# 2 *Formalism or phoneyism? The history of Kayan final glottal stop*

ROBERT BLUST

## 1 Formalism in linguistics[1]

Formalism in linguistics can be characterised as an attempt to model language behaviour in terms of a deductive system of logical relationships. In this sense it is similar to theory testing in general. However, it differs from other approaches to theory in its somewhat mechanical attempts to generate sets of logical possibilities which *might* model language behaviour or structure. For example, when Paul Kiparsky (1968) proposed that the traditional concept of sound change should be viewed instead as rule change, he was forced to fit an earlier framework of assumptions which was conceived inductively (that is, leading from phonetic change as a primary fact to structural change as a derivative consequence) into an entirely different framework of assumptions conceived deductively (leading from rules on an abstract level as a primary fact to phonetic change as a derivative consequence). One type of rule change that he proposed was rule reordering — a logical possibility which was permitted by his conceptual framework, and one that seemed to be supported by a tenuous body of evidence. But in the years that have passed since this proposal was made it seems to me there has been little hard evidence to show that rule reordering is a possible type of linguistic change. The up side to a formal approach, then, is that it may force the observer to ask questions that might not otherwise come to mind. The down side is that it may encourage a spurious faith in formalisms that have little relationship to the real world.

## 2 Kayan

Kayan is spoken in the upper courses of many of the major river systems of central Borneo, including the Kahayan, Mahakam, Baram, Rejang and Kapuas basins. Its centre of origin appears to have been in Kalimantan, probably in the Kahayan and Mahakam basins. Rousseau (1988:5), following Kayan oral tradition, maintains that the Kayan and Kenyah

[1] This paper is dedicated to the memory of Jack Prentice, friend and fellow investigator of the still largely undescribed languages of Borneo.

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'have close cultural and historical relationships. They originate from the upper Kayan river area (or Apau Kayan)'.

It is clear that Rousseau's statement is concerned only with proximate origins, since Austronesian (AN) speakers reached Borneo by sea and, given an economy based in part on the exploitation of marine resources, must have settled coastal and lower fluvial zones before ascending the upper courses of any of the major rivers. Distributional evidence strongly favours the view that the North Sarawak group of languages to which Kenyah belongs began to differentiate in the lower Baram basin of northern Sarawak (Blust 1974a). Moreover, since the evidence for classifying Kayan as a North Sarawak language is ambiguous, it is by no means obvious that the similarities which are shared exclusively by Kayan and Kenyah are due to common ancestry followed by fission and divergence, rather than to an extended period of intensive contact between distinct Austronesian cultural and linguistic traditions which entered Borneo from opposite sides of the island.

The closest linguistic relatives of Kayan are Modang, spoken in the lower Kahayan basin and adjacent areas of Kalimantan, and Murik, spoken in the Baram river basin of northern Sarawak (Blust 1974b). Of these, Modang appears to be the more distantly related. The full range of Kayan dialects is yet to be sketched out in any comprehensive treatment. Impressionistically, internal divergence within Kayan appears to be less marked than internal divergence within Kenyah, thus suggesting an historically more recent expansion from some common centre of dispersal. Distributional evidence of this kind can be taken to imply that the Kenyah preceded the Kayan in the Usun Apau and elsewhere in the upper courses of the major rivers of central Borneo. Comparison with the still more recent and equally explosive expansion of the Iban over the past century and a half suggests that the Kayan probably began to migrate upriver from a geographically more compact region within the past five to six centuries, with Murik representing a still earlier split.

Despite their overall similarity, Kayan dialects differ in subtle details of phonology, some of which are of considerable theoretical interest. This paper is concerned with one such detail, the history of final glottal stop.

## 3 Final glottal stop in Kayan dialects

One of the first features of most Kayan dialects to catch the attention of an observer with a knowledge of other Austronesian languages is the interchange of final glottal stop and zero. While other languages typically reflect Proto Malayo-Polynesian (PMP) **mata* 'eye' with a final vowel, and Proto Malayo-Polynesian **m-ataq* 'raw' with a final glottal stop, for example, the reverse is true in Kayan. Like Proto Austronesian **q*, Proto Malayo-Polynesian **q* probably was a pharyngeal stop. In the immediate ancestry of Kayan and many other languages of Borneo it had evidently already become a glottal stop, and will be treated as such in the following discussion.

