstructions that we challenge.

⁸ In Pisaflores Tepehua, as in the other Totonac-Tepehua languages, the imperfective suffix *-ya/ 'IPF'* is realized as [-y] on verbs ending in a vowel, as [-a] on verbs ending in an obstruent, and as -∅ on verbs that end in a nasal (and, in some languages, /h/). Following /i/ or /ii/, the suffix [-y] isn't realized phonetically, but it does cause the preceding vowel to be stressed.

⁹ The suffixes *-ya/ 'IPF'*, *-ta/ 'PERF'*, and */p'i/ 'FUT'* are all realized with a long vowel, [-yaa], [-taa] and [-b̥ii], when they are followed by another suffix.

only exception occurs when laryngealization serves to mark a second person subject. This process of morphological laryngealization is found in almost all varieties of Totonac and Tepehua. It is very productive and, depending on the language, can spread throughout the entire phonological word and sometimes beyond.¹⁰ The examples in (3) demonstrate morphological laryngealization in the presence of a second person (singular or plural) subject in Pisaflores Tepehua:¹¹

(3) Second person morphological laryngealization in Pisaflores Tepehua

- | | | | |
|------|---------------------------------|---------------|-------------------------|
| (3a) | [káłd̥ɔ́ɔyááb̥íɔ́d̥íɔ́] | ¹² | [káłtatayáʔ] |
| | /ka-łtata-CG-ya-p'i-t'iti/ | ¹³ | /ka-łtata-ya-ʔ/ |
| | IRR-sleep-2SUB-IPF-2FUT-2SUB.PL | | IRR-sleep-IPF-FUT |
| | 'you (pl.) will go to sleep' | | 's/he will go to sleep' |
| (3b) | [bášd̥ááɔ́d̥íɔ́] | | [páštaal] |
| | /paš-CG-ta-t'iti/ | | /paš-ta-ɦi/ |
| | bathe-2SUB-PERF-2SUB.PL | | bathe-PERF-PFV |
| | 'you (pl.) have bathed' | | 's/he has bathed' |

2.2. Laryngealized vowels in the Totonac Languages. In contrast with the Tepehua languages, the Totonac languages exhibit laryngealized vowels and do not exhibit glottalized consonants. The phonetic realization of laryngealized vowels in Totonac varies from language to language. With respect to these vowels in Zapotitlán de Méndez Totonac, Aschmann states: "Laryngeal quality is of three types: (1) vowel followed by glottal stop, (2) vowel followed by glottal stop but also affected by this glottal stop so as to be accompanied by a more or less rough glottal vibration or laryngealization (glottalization), and (3) vowel preceded and followed by a glottal stop with complete laryngealization of the vowel" (1946:35). Aschmann continues:

¹⁰ In Pisaflores Tepehua, the glottalization/laryngealization marking a second person subject can spread to preceding words, such as /haantu/ 'no, not' and adverbs. In Tlachichilco Tepehua, according to Watters (personal communication), the glottalization "doesn't pass beyond the IRR or LOBJ prefixes."

¹¹ The following abbreviations are used: AG = agentive, 1 = first person, 2 = second person, CAUS = causative, CG = constricted glottis, FUT = future, IPF = imperfective aspect, INC = inchoative, INS = instrumental, IRR = irrealis, NOM = nominalizer, OBJ = object, PERF = perfect aspect, PFV = perfective aspect, PL = plural, POS = possessive, RA = repetitive action, SUB = subject, TRANS = transitivizer.

¹² The right-most accented syllable of a word exhibits primary stress. All other accented syllables exhibit secondary stress.

¹³ The placement of the morpheme "Constricted Glottis" [CG] in glosses is arbitrary. A detailed discussion of morphological laryngealization in Tlachichilco Tepehua is found in Watters (1994). The phenomenon in Misantra Totonac is described in MacKay (1999).

In certain (but not all) words where the glottal stop follows the syllabic nucleus for a speaker of the [Zapotitlán] dialect . . . , that same word is spoken in Coyutla . . . with a glottal preceding the syllabic nucleus and in still another town, Concepción, it actualizes as a laryngealization of the syllabic nucleus without any full glottal stop present. . . . This would perhaps imply that for the language as a whole, including other dialects than [Zapotitlán], the glottal stop is not strictly fixed as to its sequence in the phonemes of the word, but is rather vaguely located anywhere within the syllable nucleus (1946:42).

This difference in the timing or phasing of laryngealization in vowels is important for reconstruction because it suggests that the timing may have changed during the development and evolution of these languages and that this was an important source of diversification within the family. The question is: “Did the laryngealization move from the beginning of the vowel to the end, or vice versa?” The answer depends on whether the protolanguage, PTT, contained a series of laryngealized vowels or a series of glottalized stops and affricates.

The distribution of laryngealized vowels in the Totonac languages varies from language to language depending on the type of consonant that precedes them. Some languages exhibit sporadic laryngealization of vowels after fricatives and sonorants, while others do not. Excluding the laryngealization which marks a second person subject in these languages, the distribution of laryngealized vowels in the Totonac languages is as follows:

2.2.1. In Papantla Totonac, laryngealized vowels are found almost exclusively following stops and affricates. They are only rarely found following fricatives, and they are never found following sonorants, with the possible exception of /w/. These facts are important because they reveal an intimate association between laryngealized vowels and the stops and affricates that precede them. The distribution of laryngealized vowels in Papantla Totonac parallels, almost exactly, the distribution of glottalized stops and affricates in the Tepehua languages—i.e., all sequences of CV in Papantla Totonac correspond to sequences of C’V in Tepehua and all sequences of C’V in Tepehua correspond to sequences of CV in Papantla Totonac. It has also been reported that the laryngealization of vowels following stops and affricates in Papantla Totonac is sometimes realized as glottalization of the preceding consonant. García Ramos (1979) cites glottalized stops and affricates in the Totonac of El Tajín, near Papantla. Alarcón Montero (2008:96) states that in Papantla Totonac “the stop consonants /p, t, k/ that precede the tense realization of laryngealized vowels are sometimes realized as voiced and other times as ejective consonants” [translation by the authors].

2.2.2. In most of the other Totonac languages, laryngealized vowels are found not only after stops and affricates but also occasionally after sonorants and, on rare occasions, after /s/. This contrasts with the situation in Papantla Totonac where, as noted above, laryngealized vowels are found almost exclusively after stops and affricates. The paucity of forms exhibiting laryngealized

vowels after fricatives and sonorants in the Totonac languages and the haphazard and unsystematic distribution of these vowels in these environments suggests that laryngealized vowels are a fairly recent development in the Totonac languages and that they did not have their origin in Proto-Totonac-Tepehua. This issue is discussed in detail in 7.

2.2.3. In some Totonac languages, the laryngealization of vowels has been eroded or completely lost. McQuown (1940, 1990) states that there are no laryngealized vowels in Coatepec Totonac (although he acknowledges them elsewhere). Tino Antonio, a linguist from Olintla, reports that there is only very slight laryngealization of vowels in the Totonac of that community, and that laryngealization sometimes results in a change in vowel quality. Troiani (2004, 2007) also fails to record any laryngealization of vowels in Huehuetla (PUE) Totonac. The loss of laryngealized vowels in these languages represents a leveling or neutralization of what was, historically, a clear contrast between modal and laryngealized vowels in Proto-Totonac.

3. Earlier Proposals

3.1. McQuown (1942). One of the first linguists to explore the issue of the relationship of the Totonac and Tepehua languages with others in Mesoamerica was Norman McQuown. In 1942, McQuown (1942:37) reported that “there is such a notable similarity between Totonac and Tepehua that it can be said without a doubt that they form diversified variants of a single protolanguage that we can call Proto-Totonac” [translation by the authors]. He also observed (McQuown 1942:38) that “Totonac is very probably related to Mixe-Zoque although this relationship is in no way as close as that which exists between Totonac and Tepehua, but much closer than the relationship with Maya” [translation by the authors]. Interestingly, McQuown based his belief in his proposed “Macro-Mayance” hypothesis on the presence of glottalized stops and affricates in the Tepehua languages. He argued (McQuown 1942:37) that “the presence in Tepehua of an entire series of glottalized consonants, absent in Totonac, and other evidence indicate that Tepehua is more conservative than Totonac and that it reveals features of Proto-Totonac which invite comparisons of greater scope” [translation by the authors]. This suggestion that PTT exhibited a series of glottalized stops and affricates was not pursued by later scholars, although the hypothesis that the Totonac and Tepehua languages shared a common ancestor with the Mixe-Zoquean languages was.

3.2. Arana Osnaya (1953). A decade later, Arana Osnaya (1953) offered the first reconstruction of Proto-Totonac-Tepehua utilizing the comparative method. Her reconstruction was based on 68 cognate sets assembled from one Tepehua language (Huehuetla Tepehua) and three Totonac

TABLE 2
INVENTORY OF PROTO-TOTONAC-TEPEHUA CONSONANTS (ARANA OSNAYA 1953)

	Labial	Alveolar	Alveopalatal	Palatal	Velar	Uvular	Glottal
Stops	*p	*t			*k	*q	
Affricates		*tʃ	*tʃ				
Lateral Affricate		*tʃ					
Fricative		*s	*ʃ		*x		
Lateral Fricative		*l					
Nasal	*m	*n					
Lateral		*l					
Glide	*w			*y			

TABLE 3
INVENTORY OF PROTO-TOTONAC-TEPEHUA VOWELS (ARANA OSNAYA 1953)

Modal Vowels (Short and Long)		Laryngealized Vowels (Short and Long)	
*i / *ii	*u / *uu	*i̥ / *ii̥	*u̥ / *uu̥
*a / *aa			*ḁ / *aḁ

languages (Coatepec Totonac, Zapotitlán Totonac, and San Pedro Petlacotla Totonac), all belonging to the Sierra branch of Totonac. Arana Osnaya reconstructed an inventory for PTT that included a series of laryngealized vowels and did not include a series of glottalized stops and affricates. Her inventory is presented in tables 2 and 3.

