

TONAL PATTERNS IN CHINESE REGULATED VERSE:  
PHONOLOGICAL RULES OR PHONOLOGICAL CONSTRAINTS?<sup>1</sup>

San Duanmu, MIT

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0. Abstract

This paper suggests that the tonal patterns in Chinese regulated verse may be derived by a constraint 'Avoid Monotony', instead of by rules as proposed in previously analyses.

1. The Problem

In Chinese regulated verse, two types of syllable tones are distinguished, E(ven) and O(blique).<sup>2</sup> There are two kinds of poems, hepta-syllabic and penta-syllabic. Of all possible combinations of O and E syllables in a line ( $2^7$  or 128 in a heptasyllabic line, and  $2^5$  or 32 in a pentasyllabic one), only four are allowed for each

(1) Heptasyllabic Lines (v = O, - = E)

- |                  |                  |
|------------------|------------------|
| a. - - v v - - v | b. v v - - v v - |
| c. v v - - - v v | d. - - v v v - - |

(2) Pentasyllabic Lines

- |              |              |
|--------------|--------------|
| a. v v - - v | b. - - v v - |
| c. - - - v v | d. v v v - - |

In addition, each poem has eight lines. Given four good lines, and the condition that even lines rime (i.e. the last syllables in even lines have the same tones as well as the same nucleus and coda, such as /tan dan/, but not /tan tai/), there are  $2^8$  or 64 ways to make a poem. In fact, however, just four ways are allowed ¶

(3) Heptasyllabic Poems

- |   |   |
|---|---|
| <p>a.</p> <p>- - v v - - v ,</p> <p>v v - - v v - .</p> <p>v v - - - v v ,</p> <p>- - v v v - - .</p><br><p>- - v v - - v ,</p> <p>v v - - v v - .</p> <p>v v - - - v v ,</p> <p>- - v v v - - .</p><br><p>c.</p> <p>v v - - - v v ,</p> <p>- - v v v - - .</p> <p>- - v v - - v ,</p> <p>v v - - v v - .</p> | <p>b.</p> <p>v v - - v v - ,</p> <p>- - v v - - v .</p> <p>- - v v v - - ,</p> <p>v v - - - v v .</p><br><p>v v - - v v - ,</p> <p>- - v v - - v .</p> <p>- - v v v - - ,</p> <p>v v - - - v v .</p><br><p>d.</p> <p>- - v v v - - ,</p> <p>v v - - - v v .</p> <p>v v - - v v - ,</p> <p>- - v v - - v .</p> |
|---|---|

<sup>1</sup> I wish to thank M. Halle for comments on an earlier draft

<sup>2</sup> The pitch values of O and E are not exactly known, but they need not concern us here.

v v - - - v v ,  
 - - v v v - - .  
 - - v v - - v ,  
 v v - - v v - .

- - v v v - - ,  
 v v - - - v v .  
 v v - - v v - ,  
 - - v v - - v .

(4) Pentasyllabic Poems

a. v v - - v ,  
 - - v v - .  
 - - - v v ,  
 v v v - - .

b. - - v v - ,  
 v v - - v .  
 v v v - - ,  
 - - - v v .

v v - - v ,  
 - - v v - .  
 - - - v v ,  
 v v v - - .

- - v v - ,  
 v v - - v .  
 v v v - - ,  
 - - - v v .

c. - - - v v ,  
 v v v - - .  
 v v - - v ,  
 - - v v - .

d. v v v - - ,  
 - - - v v .  
 - - v v - ,  
 v v - - v .

- - - v v ,  
 v v v - - .  
 v v - - v ,  
 - - v v - .

v v v - - ,  
 - - - v v .  
 - - v v - ,  
 v v - - v .

A number of observations can be made. First, each of the four good lines may start a poem. Second, for each starting line, there is a unique sequencing of successive lines. Third, every quatrain contains all the four good lines. Fourth, the second quatrain is a repetition of the first. Finally, if we drop the first two syllables from a hepta-syllabic line, we get a pentasyllabic line, and if we drop the first two syllables from every line of a heptasyllabic poem, we get a pentasyllabic poem .

