

CHAPTER 1

INTRODUCTION

1.1 Preliminaries

This thesis explores the rhythm of Mandarin finger rhymes. Rhythm is a continuous flow of speech, signaled by different types of constituents ranging from phonetic cues, metrical components, to prosodic hierarchies. The immediate efforts are not only dedicated to the theories that judge the metrical well-formedness and the ones that describe the verbal-plus-physical rhythms of the finger rhymes. They are also drawn onto the corpus that forms the empirical basis of this research.

In generative phonology, the contention is about the domain. The rhythmic structures are governed by certain types of grammars (Halle & Keyser 1969, 1971; Kiparsky 1975, 1977; Chen 1979; Duanmu 1999, 2004; Hsiao 2006). The representation is formed by a set of interacting systems, inclusive of the metrical grids, morphosyntactic hierarchy, semantic interpretations, and prosodic phonology (Nespor and Vogel 1986). Shih (1986, 1990) considers that the verse scansions are subject to the prosodic structure, as short as a

foot, or as long as an intonational phrase. Other phonologists (Kaisse 1985; Odden 1987, 1988; Chen 1979) favor the recitations on the syntactic basis. Still others (Duanmu 1999, 2004; Hsiao 1991b, 2006) take the neutral position, adopting both of the suggestions. The present study gains new insights from these perspectives, and offers evidence from an electronic corpus which is lack in the previous formal groundings.

Five fundamental issues are carefully examined: (1) what kind of the rhythmic structures the finger rhymes have, (2) what role prosodic structure plays in metrics, (3) how syntactic structures affect the alignment of syllables to demibeats, (4) how stress is active in the judgment of metrical grammars, and (5) how universal constraints in Optimality Theory (Prince & Smolensky 1993, 2004) account for the rhythmic patterns in the finger rhymes.

This thesis contains five chapters. Chapter 1 presents the research issues of this thesis and introduces Mandarin finger rhymes, followed by a description of the corpus. Chapter 2 reviews the generative phonology and Optimality Theory on the treatment of metrics and prosody; both derivational and non-derivational approaches are addressed. Chapter 3 analyzes the rhythmic structure of the finger rhymes, where the types of rhythms and the metricality are attested. Chapter 4 specifies the well-formedness condition of the finger movements that are observable in the finger rhymes but not seen in other metrical genres. Chapter 5 concludes this thesis.

1.2 The Nature of The Finger Rhymes

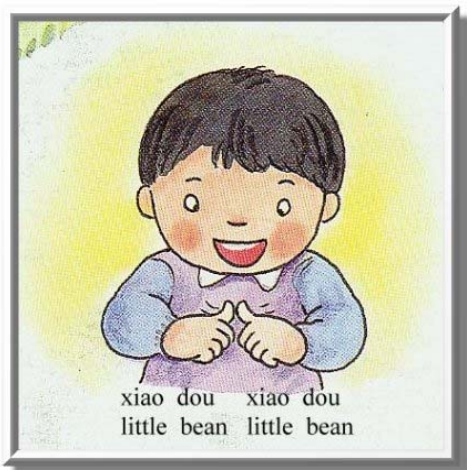
Finger rhymes are a sub-genre of nursery rhymes. The major feature is the inclusion of finger movements that rhythmically follow the recitation of each line. Mandarin finger rhymes derive from Japan, where educationists and anthologists consider that fingers are directly associated to the brain. In that event, an early exposure to fingers would benefit the cognitive development, in particular, for babies under six years old. This kind of child verses are in form of a linguistic game, but each movement has to strictly go on with the tempos. The present corpus shows that a movement may be completed as short as in one demibeat, or as long as in seven demibeats. The length of time a movement needs determines which physical part is preferred. In general, the flexibility of movement size is correlated with babies' physical limitations. The younger the babies are, the more time they need to perform a movement from a finger, a palm, to an arm. And a finger movement requires contrastively fewer demibeats than an arm movement.

Two examples are given for a clear illustration. The first passage is *da gen tou* 'a big overturn'; the second is *guan men kai men* 'close the door and open the door.' Both of the rhymes are elicited from one of the published finger-rhyme books, *bao-bei shou-zhi yao*¹ 'Baby Finger Rhymes' (Ding 1997a, 1997b, 1997c).

