Proto-Yucatecan *tʃ(') from Proto-Mayan *ts('):
Sound Change or Borrowing from Huastecan?

David F. Mora-Marín
davidmm@unc.edu
November/December 2023

1. Introduction

This paper is a contribution, first of all, to the perennial problem of distinguishing between cognates (resulting from shared inheritance) and loanwords (resulting from diffusion), and secondly and more narrowly, to the linguistic history of the Yucatecan and Huastecan subgroups of the Mayan language family. The expected Yucatecan reflexes for proto-Mayan *ts and *ts' are proto-Yucatecan *ts and *ts' (Kaufman 1969, 1976; Josserand 1975), as in the cases of proto-Mayan *wits 'hill' and *ts'ak 'medicine', retained in Yucatecan as *wits 'hill, mountain' and *ts'ak 'to heal', respectively. However, at least ten etyma reconstructible to proto-Yucatecan show *tʃ and *tʃ' reflexes instead: proto-Mayan *tseʔ 'laught(er)' and *ts'ot 'twist', for example, are retained in Yucatecan as *tʃeʔe(h/x) 'laugh(ter)' and *tʃ'ot 'to wring, twist', respectively. At the same time, proto-Mayan *tʃ and *tʃ' are known to have been generally retained as such in Yucatecan: compare proto-Mayan *tʃim 'bag' to proto-Yucatecan *tʃim 'bag', and proto-Mayan *tʃ'oʔ 'mouse' to proto-Yucatecan *tʃ'oʔ 'mouse'. Thus, the few Yucatecan etyma with *tʃ(') from proto-Mayan *ts('), require an explanation, a task that is long overdue, given that such correspondence has not been discussed since Halpern (1942). The evidence contained in this paper will suffice to discard the first alternative: a conditioned sound change of inherited etyma. The borrowing alternative, more specifically, borrowing from pre-Huastecan into proto-Yucatecan, while more likely and ultimately favored here, will prove too complicated to be definitive. The problem likely lies in the time depth involved, as well as the likelihood that subsequent sound changes and lexical loss have effectively buried much of the evidence.

The paper is organized as follows. In §2 I provide the basic consonantal correspondences for Mayan, followed by the phonemic inventory for proto-Yucatecan and an outline of some important sound changes. In §3 I present the datasets of relevance. In §4 I discuss the patterns and propose factors and constraints, but note that the evidence for a regular sound change in Yucatecan is not strong, and an alternative explanation must be sought. Then, §5 offers an alternative based on Huastecan historical phonology and additional evidence of loanwords between Huastecan and Yucatecan. In §6 I review further evidence of diffusion and discuss some implications regarding the possible chronology of interaction. And in §7 I offer some conclusions and ideas for future research.

2. Mayan Historical Linguistics

2.1. Mayan Phylogenetic Classification

I assume Kaufman's (1976, 2017) model for the diversification of Mayan languages, seen in **Figure 1**. This model calls for a series of early binary splits, starting from the homeland in the highlands of Guatemala, possibly in the area of Uspantán, El Quiche (Kaufman 2017:71): Huastecan separates, leaving Southern Mayan behind; Yucatecan separates, leaving Central Mayan behind; Central Mayan separates into Eastern Mayan and Western Mayan; Eastern

Mayan separates into Greater Mamean and Greater K'ichee7an, and Western Mayan into Greater Q'anjob'alan and Greater Tzeltalan. Each of these subgroups would differentiate further, but for our purposes the only other subgroup that deserves mention is Greater Tzeltalan, which ends up differentiating into Ch'olan and Tzeltalan, and Ch'olan itself into Eastern Ch'olan and Western Ch'olan.[1]

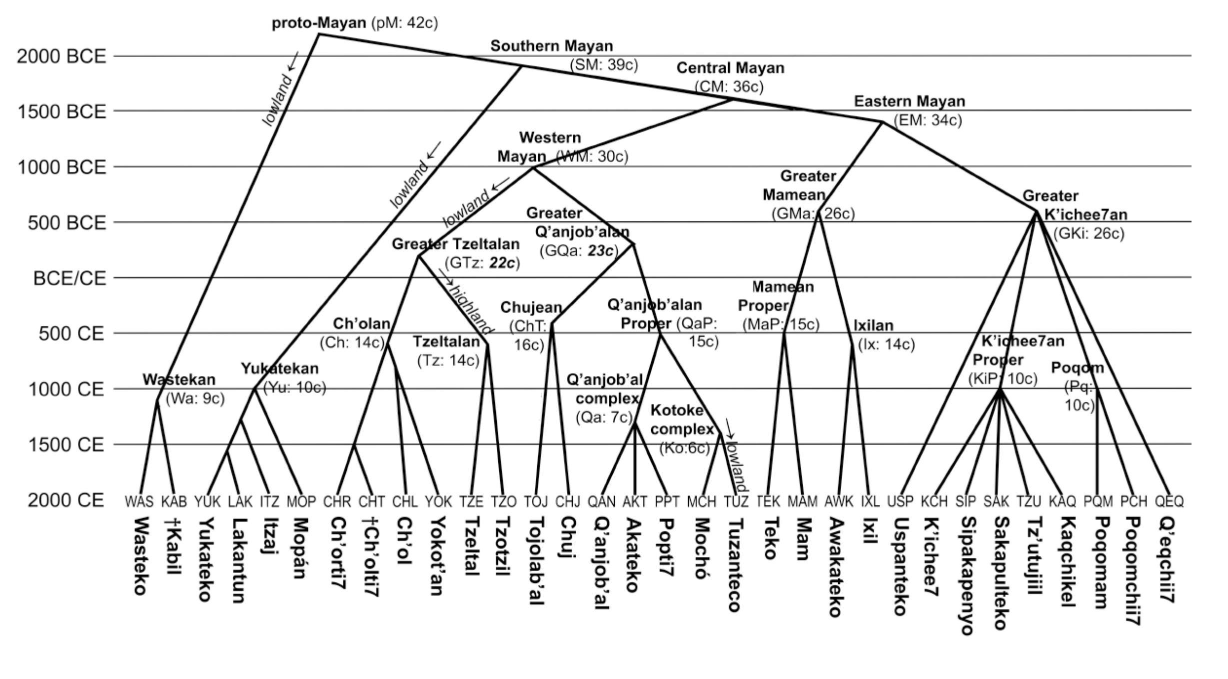

Figure 1. Diversification model of Mayan languages by Kaufman (2017:66-67).

Yucatecan is believed to have begun differentiating about a millennium ago (Justeson et al. 1985; Kaufman 2017), with Mopan (ISO-639-3: mop) separating first, followed by Itzaj (ISO-639-3: itz), Lakantun (ISO-639-3: lac), and Yucatec (ISO-639-3: yua).[2] Hofling (2006) argues that Lakantun is divided into Northern Lakantun, more closely related to Itzaj, and Southern Lakantun, more closely related to Yucatec; he has elaborated a model that points to "complex picture of shared innovations and contact-induced changes" (Hofling 2006:368). For this paper, such developments are too late and not relevant to the sound correspondence of interest here, which applies to all Yucatecan languages uniformly, and can be traced to a period before their differentiation.

Instead, a few considerations regarding early movements could be of significance. First is Kaufman's (2017:72) suggestion that Huastecan, consisting of two major varieties, Huastec (ISO-639-3 hus) and Chicomuceltec/Kabil (ISO-639-3 cob), upon separation from proto-Mayan, "moved out of the Highlands and down the Usumacinta," into the lowlands, before continuing northwest toward Central Mexico and the Huasteca. Also, Kaufman suggests that Yucatecan,

[1] For the sake of consistency, I will adopt language names, as well as their corresponding spellings and abbreviations, as they appear in Figure 1 from Kaufman (2017).
[2] The autonyms for the Yucatecan languages are as follows: Maayat'aan for Yucatec, Maaya(j) for Itzaj, Maaya(j) for Mopan, and Jach t'aan/Máayaj for Lakantun/Lacandon. I will use the conventional terms (Yucatec, Itzaj, Mopan, Lakantun) for ease of distinction.

after separating from Southern Mayan, did not immediately move into the northern lowlands, but instead "stayed in the Highlands for several hundred years before leaving for the Lowlands" (2017:72). It is not until the period between 1200-800 BCE that archaeologists would place the earliest Mayan inhabitants in the lowlands. It is thus possible that Huastecans and Yucatecans may have been in proximity to one another, in the southern lowlands or nearby, respectively, after leaving the homeland, and before Huastecan continued its migration toward Central Mexico and the Huasteca. But it is also likely that trade connections, especially along the Gulf Coast, would have promoted linguistic diffusion over the centuries. These matters are discussed further in §6.

Indeed, any investigation of the history of the Yucatecan languages will require careful attention to contact situations. Justeson et al. (1985:9, 11) define two areas of close interaction within the Mayan region: the Greater Lowland Mayan (GLL) area, involving primarily the Greater Tzeltalan (Ch'olan, Tzeltalan) and Yucatecan languages; and the Lowland Mayan (LL) area, involving primarily Ch'olan and Yucatecan. There are secondary participants in such interaction spheres, including the Greater Q'anjob'alan languages, especially the Chujean branch, the Greater Mamean languages, especially Ixil, and the Greater K'ichee'an languages, especially Q'eqchi', as previously recognized by Justeson et al. (1985:9–10, Table 2), and more recently by authors like Wichmann and Hull (2009) and Law (2013, 2014, 2017). Important phonological developments, such as the pM *r > j and *ŋ > n shifts began within the GLL area, where its results are regular, and spread outward, into the Greater Q'anjob'alan languages, but after such languages "had undergone substantial internal differentiation" (Justeson et al. 1985:12), explaining the irregular distribution of such shifts in that subgroup. The definition of the LL includes an impressive list of traits shared between Ch'olan and Yucatecan as well, lexical and morphological at least, pointing to extensive interaction that has been associated with Lowland Mayan civilization (Justeson et al. 1985), with some scholars arguing that it was interaction with Yucatecan that led some Greater Tzeltalans to become Ch'olans (Hopkins 1984, 1985). Etyma that were diffused areally are included in the discussion below, and provided a reconstruction marked with <#> to indicate its diffused status. For example, the form #tsoʔn 'body hair' is reconstructed as a Greater Lowland Mayan etymon; this does not mean that there is a Greater Lowland Mayan language, but instead, that there is a diffused etymon whose shape prior to wide diffusion and subsequent sound changes in the languages that adopted can be reconstructed with the shape #tsoʔn, following which it experienced the sound changes characteristic of different languages (e.g. *oʔ/oo > uu in Ch'olan, cf. proto-Ch'olan *tsun).

A topic that has not been given sufficient attention in the past pertains to the interaction between Huastecan and other Mayan subgroups. Previous authors have pointed to a variety of shared etyma and possible loans (Kaufman 1980; Justeson et al. 1985; Campbell 1988), but a more focused effort, called for by more recent proposals by Robertson and Houston (2015) and Law (2017:119–120), is needed to attempt to characterize their extent, and to determine whether some of these possible loans may actually constitute additional cognates instead. The present paper serves as a small contribution toward this goal, and for that reason it is worth observing that Kaufman with Justeson (2003) posit 31 etyma represented in Huastecan plus at least another subgroup, but which they do not attribute off hand to proto-Mayan. About half of such etyma are explicitly characterized as involving "Was(tekan)" (Huastecan) plus a diffusion sphere, such as "GLL+Was" (or "Was+GLL"), with two examples, and "LL+Was" (or "Was+LL"), with six examples. In fact, seven cases involve Yucatecan and Huastecan specifically ("Was+Yu" or "Yu+Was").

Recently, some linguists and epigraphers have suggested that Huastecan and Ch'olan even share a shift of *oo/oʔ > uu > u (e.g. Brown and Wichmann 2004; Lacadena and Davletshin 2014). Nevertheless, Norcliffe (2003:95) had already observed that Kabil does not exhibit such a change, only Huastec does, precluding the reconstruction of such change to proto-Huastecan. More recently, Mora-Marín (2021a), has also noted that such a Huastec change must be a Postclassic period (900-1521 CE) phenomenon. In contrast, the Ch'olan shift is attested in Epigraphic Mayan (ISO-639-3 emy) inscriptions already by 445 CE (Mora-Marín 2009), during the Early Classic period (e.g. **tu-TUN** for proto-Ch'olan *tun 'stone' from proto-Mayan *toonh). Further evidence that these were independent developments is found among etyma that experienced the shift in one group (e.g. proto-Mayan *ʔooʃ 'three' > proto-Ch'olan *ʔuʃ=; proto-Mayan *ʃootʃ' 'screech owl' > Huastec *ʈ'uuʃ*) but not the other (proto-Mayan *ʔooʃ 'three' > Huastec *ʔooʃ=*; proto-Mayan *ʃootʃ' 'screech owl' > proto-Ch'olan *ʃotʃ'). Mora-Marín (2021a) further suggests that the Huastec shift involved not just cases of earlier *oo and *oʔ, but even cases of earlier *a (e.g. proto-Wastekan *k'ob(')ak from proto-Mayan *q'aɓ 'hand, arm', reflected in Huastec as *k'ubak* but in Kabil as <kovác>), a process that did not occur in Ch'olan (cf. proto-Ch'olan *k'äɓ). This shows that a great deal of work remains to be conducted, and a more concerted effort, perhaps by specialists in Huastecan and other subgroups, is needed.

