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The Development of Falling Contours from Tone Bending in Hausa*

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0. Hausa has three surface tones: H(igh), which is notationally unmarked, L(ow), indicated by a grave accent (à), and F(alling), indicated by a circumflex (â). (With long vowels, indicated by double letters, tone is marked on the first vowel only.) Evidence from a number of areas, such as contractions, paradigmatic patterns, and morphological formations, shows clearly that the falling tone represents H + L on a single syllable, where, moreover, the level tones originally belonged to two separate syllables. For example, the items in (1) illustrate contours resulting from tone retention following vowel loss.

- (1) *kâr* = *kadà* 'don't', *dābgii* = *daabùgii* [W dialect] 'anteater'; *bēlbeelāa* 'cattle egret' < **beelābeelā*; *dāndaanāa* 'an herb' < **daanādaana*

The examples in (2) show falling tones occurring in H-L pronominal paradigms.

- (2) a. *zân* (< *zaanì*) 'I will', *zâi* (< *zaayà*) 'he will', cf. *zaakà* 'you (m) will', *zaatà* 'she will'
b. *mîn* (= *minì*) 'to me', *mâr* (= *masà*) 'to him', cf. *makà* 'to you (m)', *musù* 'to them'

The plurals in (3a) and the verbs in (3b) illustrate disyllabic F-H words corresponding to trisyllabic H-L-H words. For example, plurals of the form *zōbbāa*, which are derived from CVCV singular nouns, pattern with H-L-H plurals such as *sīrāadaa* 'saddle(s)', derived from CVCCV nouns. Similarly, surface disyllabic verbs with the tone pattern F-H, e.g. *māntaa* 'forget' behave just like trisyllabic H-L-H verbs such as *karāntaa* 'read'.

- (3) a. *zōbbāa* (< **zoobābaa*) 'rings' (sg. *zoobēe*); *sāssaa* (< **saasāsa*) 'districts' (sg. *saas(h)ēe*), cf. *sīrdīi*, pl. *sīrāadaa* 'saddle(s)', *turkēe*, pl. *turāakaa* 'tethering posts'
b. *māntaa* 'forget', *shāidaa* 'inform', *shānyee* 'drink up', cf. *karāntaa* 'read', *bayyānaa* 'explain', *bincīkee* 'investigate'

Compelling evidence regarding the analysis of the falling tone in Hausa as HL is provided by the "stabilizer" *nee/cee*, whose tone is always opposite that of the immediately preceding tone. (The *cee* allomorph is used with feminine singular nouns; *nee* is used with masculine and with plural nouns.) After words with final H tone, *nee/cee* is L; after words with final L tone *nee/cee* is H, see 4a. The tonal polarity shows up particularly clearly with words that have tonal variants, see 4b.

- (4) a. *jāakii nēe* 'it's a donkey', *rīgaa cēe* 'it's a gown'; *zoobēe nēe* 'it's a ring', *mootāa cee* 'it's a car', *huulunāa nēe* 'they're caps'
b. *kēekē nēe* = *kēeke(e) nēe* 'it's a bicycle', *ʔilmīi nēe* = *ʔilīmīi nēe* 'it's knowledge'

As we would expect based on the interpretation of F as H + L, *nee/cee* after a word-final F is invariably H, e.g.

- (5) *hārām nee* 'it's religiously unlawful', *māi nee* 'it's oil'

Finally, the fact that falling tones in Hausa only occur on heavy syllables (Newman 1972), i.e. those with two potential tone-bearing-units, further supports the interpretation of F as consisting of two tones.

1. None of the above is controversial in Hausa studies: the treatment of F as a sequence of level tones has been accepted for a long time. For example, over 50 years ago, R. C. Abraham, the remarkable lexicographer and grammarian wrote, "The falling tone . . . has arisen from the fusion into a single tone of an original *high and low*" (Abraham 1941:139, italics his). Greenberg (1941:320) commented similarly: "Examples of the compound [= falling] tone can be considered . . . as the results of a succession of a high tone and a low tone." Thus, given a tone typology in which contour tones in some languages appear to constitute primes, the East Asian tone type, and in others are analyzable as sequences of level tones, the African tone type,¹ it is not surprising that Hausa is often taken as the prototype of the African type. What is surprising to discover is that historically F tones in Hausa do *not* all come from H-L sequences. Rather, in some cases F tone derived from a simple monotone by a process that I think of as "tone slurring", "tone slipping", or "tone bending". Specifically, F tone in monosyllabic nouns came directly from a single level H by a downglide in pitch comparable to the non-phonemic diphthongization of the long vowels /ee/ and /oo/ in English. According to this analysis, a word such as *wāa* 'elder brother', for example, did not come from a CVCV word with H-L tone, as has been implicitly assumed by all Hausaists, including myself, but rather from a monosyllabic word with simple H tone, i.e. [*wāa*] < */*waa*/.

