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Evidence, New and Old, Against the Late *k(') > *ch(') Areal Shift Hypothesis

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1. Introduction

This chaper deals with two topics that have been amply researched by Lyle Campbell: the application of philology to address matters of interest in the historical linguistics of American Indian languages, including Mayan hieroglyphic writing (Campbell 1984, 1990); and the scrutiny of loanwords in order to assess relative chronologies of culture historical and linguistic developments, including evidence of past contacts between different ethnolinguistic groups (Campbell 1970, 1972, 1986, 2000; Campbell and Kaufman 1976; Justeson et al. 1985). More specifically, this chapter addresses the question of the *k(') > *ch(') shift in the Mayan languages, focusing on the problem of its chronology and attestations in Epigraphic Mayan, and the nature of scribal practices and their connection to linguistic ideologies.[1]

This question has recently resurfaced: Law et al. (2014) have put forth a proposal for a late application of this shift among already differentiated Ch'olan and Tzeltalan languages, which they argue is attested in real time primarily from the beginning of Late Classic (600–900 CE) period. Their proposal would revise the previous model, based on both comparative linguistic and epigraphic evidence, that called for the application of the shift among speakers of a largely undifferentiated community of Greater Tzeltalan speakers, by the first half of the Late Preclassic (400 BCE–250 CE) period, possibly by *c.*200–100 BCE (Kaufman 1976; Kaufman and Norman 1984; Justeson et al. 1985; Justeson and Fox 1989; Kaufman and Justeson 2007), and more conservatively no later than c. 250-400 CE, roughly corresponding to the first half of the Early Classic period (*c.*200-600 CE), when spellings of **ka-ka-wa** for proto-Ch'olan (pCh') *käkäw "cacao," a loanword from Mixe-Zoquean, are first attested. That etymon presents the right conditions to have experienced the shift, and yet, as Campbell (2000: 5) has noted, it did not, demonstrating that the shift must have occurred prior to its earliest occurrences. Law et al.'s (2014) proposal would revise the timing of shift to between *c.*600 and 900 CE, and would require that we accept that scribes ignored three phonemic contrasts (*q vs. *k, *q' vs. *k, and *nh vs. n).

This chapter assesses and critiques Law et al.'s (2014) proposal. Section 2 begins by reviewing the models for the phonological history of the Greater Tzeltalan languages, and more specifically, the proposals for the *k(') > ch(') shift by Kaufman and Norman (1984), Justeson et al. (1985), and Law et al. (2014), paying especial attention to loanwords between Greater Tzeltalan and other Mayan languages that are crucial to establishing relative chronologies for several sound changes (*k(') > ch('), *nh > n, *q(') > *k(')). Section 3 focuses on philological evidence, both old and new, from Epigraphic Mayan (ISO 639-3 emy), including examples from early inscriptions containing lexical and grammatical morphemes that experienced the shift (Mora-Marín 2001, 2005, 2009), as well as loanwords that should have experienced the shift if Law et al.'s chronology were correct, but did not (Campbell 2000; Kaufman and Justeson 2007). Finally, Section 4 offers conclusions and discusses their implications.

The chapter concludes that the philological and loanword evidence support the early shift proposal, prior to the earliest attestations of pCh' *käkäw, as previous authors had already established (Campbell 2000; Kaufman and Justeson 2007), and proposes that the sociolinguistic context of the Maya lowlands during the Late Preclassic and Classic periods, which involved interaction between likely bilingual speakers of Ch'olan and Yucatecan varieties, was probably one of interlinguistic literacy, previously proposed by Fox and Justeson (1982) and Justeson and Fox (1989), as a factor that inhibited a more systematic representation of the *k(') > ch(') shift in explicit phonetic spellings. Scribes were not linguists, attentive to capturing "supple" changes in the language, as suggested by Law et al. (2014: 362), despite the fact that their proposal necessitates that the same scribes ignored three sets of phonemic contrasts. Instead, scribes were social actors exercising their sociolinguistic attitudes and ideologies, sometimes in contradictory ways, as contextualized acts of identity. Crucially, this proposal finds support in the differential treatment of grammatical versus lexical morphemes: the former were invariably spelled phonetically and exhibited positive evidence of *k(') > ch(') shift from their earliest attestations; the latter were spelled ambiguously for the most part, and were only rarely specified, mostly during the Late Classic period, and were thus more vulnerable to social manipulation.

2. Background and proposals concerning the *k(') > ch(') shift

2.1 Mayan historical linguistics

I follow Kaufman's (1976, 1990, 2015, 2017) model of the diversification of Mayan: it is the most narrowly defined model of the diversification of the family, and therefore, of the interrelationships between the various groupings and subgroupings, as it calls for a succession of early binary splits.[2] The reader should refer to Kaufman (2017: 66–7, Figs. 4.2A–4.2B) for the illustration of his model, available online in its original, prepublication design by Justeson (n.d.). Kaufman groups Greater Q'anjob'alan and Greater Tzeltalan into a Western Mayan grouping coordinate with Eastern Mayan, and both of these, in turn, into a larger, Central Mayan grouping. He groups Yucatecan and Central Mayan into a Southern Mayan grouping (earlier, "Late Proto-Mayan" or "Core Mayan"), and regards Huastecan (aka Wastekan) as the most divergent grouping, and the first one to depart from the homeland.[3] Kaufman's justification for including Yucatecan (aka Yukatekan) as part of Southern Mayan, and for grouping Greater Tzeltalan and Greater Q'anjob'alan into Western Mayan is based more on comparative morphology than phonology, most of which was written down as of 1989, but was not made available until just a few years ago (Kaufman 2015).

I do not assume Kaufman's glottochronological estimates a priori, but instead propose to test them against other lines of evidence, as that author and others have done in the past (Josserand 1975; Kaufman 1976; Justeson et al. 1985; Kaufman with Justeson 2007). Below I discuss Kaufman's proposed diversification and movement scenarios as they become relevant. Table 7.1 provides the language and subgroup names and abbreviations that will be used in this chapter; those in bold letters are the most important.

One more general concern must be addressed before introducing the *k(') > ch(') shift: language contact. Several diffusion zones have been defined within the Maya region. Justeson et al. (1985) established the importance of two areas of close interaction between Mayan languages: the *Greater Lowland Mayan* area (henceforth GLL), primarily involving the Greater Tzeltalan and Yucatecan languages; and the *Lowland Mayan* area (henceforth LL), primarily involving the Ch'olan and Yucatecan languages. Kaufman (1976: 107; 2015: 98, 233, 413) further defined two additional areas: the *Chiapas Sphere* (Tojolob'al, Tzotzil, Ch'ol) and the *Huehuetenango Sphere* (Greater Mamean and Greater Q'anjob'alan minus Tojolob'al and Motozintleko). In addition, Justeson et al. (1985: 9–10, Table 2) and Kaufman (2017: 69) have also identified significant diffusion from LL, but in Kaufman's opinion "mostly from Ch'olan," into "Q'anjob'alan, Ixil, Uspanteko, Q'eqchi7." Wichmann and Hull (2009) focus on the extent of diffusion from LL into Q'eqchi', and indeed, highlight the influx of Ch'olan languages especially. The most recent, systematic work on language contact in the Maya lowlands is Law's (2013a, 2013b, 2014, 2017). An important aspect in his work is the focus on "areal spread," that is, diffusion across language boundaries, of phonological and morphological innovations, not only between Ch'olan and Yucatecan languages, but also between Ch'olan and Q'anjob'alan languages, "in spite of the fact that Yucatecan and Cholan are generally characterized as the core languages of the lowland area" (2017: 122). Nevertheless, this is consistent with prior and recent characterizations by Kaufman (1976, 2015, 2017) and others (Justeson et al. 1985), who have explicitly suggested relevant cases of lexical, morphological, and phonological diffusion into Greater Q'anjob'alan, a matter of relevance in this chapter.

2.2 Initial formulations of the *k(') > ch(') shift and relevant loanword evidence

From this point on I will refer to etyma with pM *k(') that underwent the *k(') > *ch(') shift, as well as those that did not, by the respective item # in Appendices A–D, consisting of four tables comprising 118 etyma in total, for a total of 125 cases of pM *k('). Appendices A–B include etyma that did not experience the shift in GTz, a total of 48 (40.7%), while Appendices C–D include those that did, a total of 70 (59.3%). In addition to GTz data (Ch', Tz), data from GQ' and Yu are also included. The datasets have been collected primarily on the basis of Kaufman and Norman (1984).

Table 7.1 Nomenclature and abbreviations used in this chapter

<table>
<tr><td rowspan="30">Proto-Mayan (pM)</td><td colspan="6" rowspan="2">Huastecan (Hua)</td><td>Huastec</td></tr>
<tr><td>Chicomuceltec</td></tr>
<tr><td rowspan="28">Late Proto-Mayan (LpM)</td><td colspan="5" rowspan="4">Yucatecan (Yu)</td><td>Mopan</td></tr>
<tr><td>Itzaj</td></tr>
<tr><td>Yucatec</td></tr>
<tr><td>Lacandon</td></tr>
<tr><td rowspan="24">Central Mayan (CM)</td><td rowspan="13">Western Mayan (WM)</td><td rowspan="6">Greater Tzeltalan (GTz)</td><td rowspan="4">Ch’olan (Ch’)</td><td rowspan="2">Western Ch’olan (WCh’)</td><td>Ch’ol</td></tr>
<tr><td>Yokot’an (Chontal)</td></tr>
<tr><td rowspan="2">Eastern Ch’olan (ECh’)</td><td>Ch’olti’</td></tr>
<tr><td>Ch’orti’</td></tr>
<tr><td colspan="2" rowspan="2">Tzeltalan (Tz)</td><td>Tzeltal</td></tr>
<tr><td>Tzotzil</td></tr>
<tr><td rowspan="7">Greater Q’anjob’alan (GQ’)</td><td colspan="2" rowspan="2">Chujean (Chj)</td><td>Tojolob’al</td></tr>
<tr><td>Chuj</td></tr>
<tr><td rowspan="5">Q’anjob’alan Proper (Q’P)</td><td rowspan="3">Q’anjob’alan Complex (Q’Cx)</td><td>Popti’</td></tr>
<tr><td>Akateko</td></tr>
<tr><td>Q’anjob’al</td></tr>
<tr><td rowspan="2">Kotoke Complex (KCx)</td><td>Mocho’</td></tr>
<tr><td>Tuzantek</td></tr>
<tr><td rowspan="11">Eastern Mayan (EM)</td><td rowspan="4">Greater Mamean (GM)</td><td colspan="2" rowspan="2">Mamean Proper (MP)</td><td>Mam</td></tr>
<tr><td>Teko</td></tr>
<tr><td colspan="2" rowspan="2">Ixilan (Ixn)</td><td>Ixil</td></tr>
<tr><td>Awakateko</td></tr>
<tr><td rowspan="7">Greater K’iche’an (GK’)</td><td colspan="2">Uspantek (Usp)</td><td>Uspantek</td></tr>
<tr><td colspan="2" rowspan="5">K’ichee’an Proper (K’P)</td><td>Kaqchikel</td></tr>
<tr><td>Tz’utujil</td></tr>
<tr><td>Sakapulteko</td></tr>
<tr><td>Sipakapense</td></tr>
<tr><td>K’ichee’</td></tr>
<tr><td colspan="2">Q’eqchi’ (Q’eq)</td><td>Q’eqchi’</td></tr>
</table>

Note: Where language and subgroup names are prefixed with “p” it means “proto.”

