The Metrical Structure of Changhua Folk Verse[*]

Yuchau E. Hsiao

National Chengchi University

Traditional treatments of folk verse have two disadvantages. First, they focus only on a small number of lines. Second, they pursue derivational rules on a language-specific basis, but lack universal validity. This paper establishes a corpus of 720 lines of Southern Min folk verse in Changhua and provides a non-derivational analysis of the data. The corpus shows a preference for masculine rhythm, which is found in 90.67% of the data. Metrical beat sharing, then, allows feminine lines to be avoided. This paper puts forth a set of metrical constraints under the framework of Prince and Smolensky's (1993) Optimality Theory. The constraints are part of Universal Grammar, but are ranked language-specifically in Changhua folk verse.

Key words: corpus, folk verse, Optimality Theory, constraint ranking, metrical structure

1. Introduction

In Western folk verse there are usually realization rules, under the tradition of generative phonology, that map the underlying metrical pattern into the surface output (Halley and Keyser 1969, 1971, Gueron 1973, 1974). A line is analyzed as either left-headed or right-headed, consisting of metrical positions, strong (S) and weak (W). The derivation in (1) illustrates this well.

(1) (S   W S W) (S W S   W) Underlying   (Italian Trentino Rhymes, Line 3)
    W   W   Realization rule
    W   W S W   W W S   W   Surface
    La   tovaglia   non e L"aglio
    The tablecloth   not is garlic

This Italian tongue-twister line is parsed into two hemistichs, as indicated by the parentheses. Each hemistich has a "W W S W" pattern, which is derived from an underlying trochaic meter by a realization rule that allows the strong position of a trochaic hemistich to be optionally realized by a weak syllable (Napoli 1978).[1]

[1] On the other hand, Halle and Keyser (1971:169) propose a set of correspondence rules to align syllables to derive iambs in English verse.

The mapping between syllables and metrical positions is not always on a one-to-one basis.   In particular, a metrical position may be aligned with more than one syllable, as in (2) and (3).   The second weak position in (2) is shared by *par* and *la*, and the third in (3) is shared by *on* and *a*.

(2)   W S   W   S   W S   W   S (Comptines de Langue FranXaise,
       Passant par la ville rencontre les gens du Roy   Line 2)
       passing by the city meet   the men of King

(3)   S   W   S   W   S   W   S   (Humty Dumpty, Line 1)
       Humpty Dumpty   sat   on a   wall

Lerdahi and Jackendoff (1983) and Jackendoff (1989), among others, have referred to the fact that metrical beat (metrical position) contributes to linguistic rhythm in much the same way that musical beat does to musical rhythm.   If we arbitrarily impose a metrical demibeat to each syllable, it can serve to indicate quantitative values for duration, and the syllable will be sounded in time with the demibeat.

Selkirk (1984) posits the idea of silent grid positions (or silent demibeats) in the sense that they may correspond to pausing or syllable lengthening.   A close analogy can be the music articulation mark (or a breath mark).   A singer can breathe before the articulation mark and have a short pause for rest in the song, or he/she can ignore the articulation mark and lengthen the note before it, singing through the subsequent notes without pause.   At this point, a demibeat is realized as a pause when it remains unaligned, or it may result in syllable-lengthening when it is aligned to a syllable which is already aligned with another demibeat.

The rhythm of Changhua folk verse can be comprehended as built from the count of demibeat.   Folk verse is an intermediate linguistic art that retains much of the neatness of poetry without sacrificing the natural vigor of ordinary speech; traditionally they are passed down by way of oral recitations in streets and alleys, and the rhythm follows from clapping.   The basic structure of clapping consists of two demibeats; namely, a downbeat falls on a clap, and an upbeat follows as the hands open.   The final upbeat is frequently left unaligned, functioning as a silent demibeat. A line may consist of an odd number of demibeats and end in a silent demibeat, referred to as a masculine line.   Or it may have an even number of demibeats but no silent demibeat, and renders a feminine rhythm.

Several questions are thus in order.   What is the metrical structure of Changhua folk verse?   How are demibeats and silent demibeats aligned with syllables in the

folk verse?   Are there significant similarities between Western and Southern Min folk verse?

This paper is not intended to approach these questions along the lines of the derivational tradition, in which language-specific phonological rules are pursued, but it offers an analysis framed in Optimality Theory (Prince and Smolensky 1993), which posits a grammar consisting of universal constraints that are language-specifically ranked.   The present research is based on a corpus of 720 lines, in which five types of information are focused on: that is, the count of demibeats, the count of syllables, word categories, syntax tree, and simplified tree.[2]   Section 2 introduces the nature of the corpus.   Section 3 proposes a basic metrical template, by which the various metrical patterns of the folk verse can be generated.   Section 4 addresses the particular patterns where an asymmetry between syllable and demibeat occurs.   Section 5 provides a constraint-based account for the metrical patterns of the folk verse.   Finally, Section 6 offers the conclusion.

2.   The corpus

This corpus contains a collection of Southern Min folk verse from the County of Changhua, located in Central Taiwan.   The book adopted here is based on an edition by Changhua County Culture Center (1994).   There are 92 folk verses in this corpus, with a total of 720 lines, which are serially numbered, as in (4).

(4)   Serial #   Syllables per line
       CH-07-01   5

The prefixal abbreviation "CH" represents Changhua.   The following number "07" indicates the seventh folk verse, and the next number "01" indicates the first line of a folk verse.   A verse line (hereafter, L") is usually equal to a printed line.   However, sometimes, two or three short L"s may be printed in sequence on the same physical line, separated only by commas.   In this case, an extra number is suffixed to distinguish an L" from a printed line.   As in (5), the number "02" indicates the second printed line, and the final number "01" indicates the first L" within the printed line.

---

[2]   There are many considerations in the corpus, but this paper concentrates on these five aspects.   The completed data of the corpus will be made available electronically on the author's website at http://phonology.nccu.edu.tw.

(5) Serial #   Syllables per line

      CH-07-02-01   3

    The folk verse is structured with lines of both regulated verse and irregulated verse. An L" may range from two syllables to fifteen syllables. As shown in (6), trisyllabic, pentasyllabic, and heptasyllabbic lines constitute 74.67% of the corpus.