Arana Osnaya (1953) necessarily considered the glottalized stops and affricates in Huehuetla Tepehua to be a later development in this language that occurred after the separation of Proto-Totonac and Proto-Tepehua. She suggested that these glottalized stops and affricates emerged in Tepehua in the context of a following laryngealized vowel in PTT. She wrote (Arana Osnaya 1953:127) that “in [Tepehua], the glottalized vowel is maintained in initial position, generally word-finally, and after a single stop or affricate, where it is realized as a feature of the consonant. The glottalization is lost in other environments” [translation by the authors]. In sum, Arana Osnaya proposed an inventory containing laryngealized vowels for PTT and considered these vowels to be the source of the glottalic/laryngeal feature that is pervasive throughout the Totonac and Tepehua languages.

3.3. Brown et al. (2011) and Brown et al. (2014). Since 1953, the claim that laryngealized vowels were a feature of Proto-Totonac-Tepehua has not been rigorously defended. Arana Osnaya’s proposal was adopted with few changes by Watters (1992) and Brown et al. (2011, 2014). Brown et al. (2011) use the inventory containing laryngealized vowels as the basis for

TABLE 4
INVENTORY OF PROTO-TOTONAC-TEPEHUA CONSONANTS (BROWN ET AL. 2011)

	Labial	Alveolar	Palato-alveolar	Palatal	Velar	Uvular	Glottal
Stop	*p	*t			*k	*q	(*ʔ)
Affricate		*t͡ʃ	*t͡ʃ				
Lateral Affricate		*t͡ʎ					
Fricative		*s	*ʃ		*x		*h
Lateral Fricative		*ɬ					
Nasal	*m	*n					
Liquid		*l					
Glide	*w			*y			

TABLE 5
INVENTORY OF PROTO-TOTONAC-TEPEHUA VOWELS (BROWN ET AL. 2011)

Modal Vowels (Short and Long)		Laryngealized Vowels (Short and Long)	
*i / *ii	*u / *uu	*ĩ / *iĩ	*ũ / *uũ
*a / *aa		*ã / *aã	

their reconstruction of Proto-Totozoquean, while Brown et al. (2014) use it to motivate a genetic relationship between Proto-Totozoquean and Chitimacha. In fact, the PTT inventory proposed by Brown et al. (2011) differs from that proposed earlier by Arana Osnaya (1953) in only two respects. First, Brown et al. posit two back fricatives /*x/ and /*h/, whereas Arana Osnaya posited only one, /*x/. Second, Brown et al. tentatively posit a glottal stop /*ʔ/, whereas Arana Osnaya had none. The inventory proposed by Brown et al. (2011) is presented in tables 4 and 5.

According to Brown et al. (2011), the glottal constriction of the laryngealized vowels in the protolanguage spread from the vowel to the preceding stop or affricate in the Tepehua languages and disappeared completely following fricatives and sonorants. Brown et al. (2011:335) write: “Our analysis is that the ʔp [Tepehua] ejectives arose from the migration of the laryngeal constriction associated with a creaky vowel first to the left edge of the nucleus in the form of a glottal stop (as seen in P [Papantla]) and then onto the preceding stop or affricate. . . . Laryngealization was lost in other environments.” The only argument advanced in support of this hypothesis is based on the sporadic occurrence, in some of the Totonac languages, of laryngealized vowels following sonorants (nasals, laterals, and glides) and fricatives. The claim is that these laryngealized vowels could not have emerged through contact with a preceding glottalized segment since no glottalized sonorants or fricatives are attested in the Tepehua languages. These vowels must therefore have been

laryngealized in the protolanguage. In contrast, we claim that the laryngealized vowels that are attested after sonorants and fricatives in some of the Totonac languages today are a relatively recent phenomenon that emerged after the division of Proto-Totonac and Proto-Tepehua. We address this issue in detail in 7.

4. An Alternative Proposal. In contrast with Arana Osnaya (1953), Brown et al. (2011), and Brown et al. (2014), we propose that Proto-Totonac-Tepehua exhibited a series of glottalized stops and affricates and did not exhibit laryngealized vowels. In addition, we propose that the PTT inventory included glottal stop /*ʔ/¹⁴ and only one post-velar fricative, /*h/.¹⁵ The phonemic inventory that we reconstruct for PTT is presented in tables 6 and 7.

This inventory contains fewer vowels but more consonants than either of the inventories considered above. Specifically, it lacks the series of laryngealized

¹⁴ Arana Osnaya (1953) does not posit glottal stop /*ʔ/ for PTT, whereas Brown et al. (2011) do, at least provisionally. In the extant languages, phonemic glottal stop only occurs word-finally and, sometimes, between vowels. All other cases of glottal stop are either epenthetic (in syllables that lack an onset) or derived from the uvular stops /*q/ or /*q'/ of PTT. Epenthetic glottal stops occur syllable-initially in all Totonac and Tepehua languages. Glottal stops derived from /*q/ or /*q' occur in Pisaflores Tepehua, Huehuetla Tepehua, Upper Necaxa Totonac, and Caxhuacán Totonac.

The phonemic status of glottal stop is established by contrasts that exist in some languages among stressed syllables in word-final position. As illustrated in the examples from Pisaflores Tepehua below, stressed word-final syllables ending in glottal stop contrast with stressed word-final syllables ending in either a short or long vowel.

Pisaflores Tepehua

- | | | | | |
|----|--------|------------|----------------|-----------|
| a. | /*Vʔ#/ | [dʔ́hniʔ] | /t'ahniʔ/ | 'turkey' |
| b. | /*V#/ | [lákškani] | /lak-škani-ya/ | 'X hurts' |
| c. | /*VV#/ | [ʔ́ani] | /anii/ | 'here' |

In addition, suffixes that end in glottal stop, such as the agentive suffix /-nVʔ/ 'AG', are found in all Totonac and Tepehua languages. Although the distribution of glottal stop is defective compared with the other consonants, it is nevertheless essential for the proper formulation of the phonological rules of PTT and its descendants. We therefore include /*ʔ/ in the phonemic inventory of PTT.

¹⁵ Like Arana Osnaya (1953), but unlike Brown et al. (2011), we posit only a single velar/post-velar fricative in PTT. The pronunciation of this fricative today varies from language to language, but there are no minimal pairs in any language that contrast the velar fricative, /x/, and the glottal fricative, /h/. In Papantla Totonac and Zapotitlán Totonac, the fricative is pronounced as [x] in syllable-initial position but as [h] everywhere else. In Apapantilla Totonac (Reid 1991), Upper Necaxa Totonac (Beck 2004), and Ozelonacaxtla Totonac (Román Lobato p.c.), both pronunciations exist, but there are no cases of contrast.

Brown et al. (2011:326) posit both /*x/ and /*h/ in the protolanguage. This decision is based on McQuown (1990), who reports a contrast between /x/ and /h/ in Coatepec Totonac. McQuown does not provide any minimal pairs to illustrate the contrast, however, nor does he present any other supporting evidence. In our view, there is simply not enough evidence at this time to support reconstruction of two distinct velar/post-velar fricatives in PTT.

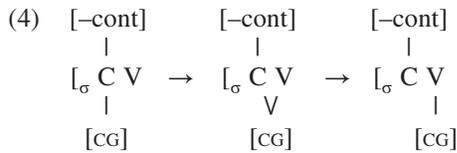
TABLE 6
PROPOSED INVENTORY OF PROTO-TOTONAC-TEPEHUA CONSONANTS

	Labial	Alveolar	Alveopalatal	Palatal	Velar	Uvular	Glottal
Stops	*p	*t			*k	*q	*ʔ
Glottalized Stops	*pʰ	*tʰ			*kʰ	*qʰ	
Affricates		*tʃ	*tʃ				
Glottalized Affricates		*tʃʰ	*tʃʰ				
Lateral Affricate		*tʃl					
Glottalized Lateral Affricate		*tʃlʰ					
Fricative		*s	*ʃ				*h
Lateral Fricative		*ʃl					
Nasals	*m	*n					
Lateral		*l					
Glides	*w			*y			

TABLE 7
PROPOSED INVENTORY OF PROTO-TOTONAC-TEPEHUA VOWELS

Modal Vowels (Short and Long)	
*i / *ii	*u / *uu
*a / *aa	

vowels proposed by Arana Osnaya (1953) and Brown et al. (2011), but it includes a series of glottalized stops and affricates. We hypothesize that the “constricted glottis” feature [CG] that characterized these consonants in the protolanguage spread in the Totonac languages to the following vowel. This resulted in sequences of a non-glottalized stop or affricate followed by a laryngealized vowel in these languages. We adopt the autosegmental formalism in (4) to illustrate the proposed diachronic development of laryngealized vowels in Totonac. These vowels emerged in this branch of the family as a consequence of the left-to-right migration of the feature [CG] from a preceding glottalized stop or affricate to the following vowel.



As can be seen, we envision an intermediate stage in which the feature [CG] is simultaneously associated with the glottalized stop or affricate and the following vowel. At this stage, the stop/affricate is glottalized (specifically, ejective or implosive) and the following vowel is laryngealized. This

stage is attested in Papantla Totonac (García Ramos 1979; Alarcón Montero 2008; Herrera Zendejas 2009, 2014) and many of the Tepehua languages, where glottalized stops and affricates are often followed by fully laryngealized vowels. Fallon (2002:20) states that “allophonically in many languages . . . ejectives (and often other glottalic sounds and glottal stop) cause adjacent vowels to be laryngealized.” The examples in (5) illustrate the phenomenon in Pisaflores Tepehua.