The problem is why, of all possible lines and poems, only (1)-(4) are good. Since Wang's (1957) modern classic Chinese Versification, the issue has attracted the attention of contemporary scholars, including many generative phonologists. Common in all the previous analyses is the use of rules. However, most rules appear stipulative and not to follow from general principles.

In this paper I take a different approach. Instead of offering rules, I suggest that (1)-(4) follow from a single constraint, 'Avoid Monotony'. First, however, let us review some previous analyses.

## 2. Previous Analyses

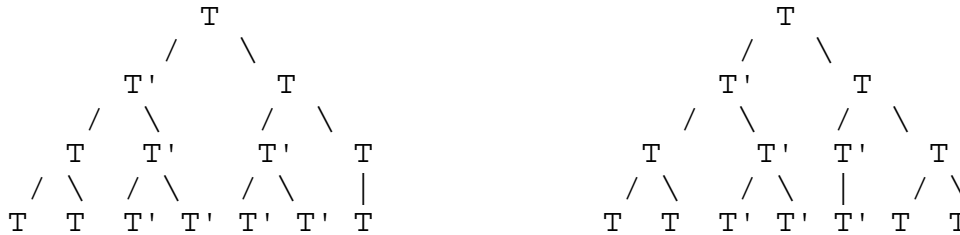
There is an assumption which every analysis makes, i.e. a line is made of two half lines; in a heptasyllabic line, the division is SSSS|SSS (S=syllable), and in a pentasyllabic line it is

SS|SSS. This assumption has independent syntactic motivations (cf. Wang 1957, Chen 1979), and will not be challenged here.

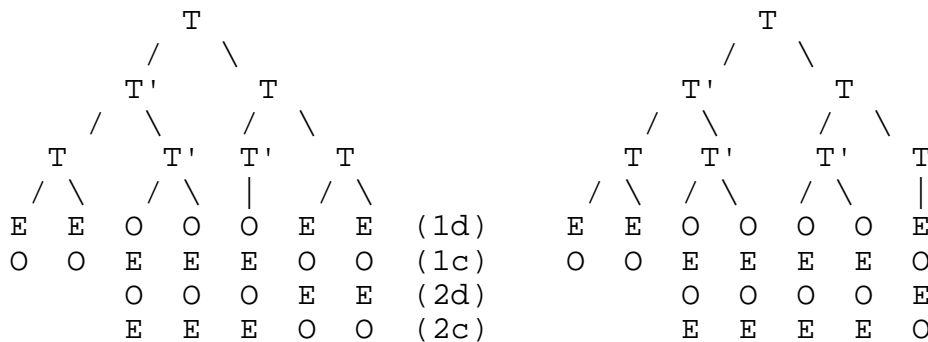
2.1. Chen (1979) proposes the following metrical rules to generate good lines

- (5) a. **Tone Assignment:**  
Opposite tones (T and T') are assigned to sister constituents down to the level of the metrical foot in this fashion:

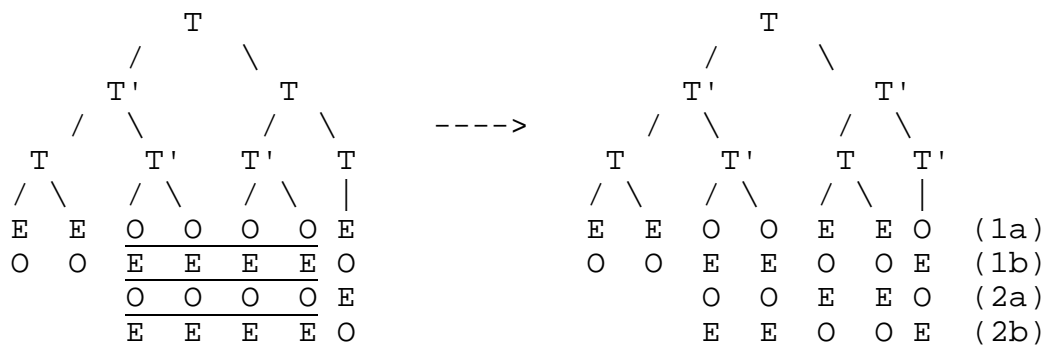
$$T \rightarrow T' \quad T \quad \quad T' \rightarrow T \quad T' \text{fi}$$



- b. **Tone Specification:**  
T may assume the value of either E or O, and T' is opposite to T, subject to the Tonotactic Condition.



