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Eugene E. Loos

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CAPANAHUA SYLLABLE RESTRUCTURING IN RELATION TO COMPARATIVE STUDIES

Eugene E. Loos
Summer Institute of Linguistics
and
University of Texas, Arlington

0. **Introduction.** Payne and Croese (1984), using a conservative approach that eliminated the factor of chance correspondences beyond reasonable doubt, demonstrated the surprising relationship of Mapuche to Arawakan. Their study showed that by complementing CV correspondences with correspondences in grammatical factors, they were able to rest their claims on principles such as those expounded by Campbell (1973, 1983), coming to conclusions different from what they might have if they had relied on scanning word lists. Comparative studies relating Panoan-Tacanan to other families are in need of a similar approach because of syllable modification in Panoan languages. Rather than relying on assumptions about the organization of the data, knowledge of the syllable modifying rules could aid the comparativist.

Shell (1975) did a careful comparative study of Panoan nouns and verb stems, using a conservative approach in which she refrained from making conjectures about the proto-phonemes of some final syllables if there was any doubt.

Girard (1971) apparently approached comparative Panoan studies from a fairly conservative basis, but was stopped by a lack of data and by the complexity of phonological changes that restructured morphemes in the daughter languages, making identification of reflexes precarious. He was therefore not able to propose more than a few simple Pano-Tacana reconstructions.

Key (1979, 1981a, 1981b) took a bold approach, using a set of assumptions about the organization of the data that enabled her to draw conclusions about linguistic relationships between many of the languages of the Americas. However, Key's assumptions were so unconstrained that a brief comparison of Key's and Girard's working hypotheses lead one to take a closer look at Panoan syllable structure. The assumptions of Girard and Key can be summarized as follows:

GIRARD	KEY
1. A high percentage of Panoan morphemes are basically monosyllabic.[1]	1. Panoan morphemes are basically monosyllabic
2. All nasalization is due to deletion of a nasal consonant.[2]	2. There is metathesis of syllables, morphemes, and phonemes.

GIRARD	KEY
3. Consonant clusters indicate morpheme boundaries (between the consonants).[3]	3. There is considerable free fluctuation of phonemes.

Campbell (1973: 114), in examining the Maya-Chipaya hypothesis, showed that if the comparativist did not have fairly rigorous constraints to reduce the probablity of mere chance correspondence, it was possible to come up with correspondences that supported a hypothesis relating Finnish, Cakchiquel, Quechua, and English. Key's method took no cognizance of the demonstrated regular phonological processes in Panoan languages. She acknowledged that there were reshaped syllables (Key 1981: 7), and recognized the hazards involved in her bold analysis (1981a: 16), but did not deal with the likelihood that chance easily accounts for the similarities of such pairs as Quechua *inti* and Proto-Panoan **niñi* 'day'.

Although the linguistic affiliation of Panoan and Tacanan is apparent enough, no systematic correlation has yet been successful because the languages of both families evidence complex phonological changes (Girard 1971: 154). Why this is so can be seen from an examination of the assumptions used by Key and Girard and a consideration of the principal phonological changes that affect the structure of a syllable in a morpheme, that have to be taken into account in doing any reconstruction of Panoan.

1. **The polisyllabic nature of Panoan morphemes.** A cursory examination of select words in Panoan languages can lead the investigator to conclude that Panoan languages are made up of more or less monosyllabic morphemes. This is the only assumption about Panoan data that is shared by Girard and Key and had a direct impact on their identification of reflexes, morpheme identification obviously being the basis for reflex identification. For example, assuming

[1] "The Panoan languages can be described briefly as suffixing agglutinative languages with, at least from contemporary evidence, a relatively low degree of fusion. One of the major and certainly most difficult problems in Panoan morphology is the identification of morphemes. It would appear from the material assembled by Shell and from a study of her Cashibo dictionary as well as her articles on Cashibo verbs and of Abreu's Cashinawa dictionary (the only reliable, voluminous works available on any of the Panoan languages) that the vast majority of Panoan words, nouns in particular, are disyllabic or trisyllabic and are composed in many instances of open monosyllabic morphemes, that is, (C)V-. This leads to the conclusion that (at least a reasonably high percentage of) Panoan nouns are in reality polymorphemic." (Girard 1971: 151)