2.2. Mayan Correspondences

Table 1 presents the proto-Mayan consonantal inventory (first column) and its reflexes in each of the major Mayan subgroups; it is largely based on Campbell's (1984:6, Table 2) table of correspondences across Mayan languages. For the languages and sounds of relevance here, **Table 1** is complete, but it is likely that there are some missing correspondences for other sounds and languages. The vocalic inventory consisted of /i e a o u/ and canonical root shapes included *CVC, *CV:C (= *CVVC), *CVhC, *CVʔC, and *CVSC with S = /s ʃ j/ (Kaufman 1976). In addition, there was also a rare, disyllabic root shape *CVʔV_1C, not to be confused with the monosyllabic *CVʔC.[3]

Table 1. Mayan consonantal correspondences

pM	pHua	pYu	pGTz	pGQ'	pGM	pGK'
*p	*p	*p	*p	*p	*p	*p
*ɓ	*b(')	*ɓ	*ɓ	*ɓ	*ɓ	*ɓ
		#p'	#p'			
*t	*ʈ	*t	*t	*t	*tʃ	*t
		*tʃ				
*t'	*ʈ'	*t'	*t'	*t'	*t'	*t'
*tj	*t	*t	*t	*t	*ts	*tʃ
		*tʃ				
*tj'	*t'	*t'	*tʃ'	*tʃ'	*tʃ'	*tʃ'
*ts	*t	*ts	*ts	*ts	*ts	*ts
		*tʃ			*ʈ	
*ts'	*t'	*ts'	*ts'	*ts'	*ts'	*ts'

[3] V_1 in CVʔV_1C simply means "same as the vowel in the preceding syllable," but it is not an echo vowel, which would be a purely phonetic realization of a non-phonemic vowel, typically voiceless, as occurs quite commonly after a root-final ejective or implosive.

	*tʃ’	*tʃ’			*ʈ’	
*tʃ	*tʃ	*tʃ	*tʃ	*tʃ	*ʈ	*tʃ
*tʃ’	*tʃ’	*tʃ’	*tʃ’	*tʃ’	*ʈ’	*tʃ’
*k	*tʃ	*k	*tʃ	*k	*k	*k
		*tʃ	*k	*tʃ?	*kj	
*k’	*tʃ’	*k’	*tʃ’	*k’	*k’	*k’
		*tʃ’	*k’	*tʃ’?	*kj’	
*q	*k	*k	*k	*k	*q	*q
	*kʷ					
*q’	*k’	*k’	*k’	*k’	*q’	*q’
	*k’ʷ					
*l	*l	*l	*l	*l	*l	*l
*r	*j	*j	*j	*j	*t	*r
*m	*m	*m	*m	*m	*m	*m
*n	*n	*n	*n	*n	*n	*n
*ŋ	*w	*n	*n	*ŋ	*x	*x
	*h					
*s	*s	*s	*s	*s	*s	*s
*ʃ	*ʃ	*ʃ	*ʃ	*ʃ	*ʂ	*ʃ
*x	*h	*x	*x	*x	*x	*x
*h	*h	*h	*h	*h	*ʔ	*h
	*ʔ					
*w	*w	*w	*w	*w	*w	*w
	*ʔ					
	*Ø					
*j	*j	*j	*j	*j	*j	*j
*ʔ	*ʔ	*ʔ	*ʔ	*ʔ	*ʔ	*ʔ
	*Ø					
	*j					

The phonemic inventory of proto-Yucatecan (pYu), seen in **Table 2**, is based on Kaufman (1991) and Hofling (2017). Colonial Yucatec retained a word-initial distinction between /h/ and /j/, which ultimately merged in all the Yucatecan languages. Kaufman (1991:3) has proposed a detailed set of syllable nuclei correspondences for the Yucatecan languages, which Yucatec preserves faithfully, enough to serve as a rule-of-thumb for proto-Yucatecan shapes. The only such correspondences of importance here are his proposed reflex of Mopan CVVC shapes from proto-Yucatecan *CVhC, and Mopan CVʔVC from proto-Yucatecan *CVʔC, on the one hand, and of (Southern) Lacandon CVVC from proto-Yucatecan *CVhC and *CVVC, on the other. There exist cases of Mopan CVVC reflexes from both proto-Yucatecan *CVhC and *CVʔC, a matter that deserves a detailed treatment in the future. Yucatec Maya tones are represented as follows: <V> neutral tone; <V́V> high tone corresponding to proto-Yucatecan /Vh/ nuclei; <V̀V> low tone corresponding to proto-Yucatecan <V:> (= <VV>) nuclei; and high tone in /V́ʔ/ nuclei, which is left unmarked because it is predictable.

Table 2. proto-Yucatecan sound inventory (Kaufman 1991:2)

p	t	ts <tz>	tʃ <ch>	k	ʔ <7>		Root shapes
p’	t’	ts’ <tz’>	tʃ’ <ch’>	k’			CVC
ɓ <b’>		s	ʃ <x>	x <j>	h		CV:C <CVVC>
	r						CVhC
	l						CVʔC
m	n						
w			y				
		i(:)		u(:)			
		e(:)		o(:)			
			a(:)				

It is worth noting that proto-Yucatecan *n (from proto-Mayan *n and *ŋ) is typically realized as [m] word-finally, and that for some roots, at least, it appears to have been reanalyzed as /m/ in non-final contexts. Yucatec ‘avocado’, from proto-Mayan *ʔoŋ, exhibits phonetic alternation: *ʔòo*[m] ‘avocado’ vs. *ʃ-ʔòo*[n]*-il* ‘grove of avocado trees’ and *u-ʔòo*[n]*-il* ‘his avocado’. Similarly, this is seen with Yucatec *tʃ’eʔe*[n] ~ *tʃ’eʔe*[m] ‘well’, as in *in-tʃ’eʔe*[n]*-il* ‘my well’. However, Itzaj *tʃ’eʔem* ‘cave’ appears to show rephonemicization of /n/ as /m/: *tʃ’eʔem* ‘hollow, cave, pit, hole’, *tʃ’eʔem-il mak* ‘person’s grave’. This rephonemicization of final /n/ as /m/ is a post-breakup process, perhaps resulting from Spanish influence, given that the Yucatecan Spanish variety typically realizes final /n/ as [m], e.g. *Yucatá*[m], although it is possible that the latter correspondence could instead be influence of Yucatecan (primarily Yucatec) on Spanish. The point for now is that this is not a change that would preclude, *a priori*, a comparison of final [m] in Yucatecan with final /n/ and /ŋ/ in other Mayan languages.

Finally, before continuing, it is important to take into account several sound changes shared by the Yucatecan languages, and which can thus be traced back to pYu. These were described by Justeson et al. (1985:15) as follows (with orthographic substitutions for phonemes and phones):

1. **t* (< pM **t* and **tj*) > *tʃ* (a) before *i* and *e*, and (b) root-finally in words of more than one syllable or in roots shaped #(…)VCV*t*# and in a few monosyllables.
2. **k’* > *tʃ’* before *i* and *e* under differing conditions.
3. **k’* > *tʃ’* and **k* > *tʃ* before *a* when followed by a reflex of pM **q* or **q’*, which must still have been phonetically distinct from **k* and **k’*.
4. **VʔC* > *V́ʔC*; **VhC* and **VxC* > *V́:C*; and **V:C* > *V̀:C*.
5. **aCi* > *iCi* and **iCa* > *aCa*, where the first vowel is short and C is not *h*.
6. **CV:ʔ* > *CVʔ* and **CV:h#* > *CVh#*.

The last sound change, #6, could be of relevance in distinguishing some cases of pYu that do not exhibit *tʃ(’) from pM *ts(’).

3. Dataset

I initially collected data from Kaufman with Justeson (2003), but have checked all examples against the following Yucatecan dictionaries: Bricker et al. (1998) for Yucatec (Maayat'aan), Hofling with Tesucún (1997) for Itzaj (Maaya(j)), Hofling (2011) for Mopan (Maaya(j)), and Hofling (2014) for Lacandon (Jach t'aan, Máayaj). Hofling (personal communication, 2020) found two additional cases illustrating the change in question. When the Yucatecan data in Kaufman with Justeson (2003) differ from the entries in the dictionaries for the individual languages I have favored the latter sources.

Table 3 presents the examples that can be argued to exhibit a Yucatecan reflex *tʃ(') from earlier *ts('), or alternatively, a Yucatecan reflex *tʃ(') from borrowed #ts('). The proto-Yucatecan forms are as proposed in this paper. The very first example, *tʃiʔk 'coati' from proto-Mije-Sokean *tsiku, could potentially be explained by allophony within Mije-Sokean, in which /ts/ could have potentially been pronounced [tʃ] (Justeson et al. 1985:23–24, Table 10): Wichmann (1995:268) documents several varieties of both Sokean and Mijean with reflexes of proto-Mije-Sokean *tsiku showing initial *tʃ, and thus, one of those varieties may have been the source of the Yucatecan form. In fact, Kaufman (2020:136) reconstructs the "Common Mije" form *tʃik. I have labeled this item as #0 because it requires omission from further consideration.

Table 3. Examples showing the changes.

Item #	Source	proto-Yucatecan	Yucatecan Cognates
0	proto-Mije-Sokean *tsiku	*tʃiʔk 'coati (pizote, tejón)'	Yucatec: *tʃíʔik* Itzaj: *tʃiʔik* Mopan: *tʃiʔik* Lacandon[4]: [ts'óoy]
1	pM *q'oʔts 'cheek'	*k'oʔtʃ 'throat'	Yucatec: *k'óʔotʃ* (n) 'throat; castor bean' Itzaj: *k'oʔotʃ(-il)* (n) 'guarumo tree, trumpet tree; higuerillo, castor bean tree; castor' Mopan: *k'oʔotʃ* 'palo guarumo' Lacandon: *k'oʔtʃ* (n) 'throat, pharynx' (not same as *k'oʔtʃ* 'guarumbo tree')
2	pM *tseʔ 'laught(er)'	*tʃeʔe(h/x) 'laugh/ter'	Yucatec: *tʃéʔeh* Itzaj: *tʃeʔeh* Mopan: *tʃeʔeh* Lacandon: *tʃeʔh*
3	pM *tseʔh 'raw'	*tʃeʔh (Yucatec, Mopan), *tʃeʔ=tʃeʔ (Yucatec, Itzaj, Lacandon)	Yucatec: *tʃeʔ-, tʃéʔeh-, tʃéʔetʃeʔ* 'raw/fresh' Itzaj: *tʃeʔ-* 'crude', *tʃeʔ=tʃeʔ* Mopan: *tʃeʔej* 'raw' Lacandon: *tʃeʔ* 'crude (raw)', *tʃeʔ=tʃeʔ* 'crude'
4	GLL #tsoʔn 'body hair'	*tʃoʔm	ColYuc: <choon> Yucatec: *tʃóʔom* 'pubic hair' Itzaj[5]: — Mopan: *tʃoʔom* 'pubic hair'[6]

[4] Interestingly, Hofling (2014:360) lists *tzzz tzzz* [*tsss tsss*] as 'sound of coati'. He lists the non-cognate form *ts'óoy* for 'coati' (Hofling 2014:367).

[5] Itzaj uses both *meʔeʃ* 'facial hair' and *tsoʔotsel* 'hair (general)' for 'pubic hair', depending on whether it is possessed by *chiim/kiyep* 'penis' or *pel/t'uy* 'vulva' (Hofling with Tesucún 1997:444, 630). I initially thought it possible that Itzaj *chom* 'racimo (bunch)' could be cognate with Yucatecn *chóʔom*, given the derived form *choom* 'a bunch/handful (of hair)' (Hofling with Tesucún 1997:212-213), but such form lacks evidence for a preconsonantal glottal stop.

[6] Hofling (2011:159, 432) notes that Mopan *choʔom* is "not known by everyone." It would appear that *tso'otsel is* 'pubic hair (of woman)' and *tso'otsel kep* 'pubic hair (of man)' are the more common terms instead.

			Lacandon[7]: —
5	pM *tsuhh ‘tecomate (gourd)’	*tʃuhh	Yucatec: *tʃúuh* ‘canteen; bottle gourd’ Itzaj: *tʃuh* ‘calabash water gourd’ Mopan: *tʃuh* ‘tecomate (water gourd)’ Lacandon: *tʃúuh* ‘tecomate (water gourd)’
6	pM *tsuy ‘to stick, fasten; to grab; to change the dressing on a bandage’	*tʃuʔy ‘tangled’	Yucatec: *tʃúʔuy* ‘tangled’ Itzaj: *tʃuʔuy* ‘wrinkled’ Mopan: — Lacandon: *tʃuʔy* ‘tangled’
7a	pM *ts’ikin ‘bird’ (*ts’ik- + -in, see discussion)	*tʃˀihtʃˀ ‘bird’	Yucatec: *tʃ’íitʃ’* ‘bird; penis’ Itzaj: *tʃ’iitʃ’* ‘bird’ Mopan: *tʃ’iitʃ’* ‘bird’ Lacandon: *tʃ’íitʃ’* ‘bird; female (animal)’
7b		*tʃˀik-(ɓuul) ‘groove-bill ani (Crotophaga sulcirostris)’	Yucatec: *tʃ’ikɓùul* ‘Grooved-bill Ani’ Itzaj: *(aj-)tʃ’ik-ɓul* ‘Grooved-bill Ani’ Mopan: — Lacandon: —
8	pM *ts’in ‘silencioso (environment)’	*tʃˀen ‘to silence, stop’[8]	Yucatec: *tʃ’en* (tv) ‘to silence, stop’, *tʃ’èenel* ‘silent, stopped’ Itzaj: — Mopan: — Lacandon: tʃˀéen (iv) ‘to calm down, stop’
9	pM *meʔts’ ‘eyebrow’ (or ‘eyebrow; eyelash’)[9]	*meʔtʃˀ (or *mehtʃˀ)[10]	Yucatec: — Itzaj: — Mopan: *meetʃ’* ‘eyelash’[11] Lacandon: —
10	pM *ts’ot ‘twist’	*tʃˀot	Yucatec: *tʃ’ot* ‘to wring, to twist’ Itzaj: *tʃ’ot* ‘to twist’ Mopan: *tʃ’ot* ‘to twist’ Lacandon: —

Table 4 provides etyma with original *ts(’) retained unchanged in Yucatecan.