Table 1 illustrates this distinctive development with data from five language communities: (1) Long Atip (Apoh branch of the Tutoh, Baram basin); (2) Uma Juman of the Rejang basin (Blust 1977); (3) the 'Baram Kayan' of Southwell (1980); (4) the subdialect of Uma Bawang spoken at Long Murum (Rousseau 1974); and (5) Murik (Blust 1974b). The first four of these communities represent Kayan dialects, while Murik is a separate language which shares about 65 per cent of its basic vocabulary with Kayan (Blust 1974b:180).

Unpublished data on Long Atip is given in phonemic transcription, and published data on the other communities in a slightly modified form of the orthography of the source:[2]

**Table 1:** The development of final glottal stop and final vowel in four Kayan dialects and Murik

| Pre-Kayan | **mata* 'eye' | **ata?* 'raw' |
|---|---|---|
| Long Atip | *mata?* | *ata* |
| Uma Juman | *mata?* | *ata* |
| Baram Kayan | *mata?* | *ata* |
| Long Murum | *mata?* | *ata* |
| Murik | *mata?* | *ata* |

No phonetically reliable data are available for Modang. Moreover, this language has undergone extensive phonological innovations, often making the recognition of cognates far less transparent than is the case for Kayan dialects and Murik. It will thus be ignored for purposes of this study.

What is immediately apparent from the examples in Table 1 is that earlier glottal stop is reflected as zero, and earlier zero as glottal stop. A similar reversal is consistently attested in many other forms that earlier ended in glottal stop or zero, both in Kayan dialects, and in Murik.

## 4 Complex sound changes

In trying to come to grips with the history of glottal stop in Kayan we are faced with what at first seems to be a conceptual dilemma. There are two changes: (1) **? > zero*; and (2) **-V > V?*. If the changes are ordered (1)–(2), glottal stop and zero will merge as glottal stop, and if they are ordered (2)–(1) glottal stop and zero will merge as zero:

| Pre-Kayan | **mata* 'eye' | **ata?* 'raw' |
|---|---|---|
| change (1) | *mata* | *ata* |
| change (2) | *mata?* | *ata?* |
| RESULT | /mata?/ | /ata?/ |
| change (2) | *mata?* | *ata?* |
| change (1) | *mata* | *ata* |
| RESULT | /mata/ | /ata/ |

During the early development of generative phonology ordering paradoxes of this kind were recognised in the relationships between phonological rules, and some linguists proposed to deal with them through the use of a formal notation which employed alpha variables. In an 'alpha-switching' rule (Harms 1968:61) it was suggested that two segments /a/, /b/ could be transformed to /b/, /a/ through a unitary, simultaneous operation. Such formalisms have long

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2 Southwell (1980: general introduction) notes that his dictionary was begun among the Uma Peliau Kayan, and then expanded as he moved from longhouse to longhouse in his capacity as a Christian minister over a period of some thirty years. Although he reportedly incorporates data from a number of different Kayan subdivisions, including the Uma Bawang, these evidently have been regularised to the phonology of Uma Peliau, since they fail to exhibit the distinctive differences with which this paper is primarily concerned.

since been abandoned in phonological theory, and I believe rightly so, but the types of problems which they addressed remain, and continue to present explanatory challenges.

The alpha-switching rule was proposed to cope with analytical problems in synchronic phonology, and was eventually abandoned. Could the case of Kayan final glottal stop provide confirmation of the reality of alpha-switching rules in historical change? Despite its intuitive artificiality, the case for an alpha-switching change in Kayan appears initially attractive. What possible phonetic gradations could be found between glottal stop and zero? Even Murik shows the change, which consequently appears to have occurred prior to the separation of the Kayan dialects proper.[3]

Comparison with other types of sound change suggests that the alpha-switching convention was designed to deal with a special case of a more general type of problem. Sound changes in historical linguistics can be divided into simple and complex. Simple sound changes are incremental if they involve a change in a single feature, and saltatory if they involve changes in two or more features.

Exemplary sound changes are simple and incremental, as with the voicing or spirantisation of intervocalic stops. Saltatory sound changes invariably raise the question of whether they might be the cumulative product of incremental changes. In some cases, as with the change **t* > /k/ in Hawaiian, saltatory changes do not appear to be reducible to a series of incremental changes. In other cases they may be, but all such examples must be considered on a case-by-case basis. The term 'saltatory' here closely parallels its usage in evolutionary biology, where complex organs such as the eye can only be satisfactorily accounted for as cumulative products of many small changes. The difference is that saltatory changes apparently are never justified in biology, but sometimes are in linguistics (as in the case of **t* > /k/ in Hawaiian).