[2] "In all Panoan languages which retain nasalization, it is the result of the 'loss' of a nasal sonant, **m* or **n*." (Girard 1971: 147)

[3] "The evidence from this rather low-level segmentation of Panoan forms and from comparison with Takanan cognates points to the following conclusions:

1. Medial clusters always signal morpheme boundaries.

2. At least three of Shell's digraphs are not indeed 'clusters'." (Girard 1971: 153)

monosyllabicity of morphemes, if a morpheme in one language consists of two (or more) syllables CV_1CV_2 and in another language a corresponding morpheme consists of CV_1 only, the extra syllable in the first case can be considered to be originally part of another morpheme, perhaps fused through time to the first syllable. The two remaining identical or similar syllables are then regarded as having a 1:1 phoneme correspondence. The comparativist is freed from being required to account for missing parts of a morpheme, and the reduction to two of the number of phonemes in sequence that compose the syllable CV_1, increases the probablity that the identification is spurious. The comparativist is also not required to account for the extraneous morpheme, even though the possible predicate-argument relations that obtained between the two morphemes (now fused) be unknown or disregarded.

The rules that we will present for Capanahua show some of the extent to which reflex identification requires internal reconstruction based on the processes that change or have changed the forms of the morphemes, lest the identifications turn out to be unfounded. This is especially true when an assumption about the monosyllabic nature or 'canonical form' of Panoan morphemes is supplemented with assumptions about metathesis.

The traditional notion of canonical form was not a concept about the shape of phonetic surface structure, for it was used to make phonemic interpretations of certain types. It was also not related to very deep structure, representing rather the traditional phonemic level. When data was incomplete, the notion of canonical form also had a certain utility in making conjectures about morpheme identifications for comparative purposes because it could be a way of defining the 'basic' shape of a morpheme and therefore lead one to account for changes that resulted in a non-canonical form. Internal reconstruction means arriving at a base form that presumably is closer to the proto form than the derived forms are, and is a point at which synchronic and diachronic study overlap: the forces that constrain the shape of morphemes must be relevant to the comparativist.

Morpheme structure rules of earlier generative phonology attempted to define a kind of canonical form by predicting feature redundancies in the phonemic constituency of a morpheme. Unfortunately, morpheme structure rules turned out to be less than what they were intended to be. They did not represent a native speaker's intuition about what the possible shape of a morpheme could be in cases where there was a significant depth, or abstraction, involved, the base form of the morpheme being quite different from the surface form, and in cases where the MS rules corresponded more closely to constraints on possible syllable constituents, provided that the syllables accounted for were not, in deep structure, too different or abstract from the possible phonetic surface structure.

However, if we did have morpheme structure rules that defined possible morpheme shapes in their underlying forms, then those shapes would presumably correspond more closely to a proto form than the surface form would. Since

phonological rules of a generative type are based on a notion of base form, it is convenient to recognize at this point that the Capanahua rules which we later mention presuppose base forms, and since the claim of typical or canonical *monosyllabic* basic forms of stem morphemes in Panoan is made by both Girard and Key, and I take issue with that claim, I am making clear that the kind of base forms I refer to when enclosing them in slashes, e.g. Capanahua /mapo/ 'head', are base forms as defined in a generative analysis.

2. **Syntactic Processes**. Syntactic processes are involved in Panoan word formation. When words are made up of more than one morpheme, and especially when the morphemes that make up a word change shape because of syntactic influences, recognition of those syntactic processes is important to the identification of the base forms of the morphemes in Panoan, otherwise erroneous morpheme identification will be the result of too superficial an examination.

Most Panoan languages mark the subject noun of transitive verbs with a consonant *-n* that in surface structure is realized as nazalization on the preceding lax vowel. The presence of the *n* prevents deletion of the final vowel of trisyllabic morphemes (a rule common to most Panoan languages), but then is itself deleted by the syllable-final consonant elision rule. In Chacobo and Amahuaca (Loos 1973: 139-142), this transitive marking *-n* is not present if the subject is shifted to post-verbal position. In Amahuaca and Cashibo, the subject of an intransitive verb may also be marked by an appended *-ṣ*. Like the *-n* above, this consonant also prevents the elision of the final lax stem vowel, since the vowel is of course no longer word-final.