Pisaflores Tepehua

- (5) [ɬɖʉk'íta], [ɬɖʉk'íta], [ɬɖʉɖʉíta], [ɬɖʉk'íta] /t'uk'ita/ 'atole'
 [ɬk'ák'a], [ɬk'ák'a], [ɬɖʉɖʉá], [ɬk'ák'a] /k'ak'a/ 'ash(es)'

We consider the intermediate stage in (4) to be a necessary precursor to the final stage in which the CG feature is completely disassociated from the stop/affricate. In this stage, attested in the Totonac languages, the vowel remains laryngealized, but the stop/affricate becomes non-glottalized. We regard the left-to-right migration of the feature [CG] as a type of consonant lenition. That is, we consider a glottalized stop or affricate to be fortis and its non-glottalized counterpart to be lenis. In our view, it makes more sense to view the migration of the laryngeal feature as a progression from left to right, rather than from right to left. This is consonant with the fact that lenition is a more natural and more common historical process than fortition.

5. Evidence re: directionality. It is difficult to construct definitive arguments in favor of either of the two competing hypotheses regarding the inventory of PTT because the available data are largely consistent with both. Nevertheless, we believe that at least three developments within the family serve to differentiate the two hypotheses and offer support for our hypothesis that PTT exhibited glottalized stops and affricates and did not exhibit laryngealized vowels. All three developments involve instances in which, under our hypothesis, the proposed glottalized and non-glottalized members of a pair of proto-consonants, *C and *C', underwent separate and distinct developments within one or more daughter languages. Under the Brown et al. (2011) proposal, these cases represent instances in which a non-glottalized proto-consonant, *C, split into two sounds, C and C', depending on the presence or absence of laryngealization on the following vowel. We argue that the unconditioned changes required to account for the attested reflexes under our proposal are simpler and more natural than the conditioned changes required under the Brown et al. (2011) alternative. The developments that we describe here cannot easily be explained unless it is assumed that both glottalized and non-glottalized consonants were present in PTT.

5.1. Lateral Affricates — /*ʎ'/ and /*ʎ/. The clearest arguments in favor of the reconstruction of glottalized stops and affricates in PTT are

based on the fate of the sounds that we reconstruct as the glottalized lateral affricate $/*\lambda'/$ and the non-glottalized lateral affricate $/*\lambda/$. As demonstrated in **A.2**, the sound that we reconstruct as the glottalized lateral affricate $/*\lambda'/$ is realized as $/\lambda'/$ before a laryngealized vowel in most of the Totonac languages, but as $/t'/$ before a laryngealized vowel in Upper Necaxa Totonac, $/t'/$ before a laryngealized vowel in Misantla Totonac, and $/t'/$ before a modal vowel in the Tepehua languages.¹⁶

Meanwhile, as demonstrated in **A.3**, the sound that we reconstruct as the non-glottalized lateral affricate $/*\lambda/$ is realized as $/\lambda/$ in most of the Totonac languages, but as a lateral fricative $/\beta/$ in Misantla Totonac, Upper Necaxa Totonac, and the Tepehua languages. We contend that the distribution of reflexes in these two correspondence sets is easier to motivate and explain under the assumption that the protolanguage contained both $/*\lambda'/$ and $/*\lambda/$ than under the alternative assumption that they resulted from the interaction of a single, non-glottalized affricate $/*\lambda/$ with modal and laryngealized vowels.

5.1.1. $/*\lambda'/$ and $/*\lambda/$ in the Tepehua Languages. As illustrated in **A.2** and **A.3**, the sounds that we reconstruct as the glottalized lateral affricate $/*\lambda'/$ and its non-glottalized counterpart $/*\lambda/$ in PTT became glottalized $/t'/$ and non-glottalized $/\beta/$, respectively, in the Tepehua languages. Under our hypothesis, which claims that both $/*\lambda'/$ and $/*\lambda/$ were present in PTT, these developments can be summarized succinctly as follows:

- (6) Tepehua developments with $/*\lambda'/$ and $/*\lambda/$ in PTT:
 $/*\lambda'/ > /t'/$
 $/*\lambda/ > /\beta/$

We consider these changes to be both natural and expected. The glottalized articulation of $/\lambda'/$ tends to accentuate the stop closure of the affricate at the expense of its lateral release. Over time, this resulted in a merger of $/*\lambda'/$ and $/*t'/$ in Tepehua. The same merger occurred, independently, in Misantla Totonac (see **5.1.2**).

Under the alternative hypothesis that posits only a non-glottalized $/*\lambda/$ in PTT, the following changes are required:

- (7) Tepehua developments with only $/*\lambda/$ in PTT:
 $/*\lambda/ > /t'/ / \text{ ___ } \checkmark$
 $/*\lambda/ > /\beta/ / \text{ elsewhere}$

These changes represent a split of the lateral affricate $/*\lambda/$ in PTT into two phonemes, $/t'/$ and $/\beta/$, in Tepehua, based on the nature of the following vowel.¹⁷ This split must have occurred before, or simultaneous with, the migration

¹⁶ Watters (forthcoming) reports that the phoneme $*/\lambda'/$ may be realized as $/t'/$, $/t/$, or $/\beta/$ in Tlachichilco Tepehua. He notes that all of these reflexes are distinct from the reflex $/\beta/$ from $*/\lambda/$.

¹⁷ The analysis in (7) is explicitly endorsed by Watters (forthcoming) who states that “the simplest explanation that can be offered is that the laryngealization, while migrating toward the

of the laryngeal feature of the vowel to the preceding affricate because it is the presence of this feature on the vowel that conditions the split under this proposal. Migration of the feature to $/*\lambda/$ might yield $/\lambda'/$ as an intermediate phoneme, but in that case the proposal recapitulates our own. We suggest that the change of $/*\lambda/ > (/*\lambda'/ >) /t'/$ before laryngealized vowels is improbable in conjunction with the change of $/*\lambda/ > /h/$ elsewhere. We maintain that the attested historical developments in Tepehua are more easily and naturally explained if we assume both glottalized and non-glottalized stops and affricates in PTT than if we assume only non-glottalized stops and affricates and a series of laryngealized vowels.

5.1.2. $/*\lambda'/$ and $/*\lambda/$ in Misantla Totonac. A similar argument is based on the reflexes of the reconstructed lateral affricates $/*\lambda'/$ and $/*\lambda/$ in Misantla Totonac. In this language, the diachronic processes resulted in an alveolar stop $/t/$ before a laryngealized vowel and a lateral fricative $/h/$ before a non-laryngealized vowel. If both affricates, $/*\lambda'/$ and $/*\lambda/$, existed in the protolanguage, the necessary changes can be formulated as in (8).

(8) Misantla Totonac developments with $/*\lambda'/$ and $/*\lambda/$ in PTT

$/*\lambda'V/ > /t'V/ > /t\underline{V}/$

$/*\lambda V/ > /hV/$

According to this hypothesis, the glottalized affricate $/*\lambda'/$ first became glottalized, $/t'/$, and then, as a result of the rightward migration of the laryngeal feature in Misantla and all other Totonac languages, became $/t/$ followed by a laryngealized vowel. Again, we regard these changes as natural and expected. In Misantla Totonac, as in Tepehua, $/*\lambda'/$ merged with $/*t'/$ to yield $/t'/$. The laryngeal feature [CG] associated with the glottalized alveolar stop $/*t'/$ then migrated rightward in Misantla Totonac to yield a non-glottalized stop $/t/$, followed by a laryngealized vowel.

Under the alternative hypothesis that the protolanguage exhibited only one (non-glottalized) lateral affricate, the required changes are as follows:

(9) Misantla Totonac developments with only $/*\lambda/$ in PTT

$/*\lambda/ > /t/ / \text{--- } \underline{V}$

$/*\lambda/ > /h/ / \text{elsewhere}$

According to this hypothesis, the lateral affricate $/*\lambda/$ merged with $/*t/$ and became $/t/$ before a laryngealized vowel, and it merged with $/*h/$ and became $/h/$ everywhere else. These mergers induced a split of the lateral affricate $/*\lambda/$ into two phonemes, $/t/$ and $/h/$, in Misantla Totonac, depending on the nature

initial position of the syllable, affected the change in such a way that the affricate, instead of changing into a lateral fricative, changed into a stop: $/ht/$, $/t/$, or $/t'/'$ [translation by the authors]. This begs the question of exactly how the vowels caused the consonants to be realized in this way. We see no phonetic motivation behind the changes summarized in (7), while we do see such motivation for the changes in (6).

of the following vowel. We regard the change $/*\lambda/ > /t/$ before laryngealized vowels as highly unlikely in conjunction with the change $/*\lambda/ > /l/$ before modal vowels. We see no obvious phonetic basis for the change $/*\lambda/ > /t/$ before a laryngealized vowel (whereas in (8) we do see a phonetic basis for the change $/*\lambda/ > /t'/$), and, consequently, we find no phonetic motivation for the split of $/*\lambda/$ into $/t/$ and $/l/$. We contend that the distribution of these sounds in Misantla Totonac is more easily and more naturally explained if we begin with a protolanguage that exhibits both glottalized and non-glottalized lateral affricates than if we begin with a protolanguage with only a single, non-glottalized lateral affricate and both laryngealized and non-laryngealized vowels.

