The Interface Between Language and Music in Huju: Tone-Tune relationship

By

Lu Lu

A dissertation submitted in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

(Chinese)

at the

UNIVERSITY OF WISCONSIN-MADISON

2017

Date of final oral examination: 08/22/2017

The dissertation is approved by the following members of the Final Oral Committee:

Hongming Zhang, Professor, Asian Languages and Cultures

Yafei Li, Professor, Linguistics

Rania Huntington, Professor, Asian Language and Cultures

Weihua Zhu, Assistant Professor, Asian Language and Cultures

Hui Yu, Associate Professor, Nankai University

© Copyright by Lu Lu 2017

All Rights Reserved

This dissertation is dedicated to

my parents and grandma

ACKNOWLEDGEMENTS

This dissertation would not have been possible without all the guidance, support, and encouragement from people who I love and who love me.

First, I would like to express my sincere gratitude to my advisor, Professor Hongming Zhang, who has given me constant guidance and inspiration throughout my graduate studies at the University of Wisconsin-Madison. Professor Zhang is the first person to lead me into the world of the Chinese linguistic. Not only is he my academic advisor, but he also helped me through the difficult times I endured during my graduate studies. His guidance helped me in all the time of research and writing of this thesis. I would never complete my Ph.D studies without his advising and encouragement.

Besides my advisor, I would like to thank the rest of my committee, Professor Weihua Zhu, Yafei Li, Rania Huntington and Yu Hui -- for their instructions, suggestions and encouragement. Their generosity with their time and expertise has been crucial to the completion of this dissertation. I would also like to thank Professor William Nienhauser, Marlys Macken and Jacee Cho who have provided much support to me during these years. Special thanks to

Professor Zuyan Chen and Hong Zhang who have always supported and guided me to be a better person since college.

With a special mention to my fellow graduate friends: Pan San Chan, Yang Gu, Hai Liu, Yangtian Luo, Xiang Lü, Qinghui Nie, Youyong Qian, Henghua Su, Rui Wang, Tianlin Wang, Yanwen Wu, Jun Xu, Fang Yan, Han Yan, Hong Yan, and Shuxiang You. Thanks for their continuous support and encouragement. My appreciation also goes to Reuben Mork, my writing tutor, for spending time polishing the language in my dissertation. Many thanks are also owed to my sweet colleagues at the College of William and Mary and Luther College, who have supported and encouraged me along the way. I am also grateful to Professor Hongming Zhang's wife, Mrs. Minhua Li. Thanks to her consistent help and encouragement, especially for taking care of me when I had difficulty during the graduate school.

Last but not least, I would like to thank my parents for supporting me spiritually throughout writing this dissertation and my life in general. Without their invaluable moral and emotional support and encouragement, this dissertation would certainly not have been completed.

Particularly, I would like to dedicate this dissertation to my grandma, Danyi Chen. I know you are looking out for me from heaven. I will always miss you!

Table of Contents

DEDICATION ..... **I**

ACKNOWLEDGEMENTS ..... **II**

TABLE OF CONTENTS ..... **V**

LISTS OF FIGURES AND TABLES ..... **VIII**

ABSTRACT ..... **X**

CHAPTER I INTRODUCTION **1**

1.1 General Background 1

1.2 Organization of this dissertation 7

CHAPTER II STUDIES ON TONE-TUNE RELATIONSHIP AND HUJU BACKGROUND **9**

2.1 Studies on Tone-Tune relationship 9

2.1.1 Definition of melody 9

2.1.2 Studies on Cantonese and Mandarin 11

2.1.2.1 Chao (1956) 11

2.1.2.2 Yung (1983) 12

2.1.2.3 Chan (1987) 12

2.1.2.4 Wong and Dieh (2002) 13

2.1.2.5 Ho (2006) 13

2.1.2.6 Chow (2012) 15

2.1.2.7 Schellenberg (2009) and Lau (2010) 15

2.1.2.8 Wee (2007) 16

2.1.2.9 Other researches: F_0 comparison 19

2.1.3 Important Concepts in Chinese operas 19

2.1.4 Studies on other tonal languages 22

2.1.5 Summary of cross-cultural language comparison 25

2.2 Background of Huju 30

2.2.1 Development of Huju 30
2.2.2 Creative process of Huju 34
2.2.3 Aria Types in Huju 35
2.2.3.1 Changqiang chang ban 长腔长板 36
2.2.3.2 Tanqiang 滩腔 37
2.2.3.3 Xiaodiao 小调 38
2.2.4 Phonology system of Shanghai dialect and Huju 39
2.3 BASICS OF TONE-SANDHI RULES IN SHANGHAI DIALECT 44
2.4. SUMMARY AND REFLECTION 47
CHAPTER III. PROSODIC STUDIES IN SHANGHAI DIALECT 49
3.1 PROSODIC PHONOLOGY STUDIES 49
3.1.1 Selkirk's studies 49
3.1.2 Nespor and Vogel's Studies 52
3.1.3 Duanmu's theory 53
3.1.4 Strict Layer hypothesis 55
3.2 ZHANG (2017) 58
3.3 SUMMARY AND REFLECTION 62
CHAPTER IV: QUANTITATIVE ANALYSIS OF HUJU 66
4.1 RESEARCH QUESTION 66
4.2 ANALYSIS METHOD 68
4.2.1 Data Collection 68
4.2.2 Analysis method 69
4.2.2.1 Overview 69
4.2.2.2 Sample Analysis 71
4.2.2.3 Evidence from F_0 illustration 78
4.3 RESULTS 80
4.4 DISCUSSION 84
4.4.1 Prosodic Word 84
4.4.2 Clitic Group 87
4.4.3. Phonological phrase and Intonational phrase 94

4.4.4 Foot 96
4.5 SUMMARY AND REFLECTION 105
CHAPTER V: GTTM AND OT ANALYSIS OF HUJU 108
5.1 INTRODUCTION 108
5.1.1 GTTM Theory 108
5.1.2 Five levels in GTTM 115
5.2 GROUPING STRUCTURE 118
5.2.1 Introduction 118
5.2.2 Examples in Huju 120
5.3 METRICAL STRUCTURE 125
5.3.1 Introduction 125
5.3.2 Examples in Huju 128
5.4 OT ANALYSIS OF HUJU 132
5.4.1 Grouping Structure 133
5.4.2 Metrical Structure 137
5.5 SUMMARY AND REFLECTION 142
CHAPTER VI. CONCLUSION AND DISCUSSION 145
REFERENCES 150
APPENDIX: FULL ANALYSIS 164

Lists of Figures and Tables

Figures

Figure 1. Wee's theoretical model
Figure 2. Historical development of Huju
Figure 3. F_0 Comparison between speech and singing line in Huju
Figure 4. Prosodic hierarchy (Selkirk)
Figure 5. Prosodic hierarchy (Nespor & Vogel)
Figure 6. Strict layer hypothesis hierarchy
Figure 7. Prosodic hierarchy (Zhang)
Figure 8. Prosodic hierarchy in Mandarin Chinese
Figure 9. Three tiers
Figure 10. Music Score of the Huju piece, 为你打开一扇窗
Figure 11: Pitch illustration of singing sentence 为你打开一扇窗
Figure 12. Pitch illustration of speech sentence 为你打开一扇窗
Figure 13. F_0 Comparison between tone-tune of the sentence 为你打开一扇窗
Figure 14. Percentage of three types matches within different prosodic domains
Figure 15. Music Score of the song, Happy birthday to you
Figure 16. Pitch contour of the singing line, 祝你生日快乐
Figure 17. Comprehensive theory of music (Lerdahl and Jackendoff)

Tables

Table 1. Optimal melodic intervals for the six non-level tonal target transition in Cantonese

Table 2. The most natural combinations of two neighboring words and melodic intervals

Table 3. Summary of cross-cultural languages comparison based on geographic regions.

Table 4. The percentage of correspondence of tone-tune relationship across languages

Table 5. Summary of tone-tune relationships across language families

Table 6. Five tones in Huju

Table 7. Five tones in Shanghai dialect

Table 8: Summary of Tone-sandhi change in a word

Table 9. Huju Initials

Table 10. Huju Vowels

Table 11. Summary of parallel conditions between different prosodic domains

Tableau 1. Demonstration of MIN-BINARITY in the second measure of 为你打开一扇窗

Tableau 2. Analysis of the second measure of 为你打开一扇窗

Tableau 3. Analysis of the fourth pitch level in the second measure of 为你打开一扇窗

Tableau 4. Analysis of the half-note level in the second measure of 为你打开一扇窗

Abstract

This dissertation examines the interface between music and language in *Huju*, which is a Shanghai dialect based regional opera. Chapter I is a short introduction. Chapter II presents a thorough review of the studies on linguistic tone and music tune, and provides descriptive background information about *Huju* and Shanghai dialect. Chapter III introduces the theory of prosodic phonology and its related studies on Shanghai dialect. Chapter IV presents a quantitative research on the mapping conditions via comparing the music melody and linguistic tone in *Huju* within the prosodic domains. Chapter V presents the linguistic Optimality Theory(OT) analysis to study about the music structure in *Huju* based on the Generative Theory of Tonal Music(GTTM). Chapter VI summarizes the findings and conclusions.

This dissertation tries to solve the following questions: 1) Does music follow melody in tonal language or is there a mismatch between them? 2) If there is a mismatch between music and language, what causes such mismatch and how are music still be understood, and 3) What interface area can be studied between music and language? *Huju*, as a dialectal opera with moderate tonal system of five tones, is the research subject. For the quantitative study, a metric,

including melodic, syllabic and tonal tiers with tone-melody matching rules within prosodic units has been proposed. After analyzing through different prosodic domains, including Prosodic Word(PW), Clitic Group(CG), Phonological Phrase(PPh), Intonational Phrase(IP) and Foot(Ft), the results suggest that there is a high correspondence between music melody and language tone in *Huju*, and the fewer tones a language has, there tends to be fewer possibilities to link tone and music melody. The OT analysis provides the comparison on the innate structure between music and language, and suggests that music resembles language from innate structure in certain ways with constraints. A discussion about the well-formedness and preference rule in music and language is also provided.