It has been widely observed that most Panoan nouns in pre-predicate position such as the object in SOV sequences and the subject in intransitive SV sequences, are reduced to two-syllable forms if they are tri-syllabic and monomorphemic. But if they are poly-morphemic, only the final morpheme is subject to this shortening, the other morphemes being modified by other predicate relations (in a predicate calculus sense) internal to the NP. The *-n* transitive subject marker is in most instances homophonous with the locative and possessive morphemes when attached to polysyllabic morphemes, but the proto forms of the locative **-no* and possessive **-na* are preserved in demonstratives, *nïno* 'here', *hano* 'there', and *'ono* 'over there', *'ïna* 'mine', *mina* 'yours', *hawïna* 'his'.

3. **Prefixation**. There are about 35 prefixes, mostly names of body parts, that appear to be reductions of their corresponding independent nouns. They are used to produce compounds when attached to noun, verb, and adjective stems. The general meaning of the prefix is to specify the location or direction of the activity or attribute conveyed by the head of the construction. Being prefixes, they are, of course, never found following their head. They are usually monosyllabic and apart from grammatical particles that occur in the noun and verb suffix and clitic series, are almost the only non-pronominal mono-syllabic morphemes in the dictionary of base forms.[4] The standard or 'canonical' forms of morphemes consist of two or more syllables. However, regular vowel and consonant reduction rules

applicable to simple and compound stems cause these prefixed stems to have a shortened surface structure, as will be explained.

In some Panoan languages, like Cashibo, the prefixation process has atrophied. Though it is no longer productive, there is in the Cashibo lexicon a residue of forms with the prefixes fused to their head stems. Similarly, in Capanahua there are stems that are rarely found unprefixed (Hall 1973: 113) so that the short form is the one most often encountered, but for which it is usually possible to elicit a paraphrase without the prefix, in which case the suppressed vowel comes to the surface, e.g. ***hantinkin*** from ***hana ki tiin'a'kin*** 'to strike one on the mouth' (lit. mouth-on-strike).

The prefixes may be attached to verb, noun, or adjective stems:

verb: /po-riškikin/ 'to hit someone on the arm' (lit. arm-hit-tns);

adjective: /ma-wiso/ 'to have black on the head, to be black-headed' (lit. head-black);

noun: /bï-tonko/ 'forehead' (lit. face-protrusion).

The most common prefixes: *ba-* 'arm', *bï-* 'face, surface', *bï-* 'eye', *bo-* 'crown of the head', *ka-* 'back', *ko-* 'chin', *čï-* 'buttocks', *wï-* 'legs', *ha-* 'mouth', *hïn-* 'liquid', *hï-* 'tail', *hï-* 'blood', *ma-* 'head', *mï-* 'hand', *mï-* 'earth', *na-* 'center' *nï-* 'water', *no-* 'stomach', *pa-* 'ear', *pï-* 'shoulder', *pï-* 'wing', *pïš-* 'ribs', *po-* 'lower arm', *po'-* 'intestines', *kï-* 'lips, edge', *ra'-* 'body', *rï-* 'nose', *ta-* 'foot', *tam-* 'cheek', *tï-* 'neck', *ɸï-* 'bottom', *ʂï-* 'tooth', *ʂï'-* 'opening', *ʂo'-* 'chest, breast'.

Most of the prefixes contain fewer than the minimum CVC sequence to satisfy Campbell's (1973: 117) requirement that reduces the chance of accidental correspondence. If in non-Panoan languages corresponding CV forms with body part meanings were also found to be prefixes, not arbitrary pairs in a longer sequence of phonemes, and the function of the prefix syllable was to *modify* the head in a similar attributive relation, the chance of accidental correspondence would be diminished. But if the form of a Panoan prefix corresponded to a pair of phonemes internal to a morpheme sequence in another family, the chance of it being a valid identification is even weaker than if it were in isolation, since it would be counter the Panoan system for combining morphemes. The weight of evidence would have to fall on arguments from the other language family, showing how its rules of word formation and syllable reduction work differently.