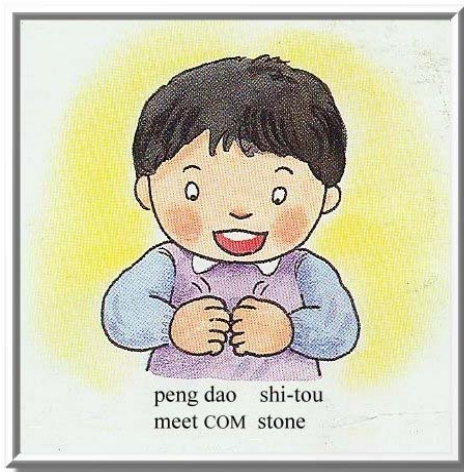
¹ This thesis is acknowledged to the authors of *bao-bei shou-zhi yao* 'Baby Finger Rhymes,' Hui-Yu Ding, Shu-Ping Sun, Luo-Wen Hao, and Zheng-Ting Shi, as well as the publisher 3&3 International Education Institute. The metrical lines and the pictures are allowed for the research use. All rights are reserved in 3&3 International Education Institute.

(1) *da gen tou* 'a big overturn' (FR-087)

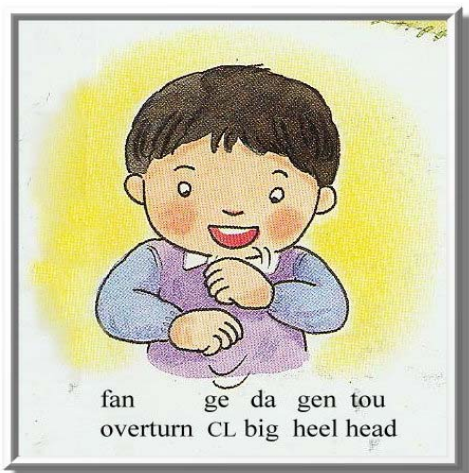
a. 'little beans and little beans'



b. 'they bump into a stone'



c. '(they) get a terrible overturn'

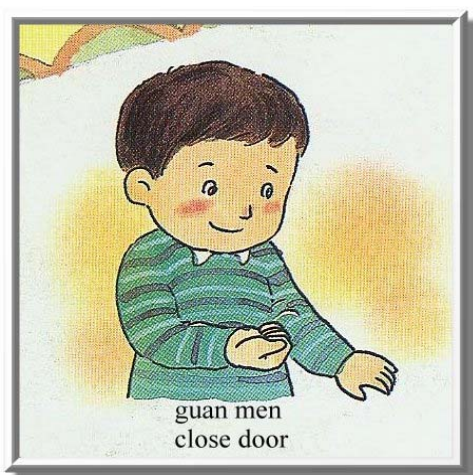


A finger form, *xiao duo* 'little bean' for instance, starts with a strong metrical beat, and the performance ends in a weak metrical beat. Every finger movement is completed within a prosodic unit, particularly a foot. Some other movements are composed of single demibeat,

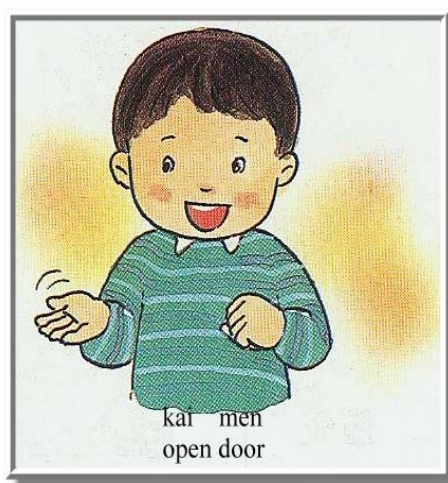
as in (1c) and (2e). In (1c), each fist showing at the front counts as one movement and the total numbers are five. In (2e) the form is the index finger moving forward, and the line ends up with seven movements.

(2) *guan men kai men* 'close the door and open the door' (FR-085)

a. 'close the door'



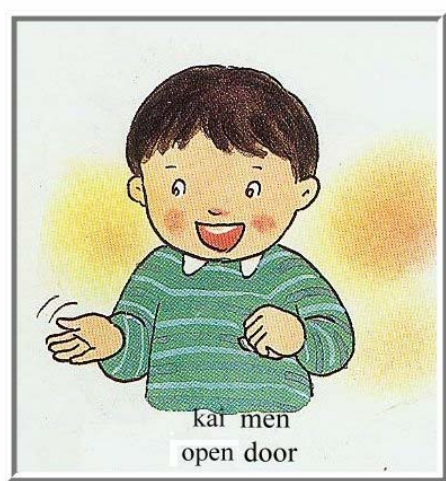
b. 'open the door'



