

CONSONANT-VOWEL HARMONY: EVIDENCE FROM THE PHONOTACTICS OF LOANWORD ADAPTATION

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1. Introduction

This paper is an extract from a phonological study on the adaptation of the Gĩkũyũ [yekojo] loanwords derived from English (see Mwhaki 1998). Gĩkũyũ is a major Bantu language spoken in Kenya. It functions on a phonemic inventory of seven vowels and eighteen consonants. The following phonemes can be considered representative of this inventory:

*/i/, /e/, /ɛ/, /a/, /ɔ/, /o/, /u/,
/mb/, /ɸ/, /m/, /θ/, /t/, /nd/, /n/, /r/, /ʃ/, /ɲ/, /ɲ/, /j/, /k/, /ŋg/, /ŋ/, /ç/, /w/, /h/.*

In this paper, I have attempted to argue a case of consonant ↔ vowel harmony. Three harmonic sets are identified. They revolve around three consonantal properties: [labiality], [liquidity], and what I tentatively describe as [tongue] (stricture). These properties demonstrate close phonetic affinity with the vowels /u/, /o/ and /i/, respectively.

The feature [tongue] is used as an umbrella term for consonantal sounds articulated with a relatively close body-of-the-tongue stricture, from the apex to the dorsum. More specifically these are dental-alveolar, palatal, and velar articulatory strictures (see Anttila 1972: 8). These strictures are concomitant with a relatively high tongue position, in contrast with the articulation of labial or glottal sounds. In this position, the tongue functions as the movable articulator.

The harmonic sets, which are identified, are definable in relation to the phonotactics of loanword adaptation. In some multi-linear views of phonology, the notion of phonotactics is re-interpreted as a relationship of phonemic licensing (see Anderson 1985, Clark and Yallop 1990, Goldsmith 1990, Katamba 1991).

Essentially, there are prosodic units, which are recognized as licensors. A licensor is endowed by the grammar of the language in question with the ability to

determine well-formedness conditions at one level or another. Two phonemic licensers function in the phonological structure of Gĩkũyũ: the syllable and the phonological word.

This paper addresses syllable-level licensing. The syllable regulates the tautosyllabic association of the phonematic and the phonemic units. In this connection, two perspectives of syllable-level licensing are identified: where the optimal syllable is the primary licenser, and, where syllable constituents function as secondary licensers.

2. Optimal Syllable as the Primary Licenser

The concept of a primary licensing function implies a basic (skeletal) distribution of the phonematic (C and V) units. Where the English word depicts a consonant cluster or a word final consonant, the adaptation process inserts a unitary V. The epenthetic process occurs regularly irrespective of phonetic environment or phonological shape, as follows:

- (1) CVC > CVCV : bus [bʌs] > mbathi [mbaθi]
 CCV > CVCV : store [stɔ:] > thitoo [θitɔ:]
 CCVC > CVCVCV : school [sku:l] > thukuru [θukuru]
 CVCC > CVCVCV : desk [desk] > ndethiki [ndeθiki]

Since CV is the optimal syllable of Gĩkũyũ, it can be concluded that each epenthetic V unit links to a C to fill an empty skeletal position. The concept of an empty position is derived from the obligatory nature of the V rhyme in the phonological structure of Gĩkũyũ. V epenthesis therefore functions as a strategy for the preferred structure preservation. The choice of the specific epenthetic vowel is constrained by the syllable onset.

3. Syllable onset as a Secondary Licenser

The notion of a secondary licensing role refers to the more concrete level of the tautosyllabic phonemic linking. A licensing function of the syllable onset is conceived of in terms of the association of a specific vowel with an unlinked C. This association can be observed in the epenthesis of three Gĩkũyũ vowels: /i/, /u/, and /o/.

3.1. /i/ epenthesis

The high vowel, /i/, is inserted in the environment of ten Gĩkũyũ true consonants: /θ/, /t/, /nd/, /n/, /ʃ/, /nj/, /k/, /ŋg/, /ɣ/, /ŋ/, as exemplified below. Where possible the first example portrays insertion in an initial or medial syllable, and the second involves a word final position. Note that the velar nasal, /ŋ/, features in rather specialized usage.

