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TSOTSIL PHONEMES WITH SPECIAL REFERENCE TO ALLOPHONES OF B

NADINE WEATHERS  
SUMMER INSTITUTE OF LINGUISTICS



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0. Purpose

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0. The Tsotsil language is a member of the Mayan family and is spoken by a minimum of 34,000 Indians living in the state of Chiapas, Mexico.<sup>1</sup>

One of the most interesting features of Tsotsil phonemics is the phoneme b which has the submembers [b], [ʔb], [ʔm], and [ʔM]. The problem involved in its analysis will be presented against the background of the Tsotsil phonemic structure as a whole.

1. Tsotsil has twenty-six phonemes, including twenty-one consonants: b, p, t, k, c, č, ʔ, p', t', k', c', č', m, n, s, š, h, v, y, l, r; and five vowels: i, e, a, o, u.

2.1. b [b], [ʔb], [ʔm], and [ʔM]. Voiced bilabial stop with glottal influence.<sup>2</sup> This is a complex phoneme whose distribution and phonetic variants are as follows.

Utterance initial: [ʔb] (voiced bilabial stop preceded by a weak glottal stop) bot [ʔbot] *hail*.

Utterance medial. Preceded and followed by vowels: [ʔ.b] (voiced bilabial stop pre-

<sup>1</sup>The material in this article was collected in the village of Nabenchau where the Zinacanteco dialect, which varies slightly from other dialects in the tribe, is spoken. María Pérez has been the informant used during the investigator's four years of residence in the village.

<sup>2</sup>It is interesting to note that in certain related dialects (for example, the Cakchiquel of Guatemala), the parallel phoneme is an implosive bilabial stop.

ceded by a glottal stop; with syllable division between, as indicated by a lowered dot) čibuk [čiʔ.buk] *just two*; ta bamil [taʔba.la.mil] *in the world*. Preceded by a stop: [b] (voiced bilabial stop without glottal influence) makbil [mak.bil] *covered*; ʔamak be [ʔa.mak be] *you covered the road*. Preceded by other consonants: [ʔb] (voiced bilabial stop with glottal influence) pasbil [pas.ʔbil] *made*; ʔapas be [ʔa.pas ʔbe] *you made a road*. Followed by a consonant: [ʔm] (voiced bilabial nasal preceded by weak glottal stop, plus nasalization and glottalization of the preceding vowel) čobtik [čɔʔm.tik] *cornfield*; ʔilub ta ʔora [ʔi.luʔm ta ʔo.ra] *he tired immediately*.

Utterance final.<sup>3</sup> [ʔM] (voiceless bilabial nasal preceded by a weak glottal stop, plus nasalization and glottalization of the preceding vowel) čib [či ʔM] *two*.

The morphological evidence tends to give strong support to the conclusions arrived at by the phonological procedures of observing the mutually exclusive positions of the submembers of this phoneme. Additional evidence is especially welcome at this point because of the marked phonetic difference between the submembers of the phoneme. In languages in general one rarely finds as submembers of one phoneme items as sharply diverse as [b] and [ʔm]. Nevertheless the phonological pressure of the mutually exclusive phonetic environments in which they occur leaves no other alternative.

The morphological evidence supporting this conclusion is as follows: morphemes

<sup>3</sup>Note that utterance final position is phonologically marked by: voiced stop b > [ʔM]; voiceless stops > heavy aspiration; h > pronounced velar friction; voiced consonants (except nasals and r) > voiceless offglide.

which contain the phoneme b have the phonetic actualization of that phoneme modified in accordance with the distributional rules given above whenever morphological processes modify the environment of that phoneme. That is to say, that the phonemic unit remains the same in any given morpheme even though the phonetic form of the phoneme is varied.

Note, for example, the morpheme *ceb girl*: (1) In isolation or at the end of utterances the morpheme would be phonetically [ceʔM]; (2) Within a phrase, when followed by a consonant of another word, the phonetic form would be [ceʔm], as in [mi ceʔm to] *is she still young?*; (3) Followed by a suffix beginning with a vowel, as for example *-etik plural*, the morpheme would be [ceʔ.b-], as in [ceʔ.be.tik] *girls*; (4) Followed by a suffix beginning with a consonant the morpheme would be phonetically [ceʔm.-], as in [ʔa.ceʔm.tak] *your girls*. Written phonemically, the illustrations just given would appear as follows: *ceb girl*, *mi ceb to is she still young?*, *cebetik girls*, *ʔacebtak your girls*.

If the phonemic interpretation given here were rejected, and [ʔb], [ʔm], and [ʔM] were considered sequences of phonemes, then the investigator describing the morphology would have to have a statement showing the universal substitution of these sequences for b under strictly defined phonological conditions on a level of analysis of the grammatical structure of the language. However, this would entail a type of morphological process which has no parallel elsewhere in the language.

We conclude therefore that it is preferable to consider [b], [ʔb], [ʔm], and [ʔM] as submembers of a single phoneme written simply b.