5.2. $/*q/$ and $/*q'/$ in Tlachichilco Tepehua. Another phenomenon that supports postulation of a glottalized series of stops and affricates in PTT concerns the fate of the proto-sounds $/*q/$ and $/*q'/$ in Tlachichilco Tepehua. Contemporary researchers of the Tepehua languages agree that Proto-Tepehua (PTep) originally exhibited a three-way contrast between $/*q/$, $/*q'/$, and $/*ʔ/$. They also agree that this contrast has slowly been eroded in the contemporary languages as a result of on-going historical mergers of all three consonants into $/ʔ/$. The exact timing and mechanism of these mergers in the various languages has yet to be established, but the fact of merger is unquestioned.¹⁸ As illustrated in A.4 and A.5, the three Tepehua languages exhibit slightly different reflexes of the PTT uvular stops, $/*q'/$ and $/*q/$. In Pisaflores Tepehua, PTT $/*q'/$ and $/*q/$ have both merged with $/*ʔ/$ to become $/ʔ/$. In Huehuetla Tepehua, $/*q'/$ has merged with either $/*q/$ or $/*ʔ/$, and $/*q/$ and $/*ʔ/$ themselves are in the process of merging to become $/ʔ/$.¹⁹ The only Tepehua language that still maintains a contrast between reflexes of $/*q'/$ and $/*q/$ is Tlachichilco Tepehua, where according to Watters (1988), the glottalized uvular, $/*q'/$ has merged with $/*ʔ/$ to become $/ʔ/$, while the non-glottalized uvular $/*q/$ has been retained as $/q/$.²⁰ It is the residual contrast between $/q/$ ($< /*q/$) and $/ʔ/$ ($< /*q'/$) in Tlachichilco Tepehua that most directly motivates reconstruction of contrasting $/*q/$ and $/*q'/$ in Proto-Tepehua.

¹⁸ Based on the distribution of $/q/$ and $/ʔ/$ ($< /*q'/$) in Tlachichilco Tepehua, Watters (1988) hypothesizes that $/*q'/$ merged with $/*ʔ/$ to yield $/ʔ/$ while $/*q/$ was retained as $/q/$. Smythe Kung (2007:67–68) suggests that in the history of Huehuetla Tepehua, the glottalized uvular stop $/*q'/$ first merged with the non-glottalized $/*q/$ to yield $/q/$. This phoneme is currently in the process of merging with $/ʔ/$ to yield $/ʔ/$.

¹⁹ Smythe Kung (2007:76) found “no perceptible evidence of a glottalized voiceless uvular stop $/q'/$ ” in Huehuetla Tepehua, and she “perceived the plain voiceless uvular stop $/q/$ only in the speech of the oldest speakers.” She reports that among the oldest speakers, $/q/$ and $/ʔ/$ are in free variation, while among younger speakers, $/q/$ (and $/q'/$) have been “completely replaced by $/ʔ/$.”

²⁰ According to Watters (1988:522), “the Tlachichilco dialect [of Tepehua] does not have the glottalized uvular $[q']$: all instances are replaced by glottal stop.”

Notice that the forms that we reconstruct with the non-glottalized uvular /**q*/ in PTT all have reflexes in the Totonac languages with /*q*/ followed by a non-laryngealized vowel, while the forms that we reconstruct with glottalized uvular /**q'*/ all have reflexes with /*q*/ followed by a laryngealized vowel. We attribute the laryngealization of the vowel in the Totonac languages to the rightward migration of the feature [CG] from /**q'*/ to the following vowel during the development of Proto-Totonac from Proto-Totonac-Tepehua.

The presence of /**q*/ and /**q'*/ in Proto-Tepehua does not, of course, entail their presence in the ancestral language, PTT. Nevertheless, we believe that it greatly simplifies the task of explaining the historical development of these sounds if they are assumed to be present in PTT as well. According to our hypothesis, Proto-Tepehua /**q*/ and /**q'*/ are simply reflexes of PTT /**q*/ and /**q'*/, respectively. According to the Brown et al. (2011) hypothesis, these two sounds in Proto-Tepehua reflect a conditioned split of PTT /**q*/ into two sounds, /**q*/ and /**q'*/, depending on the laryngeal status of the following vowel. That is, PTep /**q*/ is the reflex of PTT /**q*/ before modal vowels, while PTep /**q'*/ is the reflex of PTT /**q*/ before laryngealized vowels. This account is plausible, but unnecessary under our own account which views the sounds /**q*/ and /**q'*/ in Proto-Tepehua as retentions from PTT and not as innovations. In general, we follow McQuown (1942) and consider the Tepehua languages to be more conservative than the Totonac languages, at least with respect to the inventory of consonants and vowels. The different reflexes of the proto-sounds /**q*/ and /**q'*/ in Tlachichilco Tepehua provide clear evidence that these two sounds were distinct at least as far back as Proto-Tepehua. We see no reason not to maintain that the contrast obtained in PTT as well. The facts in Tlachichilco Tepehua constitute one more piece of evidence that there was a glottalized/non-glottalized contrast among stops and affricates in PTT.

6. Verb stem-final stops. Another argument in favor of the reconstruction of glottalized stops and affricates in PTT is based on the presence of verb stem-final glottalized stops in the Tepehua branch.²¹ As Watters (1988:419) observed, “stem-final oral stops are regularly glottalized in the Tlachichilco dialect when immediately preceding a vowel.” This generalization is valid for Huehuetla Tepehua and Pisaflores Tepehua as well. The phenomenon results in sequences of glottalized stop + vowel [C'V] in the Tepehua languages that do *not* correspond to sequences of non-glottalized stop + laryngealized vowel [CV] in the Totonac languages, and thus presents a significant challenge for reconstruction. Both Watters (1988, forthcoming) and Smythe Kung (2007) treat the glottalization of verb stem-final stops as

²¹ Affricates do not occur in stem-final position in either Totonac or Tepehua, so it is not possible to demonstrate a glottalized/non-glottalized contrast of these sounds even before a vowel-initial suffix.

part of the allomorphy of the suffix, not the stem.²² We attribute it, instead, to the presence of verb stem-final glottalized stops in the protolanguage PTT, and not to any special morphophonological interaction between the stem and the following suffix.

There are very few vowel-initial suffixes in the Totonac and Tepehua languages, and thus very few opportunities to demonstrate the presence of glottalization on verb stem-final stops.²³ The most prevalent and productive vowel-initial suffix is the allomorph [-a] of the imperfective aspect marker, /-ya/ 'IPF'. In the Totonac and Tepehua languages, this suffix is generally realized as [-y] following a vowel, [-a] following a non-nasal consonant, and [-∅] following a nasal (and sometimes /h/). As illustrated in the cognate sets in **A.6**, there is an interesting division with respect to the nature of the stops that precede the imperfective allomorph [-a] 'IPF'. In the Tepehua languages, the stops that precede this suffix are glottalized, while in the Totonac languages, the stops in this same context are not glottalized and are followed by modal, not laryngealized, vowels.

Note that the correspondence illustrated in **A.6** extends to all stop-final verb stems in these languages. All such stems in the Tepehua languages exhibit a glottalized stem-final stop in the imperfective, while all such stems in the Totonac languages exhibit a non-glottalized stem-final stop followed, crucially, by a non-laryngealized allomorph [-a] of the imperfective suffix /-ya/ 'IPF'.

- (10) Pisaflores Tepehua
 [ʔɔ́d̥a] /ʔot'-ya/ 's/he drinks X'
 [páasɔ́d̥a] /paast'ak'-ya/ 's/he remembers X'
- (11) Zapotitlán Totonac (Aschmann 1983 [1962])
 qota /qut-ya/ 's/he drinks X'
 pa:staka /paastak-ya/ 's/he remembers X'
- (12) Apapantilla (Xicotepec de Juárez) Totonac (Reid and Bishop 1974)
 qota /qut-ya/ 's/he drinks X'
 paastaka /paastak-ya/ 's/he remembers X'

There are no non-glottalized verb stem-final stops in the imperfective aspect in the Tepehua languages, and no glottalized or laryngealized allomorphs [-ʔa] or [-a] of the imperfective suffix /-ya/ 'IPF' in the Totonac languages.

Fortunately, there are at least two other vowel-initial suffixes in Tepehua that confirm the presence of glottalization on the stem-final consonant. One

²² Watters (1988:257): "the imperfective suffix, -ya, displays some morphophonemic variation. Specifically, it is -'a following stops, -a following continuants (except after /h/ when it is optionally the full form, -ya) and -∅ following a nasal."

²³ In other positions, before consonants, these stops are regularly deglottalized. Onset position, before a vowel, is the only context in which a contrast between glottalized and non-glottalized stops may emerge in the Tepehua languages.

of these is the transitivizer /-ii/ 'TRANS'. This suffix regularly co-occurs with the causative prefix /maa-/ 'CAUS', when the latter appears on a (non-stative) intransitive verb. As illustrated in the following examples, the vowel of the suffix /-ii/ 'TRANS' frequently harmonizes with the preceding stem vowel:

Pisaflores Tepehua

- (13) [máak'aḃááyáan]
 /maa-k'ap'-ii-ya-ni/
 CAUS-forget.X-TRANS-IPF-2OBJ
 's/he makes you forget about X'
 (also 's/he makes X forget about you')
- (14) [máasdaḡááy]
 /maa-st'ak'-ii-ya/
 CAUS-rest-TRANS-IPF
 's/he puts down/rests his/her load'
- (15) [máašʔḡḃúuy]
 /maa-šʔop'-ii-ya/²⁴
 CAUS-tire-TRANS-IPF
 's/he tires X'

Tlachichilco Tepehua (Watters 2007, personal communication)

- (16) maastak'áay /maa-stak'-ii-ya/ 's/he greets him/her'
 (2007:37)
- (17) klakmaastak'áay /ik-lak-maa-stak'-ii-ya/ 'I greet them'
 (2007:60)

Upper Necaxa Totonac (Beck 2011)

- (18) ma:lakapa:stakí: /maa-laka-paastak-ii-ya/ 's/he reminds X of Y'
 Apapantilla (Xicotepec de Juárez) Totonac (Reid and Bishop 1974:211)
- (19) maaqqtuu /maa-qot-ii-ya/ 's/he makes X drink'

In the Tepehua languages, the stem-final stop that precedes the suffix /-ii/ 'TRANS' is invariably glottalized. In the Totonac languages however, the corresponding stem-final stops are always non-glottalized and always followed by a non-laryngealized vowel.

Another vowel-initial suffix is the nominalizer /-at(i)/ 'NOM', which is used throughout the family to convert verbs into nouns.²⁵ As illustrated in (20)

²⁴ In this example, the suffix /-ii/ 'TRANS' harmonizes with the original root vowel /*šqup'-/.