Table 4. Examples not showing the changes.

Item #	Source	proto-Yucatecan	Yucatecan Cognates
11	GLL #tsimen ‘tapir’	*tsimin ‘tapir’	Yucatec: *tsíimin* ‘tapir; horse’ Itzaj: *tsimin* ‘equine’ Mopan: *tsimin* ‘equine, horse’

[7] Lacandon also attests to the term *choom* ‘tied handful’, but does not restrict it to ‘hair’ (Hofling 2014:110), as seems to be generally the case in Itzaj (see Footnote 5).

[8] The vowel in the Yucatecan form is unexpected; there is no known shift of pM *i > pYu *e. In grammatical morphemes Yucatecan sometimes experiences vowel changes due to analogical reanalysis, but in this case there is no obvious explanation. Perhaps borrowing could explain the deviant vowel, but no other Mayan language bears such a vowel. Huastecan does not appear to provide evidence for this etymon at all.

[9] It would appear that two Greater Q’anjob’alan languages attest to this change for this etymon: Tojolab’al *metʃ’* ‘eyelash’ and Mocho’ *meetʃ’* ‘small reddish squirrel that flies’ (Kaufman with Justeson 2003:283).

[10] There is a very similar etymon in Yucatecan, reconstructible as pYu *meʔʃ, attested as follows: Yucatec *méʔeʃ* ‘beard, whiskers, moustache’; Itzaj *meʔeʃ* ‘beard, mustache, facial hair’; Mopan *meʔeʃ* ‘beard, mustache, sideburns, tuft of hair on male turkey’s breast’; and Lacandon *meʔʃ* ‘beard, mustache’. Perhaps pYu had both, as *meʔtʃˀ ~ *meʔʃ. Note the semantic overlap between Mopan *meʔeʃ* and Yucatec *tsùum*, item #21.

[11] Although the case of pYu *meʔtʃˀ is based on one Yucatecan language only, Mopan, which has *meetʃ’*, it must be recalled from §2 that Mopan /CVVC/ may correspond to Yucatec /CVhC/ (e.g. #7, #23, #25) or /CVʔC/ (e.g. #35), but not to Yucatec /CVVC/.

			Lacandon: *tsimin* 'horse, tapir'
12	pM *wits 'hill'	*wits 'hill, mountain'	Yucatec: *wits* 'hill' Itzaj: *wits* 'hill' Mopan: *wits* 'mountain' Lacandon: *wits* 'hill, mountain'
13	pM *tsel ~ *tsal 'side(ways)'	*tsel (positional root) ~ *tsehl 'side (noun, numerical classifier)'	Yucatec: *tsel* 'to lie on one's side', *tséel* 'side' Itzaj: *tsel* 'ladear (to slope)' Mopan: *tsel* 'side' Lacandon: *tsar, tseerer* 'tilted'
14	pM *tsah 'to demand; to choose'	*tsah 'to collect, to collect from'	Yucatec: *tsah* 'to collect, recover, dun' Itzaj: — Mopan: *tsah* 'to demand' Lacandon: —
15	pM *tsats 'gordura'	*tsaats 'fat, grease'[12]	Yucatec: *tsàats* 'fat, grease' Itzaj: — Mopan: *tsats* 'lard' Lacandon: *tsaats*, *saas*
16	pM *matsaaɓ 'eyelash'	*mahtsaɓ 'eyelash'	Yucatec: *máatsaɓ* 'eyelash' Itzaj: *matsaʔ* 'eyelash' Mopan: *matsaɓ ~ matsaʔ* 'eyelash' Lacandon: —
17	pM *(ʔax=)tsooʔ	*tsoʔ 'male turkey'[13]	Yucatec: *tsoʔ* 'turkey cock' Itzaj: *tsoʔ* 'turkey gobbler' Mopan: *tsoʔ* 'male turkey' Lacandon: *tsoʔ* 'male turkey, male duck'
18	GLL #tsoʔts 'hair'	*tsoʔts 'hair'	Yucatec: *tsóʔots* 'hair' Itzaj: *tsoʔots* 'hair' Mopan: *tsoʔots* 'hair' Lacandon: *tsoʔts* 'hair, feathers'
19	WM *tsuhuC 'belly'	*tsuuk(?) 'belly'	Yucatec: *tsùuk* 'belly, stomach' Itzaj: *tsuk* 'peccary stomach' Mopan: — Lacandon: *tsuuk* 'stomach'
20	CM *tsuk 'beard'	*tsuuk nal 'corn silk'	Yucatec: *tsùuk* 'hair, silk [corn]' Itzaj: *tsuk* 'corn silk' Mopan: *tsuk* 'corn silk' Lacandon: *tsuuk* 'corn silk'
21	Diffused from pre-Ch'olan *tsuun (proto-Ch'olan *tsun), from GLL #tsoʔn 'body hair' (see item #2)	— (not proto-Yucatecan)	Yucatec: *tsùum* 'tuft of hair on chest of mature turkey'
22	pM *ʔuts 'good'	*ʔuts 'good'	Yucatec: *ʔuts* 'good, just' Itzaj: *ʔuts* 'good' Mopan: *ʔuts-* 'to fix' (positional/inchoative) Lacandon: *ʔuts* 'good'
23	pM *ts'ihɓ	*ts'ihɓ 'writing'	Yucatec: *ts'iiɓ* 'writing' Itzaj: *ts'iiɓ* 'writing' Mopan: *ts'iiɓ* 'writing' Lacandon: *ts'iiɓ* 'writing'

[12] Although #15 bears a short vowel in pM, the Yucatecan reflexes (Yucatec, Lacandon) suggest a pYu form *tsaats: recall Kaufman's (1991:3) proposed correspondence of Yucatec and Lacandon CVVC based on pYu *CVVC.
[13] This item reflects change #6 described for Yucatecan by Justeson et al. (1985:15): *CV:ʔ > CVʔ.

24	CM *ts’eet ‘left’	*ts’ihk ‘left (hand)’[14]	Yucatec: *ts’íik* ‘left (hand, side)’ Itzaj: — Mopan: — Lacandon: *ts’íik* ‘left’
25	pM *ts’iin or *ts’ihn ‘cassava’	*ts’ihn ‘yuca’	Yucatec: *ts’íin* ~ *ts’íim* ‘yuca’ Itzaj: *ts’iim* ‘cassava’ Mopan: *ts’iin* ‘manioc’ Lacandon: *ts’íin* ‘yuca’s
26	pM *ts’is ‘to sew’	*ts’is ‘to copulate’[15]	Yucatec: *ts’is* ‘to copulate’ Itzaj: *ts’is* ‘to copulate’[16] Mopan: — Lacandon: *ts’is* ‘to copulate with’
27	GLL #pehts’ ‘trap; to smash’	*pets’ ‘to smash’	Yucatec: *pets’* ‘to pat, crush, smash, press, detain’ (tv) Itzaj: — Mopan: *pets’* ‘to press’ Lacandon: *peets’* ‘to flatten, squash’
28	pM *ɓaʔts’ ‘(howler) monkey’	*ɓaʔts’ ~ *ɓaats’ ‘howler monkey’	Yucatec: *ɓàats’* ‘howler monkey’ Itzaj: *ɓaats’* ‘howler monkey’ Mopan: *ɓaats’* ‘howler monkey’ Lacandon: *ɓaʔts’* ‘howler monkey’
29	pM *ts’ak ‘medicine’	*ts’ak ‘to heal’	Yucatec: *ts’ak* ‘to cure, heal; take advantage of, overcharge’ Itzaj: *ts’äk* ‘to heal’ Mopan: *ts’äk* ‘to cure’ Lacandon: *ts’äk* ‘to cure, heal’
30	pM *u-ts’iiʔ ʔeeh ‘colmillo’	*ts’aʔaj ‘fang, canine tooth’[17]	Yucatec: *ts’áʔaj* ‘eye tooth, fang, tusk’ Itzaj: *ts’aʔaj* ‘canine tooth’ Mopan: *ts’aʔaj* ‘canine tooth’ Lacandon: —
31	GLL #ts’ohl	*ts’ohl ‘huicoy squash’	Yucatec: *ts’óol* ‘calabaza chata verde’; ‘a type of squash’ Itzaj: *ts’ool* ‘huicoy squash’ Mopan: *ts’ool* ‘huicoy squash’ Lacandon: —
32	pM *xots’ ‘to uproot, pull out, scrape/scratch off’	*xots’ ‘to remove, pull out’	Yucatec: *hots’* ‘to remove, draw out /nails/’ Itzaj: *hots’* ‘to loosen’ Mopan: *hots’* ‘to pull out’ Lacandon: *hoʔs* ‘to take off’
33	pM *soots’ ‘bat’	*soots’ ‘bat’	Yucatec: *sòots’* ‘bat’ Itzaj: *sots’* ‘bat’ Mopan: *sots’* ‘bat’

[14] This term is likely a loan from Ch’olan. pCM *ts’eet ‘left hand’ is attested as *ts’et* in Tzotzil, *ts’eht* in Tzeltal, but as <tzitic> in Ch’olti’ and *ts’ik-* in Ch’orti’ (Kaufman with Justeson 2003:242; Kaufman and Norman 1984:134). (Ch’orti’ also has the etymologically distinct *ts’ej-*.) It is possible that this form experienced the Ch’olan shift of *ee > ii > i. If so, the Ch’olti’ form would support a process of phonetic and morphological erosion, *ts’i(h)t-ik* > *ts’i(h)tik* > *ts’i(h)k*, which could explain the Ch’orti’ form *ts’ik-*, and, through diffusion, the Yucatecan form *ts’ihk. This borrowing was possibly early, during pre- or proto-Yucatecan times.
[15] This is clearly a case of semantic shift, but one based on a metaphor involving the action of sewing by repeatedly inserting and retrieving and reinserting a needle, which can be compared to the act of copulation.
[16] This form does not appear in Hofling with Tesucún (1997), but Hofling (personal communication, 2020) has explained that it was documented subsequently, in June of 2007.
[17] This is a case of extreme morphological and phonetic erosion in Yucatecan, one that requires more thorough explanation, but it is based on the pan-Mayan ‘dog of tooth’ metaphor for ‘fang, eyetooth’ or ‘canine tooth’.

			Lacandon: —
34	pM *ts'uunuʔn 'hummingbird'	pre-Yu *ts'uunuʔn > pYu *ts'unuʔn 'hummingbird'	Yucatec: *ts'unúʔun* 'hummingbird' Itzaj: *ts'unuʔun* 'hummingbird' Mopan: *ts'unuʔun* 'hummingbird' Lacandon: *ts'unuʔn* 'hummingbird'
35	CM *ts'uts' 'to lick, kiss'	*ts'uʔts' 'to suck'	Yucatec: *ts'úʔuts'* 'to puff, kiss, suck' Itzaj: *ts'uuts'* 'smoking, sucking' Mopan: *ts'uuts* 'to suck' Lacandon: *ts'uʔts'* 'to smoke, to suck (on)'
36	pM *ʔuts' 'to smell'	*ʔuts'- ~ *ʔuhts' 'to smell, to kiss'	Yucatec: ʔúuts'-, *ʔúuts'-ɓen* 'to sniff, smell' (antipassive), *ʔúuts'-ɓen-t-* 'to smell' (tv) Itzaj: *ʔuts'in* 'to kiss' Mopan: *ʔuts'in* 'to kiss' Lacandon: *ʔúuts'* 'to smell'
37	pM *muts' 'to close eyes'	*muts' 'to close eyes'	Yucatec: *muts'* 'to close /eye/; to blink' Itzaj: *muts'* 'to close' Mopan: *muts'* 'to close (eyes)' Lacandon: *muts'* 'to close (eyes)'
38	LL #puts' 'flee'	*puts', *puhts' 'to flee'	Yucatec: *púuts'* 'to flee, elope', *in pùuts'* 'my fugitive' (verbal noun), *pùuts'ul* 'fugitive' (adjective), *puts'ul* 'fugitive' (noun) Itzaj: *puts'* 'to flee' Mopan: *puuts'* 'to flee' Lacandon: *puts'* 'to help (someone) flee'

4. SOUND CHANGE ALTERNATIVE

Ten examples of the putative change are not much. When considered carefully, in terms of their phonetic and phonotactic factors, their grammatical class, and their histories, a pattern emerges among the cases not exhibiting the putative change, though admittedly, not a very satisfactory one.