This dissertation provides a new model of studying the tone-tune relationship in tonal language, and moreover, it is may fill in the gap in the interface studies between music and language in Chinese languages.

Chapter I Introduction

1.1 General Background

Linguists, ethnomusicologists and psychologists have been discussing the topic of the music-language relation for many years. Language and music are the two qualities of which we human beings are born with, and they are the essential features that distinguish how human beings are different from other animals. Both language and music represent the method of communication, and both qualities involve complicated but meaningful sound sequence patterns. Therefore, it is worthwhile to compare these two domains.

There are at least three research perspectives from which a possible relationship between language and music has been studied. 1) The most general studies have focused on how the language and music are intimated related. The two domains might share a common origin with respect to the development of human brain. Although music and speech have different specialized representations, such as interval in music and speech categories in language, these elements share basic sound processing mechanisms. For example, Tan et.al (2010) claims that although the content and character of the meanings in language and music differ widely, two

areas are both expressed and perceived through the auditory or sonic domains. 2) Another group of scientists is committed to studying the differences between music and language. They argue that music lacks the semantic accuracy and systematic grammar of the language, or assume that music can be usefully analyzed using linguistic models. Neuropsychologists have found that when the language portion of the brain is impaired it does not affect a patients' perception of music. For example, an amusia patient may not exhibit aphasia at the same time. Hence, they believe that music and language have limited cognitive overlap (Marin & Perry, 1999; Peretz, 2006; Patel 2008). 3) The third approach examines the overlap, interface or the relations between the two elements, which is also the research interest of this paper. It should be noted that the analyses of such studies are based on the concept of the shared origin of music and language.

Ethnomusicologists have considered using generative linguistics as a reference model for music theory. Generative linguistic theory is an attempt to characterize what a human being knows when he knows how to speak a language, enabling him to understand and create many sentences that he may have never heard. This knowledge is not, overall, available for conscious introspection and hence cannot have been acquired by direct instruction. Chomsky (1968) was

quite optimistic about the possibility of analogies between concepts of linguistic structure and other systems of thought or action. He states, "begin with the attempt to characterize the implicit theory that underlies actual performance and would then turn to the question of how this theory develops under the given conditions of time and access to data—that is, in what way the resulting system of beliefs is determined by the interplay of available data, and the innate schematism that restricts and conditions the form of the acquired system". It is true that it seems to be meaningless to literally translate some aspects of linguistic theory into music terms, such as parts of speech, deep structures, transformations or semantics. However, studies focusing on the comparison of elements like pitch, rhythmic organization and motivic-thematic processes are still feasible. Researchers should not regard music with any preconceptions that the substance in music theory are completely paralleled to the concept in linguistic theory, and vice versa.

One of the significant comparison studies between music and language is conducted by Jackendoff and Lerdahl (1983) that they develop generative theories for musical grammars. Their works are primarily inspired by Chomsky's generative theory of language. They make a parallel between the language and music and proposed the Generative Theory of Tonal

Music(GTTM). The general goal of their works is to make use of finite sets of rules to generate infinite sets of musical structures (Yan, 1993). Linguistic and musical capacities, as the two human cognitive abilities, the overlap of them should not be a coincidence. For example, Butenschon and Borchgrevink (1982) make a claim that prosodic and musical rhythm are processed by the speech hemisphere and concluded that "There is a close, but complex, connection between speech function and musical function. Both apparently consist of a multitude of sub-functions, many of which rely upon the same psychological mechanisms."

It is a worthy research study on the interface between music and language, then how might this relationship work in Chinese language and music? In Chinese studies, the earliest description of the relationship between music and language can be traced back to *Shangshu* 尚书 [Book of Documentary], "Poetry expresses the mind, the song is a chanting of its words, the notes depend upon the mode of chanting, the pitch-pipes harmonize the notes. When the eight kinds of sounds can be harmonized and not encroach upon each other, Spirits and men will be brought into harmony(诗言志，歌永言，声依永，律和声, 八音克谐，无相夺伦，神以人和)". Ancient Chinese people discovers the beauty of music with language. Chinese is a melodic

and tonal language, and because of this peculiarity, Chinese is considered a language with high musicity. *Shijing* 诗经[Book of Songs] is first sung instead of recited by ancient people. A person's voice is the first and most important instrument. When it comes to Zhou Dynasty, instruments such as *qing* 磬(chime stone) and *zhong* 钟(bell) are created to accompany impirical music. Until the Warring States Period, there are only five scales, the *gong* 宫, *shang* 商, jue 角, *zhi* 徵 and *yu* 羽, so there are no half-tones in traditional Chinese music. After contacts with the West Region, during the Han Dynasty, Zhang Qian 张骞(B.C164-114) introduces new western instruments to the Central Plains, and the scales starts to change. The relationship between music and language was described as, "literature created by music, and music developed by literature. They have mutual influence." Unfortunately, because of the loss of historical documents, even though modern scholars have an idea of the relationship between music and language, it is impossible to test or track it. The only musical form inherited from the past time is opera (Zhu,1989).

For tonal languages, to investigate the relationships between language tones and music melodies is always the focus. As the first linguist who proposed five-scale tonal representation

system, Chao (1956) compares the pitch level in tone, intonation, singsong, chanting, recitative, tonal composition and atonal composition. He claims that different styles of singing or chanting forms in Chinese matched with language tones. Tone should be considered as one essential part of singing, and it is better for composers to involve language tones into their consideration when composing songs. Therefore, to analyze the music-language relationships in tonal languages, the following questions need to be answered: 1) Does music completely follow speech-melody in tonal languages? 2) Is there a clash between melodic patterns based on speech and purely musical melodic patterns? 3) If there is a clash, what are the reasons behind it? In other words, what causes such clash, but more importantly, under what circumstances will that clash happen? 4) How are the music/songs understood by listeners if there is a clash between music and language?

This dissertation aims to explore the tone-tune relationships between music and language in Shanghai Opera, also known as *Huju* 沪剧, from different perspectives. Under the concept of "universal grammar", previous studies in Chinese language mainly focus on Cantonese songs/operas and Mandarin pop songs. The findings indicate that the fewer tones a

language has, there tends to be fewer possibilities to link tone and music melody. Chinese scholars have only studied the Mandarin (4 tones) and Cantonese (7 tones) music, while no researchers have ever done studies exploring the tone-melody relationship with the Shanghai dialect (5 tones), which has a moderate tonal system somewhere between Mandarin and Cantonese. Other studies of language and music tend to understand lyrics through investigating tone-melody relationships between adjacent words. However, many studies ignore factors, such as prosodic constituents and rhythm unit in language, which may also provide relevant information when processing a given speech. In addition, their research methods of studying the tone-melody match between adjacent words, not the meaningful linguistic units, needs to be examined further.

1.2 Organization of this dissertation

This dissertation is developed over six chapters: Chapter I is an introduction of the interface studies on music and language; Chapter II presents detailed literature reviews on the studies of tone-tune relationships and rhythmic studies across different languages, the

background of *Huju* and the linguistic systems of Shanghai dialect ; Chapter III introduces the theory of prosodic studies and its related studies on Shanghai dialect; Chapter IV presents a quantitative research method of analyzing tone-tune relationships based on prosodic elements; Chapter V introduces the GTTM and presents an Optimality Theory(OT) analysis on *Huju*; and Chapter VI is a conclusive discussion of the innate essence of the tone-tune relationships between music and language. There are also comments on possible future studies in this area.

Chapter II Studies on tone-tune relationship and Huju Background

2.1 Studies on Tone-Tune relationship

2.1.1 Definition of melody

To compare the interface between music and language in language, melody is the most commonly compared element. However, the usage of the word, melody, is not clear in previous studies. Most scholars prefer to use the word melody when comparing sentence intonation vs. music pitch and melody, and language tone vs. music melody and pitch. All such studies use the word melody in certain ways. What is the exact meaning of melody? The answer is hard to precisely define in both music and linguistics. In *A glossary of phonology* (Carr, 2008), the definition of melody is "a term used to identify properties of segments, as opposed to properties of suprasegmental phenomena. Features, or elements, such as [labial], found in labial sounds such as [b], [m], and [u], are said to be melodic features," and for musicians, melody is "a rhythmic succession of single tones organized as an aesthetic whole in musical composition, producing a distinct musical phrase or idea, as distinguished from harmony and rhythm;" Both dictionary

definitions are vague, especially for melody in a linguistics concept. Steele (1779) generally summarizes it as organized pitch patterns in speech, but it is too broad for a linguistics concept. For example, an ambulance two-tone pattern siren can also be considered as melody if adopting their definition. Patel (2008) tries to explain melody in music and speech with the same definition. He defines melody as "an organized sequence of pitches that conveys a rich variety of information to a listener" and it is "a constructive process by which the mind conveys a sequence of tones into a network of meaningful relationship." To make it simple, melody in speech and music are an organized sequence of pitches with cognitive processing in mind. In current studies, the use of the word, melody, is very confused, especially in linguistic studies. Generally, researchers prefer to use it in reference to three concepts: lexical tone, pitch contour and speech intonation.

Based on my understanding, melody in speech appears to be a narrowed concept compared with the melody in music. If dismissing the lexical tone, speech melody does not influence the semantic meaning of individual words no matter if it talks about intonation or pitch contour. However, music melodies are built around a stable set of pitch intervals. Melodies are aesthetically potent to music. Therefore, music melodies are the object of music, while speech melodies are a

function of speech. As Patel said, “if a music melody is a group of tones in love with each other, then a linguistic melody is a group of tones that work together to get a job done.” The ranges of melody in music are relatively broader than those in speech. To avoid confusion and to make the concept clearer, I prefer to use the term *tune* to represent music melody and the term *tone* to represent speech melody, especially referring to lexical tone throughout the rest of the paper.

2.1.2 Studies on Cantonese and Mandarin

Among all the existing tone-tune relationship studies of Chinese language and music, studies on Cantonese Opera and pop songs are relatively thorough. Those studies suggest that the degree of conformity between language tone and music tune varies with languages and genres.