²⁵ Both Watters (1988:419) for Tlachichilco Tepehua and Smythe Kung (2007:365) for Huehuetla Tepehua identify this nominalizing suffix as /-ti/ and consider the vowel that precedes it to be epenthetic. For present purposes, it makes no difference which analysis of the suffix is correct.

Brown et al. (2011, 2014) propose, then it is necessary to explain the origin of the glottalization that appears on stem-final stops before vowels in the Tepehua languages. In contrast, if there were glottalized stops in the protolanguage, as we propose, then it is necessary to explain both the absence of glottalization on the corresponding stops in the Totonac languages and the absence of laryngealization on the corresponding suffixes. We consider it easier to explain the distribution of glottalized and non-glottalized stem-final stops in the correspondence sets in **A.6** if we begin with a protolanguage that contains glottalized stops and affricates. In this case, the stem-final glottalized stops in the Tepehua languages are simply reflexes of stem-final glottalized stops in the protolanguage. There is no appeal to special glottalized or laryngealized allomorphs of vowel-initial suffixes and no appeal to any process of glottal epenthesis.

A different change affected the realization of stem-final stops in the Totonac languages. As indicated in **A.6**, these languages fail to exhibit any sort of glottalization on verb stem-final stops and also fail to exhibit any sort of laryngealization on the following vowel. Assuming that there were glottalized stem-final stops in PTT, these stops merged with their corresponding non-glottalized counterparts. In addition, the laryngeal feature associated with these glottalized stem-final stops failed to migrate, as expected in this branch, from the stem-final stop to the suffixal vowel. We hypothesize that migration of the feature was blocked or impeded by the morphological boundary separating the stem and the suffix, and therefore the following suffixal vowel remained non-laryngealized. That is, rightward migration of the laryngeal feature took place within morphemes, but not across them. The glottalized stem-final stops that we posit for PTT were eventually simply lost in the Totonac languages as a result of the historical across-the-board merger of glottalized and non-glottalized consonants in this branch.

We do not believe that there is sufficient evidence at this stage to determine whether all verb stem-final stops in PTT were glottalized, as in the Tepehua languages today, or whether only some were glottalized and some were not. We are not committed, either way, on the status of non-glottalized verb stem-final stops in PTT. However, if there were such stops, we maintain that at some point in the development of Proto-Tepehua, after its separation from Proto-Totonac, the non-glottalized stops at the end of verb stems became glottalized in the environment of a vowel-initial suffix on analogy with their glottalized counterparts. We hypothesize that the glottalization of stem-final stops before vowel-initial suffixes came to serve the prosodic function of marking the end of a stop-final stem (or, equivalently, marking the boundary between the stop-final stem and the suffix) in the Tepehua languages and was therefore extended by analogy to any non-glottalized stem-final stops that may have been retained from PTT. Without the glottalization, it would be difficult in many instances to distinguish these stop-final stems from vowel-final stems

in the environment of a following vowel-initial suffix. In effect, the glottalization serves to identify the vowel as part of the suffix, and not part of the stem.

We prefer the hypothesis that posits glottalized stops and affricates in PTT to the alternative hypothesis that posits laryngealized vowels and non-glottalized stops and affricates. Under the latter hypothesis, we detect no source at all for the glottalization that appears on the stem-final stops in the Tepehua languages. The glottalization certainly did not come from a following laryngealized vowel (i.e., the usual source for glottalization under this hypothesis) because none of the suffixes illustrated above exhibit laryngealized vowels in any of the Totonac languages today. In fact, there are no suffixes that begin with a laryngealized vowel or a glottal stop in any of the extant Totonac or Tepehua languages, and therefore there is no evidence (other than the glottalization of stops in Tepehua) to suggest that these suffixes were ever laryngealized in PTT. Brown et al. (2014:439) suggest that the glottalization of the stops in Tepehua may have emerged through “morphophonemic interaction” of the stems and the following suffixes, but they offer no specifics. In the case of the glottalization that appears on verb stem-final stops in Tepehua in the imperfective aspect (cf. cognate sets in A.6), they allude to the synchronic analyses of Watters (1980, 1988) for Tlachichilco Tepehua and Smythe Kung (2007) for Huehuetla Tepehua, which posit a glottal stop-initial allomorph [-ʔa] of the imperfective suffix, which only occurs after stops. We reject this hypothesis as a possibility for the protolanguage (which is what is at issue here), simply because there is no sign of a glottalized or laryngealized allomorph of the imperfective or any other vowel-initial suffix in the Totonac languages today. Postulation of a [-ʔa] or [-a̠] allomorph of the imperfective suffix /*-ya/ ‘IPF’ in PTT is thus unmotivated and ad hoc, especially since it necessitates postulation of a glottalized or laryngealized allomorph of every other vowel-initial suffix in PTT. We see no alternative to postulation of at least some glottalized stem-final stops in PTT, for otherwise there is no apparent source of the glottalization that is so amply attested on verb stem-final stops in the Tepehua languages today.²⁷

7. Laryngealized Vowels after Fricatives and Sonorants. Perhaps the greatest challenge to the proper reconstruction of PTT is posed by the

²⁷ In the context of a discussion of the relative merits of the two hypotheses regarding the origin of the glottalization of stem-final stops in Tepehua languages, Brown et al. (2014:439) assert that “[Chitimacha] ejectives are never found root- or stem-finally, and the same is true of Tepehua ejective stops (Watters 1988:488; Smythe Kung 2007:39).” As we have seen, the claim that there are no glottalized stem-final stops in Tepehua is invalid. In fact, neither Watters nor Smythe Kung make any such claim regarding the composition of roots or stems in these languages. Both are concerned exclusively with the phonological, not morphological, distribution of glottalized stops and affricates. There is no mention, in either source, of the distribution of these sounds in root- or stem-final positions.

sporadic presence of laryngealized vowels after fricatives and sonorants in some, but not all, of the Totonac languages. This distribution is problematic both for the Brown et al. (2011) hypothesis and for our alternative. The former must explain why laryngealized vowels are not distributed more evenly and consistently after fricatives and sonorants in the Totonac languages; the latter must explain why they occur at all. In this section, we review this distributional evidence and point out both the rarity of laryngealized vowels in these environments and their inconsistent distribution across the family. We argue that the occurrences of laryngealized vowels following fricatives and sonorants are too infrequent and erratic in the Totonac languages to support their reconstruction in PTT.

7.1. Stops and Affricates. The cognate sets that can be assembled for reconstruction of the stops and affricates of PTT reveal a near perfect correspondence between sequences of a glottalized stop or affricate before a modal vowel in the Tepehua languages and sequences of a non-glottalized stop or affricate before a laryngealized vowel in the Totonac languages. This correspondence is very regular and consistent across the family and constitutes one of the most important diagnostic features for distinguishing between the Totonac and Tepehua languages. The regularity is evident in the cognate sets in **A.7**.

7.2. Fricatives. In contrast with the regularity of the correspondences in the cognate sets with stops and affricates in **A.7**, there is a notable lack of regularity of the correspondences in cognate sets with fricatives. In fact, in our data, there are only a few sets which exhibit laryngealized vowels after fricatives (as opposed to the hundreds of sets that exhibit laryngealized vowels after stops and affricates) and, even in these sets, the laryngealized vowels are distributed sporadically and inconsistently. In addition, there are no cognate sets that exhibit laryngealized vowels after the fricatives /*h/, /*ʃ/, or /*ɬ/. All sets involving fricatives discovered thus far exhibit laryngealized vowels only after /s/.²⁸ The cognate sets in **A.8** are representative.

The occurrence of laryngealized vowels after fricatives is problematic for our proposal because the laryngealization cannot be attributed to the presence of glottalization on the preceding fricative. Glottalized fricatives do not occur in the Tepehua languages and we do not include them in our inventory for PTT. Therefore, the laryngealization that appears on vowels after fricatives in some of the Totonac languages could not have emerged via spreading of [cg] from the preceding consonant. Instead, we attribute some of the instances of laryngealized vowels in the sets presented in **A.8** to the spreading of the

²⁸ In various Totonac languages, there are individual words that exhibit laryngealized vowels following a fricative other than /s/. However, there are no cognate sets that consistently exhibit laryngealization in this context in all or even most of the Totonac languages.

feature [CG] from a glottalized stop or affricate elsewhere in the same word. This is arguably the case in the Totonac forms for ‘tongue’, for example, from reconstructed /*siimaq’aati/. We attribute the other instances of laryngealized vowels in these sets to underlying (or, in some instances, epenthetic) glottal stops. Many of the forms with medial laryngealized vowels may be derived from underlying /*-V?V-/ sequences (as in the case of Misantra Totonac [sɛ́ɛn] ‘rain’ from reconstructed /*sa?iini/, for example). Forms with word-final laryngealized vowels may be derived from sequences of /*-V?#/ or /*-V-?#/. Epenthetic glottal stop frequently occurs as a phrase-final marker in these languages, and often appears at the end of words spoken in isolation. The presence of an underlying or epenthetic glottal stop at the end of a word such as /*saqsi(?)/ ‘sweet’, for example, could easily account for the laryngealization of the final vowel in the Totonac words which exhibit it. Much more data and analysis are required before we can know, for sure, what the source of the laryngealized vowels in the sets presented in A.8 is. We do not believe, however, that there is sufficient evidence at this time to support postulation of laryngealized vowels after /s/ or any other fricative in Proto-Totonac or Proto-Totonac-Tepehua.

