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The inefficiency of 'tone change' in Sino-Tibetan descriptive linguistics

('Plus ça change, plus c'est la même chose')

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Preamble

I wish to acknowledge my debt to the author of the phonetic and phonemic part of Love Songs of the Sixth Dalai Lama Tshangs-dbyangs-rgya-mtsho (Peiping, 1930) for the liberating principle whereby he allows his two tones to have overlapping phonetic realizations (cf. p. 178 below).

It is to the 6th Conference, and especially to Pulleyblank, that I owe the stimulus to contribute a paper on tone change to the 8th Conference: during the discussion of, I think, Löffler's paper ('Bawm verbal forms, and the tonal system of Central Chin') at San Diego I mentioned that I thought the 'tone change' concept to be unsound; and I then noticed Pulleyblank smiling sadly over this aberration of mine, due, he may have thought, to the strength of the California sun; but in the cool, and occasionally stimulating, climate of England too the suspicion has continued to trouble me that 'tone change' is among the less serviceable weapons in the armoury of linguistics.

I. The sandhi (or junction) type of tone change

For the first of the two major types of tone change that I wish to criticize in this paper I take as my starting point the familiar sentence from Pike 1948:

> 'forced meaningless substitutions of one toneme for another may be called PERTURBATIONS of tonemes, in which one toneme is perturbed by another in REGULAR TONE SANDHI' (p. 25).

The 'tone sandhi' (or tone junction) notion has been much used to account for an important type of tone change, perhaps the most important, whereby a particular lexical item, morpheme, or word has been assigned to one tone (or toneme) in one junction context, but to another tone in another type of junction.

'Basic tones' versus 'sandhi tones' or 'modified tones'

In such cases one might reasonably expect a double or a multiple tone classification to be given to the lexical item, morpheme, or word concerned, in accordance with the two or more tones (or tonemes) that were attributed to it. This would mean that a lexical item that had both tones 2 and 6 attributed to it, like de 'water' in passage (1c) below, quoted from Downer 1967, would be classed, tonally, as a tone-2/6 lexical item, and šɔ 'hot' as a tone-3/5 lexical item; but in practice it is usual to

give one of the variant tones a different status from the other tone or tones, as being the 'basic tone' or 'normal tone', while the other variant tones are said to be the result of 'perturbation', and are ranked as 'sandhi tones' or 'modified tones':

1. Downer 1967

a. '- - - a total of eight tones is found in W[hite] M[iao]. The realizations of these tones - - - are - - -
(1) High level (55) - - -. (2) High falling (51) - - -.
(3) Mid rising (35) - - -. (4) Low level (11) - - -.
(5) Mid level (33) - - -. (6) Mid falling (31) - - -.
(7) Low falling (21) - - -. (8) Low rising (13) - - -', (p. 591).

b. '- - - a considerable number [of monosyllable morphemes] is found with two allomorphs, one with what shall be called 'basic tone' and one with a modified tone. The environment in which the modified tone may occur is - - - immediately after syllables with WM tones 1 and 2 - - -: items with basic tones 2, 4, 7 may occur as tone 6; basic tone 3 may occur as tone 5; and basic tone 5 may occur as tone 4.' (p. 592).

c. 'de^2 "water" kw^2de^6 "ditch" - - - $ʂɔ^3$ "hot" $de^2ʂɔ^5$ "hot water" - - -', (p. 593).

Overlapping in phonetic realization not permitted

The reasons why Downer describes the relationship between, for example, the 51 pitch of the lexical item *de* in the monosyllabic word de^2 'water' and its 31 pitch in the two-syllable sequence kw^2de^6 'ditch' as one of tone change I take to be: (i) that *de* in kw^2de^6 has the same 31 pitch as the lexical item *na* has in the monosyllable na^6 'rain', (ii) that he will not allow overlapping in phonetic (pitch) realization between one tone and another, and (iii) that in such cases of variation the pitch of the lexical item in the second-syllable place is to be assigned to whichever tone it is that has that pitch as its realization in the monosyllable. Thus, if *na* is classified as tone-6 in the monosyllable na^6 'rain', *de* must be classed as tone-6 in the disyllabic example kw^2de^6, not as continuing to be tone-2 with an alternative phonetic realization (31) that happens to overlap the realization of tone 6 in this context.