2.1.2.1 Chao (1956)

Chao is the first to point out the relationship between the tones of the text syllables and the tones of melody. He posits a hierarchy of song types in Mandarin: singsong, chanting, recitative, tonal composition, and atonal composition. Singsong, such as children’s rhymes and vendor’s cries

have the most correspondence with tone while the atonal compositions, such as contemporary songs, have the least correspondence between tone and tune.

2.1.2.2 Yung (1983)

There is a correspondence between music and language in Cantonese Opera where speech tone has a strong influence on the melody when singers give a special semi-improvisational performance. The singers use the linguistic tones as a guide in music creativity. The linguistic tones in vocal music play an important role in Cantonese opera, which is unlike other dialectal regions of China. Similar findings have been found by most scholars who study Cantonese music and language.

2.1.2.3 Chan (1987)

Chan compares the speech contour and the music melodic contour with the aid of qualitative transcriptions. She observes that Modern Cantonese songs preserves lexical tones in relative pitch contours. Tempo is the only reason to affect the tone-melody interface. The non-

matching occurs on rising tones in faster-paced songs. However, she does not find this true of Mandarin pop songs.

2.1.2.4 Wong and Dieh (2002)

An experiment on the perception of four Cantonese songs found that the songwriters abandon the ratio scale of F_0 (fundamental frequency) difference while native Cantonese–speaking listeners still apply an ordinal F_0 scale to understand the lyrics when listening to the music. The correspondence between music and lexical melodies is near 91.81%.

2.1.2.5 Ho (2006)

Ho conducts a tone-tune mapping test of Cantonese songs and compared it to Mandarin and Thai pop songs. The results indicate that there exists a close tone-tune correspondence in Cantonese and Thailand songs, but no consistent patterns are found in Mandarin songs. Huang and Ho (2006) also found that there is a certain correspondence between music and speech tone intervals. Each type of tonal target transition (e.g. 1-2, 1-3, 1-5, 2-3,2-5, 3-5, and the vice versa)

has its corresponding optimal melodic intervals when set to music, however, the correspondence is not definite and can be violated under special context. (See Table 1 and 2)

Table 1. Table of the optimal melodic intervals for the six non-level tonal target transition in Cantonese (T-T-T)

T-T-T	Example	Optimal melodic intervals	
1-2	逃避	Major 2nd or Major 3rd	2 or 4 semitones
1-3	无意	Minor 3rd or Perfect 4th	3 or 5 semitones
1-5	如果	Perfect 5th or Major 6th	7 or 9 semitones
2-3	队友	Minor 2nd or Minor 3rd	1 or 3 semitones
2-5	受伤	Minor 3rd or Perfect 4th	3 or 5 semitones
3-5	雪花	Major 2nd or Major 3rd	2 or 4 semitones

Table 2. Table of the most natural combinations of two neighboring words and melodic intervals

	1	2	3	5
1	Unison	Ascending Major 2nd Major 3nd	Ascending Perfect 4th or above	Ascending Perfect 5th or above
2	Descending Major 2nd Major 3nd	Unison	Ascending Minor 2nd Minor 3rd	Ascending Perfect 4th or above
3	Descending Perfect 4th or above	Descending Minor 2nd Minor 3rd	Unison	Ascending Major 2nd Major 3rd
5	Descending Perfect 5th or above	Descending Perfect 4th or above	Descending Major 2nd Major 3rd	Unison

Based on Ho's optimal mapping between language and musical intervals, Huang proposes the non-optimal mapping and suggests that it is the rapid tempo that allows the non-optimal melodic intervals to be mapped to tonal transition.

2.1.2.6 Chow (2012)

This study compares the sung melody with the speech melody in terms of the direction and magnitude of tonal transition. Although the correspondence between music interval and tonal transition are crucial to tone perception in sung melody, speech tones can still be perceived correctly. She hypothesizes that an optimal mapping in the succeeding context can aid non-optimal mapping in the preceding context, and that such optimal mapping may help the listeners to understand the lyrics.

2.1.2.7 Schellenberg (2009) and Lau (2010)

Schellenberg finds that Cantonese and Mandarin singers employ different strategies in the manifestation of tone in singing but these strategies match those used by composers in the two

languages. For example, Mandarin listener cannot identify individual sung words out of context but the listeners in Cantonese can use pitch and contour to identify it. A comparison of the transitions between successive syllables and notes is made. This research method is based on the idea that word tones are relative, and that the expression of tone in speech is always related with what came before it and what follows it. This method usually compares an actual spoken phrase with its sung correspondent. Each transition is categorized as rising, falling or remaining level. A match happens when the transition from one syllable to the next moved in the same direction as the transition from the note on which the first syllable is set to the note on which the second syllable was set. A mismatch is when the transitions go in the opposite direction.

2.1.2.8 Wee (2007)

Wee proposes a head theory and a model of corresponding music melody and linguistic tones. He believes a syllable was the head of the measure if it is associated with the note that had the primary accent in the music melody. Based on the definition of headedness, he claims a tone-

tune correspondence: The tonal integrity of the head syllable must be preserved. Tonal integrity of a syllable is preserved under the following conditions:

1. If the notes in the melodic tier associated with that syllable reflects its phonological tone contour,

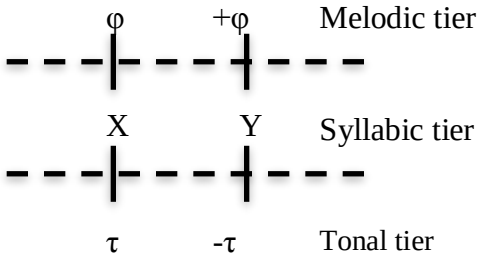
   Or

2. If tonal contrasts are preserved at the edges in the melody, Or

3. Under reduplication

The theoretical model is summarized in Figure 1,

Figure 1. Wee's theoretical model



τ represents the tone feature associated with syllables X and Y such that one of them is the head syllable, and –τ represents the opposite tone feature of τ. The tonal and syllabic tiers together make the lyric structure. φ represents the note in the melodic tier, which is associated with the

syllables, and +φ represents aggravated φ. If X is the head of a syllable and τ was +H, then the φ associated with X cannot be lower than the φ associated with Y. In Figure 1, the +φ means that the note associated with Y is higher than the one associated with X, and the plus sign means aggravation. Therefore, Figure 1 is an infeasible representation. The same would be true if Y is the head syllable. Wee also proposes that headship in music and linguistic is the prominent features when preserving tonal integrity in music.

There are two major problems with Wee's studies. First, he analyzes the lyrics word by word, but ignores the fact that tones may change through different language domains. For example, in Shanghai dialect, tones change under different language units, such as Prosodic Word (PW)and Phonological Phrase (PPh), and the prosodic constituent may also lead to listeners' understanding of the sentences. Therefore, merely studying the adjacent language tones with its corresponding music notes is not enough. Second, his theory connects individual word with single musical notes without notifying how to define the music note if one individual is assigned more than one musical note. Both situations in the theory will lead to a mismatch in the studies of word and music.

2.1.2.9 Other researches: F_0 comparison

In addition to all the previous research, another group of studies focus on the F_0 comparison. This method looks for absolute representations of tones within the music melody. The researchers usually divide the range of notes in the song melody into levels as their metric to reflect the tone system of the language. The tone of each syllable is compared to the F_0 of the notes on which it is set to test if there is a resemblance between the register of the tone and the relative placement of the musical note in the overall range of the musical melody. For instance, a match happens when a low tone is set to a note in the lowest portion of the melodic range, whereas a mismatch occurs when it falls outside the predetermined range. Yung (1983) and Lau (2010) have used this metric and found that a limited range of notes usually prefer to correlate to a particular tone instead of a single note, and some overlap may occur.

2.1.3 Important concepts in Chinese operas

Different from the findings of consistent match between tone and tune in Cantonese music and language, related studies of Mandarin usually have opposite findings.

Yu (2008) claims that vowels and consonants have small restriction on aria, but the lexical tone plays a significant role in Chinese operas. The relationship between music aria and lexical tone focus on the restriction of lexical pitch and melodic contour. In Chinese opera, there are two common saying about lyrics and melody relations, which are *xiangshun* 相顺(obeying) or *xiangbei* 相背(disobeying). *Xiangshun* means that aria and lyrics keep the perfectness of their own rules and, meanwhile obey each other's rules. *Xiangshun* is considered as a beneficial relation to both sides. When aria and lyrics obey each other, an audience may understand the lyrics better and make the aria more pleasing to hear. *Xiangbei* means aria and lyrics are "harmful" to each other. The rules from one side must be affected by the rules of the other side. Aria can disobey with lyrics and lyrics can be hurt by the aria. There are three situations under the *xiangbei* conditions: 1) the rules of lyrics are damaged by the aria; 2) lyrics sacrifice their own rules to follow the aria; 3) the aria sacrifices its own rules to follow the lyrics. These three situations share the same features, and all of them cause the imperfectness of the aesthetic appreciation of the hearing, so an audience may not appreciate the lyrics or the melody of the opera. There is a term in singing-song field that is used to describe this *xiangbei* condition, which

is called *daozi* 倒字. A famous Hong Kong lyricist called James Wong 黃霑(1941-2004) once explained , "if the speech tones of the words cannot be perceived properly and are misheard as other tones when the text is sung, this is called daozi. For example, if a tone /25/ syllable /gam25/ 錦 (brocade) is heard as /gam33/ 禁(forbidden) when sung, it is called *daozi*."

To avoid the *xiangbei* condition, artist prefer to adopt a method called *qiangcongyuci* 腔从于词 (aria follows the lyrics). It means that an aria should be followed with lyrics. It does not mean that an aria needed to sacrifice all the rules to perfectly match with lyrics. It should first keep the regulations of its own rules. It is very flexible and conditional. There are other pitchy formulas in Chinese opera field, which are *huanqiangjiuci* 换腔就词(adjust aria to fit lyrics) and *huancijiuqiang* 换词就腔(change lyrics to fit aria). These are common solutions to solve the *xiangbei* problem, but they can only be used under the necessary conditions.