A few items have been revised, rejected, or added based on new evidence primarily from Kaufman with Justeson (2003). Such changes are explicitly remarked upon in the footnotes to the relevant appendices or in the discussion that follows, except for #123 (Appendix C), "to weave," which I identify here for the first time as a possible example of the shift, but which I do not discuss further below.

Kaufman (1976: 109–10) reviewed several innovations of GTz, including the *k > ch shift (with no explicit mention of *k' > ch' at this point), and also proposed that it diffused to GQ', but in his examples he suggests diffusion of etyma, not of a sound change rule. He explains that this GTz shift must have preceded the shift of *q > k, for etyma with reflexes of pM *q were unaffected, and highlighted the fact that "lexical borrowings from Greater Tzeltalan in highland languages" such as "to sell," "peccary," and "fish," indicate that the Greater Tzeltalan *k > ch shift preceded the Greater Tzeltalan *nh > n shift, as well as the Huehuetenango Sphere *t > ch and *ch > tx shifts. These etyma correspond to items #77 (pM *konh, Yu *kon, GTz *chon, Tojolab'al *chon*, Chuj *chonh*, Q'anjob'al *txon*, Akatek *xono7*, Popti' *txonh*, KCx *chonh*), #116 (LL+WM *kitaam, Yu *kitam, Ch' *chitam, Tz *chitam, Chujean *chitam*, Q'Cx *txitam*, KCx *chitaam*) and #65 (pM *kar, Yu *kay, Ch' *chäy, Tz *chay, Chujean chay). Thus, by carefully considering likely GTz loans, Kaufman (1976) established a relative chronology for the *k > ch shift with respect to both the *q > k and *nh > n shifts, which it must have preceded.[4]

To the cases of early diffusion between GTz and GQ' raised by Kaufman (1976), I would also add the following: item #100, pM *k'ajaanh "rope, vine," reflected as pGQ' *ch'ajaanh and pGTz *ch'ajaan; #49, pM *ki7 "sweet," reflected in Chujean *chi7 and Q'Cx *chi7, but absent from KCx in a pattern reproducing proximity to the lowlands, and thus supporting of diffusion; #57, pM *kehj "deer," present in GQ' (minus Mocho') as *chej* or *cheej* or *cheh*, possibly from pre-GTz *chehj > pGTz *chihj, especially given the Chuj term *chej=chan* "boa constrictor," likely borrowed from a pre-GTz form *chehj=chan; and item #84, pM *7iik "chile," reflected in GTz *7iich, appearing in Chujean as *7ich and Q'Cx as *7ich, once again absent from KCx. Like the case of "to sell" (#77), "rope, vine" (#100) further supports the earlier timing of the *k' > ch' shift relative to the *nh > n shift. Item #61 could also provide evidence of such a relative chronology: Tojol-7ab'al *chan-e* "four" and Chuj *chanh-e7* "four" could support diffusion of a pre-GTz form *chanh- "four" prior to the GTz *nh > n shift. Also, note that possible loan evident in Chuj *chej=chan* "boa constrictor" would suggest that the sporadic change of *eh > ih in "deer" followed the *k > ch shift in GTz; this example is discussed in more detail in Section 3.2.

Several years later, Kaufman and Norman (1984: 83–5) characterized the shift as unconditioned and as involving both reflexes of pM *k and *k'. They defined a set of inhibiting environments that prevented the shift in thirty of the eighty-nine etyma in their dataset. Their characterization of the inhibiting environments is cited verbatim and in full next (Kaufman and Norman 1984: 84):

(1) Formulation of the *k(') > ch(') shift by Kaufman and Norman (1984: 83–5)
   a. in initial position before a vowel that is in turn followed by an apical consonant or /p/, unless the vowel is /i/;

b. in final position following a vowel, if the consonant preceding the vowel is an apical or /p/ (*even if* the vowel is /i/);
c. in final position following /h/ (but not following /j/);
d. in intervocalic position within a single root *unless* the vowel that precedes the velar stop is /i/.

Those authors added that out of the thirty items in which the shift did not occur, three should have undergone the shift, for they lacked inhibiting environments (Kaufman and Norman 1984: 85, 89). They argued on such basis that the following three items were diffused into GTz from other Mayan languages subsequent to the shift (and in the process likely replaced the relevant reflexes of the pM forms): pCh' *kab' "earth" (#62b), proposed to be a loan from Yucatecan *kaab' (from pM *kab' ~ *kaab'); *k'ooj "mask" (#35), which the authors suggested was diffused from the Maya highlands to the lowlands; *kok "turtle" (#5); and *kuhkay "firefly" (#8). They also noted that Ch'olti' provides evidence for both the loan as <ɛo> (i.e. /k'oj/) as well as the native form <choh> (i.e. /ch'oj/) (Kaufman and Norman 1984: 124, entry #263); thus, Ch'olti' retained the original GTz form that underwent the shift of pre-GTz *k'ooj > pGTz *ch'ooj (> pre-Ch' *ch'ooj > pCh' *ch'oj > Ch'olti' /ch'oh/). Law et al. (2014: 359, 363), who do not cite Kaufman and Norman's observation, argue instead that Ch'olti' /ch'oj/ constitutes evidence that the shift occurred late; if Law et al. correct, this would constitute the only case of the shift that did not diffuse identically within Ch' or within GTz.

Elsewhere in their paper, Kaufman and Norman (1984: 143) provided a longer list of likely loans from "Eastern Mayan or Kanjobalan Proper" into GTz, including several additional items that would have masked the application of the shift based on then-available evidence: pM *k'isiis (cf. Tzeltal *k'isis=taj* "cypress," item #26), should have shifted to ch'isiis* > ch'isis*; pM *ko "OK" (item #3) should have shifted to cho* (cf. Ch'olan *ku and Tzeltalan *ko); pM *k'oq "to cut, tear" (item #36) should have shifted to ch'oq* > ch'ok* (cf. Ch'olan *k'ok, Tzeltalan *k'ok); and pM *k'o7 "snail" should have shifted to ch'o7* (cf. Ch'olan *k'o7 and Tzeltalan *k'o7). I have culled the last example from my dataset: Kaufman with Justeson (2003: 657) have revised the reconstruction to WM *q'o7, and therefore constitutes a case that would not have undergone the shift.[5] Lastly, Kaufman and Norman (1984: 118) point to one item that should not have undergone the shift because of its apical final consonant, but which nonetheless did: LL *kyol "to clear a milpa" and the related form *kyool "milpa" (#120), both attested in Ch' as *chol "to clear fields; milpa."

Next, Justeson et al. (1985: 13) offer several important observations and qualifications relevant to the shift, which they refer to as conditioned. First, they conceive of the shift as a two-step process involving palatalization and affrication: *k(') > *ky(') > *ch('). Second, they pointed to ten diffused GLL etyma with *k(') that presented the conditions for the shift, out of which six underwent the shift in GTz but not Yu: *b'uluky "eleven" (#91), pGTz *b'uluch; *kyiiky "older sister" (#88), pGTz *chiich; *kyitaam "peccary" (#116), pGTz *chitaam; *kyonh "to sell" (#77), pGTz *chon; #maniky' "seventh day name" (#117), pGTz #manich'; *weky' "to cast grains, to sprinkle liquid" (#118), pGTz *wech'. These six etyma would have diffused within the GLL area prior to the shift. The remaining four, which retained *k(') in both GTz and Yu even though they fit the conditions for the shift, include the following: *kanan "to guard," *kohk "deaf" (#10), *kohm "short," and *jok' "to dig a well; to dip out a liquid by hand" (#119). Based on these etyma, Justeson et al. (1985: 13) conclude that these four items "all appeared in Cholan-Tzeltalan after it shifted **k(') to *ky(')*." Kaufman with Justeson (2003: 710) have since revised the reconstruction of "to guard" to pM as *qanhaanh, based on the Huastec cognat *koo7*, which points to pM *q (or else Huastec would show *tx* if from pM **k*), which means it would not have undergone the shift, and also that it was not a diffused GLL innovation. Kaufman with Justeson have also revised the reconstruction of "short" to GLL *qohm (2003: 1375). Although they did not revise the reconstruction of "deaf," they did add that it was borrowed from Totonako *qo:qo7* "dumb" (2003: 157), making it possible that it could have been borrowed initially as #qohq prior to the *q > k shift. This leaves only *jok' (#119) unaccounted for.

Additionally, Justeson et al. (1985) revisit the aforementioned case of Ch' *chol (presumably Pre-Ch *chol and *chool), and Yu *kol ~ *kool (cf. Yucatec *kol* and *kòol*), a LL term (#120)—absent from Tzeltalan, possibly due to lexical replacement. This term did not exhibit the conditions for the shift (or exhibited inhibiting factors against it), which they suggest points to evidence for their proposed two-step process of palatalization, *k(') > ky('), followed by affrication, *k(') > ch('), stating that this case "shows the *k/č* correspondence while violating the conditions on the sound change, and thus was an innovation after the development of **k* > **ky* and before **ky* shifted further to *č*" (Justeson et al. 1985: 13). In other words, this term must have been innovated within the GLL area with initial *ky, as **kyol* (and **kyool*), after the **k* > **ky* shift had already occurred, but prior to the *ky > ch shift. Kaufman with Justeson (2003: 304) have in fact reconstructed another GLL term with *ky: the root #*7iky* "facing someone(/something?)" (#121), a likely positional root attested in Yucatecan (Itzaj, Yucatec, Lakantun) and Tzotzil. The Yucatecan form attests to /k/ and the Tzotzil form to /ch/; it is not attested in any Colonial or contemporary Ch'olan language, but it is attested in Epigraphic Mayan as **yi-chi-nal** for *y-ich(V)n-al* "in his/her presence," as discussed in Section 3.2. Consequently, it is another example of a form that supports the palatalization-before-affrication process, and serves as a counterpart to *kyool/*kyol, which is attested in Ch'olan but not Tzeltalan. Though not mentioned explicitly, Kaufman and Norman (1984) do reconstruct pCh' *chum "seated; dwelling" and propose a LL form *kyum (#79); this form is not attested in Tz, but presumably would have diffused within the GLL area as *kyum prior to the GTz shift, and would have been subsequently replaced in Tz. In Section 3.2 I argue for an additional etymon that was likely innovated with *ky' in the GLL area prior to affrication, and is also attested in Epigraphic Mayan, *ky'al > *ch'al "to tie; to close; to adorn" (#122).