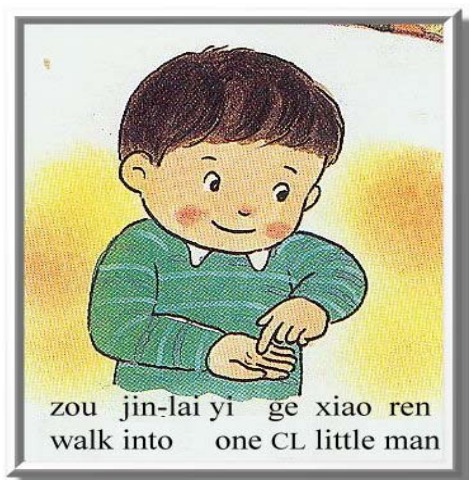
c. 'close the door'



d. 'open the door'



e. 'a little man comes in'



Finger rhymes differ from other nursery rhymes in the composition of finger movements. However, both types of child verses are similar in some way that is distinct from Chinese regulated verses. First of all, the length of rhymes is flexible. A poem can be extended to any number of lines. The poem of (1) is composed of three lines; the rhyme of (2) is of five. Second, it is common that the number of syllables in a line is irregular. For example, in (1-2), there are two, four, five and seven syllables in a line. Chinese regulated verses are instead either pentasyllabic or heptasyllabic. Third, the restriction on the finger rhymes is not rigid. For instance, the rhyming is required in Chinese regulated verses, but is not necessarily needed in finger rhymes. The above two examples have the final syllables with the consistent rime, -ou in (1) and -en in (2). The freedom of creation is such that finger rhymes behave more like natural speech but retain some metrical properties. Finally, the numbers of syllables and demibeats do not always match. Consider (3):

(3) ‘(I) board the boat and watch the autumn moon.’

x	x	x	x	x					demibeats
<i>deng</i>	<i>zhou</i>	<i>wang</i>	<i>qiu</i>	<i>yue</i>					
board	boat	watch	autumn	moon					

In Chinese regulated verses, each syllable is mapped onto a single demibeat. The finger rhymes are not in full agreement to this syllable-to-demibeat alignment. Two rhythms are seen in (4).

(4) a. Rhythm-1

x	x	x	<u>x</u>	x	x	x	x			demibeats
[<i>zhi</i>	<i>yao</i>	<i>ni</i>]	[<i>pigu</i>	<i>liang</i>	<i>jing</i>	<i>jing</i>]				
only	want	2.SG	hip	bright	shiny					
‘We only ask you to keep your hip clean.’										(FR-619-5)

b. Rhythm-2

x		x		x	x	x	x	x		demibeats
[<i>zhi</i>	<i>yao</i>	<i>ni</i>	<i>pigu</i>	<i>liang</i>	<i>jing</i>	<i>jing</i>]				
only	want	2.SG	hip	bright	shiny					
‘We only ask you to keep your hip clean.’										(FR-619-5)

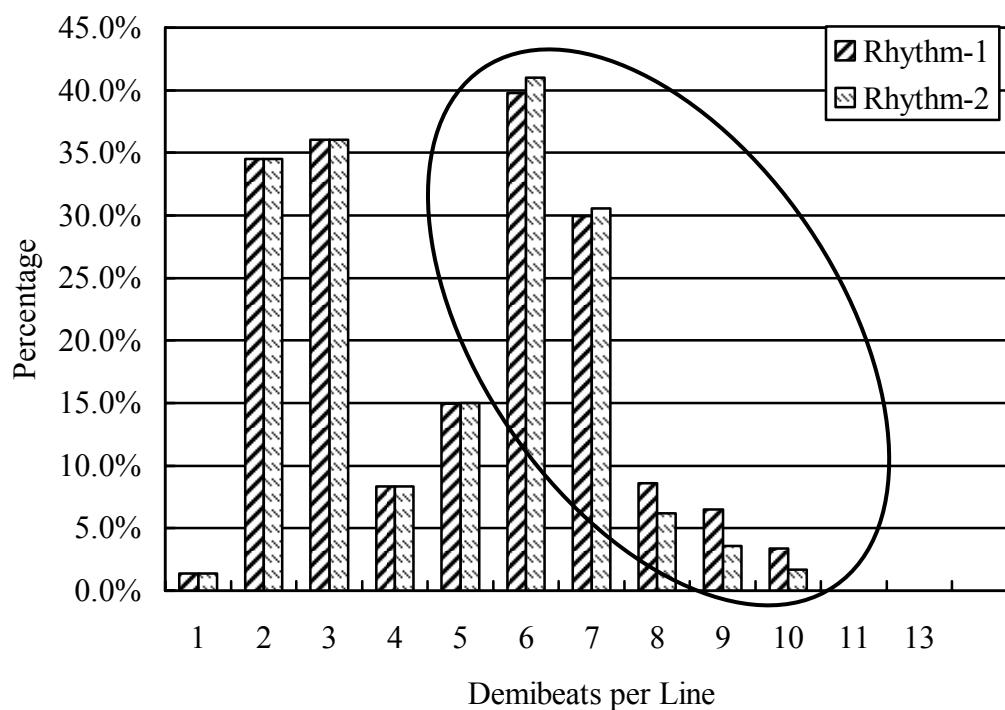
Both lines have eight syllables. However, the ways of recitation are different. For the ease of scansion, one may divide a longer line into shorter ones. None of syllables would share a single demibeat, as in (4a). (4a) are parsed respectively into the three-demibeat and five-demibeat lines. The three-demibeat line is followed by a pause (a silent demibeat: x),