Complex sound changes differ from simple sound changes in requiring two apparently simultaneous operations, one of which may provide the environment for the other. As seen in Table 2, the Pa' Dalih dialect of Kelabit exhibits two, apparently coordinated changes: (1) **e* > /i/ before a final voiced consonant, and (2) devoicing of final obstruents after /i/ from **e* (PK = Proto Kelabit, **e* = schwa):

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[3] Kenneth L. Rehg (pers. comm.) has pointed out to me that alpha-switching rules permitted the interchange of positive and negative values for a segmental feature, but did not permit the interchange of a segment and zero. Oddly, this appears to be a gap in the theoretical underpinnings of the formalism, since there is no empirical reason why alpha-switching rules, if real, should be restricted to the interchange of segments. The only obvious remedy that might be invoked to cover this defect is to propose a feature [segment] which could be specified with positive or negative values. However, this too appears contrived, since any positive specification for [segment] would require a number of dependent feature specifications none of which would have any meaning with [-segment]. Perhaps if apparent alpha-switching rules which involve the interchange of a segment with zero had been considered from the beginning, the formalism would never have been taken seriously even by its proponents.

**Table 2:** Evidence for an apparent complex sound change in Pa' Dalih Kelabit

| No. | PK | Pa' Dalih | English |
|---|---|---|---|
| 01 | **aleb* | *alip* | 'knee' |
| 02 | **kekeb* | *kekip* | 'lid' |
| 03 | **teneb* | *tenip* | 'cold' |
| 04 | **teŋeb* | *teŋip* | 'riverbank' |
| 05 | **dadem* | *dadim* | 'shivering' |
| 06 | **dedhem* | *desim* | 'dark' |
| 07 | **tadem* | *tadim* | 'sharp' |
| 08 | **keted* | *ketit* | 'back (anat.)' |
| 09 | **pued* | *puit* | 'navel' |
| 10 | **tuked* | *tukit* | 'prop' |
| 11 | **uled* | *ulit* | 'maggot' |
| 12 | **gatel* | *gatil* | 'itch' |
| 13 | **nedhen* | *nesin* | 'to press down' |
| 14 | **ŋ-eleg* | *ŋ-elik* | 'to separate' |

The raising of **e* to /i/ does not occur before word-final voiceless consonants in examples such as **ŋetep* > /ŋetep/ 'to bite' (cf. **geteb* > /ŋetip/ 'to cut'), **puet* > /puet/ 'bottom' (cf. **pued* > /puit/ 'navel'), or **bedhek* > /besek/ 'nasal mucus'. Moreover, the devoicing of final stops does not occur after /i/ from earlier **i* in forms such as **dalid* > /dalid/ 'ear', **maʔid* > /maʔid/ 'to wipe', **selubid* > /selubid/ 'lie down', or **tumid* > /tumid/ 'heel'. Superficially, then, it appears that the raising of **e* and the devoicing of final stops were innovated as a package.

If this view of the history of Pa' Dalih vowel raising and final devoicing is valid, it exemplifies a type of change similar to that seen in the interchange of glottal stop and zero in Kayan. In both cases there is an ordering paradox which appears to be resolvable only by assuming the simultaneous innovation of two changes. Hence, both are examples of complex sound changes.

The problem with this interpretation of the Pa' Dalih data is that the raising of **e* to /i/ is found in some forms which originally ended in a voiceless consonant, as in **kibet* > /kibit/ 'to heal', **ŋ-abet* > /ŋ-abit/ 'to tie', or **negeghep* > /negekip/ 'to shiver'. Moreover, some protoforms with a final voiced stop after **e* did not obligatorily devoice, as with **aleb* > /alip/ 'knee' (also recorded as /alib/), or **kereb* > /kerip/ 'can, able' (also recorded as /kerib/), and some protoforms with a final voiced stop after vowels other than **e* did devoice, as with **elad* > /lat/ 'wing', **paad* > /paat/ 'smooth, level' and **nutud* > /nutut/ 'to burn'. Although there appears to be a statistically significant association between **e* raising and final stop devoicing, then, the two changes are independent in some lexical items, implying that they were innovated as separate historical events.[4]

[4] Since final stop devoicing following vowels other than **e* is more richly attested than **e* raising before final voiceless stops, it appears likely that final devoicing was the first change to take place. The fact that **e* raising shows a statistically significant association with original final voiced stops may reflect elicitation bias in a limited corpus, since every effort was made to multiply examples of this apparent complex change once it was recognised in my field notes. The question of why neither change appears to be completely regular remains to be answered.