Of the ten examples in **Table 3**, I have chosen to exclude #0, #7a, and #7b. The first, #0, proto-Yucatecan *tʃiʔk 'coati', is excluded because it was likely borrowed from a proto-Sokean form with */ts/ → [tʃ] or proto-Mijean form with */tʃ/, ultimately from proto-Mije-Sokean *ts, as already discussed in §3.[18] The second, proto-Yucatecan *tʃ'ihtʃ' 'bird', is excluded because it only shows a potential match between the initial consonant and the vowel: the remaining three segments—more than half of the root—cannot be matched. Also, it is likely a loan from Huastecan. I suspect that Yucatecan borrowed *tʃ'ihtʃ' from pre- or proto-Huastecan *tʃ'itʃin > Huastec *ʈ'iʈin*, exhibiting the generalized *k(') > tʃ(') shift of Huastecan, as well as the pre-Huastecan shift of pM *ts' > *tʃ'/__V[+front] (but > *t' elsewhere) discussed by Norcliffe (2003), about which more is said in §5. If pYu speakers had borrowed Huastecan *tʃ'itʃ(-in), they likely would have applied assimilation in terms of glottalization to the homorganic affricates *tʃ' and *tʃ, resulting in /tʃ'itʃ'/, as there are no roots in Yucatecan of the shape CVC where the consonants agree in place and manner of articulation but one is plain and the other glottalic, except for a very few roots containing both /p/ and /ɓ/ (e.g. Straight 1972). This account does not explain the preconsonantal *h reconstructible in *tʃ'ihtʃ', but neither does proposing that pYu *tʃ'ihtʃ' stems directly from pM *ts'ikin. The third, proto-Yucatecan *tʃ'ik=ɓuul 'groove-bill ani', is excluded because it is likely onomatopoeic, according to Yucatec speakers consulted and other authors, and also, because of the potential for folk etymology based on

[18] Justeson et al. (1985:23, Table 10) noted the presence of this loan in Yucatecan and in Ch'olti' (Ch'olan).

proto-Yucatecan *tʃʾik 'flea' from proto-Mayan *k'aq 'flea', an association that makes it difficult to assess whether the prepound *tʃʾik= is in fact relatable to pM *ts'ikin.

Table 5 captures the general contexts where one finds pYu *tʃ(') from pM *ts('). These are not claimed to be conditioning factors, but merely a characterization of distribution showing root and stem shapes and immediately adjacent segments. **Table 6** captures the general contexts where one finds pYu *ts(') from pM *ts('). There appear to be four completely mutually exclusive contexts accounting for 18 of the etyma in **Table 4**: no cases of pYu *tʃ(') from pM *ts(') appear in disyllabic, CaC, CVVC, or C_1VC_1 (C_1 = ts(')) roots/stems. Item #17, pYu *tsoʔ, shows a short vowel in Yucatecan, but it likely exhibited a long vowel in pre-Yu (i.e. *tsooʔ) given pM *(ʔax=)tsooʔ (cf. rule #6, pM *CV:ʔ > pYu *CVʔ, by Justeson et al. (1985:15)). Similarly item #34, pM *ts'uunuʔn, is reconstructible as pYu *ts'unuʔn. If CVVC roots or /VV/ inhibited the putative *ts(') > *tʃ(') change, such a change would have occurred prior to the change of pre-Yu *=tsooʔ > pYu *tsoʔ and *ts'uunuʔn > pYu *ts'unuʔn, and thus, allow for a pre-Yu timing.

Table 5. Summary of contexts of cases that exhibit proto-Yucatecan *tʃ(') from proto-Mayan *ts('). Item #4 is likely an areally (Greater Lowland Mayan) diffused term of unclear source. Items #1 and #7 (likely loans borrowed with *tʃ and *tʃʾ, respectively) are excluded.

pM	#	Contexts	Etyma	Total cases
*ts, *ts'	1	#__	2, 3, 4, 5, 6, 8, 10	7
*ts, *ts'	2	CeC	2, 3, 8	3
*ts, *ts'	3	CVʔC	1, 3, 6, 9	4
*ts, *ts'	4	CoC	4, 10	2
*ts, *ts'	5	CuC	5, 6	2
*ts	6	CVhC	5	1
*ts, *ts'	7	ʔ__	9, 1	1
*ts'	8	__#	9, 1	2

Table 6. Summary of contexts of proto-Yucatecan *ts(') from proto-Mayan *ts('). Cases in bold letters are those proposed to be inhibiting factors to a possible *ts(') > *tʃ(') shift. Last column points to overlapping environments arguing against a shift.

pM	#	Contexts	Etyma	Total cases	Overlaps
*ts, *ts'	1	#__	11, 13, 14, 15, 17, 18, 19, 20, 23, 24, 25, 26, 29, 30, 31, 34, 35	17	many
*ts, *ts'	2	__#	12, 15, 18, 22, 27, 28, 32, 33, 35, 36, 37, 38	12	many
*ts, *ts'	3	CuC	19, 20, 22, 34, 35, 36, 37, 38	8	2 with 5 1 with 8
*ts, *ts'	4	CiC	11, 12, 23, 24, 25, 26	6	1 with 5 3 with 6
*ts, *ts'	5	**CaC**	14, 15, 16, 28, 29, 30	6	1 with 5 1 with 7/8
*ts, *ts'	6	CoC	17, 18, 31, 32, 33	5	1 with 7 1 with 8

					1 with 6
*ts, *ts’	7	**Disyllabic**	11, 16, 19, 34	4	1 with 1 1 with 2 1 with 3 1 with 7
*ts, *ts’	8	CVhC	23, 24, 25, 31	4	3 with 2 1 with 4
*ts	9	**CVVC**	15, 17, 34	3	1 with 3/8 1 with 4 1 with 5
*ts	10	**C_1VC_1** with C_1 = ts or ts’ (not both within same root due to constraints against homorgraphic oral/glottalized obstruents within same root)	15, 18, 35	3	1 with 3/7 1 with 4 1 with 1
*ts, *ts’	11	*CeC*	13, 27	2	none
*ts	12	V__V	16	1	
*ts (*ts’)	13	ʔ__	18 (28, 35)	1 (3)	
*ts’	14	h__	36?	1?	

C_1VC_1 roots/stems, which accounts for a mere 3/27 cases that did not experience the shift, constitute the only context that can readily be explained as constraint against the presumed change: in such roots (i.e. *tsVts or *ts’Vts’ roots), a change such as *tsVts > *tʃVts* or *tsVtʃ*, or *ts’Vts’ > *tʃ’Vts’* or *tsVtʃ’*, would be precluded by co-occurrence constraints known from a wide variety of Mayan languages, and specifically from Yucatecan languages (e.g. Straight 1972).[19] And while it is possible that /a/ in CaC roots would have inhibited palatalization, it is not clear why /o/ or /u/ would have promoted it. Nor is it clear why cases of /VV/ or why disyllabic stems would have inhibited it. Overall, these constraints seem phonologically unmotivated and arbitrary. Furthermore, this listing of four seemingly inhibiting contexts is not the whole story: 9/27 of the cases of pYu *ts(’) < pM *ts(’) do not abide by such contexts (e.g. #12, #20, #22, #26, #36, #37, #38, etc.), and many examples show overlapping contexts with some of the cases of pYu *tʃ(’) < pM *ts(’), including cases that occur in the same position and adjacent to the same vowels (e.g. #5 and #6 vs. #19, #20, etc.).

In other words, it is not very likely that we are dealing with a regular sound change. Another explanation must be sought.

5. Borrowing Alternative

[19] Straight (1972:59–60) has proposed four constraints on the consonants present in a CVC root in Yucatec. I have divided his final constraint into two, and reworded all the constraint for present purposes as follows: a) if the root is of $C'_1VC'_2$ shape, the C'_1 and C'_2 are identical; b) if the root is of C'_1VC_2 or $C_1VC'_2$ shape, the two consonants must differ in place of articulation, manner of release (occlusive vs. strident), or both; c) if the root is of S_1VS_2 shape, composed of non-ejective stridents (S = /s ts ʃ ch/), then $S_1 = S_2$ must hold; d) if the root is of CVw shape, then V must be unrounded (V = /i e a/); and e) if the root is of CVy shape, then V ≠ /i/.

In the previous section it was suggested that Yucatecan *tʃ'ihtʃ' 'bird' could be a loan from Huastecan. Could other forms in which Yucatecan exhibits *tʃ(') as an apparent reflex of pM *ts(') also be loans instead? At first glance, this does not seem likely: pM *tseʔh 'raw' is reflected as Huastec *tehtej*; pM *tseʔ 'laughter', more specifically pM *tseʔ.e.Vn 'to laugh', is reflected as Huastec *teʔen*; and pM *tsuhh 'gourd (tecomate)' is reflected as Huastec *tuʔ*. Such forms evince /t/ as a Huastecan reflex of pM *ts. Otherwise, reflexes of pM *q'oʔts (#1), *tsuj (#), pM *ts'in (#), pM *meʔts' (#) do not appear to have survived in Huastecan at all. Thus, it would seem that Huastecan bears no connection to the current dilemma, for it has experienced a regular change of pM *ts > t (Kaufman 1980, 1985; Norcliffe 2003). Nonetheless, a closer look at the evidence compiled by Norcliffe (2003:53–56) could suggest an alternative.

Before doing so, two important points about Huastecan phonological history are worth reviewing. First, the Proto-Huastecan phonemic inventory is reconstructed as follows (Kaufman 1980, 1985; Campbell 1988; Norcliffe 2003): /p b t t' tj tj' tʃ tʃ' k k' kw k'w ʔ m n s ʃ h l w j i(i) e(e) a(a) o(o) u(u)/. **Table 1** provides the basic reflexes of pM sounds in Huastecan, allowing for a close comparison with the reflexes of the same sounds among the Yucatecan languages.[20] And second, I follow several prior authors who support an early separation of Huastecan from the rest of Mayan, and further, that several of the seemingly shared innovations between Huastecan and other subgroups, especially Western Mayan, are either too cross-linguistically common to be diagnostic (e.g. *q(') > k('), *r > j), or exhibit different constraints or conditions (e.g. *k(') > tʃ(')), pointing to independent developments (Kaufman 1976, 1980, 1985, 2015; Campbell 1988, 2017; Norcliffe 2003; Kaufman and Justeson 2008, 2009). Kaufman (2017, 2020) has argued that some of these similar but likely independent developments were prompted by Mayans from different subgroups (e.g. Huastecans, Greater Tzeltalans, Yucatecans) and at different points in time migrating into regions where already established inhabitants spoke non-Mayan languages that lacked */q(')/, */r/, among other phonemes present in proto-Mayan (e.g. */ŋ/).

With this in mind, it is now possible to return to the feasibility of Huastecan as the source of the Yucatecan etyma of interest here. As seen in **Table 7**, items #39–#44, collected form Norcliffe (2003:53), provide evidence for a change of pM *ts > Huastecan t, based on data from Kabil, Veracruz Huastec, and Potosino Huastec. Several of these etyma are of relevance to the Yucatecan change of interest here (cf. #39, #43, #44), but as already noted, the Huastecan correspondence of *t does not seem to offer a viable explanation for the Yucatecan correspondence of *tʃ. Interestingly, though, the reflexes of pM *ts' in Huastecan, also discussed in detail by Norcliffe (2003:53–56), are more complex, and could offer insight into the phenomenon at work.

Table 7. Huastecan data for pM *ts(') > Huastecan *tʃ'* and *ts'* and *t(')*. pM reconstructions are drawn from Kaufman with Justeson (2003). Huastecan transcriptions are normalized to follow conventions for transcription of Guatemalan Mayan languages except <θ> for [θ]. The proto-Huastecan reconstructions are by Norcliffe (2003:172, 177, 183, 186, 189, 204).

Item #	pM	Kabil	Veracruz Huastec	Potosino Huastec	proto-Huastec(an)	Yucatecan
39	*tsuhh 'gourd'	—	tuʔ	tuʔ	—	*tʃuhh
41	GLL #tsoʔn 'body hair'	tom	toom 'zacate'	toom 'zacate'	*tom 'grass'	*tʃoʔm 'pubic hair'

[20] Kaufman (1985) has presented evidence suggesting that pM *ɓ may have been retained as an implosive in proto-Huastecan.