(6) Length of the Folk Verse

Syllables per line	Total # of lines	Percentage
2	13	1.81%
3	197	27.36%
4	37	5.14%
5	137	19.03%
6	37	5.14%
7	203	28.19%
8	49	6.81%
9	27	3.75%
10	12	1.67%
11	3	0.42%
12	1	0.14%
14	1	0.14%
15	2	0.28%
TOTAL	720	100.00%

    Both metrical demibeats and syllables are counted in the corpus, since the mapping between the two builds the basic rhythm of the folk verse. A downbeat falls on a clap, and an upbeat follows as the hands open. What is of interest is that a demibeat may include one or more syllables. Comparing (6) and (7), we can see that the number of syllables in an L" does not always match the number of demibeats.

(7) Metrical Demibeats

Demibeats per line	Total # of lines	Percentage
2	13	1.81%
3	201	27.92%
4	33	4.58%
5	148	20.56%
6	31	4.17%
7	253	35.28%
8	12	1.67%
9	17	2.50%
10	8	1.11%
12	1	0.14%
13	1	0.14%
14	1	0.14%
TOTAL	720	100.00%

Over 87% of the L''s have an odd number of demibeats, while the rest of the lines are frequently parsed into smaller units that contain an odd number of demibeats. As shown in (8), a six-demibeat line often contains a pair of three-demibeat units, and an eight-demibeat line is often combined from a three-demibeat unit and a five-demibeat unit; a ten-demibeat line may contain either a three-demibeat unit plus a seven-demibeat unit or a pair of five-demibeat units; there is only one twelve-demibeat line, which contains a seven-demibeat unit followed by a five-demibeat unit, and one fourteen-demibeat line, which contains a five-demibeat unit followed by a two demibeat unit and a seven-demibeat unit.[3]

---

[3] The parsed "units" will be referred to as metrical lines. In other words, an L'' may consist of one or more metrical lines (see Section 4 for further discussions).

(8) Demibeat Grouping

Demibeats per L"	Demibeat grouping	Total # of L"s
6	3+3	20
	6	11
	3+5	5
8	5+3	5
	8	3
	3+7	3
10	5+5	1
	7+3	4
12	7+5	1
14	5+2+7	1

Liberman and Prince (1977) and Hayes (1983) observe in English that content words, but not function words, have priority in grid-marking. Chen (1991) shows in Wunzhou Chinese that function words are invisible to intonational phrasing at an initial stage. In this corpus, word categories are coded to examine whether the categorical distinction between content words and function words may affect the assignment of metrical demibeats. The content words are coded as V (verb), N (noun) and A (adjective or adverb). The function words are coded as F. The F category is intended to be an extended class that includes classifier, conjunction, directional marker, complementizer, pronoun, suffix, particle, auxiliary, as well as the so-called coverb[4] and be-verb. Metrically speaking, coverbs and be-verbs behave quietly differently from regular verbs, but, like other functors, they often share demibeats with adjacent syllables, and thus are labeled as F. Numerals are rhythmically like nominals and thus are labeled as N, in contrast to classifiers. A sample of the folk verse is given in (9).

(9) Syntax and word category

Serial #	Syntax Tree	Simplified Tree
CH-05-01-01	[NN N]	[2 1]
CH-05-01-02	[AV][V AA]	[2][1 2]
CH-05-02-01	[AAA]	[3]
CH-05-02-02	[V NF [V NN]]	[1 2[1 2]]
CH-05-03-01	[NF V]	[1 2]
CH-05-03-02	[NF][V NN]	[2][1 2]

---

[4] A coverb is a controversial term, but in this paper simply refers to a semantically bleached verbial, such as *ka*, 'have', etc.

As the line in (10) shows, the numeral *tsit* 'one' is coded as N, while the classifier *bue* is coded as F.   V represents a monosyllabic verb, and NN is a disyllabic noun. Likewise, VV will be a disyllabic verb (e.g., *kiantang* 'frozen'), and AA a disyllabic adjective or adverb (e.g., *siosio* 'warm').

(10) CH-05-03-02

    [N F]   [V   NN]

    tsit bue   ko bok-tsiu

    one CL   glue eye

    'One (fish) glues the eyes.'

Syntax tree is needed on the assumption that prosody is related to syntactic structure.   There are 436 types of syntax tree out of 720 lines in the corpus, where only a few lines have identical bracketing.   The large variety of syntactic patterns lowers down the possibility of a global match between prosodic and syntactic structures.   Hence, I focus on the correspondence between more local syntactic constructions and smaller prosodic units (cf. Sections 4 and 5).   In fact, Chen (1984) and Shih (1986) have suggested earlier that foot formation may be affected by local syntactic relations such as immediate constituency and branching direction; Hsiao (1990, 1991) has also observed that a pair of immediate constituents may share a single demibeat.

I adopt Duanmu's (2004) coding system, where both [AN] and [NN] are labeled [NN], as many have indicated that in Chinese dialects the combination of a monosyllabic adjective followed by a monosyllabic noun is actually a noun compound or is lexicalized into one (Shih 1986, Dai 1992, Duanmu 1999, Hsiao 2000).   The distinction between [A NN] and [N NN] is made when possible, but [N NN] is preferred when the distinction is not clear.   The choice is not critical, since both A and N are content words.   An L" in the corpus may sometimes exhibit a flat structure, where no internal bracketing is made, as in (11-12).

(11) CH-01-01-01   (12) CH-05-02-01

    [N N N]   [A A A]

    tsit neng saN   tshiu tshiu tshiu

    one two three   shame shame shame

    'One, two, three'   'Shame on you.'