Law et al. (2014) were not the first to consider a later timing for the shift: Justeson et al. (1985: 73, Note 7) had already considered the possibility that the *k(') > ch(') shift "occurred after the separation of the Cholan and Tzeltalan speech communities and then diffused," noting that "such diffusion of sound changes across language boundaries is attested in the case of velar palatalization before unrounded vowels followed by *q(')* or *x* in western dialects of most Quichean languages," as Campbell (1977: 116–18, 122–6) has documented. They immediately countered this possibility: "Such diffusion is unlikely in the case of the Cholan-Tzeltalan shift of **k(')* to *č(')*, however, because both groups inhibited the change under four identical and sometimes complex conditions …," adding that

> there is no positive evidence of the sound change having postdated the diversification of proto-Cholan-Tzeltalan; loans into the two groups that differ in having *č* or *č'* in one and *k* or *k'* in the other would provide such evidence, but none of about a dozen loans involving these sounds shows such a difference. (Justeson et al. 1985: 73, Note 7)

In Section 3.2 I examine evidence of loans into GTz attested in Epigraphic Mayan precisely to test this idea, the same idea raised by Law et al. (2014).

Like Kaufman (1976) before them, Justeson et al. (1985: 60) also discussed the relevance of the *k > ch shift with regard to relative chronologies for GQ' and GM. They observed that all the GQ' languages borrowed "to sell" and "peccary" from GTz, and therefore, that this probably happened prior to their diversification, possibly between *c.*300 BCE and 100 CE.[6] As far as GM is concerned, Justeson et al. (1985) also note, the *k > ch shift took place before the diversification of pGM, for all Mamean languages exhibit evidence of GTz loans *chay "fish" and *chitaam "peccary," which then underwent the Mamean *ch > tx and *t > ch shifts, resulting in pGM *txay and *txichaam, respectively. They argue that the latter changes, which preceded the diversification of GM, occurred around or after 300 BCE. More recently, Kaufman (2017: 67) places the initial differentiation of GM starting around 500 BCE. This places another relative chronology constraint on the GTz *k(') > ch(') shift. If Kaufman's (1976) estimates of minimal centuries of separation for GTz, GQ', and GM are correct, a Middle-to-Late Preclassic dating for the GTz *k(') > ch(') shift would be required. But the more important conclusion is that for at least a few etyma ("to sell," "peccary," "fish"), not to mention some of the additional examples I have proposed (certainly "rope, vine," maybe "deer," "sweet," "chile"), the shift and their diffusion must have occurred early, and prior to the differentiation of both GQ' and GM, not just prior to the differentiation of GTz. Additional etyma distributed more narrowly within GQ' and GM would have diffused subsequent to the initial differentiation of these subgroups, but the shift may have been already finalized in GTz by then.

One more contribution by Justeson et al. (1985) was their elaboration on Kaufman and Norman's (1984: 89, 122) observations regarding pCh' *kab' "earth" (item #62b), proposed to be a loan from Yucatecan *kaab'. In addition to the evidence for pTz *chab', such as Tzeltal *liki-chab*' "earthquake" and Tzotzil *chob*' "milpa," already noted by Kaufman and Norman, Justeson et al. (1985: 14) also presented additional related forms in Tzotzil, as well as an example of the native reflex of pM *kab' ~ *kaab' "earth" in Ch' in the form of Yokot'an (Chontal) *chab'-an* "earthquake," confirming pGTz *chab' "earth."

More recently, Kaufman (2015, 2017) proposes that the GTz *k(') > ch(') shift would have occurred sometime between 1000–200/100 BCE, during the Middle

Preclassic or the Middle-to-Late Preclassic transition. He states that "a shift of *k > ch (but not of *k' to ch') took place in common Chujean, therefore after the Greater Q'anjob'alan diversification, under the same conditions as in Greater Tzeltalan," and likely sometime between 200/100 BCE–400 CE (Kaufman 2015: 1022). And of course, all of these occurred "before the later rule shifting pM **q* and **q'* to /k/ and /k'/ was also diffused to Chujean" (Kaufman 2017: 66).

Regarding suggestions by previous authors that the *k(') > ch(') shift of GTz be considered a shared innovation with similar shifts observed for other subgroups, including Huastecan, Kaufman (2015: 1024–1025) has remarked the following:

> The change of pM *k to /ch/ and *k' to /ch'/ is not the same in Wastekan, Yukatekan, and Greater Tzeltalan, and should not be viewed as a common development. In Wasteko the change is exceptionless; in Yukatekan the change occurs in only a very few highly specific environments; in Greater Tzeltalan the change occurs in about 50% of the items containing pM *k and *k', according to complex rules. Other languages changing *k and *k' to /ch/ and /ch'/ include tke [*sic*] Q'anjob'alan Complex, Some [*sic*] forms of Mam, Awakateko, and some forms of Ixil: in every case the rules are different, and no doubt independently achieved.

Regarding Huastecan specifically, Kaufman and Justeson (2008: 70–2) and Kaufman (2017: 68; 2020: 116–17) have argued that the changes in Huastecan took place after it had already arrived "in the vicinity of the Basin of Mexico or the northern Gulf Coast," given two facts: loanwords from Pre-Huastecan into various languages of Northern and Central Mexico (e.g., Pajalat, Yemé, P'urhepecha, Totonakan, Proto-Oto-Pamean) point to its retention of pM *q('), pM *r, and pM * k('); and the Huastecan *k(') > ch(') shift was significantly more general ("exceptionless") than its Greater Tzeltalan counterpart.

To sum up, prior researchers defined the *k(') > ch(') shift; described a complex set of inhibiting factors; argued that the complexity of such inhibiting factors made it unlikely to have diffused, in identical fashion, between already diversified Ch' and Tz languages, and more likely to have occurred at the GTz stage; that loans from GTz present in the GQ' languages (#77, #116, #65) allow for the definition of a relative chronology of the change with respect to the unrelated and subsequent *q(') > k(') and *nh > n shifts; that some GLL etyma exhibiting *k(') must have avoided the shift either because they can be traced back to earlier *q(') (#10, #36, #119), or because they were innovated with *k(') within the GLL diffusion area after the GTz shift had already occurred (#119); that a few etyma that must have experienced the shift may have subsequently been partly (#35) or completely replaced by cognate loans from other Mayan languages (#3, #5, #8, #26, #62b); that the shift likely proceeded in two steps, *k(') > *ky(') > ch('); and finally, that a few etyma that exhibited inhibiting conditions but nonetheless experienced the shift may have been innovated and diffused early within the GLL area as palatalized *ky(') prior to the second part of the shift, *ky(') > *ch(') (#79, #120, #121, #122). Also worth highlighting, the *k(') > ch(') shift in Huastecan was exceptionless, and thus not the same process as the shift observed in GTz. I have also added a few other cases of likely loans, some of them quite early (#100), between GTz and GQ' languages that provide additional support for the relative chronologies between the *k(') > ch(') and *nh > n shifts proposed by Kaufman (1976).

In what follows, I will cite some of the evidence and arguments just reviewed, and present new cases of etyma that experienced the shift, as well as new cases of likely loanwords that support relative chronologies for sound changes and differentiation events.

2.3 Early work on phonological contrasts in Mayan writing

By the late 1970s several scholars had already marshalled strong evidence in favor of Ch'olan innovations, especially phonological and lexical, to explain major structural properties of Epigraphic Mayan (Campbell 1984). Fox and Justeson (1982), a revised version of which (Justeson and Fox 1989), has been available to me since 1996, carried out a systematic survey of the syllabograms deciphered by then and their implications—phonological and lexical. Those authors reviewed the spellings with **kV** and **k'V** syllabograms to test for evidence of contrasts between pM *k(') and *q('), which proved negative (e.g., **la-ka** for Ch' *lak "plate" from pM *laq, **b'a-ka** for Ch' b'ak from pM *b'aaq); **chV** and **ch'V** syllabograms for evidence of pM *ch(') and cases of the GTz *k(') > ch(') shift, which proved positive (e.g., **7aj-chi**, interpreted by those authors as "drunkard" based on pCh' *chi7 "sweet" from pM *ki7, but evidence of the *k > ch shift even if it represents a reflex of pM *kiih "maguey," pCh' *chih); and **nV** syllabograms for evidence of pM *nh versus *n which proved negative (e.g., **K'AN-na** for Ch' *k'än "yellow" from pM *q'an, SNAKE-**na** for Ch' *chan from pM *kaan, SKY-**na** for Ch' *chan "sky" from pM *ka7nh, 10-**na** for Ch' *läjun= "ten" from pM *laajuunh= or *lajunh=) (Justeson and Fox 1989: 13–14, 19). They also identified examples of changes exclusive to Ch'olan, such as the *oo > uu > u shift attested by 445 CE (e.g., **tu-TUN** for *tun "stone" from pM *toonh) (Justeson and Fox 1989: 27).

Many more examples of the lack of orthographic distinction in phonetic spellings of reflexes of pM contrasts *k versus *q, *k' versus *q', and *nh versus *n have emerged since Justeson and Fox (1989). And many more examples of the attestation of sound changes pointing to GTz, Ch', and Yu innovations have been documented since then too (e.g., *k(') > ch(') shift of GTz, *oo > u and *ee > i shifts of Ch'; *t, *ty > ch/__{i, e, #} in Yu) (see review in Mora-Marín 2009). This would suggest that scribes were attuned to the contrasts present in their spoken languages, and were capable of representing them if they chose to do so. In light of their assessment and evidence that scribes could have systematically distinguished between Ch'olan and Yucatecan forms, but most often did not, Justeson and Fox (1989: 39) suggest that "the failure to indicate linguistically distinctive material," that is, material that would have readily distinguished between Ch'olan and Yucatecan cognates in a systematic fashion, "may have been deliberate, for it appears to have functioned to enhance interlinguistic literacy." Thus, interlinguistic literacy, perhaps with sociolinguistic accommodation as a goal, is an option to consider.

2.4 Grube (2010)

A few years prior to Law et al.'s (2014) reassessment, Grube (2010) had drawn attention to a highly interesting pattern, namely, that the use of *preposed* phonetic complements in Mayan texts was more rigidly structured throughout most of the Classic period than previously thought, applying primarily (though not entirely) to three specific phonological contexts.[7] These are cited in full next (Grube 2010: 29):

> 1) with logographic signs that represent a glottal-initial root (7VC or 7VCVC),
> 2) with logographic signs that represent a root beginning with one of the semivowels /w/ or /y/,
> 3) and finally, with roots that were affected by the consonant shift from proto-Mayan **k(')* > proto-Ch'olan-Tzeltalan **ch(')*.

Here I restrict myself to commenting on the last context, the one of relevance to the *k(') > ch shift, for which Grube (2010: 38) concludes that

> The only environment where preposed phonetic complements are clearly motivated by language change is in roots that were related to the shift from proto-Mayan **k(')* to proto-Ch'olan **ch(')*. As far as we know, this was the only consonantal shift in the Cholan languages that coincided with the period in which the script was in use.

This is not correct. If the *k(') > *ch(') shift was taking effect during the period of use of Mayan writing, then both the *q(') > *k(') and *nh > n shifts, also consonantal, would have followed, and would likely have been dealt with by scribes in some manner.

Importantly, Grube (2010: 32) argues that the use of **kV** preposed phonetic complements in some cases could have been intended "to stress the correct and prestigious old pronunciation," prior to the shift, of certain terms, such as the spelling of SNAKE in the context of the *Kan* emblem glyph, including what might be the earliest occurrence of the **ka**-SNAKE spelling on La Muerta Monument 1. In other words, rather than argue that scribes were still pronouncing the term "snake" as *kaan, Grube suggests that the act of preposing **ka** before SNAKE points to the shift having already occurred, and therefore, to scribes emphasizing a conservative rather than innovative pronunciation. This would imply that the script arose prior to the shift, and that evidence of earlier, pre-shift pronunciations was preserved either in older inscriptions, or oral traditions, or both, and that such conservatism may have inspired the linguistic attitudes and ideologies of some scribes.