2. First I shall describe some facts about Hausa that led to the historical hypothesis being presented here. Then, I shall show how this discovery elucidates certain synchronic tonal alternations that previously had been unexplained.

2.1. Excluding ideophones, monosyllabic words in Hausa are not very common. They are the norm in pronouns, with variable tone and vowel length depending on function, and in grammatical morphemes, e.g. *dā* 'with', *sai* 'until'. With content words, monosyllables are limited to about ten, almost exclusively H tone, verbs, e.g. *ci* 'eat', *shaa* 'drink',² and about twice that number of nouns, some of which are H and some which have F tone. Surprisingly, with the nouns, the H tone words are the ones where it is easiest to find a disyllabic source, e.g.

- (7) *sau* 'foot' < and = *saawuu* (cf. pl. *saawāayee*), *kwai* 'egg' < and = *kwaayii* (cf. pl. *kwaayāayee*); *yau* 'saliva' < and = *yaawuu*, *sai* 'urine' < ? = *sanyii*, *shuu* 'silence' = and < *shiruu*, *jaa* 'red(ness)' < */*jaajaa* by back formation (cf. pl. *jaajāayee*); *yaa* 'daughter' < */*yāa* < and = *ɗiyaa*.³

Most of the remaining monosyllabic nouns turn out to have F tone, e.g.

- (8) *dīi* [W] 'bamboo canoe pole', *kāi* 'head', *māi* 'oil', *rāi* 'life', *sāa* 'ox, bull', *sūu* 'fishing', *wāa* 'elder brother', *yāa* 'elder sister', *yāu* 'today'

In some of the above words, the F tone may in fact reflect an old H-L sequence. For example *rāi* 'life' is probably a deverbal noun, originally **raayii*, related to the verb *raayāa* 'give life', whereas *kāi* 'head' is probably a bimorphemic form consisting of the root **ka* (which reflects the reconstructed Proto-Chadic form) plus the definite article suffix -*i*. In others, however, there is no evidence to support the assumption of a disyllabic/ditonal source underlying the present F tone. Instead, one finds comparative evidence that indicates strongly that these words were always monosyllabic (and presumably monotonal). The Hausa word *māi* 'oil', for example, is a direct reflex of a word reconstructed for Proto-Chadic with confidence as a monosyllabic form **mar* (Newman 1977). Similarly, the Proto-Chadic word for 'bovine', **hla*, of which Hausa *sāa* is probably a reflex, is invariably monosyllabic in present-day Chadic languages as it clearly was in the proto-language, e.g.

- (9) *māi* 'oil' < PC **mar* ; *sāa* 'ox, bull' < PC **hla* 'bovine' (*hl* = [t])

In sum, the hypothesis being presented here is that *all* monosyllabic nouns in Old Hausa were originally monotonal (H) and all of them subsequently altered into falling tone words by a phonetic process of tone bending. The present-day monosyllabic nouns with H tone presumably all have a more recent origin, either from reduced disyllabic words, see (7) above, or from other tonal adjustments. Since the rule did not affect verbs, we now have an explanation for why monosyllabic verbs almost all have H tone whereas F tone is normal with monosyllabic nouns.

2.2. Additional evidence that F on monosyllabic nouns is an intrinsic tonal property of words of that shape rather than reflecting a tonal sequence comes from loanwords (see Hyman 1970). Although monosyllabic words in Hausa used to be uncommon, the language now has many more such words as a result of recent borrowing, e.g.

- (10) *bāl* 'ball', *bôm* 'bomb', *fîm* 'film', *kyât* 'cake', *nās* 'nurse', *zūu* 'zoo'

As one can see, all of the words have falling tone. One's first thought might be that the F is simply a reflection of the English intonation pattern. But note the following examples of French loanwords in the Hausa of Niger:

- (11) *bîk* 'ballpoint pen', *kâr* 'bus', *kyās* 'box'; *pîl* 'battery', *sôo* 'bucket'

Again we find the Hausa words with F tone, but in this case the donor language is not characterized by an intonational downglide at the end of words or phrases. So where does the F come from? My answer is that this is a further manifestation of the Hausa tendency to pronounce monosyllabic nouns with a falling contour.

3. Given the *H > F rule, we can now account for some anomalous falling tones that are found in a couple of common contractions, e.g.