According to historical Chinese phonology system, Chinese tones are divided into four groups, which are level 平, rising 上, falling 去, and entering 入. Among them, entering tone is considered to have the strongest restriction on the aria. When an aria is restricted by lexical tone and will become a fixed sound shape, it is then called *qiangge* 腔格.There are three kinds

of *qiangge*: 1) ascending 2) descending and 3) level. Ascending *qiangge* is a down to up shape of melody contour. It is divided into rising *qiangge*[1] and falling-rising *qiangge*[2]. Descending *qiangge* is the up to down shape of melody contour. It has falling *qiangge*[3] and rising-falling *qiangge*[4]. The level *qiangge*[5] is the level movement of the melody contour.

2.1.4 Studies on other tonal languages

Chapman (2001, 2003) find that tune is created out of tone melody in a special music genre, Khap-Lam of Laos. Language tones in Atlantic-Congo language families are mostly found unrelated to tune. Agawu (1988) argues that the melody of Ewe songs is not necessary to conform to the phonological characteristics of the lyrics to preserve the lexical meaning, which challenges the previous hypothesis raised by other scholars studying Northern Ewe music. Dagaare is another African language with a two-tone system. Bodomo and Mora (2000) find

1 The shape of rising qiangge is
2 The shape of falling-rising qiangge is
3 The shape of falling qiangge is
4 The shape of rising-falling qiangge is
5 The shape of level qiangge is

conflicts between tones and melody in traditional Dagaare folktales since Dagaare is a rather simple tonal system compared with other five-tone languages. Ward (1932) find that there is little correspondence between tune and tone in two well-known Fanti songs since tune goes against the melody of the words. Similar results have been found in studies of various languages families. Bright (1957) find no relationship between tone and tune through his works on Lushai, a Tibeto-Burman language. However, Sollic (2010) argues that Bright's hypothesis is not convincing because Bright misread Herzog's (1934) demonstration on Navaho songs that, although word pitch subordinates the melody, it does not mean they are not related. The tone-melody is still the fundamental organizing element. Pugh-Kitingan (1981) explores the tone-tune relationship in the be-te sung genre of Huli, an Afro-Asiatic language. He fines that tune is largely affected by three tones in Huli, which are a high falling tone, a low rising tone, and a mid-level tone. Baart (2004) does an analysis on rō, a popular style of song and poetry in KalamKohistani, an Indo-European language, and finds that there is not a straightforward relationship between phonological tones and sung pitches. List (1961) lists a similar Thai song hierarchy. He finds that children's recitation and traditional songs are on the top of the list

(around 80% correspondence in his examples), and pop songs are on the bottom (about 60%). Rycroft (1980) establishes a hierarchy for Southern African music. The praise poetry and war chants are at the beginning of the "close correspondence" scale, and the popular songs are at the end.

Schellenberg (2009) mentions that there is no such song hierarchy in Shona, an Atlantic-Congo language. The sung melodies are influenced by the spoken melodies to which they correspond, but there is not a transition-by-transition correspondence. Therefore, Shona does not treat melodic parallelism the same way that other Atlantic-Congo languages do, such as Hausa, which was mentioned above. Sollis (2010) studs a music genre called Pikono from Duna language in the Papuan language family. He finds that a word with a rising tone is often placed on a descending part of the music melody, which has the effect of preventing the melody from descending below the tonic.

2.1.5 Summary of cross-cultural language comparison

Schellenberg (2013) summarizes a cross-cultural languages comparison based on geographic regions, see Table 3 below.

Table 3. Summary of cross-cultural languages comparison based on geographic regions[6]

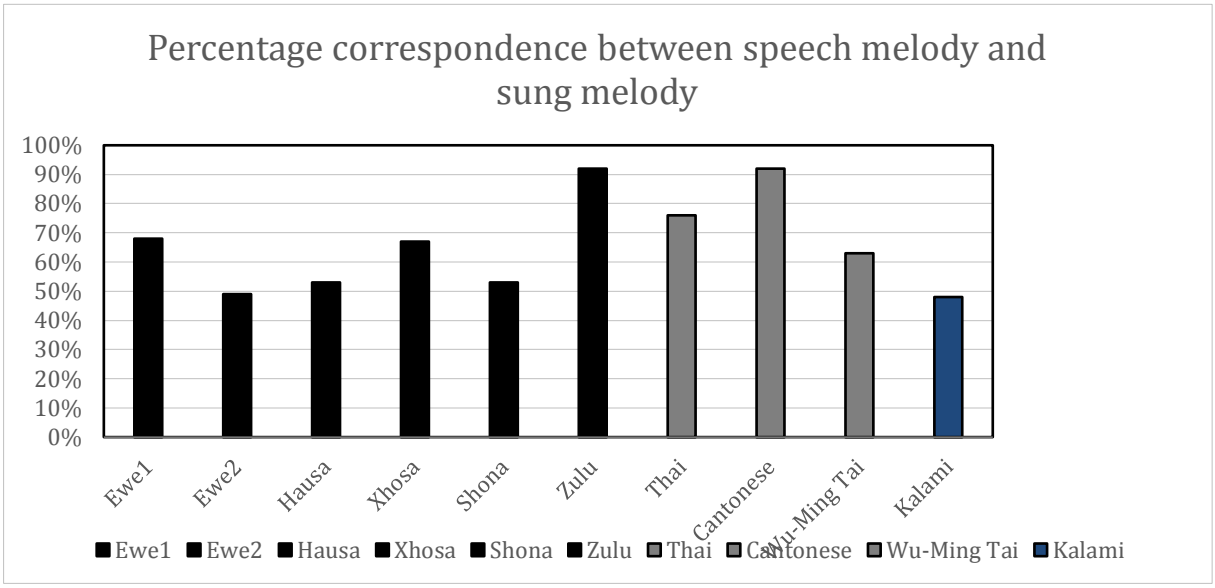
Asia		
Language	Region	Sources
Burmese	Burma	Williamson (1981)
Cantonese	Hong Kong, China	Yung (1983,1989), Chan((1987a, 1987b), Wong and Diehl (2002), Ho(2006), Cheung(2007), Lau(2010), Zhang (2011, to appear)
Kalam Kohistani	Pakistan	Baart (2004)
Lushai(Mizo)	India	Bright (1957)
Mandarin	China	Chao (1924,1956), Schneider (1950), Chan(1987a), Stock (1999), Wee (2007)
Tai Phake	India	Morey (2010)
Thai	Thailand	List (1961), Mendenhall (1975), Saurman (2006)
Wu-Ming Tai	China	Mark and Li (1966)
North and South America		
Mixtec	Mexico	Pike (1946)

6 Table 3 shows where the interaction between speaking and singing have been discussed/studied. The second column indicates the general geographic region where the language is spoken and the third column indicates the sources.

Navaho	USA	Herzog (1934)
Africa		
Anyi	C.te d'Ivoire	Gibbon et al. (2011)
Dinka	South Sudan	Ladd and Remijsen (in progress)
Ewe	Ghana	Schneider(1942),Jones(1959), Schneider (1961), Agawu (1988, 1995)
Fanti	Ghana	Ward (1932)
Hausa	Nigeria	Richards (1972), Leben (1983)
Igbo	Nigeria	Ekueme (1974)
Shona	Zimbabwe	Schellenberg (2009)
Venda	South Africa	Blacking (1967)
Xhosa	South Africa	Starke (1930)
Zulu	South Africa	Rycroft (1959, 1979)
Austronesia		
Duna Pikono	Papua New, Guinea	Solis (2010)

Several limitations of previous studies are found in Table 3. For example, most of the studies examined only one language, except Chan (1987), which examined both Mandarin and Cantonese. Categorizing languages, based on geographic areas, does not reflect the language features. Therefore, a cross-languages summary, based on the language features, is needed.

Table 4. The percentage of correspondence of tone-tune relationship across languages (Schellenberg 2013)



Schellenberg (2003) provides a table of the percentage of correspondence for nine different languages from eleven studies for which statistical results were either given or calculable. The different colors in Table 4 represent general geographical regions: Black is used for languages from Africa; Grey for languages from eastern Asia and blue for India. The range of correspondence was extremely wide: from 48% for Kalami to 92% for both Cantonese and Zulu. In all cases, this is well above the 33.3% chance but the range suggests that language is not driving the composition of songs in all tonal languages.

To further analyze for a better understanding of cross-cultural studies, Table 5 presents a summary of the studies above, from another perspective.

Table 5. Summary of tone-tune relationships across language families

Language Family	Afro-Asiantic		Atlantic-Congo				Sino-Tibeto			Thai-Kadi		Indo-European
Language	Hausa	Huli	Fanti	Ewe	KalamKohistani	Shona	Mandarin	Cantonese	Lushai	Thai	Lao	KalamKohistani
# of tones	5	?	?	3	5	2	4	7	8	5	6	5
Tone>Tune	X							X		X	X	
Tone ≠Tune		X	X	X	X		X		X	X	X	X
Tone~Tune	X					X	X	X		X		

Table 5 summarizes the languages and their tone-tune relationships based on the above literature reviews. As seen from the table, most Indo-European and Atlantic-Congo languages do not show any relationship between tone and tune, except Shona. There are differences among Sino-Tibeto, Afro-Asiatic and Thai-Kadi languages. Most of the differences seem to show that tones in the languages are affected by the melodic tunes. Although there is not a one-to-one

7 Tone>Tune means tone and tune are matched with each other; Tone ≠Tune means tone and tune are not match with each other; Tune~Tone means tone and tune are partially matched in certain aspects

correspondence between tone and tune, certain patterns within these two important elements are related in speech and melody.