Pitch variation and Firthian phonology ('prosodic analysis')

Downer solves the problem that I have illustrated from his White Miao material through change of tone; I, on the other hand, see it not as a problem of tone change but as a problem of pitch variation, variation in the pitch of a lexical item from one junction context to another. I have been influenced in my approach to this problem by passages such as the following from the teaching of J. R. Firth:

'If sounds are described, classified, and explained by

this statistical contextual technique, most contemporary theories of elision, coalescence, and assimilation will be seen to be confusing and, what is more to the point, entirely unnecessary' (Firth, 1935 and 1957, p. 37).

Following Firth, then, I should return to the unanalysed phonetic data, the variation in pitch, and, where Downer identifies a given pitch register and contour in the second-syllable place with the tone that those pitch features are realizations of in the monosyllable, I should be willing not merely to allow a given tone to have more than one register and contour as its phonetic realization but also to allow the pitch exponent to be identical with (and, therefore, to overlap) the pitch exponent of another tone in some of its contexts, such as the second-syllable place referred to above. In other words, what Downer states as tone sandhi I should treat merely as pitch sandhi, or pitch variation.

Accordingly, I have no need to treat each of these pairs of variant pitch patterns as an example of tone change but simply as a pair of alternative phonetic exponents (or phonetic realizations) of each tone appropriate to one or other of two different types of junction, and, for certain combinations of tones, overlapping each other phonetically. I see the variation, that is, as a problem of pitch harmony and exponent (or realization) harmony, operating at the phonetic level, without any need to go to such drastic lengths as stating the variation as change of tone, which is, of course, a phonological change, reflecting a significant structural difference.

Contour harmony, register harmony, and both

Downer's tones 1, 6, and 8 show no variation in pitch in any type of junction; it is tones 2, 3, 4, 5, and 7 that I wish to state as having alternative pitch exponents according as these five tones harmonize, in junction, with the preceding high-register pitch (level or falling, 55 or 51) of tones 1 and 2, or harmonize with the contrasting range of pitch features that comprises mid register (35, 33, 31), lower-mid (21), or low (11, 13) as a feature of preceding tones 3, 4, 5, 6, 7, and 8. I therefore find it necessary to distinguish two types of pitch harmony extending over the two syllables concerned; and, since this harmonizing relationship, like vowel harmony and the harmony of other phonetic features, seems to me to be proof of a high degree of union between the two syllables concerned in it, I proceed to give phonological recognition to a unit comprising both of them, which I term 'word'.

One of these two types of pitch-harmony (disyllabic) 'words' I term 'high', because it has high register (55, 51) at the beginning of its first syllable, with a matching variant pitch feature, of tones 2, 3, 4, 5, and 7, in the second syllable; the other type of 'word' it is convenient to term 'low', because it has register features other than high at the beginning of its first syllable (35, 33, 31, 21, 11, 13), and a matching alternative

pitch feature for those five variant-feature tones in its second syllable, as shown in the table below:

Tone	Phonetic exponents: 'high word'	Phonetic exponents: 'low word'	Pitch figure: common	
2	mid	high	falling	31 / 51
3	level	rising	mid	33 / 35
4	mid, falling	low, level	---	31 / 11
5	low	mid	level	11 / 33
7	mid	lower-mid	falling	31 / 21

Tone 2, then, could be described phonetically as a 31/51-pitch tone, tone 3 as a 33/35-pitch tone, and so on for the other three, according to their alternative phonetic exponents; but my analysis of these pitch figures into their register and contour components in the above table gives a better idea, to my mind, of the significance, or contrastive role, of the pitch features than can be gained from the unanalyzed figures; and these differences in the significance of identical figures for different tones can usefully be borne in mind when examining the phonetic overlapping in the second syllable of the 'high word' between, for example, tones 2, 4, and 7: all three share the pitch figure 31; but its variant significance for tone 4 ('mid, falling') is different from the 'mid' significance that it has for tones 2 and 7. Tones 3 and 5, and tones 4 and 5, also overlap, but not in the same circumstances: tone 3 has its 33 pitch pattern as its exponent in the 'high word'; but tone 5 has 33 as its alternative for the 'low word'; and, further, my table shows that the significance of the 33 pattern is 'level' (versus 'rising') for a tone-3 lexical item, e.g. ɓɔ̀ 'hot', but 'mid' (versus 'low') for a tone-5 lexical item, e.g. ntoŋ 'tree' (Downer 1967, p. 593).