2.5. Law et al. (2014)

Law et al. (2014: 361) assume that Classic texts were faithful in representing the nuances of a specific spoken language, and that they were sensitive to linguistic variation and changes: "Data from Maya writing, however, are exceptional in showing patent adaptation in supple response to shifts in spoken language." Given this assumption, they regard the pattern of phonetic sign usage involving **chV**, **ch'V**, **kV**, and

k'V syllabograms to be indicative of linguistic change in progress, one spreading during the beginning of the Late Classic period. They do see two major alternatives for explaining the pattern: "A simpler explanation is that these terms register either a change in progress or are archaic retentions, maintained from an earlier linguistic stage" (Law et al. 2014: 363). They pursue the change-in-progress option. Such a change, and the complex set of inhibiting factors associated with it, would have spread, as a sound change rule, between already differentiated Ch' and Tz languages, given evidence of exclusive Ch'olan innovations by the beginning of the Classic period, such as the vowel-raising shifts (Fox and Justeson 1982; Justeson et al. 1985; Justeson and Fox 1989). Moreover, if Houston et al.'s (2000) "Classic Ch'olti'an" hypothesis is correct, proposing that Ch' had already differentiated by the beginning of the Classic period and that Classic texts represent a prestige language based on a form of Eastern Ch'olan, the sound change rule would have spread during the Late Classic period between differentiated Ch' varieties (at least between Eastern Ch'olan and Western Ch'olan) in identical fashion, in addition to spreading between Ch' and Tz languages in identical fashion, despite the complexity of the inhibiting factors. All of this, plus the outward diffusion into other Mayan languages (already differentiated Greater Mamean, Greater Q'anjob'alan, Yucatecan subgroups), prior to the *q > k, *q' > k', and *nh > n shifts in GTz and Yu, would be required to have occurred between the Late Classic period and the sixteenth century.

Law et al. (2014) focus on examples of etyma that underwent the shift that were being spelled with **kV** and **k'V** signs during the Late Classic period. They state that "The most common explanation of these unexpected forms is that they represent borrowings from Yukatek Mayan, a neighboring Mayan language that did not undergo this sound change except in a much more limited context …" (Law et al. 2014: 363). This is a bit of an oversimplification, however, as such an explanation has only been applied to a very few cases based on linguistic evidence, and not attributed to Yucatec, specifically, but to Yu. The only such case, already noted in Section 2.2, is pCh' *kab' "earth" (Kaufman and Norman 1984: 122): it has been observed that both Ch' and Tz have preserved the native form that experienced the shift in compounds or derived lexemes, such as Yokot'an (Chontal) *chab'-an* "earthquake," Tzeltal *liki-chab'* "earthquake," and several related terms in Tzotzil, including *chob'* "cornfield" and *chab'-ah* "to work in a cornfield" (Kaufman and Norman 1984: 124; Justeson et al. 1985: 14). To my knowledge no author has proposed that all etyma subject to the shift that appear with **kV** and **k'V** signs in Epigraphic Mayan constitute cases of Yucatecanisms, borrowings from Yu into Ch'.

However construed, Law et al. dismiss such a possibility for two reasons: because a significant number of spellings with **chV** and **ch'V** signs in etyma that experienced the shift appear in the northern Maya lowlands, very likely inhabited by Yucatecan speakers; and because a large number of what they claim are presumed Yucatecan borrowings spelled with **kV** and **k'V** signs appear in the southern lowlands, from Palenque in the west to Copan in the east, characterized by a "lack of a clear, consistent geographical clustering of the /k(')/ spellings," a fact that they suggest constitutes "another line of evidence supporting the proposal that such forms are conservations of an archaic feature, rather than borrowings" (Law et al. 2014: 363–4). Law et al.

(2014: 363) refer to the northern lowlands **chV** and **ch'V** spellings of etyma exhibiting the shift as "hypercorrection" on the part of what they seem to presume were monolingual Yucatecan speakers; they may very well have been bilingual Ch'olan/Yucatecan speakers, and the **chV** and **ch'V** spellings in question may have been intended to index such an identity.[8] I agree with Law et al.'s assessment that the **kV** and **k'V** signs in the southern lowlands are evidence of archaisms, but perhaps only accidentally so: some scribes may have been motivated less by conservatism than linguistic accommodation via interlinguistic literacy (Justeson and Fox 1989: 39, 47–9). Ch'olan and Yucatecan speakers were in close interaction for centuries, and diffused vocabulary and grammatical morphology between them, a process that was likely promoted by interference in a bilingual context (Hopkins 1984, 1985). In such a context, scribes may have been motivated to use spellings that signaled a Ch'olan identity, archaic or contemporary, or perhaps a Yucatecan identity, or even both: multiple identities could be indexed within a single text.

Regarding the geographic and temporal pattern for first uses of spellings with **chV** and **ch'V** signs, Law et al. provide the following:

(2) Earliest occurrences of **chV** and **ch'V** signs according to Law et al. (2014: 361–2):
  a. **chi-K'IN** "east" in "unprovenienced early lidded tripod vessel" likely from the Peten (Fields and Reents-Budet 2005: 215, Figure 109).
  b. "**chi-hi** as part of a proper name on an Early Classic stone vessel from Santa Rita," Belize.
  c. "**ch'a-CH'AHB'** *ch'ahb'* 'penance, sacrifice' at beginning of Late Classic (Caracol Stela 3:B19, B20; 620s)."
  d. "**ch'a-CH'AM** *ch'am* 'to receive' (Piedras Negras Panel 2:H1; A.D. 667)."
  e. **cha-**SKY "in the final decades of the eighth and early years of the ninth centuries A.D."
  f. **yi-cha-ni** at Yaxchilan Lintel 58:C1 and 9:C2, "at about A.D. 750."
  g. **cho** syllabogram "generated by the early seventh century (Copan Structure 13:D8)."
  h. "**chu** ("breast variant") in the eighth century A.D. (see, for example, the Altar vase … and Piedras Negras Stela 14, sculptor's signature)."

This list appears to provide evidence for an incremental appearance of **chV** and **ch'V** signs over time, particularly in the spelling of roots that underwent the shift of pM *k(') > *ch('). The pattern, the authors propose, indicates an order of appearance starting with **chi**, then **ch'a**, then **cho**, and so on (2014: 362), perhaps indicating a gradual application of a palatalization and affrication process, starting with the high front vowel.

Finally, Law et al. (2014: 362) admit that their model poses a problem: it would imply that Classic Mayan writing obviated the phonemic distinction between *q(') and *k('), a distinction involving four phonemes (i.e., *q vs. *k, *q' vs. *k'). The problem is actually compounded by Law et al.'s (2014) disregard for the loanword evidence, reviewed in Section 2.2, which shows that the *nh > *n shift of GTz also postdates the *k(') > *ch(') shift, which means that Law et al.'s model requires that Classic Mayan writing also ignore the *nh versus *n contrast.

3. New and old linguistic and philological evidence

3.1 Loans in Epigraphic Mayans

A wide variety of authors have written on the presence of loans in Mayan texts, from other Mayan languages and non-Mayan languages alike (Justeson et al. 1985; Taube and Bade 1991; Bricker 2000; Macri and Looper 2003; Macri 2005; Boot 2006; Kaufman 2007; Kaufman and Justeson 2007; Pallán Gayol and Meléndez Guadarrama 2010). Here I discuss only those cases of relevance to the *k(') > ch('), and then only those whose context allows for a clear determination of their meaning and possible morphological structure. Other cases of potential relevance may exist but their contexts are unclear, and so are their meanings; with more contextualization and research a Mayan etymology may yet be proven to work for them.

I begin with the spellings of pCh' *käkäw "cacao" (Kaufman and Norman 1984: 122), which show substantial variation: **ka**, **ka-wa**, **ka-ka-wa**, **ka²-wa**, and even **ka-ka²-wa**. The second-to-last spelling is illustrated in Figure 7.1. Borrowed from a Mixe-Zoquean language (Campbell and Kaufman 1976), *käkäw is undoubtedly the most prominent loanword from a non-Mayan language attested in Mayan texts. The earliest archaeologically described examples date to the early-to-mid-fifth century CE,

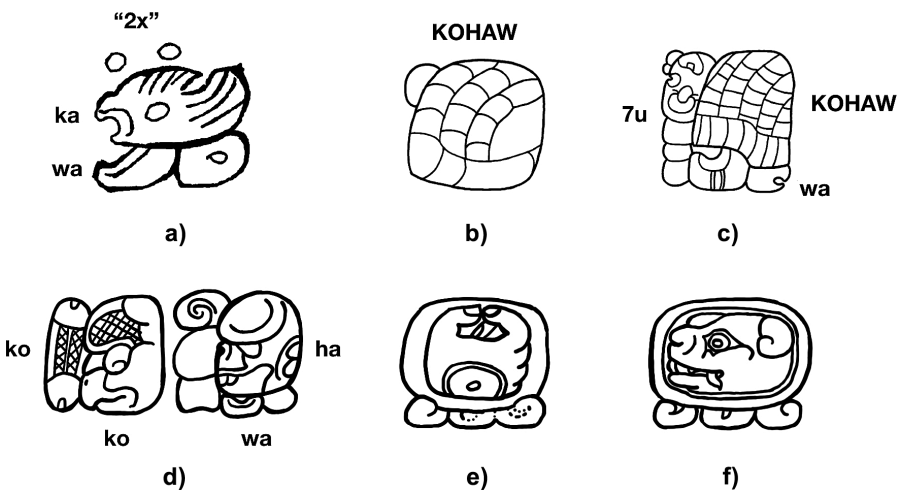

Figure 7.1 Glyphic spellings of proposed non-Mayan loanwords

Notes: a) Spelling **ka²-wa** for pCh' *kakaw > *käkäw "cacao," on lidded tripod vessel from Central Peten, dated to *c.*250–400 CE. Drawing by the author after Fields and Reents-Budet (2005: 215, Fig. 109). b) Logogram for **KO7HAW** on Piedras Negras Panel 2. Drawing from Macri and Looper (2003: 290, Fig. 5a). c) Logosyllabic spelling **7u-KOHAW-wa** on Middle Panel of Temple of Inscriptions at Palenque. Drawing from Macri and Looper (2003: 290, Fig. 5b). d) Syllabic spelling **ko-7o-ha-wa** on Piedras Negras Panel 2. Drawing from Pallán Gayol and Meléndez Guadarrama (2010: 22, Fig. 8). e) Day sign <MANICH'> or **chi** from Palenque House C, Substructure. Drawing from Thompson (1950: Fig. 7). f) Day sign <OK> from Copan Hieroglyphic Stairway. Drawing from Thompson (1950: Fig. 8).

attested on pottery vessels from sites like Tikal and Rio Azul, and thus predates the period during which Law et al. (2014) argue the *k(’) > ch(’) shift propagated. Campbell (2000: 5) and Kaufman and Justeson (2007: 199) have observed that if Mixe-Zoquean *kakawa had been borrowed prior to the *k(’) > ch(’) shift, it would have undergone the shift, and would have resulted in a form like chächäw*, which is not attested in any Mayan language. There exist hundreds of spellings of this term in the Epigraphic Mayan corpus, spanning much of the Early and Late Classic periods: had the *k > ch shift been in progress during this time, there is a very good chance—better than for almost any other lexeme showing the right conditions to experience the *k > ch shift represented in the ancient texts—that we would see at least a few spellings such as **cha-wa*** or **cha-cha-wa***, but none is attested.