and then by the five-demibeat line.

On the other hand, one may choose to read faster. As in singing, we may condense two demibeats into one. Syllables and demibeats do not match one-to-one, such as (4b), in which two syllables *yao* ‘want’ and *ni* ‘you’ are aligned to the identical demibeat. Therefore, a line of the finger rhymes is likely to have two readings. One is subject to beat-sharing; the other is not. In Chinese regulated verses *Lu Shi* and *Jue Ju*, no beat-sharing renderings are found.

The present study reveals that a lengthy line is avoided, especially the lines with more than seven demibeats. The figure (5) reports that beat-sharing has a positive effect on a longer line. As in (4b), beat-sharing is applied, and a decrease of the eight-demibeat lines would lead to an increase of the seven- or six-demibeat lines. On the other hand, the syllables of the short lines prefer a one-to-one relation with the demibeats. Beat-sharing is not obvious in the short lines.

(5) A Comparison of Rhythms



Rhythm, under the scrutiny of generative metrics, results in the difference between metrics and speech. The interest Youmans (1989) takes is echoed in the lines by Chico Hamilton, one of the jazz drummers:

“Music isn’t the universal language; rhythm is. Plenty of people are tone deaf, but everyone has a heartbeat.”

People perceive the rhythm by taking diverse approaches, which includes demibeat-counting, a survey of accents and intonation, and the way of parsing. Hsiao (1991b, 1995, 2006), by

one's clapping, captures the presence of rhythm in folk songs.

(6) Clapping Cycle

a. Downbeat: clap

↓ ↓
L1 R2
R1 L2
↑ ↑

b. Upbeat: open

L1 R2
↑ ↑
↓ ↓
R1 L2

c. Downbeat: clap

↘ R2
L1
L2
R1 ↖

d. Upbeat: open

L1 R2
↖
↘
R1 L2

e. Downbeat: clap

↓ ↓
L1 R2
R1 L2
↑ ↑

f. Upbeat: open

L1 R2
↑ ↑
↓ ↓
R1 L2

g. Downbeat: clap

L1 ↙
R2
R1
↗ L2

h. Upbeat: open

L1 R2
↗
↙
R1 L2

(Hsiao 2004: 2)

There are eight movements in a cycle of clapping. R1 and L1 are the right and left hand of the first child; R2 and L2 those of the second child. In (6a-6b) children clap their own

hands. In (6a) the hands are closed and in (6b) the hands open. In (6c-6h), the movements are mutual. The children clap on each other's hands first and next draw back their hands. From (6c) to (6h), the difference is merely a change of clapping direction.

The count of demibeats in the finger rhymes follows from Hsiao's (Ibid) clapping. The downbeat is referred to metrical strong (S) position and the upbeat metrical weak (W) position.

1.3 Basics of The Corpus

This research engages in a corpus of Mandarin finger rhymes. Many linguists (Halle and Keyser 1971, Kiparsky 1975, 1977, Chen 1979, Youmans 1989, Golstons 1998) contend that the attraction of quantitative analyses come from the frequency, which is the most objective and straightforward evidence. And my corpus-based² study is such an attempt to eliminate problems in works that are theoretically stable but empirically loose.