(12) *bâi* F < *baayaa* H-H 'back' ; *gũu* F < *guri* H-H 'place'

Previously, there seemed to be no reason at all why the monosyllabic forms should have F tone since the words from which they were derived contained level H tones. However, if we view these forms as old contractions that fed the tone slurring rule, then we have a plausible historical explanation for the modern-day alternations. Note, by the way, that we must assume that these were lexically specific old contractions, since more recent contractions, e.g. *yaawuu* > *yau* 'saliva' keep their original H tone. The hypothetical derivation is shown as follows:

(13) *baayaa* HH 'back' > (contraction) **bai* H > (tone slippage) *bâi* F

4. While it is interesting to be able to explain scattered lexical anomalies, the real significance of the historical contour tone rule is that it throws a totally new perspective on the grammatically important formation of verbal nouns from finite verbs. In Hausa, "verbal nouns", which correspond to gerunds and progressive participles in English, are formed in a variety of ways. Those corresponding to simple H tone monosyllabic verbs all have a long vowel and falling tone, e.g.,⁴

(14) *shâa* 'drinking' < *shaa* 'to drink', *jâa* 'pulling' < *jaa* 'to pull', *sôo* 'wanting' < *soo* 'to want', *bîi* 'following' < *bi* 'to follow'; *cîi* eating < *ci* to eat

As far as I am aware, no one has accounted for the tone/vowel length alternation in an explicit, formal way, but the common assumption has been that forms such as *jâa* and *bîi* were bimorphemic, made up of the verb root plus a verbal noun ending consisting of a floating L tone with length. What this analysis leaves unanswered is why the L tone resulting in the falling contour isn't added to verbal nouns formed from disyllabic verbs, which also under lengthening, e.g.

(15) *fitaa* 'going out' (not **fitâa*) < *fità* 'go out'; *tsuufaa* 'aging' < *tsuufa* 'to grow old', *kòoshii* 'being replete' < *kòoshi* 'be replete'

The explanation I would suggest is the following. In the course of Hausa linguistic history, all common nouns came to have long final vowels (see Schuh 1984, esp. 196-97, Newman 1979). As a result, verbal nouns automatically acquired long final vowels just by virtue of their being nouns. The change from *fità* to *fitaa* or *bi* to *bîi*, for example, was not due to the linear attachment of an additional morpheme; rather it was a consequence of a category shift. What this means is that contrary to our usual view, regular verbal noun formation in Hausa was a case of zero derivation.

Verbs with an underlying short final vowel would have added length as an automatic result of a category shift from verb to noun. Verbs with an intrinsic long final vowel would initially have undergone no phonological change. On becoming nouns, however, some of the erstwhile verbs would have been subject to the tone bending rule, thereby appearing with the falling tone that synchronically serves to mark verbal nouns.⁵ Presumed sample derivations are as follows:

- (16) [bi]V $\Rightarrow$ [bii]_N > (by tone slippage) bîi 'following'
 [jaa]V $\Rightarrow$ [jaa]_N > (by tone slippage) jâa 'pulling'

Note that for the F tone to appear, the forms would have to be (a) nominal and (b) monosyllabic. Verb forms such as *jaa* 'to pull', although monosyllabic wouldn't have been affected, and disyllabic verbal nouns such as *fitaa* 'going out' and *tsuufaa* 'aging', although nouns, wouldn't have been affected. The tone rule would have applied to all and only monosyllabic verbal nouns—which is exactly what we find.

5. Originally, I had thought of contour tone formation in Hausa as manifesting weakening or intonational type downglide. I suspect that a better way to view the historical change, however, is as a strengthening phenomenon, which served to prop up monosyllabic nouns, all of which originally had H tone. This case would then fit in with the type of historical tonological process described by Hyman (1978:262–63): "A tone which occurs under the influence of an accent may change to make that tone (or syllable) more prominent. What this usually means is that a level tone will become a contour"

6. In describing the development of falling tones from high as a process of tone bending/slurring/slipping, my aim has been to show that the contours developed, not from the addition of a discrete L tone, nor even from the addition of a discrete, linear L feature, but rather from the phonetic deformation of a level H tone. The erstwhile H tone was modified, not added to. Once these falling tones appeared, however, they ultimately merged with falling tones produced by H + L sequences resulting from vowel loss, so that synchronically, all of the falling tones regardless of their origin behave like HL sequences on a single syllable. It is of course commonplace in African languages for HL tones to be phonetically realized as a fall. What happened in Hausa is the opposite, namely that in the specific case of monosyllabic nouns, basic contours that were produced by a low level phonetic process underwent phonological decomposition into H + L.