4. **Compound Nouns.** A noun *phrase* composed of a head noun modifier by another noun preceding it, or adjective preceding or following in an attributive relationship is not, as a unit, subject to the syllable altering rules.

Compound nouns, as we define them for this study, are noun heads modified by nouns or adjectives fused to them forming one word, subject to the syllable

[4] We have found less than ten monosyllabic stems, all verbs: *ho-* 'come' (sg), *bï-* 'come' (pl), *ka-* 'go' (sg), *bo-* 'go' (pl), *bï-* 'bring', *bo-* 'take', *bič-* 'take', *nič-* 'walk', *hïa-* 'see'.

altering rules. E.g.:

Noun Phrases:

N-N *'atapa ṣobo* 'chicken coop' (lit. chicken-house)

mai kini 'a hole in the ground' (lit. earth-hole)

hono mapo 'the head of a peccary' (lit. peccary-head)

A-N *'ani honi* 'a large man' (lit. large-man)

honi 'ani 'a large man' (lit. man-large)

hošin mani 'a maroon banana' (lit. red-banana) [a variety]

mani hošinni 'a red banana' (lit. banana-red)

Compounds:

N-N /karo-bimi/ [karobĩ] 'the zapote tree' (lit. zapote-fruit)

/bawa-rono/ [bawarõ] 'a loro macho' (lit. parrot-snake)

A-N /wiso-bina/ [wisobĩ] 'a blackwasp' (lit. black-wasp)

N-V /mari-parana/ [mariparã] 'coati mocker' (lit. añuje-deceive) [a variety of bird]

The final syllables of each compound e.g., *bï*, represent the morphemes 'fruit', 'snake', and 'wasp' only in these particular constructions in which the syllable reduction rules have affected them. But if such short syllables (phonetically CV̈) can be shown to be identical with certain syllables in another language family *and* the rules accounting for their reduction from *bimi, rono, bina,* etc., can be established for that language family too, the shortness of the sequence shall have been compensated for, and their similarity no longer regarded as mere coincidence.

In the compound forms, the head is *never* followed by the modifier. Consequently, acceptance for comparison of any cases of apparent metathesis of the morphemes would require that evidence first be provided showing that the non-Panoan language assembled things in a different order, or else proof would have to be offered to show that the noun *phrase* is the source of the comparison.

5. **Phonological processes of syllable structure alternation.** Before discussing the phonological rules in Capanahua that bring about alternations in syllable structure, a presentation of a few of the non-structure-modifying rules may be helpful for the reader to understand the phonetic forms encountered. The following is a list of the non-syllable-altering rules, (minor details and arguments about relative ordering omitted).

a. Vowel harmony: vowels in certain contexts take on the features of the vowel of the preceding syllable.

ti'ka- 'to break' *'ti'kïti* 'to break oneself'

ʂoka- 'to skin'	*ʂokoti* 'to skin oneself'
sica- 'to smear'	*sikiti* 'to smear oneself'

b. Sibilant harmony: sibilants tend to take on the features of other sibilants in certain contexts.

bo-ˈa-ʂ-ki [boˈáṣki] 'he took it'

his-a-ʂ-ki [hišiški] 'he saw iit'

c. Deaffrication: the affricate reduces to *s* in certain contexts.

ko-paʧa-wï [kopásḯ] 'slap him on the chin' (lit. chin-slap-imp)

d. Stress assignment: primary stress is applied to a closed second syllable of a word. Since this stress rule applies after vowel deletions but before occlusive consonant deletions, the stress is left as the only trace of some consonants.

/hisisi/ [hisís] 'ant'

/maraʂï/ [maráṣ] 'huaca' (a poisonous plant)

/nanï-ˈt-i/ [nanïti] 'to embark oneself'

/nanï-ˈt-wï/ [nanïwḯ] 'Get in!' (lit. embark-refl-imp)

e. Nasalization: sequences of vowels and glides are nasalized both preceding and following a nasal consonant that is syllable final. The nasalization in either direction stops at the first obstruent encountered in the vowel or glide string. In cognate Panoan languages where the same nasalization is effected but no additional residue of the nasal consonant is left to indicate the location of the nasal consonant, (which is deleted by subsequent rules), the location of the consonant may only be revealed by alternate forms of the morpheme in other contexts.