- c. **Tonotactic Condition:**  
If Tone Assignment produces four consecutive syllables carrying an identical tone, the tones of the second half-line undergo alpha-switching



There are several problems. First, it is not clear what T and T' nodes mean above the foot level. Chen suggests that historically E tone syllables may contain long vowels and O tone syllables short vowels (cf. Zhou 1948), and so E nodes may be strong and O nodes weak. This, however, is an unsettled speculation. In addition, as English stress patterns show, CVC syllables need not be weaker than CVV syllables. Second, it is not clear why (5a) should be such; if T and T' mean S(trong) and W(eak), then  $S \rightarrow (W S)$  and  $W \rightarrow (S W)$  are a very unusual pair of stress rules. Third, as is noted by later analyses (e.g. Yip 1980, Xue 1989), (5c) is ad hoc; in particular, as Xue (1989) points out, it produces ill formed metrical trees with identical sister nodes.

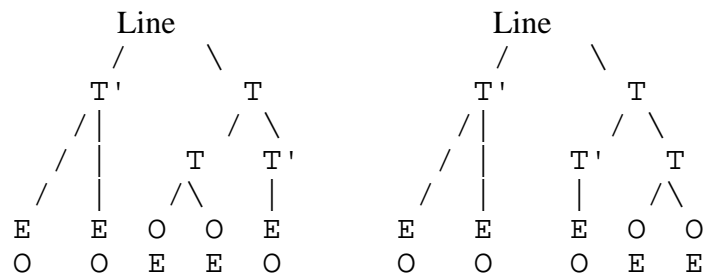
## 2.2. Yip (1980) tries to avoid Chen's (5c) by making use of branching information

### (6) a. Labeling Convention 1 (for heptasyllabic lines)

In a pair of sister nodes N1 N2, N1 is labeled T iff it branches.

### b. Labeling Convention 2 (for pentasyllabic lines)

In a pair of sister nodes N1 N2, N2 is labeled T iff it branches.

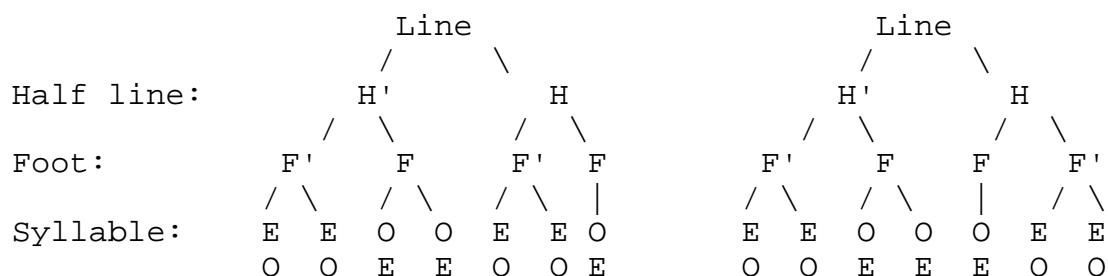


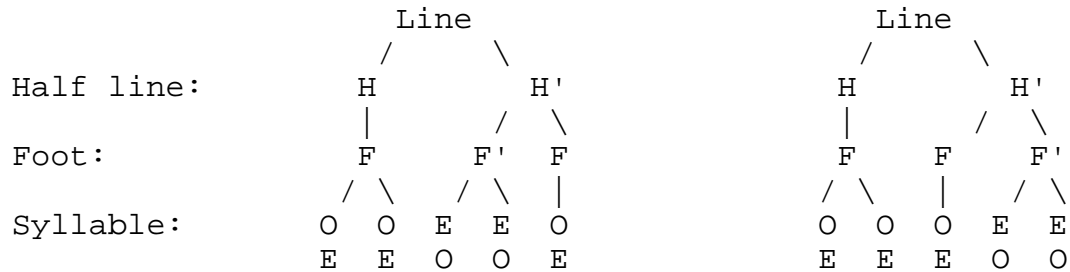
This way, Yip can generate all good lines. The defect, as Xue (1989) points out, is that there are two labeling systems, one for hepta-syllabic lines and one for pentasyllabic lines. Thus, Yip misses the similarity between hepta- and pentasyllabic lines, i.e. their last five syllables are identical, and that four consecutive Os (or Es) are bad.