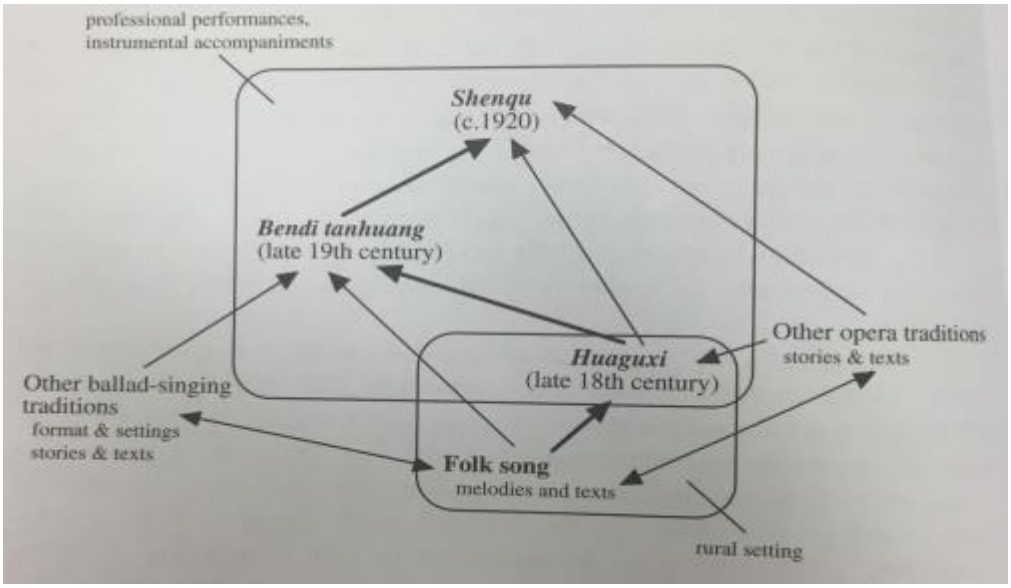
Under the Sino-Tibeto language family, the tone-tune relationships within Mandarin and Cantonese are worth noting. Most of the studies on Mandarin sung text tend to argue for the lack of any correspondence between tone and tune, while studies on Cantonese present an opposite argument that linguistic tone and music tune do have a close relationship. The difference between these two perspectives may be due to the different tonal systems. Mandarin has four tones, while Cantonese has a rich tonal system of seven. There is a tendency that the fewer tones a language has, the smaller the probability of a link between tone and tune. Chinese scholars have only studied the Mandarin and Cantonese music, while no research has ever been done to explore the tone-tune relationships of the Shanghai dialect, which has a moderate tonal system somewhere between Mandarin and Cantonese. In addition, the Shanghai dialect tonal system has been reduced to an accentual system, and tonal characteristics determine the location of the accentual prominence.

2.2 Background of Huju

2.2.1 Development of Huju

Huju, known as Shanghai Opera, has a history of 220 years. It was popular in the Yangtze River delta (Eastern China). The rise of *Huju* starts with a form of folk entertainment, which occurs at ritual or religious occasions in rural areas, during the eighteenth century. In the late nineteenth century, the rural opera troupes migrate to Shanghai, and the folk-song melodies are combined with local ballad and were also influenced by other Chinese opera performance. From the period of 1940s to 1980s, an increasing formalization of the tradition of *Huju* starts. Simply speaking, the development of *Huju* can be seen as changing from local folk-song performance to ballad singing and then opera. Stock (2003) concludes the development of the *Huju* as shown in the Figure 2.

Figure 2. Historical development of Huju (Stock 2003)



According to You (2006), the rise of *Huju* starts with folk songs. During the eighteenth century, folk songs take two forms in eastern China. Manual laborers sing to maintain rhythm and synchronization, and teams of good singers are hired by local landowners to provide music accompaniment during the arduous tasks of rice planting and weeding. Other work songs are performed more casually between different individuals or groups or by traveling boatmen. Peasant singers in this region also form small part-time troupes to supplement their agricultural income, performing on temporary stages at fairs, rites, and festivals, and use popular folk songs as their melodic material. The majority of these musicians leave their homes only when the agricultural calendar permitted or when hardship dictated. In times of famine, they take part in

begging expeditions, adding variety to their acts with such entertainments as lion dances and *Huaguxi* 花鼓戏, or flower drum song-and-dance skits. The singing style of *Huaguxi* is based on *Dongxiang diao* 东乡调[8]or *Dongxiang shange* 东乡山歌.

When the *Huaguxi* performers switches from rural street performance to urban tea-house performance, they adopts the seated performance of *Tanhuan* 滩簧, and later this develops to *huangguxi-bendi tanhuang style*. *Tanhuang* is originally a kind of ballad singing genre in Suzhou, which is also known as *Sutan* 苏滩. The specific origin of this term is unclear, but such ballad singing style is applied to a variety of music genres. Xu Ke defines *Tanghuang* as "a kind of tanchang [ballad-singing]. Five to six, or seven to eight performers gather together and take the role of sheng, dan, jing and chou. They do not wear makeup, and dress plainly, sitting together in a circle to sing seven-character lines with xianzi, pipa, huqin and guban. Speech and song are combined with humorous banters." Like folk-song styles, *Tanghuang* still adopts the basic type that two-line music couplets are repeated in varied forms. The melodic outline and the

8 There are several features of Dongxiang diao 东乡调. For example, a piece of short song usually has two melodic phrases. Generally, there is a decent five pentatonic(落五音) steps from high F(徵调) sharp($F^{\sharp}$) down to the note A or a five-step descent steps from high E(商调) down to F sharp. The melisma occurs at the end of a phrase, and it usually has a falling pattern.

cadence structure are similar to folk songs, with an overall falling contour pattern. The texts changes to seven-syllable units. The difference is that it introduces more heterophonic instrumental lines. Also, there are two forms of the same melody in *Tanhuang* music instead of one form compared with folk song.

In 1920, Shao Wenbin 邵文滨(1883-1933) officially changs the name of Shanghai Opera to *Shenqu* 申曲. During the *Shenqu* period, a more modern style of performance has been introduced. The directors and performers from *Wenmingxi* 文明戏(a western-style drama in Chinese language) and filmdom plays starts to participate in the making of *Shenqu*. They even recompose Shakespeare's theatres, such as Hamlet and Romeo and Juliet. The development of broadcasting during the 1930s also enrich the performance styles of *Shenqu* that more melisma are introduced into the music sentences, and the rhythm of the whole piece have become faster. *Shenqu* gradually changs from a singing performance to a theatre-like art performance. In 1941, with the foundation of Shanghai Huju Institute, *Shenqu* officially changed the name to *Huju*.

Huju is recognized as a young opera compared with other Chinese regional operas. The format of the modern Shanghai opera is very closed to western drama and not fully formatted like Beijing Opera.

2.2.2 Creative process of *Huju*

The creative process of *Huju* is quite different from that of Western operas. Like many other regional operas in China, the music of all operas was drawn from a common pool of pre-existing material, which is different from Western opera in that the opera is written by a composer. As Figure 2 indicated, *Huju* is more or less a descendant of folk song. The past singers knew numerous short tunes and were adept at fitting texts to the songs melodic outlines, and these are recycled in varied forms. Zhao Yunming (1916-96) describes how he was trained: "Performing old dramas was difficult.……since there were no scripts and your teacher did not teach you, you had to rely entirely on yourself.…… Although there were no scripts for old dramas, when all is said and done, there were pre-existing songs and speeches which provided some material to fumble around with while learning."

For Contemporary *Huju* stars, such as Mao Shanyu (b. 1962) and Sun Xuchun (b. 1960), most can read scripts and music notation, but they cannot create melodies from a simple idea. Elderly performers—such as Wang Pansheng and Yang Feifei (both b. 1923)—may be among the last to originate recognized schools of performance, and the last able to create new scenes during their performance in the traditional manner (Stock 2003). Because the recruitment of specialist composers, librettists, and directors who are trained in specialist colleges and conservatories, there has been a decline in the improvisatory skills of the singers themselves.

2.2.3 Aria Types in *Huju*

There are three major aria singing types in *Huju*: 1) *changqiang* 长腔, 2) *huang qiang* 簧腔 and 3) *xiaodiao* 小调. There are different kinds of *ban* 板 with various changes in rhythm, speed, and melody under each aria type.

2.2.3.1 Changqiang chang ban 长腔长板

The principal melodic theme in traditional *Huju* is *changqiangchangban* 长腔长板. It is considered as the fundamental melodic core of the traditional Shanghai opera tradition. It is like *xipi* 西皮 or *erhuang* 二黄, an aria type or tune family of Beijing opera. It is based on the local tune of *dongxiang diao*, and further developed through *huagu xi*. The concept of *changqiang* 长腔 is from the phrase in *Shijing* [Book of Songs], 言之不足故嗟叹之嗟叹之不足故永歌之 (if words are not sufficient, sighing can be better; if sighing is not sufficient, songs can be better). Zhuang (2006) mentions that "*changqiang* is closed enough to reciting, and it is similar to Shanghai dialect speaking". *Changqiang changban* is normally in quadruple meter.

In *Huju*, the opening phrase is referred to as a *qiqiang* 起腔, literally "rising tune". *Qiqiang* phrase usually starts with the high point note of the whole phrase. It normally starts and ends on a strong beat. The next central segment is *pingqiang* 平腔, literally 'level tune'. *Pingqing* is less melodic than *qiqiang* in a single syllable, and the adjacent musical sentences are more compact. The performers need to communicate the song text as clearly as possible for *pingqiang.* The standard expectation of *qiqiang* is that it starts on a weak beat and ends on a strong beat as well.

The *pingqiang* section can be of any length. The final completed section is called *luoqiang* 落腔, ‘falling tune.’ It usually had stronger emotion than *pinqiang*.

The *ban* styles under *changqiangchangban* included *changqiangzhongban* 长腔中板, *manzhongban* 慢中板, *manban* 慢板, *jinzhongban* 紧中板, *jinban* 紧板, *fuziban* 赋子板, *sanban* 散板，*kuaibanmanchang* 快板慢唱, *jindamanchang* 紧打慢唱，*sanjiaoban* 三角板, *lianzhusanjiaoban* 联珠三角板, *kuailiushu*i 快流水, *shiziban* 十字板 and *fanshiziban* 反十字板.