7. Synchronically, Hausa appears to be a typologically very typical, African-type tone language in which surface contours represent tone sequences. In this paper I have shown how a casual acceptance of such a typology can mask diachronic developments of a totally unsuspected and interesting nature.

NOTES

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¹ In the terminology of Yip (1989:149-50), contours in African languages tend to be "tone clusters" whereas in East Asian languages they are "melodic units or branching tones".

² The pattern of monosyllabic verbs all having H tone, with no lexical contrast, is reconstructed by Schuh (1977) as a feature of proto-West Chadic.

³ Hausa does not have surface rising tones. As first described by Parsons (1955), these generally simplify to high (although not always, as is normally assumed). Gwandara, a closely related creolized offshoot of Hausa, on the other hand, still preserves rising tones (Matsushita 1972), cf. *yǎ* 'daughter' and *pǎ* 'a flat rocky outcrop' with Hausa *yaa* and *faa*.

⁴ The verbs *zoo* 'come' and *jee* 'go' are irregular in many respects and do not follow the pattern described here.

⁵ The process described here only applies to "Primary verbal noun", i.e. phonologically regular gerundives. Hausa also has "Secondary verbal nouns", which are formed by suffixes and vowel ablaut patterns, the choice being lexically specific.

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Form and Function in Tone Languages

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1. Introduction. This paper is an overview of a tone language typology based on tone function and a discussion of some instructive challenges to the typology. To my knowledge, such a typology has not been attempted before. So far, the *phonological* aspects of tone have been used as bases for tone language typologies: for example, tone inventory size (Maddieson 1978), the basic components of tone (Pike 1948, Wang 1967, Woo 1969), the representation of tone in the underlying structure (Leben 1971, Voorhoeve 1973, Duanmu 1990), and the behavior of tone in phonological rules (Hyman and Schuh 1974, Schuh 1978). Typologies also exist in which tone languages as a type are contrasted with other types of languages which make different linguistically significant uses of pitch (McCawley 1970, 1978, VanderHulst and Smith 1988).

A typology which is organized around how tonal contrasts are used leads the investigator beyond tone itself to other related aspects of these languages. Morphological tone, or tone that carries a measure of independent meaning, is found in almost all tone languages. First, one must simply identify what kinds of morphological tone are found in different languages to counteract the mistaken idea that Asian tone languages have only lexical tone. Elsewhere (Ratliff 1991a, 1991b, 1992b) I have presented and defended the functions listed below as definitional for two language types, "A" and "B":

TYPE A

lexical; and
minor morphological uses of tone:
--attitude of speaker toward referent
--meaningful tone patterns in
 expressive (ideophonic) phrases
--meaningful tone patterns in
 reduplicative phrases
--tone sandhi compound formation
--minor word class demarcation

TYPE B

all type A functions; and
major morphological uses of tone:
--derivation
--inflection
--major word class demarcation
(inventories and/or alternation patterns)

But the steps that come after the identification of morphological tone type are the most interesting: the delineation of the relationship between tone function and other structural properties of a tone language apart from tone, and the attempt to ascertain *why* certain types of morphological tone are found in tone languages that have other

well-known characteristics. I will illustrate what I mean by this with a brief discussion of White Hmong, as typical of type A, and Kanuri, as typical of type B.

2. A type A tone language: White Hmong (Ratliff 1992a). White Hmong, a Hmong-Mien language of Yunnan province China and northern Southeast Asia, is a classic type A tone language. In addition to the tone functions listed above for type A languages, it has the following related structural features: almost no segmental morphology, primarily monosyllabic roots, low word-building resources, many tones, and a replacement type of tone sandhi.

TONE FUNCTION: as in A above

Major-lexical

Minor-morphological: attitude markers, meaningful tone patterns in expressive phrases, some tonally marked minor word classes, tone sandhi compounding

SEGMENTAL MORPHOLOGY: poor to nonexistent

There are no grammatical affixes. Only some "shape prefixes" with clear independent meaning are used with certain nouns.

ROOT SYLLABLE STRUCTURE: primarily monosyllabic

Except for loan words, bisyllabic words are compounds and compounds are transparent.

SEGMENTAL CONTRASTS/PHONOTACTICS: limited resources

58 onsets times 13 rimes = 754 possible combinations without tone factored in. Since syllables are usually coextensive with morphemes, almost all possible combinations need to be realized as morphemes. There is a high level of homophony as well.