2.3. Xue (1989) notes that, in Yip's analysis, the left branch of a pentasyllabic line has one fewer node levels than the right branch (cf. (6b)). Xue suggests that if both branches have three levels (syllable, foot and half line), Yip's labling rules can be reduced to one

### (7) Labeling Rule:

In a pair of sister nodes [N1, N2], N1 is labeled N' iff it branches; otherwise N2 is labeled N'.





The problem with Xue's analysis again is that it is not clear what the nodes H, H', F and F' mean, and why their labling should be sensitive to branching. As Wang (1957) points out, the reason to disallow four consecutive Os or Es is to avoid monotony. Xue's analysis, however, does not reflect this fact.

2.4. Chen (1979) points out that the tonal pattern of a line has two parameters: whether the first foot starts with O or E, and whether the second half line is left or right branching. Chen suggests that if we change the two parameters one at a time, we get the correct sequencing of lines in a poem. Take (3a) for example    †

(8) Lines	Parameters	Key
- - v v - - v,	E, L	- = E tone
v v - - v v -.	O, L	v = O tone
v v - - - v v,	O, R	E = First foot is E
- - v v v - -.	E, R	O = First foot is O
- - v v - - v,	E, L	L = second half line is left branching
v v - - v v -.	O, L	R = second half line is right branching
v v - - - v v,	O, R	
- - v v v - -.	E, R	

The first line starts with an E foot and its second half line is left branching (cf. (7)), so its parameters are E and L. Changing E to O, we get the parameters of the second line, O and L. Changing L to R, we get the third line, O and R. And so on. This mechanism of line rotation is silently accepted in Yip (1980) and Xue (1989). However, there is no explanation why the parameters should change one at a time, and why the first change should be E-->O rather than L-->R. Such analyses strikes one as mystic solutions to mystic puzzles.

3. A Different Analysis                      Previous analyses miss a central point which is repeatedly emphasized in all texts on regulated verse, namely, Avoid Monotony. Examples of Avoid Monotony abound. For instance, a line of pure E or O tones is acceptable in pre-Tang poetry (e.g. in Shi Jing 'The Book of Odes'), but forbidden in regulated verse. Similarly, pre-Tang heptasyllabic verses used to rime every line, but regulated verses rime on even lines (Wang p16). Moreover, in pre-Tang couplets, identical words can be used in the corresponding positions between the two lines, but in regulated verses, one must not only avoid identical words in such positions, but also identical tones (Wang pp7-11). Apparently, 'Avoid Monotony' is a central constraint on regulated verse, though the spirit is preferred in other verses, too. I will show that if we follow this constraint properly, we can derive all patterns of regulated verses. First, let us formalize the constraint

(9) Avoid monotony: \*[X X] (X = constituent)

What (9) says is that identical adjacent constituents should not have the same tonal patterns. But what constituents can (9) apply to? In a poem, there are several phonological levels: segments, syllables, feet, riming positions, lines, couplets, and quatrain. The null hypothesis is that (9) applies to them all, if possible. However, (9) cannot apply to segments, since E and O are syllable tones. The lowest possible level is then the syllable. Let us see whether from this level up (9) always holds.

3.1. Take pentasyllabic lines first. If X in (9) is syllable, then there are just two good lines

(10) a. v - v - v                      b. - v - v -

Now let (10a) be the first line, then there is just one way to make a quatrain ◻

(11)                      v - v - v, - v - v -.                      (first couplet)  
                              v - v - v, - v - v -.                      (second couplet)

If we start with (10a), the second line must be (10b), to avoid identity with the first line; the third line must be (10a), to avoid identity with the second line; and the fourth line must be (10b), to avoid identity with the third line.