The simplified tree of (11-12) is coded as [3].   Simplified tree is included to facilitate an overview of syllable distribution and syntactic variety.   The corpus

reveals a tendency that the final three syllables of an L" are constructed either under a right-branching tree [1 2] or under a left-branching tree [2 1], as shown in (13).
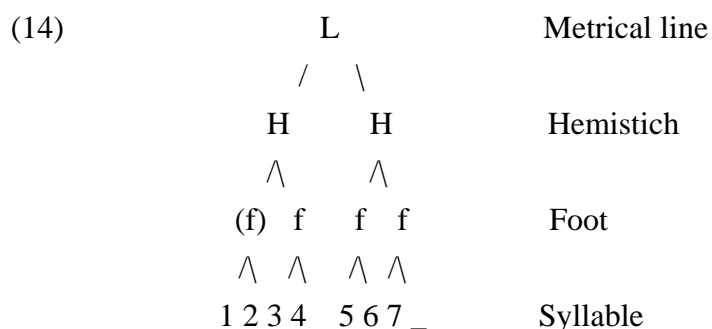
(13) Final three syllables

Simplified tree	Total # Line	Percentage
…[1 2]	432	60.00%
…[2 1]	199	27.64%
[2] (shorter than trisyllabic)	13	1.81%
others	76	10.55%
TOTAL	720	100.00%

Note in particular that 60% of the L"s end in a [1 2] tree, and interestingly, I find no instance where the final two syllables share a beat. What this means is that metrical units do not necessarily match syntactic units.

3. Template mapping

In spite of the fact that stress is not intuitively clear for Chinese speakers in speech (Chao 1968, Selkirk and Shen 1991), there have been some arguments over the meter in Chinese regulated verse. Chen (1979, 1980, 1984) has portrayed the verse as having an iambic meter. A metrical template can be summarized from his works, as in (14).

(14)

```
                 L              Metrical line
               /   \
            H       H           Hemistich
           /\       /\
        (f)  f    f   f         Foot
        /\  /\   /\  /\
       1 2 3 4  5 6 7 _         Syllable
```

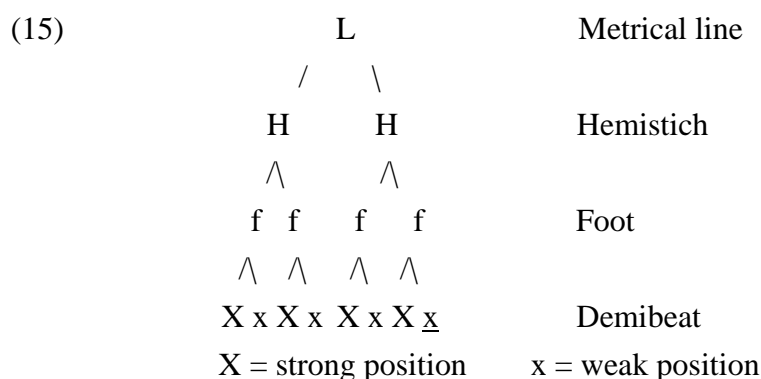A metrical line consists of two hemistichs. A hemistich contains two feet. A foot then is made of two syllables, or one syllable followed by a vacant position in the final foot. This template yields two kinds of regulated verse: namely, the pentasyllabic pattern if the parenthesized (f) is omitted, and the heptasyllabic pattern otherwise.

Hsiao (1990, 1991a, b) observes that folk ballads in Southern Min reflect metrical

patterns of both regulated verse and irregulated verse (Chang Duan Ju),[5] and proposes a trochaic template to yield the rhythm. Duanmu (1999, 2004) considers the trochaic meter a part of Universal Grammar. He suggests that Chinese verse, like English verse, displays a system of stress and should be reanalyzed under trochaic meter. In this section, I show that the folk verse also instantiates a clear case of trochaic meter: the stress falls on a clap (a downbeat), while a weak position follows as the hands open (an upbeat).

In spite of the fact that an L" may have a wide range of length, the rhythm of the folk verse is substantially indebted to regulated verse. Two facts are in order. First, the meter of the folk verse is based on clapping, and thus is better captured by the count of demibeat. Second, the most common line type in the corpus is one that has seven demibeats, found in 35.28% of the verse lines. These facts make it possible to posit (15) as the basic template, from which various metrical patterns can be accounted for. An essential difference between regulated verse and folk verse is that the numbers of syllables and demibeats always match in the former but not in the latter. In the case of syllable-beat mismatch, the basic template facilitates beat sharing, which allows a beat to be aligned with two syllables, as will be discussed in Section 4.

(15)   L   Metrical line
                      /   \
                 H   H   Hemistich
               /\   /\
             f   f   f   f   Foot
           /\ /\   /\ /\
         X x X x X x X x   Demibeat
         X = strong position   x = weak position

The idea of the basic template is that the mapping between the verse line and the template renders the unmarked readings.[6] Several patterns are observed in the corpus. First, the L" prefers an odd number of audible demibeats. I refer to a line of this type as a masculine line, which may consist of three, five, seven or nine demibeats, etc. Based on the template in (15), I posit the seven-demibeat line as the basic pattern. As in (16), there are seven demibeats followed by a silent demibeat.

---

[5] Chang Duan Ju refers to the verse of the Song Dynasty, where the length of a verse line is variable. A line of such verse can be as short as two syllables, or as long as nine syllables (or longer).
[6] In this paper, I focus on the unmarked readings. Variations of individual persons are not considered here, since they are less common and differ in trivial ways; a phonological generalization would be impossible otherwise.

(16) CH-34-01   seven-demibeat line

```
                      L
             /                 \
          H                       H
        /      \              /        \
      f         f           f           f
     / \       / \         / \         / \
    X   x     X   x     X   x         X   x
    o    tsiao  peh tsiao  lai   thao      tsia
    black bird    white bird come secretly eat
   'Black birds and white birds come to steal food.'
```

A five-demibeat line is then generated in the absence of the first foot, as in (17), and a three-demibeat line leaves out the entire first hemistich, as in (18).

(17) CH-22-14   five-demibeat line

```
                    L
             /             \
          H                 H
        /    \           /     \
     (f)      f         f        f
             / \       / \      / \
            X   x     X   x   X   x
            ke-nua     bin  o   o
            hen        face black
          'The face of the hen is black.'
```

(18) CH-13-01-01   three-demibeat line

```
                    L
             /             \
         (H)               H
                        /     \
                      f         f
                     / \       / \
                    X   x     X   x
                    gue keng keng
                    moon bright bright
                   'The moon is bright.'
```

When the final silent demibeat becomes audible, the L" will have an even number

of demibeats.   I refer to this as a feminine rhythm.   In terms of the metrical template, a four-demibeat line fills the second hemistich, as in (19), and a two-demibeat line fills only the final foot, as in (20).