## 5 The history of final glottal stop in Kayan

If the seemingly simultaneous raising of **e* and devoicing of final stops in Pa' Dalih Kelabit actually was a sequence of irregular final devoicing intercepted mid-course by irregular raising, our faith in the reality of complex sound changes must be shaken to some extent. What, then, can we offer as an alternative explanation of the facts in Kayan?

Rousseau (1974) provides data on the Uma Bawang subdialect of Long Murum on the Baluy branch of the Rejang river, and Southwell (1980) claims to include the Uma Bawang subdialect within the range of dialects surveyed in his dictionary of 'Baram Kayan'. In both cases final glottal stop and final vowel have the distribution sketched in Table 1. It thus comes as something of a surprise to discover that Uma Bawang material which I recorded in the Baram basin during fieldwork in 1971 has added glottal stop after original final vowels, but without dropping earlier final glottal stop, as in pre-Kayan **telu* > /telo?/ 'three', but **pulu?* > /pulu?/ 'ten'.[5] How, then, was merger prevented?

Table 3 illustrates the Uma Bawang reflexes of forms with earlier final vowel and earlier final glottal stop:

**Table 3:** Uma Bawang reflexes of forms with earlier final vowel and earlier final glottal stop

| Pre-Kayan | Uma Bawang | English |
|---|---|---|
| **-i* | *-e?* | |
| *beli* | *bele?* | 'to buy' |
| *kami* | *kame?* | 'we (excl.)' |
| *punti* | *pute?* | 'banana' |
| *ñupi* | *ñupe?* | 'to dream' |
| | | |
| **-i?* | *-i?* | |
| *nji?* | *ji?* | 'one' |
| *pili?* | *pili?* | 'choose' |
| *puti?* | *puti?* | 'white' |
| *uli?* | *uli?* | 'go home' |
| | | |
| **-u* | *-o?* | |
| *asu* | *aso?* | 'dog' |
| *batu* | *bato?* | 'stone' |
| *kayu* | *kayo?* | 'wood' |
| *kutu* | *kuto?* | 'head louse' |
| | | |
| **-u?* | *-u?* | |
| *bulu?* | *bulu?* | 'bamboo sp.' |
| *ipu?* | *ipu?* | 'blowgun poison' |
| *pulu?* | *pulu?* | 'ten' |
| *pusu?* | *pusu?* | 'heart' |

[5] Uma Bawang data was collected from Andrew Jan Ajang, then a student at Tanjong Lobang College, Miri, in Sarawak's Fourth Division, during the summer of 1971.

| Pre-Kayan | Uma Bawang | English |
|---|---|---|
| **-a* | *-a?* | |
| *dua* | *dua?* | 'two' |
| *lima* | *lima?* | 'five' |
| *mata* | *mata?* | 'eye' |
| *tuba* | *tuba?* | 'derris root' |
| | | |
| **-a?* | *-aa* | |
| *bua?* | *buaa?* | 'fruit' |
| *sala?* | *salaa?* | 'wrong' |
| *uma?* | *umaa?* | 'house' |
| *tana?* | *tanaa?* | 'earth' |

As the data from Uma Bawang show, a glottal stop was added to final vowels before earlier final glottal stop was dropped. Merger was prevented through two changes in the preceding vowel: (1) lowering of high vowels before secondary glottal stop, and (2) lengthening of low vowels before a primary glottal stop. This still leaves an important question unanswered: how were primary and secondary glottal stop distinguished for purposes of the rule which lowered high vowels? Close checking in the field showed that while /a/ and /aa/ contrast before final glottal stop in Uma Bawang, as in /ata?/ 'water' (< **ata*) versus /ataa?/ 'raw, unripe' (< **ata?*), /i/ and /u/ are automatically lengthened before final glottal stop.

What this indicates is a sequence of four ordered changes leading to the reversal of final glottal stop and zero:

1. all vowels were lengthened before final glottal stop. This includes only **i*, **u* and **a*, since the final /e/ and /o/ that occur in many Kayan dialects developed from diphthongs **-ay* and **-aw*, which are preserved in dialects such as Long Atip (Blust 1974b:181ff.).
2. glottal stop was added after final vowels, producing length contrasts in ALL vowels before final glottal stop.
3. short high vowels were lowered before final glottal stop.
4. final glottal stop was lost after long vowels.