Brown et al. (2011) have no trouble explaining the occurrence of laryngealized vowels after fricatives, because they allow them after all segments. Nevertheless, they do have trouble explaining why there are so few laryngealized vowels after fricatives and why they are distributed seemingly at random, with no discernable pattern. Brown et al. (2011) propose 10 reconstructed protoforms (out of 190) with a laryngealized vowel following a fricative: five after /*š/, five after /s/, and none after /*l/, /*x/, /*h/, or /*H/.²⁹ Five of these 10 protoforms are based on cognate sets which lack forms from any of the Tepehua languages, so under standard assumptions, they can only be reconstructed for Proto-Totonac, not Proto-Totonac-Tepehua. The five remaining protoforms (three with /*š/ and two with /s/) are based on sets which present roughly equal numbers of laryngealized and non-laryngealized vowels after the relevant fricative, so it is difficult to establish whether the vowel was laryngealized in PTT or not. Two of these forms (T43: /*kúši/ ‘corn’ and T70: /*nipši/ ‘squash’) exhibit word-final laryngealized vowels, which, as noted above, may plausibly be attributed to the presence of a word-final (underlying or epenthetic) glottal stop. In fact, McQuown (1940, 1990) transcribes these words in Coatepec Totonac as /kuši?/ and /nipsi?/, respectively, with word-final glottal stop. Reconstruction of word-final glottal stop in these words would obviate the need for reconstruction of word-final laryngealized vowels. In sum, we believe that there are no convincing cases of laryngealized vowels following /*š/ in Brown et al.’s data, and the evidence for these

²⁹ Brown et al. (2011) employ the symbol /*H/ in their reconstructions to indicate a fricative that is either /*x/ or /*h/, but the evidence does not reveal which one.

vowels following /*s/ is equivocal, with the majority of Brown et al.'s cognate sets presenting at least as many cases of non-laryngealized vowels after this fricative as laryngealized ones. Partly because the distribution of laryngealized vowels following fricatives is neither regular nor consistent, and partly because there are no cognate sets documenting laryngealized vowels following /*h/, /*ʃ/, or /*ɬ/, we maintain that the laryngealized vowels that follow fricatives in the Totonac languages are fairly recent innovations in this branch of the family and did not originate in PTT.

7.3. Sonorants. There is also a notable lack of regularity in the distribution of laryngealized vowels after sonorant consonants in the Totonac languages. In fact, in our data, only a handful of cognate sets include laryngealized vowels in this context (similar to the pattern following fricatives), and, as illustrated in **A.9**, there is no regularity concerning either the occurrence or distribution of these vowels throughout the family.

As can be seen, laryngealized vowels occur after sonorants in some of the Totonac languages, but not in others, with no apparent pattern. In many cases, it is difficult to decide if the relevant vowel should be reconstructed with laryngealization or not. This state of affairs is problematic for both Brown et al.'s proposal and our own. If the vowels in the words in **A.9** were laryngealized in PTT, as Arana Osnaya (1953) and Brown et al. (2011) claim, then one would expect them to be more consistently laryngealized throughout the Totonac languages. However, if they were not laryngealized in PTT, as we claim, then one would expect them to be devoid of laryngealization everywhere. We trust that future analysis will enable us to attribute many of the examples of laryngealized vowels after sonorants to spreading of the feature [CG] from some other glottalized stop or affricate in the word. This is possibly the case in the word /*ɬwak'ak'a/ 'liver', for example. In other cases, we appeal to the analogical extension of laryngealized vowels in Totonac languages from their original positions after stops and affricates in Proto-Totonac to their current positions, in some Totonac languages, after sonorants. This extension would not be expected to be systematic across the languages, but rather, to be irregular and idiosyncratic, like the pattern that actually occurs. Certainly, if laryngealized vowels did follow sonorants in PTT, then one would expect far more evidence of them than we have discovered thus far, and also far more consistency and regularity with respect to their distribution.

Brown et al. (2011) propose 24 protoforms (out of 190) that exhibit a laryngealized vowel following a sonorant: six after /*l/, three after /*n/, six after /*m/, nine after /*w/, and none after /*y/. Again, 10 of these protoforms are reconstructed on the basis of sets which lack cognates from any Tepehua language, so they cannot legitimately be reconstructed for Proto-Totonac-Tepehua, but only, possibly, for Proto-Totonac. The 14 protoforms that remain consist of three with a laryngealized vowel after /*l/, one with a

laryngealized vowel after */*n/*, three with a laryngealized vowel after */*m/*, and seven with a laryngealized vowel after */*w/*. The distribution of these vowels is haphazard at best. In seven of the 14 sets, there are actually more occurrences of non-laryngealized vowels in the relevant environment than of laryngealized ones. Reconstruction of a laryngealized vowel in the protoform in these instances then is unwarranted. In the remaining seven sets, there are roughly equal numbers of laryngealized and non-laryngealized vowels. The evidence for laryngealized vowels after sonorants in Proto-Totonac and, especially, Proto-Totonac-Tepehua is thus very sparse. We do not believe that the evidence that has been presented thus far is sufficient to support postulation of laryngealized vowels after sonorants in either Proto-Totonac or Proto-Totonac-Tepehua.³⁰

8. Conclusion. In this paper, we propose a reconstruction of the phonological inventory of Proto-Totonac-Tepehua that differs significantly from those offered by Arana Osnaya (1953) and Brown et al. (2011, 2014). The chief difference is that the PTT inventory proposed here includes a series of glottalized stops and affricates, and not a series of laryngealized vowels. We consider the presence of laryngealized vowels in the Totonac languages to be an innovation in this branch and we attribute this innovation to the historical spreading or migration of the feature [CG] from a glottalized stop or affricate in PTT to the following vowel. We argue that the diachronic changes that are required to account for the distribution of glottalized consonants and laryngealized vowels under this proposal are more natural, more plausible, and far less marked than they are under the alternative proposal involving laryngealized vowels in PTT.

In support of our reconstruction, we present three cases in which the glottalized and non-glottalized counterparts of a reconstructed stop or affricate exhibit qualitatively different reflexes in one or more daughter languages. Two cases involve the lateral affricates */*ʎ/* and */*ʎ̥/*—one case in the Tepehua languages where these affricates became */tʰ/* and */t/*, respectively, and another in Misantla Totonac where they became */tʰV/* and */tV/*, respectively. The third case involves the uvular stops */*qʰ/* and */*q/* in Tlachichilco Tepehua, which became */ʔ/* and */q/*, respectively. In all three cases, we demonstrate that it is

³⁰ Brown et al. (2014:439) are mistaken in their claim that our proposal requires “positing a consonantal inventory in which every plain consonant has an ejectives counterpart.” This claim is based on their assertion that “PTT laryngealized vowels are not restricted to environments following stops and affricates; they occur as well in syllables with nasals, laterals, and glides in the onset” (2014:439). As argued above, the distribution of laryngealized vowels after sonorants in the Totonac languages is too sporadic and inconsistent to justify reconstruction in PTT. We claim only that there was a series of glottalized stops and affricates in the protolanguage. We do not claim that there was ever a series of glottalized or laryngealized fricatives or sonorants.

easier to motivate and explain these developments if we begin with a protolanguage that exhibits contrasting series of glottalized and non-glottalized stops, and not contrasting series of laryngealized and non-laryngealized vowels. The unconditioned changes required to account for the reflexes of the affricates /*ʎ/ and /*λ/ and the stops /*q'/ and /*q/ under the present proposal are far more natural and expected than the conditioned changes required under the Brown et al. (2011) alternative. The evidence clearly supports postulation of a series of glottalized stops and affricates in PTT and does not support postulation of laryngealized vowels.

Another argument in favor of our reconstruction is based on the glottalization of verb stem-final stops in the Tepehua languages. As noted, this results in [C'V] sequences in these languages that do not correspond to [CV] sequences in the Totonac languages. We argue that it is easier to account for this phenomenon if we begin with a protolanguage in which at least some verb stems ended in glottalized stops. Otherwise, there is no plausible source of the glottalization. It certainly did not have its origin in glottalized or laryngealized allomorphs of vowel-initial suffixes, since there is no evidence of laryngealization on these suffixes today. We submit that the glottalized verb stem-final stops in the Tepehua languages represent a retention of glottalized verb stem-final stops in the protolanguage.

A final argument is based on the distribution of laryngealized vowels after fricatives and sonorants in the Totonac languages. In striking contrast to the regularity and consistency of correspondences involving stops and affricates, there is precious little regularity and consistency of correspondences involving fricatives and sonorants. Forms with laryngealized vowels following fricatives are rare in our data and are distributed in a haphazard way, without any discernable pattern. In addition, there are no cognate sets that consistently exhibit laryngealized vowels following the fricatives /*h/, /*š/, or /*l/. The absence of laryngealized vowels following these fricatives in the Totonac languages and the lack of regularity of laryngealized vowels after /*s/ support our contention that laryngealized vowels after fricatives are a fairly recent innovation in the Totonac languages and not an original feature of PTT.

A similar argument is based on the inconsistent distribution of laryngealized vowels after sonorants in the Totonac languages. This distribution is expected under our proposal since we do not include glottalized or laryngealized sonorants in our inventory and therefore provide no obvious source for the laryngealization. If the protolanguage contained laryngealized vowels after sonorants, as claimed by Arana Osnaya (1953) and Brown et al. (2011), then one would expect to find more evidence of them and also expect a more regular and consistent distribution. In fact, the distribution of laryngealized vowels after sonorants in the Totonac languages is sporadic and inconsistent, indicative of a more recent historical development.