42	*tsima(h) ‘gourd’	—	timaʔ	timaʔ ‘gourd cup’	—	—
43	*peets or *peety ‘turtle’	petpet	pet	pet	*pet	—
44	*tseʔ ‘laughter’	—	teʔen	teʔ-n-al	—	*tʃeʔe(h/x)
45	*tseʔh ‘raw’	—	tehtej	tehtej	—	*tʃeʔh
46	*ts’ikin ‘bird’	tʃitʃin	tʃ’itʃin	ts’itsin	*tʃ’itʃin ‘bird’	*tʃ’ihtʃ’ ‘bird’ (Table 3, #7)
47	GLL+ #ts’eh(-el) ‘sideways; on the side’	tʃehet ‘thigh’	tʃ’ehet ‘whole leg’	ts’ehet ‘leg’	*tʃ’ehet ‘leg’	—
48	*ts’ihn ~ *ts’iin ‘cassava’	<tzinté> [21](me: probably /tʃ’inteʔ/)	t’intseʔ (expected t’inteʔ); t’inse’ in SIL n.d.:67	t’intʃeʔ (expected t’inteʔ) KJ 2003:1090 show t’in=tjeʔ	*tʃ’inte(ʔ) or *t’inte(ʔ)	*ts’ihn ‘yuca’ (Table 4, #25)
49	*ts’usuɓ ‘grape’	—	t’uθub	t’uθub ‘mountain grape’	—	—
50	*ts’uhuum ‘skin, leather’	tul	t’uʔ ‘flesh of the body’ (t’uʔ- ‘flesh’, t’uʔ-lek ‘meat’)	t’uuʔ ‘naked child, plucked chicken’, t’uʔ-uul ‘meat’	*t’uʔ-	—
51	*ʔaʔts’aam ‘salt’	et em	at’em	at’em	*at’em	—
52	*soots’ ‘bat’	sot	θut’	θut’	*sot’	*soots’ ‘bat’ (Table 4, #33)
53	*muts’ ‘close.eyes’	—	—	mut’uhual; mut’.uw (Kaufman with Justeson 2003:1243)	—	*muts’ ‘close eyes’ (Table 4, #37)
*54	*q’oʔts ‘cheek’		k’ut’uw ‘swallow’	k’ut’umtal ‘throat’		*k’oʔtʃ ‘throat’ (*11)

Before exploring this possibility, a disclaimer is needed: the Kabil sources do not consistently represent the distinction between glottalized and unglottalized obstruents, short and long vowels, or the presence of /ʔ/, for which Huastec sources and additional comparative Mayan data must be used instead.

Now, there are three relevant patterns (Norcliffe 2003:53, 54):

1) a correspondence of Kabil <t> to Veracruz Huastec /t/ to Potosino Huastec /t/ from pM *ts;

[21] Norcliffe (2003:164) notes with regard to Termer’s and Sapper’s transcriptions of Kabil that “Cases of <tz> are generally č misheard.”

2) a correspondence of Kabil <ch> to Veracruz Huastec /tʃʾ/ to Potosino Huastec /ts'/ from pM *ts'; and

3) a correspondence of Kabil <t> to Veracruz Huastec /t'/ to Potosino Huastec /t'/ also from pM *ts'.

Norcliffe (2003:55–56) proposes that the second correspondence applies to situations adjacent to front vowels, and also that the third correspondence of /t'/ : /t'/ : /t'/ applies to contexts adjacent to non-front vowels (cf. #46, #47), with the apparent exception of #48, the term for 'cassava'. However, upon closer inspection, the case of #48, a compound of Huastecan reflexes of pM *ts'ihn 'cassava' and pM *tjeeʔ 'tree', turns out not to be an exception. With regard to the first segment of the compound, Kabil bears <ch> for /tʃʾ/, while Veracruz Huastec and Potosino Huastec bear /t'/. In these examples, the reflexes of the *tj of pM *tjeeʔ appear in Kabil as <t>, Veracruz Huastec as /ts/ and Potosino Huastec as /tʃ/, in which case both Veracruz and Potosino deviate from the expected proto-Huastecan reflex, *t (Norcliffe 2003:51–52). Norcliffe (2003:55) explains that this could be the result of a co-occurrence constraint in Huastecan, whereby the first two obstruent consonants in the earlier forms *tʃ'inteʔ* (Veracruz) and *ts'inteʔ* (Potosino), as expected before front vowels, would have experienced metathesis with the first consonants of the compound, resulting in *t'intseʔ* and *t'incheʔ*, respectively, to avoid the dispreferred co-ocurrence combinations *ts'_t* (Veracruz) and *tʃ'_t* (Potosino). The metathesis in question would have involved only the oral articulations, but not the ejective (glottal constriction) articulation. A similar process is also documented in two Ch'ol roots (Mora-Marín 2021b): *ʔejk'atʃ* 'fingernail' from proto-Ch'olan *ʔehtʃʾäk ~ *ʔihtʃʾäk, and *ʔik'ot* 'with' from proto-Ch'olan *ʔit'ok. In other words, the expected form in proto-Huastecan would have been *tʃʾinteʔ, prior to metathesis, given the change of pM *tj > Huastecan *t* in the root for 'tree', pM *tjeeʔ > proto-Huastecan *teʔ, so that Norcliffe's generalization regarding the conditioning environments for the two correspondence sets stands.

Norcliffe's (2003:55–56) hesitation to put forth a more formalized account of a change of *ts' > tʃʾ > t' is the result of what she considers to be alternative explanations. In the case of #46, proto-Mayan *ts'ikin > proto-Huastecan *tʃʾitʃin 'bird', she also points to a possible co-occurrence constraint that may be at work. In particular, she states (2003:55): "it should be noted that there are no instances of the occurrence of *t'* followed by *tʃ* in [Veracruz Huastec] and *t'* followed by *ts* in [Potosino Huastec] in the data I have at my disposal," which she says would suggest "that there is a constraint on the co-occurrence of these consonants." She continues: "This may account for the actual reflexes of **ts'ikin." In other words, she is suggesting that the presence of /tʃʾ/ in Kabil and Veracruz Huastec, and of /ts'/ in Potosino Huastec, in this etymon, could be the result of a constraint against the otherwise more common Huastecan reflex of pM *ts', /t'/, in co-occurrence with a following /ch/ in the same root or syllable.

Nevertheless, even if such a co-occurrence constraint were at work, there is another way to think about it: it is possible to propose that Huastecan first experienced the change of pM *ts' > tʃʾ in this root, resulting in *tʃʾitʃin, after the change of pM *k > tʃ, and that it did not continue with the expected shift to /t'/ precisely because of said constraint against the co-occurrence of /t'/ (or [t']) and /tʃ/. Put a different way, perhaps the complete shift to /t'/ was blocked by the co-occurrence constraint, preserving instead the intermediate stage. If so, phonologically, the [tʃʾ] or [ts'] of 'bird' in Huastecan today would constitute an allophone of /t'/ conditioned by such constraint, from a synchronic perspective, but such synchronic state would be the result of the historical phonology of pM *ts' in Huastecan.

Norcliffe (2003:55) further lessens support for the change of *ts’ > tʃ’ before front vowels by noting that Kaufman’s pM reconstruction of the second example, #47, “may not be not [sic] based on enough Mayan languages to produce an accurate reconstruction,” adding that “Huastecan ‘thigh’ is not semantically identical to the meaning of the [proto-Mayan] word ‘side, flank’, so it is possible that they are not actually cognate.” In fact, Kaufman with Norman (2003:241) reconstruct this etymon as an areally diffused term, GLL+ #ts’eh.el ‘on the side, sideways’, and cite Huastec *ţ’eheel-tal* ‘zenit’, a derived abstract noun (cf. *-tal* ‘abstractivizer’), as related. Despite the fact that Kaufman no longer reconstructs this particular etymon to pM, the Huastec form, assuming borrowing, reflects the expected sound change from an earlier *ts’: thus, even if borrowed, it would seem that it was borrowed prior to the change of *ts’ > tʃ’ > t’, and it would support the proposition that the shift did not advance fully prior to front vowels.

A last observation in connection with Norcliffe’s reservations pertains to #48, ‘yuca’. Even though she included this etymon among the set of etyma that illustrate the shift of pM *ts’ > proto-Huastecan *t’, given the foregoing discussion, and the fact that she offers two alternative reconstructions, *tʃ’inteʔ and *t’inteʔ, it is possible that this is another case of the intermediate stage of *ts’ > tʃ’. The Huastec forms *t’intseʔ* and *t’intʃeʔ* may be analyzed as /ts’inteʔ/ and /tʃ’inteʔ/, respectively. Similarly, the Kabil form <tzinté> can be analyzed as /tʃ’inteʔ/, keeping in mind that <ts> typically corresponds to /tʃ/ (or in this case, due to the typical undermarking of glottalization, /tʃ’/), and that final glottal stops were also seldom marked, as explained by Norcliffe (2003:14, 36, 55, 164). Thus, Norcliffe’s first alternative reconstruction, *tʃ’inte(ʔ), now revised to *tʃ’inteʔ, is the more likely reconstruction. Again, as with the case of #46 ‘bird’, perhaps *tʃ’ was the result of an intermediate stage of the shift of pM *ts’ > pre-Huastecan *tʃ’ > proto-Huastecan *t’. However, unlike the case of #46 ‘bird’, there is no co-occurrence constraint that would have prevented the further shift of a pre-Huastecan *tʃ’ to proto-Huastecan *t’ in #48 ‘yuca’, at least not based on Norcliffe’s (2003:21) data, which does not list a constraint on the co-occurrence of *t’-t* within the same CVC root or sequence. Consequently, this case provides support for Norcliffe’s initial suggestion of a conditioning factor: pM *ts’ > tʃ’/__V[+front], pM *ts’ > t’/elsewhere. In fact, given this, it is possible that Huastecan experienced the change as follows: pM *ts’ > pre-Huastecan *tʃ’ in all environments, followed by pre-Huastecan *tʃ’ > t’ adjacent to non-front vowels. From this perspective, the change of pM *ts > proto-Huastecan *t may have exhibited a parallel development, raising the possibility that it too underwent an intermediate stage of pM *ts > pre-Huastecan *tʃ, after which pre-Huastecan *tʃ > proto-Huastecan *t. But unlike the case of pM *ts’ > pre-Huastecan *tʃ’ > proto-Huastecan *t’, for which there is direct evidence among etyma with front vowels for an intermediate stage, in the case of pM *ts > proto-Huastecan *t there is no such direct evidence, as the change was fully generalized.

A clarification regarding the reflexes of pM *ts’ in Huastecan is warranted here, specifically, regarding cases of the correspondence of Kabil <ch> (and some <tz>) to Veracruz Huastec *tʃ’* to Potosino Huastec *ts’* from pM *ts’ in #46 and #47, as in **Table 7**. It might be tempting to suggest that Potosino Huastec inherited pM *ts’ intact in such examples, and that Kabil and Veracruz Huastec innovated *tʃ’*. Nevertheless, in addition to other lines of evidence that point to Kabil as distinct from the other varieties, the Colonial documentation of Potosino Huastec, discussed by Kaufman (1980, 1985), points to Potosino sharing *tʃ’* with the other Huastec varieties until ca. 1600 CE, after which Potosino experienced the change of pM *tʃ(’) > ts(’); this change affected some instances of pM *ts’ > pre-Huastecan *tʃ’ that did not shift to proto-Huastecan *t’, specifically those before front vowels (items #46 and #47).

A quick glance at #54 (**Table 7**) is warranted now. This set, I propose, provides the Huastecan (Potosino Huastec) and Yucatecan reflexes of pM *q'oʔts 'cheek'. The correspondences are consistent, with one minor deviation: typically, pM *ts > Huastecan *t, but the root *k'ut'*- shows *t'* instead of the expected *t*. Nevertheless, Kaufman with Justeson (2003:261) show a reflex of pM *q'oʔts for Uspantek as *q'oots'* that, together with the cases of Veracruz and Potosino Huastec *k'ut'*-, suggests that it is possible that the final /ts/ may have become glottalized due to the preceding glottal stop. The Uspantek form is consistent with the Greater K'ichee'an merger of *CVʔC, *CVVC > CVVC (later > CVC in many individual languages): after glottalization of the final consonant, the preconsonantal glottal stop disappeared. Similarly, in Huastecan, pM *ʔ > Ø/__C# except when the final consonant was a reflex of pM *ŋ. Like Uspantek, Huastecan may have experienced glottalization of the final consonant due to assimilation to the preceding glottal stop, after which that glottal stop disappeared. This is where things get interesting: while pM *q'oʔts may be reconstructed as 'cheek' based on the reflexes in Greater Q'anjob'alan and Eastern Mayan, which agree on precisely such gloss, both Huastecan and Yucatecan agree on 'throat'. Although it is possible that this could have been an independent semantic shift 'cheek' > 'throat', it seems peculiar enough to support the possibility that Yucatecan *k'oʔtʃ may have borrowed a pre-Huastecan form **k'oʔtʃ, prior to the glottalization of the final consonant (> **k'oʔtʃ'), the *ʔ > Ø change (> **k'otʃ'), the *tʃ' > t' change (> **k'ot'), and also the *o(o) > u change (> *k'ut'). The last step relates to cases of pM *o(o) appearing as *u in Huastec (Norcliffe 2003:95; Mora-Marín 2021a). The idiosyncratic shift from 'cheek' to 'throat', likely a case of intrafield metonymy, supports a connection between the Yucatecan term and the Huastecan term.

Finally, if pre-Yucatecan speakers were in contact with pre-Huastecan speakers, at a stage following the changes of pM *ts > pre-Huastecan *tʃ and pM *ts' > pre-Huastecan *tʃ', but preceding the subsequent changes of pre-Huastecan *tʃ > t in all environments and pre-Huastecan *tʃ' > t' next to non-front vowels, they *could* have borrowed not just *tʃ'itʃ 'bird' (as pYu *tʃ'ihtʃ'), but all etyma exhibiting Yucatecan *tʃ(') from pM *ts('), except for #1 'coati', borrowed from a Mije-Sokean language. This could potentially have included item #41 in **Table 7**, proposed by Kaufman with Justeson (2003:292) to be a GLL innovation, as #ts'oʔn 'body hair', which, if once present in Huastecan, would be expected to appear as /tom/ or /toom/, possibly /tum/ or /tuum/ —recall that some cases of pM *o(o) appear as *u in Huastec (Norcliffe 2003:95; Mora-Marín 2021a). Indeed, a quick search of Norcliffe's dataset yielded an item that she reconstructs as proto-Huastec(an) *tom, glossed as 'zacate (grass)' in the varieties that she documented. Given the gloss 'moss, pubic hair' for proto-Ch'olan *tsun by Kaufman and Norman (1984:134), it seems entirely plausible that this Huastecan etymon, perhaps better reconstructed as *toom, may be related, and reconstructible to pre-Huastecan **tsoʔm > *tʃoʔm, which could have served as the source for Yucatecan *tʃoʔm. Later, this late pre-Huastecan form, *tʃoʔm, would have changed to proto-Huastecan *toom, as discussed below in connection with possible cases of compensatory vowel-lengthening following the loss of preconsonantal /ʔ/.