- (2) store [stɔ:] > thitoo [θitɔ:]
 vest [vest] > bethiti [βeθiti]
- (3) suit [su:t] > thuuti [θu:ti]
 guard [gɑ:d] > ngati [ŋgati]
- (4) drawer [drɔ:] > ndiroo [ndirɔ:]
 card [kɑ:d] > kandi [kandi]
- (5) line [laɪn] > raini [raini]
 fine [faɪn] > baɪni [βaeni]
- (6) torch [tɔ:ʃ] > toci [tɔʃi]
 church [tʃɜ:ʃ] > caci [ʃaʃi]
- (7) lunch [lʌnʃ] > ranji [raŋji]
 change [tʃeɪŋ] > cɪŋji [ʃeŋji]
- (8) cake [keɪk] > keki [keki]
 desk [desk] > ndethiki [ndeθiki]
- (9) glass [glæs] > ngirathi [ŋgiraθi]
 bank [bæŋk] > bengi [βeŋgi]
- (10) socks [sɒks] > thogithi [θɔɣiθi]
 tractor [træktə] > karagita [karayita]
- (11) king [kɪŋ] > king'i [kiŋi] 'as in *drafts*'
 wing [wiŋg] > wi:ng:i [wi:ŋi] 'as for *youthwing*'

Taking into account all the consonants of the Gĩkũyũ phonological structure, it can be observed that the individual phonetic structure of the phonemes is irrelevant. Phonetic features such as [voice], [sonorant], or [continuant], cannot be considered decisive. All the affected sounds are, however, true consonants of the 'tongue' structure: articulated at the dental-alveolar, palatal, velar regions (see Schane 1973, Hyman 1975). This association can be considered an indication of the need for a phonetic feature [tongue]. On the strength of this assumption, the following rule is postulated:

- (12) $\emptyset > V \quad / \quad C-$
 [+ high] [+ tongue]
 [- back] [- vocalic]

The extent of the physiological space correlating with this rule can be interpreted to mean that /i/ is the most diffuse vowel of Gĩkũyũ. The manifest diffusion of /i/ is attributable to the height and centrality of its articulatory position: incidentally this vowel has been described as a palatal (see Fromkin 1985: 86-88). In this position, /i/

is optimally placed to diffuse forwards and backwards linking to all consonants associated with a similarly high tongue placement.

Cases of deviation can be found. In some derivations, the epenthetic /u/ occurs in environments associated with /i/- as in the derivatives *spanner* [spænə] > *thubana* [θuφana], *sponge* [spʌŋ] > *thubanji* [θuφanji] and *spare* [speə] > *thubea* [θuφea]. This deviation is attributed to regressive assimilation, to the contiguous bilabial fricative. An instance of regressive assimilation is assumed in view of the regular constraints of /u/ epenthesis.

3.2. /u/ epenthesis

The high back vowel, /u/, is regularly inserted in the environment of the three Gîkûyû labials /φ/, /mb/, /m/, as illustrated below:

- (13) *stove* [stəʊv] > *thitobu* [θitəφu]
soup [su:p] > *thubu* [θuφu]
- (14) *brake* [breɪk] > *mburîki* [mbureki]
blouse [blaʊz] > *mburaûthi* [mburaoθi]
- (15) *form* [fɔ:m] > *bomu* [φomu]
gum [gʌm] > *ngamu* [ŋgamu]

Since the principal constraint of /u/ epenthesis is clearly labiality, the following phonological rule is postulated:

- (16) $\emptyset > u$ / C_ [+labial]

The plausibility of this rule can be defended on the basis of the fact that the vowel /u/ shares a close phonetic affinity with the labio-velar glide, /w/. Deviation from this rule is observed whereby /o/ rather than /u/ functions in some word final environments. Consider the derivatives *chief* [çi:f] > *cibû* [šifɔ]; *stamp* [stæmp] > *hitembû* [θitembo], and *cream* [kri:m] > *kirimû* [kerimo].

Deviation is attributed to a subsequent process of etymological nativization (see Hock 1986). This process responds to a restructuring of /i/ and /u/, a strategy believed to have been previously undergone by Gîkûyû, among a sub-group of Bantu languages, to derive the mid-high vowels /e/ and /o/, respectively (see Guthrie 1967).

The important point for this discussion is that the restructuring of /u/ > /o/ is a plausible development. This claim can be defended on the basis of the treatment of some loanwords from Kiswahili, a sister Bantu language, into Gîkûyû: consider [ndimu] > [ndimo] 'lime' and [mbuni] > [mboni] 'coffee berries'. In such derivations, /u/ modifies into /o/, irrespective of the fact that the former is a constituent of the Gîkûyû phonemic inventory. This argument sustains a claim of /u/ ↔ labial harmony.