1.3.1 Sources

This work constructs a corpus of 4172-line Mandarin finger rhymes. The data mainly

² I thank Prof. T.-H. Jonah Lin in National Tsing Hua University for his valuable comments. This study is on the basis of 'corpus,' the definition of which follows Biber, Conrad and Reppen (1998: 4-18). A corpus must be a large and systematic collection of natural texts with certain essential features. First, it is empirical for displaying the actual patterns of natural language. Second, the research makes use of computers for the consistent and reliable analysis. Third, both quantitative and qualitative techniques are treated well. My thesis follows these principles and regards the work as corpus-based. I am, of course, responsible for all possible errors.

rely on three sources: (1) the weekly broadcasting programs, *Voice of Han Broadcasting Network* (1995-1997), which is popular with parents and preschool teachers in Taiwan, (2) several published textbooks (Li 1996; You 1996a, 1996b; Ding 1997a, 1997b, 1997c; among others), and (3) the websites³. Some other information is acknowledged to Ding (1997a, 1997b, 1997c), and the other preschooler teachers through personal communication.

The present corpus follows the format of Microsoft Office Excel™ 2003 that is known to the public and user-friendly, as given below.

(7) The Present Corpus

Serial #	Words	Syllables	Rhythm-1	Demibeat: R-1	Rhythm-2	Demibeat: R-2
1						
2	ㄉ	1	(SW)	1		
3	ㄉ	1	(SW)	1		
4	ㄩ	1	(SW)	1		
5	一	1	(SW)	1		
6	七	1	(SW)	1		
7	九	1	(SW)	1		
8	二	1	(SW)	1		
9	八	1	(SW)	1		
10	三	1	(SW)	1		
11	五	1	(SW)	1		
12	六	1	(SW)	1		
13	扌	1	(SW)	1		
14	王	1	(SW)	1		
15	叭	1	(SW)	1		
4135	嘴裏頭有一排白白牙	9			(SW)(SW)(SW)(SW)	7 W=裏到
4136	廟外頭有一隻黑黑豬	9			(SW)(SW)(SW)(SW)	7 W=外到
4137	廟裡頭有一隻白白豬	9			(SW)(SW)(SW)(SW)	7 W=裡到
4138	戴頂草帽來到坑水邊	9			(SW)(SW)(SW)(SW)	7 S=來到
4139	還沒繞過一個駝鳥蛋	9			(SW)(SW)(SW)(SW)	7 S=一個
4140	還是四十四隻石獅子	9	(SW)(SW)(SW)(SW)(SW)	9	(SW)(SW)(SW)(SW)	7 S=四十
4141	鬚子一把樣子像小孩	9	(SW)(SW)(SW)(SW)(SW)	9	(SW)(SW)(SW)(SW)	7 S=樣子
4142	變成變成變成三角形	9	(SW)(SW)(SW)(SW)(SW)	9	(SW)(SW)(SW)(SW)	7 S=變成
4143	變成變成變成小白兔	9	(SW)(SW)(SW)(SW)(SW)	9	(SW)(SW)(SW)(SW)	7 S=變成
4144	變成變成變成小狗狗	9	(SW)(SW)(SW)(SW)(SW)	9	(SW)(SW)(SW)(SW)	7 S=變成
4145	變成變成變成小花貓	9	(SW)(SW)(SW)(SW)(SW)	9	(SW)(SW)(SW)(SW)	7 S=變成
4146	變成變成變成小鳥飛	9	(SW)(SW)(SW)(SW)(SW)	9	(SW)(SW)(SW)(SW)	7 S=變成
4147	變成變成變成毛毛蟲	9	(SW)(SW)(SW)(SW)(SW)	9	(SW)(SW)(SW)(SW)	7 S=變成
4148	變成變成變成打電話	9	(SW)(SW)(SW)(SW)(SW)	9	(SW)(SW)(SW)(SW)	7 S=變成
4149	變成變成變成拍拍手	9	(SW)(SW)(SW)(SW)(SW)	9	(SW)(SW)(SW)(SW)	7 S=變成
4150	變成變成變成神槍手	9	(SW)(SW)(SW)(SW)(SW)	9	(SW)(SW)(SW)(SW)	7 S=變成
4151	變成變成變成蜜蜂	9	(SW)(SW)(SW)(SW)(SW)	9	(SW)(SW)(SW)(SW)	7 S=變成

³ Some data are collected from a list of the websites:

- (1) *Woby* <http://www.woby.com.tw/>,
- (2) *Yao-yang* <http://cnat.pckids.com.tw/teachpaper/song1.asp>,
- (3) <http://www.tmtc.edu.tw/~kidcen/newteach/12.htm>,
- (4) <http://blog.yam.com/tingma/archives/80523.html>,
- (5) PTT Bulletin Board System: [telnet:// ptt.cc/](telnet://ptt.cc/)

Microsoft Office Excel™ 2003 is a program for the establishment of a small-size database.