Needless to say, our proposed reconstruction has significant implications for all proposals concerning the nature of Proto-Totonac-Tepehua and its relation to other languages and language families in Mesoamerica. We have not attempted to explore the implications of our proposal for Brown et al.'s Totozoquean hypothesis, but it is apparent that this too will need to be carefully reconsidered in light of the reconstruction of PTT offered here. Brown et al. (2011:336) claim that "should the alternative interpretation [involving glottalized consonants in PTT] eventually prove valid, this would have no impact on the major conclusions of [our] study. While the precise nature of the sound shifts separating PTh and PMZ might change, the correspondences between cognate sets would not." It is true, of course, that if one establishes a correspondence between two sounds, X and Y, and then changes Y to Z, one still has a correspondence between X and Z. Nevertheless, it is not sufficient simply to establish correspondences. In addition, it is necessary to describe in detail the sound changes that are required to get from a reconstructed sound *X in a protolanguage to its reflex in each of the protolanguage's descendants. A change from *X > Y may be more plausible and natural than a change from *X > Z. The "precise nature of the sound shifts" is, in fact, the key issue in this discussion, and considerations of plausibility, naturalness, markedness, etc. are necessarily implicated. Reconstruction of any protolanguage requires careful consideration of the nature of the sound changes entailed by the reconstruction and a rigorous defense of those changes against others that might be proposed.

Pending further evidence and argumentation, we remain agnostic regarding Brown et al.'s Totozoquean hypothesis. Our position is that it is better to nail down the specifics of Proto-Totonac, Proto-Tepehua, and Proto-Totonac-Tepehua first, before attempting to establish correspondences between more distant and remote languages and protolanguages. As noted before, it is not sufficient to establish a set of correspondences between (proto)languages. It is also necessary to provide a detailed exposition of the sound changes needed to account for the correspondences and a thorough evaluation of the naturalness and plausibility of those changes. We trust that the present effort in this direction will stimulate further description and analysis of the Totonac and Tepehua languages and their historical relationship with their neighbors.

A.1. Basic Contrast³¹

	MT	AT	UNT	FMT ³²	ZT	CT ³³	OT	PT	PŦp	HŦp	TŦp
PTT 1: / [*] ɪkaka/ 'spicy'	ɪkák	ɪkaka	ɪkáká	ɪkáká	ɪkaka	— ³⁴	ɪkáká	ɪkáká	ɪkáká	ɪkaka	ɪkáká
PTT 2: / [*] ɪk'ák'a/ 'ash(es)'	ɪkák	ɪkákán	ɪkákán	ɪkáká	ɪkáká	ɪkákáʔ	ɪkáká	ɪkáká	ɪk'ák'a	ɪk'ák'a	ɪk'ák'a

³¹ The authors of our sources use a wide range of diverse and idiosyncratic orthographies to present their data. In this paper, we have attempted to regularize the transcriptions by employing the Americanist version of the IPA. Errors of transcription and transliteration are our own. The languages which we cite are abbreviated as follows: MT = Misantla/Yecuatla Totonac, AT = Apantilla Totonac, UNT = Upper Necaxa Totonac, FMT = Filomeno Mata Totonac, ZT = Zapotitlán de Méndez Totonac, CT = Coatepec Totonac, OT = Ozelonacaxtla Totonac, PT = Papantla Totonac, PŦp = Pisaflores Tepehua, HŦp = Huehuetla Tepehua, and TŦp = Tlachichilco Tepehua. The protolanguages are abbreviated: PŦot = Proto-Totonac, PŦep = Proto-Tepehua, PTT = Proto-Totonac-Tepehua. ³² McFarland (2009) does not consistently transcribe laryngealization in Filomeno Mata Totonac. The transcriptions for this language that we employ here are based on our own fieldnotes from 2007 to 2013.

³³ McQuown (1940, 1990) reports that there are no laryngealized vowels in Coatepec Totonac. We include forms from this language in our tables only to demonstrate the pervasiveness of cognates.

³⁴ The solid line "—" in a cognate set indicates that a cognate has not yet been attested in the language in question.

A.3. PTT / *ʒ/

MT	AT	UNT	FMT	ZT	CT	OT	PT	PŦp	HŦp	TŦp
ʔ	ʒ	ʔ	ʒ	ʒ	ʒ	ʒ	ʒ	ʔ	ʔ	ʔ
PTT 11: / *ʒaha-ya/ 'wins', 'earns'	ʒahá	ʔaxá	ʒahá	ʒahay	ʒaha-	ʒaháy	ʒahá	ʔaháy	ʔaháy	ʔaháy
PTT 12: / *ʒaqwan-ya/ 'tires', 'gets tired'	ʒaqwán	ʔárwán	ʒaqwán	ʒaqwán	ʒaqwáʔ ³⁷	ʒaqwán	ʒaqwán	ʔóʔn	ʔoqon	ʔoqón
PTT 13: / *ʒaqʔii-ya/ 'talks to X', 'greet X'	ʒaqʔí	—	ʔiiʒaqʔíʔi	ʒaqʔíy	ʒaqʔii-	ʒaqʔí	—	ʒaʔáʔáy	ʒaqalay	ʒaqalaaɣ
PTT 14: / *ʒawa-ya/ 'makes', 'does'	—	ʔawá	ʔiiʒawakán	ʒawáy	ʒawa-	ʒawá	ʒawá	tawáɣ	ʔawana	ʔawaay ³⁸
PTT 15: / *kukaʔiiti/ 'avocado tree'	kukútiit	kukaʔiit	—	kukaʔiiti	—	—	kukaʔiiti	haʔúkiʔiiti	kukʔiiti	—

³⁷ /ʒaqwáʔ/ in Coatepec Totonac means 'the one who tires/gets tired' (McQuown 1990:320).

³⁸ /ʔiiʒawakán/ in Filomeno Mata Totonac means 'to be made of X'; /tawáɣ/ in Pisaflores Tepehua means 'to be made'; /ʔawana/ in Huehuetla Tepehua means 'to spread'; /ʔawaay/ in Tlachichilco Tepehua means 'to multiply, to create'.

A.4. PTT /*q/

MT	AT	UNT	FMT	ZT	CT	OT	PT	PTp	HTp	TTp
q	q	ʔ	q	q	q	q	q	ʔ	ʔ/q	q
PTT 16: /*qahni/ 'nettle'	qahna	áxna	qáhñj	qahnj	—	qáhñj	qáhni	ʔáhñj	qah	qáhni
PTT 17: /*qastah/ 'lime (mineral)'	qáštah	ʔeštáx	qáštah	qáštah	—	qáštah	qáštah	ʔáʔʃʃta	qayštah	qáyštah
PTT 18: /*puqšni/ 'dust', 'powder'	poqšñj	póʔšni	póqšñj	poqšñj	—	póʔšni	poqšni	póʔšñj	poqšñj	p'óqšni
PTT 19: /*aqʔ'iis/ 'flea'	ʔáqʔiis	áʔʔiis	ʔaqʔiisj	áqʔiis	—	ʔaqʔiis	áqʔiis	ʔáʔʔ'iis	ʔaʔʔ'iis	ʔáqʔ'iis
PTT 20: /*qalaati/ 'wasp'	qélagát	ʔeelqʔ	qálaati	qalaat	qaláat	qálaat	qálaat	ʔálaati	qaylaati	qáylaati
PTT 21: /*qahin/ 'turtle' ³⁹	qayan	ʔayán	qayán	qayan	—	qayán	qayín	ʔahin	qahin	qáhini
PTT 22: /*ʕuqumi/ 'knee'	ʕóqosni	ʕóʔósnj	ʕóqósnj	ʕóqosni	ʕuqusniʔ	ʕóqósnj	ʕóqósnj	ʕóʔʔñj	ʕóʔóʔ	ʕóqóqna
PTT 23: /*paqlča/ 'tomato'	páqlča	páʔlča	páqlčə	paqlča	—	páqlčə	páqlčha	páʔlčə	páʔlčj	páqlča
PTT 24: /qamaan-ya/ 'plays'	qamaanán	ʔa.ma.nán	qamaanán	qamaanán	—	qamaanán	qamaanán	ʔamaanán	qamaan	qamaanán
PTT 25: /*squli-ya/ 'whistles'	sqolj	s'olj	—	sqolij	—	—	sqolj	sʔəlʃ	sqolij	sqolij

³⁹ The sequence /*hi/ is frequently realized as /y/ after a vowel.

A.5. PTT /*q/

MT	AT	UNT	FMT	ZT	CT	OT	PT	PTh	HTh	TTh
q	q	?	q	q	q	q	q	?	?/q	?
PTT 26:	/*sq at'a/ 'infant', 'baby'	s'áta	sqátá	sqatá	sqata?	sqátá	sqátá	hás?á'rdá	sasqát'a	has?at'a
PTT 27:	/*luuq'u/ 'heron'	lóo?oo	—	lōoqq	—	—	lóoqq	lō'q'q	—	lō'o
PTT 28:	/*siimaq'aati/ 'tongue'	siima?áa	siimáqaaq	siimáqaaq	—	siimqáat	siimáqaaq	siimá'aaq	siimáqaaq	siimá'aaq
PTT 29:	/*q'at'waati/ 'egg'	q'atwá?	q'atwáq	q'atwáq	—	q'atwáq	q'atwáq	har'áas'waati	q'atwáq	har'áas'waati
PTT 30:	/*q'ušq'ihu/ 'yucca'	q'os'éwi	q'os'q'ewi	q'os'q'ewi	—	q'os'q'aw	q'os'q'ewi	q'os'éw	q'os'q'ewi	š'éu
PTT 31:	/*q'aaši/ 'gourd'	q'aaš	q'aaš	q'aaš	q'a:š?	q'aaš	q'aaš	q'aaš	q'aaš	q'aaš
PTT 32:	/*č'aa-ya/ 'washes X'	č'á'áa	č'aaš	č'aaš	č'aaš	č'aaš	č'aaš	č'aaš	č'aaš	č'aaš
PTT 33:	/*sq'uq'u/ 'salty'	sq'oo	sq'oo	sq'oo	—	—	sq'oo	s'ó'q	s'ó'q	s'ó'q
PTT 34:	/*q'ata-/ 'steals', 'steals X'	q'atán	q'at'én	q'atán	—	q'atán	q'atán	q'at'ahúy	q'at'ahúy	q'at'ahúy