(19) CH-39-01-01   four-demibeat line

```
                 L
            /         \
        (H)           H
               /    \
             f        f
           / \      / \
          X   x    X   x
          sin-niu   sui sui
          bride        pretty
         'The bride is pretty.'
```

(20) CH-35-01-01   two-demibeat line

```
                 L
            /         \
        (H)           H
               /    \
            (f)        f
                     / \
                    X   x
                    o   niao
                  black cat
                 'A black cat.'
```
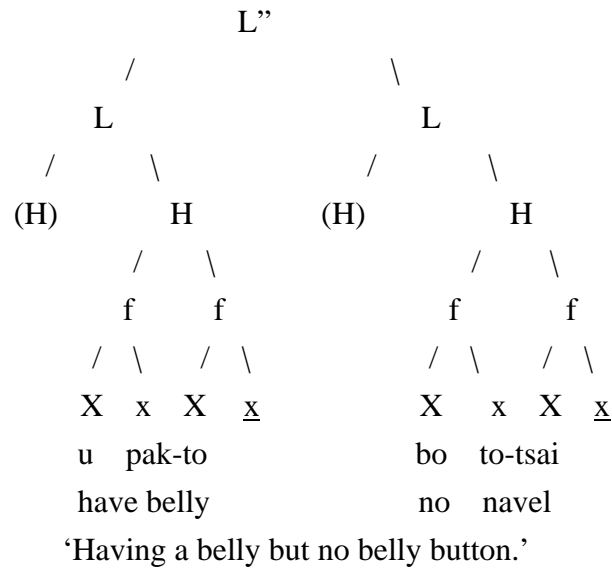
There is no one-demibeat line in the corpus.   When an L" contains more demibeats than the metrical template can accommodate, it is made of multiple metrical lines.   The template will look like (21).

(21)   L"   Verse Line
                    /   \
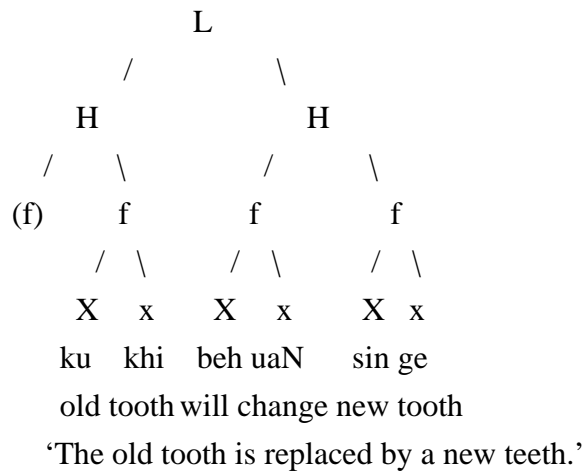   L   L   …   Metrical Line

A feminine L" also has a tendency to break into smaller metrical lines, particularly masculine ones, as have been shown in (8).   There are thirty-one six-demibeat L"s in the corpus.   Twenty of them are parsed as 3+3, as in (22), where an L" is made of two consecutive three-demibeat metrical lines.   The remaining 11 are parsed as

11

single six-demibeat lines, with the absence of the first foot of the template, as in (23).

(22) CH-25-03   six-demibeat line: 3+3

```
                        L"
                   /          \
               L                    L
            /      \            /       \
        (H)          H      (H)            H
               /   \              /    \
             f       f          f         f
           / \   / \          / \    / \
          X  x  X  x         X   x  X   x
          u   pak-to         bo   to-tsai
          have belly         no    navel
```
          'Having a belly but no belly button.'

(23) CH-46-02   six-demibeat line: 6

```
               L
            /        \
        H                 H
      /    \          /        \
    (f)      f      f            f
        / \      / \       / \
       X   x    X   x     X   x
       ku   khi  beh uaN   sin ge
       old tooth will change new tooth
```
       'The old tooth is replaced by a new teeth.'

The eight-demibeat L"s, thirteen in total, are parsed in three ways: five are parsed as 3+5, as in (24), another five are parsed as 5+3, as in (25), and only three are parsed as a single feminine L", as in (26).

(24) CH-60-05   eight-demibeat line: 3+5

```
                        L"
            /                       \
          L                           L
        /      \                  /         \
     (H)        H            H              H
            /    \        /    \         /      \
          f        f    (f)     f      f          f
         / \  /  \      /  \    /  \   /  \
        X   x  X   x        X   x   X   x  X   x
        go-gue  go          si-kue  muaN  ke-lo
        May   five      water-melon  fill   street
```
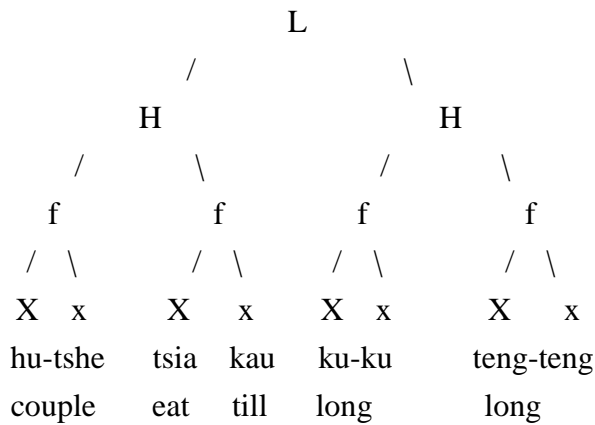'On May 5th, the street is full of water melons.'

(25) CH-25-03   eight-demibeat line: 5+3

```
                      L"
            /                   \
          L                       L
       /        \            /        \
      H           H      (H)           H
    /    \       /   \              /     \
  (f)      f    f      f           f         f
   / \       / \  / \           /  \      /  \
  X   x    X  x  X   x         X   x    X    x
  tiam-ti    to-a  kha           phi-phi-tshua
   be        table  foot          shivering
```
"Being under the table and shivering.'

(26) CH-43-02   eight-demibeat line: 8

```
                         L
               /                  \
           H                         H
         /       \             /        \
       f          f          f           f
      / \        / \        / \         / \
    X   x      X   x      X   x       X      x
    hu-tshe    tsia  kau   ku-ku      teng-teng
    couple     eat   till   long        long
```

'The husband and wife live a long life.'