What matters here is that the Huastecan changes were regular and motivated, whereas the proposed Yucatecan shift of pM *ts(') > tʃ(') requires too many, seemingly unmotivated, inhibiting constraints, which operated in the majority of the vocabulary with pM *ts('), not to mention that some such cases are characterized by overlapping contexts with respect to some of the items that exhibit *tʃ(') from pM *ts('). Thus, the Huastecan sound changes offer a more solid basis as the source of the Yucatecan etyma, despite the fact that Huastecan lacks cognates for several of the relevant cases of the shift in Yucatecan (perhaps due to loss and replacement by other etyma), as well as the lack of direct evidence of a change of pM *ts > pre-Huastecan *tʃ > proto-Huastecan *t, initially parallel to, but eventually becoming more generalized than, that of pM *ts’ > pre-Huastecan *tʃ’ > proto-Huastecan *tʃ’ (front vowels) ~ *t’ (elsewhere).

If borrowing is assumed, another question remains: are there clues as to the relative chronology of the process? If the Yucatecan etyma in question are loans from Huastecan, they appear to show a uniform result in the Yucatecan languages, and is thus traceable to a pre- or proto-Yucatecan stage. But what about their proposed Huastecan sources? First, two major Huastecan sound changes would have preceded the borrowing of these etyma by Yucatecans:

1) pM *k(’) > Huastecan *tʃ(’)
2) pM *ts(’) > pre-Huastecan *tʃ(’)

Second, several Huastecan sound changes discussed by Norcliffe (2003) would have followed the diffusion of these loans into Yucatecan, specifically:

1) (pM *ts >) pre-Huastecan *tʃ > proto-Huastecan *t;
2) (pM *ts’ >) pre-Huastecan *tʃ’ > proto-Huastecan *t’ (adjacent to non-front vowels);
3) pM *h > ʔ/__#;
4) pM *h > Ø/__C#;
5) pM *s > proto-Huastecan *s > Huastec *θ;
6) pM *ʔ > Ø/__C#;
    a. pM *Vʔ > VV[+front]Ø/__C#;
    b. pM *Vʔ > V[-front]Ø/__C#;
7) pM *h > ʔ/a,u__#.
8) Some pM *o(o) > Huastec u

Changes 6a and 6b are only tentatively suggested by Norcliffe (2003:69–70) based on reflexes of pM *k’iʔʃ ‘thorn’, pM *k’eʔn ‘cave’, pM *raʔʃ ‘green’ (cf. Kaufman with Justeson 2003:225, 432, 1041): the first is attested as *k’iiθ* in Veracruz and Potosino Huastec; the second as *tʃ’een* in Veracruz Huastec and *ts’een* in Potosino Huastec; and the third as *jaʃ=* in Veracruz and Potosino Huastec. Example #41 in **Table 5**, reconstructed as proto-Huastecan *tom by Norcliffe, is attested as *toom* in both Veracruz and Potosino Huastec, which could support a proto-Huastecan *toom instead. If this etymon is in fact related to GLL #tsoʔn ‘body hair’, as suggested above, it is possible that it could be another case of change 6a, more generally notated as pM *Vʔ > VVØ/__C#, and it would widen the environment for such change to a preconsonantal glottal stop following a non-low vowel, pM *Vʔ > VV[-low]Ø/__C#. Change 7 is poorly constrained: it was proposed by Norcliffe (2003) based on three examples, but only with confidence for one of the examples. Nevertheless, in one of the three cases, reflexes of pM *k’ah ‘bitter’, the change appears to be present in Chicomuceltec as well as in the Huastec varieties: Kabil <cheec>, Veracruz Huastec *ts’aʔik*, and Potosino Huastec *ts’aʔik*.[22] This means that if Yucatecan speakers borrowed any etyma from Huastecan that eventually experienced such a change, they would have done so during pre-Huastecan times, before proto-Huastecan experienced the change.

[22] Norcliffe (2003:) clarifies that the *ts’* in the Veracruz Huastec form is unexpected; *tʃ’* would have been expected instead. She suggests sound symbolism as a possible cause.

6. Discussion and Implications

6.1. Other Huastecan loans in Yucatecan

These are not the only etyma suggestive of diffusion involving Yucatecan and Huastecan, as seen in **Table 8**. Another example is #54, pYu *peek’ (e.g. Yucatec *pèek’* ‘dog’) and Huastec *pik’oʔ* (*ʔu piikw’-al* ‘my dog’) (Edmonson 1988:370), both in turn borrowed from Sapotek *peʔkku, ultimately from Mije-Sokean *ʔuku (Kaufman with Justeson 2003:574). In this case, Kaufman (2020:179) suggests that Yucatecan did not borrow the etymon from Huastecan, but from Sapotek; he notes other etyma borrowed into at least Yucatec from Sapotek, namely, proto-Sapotek *mma=niʔ ‘animal’ borrowed as Yucatec <manik> ‘dayname deer’ (also in Ch’ol <manich> ‘dayname deer’), as well as Sapotek <lapa> ~ <laba> /lapa/ ‘day name (corresponding to Venus)’ borrowed into several Mayan languages as <lam(b)at> for the same day name (Justeson et al. 1985:21). Another possible instance of diffusion between Yucatecan and Huastecan involves #55, Yucatecan *ʔoot’* and Huastecan *ʔoot’* ~ *ʔot’-ool*, both ‘cuero, piel, pellejo’ (Kaufman with Justeson 2003:375).

Table 8. Additional lexical evidence of diffusion between Yucatecan and Huastecan. Huastecan data are from Norcliffe (2003) unless otherwise stated. Square brackets enclosing proto-Mayan forms indicate the Huastecan and Yucatecan forms are unrelated.

Item #	pM	Huastecan	Yucatecan
54	[*ts’iʔ ‘dog’]	Kabil: Veracruz Huastec: — Potosino Huastec: pik’oʔ, piikw’-al ‘dog’	Yucatec: *pèek’* ‘dog’ Itzaj: *pek’* ‘dog’ Mopan: *pek’* ‘dog’ Lacandon: *pek’* ‘dog’
55	[*ts’uhuum(-aal) ‘skin’]	Kabil: otol Veracruz Huastec: ot’ool ‘lips’ Potosino Huastec: oot’ ‘skin, peel’	Yucatec: *ʔòot’(-el)* ‘skin’ Itzaj: *ʔot’(-el)* ‘(person’s) skin’ Mopan: *ʔot’(-el)* ‘skin’ Lacandon: *ʔoot’(-er)* ‘skin’
56	[*ts’iʔ ‘dog’]	Kabil: sul Veracruz Huastec: — Potosino Huastec: θulul ‘tepechiche’	ColYuc: <tzul> ‘domestic dog’
57	[*ts’iʔ ‘dog’] [*ʔoʔq ‘coyote’]	Huastec *ʔok* ‘fox’ (K1980:104), possibly from pM *ʔoʔq ‘coyote’, but more likely from Mije *ʔok < pMZ *ʔuka ‘dog’	ColYuc: <oc> ‘dog’ (K1980:104)
58	—	Potosino Huastec: k’ak’aθ ‘ugly’ (KJ2003:142–143)	Yucatec: *k’àas* ‘bad, ugly’, *k’as* ‘somewhat’, *k’àak’as* ‘evil; poisonous’ Itzaj: *k’as* ‘bad, ugly, deformed’, *k’ak’as* ‘rather bad’ Mopan: *k’as* ‘dirty, stained, ugly, bad; trash’, *k’ak’as* ‘very bad; bad, evil’ Lacandon: *k’aas* ‘bad’, *k’aak’as* ‘bad’ Also: Ch’orti’: *k’as* ‘bad’

The case of Colonial Yucatec <tzul> is interesting, and possibly relevant to the change of pM *s > proto-Huastecan *s > Huastec *θ. It is attested in Kabil as <sul> and in Potosino Huastec as *θulul*. Norcliffe (2003:45) argues that Kabil had /s/, retained from pM *s, not /θ/. She does note that there are “two exceptions” to this correspondence, “where <tz> is transcribed for the Kabil form,” but also adds that “In both cases there are alternative transcriptions with the expected *s*,” and concludes that these were likely cases of “mishearing” on the part of the transcriber. The cases in question are <tzam> ‘nose’, also transcribed <sam>, and <tzuk’u> ‘salty’, also seemingly transcribed <sucu>. Nevertheless, it is worth considering the possibility of variation: perhaps Kabil speakers were producing /s/ variably as [s] and [ts], at least word-initially, and if so, Colonial Yucatec <tzul> may have been an adaptation of proto-Huastecan *sul based on a pronunciation [tsul]. But this is not a definitive assessment, for it is also possible that Yucatecan speakers, with no native /θ/, may have perceived Huastec /θ/ as [ts]. This is certainly worth further research.

Pache et al. (2016:396) have noted that the term is attested in Atakapan as <cul> for *ʃul*. Based on this, they propose Atakapan > Huastecan diffusion, certainly an exciting possibility. Nevertheless, not only is the term attested in Colonial Yucatec as <tzul> ‘dog’, as already explained, but there is also evidence of very similar terms in languages to the south of the Mayan region: Sumu and Ulúa (Misumalpan) bear *sulu* ‘dog’, Misquito (Misumalpan) bears *jul* ‘dog’ (<j> = IPA [j]), Honduran Lencan (Lencan) bears *suj* ‘dog’ (<j> = IPA [j]), Salvadoran Lencan (Lencan) bears *ʃúʃù* ‘dog’, and Paya/Pech (Chibchan) bears *ʃuʃu* ‘dog’, these last two examples probably showing reduplication (Constenla Umaña 2002:31–32, 2005:63). Such wide distribution, and the possibility of sound symbolism being also at play, makes this etymon an unreliable trait to attempt to establish direction of diffusion. Moreover, Kabil, with <sul>, and the Misumalpan languages, with *sulu*, are both close to the area of Yucatecan speech. It thus constitutes a pan-Middle-Americanism.

In addition, Kaufman and Justeson (2008:16) outline a scenario in which an early Mayan language in the general geographic position of contemporary Huastec varieties served as the source of loans into a variety of non-Mayan languages of Tamaulipas and northern Veracruz as well as the Basin of Mexico, and furthermore, such loans are characterized by correspondences pointing to a stage prior to most of the changes undergone by proto-Huastecan, and therefore pointing to a pre-Huastecan stage. **Table 9** provides the evidence for such early loans. These loans include etyma with reflexes of pM *r (#1), *ŋ (#2), *ts’ (#3), *k (#4, #5, #6), *q (#7, #8, #9) that had not yet experienced the changes that characterize proto-Huastecan, including the change of pM *ts’ to pre-Huastecan *tʃ’ to proto-Huastecan *tʃ’ ~ *t’ of relevance here. Since no other Mayan language besides Huastec is known to have been in Veracruz, the most likely explanation is that it was a pre-Huastecan language that served as the source of these early loans. Given that Huastec and Kabil are very closely related, separating around the beginning of the Postclassic period, and given that the loans in **Table 9** presuppose a pre-Huastecan language, the more likely scenario, according to Kaufman and Justeson (2008), is that Kabil migrated south, arriving in the Grijalva Basin, late, by the beginning of the Postclassic period, following the intrusion of Totonacans into the Gulf Coast lowlands.

Table 9. Loans from Huastecan into languages of northern Veracruz, Tamaulipas, Coahuila, and the Basin of Mexico. Baed on Kaufman with Justeson (2003), Kaufman and Justeson (2008), and Kaufman (2020).