NUMBER OF TONES: high (7: 55, 51, 24, 33, 22, 21?, breathy-fall)

TONE SANDHI: paradigmatic (involving replacement of one tone in the inventory by another)

Morphemes are always identifiable, even if altered by the sandhi process. No spreading; no assimilation; no phonologically "natural" tone changes at all; for example:

22 > breathy-fall after 55:

i55 tu22 neɣ^F > i55- tu^F neɣ^F
one CLF person 'one CLF person'

24 > 33 after 51:

va51 če24 > va51-če33
house garden 'house and grounds'

3. A type B tone language: Kanuri (Hutchison 1981). A representative of type B is Kanuri, a Nilo-Saharan language spoken in a wide area stretching from the Sudan to Nigeria. In addition to the tone functions listed above for type B tone

languages, it has the following related structural features: extensive segmental morphology, roots which are primarily polysyllabic, great word-building resources given the possibility that each syllable can be found in either first or last position in the disyllabic word, few tones, and a spreading type of tone sandhi.

TONE FUNCTION: as in B above

Major-morphological:

Inflectional:

V: root tones determine affix tones in different verb classes

N: affixes change root tones: noun plurals

Derivational:

V > N: (1) Tone and affix changes dependent on verb class

membership; (2) L₀H pattern to derive abstract nouns

Minor-lexical; expressive

SEGMENTAL MORPHOLOGY: rich

Inflectional:

V: tense, aspect, person and number agreement

N: case and number marking

Derivational:

V > N: (1) Nominalizing affixes with different semantic associations (abstraction, instrumentality, location, agency)

(2) Reduplication

N > Adj (by affixation)

basic V > derived V: applied, passive/reflexive, causative

ROOT SYLLABLE STRUCTURE: polysyllabic

"It seems that the optimal syllable structure for the Kanuri word is bisyllabic . . ." (Hutchison, p. 16). An analysis of one text yielded an average of 2.69 syllables per word.

SEGMENTAL CONTRASTS/PHONOTACTICS: extensive resources

27 onsets times 35 rimes = 945 possible combinations without tone factored in. When taken to the power of 2 (the optimal syllable structure for the Kanuri word being disyllabic), it becomes clear that Kanuri has considerable resources for the generation of new words.

NUMBER OF TONES: low (2: L, H)

TONE SANDHI: syntagmatic (spreading, assimilatory)

A tone melody language (= "restricted" tone language) in part: spread of L tone over all but last syllable of many derived forms and compound nominals (Hutchison, p. 28):

fúfù 'lungs'

> fùfù 'permanent cough'

Kànùrì 'Kanuri people'

> Kànùrí 'Kanuri language'

mánè̀m 'you look for' + búì 'eat it'

> mánè̀mbúi 'daily bread'

4. Further examples and a rationale. White Hmong and Kanuri may be grouped with many other languages which share similar structural properties and use tone in much the same way. Like White Hmong, there are Mandarin, Hakka, Cantonese, Thai, Vietnamese, and Biao Min in Asia and !Xũ on the Namibia/Botswana border in southern Africa. Like Kanuri, there are Kikuyu, Hausa, Kxoe in Africa, Burmese in Asia, and Otomi, Mazatec, Zapotec in Mesoamerica. They thus define two major tone language types. Why should most tone languages be of one type or the other? The answer comes from the fact that languages are designed to allow us to communicate successfully, and tone is a communicative tool. Tone must be used for lexical discrimination when there are not enough other resources available in a tone language to do the job. This is the case in what I have called "type A" tone languages. Non-tonal resources for word-building are low: there is no derivational morphology, words are short, and there is a low number of possible syllables, as determined by the phonemic inventory and constraints on syllable structure. It follows that if tone is needed for this important job, it will not be easily obscured by tonal alternation processes. If these exist, there will be one highly constrained predictable alternate for each lexical tone that undergoes alternation (and not all will). Assimilatory, or spreading tone rules do not develop because they would obscure lexical tone, as would morphological tone alternations that affect large word categories. Also, languages that need tone primarily to create new words can make good use of a high number of tonal contrasts. Type A tone languages typically have three tonal contrasts or more, up to twelve. Finally, the morphological tone one finds in these languages live on the "interesting outskirts" of the language proper: tones are used to define small closed word classes such as a run of numerals or a set of deictics, to form compounds (where the compound may differ semantically from the sum of its component parts) or to express speaker judgment. What I have called "type B" tone languages can do more with tone because they have rich internal resources for word-building: derivational morphology, longer words, a high number of segmental contrasts. Tone is not needed for lexical discrimination to as great an extent. Words are recoverable despite quite intricate disturbances to the underlying lexical tone. In these languages, tone is used in conjunction with segments to mark inflectional categories and membership in major word classes, and to derive new words.