As in (22), (24), and (25), an L" may consist of more than one L.   These patterns bring about analyses of longer lines.   A nine-demibeat L" may include up to three metrical lines; five out of seventeen nine-demibeat L"s are parsed as 3+3+3, five as 4+5, and six as 2+7.   There are eight ten-demibeat L"s: four of them are parsed as 7+3, three as 3+7, and one as 5+5.   No eleven-demibeat L" is found in the corpus. Finally, there are one twelve-demibeat L" (parsed as 7+5), one thirteen-demibeat L" (parsed as 3+3+7), and one fourteen-demibeat L" (parsed as 5+2+7).

One problem arises as to how to determine the masculinity or femininity of an L" that consists of multiple Ls.   In particular, when an L" is formed by a feminine metrical line and a masculine metrical line, e.g., 4+5, is it a feminine or masculine L"? An appeal to clapping can solve this problem.   That is, a masculine L" ends in a clap, a downbeat, while a feminine L" ends in an upbeat.   The list in (27) shows all the combinations found in the corpus: each ends in a downbeat, followed by a silent upbeat.   All of these L"s are considered masculine.

14

(27) Masculine L"s

3+3	six-demibeat line
3+5	eight-demibeat line
5+3	eight-demibeat line
2+7	nine-demibeat line
3+3+3	nine-demibeat line
4+5	nine-demibeat line
3+7	ten-demibeat line
5+5	ten-demibeat line
7+3	ten-demibeat line
7+5	twelve-demibeat line
3+3+7	thirteen-demibeat line
5+2+7	fourteen-demibeat line

In other words, the combination in which a feminine L is followed by a masculine L results in a masculine L". An opposite combination is not found in the corpus. In fact, the corpus shows an impressive high percentage of masculine L"s, as given in (28).

(28) L"s

Line types	Total # of lines	Percentage
Masculine	660	90.67%
Feminine	60	9.33%
TOTAL	720	100.00%

This corpus shows that masculine rhythm is the prevalent pattern in the folk verse; 90.67% of the L"s are masculine, while only 9.33% are feminine. The following sections will thus work toward an analysis of the preference for masculine rhythm.

4. Beat sharing

Some prosodic phonologists suggest that a metrical demibeat may be assigned according to syntactic junctures (Selkirk 1984) or prosodic junctures (Shih 1986). In various linguistic forms across Chinese dialects, beat assignment is sensitive to the categorical distinction between content words and function words (Hsiao 1991, 1994, 1995). A set of beat addition principles are reproduced as follows.

(29) <u>Beat Addition</u>   (Hsiao 1995:144)

    (a) Lexical Beat: every lexical syllable is assigned a metrical beat.[7]

    (b) Functor Beat: a phrasal functor syllable is assigned a beat or adjoined to a neighboring beat of a syntactic sister.

    (c) Suffix Beat: a suffix syllable is adjoined leftwards to a neighboring beat within the same phonological word.

To paraphrase, a lexical syllable (a syllable of a content word) is usually assigned a single beat, while a functor syllable (a syllable of a function word) or a suffix syllable tends to share a beat with a preceding syllable.   However, in terms of Changhua folk verse, this paper has found that directionality does not matter in terms of beat sharing, but either a preceding syllable or a following syllable may be involved.   This will become clear in the following discussions.

We have mentioned earlier that the number of syllables in an L" does not always match the number of demibeats.   The question then is how the demibeats are assigned to syllables in the case of syllable-beat asymmetry.   In the corpus, such an asymmetry does not occur in feminine verse lines, but in masculine ones.   The first pattern observed in this paper is that an F category item shares a demibeat with an adjacent syllable.   The F category includes classifier, conjunction, directional marker, complementizer, pronoun, suffix, and particle, as well as coverb and be-verb.   The be-verb falls in the F category because it is metrically less salient.   Consider the three readings in (30).

(30) CH-79-03   'The most worrying is being poor.'

  *a. X x   X x X x X x

      te-it   huan-lo si   ka-lai san

      first   worry   be   home poor

  b. X x   X   x   X x X <u>x</u>

      te-it   huan-lo si   ka-lai san

      first   worry   be home poor

  c. X x   X x   X   x X <u>x</u>

      te-it   huan-lo   si ka-lai san

      first   worry   be home poor

In (30a), each syllable (including the be-verb *si*) is assigned a demibeat, and the resulting line has a feminine rhythm.   However, the reading is unmetrical.[8]   The

---

[7] It is equal to a demibeat in this paper.

[8] A reading is considered "unmetrical" if it does not sound like verse.   Metrical readings are those that render verse.

be-verb shares a demibeat with a preceding syllable in (30b) and with a following syllable in (30c).   Both readings are unmarked, metrical readings.

Beat sharing is a means to avoid a feminine rhythm.   Yet an F category item is not able to share a demibeat if the beat sharing will result in a feminine L", since an L" prefers a masculine rhythm, as illustrated in (31).

(31) CH-87-18   'My boss told me to wrap the grass.'
    a. X x X x X x   X   x
        thao-ke kio gun khi tsang tshao
        boss   tell me DIR wrap grass
    *b. X x   X   x   X   x
        thao-ke kio gun khi tsang tshao
        boss   tell me DIR wrap grass
    *c. X x X x   X   x
        thao-ke kio gun khi tsang tshao
        boss   tell me DIR wrap grass
    *d. X   x   X   x   X   x
        thao-ke kio gun khi tsang tshao
        boss   tell me DIR wrap grass

There are two F category items in the L" above: the pronoun *gun* and the directional marker *khi*.   Both *gun* in (31b) and *khi* in (31c) share a demibeat with an adjacent syllable, but both create a feminine, unmetrical rhythm.   Beat sharing in (31d) should not happen either, since the one-to-one mapping would not create a feminine line. As a result, (31a) renders the metrically unmarked, masculine reading, where each syllable is assigned a single demibeat.

A second observation of beat sharing is attributed to syntactic structure.   In particular, immediate constituents (hereafter, ICs) share a demibeat to create a masculine line, as in (32).