As a diversion, one may argue that the third line need not be considered adjacent to the second line, since they are in different couplets. If so a quatrain may have the following lines

(12)                      v - v - v, - v - v -.                      (first couplet)  
                              - v - v -, v - v - v.                      (second couplet)

(12) might have been a practice to follow, where the second and the third lines rime, rather than even lines rime. But in the tradition of Chinese poetry, regulated or not, even lines must rime. Every analysis must acknowledge this fact. This could be an arbitrary convention, but also could be due to good reasons. In fact, if we take X in (9) to be the riming position, which is the last tone in a line, then the fact that even lines rime, and adjacent lines do not, follows from (9). The badness of (12) is a predicted result.

Let us return to (11). Now although (9) is met on the syllable and the line levels, it is not met on the foot and the couplet levels; the first two iambic feet on every line are identical, so are couplets 1-2. In an eight line poem, there will be four identical couplets. In other words, of the six tonal levels (syllables, feet, riming positions, lines, couplets, and quatrain), only two (syllable and line) satisfy (9). Evidently, such versification is disfavored by the Tang poet.

Let us then ignore the syllable and try the next level up, the foot. There is the question of how long a foot should be. There are two reasons for choosing the bisyllabic foot. First, a bisyllabic foot is the smallest unit above the monosyllable. Second, there are far more bisyllabic Chinese words than trisyllabic or quadrisyllabic ones. To assume the bisyllabic feet, therefore, is the null hypothesis. To assume longer feet, on the other hand, needs independent justification. In addition, we assume, as every other analysis does, that syllables in a foot have the same tones;

we will say more on this later. Moreover, we follow the common assumption that, for historical and syntactic reasons, a pentasyllabic line has the division SS|SSS, i.e. it starts with a full foot (Wang, Chen). This gives six possible lines

- (13) a. v v | - - | v      b. - - | v v | -      c. - - | - | v v  
 d. v v | v | - -      e. \*v v | - | v v      f. \*- - | v | - -

There are two and a half feet in a line, marked by vertical bars. (13a-d) are identical to (2a-d). (13a-b) satisfy (9). Since a full foot is not identical to a half foot in structure, (13c-d) also satisfy (9). Although (13e-f) do not violate (9), they will be excluded for other reasons, to be seen shortly. Before we see how a poem is formed, an independent convention need to be mentioned

- (14) Couplet Symmetry:  $\tilde{A} \# \tilde{A}$   
 The two lines in a couplet must have the same syntactic bracketing. fi#Pfi

The requirement that two couplet lines have the same syntax has much older origins, ever since the beginning of Chinese poetry (Wang pp7-11). Now if we begin with (13a) to make a poem, there is only one possible order of lines, namely, (13a), (13b), (13c), (13d), (13a), (13b), (13c), and (13d)

- (15)            v v | - - | v, - - | v v | -.                    (first couplet)  
                   - - | - | v v, v v | v | - -.                    (second couplet)  
                   v v | - - | v, - - | v v | -.                    (third couplet)  
                   - - | - | v v, v v | v | - -.                    (fourth couplet)

(15) is the same as (4a). Let us see how the unique order follows from (9). To avoid identical adjacent riming positions (last tones), line two must be (13b) or (13d). But by (14), line one and line two must have the same syntactic bracketing. Since foot construction is dependent on syntactic bracketing, and since (13a) and (13d) do not have the same foot structures, they cannot have the same syntax. This leaves (13b) the only candidate for line two. We next look at line three. To avoid identical riming positions, line three must be (13a) or (13c). If we choose (13a), the fourth line must be (13b), for the same reasoning we gave to line one and line two. But then the second couplet is identical to the first, violating (9). So (13b) cannot be line three, leaving (13c) the only candidate. Finally, to ensure that line four rimes with line two yet has the same structure as line three, (13d) is the only choice.