Next is the term for a type of headdress or helmet attested eleven times across four texts between 667 and 732 CE. Macri and Looper (2003: 290) have described this term, and spelled once as **KOHAW** (Figure 7.1b), six times as **KOHAW-wa** (Figure 7.1c), once as **ko-ha-wa** (not illustrated), and three times as **ko-7o-ha-wa** (Figure 7.1d), as a possible loanword. These authors note that the term may be attested in Colonial Tzotzil as <kovov> “helmet,” showing an initial <k> for /k/. Its very limited distribution within Mayan, restricted to Epigraphic Mayan and Colonial Tzotzil, the authors argue, supports its status as a loanword. They argue for a Nawan sourceword **kwa:-w* “head.” Kaufman (2007), for his part, proposes a Proto-Zoquean source, *ko7.jap “headgear.” Either way, the appearance of this term during the seventh century CE, a time when the *k(’) > *ch(’) shift would have been in progress according to Law et al. (2014), would have made this term vulnerable to the shift. Since Law et al.’s (2014) model requires that the shift spread between Ch’ and Tz, and indeed between already differentiated Ch’ varieties, during or after the Late Classic, it is noteworthy that the only possible attestation of this term in a Colonial or contemporary GTz language does not reflect the shift either.

Another case is the Mayan day name corresponding to “deer.” Although there are no fully or partly phonetic spellings to confirm a glyphic reading **MANICH’** for the seventh day name, pan-Mesoamerican “deer,” it is attested alphabetically as <manik>, that is, #manik’, in Colonial Yucatec, and <manich>, that is, #manich’, in Colonial Ch’ol baptismal records. Justeson et al. (1985: 15, 21–22) and Kaufman and Justeson (2007: 200) have shown that the term was a loanword from Proto-Zapoteco *mma=ni7 “animal, large quadruped” (itself involving a borrowing from Proto-Zoquean *mʉ7a “deer”) into (Greater) Lowland Mayan, and that it was borrowed into GTz prior to the *k’ > ch’ shift. I suspect that, prior to the innovation of the use of T671 **chi** to spell this day name, Mayan scribes may have used a DEER logogram, perhaps like the one attested in a Late Preclassic mural fragment at San Bartolo in a spelling 7-DEER (Hurst 2009: 301, Fig. 33e). T671 **chi** would not have worked as a spelling of **MANICH’**. Instead, in Section 3.2 I discuss the use of T671 **chi** and argue that it functioned phonetically to spell pCh’ *chihj > *chij.

The term for the Lowland Mayan (Ch’ol, Yucatec) tenth day name, <oc> “dog,” that is, #7ok, is very likely a loanword also. Justeson et al. (1985: 23–4) suggested it comes from Proto-Mixean **7uka*, reconstructed as “dog,” and pointed out that it did not undergo the *k > ch shift, indicating that it was borrowed after the shift had taken effect. More recently, Hopkins (2014: 10) has argued, very persuasively, that the Lowland Mayan loan #7ok reflects the meaning "agouti," not "dog." He follows Wichmann's (1995: 223, 254) reconstruction of Proto-Mixe-Zoquean *7uku as "agouti (*Dasyprocta* spp.)," with Proto-Zoquean preserving the meaning "agouti" and Proto-Mixean shifting the meaning to "dog," and argues that Lowland Mayan borrowed the Zoquean form and meaning.

Kaufman and Norman (1984: 124) and Justeson et al. (1985: 14) proposed that pCh' *kab' "earth," spelled with T529 **KAB'**, T25:501 **ka-b'a**, and T529:501 **KAB'-b'a** in Classic texts, constitutes a loan from another Mayan language, most likely Yucatecan, given the evidence for restricted retentions (see discussion in Section 2.5) in both Ch' and Tz of a form *chab', which confirm that the shift took place for this etymon. Thus, it cannot be doubted that GTz underwent the *k > ch shift for this term. The presence of *kab' as a basic lexeme meaning "earth," in addition to the GLL term *lu7m, requires an alternative explanation: either a loanword from another Mayan language, a neighboring Yucatecan language being the most likely source, or speakers of Ch' retained Pre-GTz *kab' alongside the shifted form *chab', in some registers at least, before it began to displace the shifted form *chab', a process that could have been facilitated by scribal practices. There is one instance, at least, of a spelling **cha-b'a**, cited by Law et al. (2014: 362, Table 1), occurring on Halakal Lintel 1:H7, almost certainly in Yucatecan territory during the Classic period (Justeson and Fox 1989; Lacadena and Wichmann 2002). Such usage could constitute evidence of a loan in the written language of an elite Yucatecan group, or an act of identity by a bilingual Ch'olan/Yucatecan scribe.

I have not discussed the case of **k'o-jo** for pCh' *k'oj "mask" in this section because it is a point of contention. Kaufman and Norman (1984: 85, 124, #263), as already noted in Section 2.2, argued that pCh' *k'oj "mask" (#35) was diffused from the Mayan highlands to the lowlands, along with *kok "turtle" (#5), *kuhkay "firefly" (#8), and a few other etyma that should have experienced the shift if they were native GTz terms. They also proposed that Ch'olti' attests to both the loan from a highland Mayan language, /k'oj/, and the native form /ch'oj/. Law et al. (2014: 359, 363) apparently missed this, for they do not cite Kaufman and Norman's explanation, but posit instead that Ch'olti' /ch'oj/ constitutes evidence that the shift occurred late. I take up this question again in the final section of the chapter.

In summary, at least two loanwords from non-Mayan languages are attested in Classic texts prior or to, or during the time of Law et al.'s (2014) chronology for the *k(') > *ch(') shift: "cacao" and "headgear." These terms should have experienced the shift, if those authors were correct, but they did not.

3.2 Early <chV> and <ch'V> spellings and their sources

Law et al. (2014: 361) begin their chronological review as follows:

> The earliest **ch(')V** syllabic sign appears to be the syllable **chi**, attested in an early spelling of **chi-K'IN** ("east"—importantly, this is an erosion of *ochi-k'in* "enter sun," which displays the *k* to *ch* sound change *ochi* [from pM **okik*] on an unprovenanced early lidded tripod vessel …

This is example (2a) in the list of earliest occurrences discussed by Law et al. (2014) provided in Section 2.5. The glyphic collocation in question is shown in Figure 7.2, as **?hi-chi-K'IN** for *chik'in* "west." Although Law et al. do not say so, the vessel has been dated stylistically to *c*.250–400 CE by Fields and Reents-Budet (2005: 215, Figure 109). This same vessel also includes the spelling **ka^{2}-wa** for pCh' *käkäw "cacao" illustrated in Figure 7.1 above, see Section 3.1. Both spellings, **?-chi-K'IN** and **ka^{2}-wa**, support the proposition that the shift had already transpired by 250–400 CE. As Law et al. explain, this spelling of "west" represents an already idiomatic, phonetically reduced, and lexicalized version of a phrase they analyze as *7och-i-Ø k'iin* (enter-COMPLETIVE-3SA sun) "the sun entered" > *[7o]chik'iin* > *chik'in* "west," and one showing that item #89, GTz *7ooch from pM *7ook "to enter," that had already experienced the *k > ch shift, by the first half of the Early Classic period.[9] The not-insignificant phonetic reduction of clausal *7och-i-Ø k'iin* to monomorphemic *chik'in*, must have itself taken time to develop; its idiomaticity and lexicalization suggests that speakers and writers were very likely not attending to its phonological form in the written register.

There are certain problems with some of the data Law et al. (2014) present as the earliest uses of **chV** and **ch'V** signs, as cited in (2a–h). For example, they mention the use of T643/HT6 (2h), a sign that resembles a pair of breasts and has been suggested to read **chu**, and note its appearance in the eighth century CE, apparently among their epigraphic evidence for the late appearance of **chV** and **ch'V** spellings. If correctly deciphered, the sign would have to be acrophonically derived from

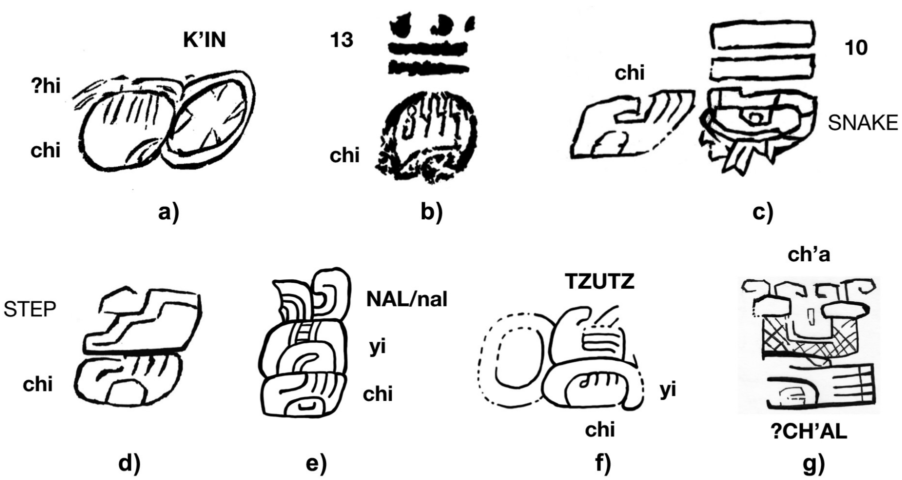

Figure 7.2 Early examples of signs with **chV** and **ch'V** values

Notes: a) Spelling **K'IN-hi-chi** on lidded tripod vessel dated stylistically to *c*.250–400 CE. Drawing by the author based on photograph in Fields and Reents-Budet (2005: 215, Figure 109). b) 13-Deer expression using T671/MR7 **chi** sign. Drawing by Špoták (2017: 78, Fig. 11). c) 10-**chi**-SNAKE expression on Kaminaljuyu Stela 10. Drawing by the author. d) STEP-**chi** expression on Dumbarton Oaks quartzite pectoral. Drawing by the author. e) Detail from Tikal Stela 7:A7. Drawing from Schele (1990: 121). f) **yi-chi-nal** expression from Tikal Stela 31:C20. Drawing from Schele (1990: 99). g) **ch'a-?CH'AL** expression on K1955. Drawing by the author after photo in Wagner (2001).