(32) CH-10-04   'Come out to look.'
    *a. X   x X x
        tsao tshut-lai khuaN
        run DIR-DIR look
    b. X   x   X   x
        tsao tshut-lai khuaN
        run DIR-DIR look

One may notice that the pair of ICs *tshut-lai* consists of two directional markers, i.e., F category items, which are subject to beat sharing anyway.   This is true, but (33)

shows that morphosyntactic ICs indeed play a role in beat sharing. In (33a) the non-ICs *tsao tshut-* share a demibeat, and in (33b) *-lai khuaN* share a demibeat; although both derive a masculine line, both are unmetrical.

(33) CH-10-04   'Come out to look.'
 *a. X x X <u>x</u>
   tsao tshut-lai khuaN
   run DIR-DIR look
 *b. X x X <u>x</u>
   tsao tshut-lai khuaN
   run DIR-DIR look

The effects of morphosyntactic ICs are further revealed in lines like (34), where no F category item is involved.   The members of the disyllabic adjective *tsa-bo* share a demibeat to render a masculine line, as in (34b).   Without the beat sharing, a feminine line would be derived, as in (34a).

(34) CH-61-11   'On 11th, invite the daughter.'
 *a. X x X x X x
   tsap it tshiaN tsa-bo kiaN
   ten one invite   female kid
  b. X x X x X <u>x</u>
   tsap it tshiaN tsa-bo kiaN
   ten one invite   female kid

5. Constraint ranking

The emergence of Optimality Theory (OT) has initiated a new era of non-derivational approaches (Prince and Smolensky 1993, McCarthy and Prince 1994).   OT deserts the derivational convention but considers UG as consisting of universal constraints, which are ranked into a domination hierarchy on a language-specific basis.   Under this framework, a function Gen takes an input and relates it to an infinite number of possible output candidates, which are submitted in parallel to a set of relevant constraints.   A lower ranked constraint can be sacrificed to satisfy a higher ranked constraint.   A candidate that violates only the lowest ranked constraint or does not violate any constraint is the optimal output.   Linguists like Rice (1997, 2000), Hayes (2000) and Kager (2001), among others, have pursued the generative metrics from a constraint-based perspective, and have characterized

poetic meter by virtue of constraint reranking.　In particular, the way that constraints are ranked in verse is different from that in common speech.

　　In this section, I develop an OT account of the rhythm of the folk verse.　Several phenomena are worth noting.　First, the basic metrical template posited in (15) preferentially map syllables and demibeats on a one-to-one basis.　Second, a masculine L" is preferred to a feminine one.　A pair of constraints can thus be formalized as follows.

(35) NoShare: every syllable is assigned a single demibeat.

(36) Masculinity: a masculine rhythm is preferred.

　　NoShare conflicts with Masculinity in the event that the one-to-one demibeat assignment results in a feminine L", which would sound less metrical or unmetrical, as shown earlier in (30).　Due to the fact that a masculine rhythm is preferred, Masculinity must rank above NoShare.　In other words, beat-sharing is inevitable in cases like (37).

(37) CH-79-03　　te-it　huan-lo　*si*　ka-lai san　　= (30)
　　　　　　　　　first　worry　be　home poor

	Masculinity	NoShare
a.　x　x 　　-lo si	*!	
☺ b.　　x 　　-lo si		*
☺ c.　x 　　si ka-		*

In (37a) each syllable receives a demibeat such that a feminine rhythm is created (= 30a), in violation of Masculinity.　In (37b, c), *si* shares a demibeat either with a preceding syllable or with a following syllable; both render a masculine rhythm (= 30b, c), and thus both are selected as optimal outputs (shown by the happy face, ☺).

(38) CH-79-03   te-it   huan-lo *si*   ka-lai san   = (30)

           first   worry   be   home poor

	Masculinity	NoShare
☹ a. x x huan-lo si		*
☺ b. x -lo si		*
☺ c. x si ka-		*
☹ d. x x si ka-lai		*

Note that not just any category of syllable may be subject to beat sharing.   A third pattern is observed as follows: to prevent a feminine rhythm, it is an F category item that shares a demibeat with an adjacent syllable.   As shown in (38), if *si* does not share a demibeat with an adjacent syllable, candidates (a) and (d) would be incorrectly selected (indicated by the upset face, ☹).   The constraint in (39) is thus indispensable.

(39) F-Share: an F category syllable shares a demibeat with an adjacent syllable.

F-Share should rank between Masculinity and NoShare.   This partial ranking allows the F category to share a demibeat with an adjacent syllable only if a feminine rhythm would be obtained otherwise.   In (40), F-Share successfully eliminates candidates (b) and (e).

(40) CH-79-03   te-it   huan-lo *si*   ka-lai san   = (30)
          first   worry   be   home poor

	Masculinity	F-Share	NoShare
a. x x -lo si	*!		
b. x huan-lo		*!	*
☺ c. x -lo si			*
☺ d. x si ka-			*
e. x ka-lai		*!	*

   A fourth observation is that a pair of syllables that are morphosyntactic ICs shares a demibeat, when no F category item is involved.   The constraint in (41) serves to capture this insight.

(41) IC-Share: two syllables that are morphosyntactic ICs share a demibeat.

   The ranking of IC-Share is also below Masculinity and above NoShare.   ICs share a demibeat in order to achieve a masculine rhythm.   In (42), candidates (c,d) are ruled out by IC-Share, since the non-ICs share a demibeat.   Candidate (a) has no beat sharing and derives a feminine rhythm, in violation of Masculinity.   As a result, candidate (b) is chosen as the optimal output, where *tsa-bo* shares a demibeat.

(42) CH-61-11   tsap it   tshiaN tsa-bo kiaN   = (34)
          ten one invite   female kid

	Masculinity	IC-Share	NoShare
a. x x tsa-bo	*!	*	
☺ b. x tsa-bo			*
c. x tshiaN tsa-		*!	*
d. x -bo kiaN		*!	*

The next question lies in the interaction of F-Share and IC-Share. Consider again (30), where the IC pairs *huan-lo* and *ka-lai* are not allowed to share demibeats, but rather, the beat sharing must involve the F category *si*. It thus becomes clear that F-Share is ranked higher than IC-Share, as shown in the following tableau.