A.6. Verb-stems ending in a glottalized stop

	MT	AT	UNT	FMT	ZT	CT	OT	PT	PŦp	HŦp	TŦp	
PTT 35: /*paastak'-ya/ 'remembers', 'remembers X'	páasték	paastaka	paastáka	lakapáasták	paastaka	paastak-	lakapáastáka	lakapaastaka	páastáka	paastáka	paasták'a	paasták'a
PTT 36: /*maast' uq'-ya/ 'piles X up'	máastáχ	máakstoqa	máastóq'a	máastóq'a	máamaqstoqa	-štuoq-	maastóq'a	maastoqa	máastóq'a	maastóq'a	máastóq'a	máastóq'a
PTT 37: /*q' ut'-ya/ 'drinks', 'drinks X'	—	qota	qóta	qáq'a	qota	qut-	qótmán	qota	qáq'a	qot'a	ót'a	ót'a
PTT 38: /*qasmát'-ya/ 'hears', 'hears X'	qasmát	qasmata	qasmáta	qasmát'a	qasmata	qasmáta	qasmát	qasmáta	qasmát'a	qasmát'a	qasmát'a	qasmát'a
PTT 39: /*tasp' it'-ya/ 'returns'	—	taspita	taspíta	táspít'a	taspita	taspit-	táspít'a	taspíta	táspít'a	tasp' it'a	tasp' it'a	tasp' it'a
PTT 40: /*sit'-ya/ 'cuts X'	—	sita	síta	sít'a	sita	sit-	síta	sita	sít'a	sit'a	aqsit'a	aqsit'a
PTT 41: /*č' it'-ya/ 'squeezes X'	č'ítmán	č'ita	č'íta	č'ít'a	č'ita	—	č'íta	č'ita	č'ít'a	č'it'a	č'it'a	č'it'a
PTT 42: /*škut'-ya/ 'unties X'	škút	škuta	škúta	škúta	škuta	—	škúta	škuta/sqota	škút'a	škút'a	škút'a	škút'a
PTT 43: /*sak'-ya/ 'picks X up'	sák	saka	sáka	sák'a	saka	saqnan	sáka	saka	sák'a/sáq'a	sák'a	sák'a	sák'a
PTT 44: /*č' uq'-ya/ 'writes', 'writes X'	č'áχ	č'oqa	č'óta	č'óq'a	č'oqa	č'uqa	č'əqnan	č'óq'a	č'áχ'a	č'əq'a	č'əra	č'əra

A.7. Stops and affricates in Proto-Totonac-Tepehua

MT	AT	UNT	FMT	ZT	CT	OT	PT	PtP	HtP	TtP
/*p/										
PTT 45: /*puputi/ 'foam'										
(káak)púput puput		(?el)pupút	púput	puput	—	púput	púput	(ha)púputj	puupuuta	oqxópuputi
PTT 46: /*piš-/ 'neck-related (body-part prefix)'										
pištúun pišni		pišni	pišni	pišni	pišni?	pišni	pišni	pištú?u	pištu?	pištu
/*p'/										
PTT 47: /*pəšni/ 'pig'										
pəšni pəšni		pəšni	pəšni	pəšni	pəšni?	pəšni	pəšni	bəšni	p'əš	p'əšni
PTT 48: /*p'uš-ya/ 'cuts X'										
püş püş		püşa	püşə	püşa	—	püş	püşa	büşə	p'uš-	p'üşa
/*t/										
PTT 49: /*skaata/ 'louse'										
skáat skaata		skáata	skátj	skaata	skátati	skáat	skaata	skáata	skaata	skáata
PTT 50: /*tata-ya/ 'sleeps'										
tata tata		tata	tata	tata	tata	tata	tata	tata	tata	tata
/*t'/										
PTT 51: /*-t'uy/ 'two'										
mátat? taqtú		atú	?áqtú	atúy	-tiy	?áqtí	atúy	la?áqtúy	duy	aqšt'uy
PTT 52: /*st'aa-ya/ 'sells X'										
stáa staa		stáama?aan	stáa?a	staa	staa-	stáay	stá	sdáay	st'aa-	st'áay
/*k/										
PTT 53: /*kitini/ 'mouth'										
kíni kitini		kíni	kíni	kitini	kitini?	kíni	kitini	kíni	ki	kitina
PTT 54: /*maka-/ 'hand-related (body-part prefix)'										
makálat makan		makán	makán	makan	makan	makán	makán	makát?	makát?	maká
/*k'/										
PTT 55: /*k'əčii-ya/ 'knows X'										
kəčii kəčii		kəčii	kəčii	kəčiiy	kəčiiy-	kəčii	kəčii	gəčáay	k'əčay	k'əčáay

PTT 56: /*k'áata/ 'year'	káat	káatq	káatq	káat	kaata	káat	káata	k'áataq	kaata	k'áatán
/*q/										
PTT 22: /*ɕuqumi/ 'knee'	ɕoqósmi	ɕoʔósmi	ɕoqósmi	ɕoqósmi	ɕuqumí?	ɕoqósmi	ɕoqósmi	ɕoʔósmi	ɕoʔó	ɕoqóqna
PTT 38: /*qasmat'-ya/ 'hears', 'hears X'	qasmát	qasmata	qasmata	qasmata	qasmáta	qasmát	qasmáta	ʔasmádá	qasmát'a	qasmát'a
/*q/										
PTT 29: /*q'atwaati/ 'egg'	qáqatwáat									
/*ɕ/										
PTT 57: /*taɕa-/ 'tooth-related (body-part prefix)'	təɕálat	taɕán	taɕán	taɕán	taɕán	taɕán	taɕán	taɕálat	taɕálat	taɕálat
/*ɕ'/										
PTT 58: /*ɕ'ik'itii/ 'breast'	ɕik'it	ɕik'í	ɕik'itii	ɕik'it	ɕik'it	ɕik'it	ɕik'it	ɕ'íq'it	ɕ'ik'it	ɕ'ik'íy ⁴⁰
/*ɕ/										
PTT 59: /*ɕiwis/ 'stone'	ɕiwis	ɕiyuš								
/*ɕ'/										
PTT 60: /*č'ankati/ 'sugar cane'	č'ňkat	č'ankát	č'ňkati	č'ankat	č'ankat	č'ňkati	č'ankat	č'ňkati	č'ankat	č'ankati
/*λ/										
PTT 11: /*λaha-ya/ 'wins', 'earns'	łahá	łahá	łahá	łahay	łaha-	łaháy	łahá	łaháy	łaháy	łaháy
/*λ/										
PTT 4: /*p'alan-ya/ 'vomits'	pałán	pałaganan	pałaganán	pałaganan	pałaganan	pałaganán	pałaganan	pałaganán	pałagan	p'at'an

⁴⁰ [ɕ'ik'iy] in Tlaxichilco Tepehua is an imperfective verb meaning 's/he nurses, suckles'.

A.8. Laryngealized vowels following fricatives

MT	AT	UNT	FMT	ZT	CT	OT	PT	PTp	HTp	TTp
PTT 28: /*siimaq'aati/ 'tongue'	siimáqqaat	siimáq'áa	siimáqqaaj	siimáqqaat	—	siimáqqaat	siimáqqaat	siimáq'qaaj	siimáqqaat	siimáq'qaati
PTT 40: /*sit'-ya/ 'cuts X'	—	síta	síta	síta	sít-	síta	síta	sídja	sít'a	aq'sít'a
PTT 61: /*saʔini/ 'rain'	ségn	taasáʔín ⁴¹	saʔínj	siin	siin	ségn	ségn	—	—	—
PTT 62: /*sunu-ya/ 'blows X'	sunú(ʔ)	sunú	sunú	sunúy	sunu-	sunúy	sunú	sunúy	sunuuy	sunúy
PTT 63: /*saqsí(ʔ)/ 'sweet'	saqsí	séʔsɨ	séqsɨ	saqsí	šasaqsíʔ	saqsí	saqsí/saqsí	saʔsɨ	saʔsɨ	saqsí
PTT 64: /*suuni/ 'bitter' ⁴²	šúun	šúunj	šúunj	šúun	šun	šúun	šúun	suun	suun	suun

⁴¹ /taasáʔín/ in Apantilla Totonac and Upper Necaxa Totonac means 'heavy rain, downpour'.

⁴² We attribute the reflex /s/ from /*s/ in the Totonac languages to the sound symbolic alternation between s/sʔ/ referenced in note 36.

A.9. Laryngealized vowels following sonorants

MT	AT	UNT	FMT	ZT	CT	OT	PT	Pʔp	HTp	Tʔp
PTT 65: /*wahn-ya/ 'eats'	wáayán	wáayán	wáayán	wáayán	way	wáayán	waayán	wahín	wahín	wahín
PTT 66: /*maa-hi/ 'is lying down', 'is supine'	máat	maat	mágh	mgh	má	máh	má	máat	maat	maa
PTT 67: /*slul/ 'lizard'	slut	slújúku/ sluʔ ⁴³	slúlukj	slújúku	saluku	slújúk	slúluk	slót	slut	slut
PTT 68: /*wii-ii/ 'is seated'	wílal	wíi	wíj	wí	wí	wí	wí	wíi	wíi(ɬ)	wíi
PTT 69: /*hwak'ak'a/ 'liver'	hwákak	makiwáka	hwákaka	hwákaka	hwákakáʔ	hwákka ⁴⁴	hwákaka	mákt wak'á	mákt'ák	máktúk'a
PTT 70: /*maq'an-ya/ 'throws X', 'throws X away'	maqán	maqán	maqán	maqán	---	---	maqán	máh?án	maqan	máh?án

⁴³ According to Beck (2011:543), [slújúku] means 'lizard' in Upper Necaxa Totonac, while [sluʔ] means 'crocodile'. Note the difference in laryngealization in the two words.

⁴⁴ Geminate consonants occur in Ozelonacaxtla Totonac as a result of pervasive processes of vowel deletion. See Román Lobato (2008) for further discussion and examples.

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