pCh' *chu7 "(women's) breast," from pM *chu(u)7, and is thus not relevant to the *k > ch shift at all. They also cite spellings that remain unclear, in their words "opaque," as to their precise lexical, and therefore, historical identification, such as their example (2b), a spelling **chi-hi**. Their example (2e), a spelling **cha**-SKY for pCh' *chan from pM *ka7nh "sky" (item #63), is attested on an inscribed bone from Dzibilchaltun in the northern lowlands, almost certainly in Yucatecan territory, and is more likely an example of Yucatecan or bilingual Ch'olan/Yucatecan scribes associating themselves with the prestige of Ch'olan speech, rather than a case of Ch'olan scribes reflecting a change that is taking place in their speech. Their example (2f), **yi-cha-ni** for *y-ichan* "his mother's brother" (item #82, from pM *7ikaan) on Yaxchilan Lintel 58, dated to 780 CE, is actually the latest-dated of the four inscriptions with this expression, ranging between 734 and 780 CE. Regardless of their late date, it is difficult to assess its significance since there are no prior examples of the "mother's brother" expression, reflecting the shift or not. The same is true of (2d): while it is true that the earliest example of the logosyllabic spelling **ch'a-CH'AM**, for pCh' *ch'äm "to take, grab" (item #101, from pM *k'am), dates to 662 CE, there are no prior examples of this expression with **k'a**, pointing to **K'AM**. In fact, there are fewer than a handful spellings of **k'a-ma**, their context is not very clear and it is not obvious that they represent the same root, not to mention that they postdate the **ch'a-CH'AM** spelling, starting *c.*692 CE. The case of (2c) is again similar: there are no prior or later examples of this logogram involving a **k'a** sign to suggest that it was ever read **K'AB'*** for WM+LL *k'ajb' "to fast, to abstain" (item #104). Lastly, example (2g), the T590/HJ1 **cho** syllabogram, first attested by 652 CE, depicts a jaw with molar teeth, and likely developed acrophonically from pCh' *choh "cheek" (item #70), itself from pM *kooh "molar tooth" or "molar tooth; cheek." This sign actually appears in an Early Classic text, a sixth-century lidded vase, K5509, described by Coe (1973: 84–6), in a spelling **cho-ja**, probably verbal, that remains undeciphered, and thus its status as spelling a reflex of pM *ch('), *k('), or *ty(') cannot yet be tested. However, if one assumes its acrophonic origin is based on pCh' *choh from pM *kooh, it would provide evidence for the *k > ch shift before the vowel *o prior to the Late Classic. Geographically speaking, the data points adduced by Law et al. are too few and scattered to suggest a pattern of spread. At best, what they show is a trend among scribes from different regions to begin to deviate from traditional spellings, mostly logographic spellings.

Table 7.2 presents more examples of early occurrences of **chV** and **ch'V** signs on reliably dated inscriptions that can be associated with etyma that experienced the *k(') > ch(') shift; most examples were collected using the Maya Hieroglyphic Database by Looper and Macri (2011–present. They allow for more detailed assessment of some patterns than the examples by Law et al. (2014). For instance, the **chu** examples at Copan are likely employed in spelling pCh' *chum from (G)LL *kyum "seated" (item #79), which was never spelled with **ku**, and in fact, it was almost invariably spelled logographically, as SEATED. Scribes may very well have read it as **CHUM** from its earliest examples (e.g., Leyden Plate, *c.*320 CE), but the only syllabogram used in its spelling was postposed **mu**, typically infixed graphically within the logogram (i.e., **CHUM/KUM[mu]**), to spell the final consonant of the root, instead of a preposed syllabogram **chu** or **ku** that would have easily disambiguated the

Table 7.2 Earliest-dated occurrences of chV and ch'V signs in Maya Hieroglyphic Database representing examples of *k(') > ch(') shift

Sign	Site	Text	Date	CE	Spelling	Proto-Ch'olan	Gloss	Proto-Mayan
cha	El Zapote	Stela 1	8.19.10.0.0	426	**CHA7 7AJAW**	*cha7	metate	*kaa7
cha	Tikal	Stela 31	9.0.10.0.0	445	**chi-CHA7**	*chih *cha7	agave metate	*kiih *kaa7
chi	Tikal	Stela 31	9.0.10.0.0	445	**yi-chi-nal**	—	in his presence	GLL *7iky-an-al
chi	Tikal	Stela 9	9.2.0.0.0	475	**7i-TZUTZ-yi[chi]**	*-ich	already	*-ik
che	Copan	Papagayo Step	9.3.0.0.0	495	**che-7e-na**	*che7	quotative particle	*kih
che	Copan	Stela 34	9.3.0.0.0	495	**che-7e-na**	*che7	quotative particle	*kih
chi	Collection	Panel	9.3.3.16.04	498	**7OCH-chi-K'AK'**	*7och	enter	*7ook
che	Arroyo de Piedra	Stela 01	9.9.0.0.0	613	**che-7e**	*che7	thus	pCM *hek ~ *hik
che	Chactun	Stela 01	9.16.0.0.0	751	**che-he-na**	*che7	quotative particle	*kih
ch'a	Seibal	Tablet 09	9.16.0.0.0	751	**che-he-na**	*che7	quotative particle	*kih
chu	Copan	CPN 40/Stela 02	9.11.0.0.0	652	**chu-ni-ya (chu-*mu-*wa-ni-ya)**	*chum	seated	GLL *kyum
chu	Copan	CPN 61/Stela 12	9.11.0.0.0	652	**chu-wa-ni-ya (chu-*mu-wa-ni-ya)**	*chum	seated	GLL *kyum

linguistic affiliation as either Ch' or Yu. What we see at Copan by 652 CE are probably incomplete spellings aimed not at representing a change-in-progress, but at asserting, after centuries of ambiguity, a specific linguistic identity.

It is important to highlight that the spellings of the pCh' *che7 "thus" (item #124), first attested by 613 CE, and *che7 "quotative particle" (item #53), appearing by 495 CE, are *only* spelled with **che**; perhaps these grammatical morphemes, which could probably only be spelled phonetically, were not tied to sociolinguistic attitudes and ideologies—there are no cases of **ke-he/7e-na** or **ke-7e**.

The glyphic expression **yi-chi-nal** (Figure 7.2), listed in Table 7.2, attests to a positional root that was innovated within the GLL area as **7iky* "facing someone (/something?)" (Kaufman with Justeson 2003: 304). It is not attested in any Colonial or contemporary Ch'olan language, but it is attested in Yucatecan (Yucatec, Itzaj), as in Yucatec *t-uy-iknal* "in his/her presence" (PREPOSITION-3SINGULAR.ERGATIVE-presence) (Bricker et al. 1998: 11), and Tzeltalan, as in Tzotzil *ta k-ichon* "in front of me" (PREPOSITION-1SINGULAR.ERGATIVE -presence/front) (Laughlin 2010: 113). The earliest attestation is found on Tikal Stela 31, dedicated on 445 CE, spelled **yi-chi-nal**, for *y-ich(V)n-al* "in his/her presence" (3SINGULAR.ERGATIVE-presence-ABSTRACTIVIZER), a relational noun. It is never spelled with **ki**.

Table 7.2 also includes the spelling **7i-TZUTZ-yi[chi]** (Figure 7.2f), for *7i tzutz-uy-Ø+ich* "and.then it was finished already" (and.then finish-INCHOATIVE/VERSIVE-3SINGULAR.ABSOLUTIVE + already), on Tikal Stela 9, dated 495 CE. The **yi-chi** sequence spells two morphemes: a -V_1y "inchoative/versive/ingressive" suffix (Mora-Marín 2007), and a reflex of pM *+ik "already" (Kaufman 2015: 208) corresponding to item #29 in Appendix C, and its GTz reflex *+ich (Kaufman and Justeson 2007: 199). This suffix is attested in dozens of Classic texts, most of them portable ones, spelled either **ji-chi** or **yi-chi** depending on the preceding suffix (whether it is *-aj*, with final *j*, or *-Vy*, with final *y*), with Tikal Stela 9 being the only case I know of on a stela. There are earlier texts that bear relevant data, though they lack archaeological context and calendrical data. One such case is the Dumbarton Oaks pectoral, dated stylistically to *c.*300–1 BCE (Coe 1966; Mora-Marín 2001) or 100 BCE–100 CE (Fields and Tokovinine 2012). On it is found a spelling of a dedicatory verb, STEP-**chi** (Figure 7.2d), as proposed in Mora-Marín (2001: 256, n. 180), that closely parallels instances on later texts (e.g., STEP**[yi]-chi**, GOD.N-**yi-chi**, **K'AL-la-ja-ji-chi**, **ya-ja-ji-chi**). In this way, from the Late Preclassic through the Late Classic, the consonant of this enclitic was only ever represented with **chi**, reflecting the shift.

Consequently, the sociolinguistic neutrality apparent in the spellings of *che7 "thus" and *che7 "quotative particle" would also seem to apply to the relational noun *y-ichVn-al* "in his/her/its presence," the **ji/yi-chi** spellings of the enclitic *+ich* "already," and the **chi-K'IN** spelling for *chik'in* "west": whether due to their nature as grammatical constructions (*che7*$_1$, *che7*$_2$, *y-ich(V)n-al*, *+ich*) or as phonetically eroded lexicalized idioms (*chik'in*), scribes did not vary their spelling, representing them phonetically and doing so reflecting only the forms exhibiting the shift.

More tentative is the case of "metate," item #67, also on Table 7.2. Stuart (2014) presented preliminary arguments in favor of a logographic value of sign ZE5 (Macri and Looper 2003) as **CHA7** or **KA7**, representing a reflex of pM *ka7 "metate," pCh' *cha7. Shortly afterward, Stuart (2018) presented evidence for the use of ZE5 as a word-final substitution for the T671 syllabogram **chi** in the **K'INICH-chi** expression, as **K'INICH**-ZE5, suggesting that ZE5 does in fact have an initial consonantal value /ch/. Stuart narrowed down the logographic value of ZE5 as **CHA7**. He further suggested that T671 **chi** functioned to spell pCh' *chih "maguey" from pM *kiih (item #51), and that together, **chi-CHA7** yields *chih cha7* "maguey metate." If proven correct, the earliest example of the ZE5 logogram on El Zapote Stela 1, dated to 426 CE, would support the *k > ch shift both for "metate" and "maguey."

In addition to the Peten-style lidded tripod vessel with the **?-chi-K'IN** and **ka²-wa** spellings from *c.*250–400 CE, there exist spellings involving **chV** and **ch'V** signs that predate the examples discussed so far. Law et al. (2014: 362) dismiss one of the earliest uses of T671/MR7 **chi**, arguing that it may have functioned logographically instead[10]:

> While this sign itself is not iconographically transparent, early use of this sign within a cartouche for the day sign "manik" or "deer" in the pan-Mesoamerican calendar suggests that this sign takes its value from the word *chij* "deer" (from proto-Mayan **keeh*). Since the earliest uses of this sign are logographic, representing a day in the calendar round, however, it is entirely possible that it indicated "deer" prior to the sound change (**kiih* or **keeh*) but was only recruited as a syllabic sign after the sound change had affected that word.