(43) CH-79-03　te-it　huan-lo *si*　ka-lai san　　= (30)
　　　　　　　first　worry　be　home poor

	Masculinity	F-Share	IC-Share	NoShare
a.　x　x 　　-lo si	*!	*		
b.　　x　　x 　　huan-lo si		*!		*
☺ c.　　x 　　-lo si			*	*
☺ d.　x 　　si ka-			*	*
e.　x　x 　　si ka-lai		*!		*

When adjacent ICs are both F category items, F-Share will not be able to prevent either member of the ICs from sharing a demibeat with an outsider. As shown in (44), candidates (c, d) are ruled out by IC-Share but not by F-Share, whereby candidate (b) merges as the optimal output.

(44) CH-10-04　　tsao tshut-lai khuaN　　= (32, 33)
　　　　　　　run DIR-DIR look

	Masculinity	F-Share	IC-Share	NoShare
a.　　x　x 　　tshut-lai	*!	*	*	
☺ b.　　　x 　　tshut-lai				*
c.　　　x 　　tsao tshut-			*!	*
d.　　　x 　　-lai kuaN			*!	*

However, a problem occurs from this constraint ranking. Consider again (31a) and (31d). Both render masculine lines: the former is a seven-demibeat line, where

each syllable is assigned a demibeat, while the latter is a five-demibeat line, where the first four syllables share two demibeats.   The domination hierarchy "Masculinity >> F-Share >> IC-Share >> NoShare" is insufficient to select (31a) over (31d).[9]   The constraint in (45) should be added to the hierarchy.

(45) Mascu(NoShare): a masculine line assigns each syllable a demibeat.

There are two angles to look at Mascu(NoShare).   First, it appears as a primitive member of NoShare, and in cases like this, the former usually ranks higher.   Second, we can employ the concept of "feature-sensitive constraint" (Rice 2003): namely, verse lines can be distinguished by features such as [+masculine] and [+feminine], and the constraint in (45) prevents a line that is [+masculine] to have beat sharing. In any case, Mascu(NoShare) is dominated by Masculinity but dominates F-Share and IC-Share, as shown in (46).

(46) CH-87-18   thao-ke kio gun khi tsang tshao   = (31)
                 boss   tell me DIR wrap grass

	Masculinity	Mascu(NoShare)	F-Share	IC-Share	NoShare
☺ a. x x x x thao-ke kio gun			*	*	
b. x x x thao-ke kio gun	*!			*	*
c. x x x thao-ke kio gun	*!		*		*
d. x x thao-ke kio gun		*!			*

The effect of Mascu(NoShare) is to eliminate (46d) such that (46a) can surface as the optimal output.   As to (46b, c), both result in feminine lines and thus are removed by Masculinity.   The next question is whether the inclusion of Mascu(NoShare) would change the outcome of tableau (44).   The answer is negative, as in (47).

---

[9] I would like to thank an anonymous reviewer for pointing out this problem.

(47) CH-10-04   tsao tshut-lai khuaN   = (32, 33)
            run DIR-DIR look

	Masculinity	Mascu(NoShare)	F-Share	IC-Share	NoShare
a. x x tshut-lai	*!		*	*	
☺ b. x tshut-lai		*			*
c. x tsao tshut-		*		*!	*
d. x -lai kuaN		*		*!	*

Mascu(NoShare) is violated by (47b, c, d) at the same time, each of which creates a masculine line by beat sharing. The evaluation is passed one level down, where these three candidates incur no violation of F-Share. The evaluation is again passed one level down, where IC-Share excludes (47c, d) and thus (47b) wins out.

    Assuming the basic template in (15), we can often expect a mismatch between prosody and syntax. Specifically, the metricality in (48) can be comprehended in a gradient manner: (a) > (b, c) > (d, e).

(48) a.   f   f   ?b.   f   f
          / \   / \   / \   / \
          X   x X   x̲   X   x X   x
       … [σ [σ   σ]]   … [σ [σ   σ]] syntactic bracketings

   ?c.   f   *d.   f
            / \   / \
            X   x̲   X   x
       … [σ [σ   σ]]   … [σ [σ   σ]]

   *e.   f   f
          / \   / \
          X   x   X   x̲
       … [σ [σ   σ]]

The footing and syntax completely mismatch in (48a), which, however, is masculine and metrically preferred. (48b, c) are feminine readings, which sound less metrical. As to (48d, e), they both are unmetrical; the reason for this unmetricality is due to the

fact that the final two syllables share a demibeat in both readings. A pattern is thus observed here: namely, the final syllable is not subject to beat sharing, and another primitive member of NoShare can be singled out, as in (49).

(49) NoShare-Final: the final syllable is assigned a single demibeat.

NoShare-Final ranks higher than Mascu(NoShare), F-Share, IC-Share and NoShare. The high ranking of this constraint predicts that the final syllable does not share a demibeat with a preceding syllable even if an F category item or a pair of ICs is involved. NoShare-Final does not conflict with Masculinity, and thus the enriched constraint ranking is as follows.

(50) Masculinity, NoShare-Final   >>
      Mascu(NoShare)   >>
      F-Share   >>
      IC-Share   >>
      NoShare

6. Concluding remarks

Traditional studies of folk verse have been focused only on a small number of lines (Halley and Keyser 1969, 1971, Gueron 1973, 1974, Napoli 1978), and the theoretical predictions are not attested by thicker data. This paper has offered an analysis of Changhua folk verse based on a corpus of 720 lines, in which five types of information are coded, including the count of demibeats, the count of syllables, word categories, syntax tree, and simplified tree. As the corpus shows, the number of syllables and the number of demibeats do not always match in the lines, and the syllable-demibeat mapping may require beat sharing to achieve a masculine line, as do 90.67% of the lines in the corpus. One factor governing beat sharing lies in a categorical distinction between content word and function word, a tendency that is often found in Western folk verse as well. A second factor that facilitates beat sharing is syntactic immediate constituency. Such an influence of syntax upon prosody is not at all surprising, as similar patterns have been addressed in English verse (Hayes 1989, and others).