5. Exceptions and challenges. Of course, what I have sketched here is a picture of two pure types, and what one finds in the real world are to an extent compromises of these idealizations. Nonetheless, most tone languages are surprisingly easy to classify as representative of either one type or the other --- I assume for the communicative reasons I have just presented. Given that this is true, I have found exceptional languages which mix elements from both feature sets to be both interesting and instructive. They fall into three categories:

1) Most tone languages will display marginal use of features from the opposite list. Examples are the presence of some disyllabic words in a primarily monosyllabic word language, and the presence of perhaps one derivational affix in a language otherwise morphology-free. I consider these facts of no importance in determining the basic classification of the language.

2) Some of these exceptional languages -- those that have characteristics of both types, and hence belie the claim that the structural properties outlined above necessarily hang together -- are languages which I claim have been caught in a change in progress which is moving them in the direction of the opposite type. The circumstances of the change actually help demonstrate that the features defining each type are linked: as one feature changes (for whatever reason), other features from the same set begin to develop as well. Shimen Hmong, a Hmong-Mien language, is one of these, and illustrates the development of type B features in a type A language (see extensive discussion in Ratliff 1991b). Gokana, a Benue-Congo language, is another. It illustrates the converse, a development of type A features in what was historically a type B language (see Ratliff 1992b). In both cases, however, the synchronic outcome is a type A language *with the exception* of tone function. In Shimen, the type B tone function is innovated; in Gokana, the type B tone function is preserved.

3) There is a third set of seemingly exceptional languages, however, that I would like to discuss here for the first time. These languages have been proposed to me by various people as constituting counter-evidence to my theory that tone language function is predictable on the basis of the non-tonal structural properties of a tone language. The challenges take the following form: language X has type B tone functions, yet its roots are monosyllabic. What is the explanation for this within a tone language typology which links tone function to root syllable structure? These challenges have proved most helpful, because they have led to a more subtle understanding of the relationship of form and function in tone languages than I could possibly have achieved by only looking at the classic examples of each type, such as Hmong and Kanuri. I will try to show that these languages are not exceptions at all, nor are they languages whose nature can be explained as the result of reconstructable change involving type A and type B feature sets. They are rather stable languages which well illustrate the point that tone function is related to other structural properties of a tone language, but not always primarily to root syllable structure. Accommodating these languages will require the refinement of the basic shape of the typology, rather than an abandonment of it.

6. Challenge #1: Dinka (Andersen 1987). Dinka, a Nilotic language spoken in the Sudan, poses a challenge to this typology: it is a monosyllabic root language, but it is characterized by a great deal of tonal morphology of the B type.¹ In Dinka, tone marks mood and agreement in the verbal system and location and possession in the nominal system. Other features of this language are from the B set rather than the A set, as exemplified below:

TONE FUNCTION: as in B above

Major: morphological

Inflectional: subject agreement

Derivational:

V > N

V > V (passive, imperative, relative, interrogative modes)

Noun, verb and adjective tonal classes

Minor: lexical

SEGMENTAL MORPHOLOGY: rich

Verbal: mood, tense, aspect; person and number agreement

Nominal: location, possession

ROOT SYLLABLE STRUCTURE: primarily monosyllabic

According to Andersen (p. 2), native roots are monosyllabic. Polysyllabic stems are the combination of derivational prefix plus monosyllabic roots or a compound of two monosyllabic roots. In one text examined, 73% of the words were monosyllabic, 25% disyllabic, 2% trisyllabic.

SEGMENTAL CONTRASTS/PHONOTACTICS: extensive resources

21 onsets times 84 nuclei times 13 finals = 22,932 possible combinations without tone factored in! The high number of possible nuclei comes from the fact that the vowel quality contrasts (7 monophthongs + 12 diphthongs = 19) must be multiplied times 2 voice qualities (breathy and creaky but not modal) and that number must be multiplied times three contrastive vowel lengths. A number of phonotactic constraints have already been built in.

NUMBER OF TONES: low (2: L, H)

TONE SANDHI: syntagmatic

Some spreading sandhi (involving bundling and unbundling of surface contour tones)

bundling: L > HL after H

mòc à-^lgée^m thòc^k

'The man is giving a goat.'

L L H HL

man declar-give goat

unbundling: HL > H before L

à-nòŋ^lcua^{ar} kù^ltiik

'There are a thief and a woman.'