Classification of tones in relation to the 'word'

In the second-syllable place my five alternative-exponent tones 2, 3, 4, 5, and 7 occur freely, in their alternative

phonetic forms, in both my 'high word' and my 'low word' alike; but this is not so with the first-syllable place. That place is limited to tones 1 and 2 (with pitches 55 and 51) for the 'high word', and, complementarily, to tones 3, 4, 5, 6, 7, and 8 (with pitches 35, 11, 33, 31, 21, and 13) for the 'low word'. These limitations on occurrence in the first-syllable place can be translated into a classification whereby tones 1 and 2 can be classed as 'high-word' tones, to qualify their monopoly of the first-syllable place in the 'high word'; and tones 3, 4, 5, 6, 7, and 8 can, on corresponding grounds, be classed as 'low-word' tones from their exclusive association with the first-syllable place of the 'low word'. In monosyllabic words all eight tones can, of course, occur; and their phonetic exponents in that type of word are, with constant register and contour exponents:

1	2	3	4	5	6	7	8
high level	high falling	mid rising	low level	mid level	mid falling	lower-mid falling	low rising

Single tone classification

I would claim for my 'phonetic-overlapping' type of analysis that it has the advantage of making a single tone classification possible for each lexical item, thereby making the distinction between 'basic tones' and 'modified tones' or 'sandhi tones' unnecessary. The price to be paid for it I believe to be modest: familiarizing oneself with two phonetic exponents instead of one for certain tones (2, 3, 4, 5, 7), and accepting some degree of overlapping in the phonetic exponency of, in this White Miao example at least, tones 2, 4, and 7 with each other and with tone 6, and, though not under comparable conditions, of tone 3 with tone 5, and of tone 4 with tone 5. Consequently, a single tone classification will stand, by my analysis, for each lexical item. The lexical item de 'water' referred to above can be classified as a tone-2 lexical item, not as a basic-tone-2 lexical item or as a tone-2/6 lexical item, with a falling pitch contour as its phonetic exponent, either from high register or from mid register according to the ytype of word, and the syllable place, in which it occurs. The lexical item šɔ 'hot', correspondingly, can be classified as tone-3, not as basic-tone-3 or as tone-3/5; and its pitch exponent is mid register, with either rising or level contour according to context. Attaining a single classification is particularly important for an analysis carried out in accordance with Firth's 'prosodic approach', because its aim is to arrive at a single phonological formula for each lexical item (cf. section III); and a double or multiple tone classification must be an embarrasment to an analysis carried out in accordance with this principle.

Phonetic overlapping at Berkeley

At Berkeley, at least, my readiness to allow overlapping in the phonetic realization of two or more tones should not need an elaborate defence: one of the insights to be found in Y.R. Chao's phonemic analysis of Lhasa Tibetan in Love Songs of the Sixth Dalai Lama, published as early as 1930, is precisely that he does not hesitate to accept some degree of identity in realization between his low tone (˩) and his high tone (˥) whereby the same pitch is shown in his phonetic transcription as serving as a phonetic realization of both tones; e.g.

Pitch	Low tone	Page	Song	Line	High tone	Page	Song	Line
˩	+oɾʂu˩	46	2	4	ɲam˥	48	3	4
˧	k'amɾtɕɛ(ə)˩˧	52	5	2	ɲin˥˧t'up˩	50	4	1
˩	k'amɾotŋ˩˩ [sic, toŋ]	52	5	3	lo˥˩na˥˩	92	23	2

The White Miao constant-pitch tones

My exploitation of phonetic overlapping does not, of course, extend to tones 1, 6, and 8; indeed I have not even been able to treat them as also occurring in the second-syllable place of disyllabic 'words', because they show none of the pitch variation that I have used as a criterion for delimiting the disyllabic 'word' in the case of tones 2, 3, 4, 5, and 7. It seems unlikely that there are other junction features, parallel to the pitch-variation criterion, that I could use as criteria for this purpose; for Downer would have mentioned them. In the absence of such features it is impossible to determine whether a tone-1, a tone-6, or a tone-8 lexical item should be united with a preceding lexical item in a disyllabic word (which is what one would expect, after all, on the model of the pitch-variation tones) or separated from it in all cases; but, in any case, these three tones, with their constant phonetic exponents, do not raise the tone-change problems that I have been criticizing here.