2.2.3.2 Tanqiang 滩腔

Tanqiang is developed during the *Tanhuang* period. *Tanqiang* borrows the *qiang* from other operas, such as Suju(Sutan), Xiju 锡剧 and also Beijing Opera. For example, the most famous *tanqiang* is called *yinyangxue* 阴阳血, a duet sung by male and female, which originally is from *Taipin diao* 太平调 from *Sutan*. It also has *qiqiang*, *pingqiang* and *luoqiang*. Both the male’s and female’s qiqiang fall to the sixth degree on the scale. Male *pingqiang* falls to the first degree, and the female *pinqiang* falls to the fifth degree. There are commonly seven syllables in one text unit with an overall falling contour pattern. Generally speaking, *tanqiang* borrows aria singing styles from other regional operas and merges it with traditional

changqiangchangban. It includs more instrumental accompaniments and more melodic varieties with each syllable.

The famous *qiangtan* includes *yinyanxue* 阴阳血, *yangxue* 阳血, *fanyinyangxue* 反阴阳血, *liushuiban* 流水板, *xiuqiang* 绣腔, *mihundiao* 迷魂调, *wangwangdiao* 汪汪调, and *daluban* 大陆板.

2.2.3.3 Xiaodiao 小调

Xiaodiao is considered more urbanized compared with *changqiang* and *tanqiang*. Zhang's (2006) famous quote is that *changqiang* originated from folk songs in rural places, and *xiaodiao* originated from ballads in urbanized villages. The significant difference between *xiaodiao* and *changqiang* is that the *xiaodiao* melody is more emotional while *changqiang* melody is more narrative. There are more *chenzi* 衬字(lining word) and melisma in the middle of the musical sentences as well as more interludes between sections. Structurally, *xiaodiao* has four parts instead of three, which are *qi* 起, *cheng* 承, *zhuan* 转, and *he* 合.

2.2.4 Phonology system of Shanghai dialect and *Huju*

You (2006) concluded that there are five tones in *Huju*, see Table 6:

Table 6. Five tones in *Huju*

Tone Type	Pitch Level	Examples
Yinpin 阴平	53	高
Yinqu 阴去	34	古
Yangqu 阳去	23	穷
Yingru 阴入	55	急
Yangru 阳入	12	月

Compared it with five tones in Shanghai dialect,

Table 7. Five tones in Shanghai dialect

Tone Types	Pitch Level	Citation Tone	Base Tone
Yinpin 阴平	53	HL	HL
Yinqu 阴去	34	MH	MH
Yangqu 阳去	13	LM	LH
Yinru 阴入	5	Hq	MH
Yangru 阳入	12	LMq	LH

The only differences found between tones in *Huju* and tones in Shanghai dialect are the *yangqu* and *yinru* tones. However, such differences are very minor, so I will disregard it in the following analysis.

According to You (2006), there are 28 initials and 41 vowels in *Huju* based on the pronunciation of Wang Zhiliang, the director of Shanghai Huju Institution (See Table 8 and 9).

Table 8. Huju Initials

[p]布别	[pʰ]怕	[b]布盘	[m]门母	[f]飞费	[v]闻冯	
[t]到	[tʰ]太	[d]到夺	[n]难怒		[l]蓝路	
[ts]精节	[tsʰ]秋仓	[s]散扇		[z]从虫		
[tɕ]经节	[tɕʰ]丘去	[ɕ]休线	[ȵ]女严		[ʑ]齐旋	[dʑ]旗全
[k]贵	[kʰ]开	[g] 跪葵	[ŋ]硬	[h]灰化	[ɦ]红话	
[θ]胡案						

Table 9. Huju Vowels

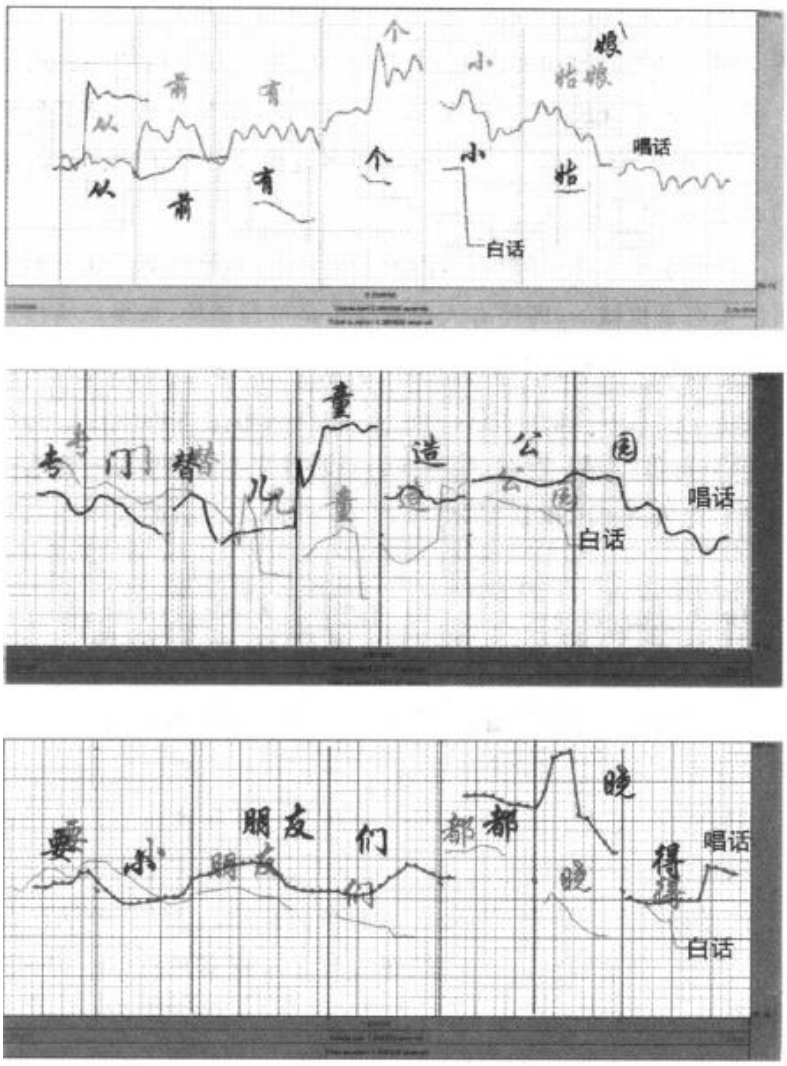
[ɿ]资知	[i]第姐	[u]爬河	[y]雨靴
[A]太鞋	[iA]架野	[uA]怪	
[ɔ]饱保	[iɔ]条		
[o]故花			
[ɣɯ]丑	[iɣɯ]流休		
[E]倍妹		[uE]桂贵	
[ø] 短酸		[uø]碗欢	[yø]软园
[ã] 章昌			
[ã] 党船	[iã]良	[uã]横	
[ən]根	[in]紧林	[uən]魂温	[yn]云群

[oŋ]红翁	[ioŋ]穷胸		
[ʌʔ]色直	[iʌʔ]确药	[uʌʔ]刮活	
[oʔ]北各	[ioʔ]肉玉		
[ɔʔ]落鹿			
[iʔ]接踢			[yiʔ]月欲
[əʔ]出舌			
[iəʔ] 急铁			
[ər] 耳尔	[m̩] 姆	[n̩]口	[ŋ]鱼五

One difference between the *Huju* and Shanghai dialects is that *Huju* still retains the features of dental and palatalized sounds. You (2006) pointed out two trends in *Huju*: 1) the voiced sounds change into voiceless sounds entirely through switching from high tone to low tone. This situation happens on the infrequent literary words. 2) The voiced sounds are not stable, especially for the voiced consonants. The acoustic feeling for the voiced sounds are between voiced and voiceless. Another important point of *Huju* was that there are more literary words than those in Shanghai dialects.

To explore the scientific nature of the sounds in *Huju*, You (2006) compared the F_0 of the narrative line and singing line.

Figure 3. F_0 Comparison between speech and singing line in Huju (You 2006)



As seen from Figure 3, the tone and pitch contours are related to each other in certain areas. They are neither entirely matched with each other nor discrete. This picture vividly demonstrates the relationship between tone and tune with the help of Praat software. Chao (1956) advocates that composers should create songs based on tones. The even tones in past time

are equal to *yinping* tones in Mandarin. *Yangping* tones are mid-high or low, but the phonemes are even, and the lengths of the sounds are middle or long. Even tones are better matched with words of long and low sounds, while oblique tones are better matched with words of short and high tones. Xu (2006) makes an analysis of the tones of old *Huju* and new *Huju*. The piece, Lalitou 痢痢头(Bald head), as an example, keeps the tone-sandhi of old Shanghai dialect. Other examples are,

(1) 坐罢 23+53
一番 44+53
同窗 23+55
嘲嘲说 23+44+55

One may speculate that the *yinshang* tones existed in ancient times, while at the same time, it keeps the *yangping* tones. But a large amount of *yangpin*g tones are now merged into *yangshang* and *yangru* tones. Therefore, the tone-sandhi phenomenon in many disyllabic words, beginning with *yangping* tones, becomes 23+44, and at the same time, the disyllabic words beginning with non-*yangping* tones are merged into the disyllabic words ending with *yangping* tones. For example, chiba 吃罢, the original tone level is 44+44, but in the old Shanghai *Huju*, it becomes 44+53, a falling trend. Therefore, words with low-level tones are not

stable at that time, and they are merged into *yangshang* or *yangru*. Xu finds that the tones in Laolali 老癞痢 are matched with the tone-sandhi phenomenon of old Shanghai dialect, and this indicates that the early *Huju* is very narrative. In reference to *Huju* collections in the 1940s, the tone-sandhi phenomenon begun to change. For example, there are 4.13% old Shanghai dialect tone-sandhi in *ZhichaoDuxin* 志超读信(Zhichao reads letter), where most of the low-level tones were merged into low-falling tones. The collections in 1950s, such as *Jinu Lei* 妓女泪(Lady's tear) and *JimaoFeishangTian* 鸡毛飞上天(Chicken feather fly into sky), share the same tone-sandhi features of New Shanghai dialect. For the new collections, such as *Leiyu* 雷雨 (Thunderstorm), all follow the tone-sandhi rules of Shanghai dialect with slight differences on single word pronunciation. Therefore, this paper will adopt the tone-sandhi rule of New Shanghai dialect for the following analysis.