Sample derivations for pre-Kayan **telu* 'three', **pulu?* 'ten', **mata* 'eye', and **tana?* 'earth' are given in Table 4. Developments which applied to final **u* also applied *mutatis mutandis* to **i*:

**Table 4:** Sample derivations showing the development of final vowels and of final glottal stop in the language communities of Table 1

| **telu* | **pulu?* | *mata* | *tana?* | INNOVATION |
|---|---|---|---|---|
| *telu* | *puluu?* | *mata* | *tanaa?* | 1 |
| *telu?* | *puluu?* | *mata?* | *tanaa?* | 2 |
| *telo?* | *puluu?* | *mata?* | *tanaa?* | 3 |
| *telo?* | *pulu* | *mata?* | *tana* | 4 |

Uma Bawang Kayan has undergone only changes (1)–(3). In this dialect high vowels are automatically long before final glottal stop, but since length is fully predictable for these segments it is not treated as phonemic. By contrast, the low vowel /a/ can be either long or short before final glottal stop, and this phonetic difference is therefore contrastive. The language communities of Table 1 have undergone all four of these changes. Since these include both Kayan dialects and Murik, it is clear that change (4) was independently innovated on at least two occasions (once in the history of some still unspecified collection of Kayan dialects and another time in the history of Murik). In these language communities the lowering of high vowels before final glottal stop is fully predictable, and so has not been indicated phonemically in past publications (e.g. Blust 1974b, 1977).

After innovation (1), length was a phonetic feature of all vowels before final glottal stop, but was not yet contrastive. After innovation (2), length became contrastive for all vowels, but only before final glottal stop. After innovation (3), the lowering of short high vowels restricted length contrasts to the low vowel /a/, as is currently the case in Uma Bawang Kayan.

The Uma Bawang dialect spoken in the Baram basin does not appear to be the only Kayan language community which has preserved a record of these ordered changes. The Kayan dialect of the upper Kapuas basin in Kalimantan which the Dutch colonial language official J.P.J. Barth (1910) described early in the twentieth century also has undergone only changes (1)–(3). This is not immediately apparent from his orthography, but can be determined from additional notes which he provides.

In his Introduction, Barth (1910:xv) describes the glottal stop as a 'swallowed k;' (Dutch: '*opgeslokte' k*), and notes that he signals it with the Arabic hamzah, since no diacritic sign is available for it from the Latin alphabet. He cites some words with a single pronunciation, ending in glottal stop, as with /asò'/ 'dog', /ata'/ 'water', or /putè'/ 'banana', but cites others in a primary boldface entry with final vowel, followed by an alternative form in parentheses which contains a final glottal stop, suggesting that the two are in free variation, as with /mata/ (*mata'*) 'eye', or /puti/ (*puti'*) 'white'. In other cases he cites forms which are identical except for a diacritic which is inadequately explained (p.xvi), but which must represent a contrast in vowel length, as with /ata'/ 'water', but /atá'/ 'raw' (cp. Uma Bawang /ata?/ 'water', /ataa?/ 'raw').

These citations show that Busang, like the Uma Bawang dialect of the Baram basin, has undergone changes (1)–(3) but not change (4), and further confirm the explanation given here for the interchange of original final glottal stop and original final zero.

## 5 Conclusion

What at first appears to be evidence for complex sound changes in typical Kayan dialects, and hence diachronic evidence for formal conventions of the type once advocated under the rubric of 'alpha-switching' rules in synchronic phonological theory, turns out on closer inspection to result from a sequence of ordered changes in which merger is prevented by innovations in the environment of the affected segments. The apparently single innovation which interchanged final glottal stop and zero in many Kayan dialects and in Murik is an illusion created by a parallel change (loss of final glottal stop after long vowels) in closely related languages. The solution proposed to this problem highlights two principles of reconstructive methodology which are often overlooked: (1) the importance of dialects in

comparative linguistics, and (2) the importance of phonetic detail in language comparison.[6] Both of these considerations are often treated as 'little things' of marginal importance to the greater enterprise of reconstruction. But the history of final glottal stop in Kayan shows that little things matter, and without paying sufficient heed to them much bigger things may be seriously misunderstood.

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6 For a rare exception to the not infrequent neglect of dialects in historical linguistics see Llamzon (1973).

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