By "the earliest uses of this sign are logographic, representing a day in the calendar round," the authors seem to be referring, though not explicitly, to the early Uaxactun Structure B-XIII murals (Smith 1950), discussed in connection to the *k(') > ch(') shift by Kaufman and Justeson (2007: 199). On the murals, recently studied by Špoták (2017: 81–2), who dates them to either 378 or 402 CE, T671/MR7 **chi** is used in the spelling of the seventh day name in the ritual calendar, "deer," in a 13-Deer day count (Figure 7.2b).[11] Law et al. (2014) dismiss its significance by arguing that it may have been used logographically, via some indirect and unexplained association left unresolved. Nevertheless, there is evidence that the use of the **chi** syllabogram may have in fact been phonetic. At the site of San Bartolo, Beltrán (2008: 43) briefly reports on the discovery of a text fragment topped with the expression "seven deer"; a photograph of the fragment illustrated by Hurst (2009: 301, Fig. 33e) shows a DEER.HEAD sign used as a day sign logogram topped by a bar-and-dot numeral "7." This 7-DEER collocation from San Bartolo, presumably of Late Preclassic date (*c.*100 BCE?), supports the likelihood that the spellings from Uaxactun are indeed phonetic—instances of the syllabogram **chi** used to spell pCh' *chihj > *chij "deer." In other words, since Late Preclassic period scribes had access to a thoroughly iconic logogram for that day name, the early use of T671/MR7 **chi** at Uaxactun makes more sense as a purely phonetic sign usage.

There are instances of T671/MR7 **chi** in Late Preclassic texts that suggest a phonetic function and also correspond to cases of the *k > ch shift (Mora-Marín 2001, 2008). Perhaps the earliest one is present on Kaminaljuyu Stela 10, previously dated stratigraphically to *c.*400–200 BCE (Shook and Popenoe de Hatch 1999), but more recently to *c.*100 BCE (Inomata and Henderson 2016). In it is found a spelling of **10-chi**-SNAKE (Figure 7.2) that likely spells '10 Chicchan' (Mora-Marín 2005: 71).

This term involves the etymon "deer" as the first term of a compound for "boa constrictor": Ch'orti' *chijchan* and Colonial Yucatec <chicchan> ~ <chijchan> "boa constrictor," literally "deer=snake." The term for "deer" is reconstructed as pM *kehj and underwent the *k > ch shift in the GTz languages, as well as a sporadic vocalic change of *eh > ih > i, unrelated to the *ee, *e7 > ii > i shift characteristic of Ch'olan languages. Prior to this sporadic vocalic change, but after the **k* > *ch* shift, it was borrowed as *chej* into Chujean and Q'Cx. Mocho' alone retains the reflex of pM *kehj as *keej*. The pGTz term **chihj=chaan* "boa constrictor" is attested in Chuj as *chej=chan* (Hopkins 2012: 51): it must have been borrowed from a Pre-GTz form **chehj=chaan*. One may wonder whether the GQ' languages borrowed *chej from GM instead: Ixil, Awakatek, and most varieties of Mam in fact show *cheej* or *chej*, with two varieties of Mam showing *kyeej/kyej*. However, no GM language shows *chan* or *chaan* for "snake"; thus, a loan like Chuj *chej=chan* is much more likely to have come from GTz. Consequently, the Kaminaljuyu Stela 10 spelling likely postdates not only the *k > ch shift, but also the sporadic vocalic change of Pre-GTz *chehj > pGTz *chihj > pCh' *chij, and the Chuj loan must predate such spelling, as it preserves the vowel *e*.

The example in Figure 7.2g is part of a "Protoclassic" text inscribed on a stone sculpture of Goddess O, K1955, described by Wagner (2001) and also by Fields and Reents-Budet (2005); the latter authors describe the sculpture as dating to *c.*100–350 CE. This text bears the spelling T93/2G2:T713/MR2, the first sign being a syllabogram **ch'a**, the second the logogram **K'AL** "to bind." Interestingly, Kaufman with Justeson (2003: 1000) document the reflexes of pM *k'al, generally with meanings related to "amarrar (to tie (up), to bind)," in Yu, GK', and GM; this distribution would make it a LpM (aka Southern Mayan) term. However, they do not provide attestations in any of the GTz languages. I believe that Yokot'an (Chontal) *ch'äl* "enredar (to tangle (up))" (Keller and Luciano 1997: 98, 100), Ch'ol *ch'äl* "adornar" (Aulie and de Aulie 2009: 31), Tzeltal *ch'al* "adornar" (Slocum et al. 1999: 36), and Tzotzil *ch'al* "amarrar (to tie (up), to bind)" (Laughlin 2007: 83) are the relevant cognates. These cognates point to pGTz *ch'al "to tie (up), to bind; to adorn," which could explain the Early Classic spelling **ch'a-**FLAT.HAND in question: the spelling could point to a reading **ch'a-CH'AL** for *ch'al* "to bind; to adorn." Pictorial imagery in Mayan art associated with dedicated objects often appear to refer to the binding, but occasionally the binding appears to be a type of adornment, as with the case of the imagery on the Copan peccary skull, a detail of which is seen in Figure 7.3. This presumed GTz term, *ch'al "to bind; to adorn," would then join Ch' *chol "to clear fields; milpa" as exceptions to the first inhibiting environment proposed by Kaufman and Norman (1984: 84), in word-initial position before a vowel other than /i/ followed by an apical consonant. It points to a GLL etymon *ky'al that likely diffused far and wide, beyond the GLL area, preserved as *k'al outside of GTz. It is worth noting that after the **ch'a-CH'AL** spelling, the next example with a phonetic complement is found in the Po Panel, dated to 521 CE, an Early Classic spelling **k'a-ja-K'AL** for *k'a[h]l-aj-Ø-Ø* (close[(MEDIO)PASSIVE]-INTRANSITIVIZER-COMPLETIVE-3SINGULAR.ABSOLUTIVE) "it was/got closed/wrapped." Scribes were thus making a choice when favoring **k'a**, and this choice would likely be based on sociolinguistic accommodation, to promote interlingual literacy of logographic or logosyllabic spellings.

Figure 7.3 Detail of incised peccary skull from Copan Tomb 1

Note: Photo and line drawings by the author.

Finally, Table 7.3 presents examples of **chV/ch'V** signs spelling etyma that can be traced back to pM *ch, *ch', *ty, *ty', or whose history cannot be confirmed, as they are attested only in Ch', lacking outside cognates. One such case is the root *chok "to throw down," the root represented in the so-called "to scatter" verbal expression. Its preposed phonetic complement, T590/HJ1 **cho**, is first *confirmed* on a reliably dated inscription at 652 CE. Law et al. (2014) highlight this sign because it is acrophonically derived from pCh' *choh "cheek," traced back to pM *kooh (item #70); in pM it may have meant "molar tooth" or possibly "molar tooth; cheek." Although its earliest, reliably dated example is Late Classic, it also appears in an unprovenienced Early Classic text, a sixth-century lidded vase described by Coe (1973: 84–6), in a spelling **cho-ja** that remains undeciphered (perhaps an abbreviated spelling of **cho-*ka-ja** for *cho[h]k-aj-Ø-Ø* "it was thrown down" (throw.down[PASSIVE]-PASSIVIZER-COMPLETIVE-3SINGULAR.ABSOLUTIVE). Even if this means that its use as spelling a reflex of pM *ch('), *k('), or *ty(') in such context cannot yet be tested, it does support the *k > ch shift in pCh' *chok having already occurred no later than the Early Classic, by *c.*600 CE.

To summarize, there is evidence from Late Preclassic and Early Classic texts supporting an early date for the *k > ch shift (Justeson et al. 1985; Kaufman and Justeson 2007, 2009). Some of these examples include grammatical morphemes and idiomatic/lexicalized expressions, which were only spelled in Mayan texts in a manner reflecting the shift. I propose that scribes lacked strong sociolinguistic attitudes associated with

Table 7.3 Earliest-dated occurrences of **chV** and **ch'V** signs in Maya Hieroglyphic Database not relevant to *k(') > ch(') shift (from pM *ch, *ch', *ty, *ty')

Sign	Site	Text	Date	CE	Spelling	Proto-Ch'olan	Gloss	Proto-Mayan	*k > ch shift?
ch'a	Tikal	Ballcourt marker-Marcador	8.19.0.0.0	416	**ch'a-CH'AMAK**	Yucatecan *ch'umak > Yucatec *ch'omak* ~ *ch'amak*	fox	—	Not known
chi	Collection	Jade Museum plaque	8.19.10.14.0	426	**TUN-chi**	Yuc. *tùunich*	stone	—	Not known
ch'o	Uaxactun	Structure B-13 Mural	9.2.0.0.0?	475?	**ch'o-ko**	*ch'ok	unripe, young child		Not known
ch'o	Pacbitun	Stela 06	9.2.10.0.0	485	**ch'o-ko**	*ch'ok	unripe, young child	—	Not known
ch'a	Quirigua	Monument 26	9.3.0.0.0	495	**ch'a-ho-ma**	?ch'aj-om	dripper	*ty'aj- 'dripping, splattered'	Irrelevant
chu	Yaxchilan	Lintel 18	9.4.12.0.0?	526?	**[ku]chu-TE7**	*kuch	to carry	WM+LL *kuch	Irrelevant
chi	Nim Li Punit	NMPJP	9.6.14.10.0	568	**K'IN-ni-chi**	Yuc. <kinich>	Sun God	—	Not known
chu	Dzibanche	Monument 13	9.7.0.0.0	573	**chu-?-ja, chu-?ka-?**	*chuq	to capture	*chuq	Irrelevant
che	Caracol	Stela 06	9.8.10.0.0	603	**che-ka-ja**	*chek	visible	WM+LL *chik, WM *chek.el	Irrelevant
chu	Coba	Stela 11	9.10.0.0.0	633	**chu-ja**	*chuk	to capture	*chuq	Irrelevant
cho	Copan	CPN 62/ Stela 13	9.11.0.0.0	652	**7u-cho-ko-?wa**	*chok	to throw down	—	Not known
chu	Calakmul	Stela 09	9.12.0.0.0	672	**chu-ka-ja**	*chuk	capture	*chuq	Irrelevant

grammatical markers, unlike the case of lexical roots/stems, such as GLL *ky'al > pGTz *ch'al.

4. Conclusions and implications

The philological evidence, both new and old, reviewed and presented in this chapter allows for the following conclusions:

(1) Positive evidence points to the spellings of several examples of the *k(') > *ch(') shift by the Late Preclassic and beginning of Early Classic periods, in spite of the fact that logographic spellings were the norm for most lexical items that experienced the shift.
(2) Crucially, loanwords with /k/ into Epigraphic Mayan attested during the Early Classic and Late Classic periods did not experience the *k(') > *ch(') shift, which can only be the case if the shift had already occurred prior to their earliest attestations (e.g., 250–400 CE for pCh' *käkäw "cacao" from Mixe-Zoquean *kakawa).
(3) Ambiguities and oscillations in spelling patterns were likely responses to sociolinguistic attitudes and ideologies by scribes, including accommodation through interlingual literacy, appeals to conservatism through archaic spellings, and instantiations of distinct phonological markers as acts of identity perhaps by Ch'olan/Yucatecan bilinguals.
(4) A model based on sociolinguistic attitudes and ideologies is better suited to explaining the fact that spelling ambiguities are evident in lexical roots and stems, some of which would have been highly culturally and politically salient (e.g., pCh' *chum "seated"), whereas grammatical particles and constructions (e.g., inflectional and derivational affixes, enclitics, relational nouns) and phonetically reduced and lexicalized expressions (*chik'in* "west") that experienced the shift, and which may not have been as salient, were consistently spelled phonetically in such a way as to display the shift from their earliest attestations.
(5) A few of the signs and spellings adduced by Law et al. (2014) are irrelevant to the shift (instead reflecting pM *ch(') or *ty(')); those that are relevant, most of which date to the Late Classic period, lack a pattern of geographic spread, and in several cases are restricted to sites in the northern lowlands, where Yucatecan-speaking scribes were likely showing off their knowledge of Ch'olan pronunciations of words, or perhaps indexing their Ch'olan/Yucatecan bilingual identities by code-switching. Several of these items became incorporated, as loans, into the modern Yucatecan languages (e.g., *cháak* "rain; thunder").