	Non-Mayan languages	Huastecan	proto-Mayan	Chronology
1	Yemé (Comecrudo) <jat> ‘how many?’ Pajalat <jat> ‘how many?’	Huastec *xaaj*	pM *xar(-uɓ) ‘home many?’	pM *r had not yet shifted to proto-Huastecan *j

2	P'urhepecha <xanhá-ra-ni> 'to walk', <xanhá-ri> 'road'	Huastec *ʃeʔ*	pM *ʃaŋ 'to walk'	pM *ŋ had not yet become a proto-Huastecan *w, *x, *j, *ʔ
3	proto-Oto-Pamean *tsoa-tsʔ 'bat'	Huastec *θut'*, Huastecan *sot'	pM *soʔts' 'bat'	pM *ts(') had not yet become proto-Huastecan *t(') pM *s had not yet become proto-Huastec *θ
4	Yemé (Comecrudo) #kamaw 'to die'	Huastec *ʈam ~ ʈem* 'to die'	pM *kam 'to die'	pM *k(') had not yet become proto-Huastecan *tʃ(')
5	P'urhepecha *kapárhi* 'bumblebee', <kapári> 'large hive', <kapá-r(h)i> 'large bee'	Veracruz Huastec *tsap=ʈam* 'a kind of bee', Potosino Huastec *tʃab=tʃam* 'bee'	pM *kaaɓ 'bee'	
6	P'urhepecha <khamé-ri> 'bitter'	Huastec *ʈ'aʔik* 'bitter' < proto-Huastecan *tʃ'aʔik	pM *k'ah 'bitter'	
7	Totonac: XCT *cha:ʔqa:ʔt* 'chaca cuerudo, palo mulato'	Huastec *ʈakax*	pM *kaqaax 'gumbolimbo tree'	pM *q(') had not yet become proto-Huastecan *k(')
8	Totonac: XCT *a:ʔqe:ʃtu* 'guásima, olmo', PAP *aqaʃiiʔ* 'palo de guácima'	Huastec *ʔakitj*	pM *ʔaqit 'pricklenut tree'	
9	Totonac: XCT *kuchúʔ* 'cotorra', PAP *qochuyu* 'cotorra'	Huastec *kuʈuʔ* 'parrot'	pM *qutʃ 'bent, crooked'	

Kaufman and Justeson (2008:16) also highlight that the Totonacan loans from Huastecan provide evidence of the pM *k(') > proto-Huastecan *tʃ(') shift, but at the same time reflect the retention of pre-Huastecan *q('). Based on this, those authors argue that "Speakers of pre-Wastekan were therefore in or near the Basin of Mexico and the northern coast of Veracruz before they began serious engagement with Totonakans" (2008:16). Furthermore, they note that "seventeen loanwords from Wastekan into Totonako" involve "names of lowland animals and plants," including items #7–#9 in **Table 9**, which strongly points to Huastecans having been established in the Gulf lowlands prior to the arrival of Totonacans (2008:18):

> In this case, it shows that Totonakos were foreigners in the Gulf lowlands who had lived almost exclusively in highland areas until they entered the lowlands. Furthermore, the recognized borrowings by Totonako from Wastekan consist exclusively of these plant and animal terms. This suggests no long-term interaction along a border, but rather the adoption of local plant and animal terms as Totonakos replaced Wastekos in parts of the lowlands.

Kaufman and Justeson (2008:18) conclude, on the basis of absence of evidence of grammatical and phonological influence of Huastecan on Totonacan, which would have been evidence of a more gradual process of absorption of a Huastecan substratum population after the arrival of Totonacans, plus the significant number of fauna and flora terms borrowed by Totonacans from Huatecans, that the evidence points to territorial displacement of Huastecans by Totonacans.

Support for the possibility that it was a pre-Huastecan language that served as the source of such loans is the fact that Huastecan bears evidence of multiple loans from several of the same languages, specifically Pajalat (Texas, Coahuila) and Yemé (Tamaulipas): "Four sibling and cousin terms were seemingly acquired by Wastekans from Pajalat (or a related language), since they have no cognates in other Mayan languages, and one for brother-in-law went the other direction" (Kaufman and Justeson 2008:15). Kaufman (1980:105–106, 2020:115) provides the details of these loans.

Additionally, Kaufman and Justeson (2008:12–13) have presented evidence for relative chronology of sound changes and loanwords involving proto-Sapotek and proto-Huastecan, seen in **Table 10**. The evidence, including the pattern of variation evident in the last example, where proto-Sapotek *kw was borrowed into Huastec as [p] and [kw], suggests contact between proto-Sapotek and proto-Huastecan prior to the completion of the regular sound change of proto-Sapotek *kw > p word-initially, estimated to have taken place no later than the end of the Classic period, since all subsequent varieties of Sapotek exhibit /p/ in that position. In their words, "This shows Sapoteko contact with Wastekan during the Classic Period or even earlier" (2008:13), since the variation between word-initial [kw] and [p] presumably lasted for a significant period of time.

Table 10. Loans from proto-Sapotek into Huastecan (Kaufman and Justeson 2008; Kaufman 2020). Additional Huastecan data from Edmonson (1988) and Kondić (2012).

	Non-Mayan languages	Huastecan	proto-Mayan	Chronology
1	proto-Sapotek *kwe+tsinaʔ 'deer'	bitjim 'horse' (< 'deer'), Potosino Huastec *bitʃim* 'horse', Veracruz Huastec *biţim* 'horse', Chicomuceltec <witim>	—	prior to change of pS **kw > *p(/#__)
2	proto-Sapotek *kweʔkku 'dog' < *kwe+Vʔkku borrowed from proto-Mije-Sokean *ʔuku	pik'oʔ 'dog'	—	prior to change of pS **kw > *p(/#__)
3	proto-Sapotek *kwe+ʃiːʔtsu	beʃeʔ 'coati'	—	prior to change of pS **kw > *p(/#__)
4	proto-Sapotek *kwetjak presumably originally 'fowl'	Potosino *piitaʔ* 'chicken' < 'fowl' Veracruz *kwitaʔ* 'chicken' < 'fowl'		*during* change of pS **kw > *p(/#__)

For now, what matters is that under the scenario posed here, a form of pre- or proto-Yucatecan would have borrowed 9 etyma from a form of late pre-Huastecan. Of these 9 etyma, only five have been retained in documented Huastecan languages; the remaining four ('tangled', 'to silence, stop', 'eyebrow', 'twist'), would have to be inferred as present in Huastecan prior to the proto-Huastecan change of *tʃ(') > t(') from pre-Huastecan *ts('), but subsequently lost or replaced in both Huastec varieties and Kabil, although the data for Kabil are not extensive and cannot be assumed to be representative. Besides this pre-proto-Huastecan change, there is additional evidence that these loans would have preceded the separation of Huastec and Kabil, as it preceded at least two other changes that can be attributed reliably to proto-Huastec(an) (they may have been present in Chicomuceltec, but not detectable in the transcriptions in the available sources): *ʔ > Ø/__C#, although this change cannot be reliably demonstrated for Kabil; and *h > ʔ/u, a__#, for which a single example, the reflex of pM *k'ah 'bitter', supports a proto-

Huastecan development, as it is transcribed in Kabil as <cheec>, possibly for /tʃeʔek/, cognate with a proto-Huastec form *tʃ'aʔik.

Finally, evidence of diffusion between Huastecan and non-Mayan languages is not definitive to resolve the issue of Huastec and Kabil differentiation and migration, in large part because of the limited lexical evidence available for Kabil, but also because some of the languages implicated in diffusion (e.g. Sapotek, Mije-Sokean) are not sufficiently restricted geographically, or may have spread their vocabulary and other traits through long-distance trade (e.g. Mije-Sokean, Ch'olan, Yucatecan). Campbell (1988:211) highlighted the case of Huastec and Kabil *tak'in* 'silver, money, precious metal'. This is likely a loan from a Lowland Mayan language (Kaufman 1980, 1985; Justeson et al. 1985; Kaufman and Justeson 2008), initially diffused as #taaʔ=q'iiŋ 'metal (lit. shit=sun, i.e. shit-of-the-sun)' (Kaufman with Justeson 2003:400), given that a native Huastecan term would exhibit *k'ih* instead of *k'in* from pM *q'iiŋ 'sun, day'. Campbell suggests that this loan is evidence of late contact, arguing that the spread of metal artifacts and metallurgy is mostly a Postclassic phenomenon, and therefore, potentially supportive of a late presence of Huastecan in the Mayan region, after which pre-Huastec speakers migrated north toward the Huasteca, leaving pre-Chicomuceltec speakers behind in the Maya region.

Nonetheless, with regard to metal objects, things are not that simple. Metal objects manufactured through complex metallurgical techniques had been arriving into the Maya region already during the Early Classic (e.g. gold-copper alloy claw from Altun Ha, Belize, early sixth century) and Late Classic (e.g. gold-copper alloy legs, Copan, Honduras, eighth century) periods (Morley 1946:431-432, Fig. 55c; Pendergast 1970), which means that Lowland Mayans may have coined the term for 'metal' as early as the late Early Classic period or early Late Classic period.[23] Moreover, simpler metallurgical techniques had been employed much earlier than that within Mesoamerica: some iron ores, such as hematite and magnetite, were polished into mirrors and likely used to reflect the sun's light, and are known from the archaeological record going back to the Middle Preclassic period (1000-400 BCE); also, Mayans in both the highlands and lowlands manufactured polished iron ores, in the form of pyrite- or hematite-backed slate disks or squares, as mirrors that likely reflected sunlight, between the Middle Preclassic (ca. 600 BCE) and the Late Postclassic (ca. 1521 CE) periods (e.g. Healy and Blainey 2011). The diffused etymon #taaʔ=q'iiŋ 'metal', consequently, could have been traveling along with iron-ore mirrors for centuries prior to the beginning of the Classic period ca. 200 CE.[24] Metal objects are long-distance trade items *par excellence* since the Preclassic period. Gold and gold-copper alloys began arriving in Mesoamerica from as far away as Costa Rica, Panama, and Colombia, and thus the wide-ranging diffusion of terms for such objects should be no surprise: Yokot'an/Chontal speakers may have been in a position to spread this term both along the coast and inland. Other loanwords between Huastecan and other Mayan languages, especially terms attested in Ch'olan and Yucatecan, both of whom had access to the coast, may be the result of coastal trade connecting the Huasteca to the Maya region, and do not require an assumption of geographic contiguity of settlements.

---

[23] The term, spelled **ta-K'IN-ni**, possibly in reference to gold or metal, is in fact attested by 870 CE on the lintel of the Akab Dzib at Chichen Itsa (Pharao Hansen and Helmke 2019:118–119, Fig. 3). However, its context is not clear, and it is possible that it actually was meant to say *tä k'iin* 'on/at/to (a/the) day'.

[24] Kaufman with Justeson (2003:293) reconstruct two etyma as 'shit': pM *tsaaʔ and LL #ta(a)ʔ. The diffused etymon #taaʔ=q'iiiŋ, present in Huastec, Yucatecan, Greater Tzeltalan, as well as at least three of the Greater Q'anjob'alan languages (Tojolab'al, Mocho, Tuzantek), uses LL #ta(a)ʔ 'shit', as evidenced by the fact that the Greater Q'anjob'alan languages exhibit reflexes of pM *tsaaʔ as their native term for 'shit'.

Two additional alternative explanations are worth mentioning.

A third alternative would be diffusion from a submerged Mayan language, a language that has left no direct trace except perhaps for loans in other Mayan languages. Such a hypothetical, submerged language, perhaps even a Yucatecan language that differentiated at a much earlier time, may have experienced a regular change of *ts(') > *tʃ('). Kaufman (1980) argued for a case of a submerged Mayan language to explain cases of apparent loans into Huastecan from a Mayan language that must have experienced sound changes that no other Mayan language experienced. But for now, given that it is possible to propose a relevant pre-Huastecan change, I opt for a Huastecan alternative instead.

A fourth alternative would be the possibility that the apparent proto-Yucatecan reflexes of PM *ts(') showing *tʃ(') are not actually reflexes of PM *ts('), but instead point to a previously unrecognized PM contrast. Given that there are fewer than a dozen examples from a single branch of the Mayan family that would point to such a solution, a borrowing scenario remains more likely.

7. CONCLUSIONS

This paper sets out to test whether an apparent Yucatecan "reflex" of proto-Mayan *ts('), as proto-Yucatecan *tʃ('), is an actual reflex, or the result of borrowings from another Mayan language that experienced a sound change of *ts(') > *tʃ('). The data are very few, which is why two major alternative explanations have been explored.

The first alternative would be a very limited shift of pM *ts(') > *tʃ(') that was *inhibited* by the following contexts: C_1VC_1 roots, with C = /ts/ or /ts'/ (i.e. *tsVts* or *ts'Vts'*); CVVC roots or /VV/ (long vowel); disyllabic stems; CaC roots. Problematically, most of these contexts appear to be phonologically unmotivated, and as a set, rather arbitrary. Moreover, there are 9 cases that did not experience the putative shift that do not abide by these constraints, and some of them even exhibit overlapping contexts with cases that experienced the shift. Thus, it is not possible to support a regular sound change, given the current evidence.

The second alternative involves the possibility of borrowing, specifically, from Huastecan. Although Huastecan generally bears /t/ and /t'/ as reflexes of proto-Mayan *ts and *ts', respectively, the details reviewed here, following Norcliffe's (2003) data and insights, allow for a formulation of a change *ts(') > tʃ(') > t('), whose initial phase, namely proto-Mayan *ts(') > pre-Huastecan *tʃ('), would explain the etyma in question as part of a regular sound change in Huastecan, and thus allow one to posit that Yucatecan speakers, at some stage prior to the differentiation of proto-Yucatecan, borrowed such etyma from Huastecan. This also means, of course, that the source of such loans would have been a pre-Huastecan language, reflecting changes post-dating the early stage of the pre-Huastecan language implicated by multiple Mayan loans among the languages of northern Veracruz and the Basin of Mexico, but predating many of the changes attributed to the proto-Huastecan stage, except for *k(') > tʃ('), which is in fact documented in the borrowing of proto-Huastecan *tʃ'ichin 'bird' by Yucatecans as *tʃ'ihtʃ'in.

Based on the current alternatives, a borrowing scenario seems more likely, given that the inhibiting factors required for an internal, Yucatecan sound change seem excessively arbitrary and unmotivated, for one, and because there are overlapping contexts for etyma that retained pM *ts and *ts' relative to those that would have experienced the change of pM *ts and *ts' to pYu *tʃ and *tʃ'. Thus, the cases of Yucatecan *tʃ and *tʃ' in question are not true reflexes of pM *ts and *ts'. Selective borrowing of etyma exhibiting a regular sound change in Huastecan allows for a less arbitrary solution. At this point the most parsimonious scenario would involve coastal trade between late pre-Huastecans and (pre-)proto-Yucatecan, given that the items in question exhibit a uniform result within Yucatecan. Further exploration of this topic is necessary to offer a more definitive assessment: this should include additional exploration of more complete Huastec lexical datasets.