In other positions the glottal stop as a separate phoneme is somewhat similar to the glottal stop<sup>4</sup> which is part of the phoneme b.

<sup>4</sup> Initially in utterances the phonetic glottal stop which occurs with and as a part of b is rather

At first this occurrence of [ʔ] in both the phonemes ʔ and b would appear to invalidate the phonemic analysis presented since it might seem to imply that actual intersection of phonemes were present. Consider, however, a partially parallel situation in English. The phoneme h occurs at the beginning of the word *heel*. In the word *peel* the stop [p] is followed by a phonetic [h] which is quite similar to the [h] of *heel*. Nevertheless we consider the phonetic combination [p<sup>h</sup>]<sup>5</sup> as a single phoneme (1) because it is phonologically in complementary distribution to unaspirated [p] and (2) because [p] does not occur without an aspiration in many phonological positions such as the beginning of a heavy stressed syllable. Furthermore, (3) the complex [p<sup>h</sup>] functions as a single unit in determining the syllable structure and the sequences which make up syllables so that [p<sup>h</sup>] acts as a single consonant in the structural setup of the language. We conclude then that the English aspirated p is a single phoneme which is phonetically complex, rather than being comprised of a sequence of phonemes which includes [p] and a variety of [h] that is slightly modified due to the fact that it occurs in such a sequence.

Consider now the parallel with Tsotsil. (1) [ʔb], [ʔm], and [ʔM], are all in complementary distribution with b and with each other. (2) In certain phonological environments [b] does not occur unless the glottal stop accompanies it. (3) [ʔb] acts as a single unit in the syllable structure as portrayed in section 3 of this paper. In Tsotsil we conclude, therefore, that the [ʔb] is a phonetically-complex submember of the phoneme b, rather than being comprised of a sequence of phonemes which

weak or lenis and in phonetic contrast to the rather fortis nature of that which occurs as a regular initial phoneme ʔ.

<sup>5</sup> We have raised the h, rather than writing it on the line, in order to avoid the complications which come into the discussion if we include such words as *loophole* in which one may find the sequence [-p<sup>h</sup>.h-].

includes [ʔ] and [b]. If it is legitimate to conclude that the aspirated p of English is a single phoneme without intersection of the phoneme h, it is equally legitimate to conclude that [ʔb] of Tsotsil is a phonetically-complex single unit constituting a sub-member of the phoneme b.

When a glottal stop phoneme ends a word and this word precedes a word beginning with the phoneme b in its phonetic form [ʔb], the weak glottal stop of the second word disappears and the strong glottal stop of the first word remains. In this case a problem is created in that [-V ʔ.bV] is phonetically quite similar to [-Vʔ. bV]. Instrumental studies are needed to determine the degree of similarity. The analysis of the [ʔb] as one phoneme, however, on the analogy of English [p<sup>h</sup>], would remain the same.

p, t, k<sup>6</sup> voiceless aspirated bilabial, alveolar, and velar stops; as in pop *straw mat*, tok *cloud*. These become more strongly aspirated in utterance final position.

c, č voiceless aspirated alveolar and alveopalatal affricates; as in cekil *skirt*, čuč *squirrel*.

ʔ glottal stop; as in voʔ *water*, ʔavuʔun *yours* (compare vo *house fly*, ʔavun *your paper*).

p', t', k', c', č' voiceless glottalized bilabial, alveolar, and velar stops, and voiceless glottalized alveolar, and alveopalatal affricates; as in p'in *pot*, t'ul *rabbit*, k'ok' *fire*, c'iʔ *dog*, č'iš *thorn*, (compare pil *Philip*, tul *short stick*, kok *my foot*, cib *fern*, čiš-teʔ *cherry*).

m, n voiced bilabial and alveolar nasals, as in meʔ *mother* and in ničim *flower*.

s, š, h voiceless alveolar, alveopalatal, and glottal spirants as in sat *his face*, šan *palm*, hol *my head*. The h has heavy velar

<sup>6</sup> k and k' vary nonphonemically to a position farther front or back in the mouth when they occur next to front or back vowels respectively, as in kič *my chile*, kuʔun *mine*, ʔik' *wind*, hnuk' *my throat*.

friction in utterance final position, as in vah *tortilla*.

v, y [v, v<sup>V</sup>; y, y<sup>Y</sup>] voiced bilabial and alveopalatal spirants, as in voʔ *water*, and yan *more*. The v is freely variable to w or to labiodental v with some speakers. Both v and y have voiceless offglides in utterance final position, as in taiv *frost*, čoy *fish*.

l [l, l<sup>L</sup>] voiced alveolar lateral with voiceless offglide in utterance final position, as in kil *my debt*.

r voiced alveolar flap, rare in words of native origin, as in krem *boy*, but more frequent in borrowed words,<sup>7</sup> as in rominko *Sunday*.

2.2. i high front close unrounded, as in p'in *pan*; e mid front open unrounded, as in tem [tɛm] *bed*, a low central open, as in sat *his face*; o mid back open rounded, as in k'on *yellow*; u high back close rounded, as in mut *bird*. These vowels all become glottalized and nasalized when they occur in a closed syllable with the phoneme b as the final consonant, as in ʔabtel [ʔaʔm.tel] *work*.