In light of the data and conclusions, Kaufman and Norman's (1984: 85, 125, entry #263) proposal that pCh' *k'oj "mask" is a loan from a highland Mayan language (one that did not undergo the *k' > ch' shift), and that it must have coexisted with a native pCh' *ch'oj form, can be given additional support, much like the case of pCh’ *kab’ “earth,” borrowed from Yucatecan, but not entirely replacing GTz *chab’. In fact, pTz *k’oj “mask” can also be argued to be a loan, which means that a hypothetical GTz *ch’ooj can be proposed, one that was ultimately replaced almost completely, except in Ch’olti’, which exhibits both the reflex and the loan (i.e., <εo> for /k’oj/ and <choh> for /ch’oj/). This case also highlights the difficulty of identifying loans in Mayan writing that originate in other Mayan languages, for the spelling **k’o-jo** for pCh’ *k’oj “mask” has not been treated in recent discussions of loans in Mayan writing (Macri and Looper 2003; Macri 2005; Boot 2006; Pallán Gayol and Meléndez Guadarrama 2010) despite Kaufman and Norman’s (1984) proposal.

Finally, I return to Law et al.’s (2014: 362) claim that the “Data from Maya writing, however, are exceptional in showing patent adaptation in supple response to shifts in spoken language.” I do not dispute that Mayan scribes were capable of representing the important phonemic contrasts of their linguistic varieties, or to adapt the script to real-time changes. In fact, as noted by Campbell (1990: 100–1) with regard to Colonial K’ichee’ scribes, it is likely that ancient Mayan scribes were capable of isolating and representing non-contrastive, allophonic details of their speech. Nevertheless, Law et al.’s hypothesis for a very late spread of the *k(’) > ch(’) shift calls for an unnecessarily complex scenario. It requires that we assume that scribes were in fact interested in reflecting their spoken language accurately, at all times and places, throughout the two-millennium history of the script, instead of behaving like people with sociolinguistic attitudes and ideologies, concerned with prestige and stigma, political and social alliances, which often lead them to use language and writing in prescriptive and contradictory ways that may themselves shift radically over time as social valuations of linguistic practices themselves change. It also requires that we assume that the scribes ignored three phonemic contrasts that were retained in the Greater Tzeltalan languages for some time after the *k(’) > ch(’) shift had taken effect, namely, */k/ versus */q/, */k’/ versus */q’/, and */nh/ versus */n/. From the perspective of historical linguistics, the late *k(’) > ch(’) shift model also places a great deal of strain on our credulity: timing the *k(’) > ch(’) shift almost a millennium later than previously proposed (Kaufman 1976; Justeson et al. 1985; Kaufman and Justeson 2007) requires that it have spread to many already differentiated speech communities (Ch’olan languages, Tzeltalan languages) *in identical fashion* in spite of the complexity of the inhibiting factors, between the time when the shift was supposedly completed in the spoken language of Mayan scribes sometime in the middle-to-late Late Classic period, and outward, in the form of isolated loanwords at least, into a possibly still unified Yucatecan subgroup, and the already-by-this-time differentiated Greater Q’anjob’alan (Chujean, Q’anjob’alan Complex, Kotoke Complex) and Greater Mamean (Mamean Proper, Ixilan) languages.

The evidence presented in this chapter, both philological and comparative, along the same vein as was already explored by Lyle Campbell, and including some of the very same data and arguments he has advanced in the past (Campbell 2000: 5), suggests that the shift had already occurred prior to the early attestations of loanwords such as *käkäw “cacao,” starting *c.*200–450 CE, and probably by the time of the earliest attestations of the shift itself, as early as 100 BCE. Such constraints allow for the possibility that the shift could have in fact spread areally within a largely undifferentiated Greater Tzeltalan speech community by the Late Preclassic period, and then outward, in the form of loanwords or at best limited sound change rules, or both, onto largely undifferentiated Greater Q'anjob'alan, Greater Mamean, and Yucatecan speech communities as well starting in the Late Preclassic period and continuing into the Early Classic periods. It would also allow for enough time for the necessarily subsequent shifts and mergers (i.e., *q(') > k(') and *nh > n) to take place before phoneticism mainly in the form of phonetic complementation would become increasingly common during the Early Classic period.

Indeed, the data support Grube's (2010: 32) suggestion that the **kV** and **k'V** complements may have actually served to promote a more prestigious, archaic pronunciation—one that, in my opinion, may have been preserved by this time only in written texts, and perhaps ritual spoken registers. Such archaisms suggest a significant amount of institutionalization of scribal practices, one that promoted the retention of conservative spellings, one scribe after another, one generation after another, while innovations in the earliest texts from the Late Preclassic, and occasional departures from archaic spellings during the Early Classic and Late Classic, could be suggestive of occasional disruptions or changes in institutional practices (e.g., shrinking or expanding of scribal networks; political events leading to reorganization of scribal institutions), akin to the patterns of spelling variation described by Bricker (2015) in Colonial Maya testaments. Alternatively, instead of archaisms, many scribes may have been guided by a principle of interlingual literacy (Justeson and Fox 1989), implying a strategy of sociolinguistic accommodation between Ch'olan and Yucatecan scribes, many of whom were likely bilingual (Hopkins 1984, 1985). Among such bilinguals, in fact, code-switching in speech and writing may have been common.

Mayan scribes were not linguists, dedicated to documenting their speech varieties as faithfully as possible, apathetic to worldly matters, just like they were not peaceful astronomers dedicated to observing the heavens, mystified by their endless cycles. They were social and political agents motivated by complex and even contradictory linguistic attitudes and ideologies, exhibiting at times innovative tendencies, and at times conservative tendencies, depending on the changing patterns of social and cultural valuation of linguistic practices.

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Appendices: Datasets for the *k(') > ch shift.

Appendices A–D are based on data from Kaufman and Norman (1984), Kaufman with Justeson (2003), and Boot (2009) unless otherwise stated. Due to space limitations, the appendices *will be available on the Edinburgh University Press website* ~~<web address to be added at proof stage>~~.

Notes

1. I would like to thank John Justeson for correspondence on some of the data items relevant to this chapter, including proto-Ch'olan *wich' "wing," and for directing me toward the entry in Kaufman with Justeson (2003) relevant to the positional root *7iky- "facing someone" of relevance to the yi-chi-nal expression. Any mistakes in the citation of the data are entirely my own.
2. Campbell (2017: 45) states: "It has generally been accepted that Ch'olan-Tseltalan and Greater Q'anjob'alan belong together in a single branch (sometimes called Western Mayan), though this has never been completely confirmed."
3. Kaufman (1976: 106) argued that Eastern Mayan departed from the homeland after Huastecan and before Yucatecan. Subsequently, Kaufman (1990, 2015, 2017) posits that Yucatecan broke off after Huastecan and before Eastern Mayan.
4. Robertson (1977: 113–14), who in the process of carrying out a comparison of Popti', Q'anjob'al, Chuj, Tojolabal, Tzotzil, and Tzeltal, defined the *k > ch shift as a trait shared by Chuj, Tojolabal, Tzotzil, and Tzeltal. He did not address the Ch'olan languages in connection to this shift.
5. Another such item is the Lowland Mayan term *k'aab'aa7 "name," which likely replaced pM *b'ih "name" in Ch'olan (cf. Tzotzil b'i "name"). It is likely that it diffused from Yucatecan into Ch'olan after the *k > ch shift, or else it is possible that it could have been originally *q'aab'aa7, in which case it would not have undergone the shift. Similarly, the Tzeltal term k'intun ~ k'inton "rainbow" is attested also in Tojolob'al as k'intum and in Mocho' as k'emtum; Kaufman with Justeson (2003: 470) propose a reconstruction to WM as *k'intum but note that it has been diffused. It is also possible that it avoided the shift in GTz because of diffusion into GTz subsequent to the occurrence of the shift; but given that Mocho' preserves pM *q', it did not avoid the shift because of the presence of earlier *q'.
6. Interestingly, Justeson et al. (1985: 60) have also observed that while Q'P retained pM *xiik' "wing," and Chuj innovated a unique form, k'axi7il "wing," Tojolab'al exhibits a form wech' "wing," corresponding to Ch' as *wich'; since this form is suggestive of the *ee > ii > i shift of Ch'olan, it may have been borrowed as *weech' into Tojol-7ab'al (or possibly Chujean more generally), or vice versa, from Tojolob'al (or Chujean) into Ch'olan, prior to the *ee > ii > i shift in Ch'olan, which would place the Ch'olan *ee > ii > i shift after the *k' > ch' shift. This in turn would mean that the earliest spellings attesting to the *ee > ii > i shift in Epigraphic Mayan, documented in the adverbial enclitic sequence +ij+iy "since," from pM *+eej+eer, on the Tikal Ballcourt Marker (416 CE), would also serve as absolute anchors for the *k' > ch' shift. However, since there are no

cognates of pCh' *wich' in Mayan languages that did not experience the shift or borrow etyma including evidence the shift, this cannot be confirmed.

7. Although Law et al. (2014) do not cite Grube's (2010) work, it is likely that multiple epigraphers were becoming aware of the pattern of preposed phonetic complements with chV and ch'V signs around the same time.
8. "Hypercorrection" would imply that the Ch'olan terms were used "incorrectly" or outside their normal context by the likely Yucatecan scribes, but this was not the case: the spellings in question were being used in their proper contexts. Instead of hypercorrection we are probably witnessing borrowings or cases of code-switching.
9. Hopkins and Josserand (2011: 7–8) describe the etymological derivation carried out by them in conjunction with Terrence Kaufman in 1990; they proposed an expression *7och-ib' k'in "the door of the house of the Sun (where the Sun enters)" as a metaphor for "west," which eventually became reduced: *7och-ib' k'in > [7o]ch-i[b'] k'in > chik'in. In Yucatec and Itzaj, at least, this would constitute another loan. In Mayan languages, Hopkins and Josserand (2011) show, the terms for "east" and "west" are typically based on the terms for "exit" and "enter," respectively, plus an instrumental/locative. Thus, *7och-ib' k'in, with *-ib' "instrumentalizer," is a more likely origin for chik'in "west."
10. The evidence for reconstructing the pM "deer" root as *kehj, rather than *keej, is quite strong (cf. Yucatec kéeh < *kehj; Tzeltal chihj). Pre-Greater Tzeltalan likely had *kehj, not *kij, as a reflex of Proto-Mayan *kehj prior to the*k(') > ch(') shift.
11. The Uaxactun murals bear at last one instance of a non-calendrical T671/MR7 **chi**, which is regrettably largely erased, and its potential function thus unclear.

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