Pitch features in non-contrastive contexts

Before leaving my criticism of the junction, or sandhi, type of tone change, I should like to emphasize that what I am claiming is that to assign the same pitch features always to the same tone, without taking into account other factors such as lexical identity, is excessively phonetic, and therefore insufficiently phonological (and structural). I am particularly opposed to automatically treating a pitch in a non-contrastive context as a realization of the tone to which the same pitch is assigned in a contrast context merely because the two pitches are phonetically identical. In my example from the Lhasa dialect of Tibetan below you will see that the second syllable of a noun has an obligatory high pitch, and, further, that this second-syllable high pitch is non-contrastive, unlike the high pitch of the first-syllable place, which is in contrast with a lexically distinctive low pitch:

Lhasa Tibetan, tone-1 and tone-2 words (disyllabic noun)

Tone 1:	lcags-sgam	'iron box',	gsol-ja	'tea'
Tone 2:	sgam-chung	'small box',	ja-ldong	'tea churn'
	yi-ge	'letter'	lam-yig	'passport'

(Sprigg, 1955, pp. 147, 151)

I, therefore, find it structurally misleading to describe the lexical items sgam 'box', ja 'tea', and yi(g) 'letter' that occur in the first-syllable place of the words sgam-chung, ja-ldong, and yi-ge with contrastive low pitch as having changed tone from low tone to high tone in the words lcags-sgam, gsol-ja, and lam-yig simply because, in these last three words, those lexical items have a high pitch, the non-contrastive high pitch appropriate to the second-syllable place in those words; and I have elsewhere proposed a solution that avoids the tone-change concept for forms such as these, through basing the tonal analysis not on the syllable unit but on the (monosyllabic or polysyllabic) word, and classifying each lexical item according to syllable place (Sprigg, 1955, and Sprigg, to appear). By this means sgam, ja, yi(g), and lam are all classified as tone-2 in accordance with their distribution in relation to the first-syllable and second-syllable places of both the tone-1 word and the tone-2 word, and, by the same principle, lcags, gsol, and chung are classified as tone-1. I am not, therefore in agreement with the following passage from Chang and Shefts, 1964:

> 'The tone - - - in a second syllable, has following a more general morphophonemic rule, the high tone,' (p. 24).

II. The grammatical type of tone change

The major type of tone change discussed in section (I) is associated with junction differences; the type that I wish to criticize in this section differs from it especially in that it concerns not so much a lexical item as different grammatical forms of a lexical item. A problem arises when those different grammatical forms are assigned to different tones; and this problem is particularly grievous for adherents of 'prosodic analysis', because it obstructs their attempt to devise a single phonological formula for each lexical item.

I take my example of this type of tone change from the work of one of my colleagues, Henderson, 1965:

> 'The alternance is a tonal one. Where the noun has more than one syllable, this alternance operates in the last syllable only. The form of the noun that is by far the commonest in the texts is referred to as the direct form, the less common form is referred to as the oblique form ---:

Tone of direct form	Tone of oblique form
1 (rising)	3 (falling or low level)
2 (level)	1 (rising)
3 (falling or low level)	2 (level)' (p. 70)

Here, the problem for me is that a given lexical item has two different tones, one for each of its two different grammatical forms, 'direct' and 'oblique'. This is because Henderson assigns a given pitch always to the same tone, the rising pitch to tone 1, for example, and the falling (or low level) pitch to tone 3, regardless of grammatical differences in the forms to which this tonal classification is applied; I, on the other hand, prefer to make my tonal analysis of the oblique and the direct forms separately from each other, with the result that the rising pitch, say, can be treated as the exponent of a different tone for an oblique form from a direct form. In other words, the same pitch feature serves as the phonetic exponent of two different tones, as in the following table comparing Henderson's analysis with mine:

Tone (Henderson)	Pitch		Tone (Sprigg)
	Direct form	Oblique form	
tone 1	rising		tone 1
tone 3		falling	
tone 2	level		tone 2
tone 1		rising	
tone 3	falling		tone 3
tone 2		level	

By this means I arrive at a single tone classification for each lexical item: tone-1 (rising/falling-pitch), tone-2 (level/rising-pitch), tone-3 (falling/level-pitch). Each tone has two phonetic exponents, one for the 'direct' form and one for the 'oblique'; and the phonetic overlapping does not apply if one keeps the tonal analysis of one grammatical form apart from the tonal analysis of the other.

III. A single phonological formula summarizing all variant pitch patterns

In conclusion, I would say that my aim is to devise a single tone classification for each lexical item that shall summarize all the variant pitch features of that lexical item in all types of junction and for all grammatical forms of that lexical item equally, as part of a phonological formula that shall account for all variant phonetic features of the lexical

item, both pitch variants and segmental variants (cf. Sprigg, 1963, pp. 79-80).

'Plus ça change, plus c'est la même chose'.

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