As in (7), it is easy and convenient to sort a great deal of material by syllables, demibeats, syntactic structures and more. Also, this program supports the statistic operation on my data.

In this event, the outcome is precise and efficient.

1.3.2 Annotation

The current corpus includes 689 finger rhymes, with a total of 4172 lines⁴. Any given metrical line of the corpus is segmented with code information, such as word categories, syntax tree⁵, simplified tree, the number of syllables, the number of demibeats, and the stress.

Some examples are given in (8).

(8) Syntax and Word Category

Serial #	Words	Syntax Tree	Simplified Tree
FR-100-1	[<i>zuo</i> [<i>huo-che</i>]] 'take a train'	[V NN]	[1 2]
FR-085-1-2	[<i>kai men</i>] 'open the door'	[V N]	[2]
FR-646-9-1	[[<i>jiu gen</i>] <i>shou-zhi-tou</i>] 'nine fingers'	[[N Q] NNN]	[2 3]
FR-134-1-3	[[<i>yi zhi</i>][<i>shang shu</i>]] 'One climbs up the tree.'	[[N Q][V N]]	[2 2]

See FR-646-9-1, the third line of (8). The prefixal abbreviation "FR" represents Finger

⁴ The total lines of 689 rhymes are 5400. To avoid analyzing the same material, we remove the lines that appear after once, and get 4172 lines in total.

⁵ The guilds to the syntactic categories include the tagging system of Academia Sinica Balanced Corpus of Modern Chinese (1995-2006), and part of the perspective in Li & Thompson (1984).

Rhymes. The following number “646” means the six hundred and forty-sixth child verse, and the next following number “9” indicates the ninth printed line. The final number “1” then denotes the first fragment of the printed line.

In the line FR-100-1, the disyllabic word *huo-che* ‘train’ is a NN compound. This compound is coded as 2 in terms of simplified trees, which formally represent a syntactic branching domain (the syntactic nodes).

In work by Hsiao (2006), the function words (F category in his terms) display a special rhythmic behavior. For example, the syllable-to-demibeat misalignment is more prone to the function words than content words. Following him, I use F to represent F category, which includes classifier, conjunction, directional marker, complementizer, as well as pronoun and particle, as in (9).

(9) F-Categories

Serial #	Words	Syntax Tree	F-Categories
FR-100-1	[<i>zuo</i> [<i>huo-che</i>]] ‘take a train’	[V NN]	[V NN]
FR-085-1-2	[<i>kai men</i>] ‘open the door’	[V N]	[V N]
FR-646-9-1	[[<i>jiu gen</i>] <i>shou-zhi-tou</i>] ‘nine fingers’	[[N Q] NNN]	[[N F] NNN]
FR-134-1-3	[[<i>yi zhi</i>][<i>shang shu</i>]] ‘One climbs up the tree.’	[[N Q][V N]]	[[N F][V N]]

Stress is assigned to each line of finger rhymes in terms of the non-head stress model

(Duanmu 2004). Duanmu (Ibid) posits that stress is universal, and Mandarin stress assignment is relative to the structural descriptions. In (10) the number “1” represents a stressed syllable, and the number “0” indicates an unstressed one. This idea about accent prominence arises from the notion of digital signals, as widely applied in the information technology. We then paraphrase “1” as “X,” which means “stressed,” and “0” as “x,” which means “unstressed.”

(9) Non-head Stress

Serial #	Words	Syntactic Trees	Non-head Stress
FR-100-1	[<i>zuo</i> [<i>huo-che</i>]] [take [train]] 'take a train'	[V NN]	[0 10] [x Xx]

The present corpus, with a total of 4172 lines, consists of 1447 types of syntax trees and 224 types of simplified trees. The implication is that the lines are rather different in the structural description but similar in the branching domains. To make condense this article, I will give in the appendixes the specific information of the corpus, including the syntactic structures, simplified trees, and the F-category trees. The other relevant frequencies will be given in the following chapters. Chapter 3 focuses on the syllable-to-demibeat alignment and the finger-rhyme metricality, in which the count of syllables and demibeats are needed as well as the distribution of stress, whereas Chapter 4 looks into the prosodic nature of finger

movements, whose size is measured in the present corpus.