3.3. /o/ epenthesis

The high mid vowel, /o/, is regularly inserted in the environment of the only Gîkûyû liquid, /r/. This association validates a general rule, as represented below:

- (17) *file* [faɪl] > *bairû* [φairo]
bill [bɪl] > *mbiirû* [mbi:ro]
mile [maɪl] > *mairû* [mairo]
oil [ɔɪl] > *uirû* [oiro]
- (18) $\emptyset > o$ / C_ [+vocalic] or $\emptyset > o$ / liquid_

This rule leads to an assumption that a strong phonetic affinity exists between the vowel /o/ and the liquid. The manifest affinity is further observed where the syllable rhyme functions as a secondary licenser.

4. Syllable Rhyme as a Secondary licenser

The following discussion is concerned with lateral resyllabication. In the course of loanword adaptation, the syllabic lateral of the English phonological structure regularly modifies into the mid-high vowel, /o/, as follows:

- (19) *pencil* [pensl] > *benjû* [φeŋjɔ]
council [kaʊnsl] > *kanjû* [kaŋjɔ]
double [dʌbl] > *ndabû* [ndaφɔ]

The process of resyllabication is constrained by the obligatory vowel rhyme of the Gîkûyû syllable structure (see Mbugua 1990). The syllabic lateral is therefore considered ill-formed and hence regularly modifies into a vowel which plausibly shares a close phonetic affinity. This assumption validates the following rule:

- (20) $l > o$ or $l > o$
[+syll]

The concept of resyllabication extends to the treatment of sequences of the schwa and the lateral. These sequences regularly modify into /o/, as observable below.

- (18) *petrol* [petrəl] > *betûrû* [φetoro]
general [jɛnrəl] > *njenûrû* [ɲjɛnoro]
corporal [kɔ:pərəl] > *koburû* [kɔφuro]

Similar to the word-final lateral, word-final sequences of the English schwa and the lateral function together as the syllable rhyme (see Ladefoged 1982). To the native Gîkûyû speaker, this constitutes structural and functional redundancy. It can

therefore be assumed that the schwa either deletes or assimilates to the lateral, prior to or simultaneous with resyllabication.

The process of resyllabication is not only phonologically constrained; it is also phonetically conditioned. Essentially, liquids are consonants with vocalic properties (see Hyman 1975). It is therefore logical that some phonetic affinity can exist between liquids and a vowel bearing close perceptual correlates.

5. Summary and conclusions

The significance of the syllable level phonotactic adaptation is definable in relation to the phonematic as well as the phonemic licensing. The different levels and perspectives of licensing indicate that the syllable is a fundamental unit of speech perception.

The most salient strategy of syllable level licensing involves V epenthesis. For each epenthetic situation, the C has a specific function. At the phonematic level, it links to a unitary V and thereby preserves the preferred skeletal structure of Gîkûyû: CV... At the phonemic level, it regulates the choice of the specific derived vowel.

This association can be interpreted to mean that there is a certain harmonic correlation between particular vocalic properties and specific consonantal features. Three harmonic sets are defined: /i/ and the 'tongue' stricture, /u/ and the labial consonants, and /o/ and the liquid, as far as these function in the phonological structure of Gîkûyû.

The phonetic affinity existing between the liquid and /o/ is further demonstrated in the resyllabication processes. This association further substantiates the assumption that /o/ can be considered a liquid vowel. In a corresponding manner, /u/ can be accorded labiality. The latter claim can be validated on the basis of the phonetic affinity existing between /u/ and the labio-velar glide, /w/.

Similarly, /i/ manifests a close phonetic affinity with the palatal glide /j/. This affinity makes /i/ the natural epenthetic choice for the tongue-stricture consonants: the consonants articulated at the dental-alveolar, palatal, and velar regions, with the body-of-the-tongue as the movable articulator.

Where the epenthesis of /i/ is concerned, this paper recommends the recognition of a phonetic feature [tongue] to embrace all the true consonants associated with tongue-stricture. This feature can be considered a correlate of the features [labial] and [glottal]. It is perhaps worthwhile noting that the properties [labial] and [glottal] were incorporated into the distinctive feature system after careful consideration of some significant phonological processes. Similar consideration could result in the acceptance of the phonetic feature [tongue].

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