2.3 Basics of Tone-sandhi rules in Shanghai Dialect

There are two types of tone-sandhi in Shanghai dialect: 1）Guang-yong shi bian-diao 广用式变调(Tone-sandhi in broad used form), and 2) Zhai-yong shi bian-diao 窄用式变调(Tone-

sandhi in narrow used form) (Zhang, 2017). No matter what kinds of tone-sandhi rules are used, all but the leftmost morpheme lose their underlying base tones. These base tones are associated in a one-to-one fashion, from left to right, across the entire tone-sandhi domain (Sherard 1972; Yip 1980; Zee & Maddieson 1980; Wright 1983; T.Shen 1985; Selkirk & Shen 1990; Duanmu 1992). Therefore, I will adopt the idea that Shanghai dialect has only three base tones and their corresponding relationships to citation are listed below.

The process of tone sandhi change in Shanghai dialect can be concluded as follow in (2),

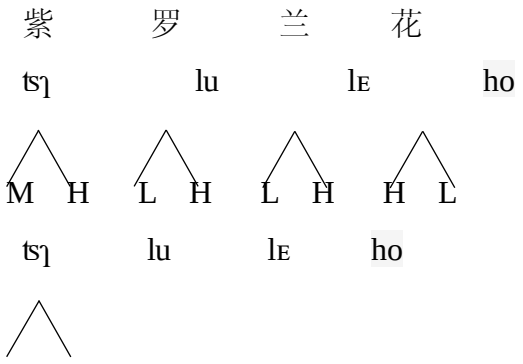
(2) a. Tone deletion: In each TS domain, delete all underlying tones, except an initial syllable

b. Associate convention: associate tones to syllables one to one from left to left

c. Default tone: assign default tone L to the remaining syllables.

An example of TS rule application is provided below in (3),

(3)



b. Tone deleting M H
tsɿ lu lɛ ho

c. Association line deleting M H
tsɿ lu lɛ ho

d. Association convention M H
tsɿ lu lɛ ho

e. Assign default tone M H L L
tsɿ lu lɛ ho

f. Surface form M H L L

As for TS-Z, the last syllable keeps its underlying tone, but the preceding syllables drop the latter half of base tones, and the original contour tones changes into a level tone. Shanghai dialect is known for word-tone sensitive language; therefore, all the lexical items undergo tone-sandhi change. In the rest of analysis in this dissertation, I will adopt the TS rules stated above, and Table 8 is a summary of tone-sandhi change in a word

Table 10: Summary of Tone-sandhi change in a word

Type	Base Tone	Disyllabic	Trisyllabic	Quadrisyllabic
Ying Ping	HL	H+L	H+L+L	H+L+L+L

Ying Qu	MH	M+H	M+H+L	M+H+L+L
Yang Qu	LH	L+H	L+H+L	L+H+L+L
Ying Ru	MH	M+H	M+H+L	M+H+L+L
Yang Ru	LH	L+H	L+H+L	L+H+L+L

2.4. Summary and Reflection

This chapter first summarizes the studies on tone-tune relationship in Cantonese and Mandarin and provides a detailed cross-cultural language comparison based on different language features.

The past research methods can be categorized as one of the following three types: 1) from native speakers' comparison, 2) F_0 (pitch) comparison between sung and speech melody and 3) contour or shape comparison. As for the third group of studies, the researchers compare the contour changes between successive syllables and successive music notes or compare the musical intervals with language pitches. Their theoretical foundation derives from a psycholinguistic perspective that the expression of tone in speech is always in relation to what

came before and what comes after it. (Schellenberg 2009, 2010). However, Nespor and Voger (2007), as linguists, proposes that it is the prosodic rather than syntactic structures that account for the ability of listeners to understand the ambiguous sentences. Therefore, an analysis from a linguistic perspective, in this area, is needed. In Chapter IV, I will analyze the tone-tune relationship in *Huju* based on the concept of prosodic domains. In addition, the reason I choose *Huju* or Shanghai dialect as the research subject is that where there are fewer tones in a language, there are also smaller probabilities of a link between tone and tune.

Chapter II also introduced the background of Huju, including its historical development, creative process and aria types. A summary of the phonology system of *Huju* and Shanghai dialect, and basic tone-sandhi rule change in Shanghai dialect was also provided.

Chapter III. Prosodic Studies in Shanghai Dialect

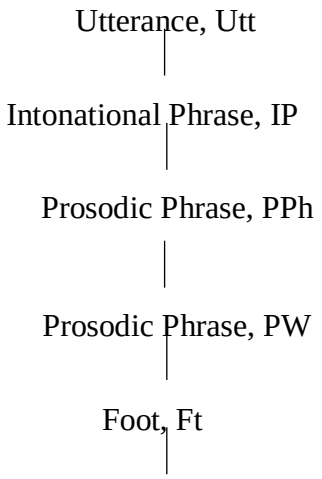
3.1 Prosodic Phonology Studies

As mentioned in the previous chapter that a linguistic analysis on tone-tune relationship based on prosodic domains need to be conducted, this chapter will focus on the introduction of the major tenets in prosodic theory, especially related to Shanghai dialect, and several outstanding issues discussed in this area.

3.1.1 Selkirk's studies

Prosodic phonology is considered as the representative theory of the interface studies between phonology and other linguistic components, such as syntax, semantics etc. Selkirk (1978) developes the first model of prosodic phonology, which is a six-layer prosodic hierarchy (Figure 4)

Figure 4. Prosodic hierarchy (Selkirk)



She later on abandons this hierarchy and proposes a new version under the influence of Prince (1983)'s grid-only approach. The famous Strict Layer Hypothesis (SLH) (to be discussed in more detail in section 3.1.4) is also proposed during this time period.

Two years after Selkirk (1986)'s new proposal on prosodic hierarchy, she claims that prosodic constituency and the metrical grid can exist peacefully; that the metrical grid is defined not by syntactic domains but by the prosodic structures. She also argues for a single-edge-based approach that the relation between syntactic structure and prosodic structure is defined in terms of the edges of syntactic constituents (Selkirk 1986). According to Selkirk and Shen (1990), the prosodic structure assigned to a sentence in Shanghai dialect is the minimal structure consistent

with the well-formedness constraint and the mapping rules. For any level of prosodic structure, only the bracketing of the sentence into constituents of one particular X-bar type is relevant and precisely only at the left or right edge of such a constituent. E.g.

(4) C^n: {Right/Letft; X^m}, X^m is a category type in the X-bar hierarchy

In Shanghai dialect, Selkirk and Shen argues that the left edge of a syntactic word belonged to the categories, noun, verb, or adjective (=a "lexical item") always coincide with the edge of a prosodic word, so the syntax-phonology mapping rule in Shanghai dialect is listed in (5),

(5) Prosodic Word: {Left, Lex^0}, where Lex^0 stands for word belonging to the lexical categories N, V, A

A Prosodic Word will extend from the left edge of one lexical item to the left edge of the next, incorporating the function word that lie between. The example is adopted from Zhang (2017)

(6)

狗	咬	伊	手
kɤ	ŋɔ	ɦI	sɤ
dog	bite	he	hand

"The dog bit his hand"

BT	MH LH LH MH
TS	MH# L=H# MH

In example 6, kɤ 'dog' ŋɔ 'bit' sɤ 'hand' are lexical words, ɦI 'he' is a function word. According to the edge principle, there are three Prosodic Word kɤ, ŋɔ and sɤ. ɦI is an immediate constituents(IC). Although ɦI c-command sɤɦI does not form a TS domain with sɤ, but with ŋɔ, the PW on the left. Therefore, Selkirk and Shen claim that the ascertaining of a phonological domain is not sensitive to syntactic structure but to the edge of X^0 or X^{max}.

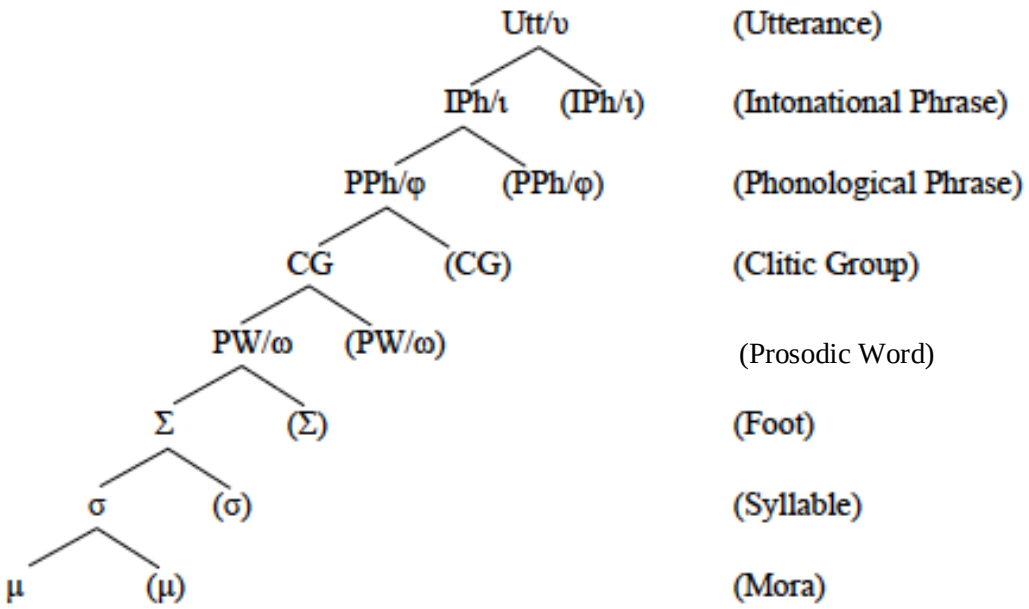
After the advent of Optimality Theory (OT), Selkirk (1996) adopts its framework of ranked constraint-based rules. Selkirk (1996) proposes four general constraints entailed by the Strict Layer Hypothesis in OT. A discussion about the OT analysis of the *Huju* will be provided in the Chapter V.