2.3. Stress is lexically nonphonemic occurring on utterance final syllables: mi ʔaman ʔak'ál *did you buy charcoal?* However, sentence stress ['] occasionally indicates the center of emotional attention in short exclamations and possibly elsewhere, as in ʔák'al van *charcoal!*

3. Note the following types. Syllables beginning with a vowel are limited in occurrence to medial and final position in words:<sup>8</sup>

<sup>7</sup> Spanish loans introduce no new phonemes into the language.

<sup>8</sup> Words like ʔon *avocado* begin with a phonetic glottal stop. This stop remains in compounds such as yaš-ʔon *a variety of avocado*, or following the morpheme č, as in čʔalah *she gives birth*. However, when the morphemes y *his*, and k *my*, are prefixed to words beginning with ʔ, the ʔ is lost, as in ʔokoc *lizard*, yokoc *his lizard*, and ʔon *avocado*, kon *my avocado*.

V na.e.tik *houses*, ta.o *find it*.

VC sč'o.al.tak *its rats*, sč'o.al *its rat*.

CVCC syllable type occurs with only one word ?anc *woman*,<sup>9</sup> and retains this syllable form only at the end of utterances or before syllables beginning with a consonant. The following syllable types may occur initially, medially, and finally in words:

CV na *house*, hma.la.tik *let's wait*,  
ma.no *buy it*.

CVC tot *father*, sa.kub.ta.so *whiten it*,  
ča.nib *four*.

In words of native origin certain syllable types occur only initially in words:

CCV sna *his house*, ččam *he dies*.<sup>10</sup>

CCCV hkrem *my boy* (only known example that is not a loan word).

Loan words with stop plus r may form the following syllables:

CCCVC initially as in hkrus *my cross*.

CCV medially as in lim.pro.niš *quince*.

CCVC finally as in man.treš *tablecloth*.

4.1. Within the pattern of syllables CVC, CV, and VC described above any consonant may occur as the presyllabic or postsyllabic; except that r occurs only presyllabic. For illustrations of these various types note items quoted elsewhere in the paper.

As the first of two consonants in a presyllabic consonant cluster, the consonants h, s, š, č<sup>11</sup>, c may occur, as illustrated in eman *he buys it*, hna *my house*, sna *his house*, šme?mon *it is meowing*, čmuy *he ascends*.

As the third of three consonants in a

<sup>9</sup> There is only one word known in the language with a final consonant cluster, ?anc *woman*.

<sup>10</sup> The cluster čč has open transition analogous to that of clusters of stops within words or between words, as in ččam *he dies*, k'elo?amoč čp'aj *look at your basket, it's falling*, hmaktik *let's close it*, ?amak *to you still closed it*.

<sup>11</sup> All of these items are morphologically complex. s *his* plus na *house* > sna *his house*.

presyllabic consonant cluster, the consonant is limited to r, as in hkrem *my boy*.

The second of two consonants in a postsyllabic consonant cluster is limited to c, as in ?anc *woman*.

Between syllables it would appear that any combination of consonants may occur, of permitted syllable final plus permitted syllable initial, and they do not seem to form any pertinent pattern. However, numerous combinations have not yet been found.

Two glottalized consonants occurring in the same syllable must be identical as in k'ok' *fire*, t'ut' *stingy*, p'up' *powder*. There may be two diverse glottalized consonants in a word provided they occur in two different syllables, as in č'u.pak' *soap-root*.

4.2. Any of the vowel phonemes may occur as the syllabic within any of the syllable patterns described above. For illustrations note items quoted elsewhere in the paper. All clusters of two vowels are ambisyllabic. (No clusters of three vowels have been found.)

All of the theoretically possible combinations of two vowels occur, including combinations of identical vowels.

i.i, i.e, i.a, i.o, i.u; bi.il *name*, bi.e.so *rub it*, syi.al *its young ear of corn*, č'i.om-ka? *young horse*, č'i.uk *that it might grow*.

e.i, e.e, e.a, e.o, e.u; ?i.be.in *he went in the road*, be.e.tik *roads*, ?e.al *mouth disease*, be.o? *waterway*, ce.u.bem *gotten green*.

a.i, a.e, a.a, a.o, a.u; ta.iv *frost*, k'a.ep *garbage*, ča.kol.ta.at *you are freed*, ta.o *find it*, č'a.u.bem *gotten bitter*.

o.i, o.e, o.a, o.o, o.u; yo.ik *you (pl.) chase it*, vo.e.tik *flies*, sč'o.al *its rat*, yo.o *chase it*, vo.uk *that it might be a fly*.

u.i, u.e, u.a, u.o, u.u; stu.il *its bad odor*, st'i.ru.el *its thumping*, su.al *its squash blossom*, t'i.lu.o *thump him*, cu.uk *that it might be a gourd*.

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