We next look at line five. To avoid an identical riming position with line four, line five must be either (13a) or (13c). If we choose (13c), line six will be (13d), for the same reasoning we gave to lines three and four. But then couplets two and three will be identical, violating (9). Thus, line five must be (13a). We are back at the start; following all the reasoning over again, quatrain two is a repetition of quatrain one.

Thus, (15) satisfies (9) on all levels, except on the quatrain level. It would be better if (9) could be satisfied on all levels, but we have seen that that is impossible. (15) is the best state that one can get. Note that the quatrain can be a regulated poem by itself. Such four line poems, or 'Jue' poems, obey all rules of regulated verse. This may be another reason why (9) is ignored at the

quatrain level, which is in this sense the top level. Moreover, we will see later that there is a way, adopted by later poets, to avoid identical quatrains, too.

It can be shown that, following the same reasoning, if we start with (13b-d), we will derive (4b-d) respectively. We omit the derivations.

Let us move on to (13e-f). In the terminology of Chinese regulated verse, (13e) has committed *gu ping* or the 'single E offense', stated below (Wang p85)

(16) The Single E Offense:  $\tilde{A}$  ( $\tilde{A}$ )

A line must contain at least two E tones, excluding the final tone.

The reason why the final tone is discounted is that it is reserved for riming purposes and so not subject to variation. Besides (13e), the following lines also commit the 'single E offense'

(17) a.        v - v v -                      b.        v v v - v v -

Each of (17a-b) contains two E tones, but if we exclude the final E from consideration, each contains just one E, and so both are bad. The formal nature of (16) is not clear, and (16) does not seem to follow from (9). However, both (16) and (9) share the same spirit to avoid monotony, and in this sense (16) is no less natural than (9). We will return to (16), and discuss how (17a-b) arise and how they can be rescued.

Although (16) rules out (13e), there is no corresponding 'single O offense' to rule out (13f) (Wang p84).<sup>3</sup>

Intuitively, (13e-f) should be bad for the same reason: (13e) has too many O tones and (13f) too many E tones, both leading to monotony. It turns out, however, that although (13f) is not directly ruled out by (16), its absence follows from given constraints. To see this, let us start a poem with (13f); the next line must be (13e)

(18)            - - v - -, v v - v v.

This is because, of all lines in (13a-f), only (13e) has the same bracketing as, but opposite tones to (13f). But (13e) is ruled out by (16), so (13f) cannot begin a line. Moreover, given (14), in every couplet, if the first line is one of (13a-d), (13f) cannot follow, while if the first line is (13f), (13e) must follow, violating (16). In other words, the absence of (13f) follows from given constraints.

Thus, we have accounted for all patterns in (2) and (4).

3.2. We now look at heptasyllabic Poems. Historically, regulated pentasyllabic verses appeared about 300-400 years earlier than regulated heptasyllabic verses (Wang pp11-17). This means that

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<sup>3</sup> The fact that there is the 'single E offense' but no 'single O offense' is puzzling. It might be due to the properties of E and O tones. Zhou (1948) argues that historically E tones occur on long vowels and O tones on short vowels. However, there is no reason why a line can have too few short vowels but not too few long vowels. I leave this question open.







In (23b) a nonfree syllable, the fourth, is changed, giving a bad line. If counterbalanced by changing the third syllable as in (23c), we get a good line (Wang p100). Apparently, this is another case of Avoid Monotony.

5.4. The 1-3-5 freedom, first line riming, and counterbalance show that the 'single E offence' and Avoid Monotony are independently motivated. In rule based analyses, they have to be explained by additional rules. In our analysis, they are as expected.

6. Summary I have shown that tonal patterns in Chinese regulated verse can be derived by well motivated constraints, in particular Avoid Monotony, instead of by rules as suggested in previous analyses.<sup>4</sup>

Since 1980s, generative syntax has shifted from looking for rules to looking for constraints. This paper is an attempt to do the same in phonology.

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<sup>4</sup> Paradoxically, the strict requirement to avoid monotony leads to highly limited patterns, and this in effect produces a monotony in the variety of regulated verses.

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