6. **Syllable altering rules.**

(1) Stem initial syllable reduction. When a noun, verb or adjective stem is prefixed so that the first syllable of the stem becomes the second syllable in the derived form, the vowel of that syllable is deleted, provided that the consonant that precedes it is a continuant and the consonant that follows the vowel is not a resonant (*b* or *r*) or part of a consonant cluster.

/mï-šatï-wï/ (branch-cut-imp) > [mïštíwï] 'cut off its branches'

/bï-sika-wï/ (face-smear-imp) > [bïskíwï] 'smear it on his face'

/ta-ʂïka-wï (foot-slide-imp) > [taʂkḯwï] 'slide his foot'

(2) Post vocalic vowel deletion. When a stem is composed of the form CVV(C), the second of the adjacent stem vowels is deleted when the stem is prefixed. A large number of onomatopoeic stems are affected by this rule.[5]

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[5]There are a few exceptions to this rule, perhaps because we have not found a basis for positing a different underlying structure, e.g. [bïˈtoasaˈkï] 'to roast superficially', which is also irregular in having

/bï-ɸoa-ˈaˈ-wïˈ/ (face-pucker-do-imp) > [bïɸóaˈwï] 'kiss him on the forehead'

/mï-taaš-ˈaˈ-wï/ (hand-strike-do-imp) > [mïtášaˈwï] strike him on the hand'

(3) Stem-final vowel deletion. Vowels in the third syllable of a stem or derived stem are deleted when the syllable is open.[6] This rule, along with consonant deletion, has led to the resultant bisyllabic forms being readily encountered by investigators of Panoan.

/mapopa/ 'clay' > [mapó]

/nonoma/ 'duck' > [nonṍ]

/hamaka-wï/ 'step-imp' > [hamáwĩ́] 'step on it'

/hamaka-ˈt-wï/ 'step-refl-imp' [hamakaˈwï]

(4) Syllable-final consonant deletion. Non-continuant obstruents (*p*, *t*, *k*, *m*, *n*) are deleted in syllable final position. A trace can be left: primary stress, if the syllable is the second in the word, and nasalization on the preceding vowel or glide string if the consonant is a nasal consonant. Since this rule follows the vowel deletion rules, consonants left as syllable final as a result of final vowel deletion are affected.

/mapopan/ > [mapopã] 'clay' (transitive form)

/mapopa/ > [mapó] 'clay' (intransitive form)

/ninkaka-wï/ > [ninkáwï] 'listen'

(5) Post-consonantal glide deletion. The concatenation of glide-initial morphemes with consonant-final morphemes produces consonant clusters. Any such clusters that have survived the syllable final consonant deletion, such as when the first consonant of the cluster is a continuant, are reduced by deletion of the post-consonantal glide, i.e., when the first consonant is an obstruent but not when the first is also a glide.

/his-wï/ (see-imp) > [hisï] 'look!'

/his-yama-wï/ (see-neg-imp) > [hisamawï] 'don't look!'

(6) Even-syllable glottal deletion. Even-numbered syllables that are closed by a glottal have the glottal deleted. Other Panoan languages also have some kind of alternate syllable timing that affects the phonology, but only Capanahua manifests it in glottal deletion.

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the first syllable accented, and a glottal cluster appearing at the close of an even numbered syllable.

[6]Though this rule is widely operative, a few three-syllable forms have resisted reduction, e.g., [ʂõntako] 'girl', possibly because the base form of girl in the proto-language was longer, leaving the present three-syllable form.

/ta-ma'nï-'t-wï/ (foot-change-refl-imp) > [tamánï'wï] 'take a step'

/ka-ri'bi-wï/ (go-again-imp) > [karíbiwï] 'go again'.