Theoretically, the convention of derivational phonology concentrates on rule derivations of metrical output on a language-specific basis. This study of Changhua folk verse, on the other hand, employs a non-derivational approach and appeals to a set of constraints to account for the various metrical outputs. A partial constraint

ranking is put forth as follows: Masculinity, NoShare-Final >> Mascu(NoShare) >> F-Share >> IC-Share >> NoShare.   This ranking ensures that a masculine line has priority to surface, and that F categories and syntactic ICs are subject to beat sharing in the case of syllable-beat asymmetry, except that the final syllable must receive a single demibeat.   Under the framework of OT, this research on Changhua folk verse has shed light on a general theory of metrics from both the constraint-based and the corpus-based perspectives.

References

Chao, Y. R. 1968. *A Grammar of Spoken Chinese*. Berkeley: University of California Press.

Chen, M. 1979. Metrical structure: Evidence from Chinese poetry. *Linguistic Inquiry* 10:371-420.

Chen, M. 1980. The primacy of rhythm in verse: A linguistic perspective. *Journal of Chinese Linguistics* 8:15-41.

Chen, M. 1984. Unfolding latent principles of literary taste: Poetry as a window onto language. *Tsing Hua Journal of Chinese Studies* 16:203-240.

Chen, M. 1991. From tone to intonation: A case study on Wenzhou. *Manuscript*. University of California, San Diego.

Changhua County Culture Center. (ed.) 1994. *Changhua Literature Selections 1: Folk Ballads*. Changhua: Changhua County Culture Center. [In Chinese]

Dai, J. X. 1992. *Chinese Morphology and Its Interface with the Syntax*. Ph. D. Dissertation. Columbus: The Ohio State University.

Duanmu, S. 1999. *Stress and the Development of Disyllabic Vocabulary in Chinese*. Diachronica 16:1-35.

Duanmu, S. 2004. A corpus study of Chinese regulated verse: Phrasal stress and the analysis of variability. *Phonology* 21.1:43-89.

Gueron, J. 1973. Children's verse and the Halle-Keyser theory of prosody. *The Great Excluded* 2:197-208.

Gueron, J. 1974. The meter of folk verse: An application of the Halle-Keyser theory of meter. *Poetics* 12:73-111.

Halle, M. and S. J. Keyser. 1971. *English Stress: Its Form, Its Growth, and Its Role in Verse*. New York: Harper and Row.

Halle, M. and J.R. Vergnaud. 1987. *An Essay on Stress*. Cambridge: MIT Press.

Hayes, B. 1983. A grid-based theory of English meter. *Linguistic Inquiry* 14:357-393.

Hayes, B. 1989. The prosodic hierarchy in meter. *Phonetics and Phonology* 1:201-260.

Hayes, B. 2000. Faithfulness and componentiality in metrics. ROA-421.

Hsiao, Y. E. 1990. When syntax meets rhythm. *Proceedings of the 20th Western Conference on Linguistics* 20:127-137.

Hsiao, Y. E. 1991a. The syntax-phonology interface as the key to metricality: Evidence from Taiwanese folk songs. *Kansas Working Papers in Linguistics* 16:77-98.

Hsiao, Y. E. 1991b. *Syntax, Rhythm and Tone: A Triangular Relationship*. Taipei: Crane Publishing Co., Ltd.

Hsiao, Y. E. 1995. *Southern Min Tone Sandhi and Theories of Prosodic Phonology*. Taipei: Student Book Co., Ltd.

Hsiao, Y. E. 2000. Optimal tone sandhi in Taiwanese southern Min. *Chinese Research*. 18:25-40. [In Chinese]

Jackendoff, R. 1989. A comparison of rhythmic structure in music and language. *Phonology and Phonetics* 1:15-44.

Kager, R. 2001. Rhythmic directionality by positional licensing. ROA-514.

Lerdahi, F. and R. Jackendoff. 1983. *A Generative Theory of Tonal Music*. Cambridge: MIT Press.

Liberman, M. and A. Prince. 1977. On stress and linguistic rhythm. *Linguistic Inquiry* 8:249-336.

McCarthy, J. and A. Prince. 1993. Generalized alignment. *Yearbook of Morphology*, 79-153. Dordrecht: Kluwer.

Napoli, D. 1978. The metrics of Italian folk verses. *Language and Style* 11:40-59.

Prince, A. and P. Smolensky. 1993. *Optimality Theory: Constraint Interaction in Generative Grammar*. ROA-537. 2004. MA: Blackwell Publishers.

Rice, C. 1997. Ranking components: The grammar of poetry. *Phonology in Progress -- Progress in Phonology*, ed. by G Booij and J. van de Weijer. The Hague: Holland Academic Graphics.

Rice, C. 2000. Generative metrics. *The First Glot International State-of-the-Article Book: The Latest in Linguistics*, ed. by L. Lai-Shen Cheng and R. Sybesma, 329-347. Berlin: Mouton de Gruyter.

Rice, C. 2003. Optimizing gender. ROA-653.

Selkirk, E. 1984. *Phonology and Syntax: The Relation between Sound and Structure*. Cambridge: MIT Press.

Selkirk, E. and T. Shen .1990. Prosodic domains in Shanghai Chinese. *The Phonology-Syntax Connection*, ed. by S. Inkelas and D. Zec, 19-46. Chicago: The University of Chicago Press.

Shih, C. 1986. *The Prosodic Domain of Tone Sandhi in Chinese*. Ph.D dissertation. University of California, San Diego.

Shih, C. 1990. Mandarin third tone sandhi and prosodic structure. *Studies in Chinese Phonology*, ed. by J-L Wang and N. Smith. University of California Press.

Graduate Institute of Linguistics
National Chengchi University
Taipei, TAIWAN
ychsiao@nccu.edu.tw

彰化民謠之節律研究

蕭宇超

國立政治大學

　　民謠在傳統研究上有兩個缺點：一、素材僅限於少數韻行；二、只著重語言個別派生規律，而缺乏普遍性。本文建立一個 720 行的彰化閩南語民謠語料庫，並提出一個非派生分析。從這個語料庫顯示，大部分的韻行屬陽性節律，占 90.67%，而拍板分享則是避免陰性節律的手段。本文在 Prince and Smolensky (1993)的優選理論框架下，提出一組節律制約。這些制約屬於普遍語法的一部分，而在彰化民謠中呈現語言個別性的層級排序。

關鍵詞：語料庫、民謠、優選理論、制約層級排序、節律