L L H L L

declar-have thief and woman

(Andersen, pp. 23-24)

In addition to the presence of type B tonal morphology, in Dinka segmental morphology is rich, phonological word-building resources are (extraordinarily) extensive, and the tonal inventory is small. This therefore *is* a type B language, since tone is clearly not particularly necessary for lexical discrimination. The key is the presence of one of the structural characteristics of type B languages other than polysyllabic root structure: segmental morphology, here ablaut (or gradation) morphology, involving both vowels and consonants. "To a large extent . . . inflexion is not realized by affixes but by vowel and tone changes in the stem and by changes in the stem-final consonant" (Andersen p. 3). It is common knowledge that in many well-attested cases inflectional and derivational tones, analyzed

synchronically as "floating tones", are all that remain of old affixes. Comparative evidence suggests that Dinka experienced a great deal of compression, but not at the expense of its grammatical contrasts: to put it crudely, what had been spread out horizontally has piled up vertically in this language. The criteria for type B must therefore be modified in light of the existence of languages of this type: type B tone languages may have either polysyllabic roots (the usual case) or predominantly monosyllabic roots, if the language is characterized by segmental morphology of the ablaut type. A type of segmental morphology -- affixal or ablaut -- is, however, a necessary precondition for the presence of inflectional and derivational tone, since this kind of tonal morphology has its origin in segmental morphology.

Amuzgo (Smith-Stark and García 1986), an Oto-Manguean language of Mexico, is another language which should be classified as type B despite the fact that it has predominantly monosyllabic roots. Compared to Dinka, it has neither so much segmental nor so much tonal morphology, but it is significant that they seem to be present to roughly the same extent in this language. Smith-Stark (p.c.) believes Amuzgo has undergone the same kind of "compression experience" as Dinka has. So in Amuzgo as well, the key structural feature correlated with the presence of type B tonal morphology in a monosyllabic root language is the presence of segmental morphology.

7. Challenge #2: the Northern Wu dialects of Chinese.² Certain Chinese dialects pose another version of the same challenge posed by Dinka and Amuzgo. In the same family as the quintessential type A tone language, Mandarin, these dialects surprisingly have predominantly monosyllabic root structure and another type B tone function: major syntactic class demarcation. To quote Sagart (p.c.), "Chinese dialects in which monosyllables behave differently in sandhi according to the grammatical nature of the compound in which they occur are common in the Northern Wu area, [that is] more or less that part of Jiangsu province which lies south of the Yangtse river. Descriptions of dialects such as Chongming island in the Yangtse estuary, Suzhou, or Danyang state that these have a 'normal' or 'major' or broad' pattern of sandhi which applies generally, and a 'minor' or 'narrow' pattern which applies in certain [constructions]". I identify this tone function as harmonic in type B rather than type A tone languages. Type A tone languages may have syntactically conditioned tone sandhi, but it is usually different in two important respects. First, if they have any at all, type A languages have only highly restricted tone sandhi processes. Northern Wu type tone sandhi not only identifies certain constructions as candidates for tone sandhi alternations, but may contrast constructions by virtue of *which* tone sandhi pattern they will follow, thereby according tonal patterns syntactic meaning. Since major constructions are involved, this seems analogous to the identification of verbal and nominal class members in type B languages according to the type of tonal alternations they undergo.

Second and most important, tone sandhi in type A languages preserves lexical tone since each tone has at the most only one alternate drawn from the tonemic inventory, and these alternates can be learned by tone category pairings. In the Northern Wu type of tone sandhi which involves spreading tone and/or tone

neutralization, lexical tone is obscured to the point of being irretrievable. Of Shanghai, Ballard reports: "... tone is becoming nondistinctive ... Shanghai's isolation values are the fewest of any Wu dialect [3 tones with 2 checked tones for category D] ... a lot of polysyllabic words must be learned as units 'with a particular overall contour'" (p. 44, quoting from Sherard 1972, 1980). Of Tang Xi, Kennedy writes: "It is beyond question that tone is word-distinctive on monosyllables ... But these monosyllables form a very small percentage of the vocabulary. Most of the time the tonal pattern is functioning morphologically ... one might be led to the broad guess that the function of tone in Tangsic is essentially not to distinguish otherwise homophonous syllables, but to express syntactic relationships. From spoken material alone and without reference to historical dictionaries it is extraordinarily difficult to make up a word list for Tangsic in terms of monosyllables with fixed tones" (p. 373). And of the Northern Wu group of dialects as a whole, Ballard writes: "It is at least possible that the tone sandhi groups are being treated as words, and thus receive a tone envelope that is equivalent to some single syllable tone value" (p. 210). The key to the appearance of a type B tone function in some dialects of Chinese, then, is the presence of two other structural characteristics of type B languages: syntagmatic (spreading) tone sandhi and the concomitant growth of polysyllabic roots.