(7) Glottal shift. In normal speech a syllable-initial glottal of a third syllable moves to the close of the syllable, provided that the syllable is not word-final. The vowel over which the glottal passes is glottalized.

/mari-'ino/ (añuje-tiger) > [marii'no] 'puma'

/kï¢in-'ino/ (colored-tiger) > [kï¢íĩ'no] 'tigrillo'

/bana-'a'-ki/ (plant-past-validational) > [banaa'ki] 'I planted'

Capanahua alone of the Panoan languages has a large number of consonant clusters of which the first consonant is a glottal stop. Using the data available at the times of their studies, Shell considered the clusters to be preservations of original proto forms and Girard concluded that the glottal clusters were a confusing picture, of unknown source. The vowel deletion and glottal shift rules presented thus far account for many glottal-consonant clusters not found in the base forms, but many others have no other explanation than to be part of the base form.[7]

(8) Epenthetic nasal consonants. Epenthetic nasal consonants are realized between a nasalized vowel and a following occlusive (*p, t, k, m, n, ɬ, č*). This is a low-level phonetic rule that has the effect of replacing deleted nasal consonants with nasal consonants homorganic to the following consonant, and inserting nasal consonants where they do not appear in the underlying form. This was missed in Loos (1969), in which a separate rule was proposed to account for what was analyzed as nasal assimilation. These epenthetic nasals in other Panoan languages are a problem to comparativists because the orthographies used in source data sometimes place the nasal consonant where it is detected in surface structure, not where it belongs in the base form as the source of nasalization. The surface structure gives the appearance of a metathesis of nasal consonants with nasal assimilation, as can be seen by comparing the following forms.

/taran-i/ 'roll-to'

[tarani] 'to roll it'

[tarã́wĩ́] 'roll it!'

[tarã́mpã́] 'I shall roll it'

[tarã́nti] 'a rolling'

[tarã́ŋ̃kĩ] 'rolled'

/hošin-ha-kin/ [hošĩ́ã́ŋkĩ] 'made it red'

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[7]In the reflexive forms particularly, the exact constituency of the underlying form is still a puzzle. Though I have proposed a base form *'t* for synchronic analyses (Loos 1969: 145, 1973b:217), I have found forms that are unexplained by such a base form; more study is needed.

(9) Intervocalic *h*-deletion. The consonant *h* in intervocalic position is not realized phonetically, though its underlying presence can be detected by stress, nasalization, or by separation of the morphemes (removing one morpheme) so that the *h* appears word initial.

/hoṣo/ [hoṣo] 'white'

[pïóṣ] 'that is white on the wings'

/hanan-hanan-i/ > [hanáánani] 'to vomit violently'

7. **Rule summary**. Clearcut rules for the concatenation of morphemes eliminates the plausibility of morpheme or syllable metathesis in Panoan. The complexity of Panoan morphophonemics can be traced to a relatively limited number of rules that are still actively productive in Capanahua. There is no synchronic metathesis of phonemes: we find only low level phonetic phenomena of displaced glottal and nasal features. Though syllable reduction processes in the concatenation of morphemes can lead to surface structure monosyllabic morphemes, such forms are not the ones to be used for cross-linguistic comparison unless it can be shown that both languages being compared had reduction rules leading to the same forms. Clusters of consonants in a Panoan language are not necessarily the indication of a (former) morpheme juncture; some clusters are the result of vowel deletion.

8. **Conclusions**. Some of the forms given by Key to support a hypothesis about the relation between numerous North and South American languages might be valid identifications, but the assumptions that underlied those identifications, i.e., monomorphemic forms, fluctuation, metathesis of phonemes and syllables, are unsupported on the Panoan side as shown by Panoan, especially Capanahua, data. The chance of fortuitous correspondence needs to be reduced by comparing base forms, not surface structure forms produced by regular phonological rules. More information on Panoan and Tacanan lexical items is available now than there was when the Shell and Girard comparisons were made, but the disparate non-uniform nature of the word lists of most of the 35 or so Panoan languages still makes comparison difficult. Knowledge of some of the more common Panoan phonological changes accounting for data that the comparativist is likely to encounter, however, can help in making the necessary morpheme identifications on the Panoan side.

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