Additional evidence for diffusion may be found in other Mayan languages with /ch/ or /tʃ'/ instead of /ts/ or /ts'/ for etyma reconstructed with proto-Mayan *ts and *ts'. In such languages, there is no evidence for a regular sound change, but instead, the etyma with such correspondences agree with the Yucatecan etyma exhibiting /tʃ/ and /tʃ'/, suggesting that borrowing may also be involved. For instance, two Greater Q'anjob'alan languages attest to /tʃ'/ in forms related to proto-Mayan *meʔts': Tojolab'al *metʃ'* 'eyelash' and Mocho' *meetʃ'* 'small reddish squirrel that flies' (Kaufman with Justeson 2003:283). Similarly, with respect to pM *ts'ot 'to twist', reflected as pYu *tʃ'ot, Mocho' and Tuzanteko exhibit *tʃ'ot*, but this time Tojolab'al preserves *ts'ot*: this suggests either that Mocho' and Tuzanteko experienced a conditioned *ts' > tʃ' shift that remains undescribed, or that they borrowed this etymon as well from a language that experienced such change. Also, proto-Mayan *ts'ikin 'bird' is seen in two Greater Q'anjobalan languages with *tʃ'* (Kaufman with Justeson 2003:618): in Chuj as *tʃ'ik*, and in Popti' as *tʃ'ik* or *ṭ'ik*. But interestingly, it is attested as *ts'ikin*, the expected proto-Mayan reflex, among the remaining Greater Q'anjob'alan languages. To my knowledge, these are the only etyma with pM *ts' that exhibit a *tʃ' reflex in Greater Q'anjob'alan, and they all agree with the Huastec and Yucatecan etyma in showing /tʃ'/. Perhaps they point to diffusion between Yucatecan and isolated Greater Q'anjob'alan languages, or between Huastecan (Kabil, specifically?) and isolated Greater Q'anjob'alan languages.

Other options seem much less plausible still. Perhaps cases of Yucatecan *tʃ(') traced to pM *ts(') could actually point to a previously unidentified pM consonant phoneme, distinct from all other currently reconstructed stops and affricates, including *ts('). Or perhaps Yucatecan exhibits irregular alternations reflecting pM *ts(') due to some sort of previously unidentified sound symbolic alternations. Nevertheless, to support such a scenario, one would need to find plausible cases of the alternation. Neither of these alternatives seems plausible at this point. Lastly, borrowing from an extinct branch of the Mayan family, one that experienced a more regular *ts(') > *tʃ(') shift, could also be entertained, but this avenue is too speculative to pursue further.

Future research should pay close attention to shared etyma between Huastecan and other Mayan subgroups, and to archaeological evidence to better understand the chronology and nature of the interactions at work. It is possible that more comprehensive Huastec sources may provide additional evidence supporting the Huastecan origin of the Yucatecan etyma studied in this paper, but even if not, such work will undoubtedly elucidate the dozens of other etyma that are shared between Huastecan and other Mayan languages that have not yet been properly characterized.

Acknowledgments
Thanks are due to Barbara MacLeod, John Justeson, and Lyle Campbell for their comments on an earlier version of this draft. I especially want to acknowledge Andy Hofling for his very detailed assessment of the etyma and his additional examples, including two more cases of Yucatecan *tʃ and *tʃ' from earlier *ts and *ts'. I am also indebted to three reviewers who thoroughly examined the issues at stake in the borrowing scenario, providing me with invaluable insights that have helped improve the argumentation.

REFERENCES

BRICKER, VICTORIA, ELEUTERIO PO'OT YAH, AND OFELIA DZUL DE PO'OT. 1998. *A Dictionary of The Maya Language As Spoken in Hocabá, Yucatán*. Salt Lake City: University of Utah Press.

CAMPBELL, LYLE. 1977. *Quichean linguistic prehistory* (University of California Publica- tions in Linguistics, 81). Berkeley: University of California Press.

-----. 1984. The implications of Mayan historical linguistics for glyphic research. In John S. Justeson & Lyle Campbell (eds.), *Phoneticism in Maya Hieroglyphic Writing*, 1–16. Institute for Mesoamerican Studies, Publication No. 9. Albany: State University of New York.

-----. 1988. *The linguistics of Southeast Chiapas* (Papers of the New World Archaeological Foundation, 51). Provo: New World Archaeological Foundation.

CONSTENLA UMAÑA, ADOLFO. 2002. Acerca de la relación genealógica entre las lenguas lencas y las lenguas misumalpas. *Revista de Filología y Lingüística de la Universidad de Costa Rica* (28). p. 189-206.

-----. 2005. ¿Existe relación genealógica entre las lenguas misumalpas y las chibchenses? *Estudios de Lingüística Chibcha* XXIV:7-85.

EDMONSON, BARBARA. 1988. A descriptive grammar of Huastec (Potosino dialect). PhD Dissertation, Department of Anthropology, Tulane University.

FISHER, WILLIAM M. 1973. Towards the Reconstruction of Proto-Yucatec. Doctoral dissertation, University of Chicago.

HALPERN, ABRAHAM M. 1942. A Theory of Maya tš-Sounds. *Notes in Middle American Archaeology and Ethnology* l3:34–39. Carnegie Institute of Washington.

HEALY, P., & BLAINEY, M. 2011. Ancient Maya Mosaic Mirrors: Function, Symbolism, and Meaning. *Ancient Mesoamerica, 22*:229-244. DOI:10.1017/S0956536111000241

HOFLING, CHARLES ANDREW. 2006. A Sketch of the History of the Verbal Complex in Yukatekan Mayan Languages. *International Journal of American Linguistics* 73:367-96.

-----. 2011. *Mopan Maya-Spanish-English Dictionary*. Salt Lake City: The University of Utah Press.

-----. 2014. *Lacandon Maya-Spanish-English Dictionary*. The University of Utah Press.

-----. 2017. Comparative Maya (Yucatec, Lacandon, Itzaj, and Mopan Maya). In *The Mayan Languages*, edited by Judith Aissen, Nora C. England, and Roberto Zavala Maldonado, pp. 685-759. London and New York: Routledge/Taylor and Francis Group.

HOFLING, CHARLES ANDREW, WITH F. F. TESUCÚN. 1997. *Itzaj Maya-Spanish-English Dictionary*. Salt Lake City: University of Utah Press.

HOPKINS, NICHOLAS A. 1984. La influencia del yucatecano sobre el cholano y su contexto histórico. In *Investigaciones recientes en el área maya; XVII Mesa Redonda; 21-27 junio 1981*, 191–207. San Cristóbal de Las Casas, Chiapas: Sociedad Mexicana de Antropología.

HOPKINS, NICHOLAS A. 1985. On the History of the Chol Language. In Elizabeth P. Benson (ed.), *Fourth Palenque Round Table, 1980, Vol. VI*, 1–5. San Francisco: Center for Pre-Columbian Art Research.

HULL, KERRY. 2016. *A Dictionary of Ch'orti' Mayan-Spanish-English*. Salt Lake City: The University of Utah Press.

JOSSERAND, J. KATHRYN. 1975. Archaeological and linguistic correlations for Mayan prehistory. *Actas del XLI Congreso Internacional de Americanistas, México, 2-7 de septiembre de 1974*, vol. 1, 501–10.

JUSTESON, JOHN S., WILLIAM M. NORMAN, LYLE CAMPBELL, AND TERRENCE KAUFMAN. 1985. *THE FOREIGN IMPACT ON LOWLAND MAYAN LANGUAGE AND SCRIPT*. MIDDLE AMERICAN RESEARCH INSTITUTE, PUBLICATION 53. NEW ORLEANS: TULANE UNIVERSITY.

KAUFMAN, TERRENCE. 1969. Teco–A New Mayan Language. *International Journal of American Linguistics* 35:154–174.

-----. 1976. Archaeological and linguistic correlations in Mayaland and associated areas of Mesoamerica. *World Archaeology* 8:101–118.

-----. 1980. Pre-Columbian borrowing involving Huastec. In *American Indian and Indo-European studies: papers in honor of Madison S. Beeler*, edited by Kathryn Klar, Margaret Langdon, and Shirley Silver, pp. 101–112. (Trends in Linguistics, Studies and Monographs 16). The Hague: Mouton.

-----. 1985. Aspects of Huastec dialectology and historical phonology. *International Journal of American Linguistics* 51:473–476.

-----. 1991. Notes on the structure of Yukateko and other Yukatekan languages. Unpublished manuscript used with permission of author. Made available by the author here: https://www.researchgate.net/publication/343700276_yukateko_and_yukatekan_lgs-tk.

-----. 2015. Mayan Comparative Studies. URL: https://www.albany.edu/ims/pdlma/2015%20Publications/Kaufman-Mayan%20Comparative%20Studies.pdf. Accessed January of 2017.

-----. 2017. Aspects of the Lexicon of Proto-Mayan and Its Earliest Descendants. In *The Mayan Languages*, edited by Judith Aissen, Nora C. England, and Roberto Zavala Maldonado, pp. 62-111. London and New York: Routledge/Taylor and Francis Group.

-----. 2020. Language History & Language Contact in Pre-Columbian Meso-America. DOI: 10.13140/RG.2.2.27129.42081.

KAUFMAN, TERRENCE, AND JOHN JUSTESON. 2008. The Epi-Olmec Language and its Neighbors. In Philip J. Arnold, III, and Christopher A. Pool (eds.), *Classic Period Cultural Currents in Southern and Central Veracruz*, pp. 55–83. Washington, DC: Dumbarton Oaks Research Library and Collection.

KAUFMAN, TERRENCE, WITH JOHN JUSTESON. 2003. *Preliminary Mayan Etymological Dictionary*. http://www.famsi.org/reports/01051/index.html.

Kondić, Snježana. 2012. A Grammar of South Eastern Huastec, a Mayan Language from Mexico. Volume 1. PhD Dissertation, Department of Linguistics, University of Sydney, Australia.

LACADENA, ALFONSO, AND ALBERT DAVLETSHIN. 2013. Grammar of Hieroglyphic Maya. Advanced Workshop, Brussels, October 29-31, 2013, European Association of Mayanists.

LAW, DANNY. 2013. Inherited similarity and contact-induced change in Mayan languages. *Journal of Language Contact* 6. 271–99.

-----. 2014. *Language contact, inherited similarity and social difference: the story of linguistic interaction in the Maya lowlands*. Amsterdam: John Benjamins.

-----. 2017. Language contacts with(in) Mayan. In Judith Aissen, Nora C. England, and Roberto Zavala Maldonado (eds.), *The Mayan Languages*, pp. 112–127. London and New York: Routledge/Taylor and Francis Group.

MORA-MARÍN, DAVID F. 2009. A Test and Falsification of the "Classic Ch'olti'an" Hypothesis: A Study of Three Proto-Ch'olan Markers. *International Journal of American Linguistics* 75(2): 115–157.

-----. 2021a. Notes on the **oo/*o? > uu > u* Shift in Ch'olan and Huastec(an). *Notes on Mesoamerican Linguistics and Epigraphy* 19. URL: https://davidmm.web.unc.edu/2021/09/07/note-19/.
-----. 2021b. The Regularizing, Analogical Effect of Metathesis in Modern Ch'ol (Mayan). *Revue canadienne de linguistique/Canadian Journal of Linguistics* 66:317–345.
MORLEY, SYLVANUS G. 1946. *The Ancient Maya*. Palo Alto: Stanford University Press.
NORCLIFFE, ELIZABETH. 2003. *The Reconstruction of Proto-Huastecan*. MA Thesis in Linguistics, University of Canterbury.
PACHE, MATTHIAS, SØREN WICHMANN, AND MIKHAIL ZHIVLOV. 2016. Words for 'dog' as a diagnostic of language contact in the Americas. *Language Contact and Change in the Americas: Studies in honor of Marianne Mithun*, edited by Andrea L. Berez-Kroeker, Diane M. Hintz, and Carmen Jany, pp. 385–410. John Benjamins Publishing Company.
PENDERGAST, DAVID M. 1970. Tumbaga Object from the Early Classic Period, Found at Altun Ha, British Honduras (Belize). *Science* 168:116-8.
PHARAO HANSEN, MAGNUS, AND CHRISTOPHE HELMKE. 2019. Tracing the Introduction of Gold to Mesoamerica Through Linguistic Evidence. *Contributions to New World Archaeology* 13:113–136.
ROBERTSON, JOHN S., AND STEPHEN HOUSTON. 2015. The Huastec Problem: A Linguistic and Archaeological Perspective. In *The Huasteca: Culture, History, and Interregional Exchange*, edited by Katherine A. Faust and Kim N. Richter, pp. 19-36. Norman: University of Oklahoma Press.
WICHMANN, SØREN. 1995. *The Relationship Among the Mixe-Zoquean Languages of Mexico*. Provo: University of Utah Press.
WICHMANN, SØREN, AND KERRY HULL. 2009. Loanwords in Q'eqchi', a Mayan language of Guatemala. In Martin Haspelmath and Uri Tadmor, *Loanwords in the world's languages: a comparative handbook*, 873–96. Berlin: Mouton de Gruyter.