For example, in **Tang Xi** (Kennedy 1953), a sketch of which appears below, there are two primary tone sandhi patterns. One tone sandhi pattern is used for attribute-head constructions and is left dominant (with rightward spreading of the tone of the first morpheme of the noun phrase) while the other tone sandhi pattern is used for verb-complement constructions and is right dominant (with neutralization of the tone of the verb on the left). According to Kennedy, these patterns arose from differential stress patterns in the two constructions.

TONE FUNCTION: as in B above

Lexical; yet major constructions characterized by different tone patterns which obscure lexical tone

SEGMENTAL MORPHOLOGY: poor

No significant segmental morphology

ROOT SYLLABLE STRUCTURE: monosyllabic > disyllabic

SEGMENTAL CONTRASTS/PHONOTACTICS: not predictive

The possibility of positioning syllables at the beginning or end of a disyllabic word increases the number of possible words exponentially.

NUMBER OF TONES: not predictive

Either 3 (if two "registers" factored out, which is possible since the initial consonant voicing contrast is retained), or 5 (if initial consonant class disregarded) on open syllables

TONE SANDHI: syntagmatic

Both a rightward, left-dominant (spreading) pattern for attribute-head constructions and leftward, right-dominant (neutralization of first unstressed syllable) pattern for verb-complement constructions. Neither pattern involves replacement sandhi; both patterns are syntactically defined. In certain collocations, this gives rise to different meanings (Kennedy, pp. 372-373):

ʔea²⁴ 'love' + nyin²⁴ 'man'

attribute-head pattern: ʔea-nyin²⁻⁴ 'sweetheart (loved person)'

verb-complement pattern: ʔea-nyin⁰⁻²⁴ 'to love people'

tsao⁵¹ 'fry' + vae²⁴ 'rice'

attribute-head pattern: tsao-vae⁵⁻¹ 'fried rice'

verb-complement pattern: tsao-vae⁰⁻²⁴ 'to fry rice'

8. Conclusion. We have seen that the unexpected cooccurrence of type B tone function and monosyllabic root structure is to be understood in the light of other information about these languages, namely information about segmental morphology for Dinka and Amuzgo and information about sandhi processes and the growth of the phonological word in the Northern Wu dialects of Chinese. Furthermore, of the two type B tone functions, it appears that inflectional and derivational tone may be most closely correlated with the presence of segmental morphology of the same type, whereas the marking of major constructions by tone may be correlated with stress-derived tone sandhi processes, and not with segmental morphology at all. In other words, within the type B group, languages can differ according to how tone is used and which of the other structural properties of the language is (or are) crucially involved.

Monosyllabicity, therefore, cannot be used as a necessary or sufficient condition for the presence of type A tone functions to the exclusion of type B tone functions in a tone language. Polysyllabicity, on the other hand, does seem to constitute a sufficient condition for the presence of type B tone functions. I have encountered no polysyllabic root tone language that does not display one or more of the type B tone functions. The presence of other type B structural features, especially the presence of segmental morphology, may also constitute sufficient condition for a tone language to have important grammatical functions.

This asymmetry in structural prerequisites for particular tone functions is reflected in two further facts. First, any type A tonal function (including lexical discrimination, of course) can appear in a type B language, but identification of a tone language as type A depends on that language *not* having type B functions. Second, the communicative explanation for the role of tone in a language only works for the A type: there is no clear communicative reason why tone should redundantly mark grammatical contrasts in a type B language.

Two of these asymmetries, (1) the use of monosyllabic roots in both types, but polysyllabic roots in just one, and (2) the use of lexical tone in both types, but substantial grammatical tone in just one, may help explain the fact that type B tone languages, of all the world's tone languages, appear to be more frequently encountered and more widely dispersed. We may want to identify type A as the marked and type B as the unmarked tone language type. As part of a formal characterization of these ideas I would like to propose the following implicational universals for mature tone languages. "Grammatical use of tone" in these statements refers to the major grammatical tone functions of type B:

1. If a tone language has only 2 contrastive tones, it will make grammatical use of tone.
2. If a tone language is characterized by significant spreading (assimilatory) tone sandhi, it will make grammatical use of tone.
3. If a tone language makes significant use of segmental morphology (either affixal or ablaut), it will make grammatical use of tone.
4. If a tone language is characterized by polysyllabic roots, it will make grammatical use of tone.

Notes

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²I am grateful to San Duanmu for raising the question of spreading tone in apparent type A languages and Laurent Sagart for calling my attention to tone behavior in a number of Wu dialects. Sagart also reports that syntactically governed tone sandhi can also be found in dialects from another area in China: Western Jiangxi and Southern Hunan.

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