3.1.2 Nespor and Vogel's Studies

Nespor & Vogel's (1986) book is another authoritative work in prosodic phonology. In this book, Nespor & Vogel proposes their prosodic constituency hierarchy: the syllable, the foot, the

phonological word, the clitic group, the phonological phrase, the intonational phrase, and the phonological utterance.

Figure 5. Prosodic hierarchy (Nespor & Vogel)



Different from the Edge Approach proposed by Selkirk, the Relation-Based Approach (RBA) proposed in this book refers to X-bar notions of phrase structure, such as head-complement, modifier-head, and specifier-head relations, as well as syntactic branching.

3.1.3 Duanmu's theory

The metrical theory was originally developed as the theory of stress. Halle and Vergnaud (1987) proposes that the stress system of a language is determined by a set of parameters, and the

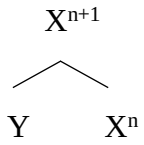
stress assignment may be sensitive both to phonological entities and the syntactic entities. Chen (1979, 1980, 1984, 2000) and Wright (1983) first apply the metrical approach to Chinese phonology, and then followed by Duanmu (1991, 1992, 2007). He argues that standard Mandarin has word stress. When a heavy syllable is followed by a light syllable, the heavy syllable has stress while the light syllable does not, for example, maa-ma1 'mother.'

(7) The weight-to-stress principle:
If a syllable is heavy, then it is stressed.

He also proposes the non-head stress rule(NHS), for assigning compounding and phrasal stress,

For example,

(8)



Y is the non-head and X^n is the head,
Y=any projection

In the syntactic structure [Y XP] (or [XP X]), where X is the syntactic head and XP the syntactic non-head, XP should be stressed. In addition to it, he also proposes an alternative analysis with the notion of the metrical foot that starts with a stressed syllable followed by an

unstressed one. He suggests that the third tone-sandhi obligatorily applied over two syllables that belong to the same immediate syntactic constituent, do not belong to separated full feet (containing two or more syllables), and optionally applies over two syllables that belong to two full feet.

Zhang (2017) finds the counterevidence from Shanghai dialect as well as other Wu dialects for Duanmu's metrical theory, which will be introduced in the section 3.2.

3.1.4 Strict Layer hypothesis

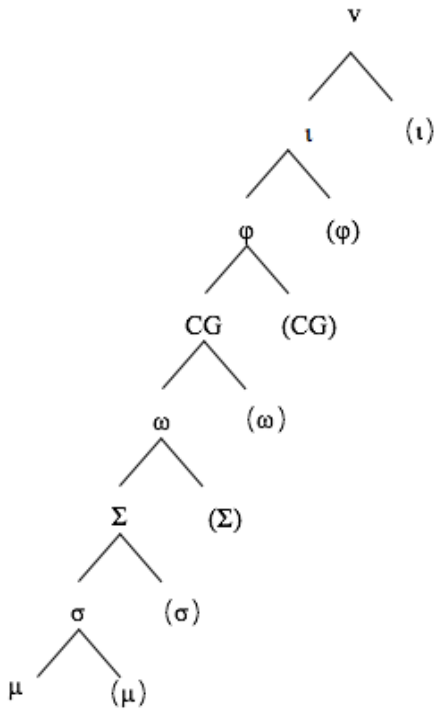
The only well-formedness condition on prosodic constituency is the Strict Layer Hypothesis (SLH) proposed by Selkirk (1984,1986), Nespor and Vogel (1986) and Hayes (1989). It generally assums that a prosodic unit of a given level n immediately dominated the unit of the lower level n-1, and is exhaustively contained in a constituent of the immediately higher level n+1.

(9) Strict Layer Hypothesis

a. A given nonterminal unit of the prosodic hierarchy, X^p is composed of one or more units of the unit of the immediately lower categoryX^{p-1}

b. A unit of a given level of the hierarchy is exhaustively contained in the superordinate unit of which it is a part,

Figure 6. Strict layer hypothesis hierarchy



As shown in the above typical hierarchy, a unit at any given level can never be composed of anything but the unit at the next lower level, therefore, the recursive prosodic structure does not occur. For example, a prosodic word can only contain foot, and may not contain prosodic word or clitic group or phonological phrase.

Later on, within the OT framework, Selkirk (1996) proposes four general constraints for Strict Layer Hypothesis (Hereafter SLH)

（10） Strict layer hypothesis in OT (where C^n = some prosodic category)

a. Layeredness: no C^i dominates a C^j, iff j>I (e.g. no φ dominates a Σ)

b. Headedness: any C^i must dominate a C^{j-1}(e.g. a ω must dominate a Σ)

c. Exhaustivity: no C^i dominates C^j, iff j<i-1(e.g.no ω immediately dominates a σ)

d. Non-recursivity: no C^i dominates C^j, iff j=i (e.g. no Σ dominates a Σ)

There are many constraints for different types of prosodic units. For example, BinMin (φ, ω) requires that a phonological phrase contains at least two prosodic words, while BinMax (φ, ω) demands that a phonological phrase can be formed by only two prosodic words.

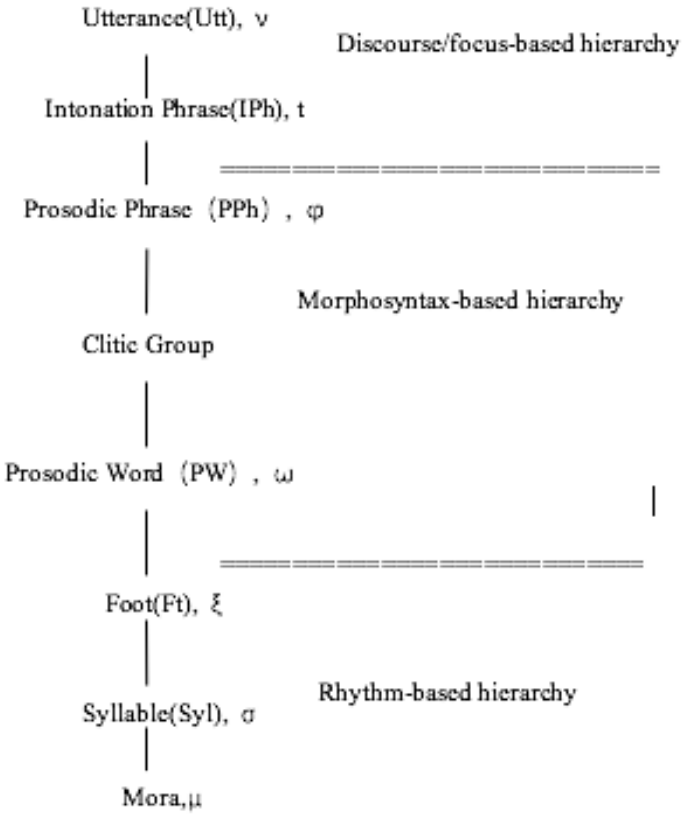
Selkirk holds that the constraints of Layeredness and Headness are inviolable and should not be dominated in the constraint ranking universally, while the Exhaustivity and non-recursivity are not observed by all languages. SLH is a well-formedness condition on prosodic constituency, it may not be the universal principle that some languages. For example, the

prosodic recursivity is allowed in Mandarin Chinese and Shanghai dialect, (Ladd 1986,1990; Hyman et al. 1987; Odden 1987; and others).

3.2 Zhang (2017)

As mentioned before, SLH might not be the universal principle for all the languages. Zhang (2017) proposes a trisected model for prosodic hierarchy.

Figure 7. Prosodic hierarchy (Zhang)



In addition, he suggests that SLH is not applicable in all languages and the prosodic recursion is allowed. A prosodic hierarchy, which entails four possible types of organization of prosodic constituents in Mandarin Chinese is proposed. Level-skipping or the violation of exhaustivity is allowed.

A supplementary principle of the SLH is therefore suggested by Zhang (2017),

(11) Stipulation of prosodic recursivity

Prosodic recursivity is prohibited between the units of different hierarchies (language universal), but optionally in the units of the same hierarchy (language specific)

As for Shanghai dialect, according to Zhang, regardless of its internal structure, it must undergo tone sandhi since Shanghai dialect is a word-tone-sensitive language. But the case will become more complicated when they involve function words. In contrast to the lexical items, not all the function words will form a TS domain with the lexical item to its left. Zhang proposes that the TS condition in Shanghai dialect is that,

(12) The TS rule is applied if the adjunct is c-command by its head

Zhang mentions that different dialects in Chinese need different parameters for setting values, which include functional relations (argument/adjunct dichotomy), left/right branching, immediate constituency, c/m-command, directionality, adjacency, syntactic units, and syntactic categories.

For Shanghai dialect, adjunct, c-command, and syntactic units are the major parameter, and there are at least three prosodic domains: ω, CG (clitic group), and φ. The parameter set is given below

(13) A. Domain: ω

Parameter: c-command; adjunct
Function: insert "="
Target condition: lexical word

B. Domain: CG
Parameter: c-command; right edge of XP
Function: insert "="
Target condition: lexical syllable; functional word

C. Domain: φ
Parameter: c-command; argument
Function: insert "="
Target condition: lexical word

Therefore, all languages should possess the mapping relationship as well as the morphosyntax-based prosodic hierarchy. The syntactic conditions needed by each of the prosodic domains are varied within different languages.

In addition, Zhang provides a clear definition of each unit in the hierarchy and clarifies the concepts. I will mainly adopt the following concept in the analysis for next chapter.

Syllable is the minimal structural unit that can be identified naturally in speech and forms a foot within words in some stressed languages.

Foot(Ft): Whether foot as a prosodic unit exists in a language or not is determined by the existence of metrical binary contrast. Foot is not a prosodic unit, because foot and prosodic word are two different units in a prosodic hierarchy. A prosodic word is the minimal prosodic unit that is higher than foot in prosodic hierarchy and directly dominates foot.

Clitic group(CG) is the prosodic unit located between a prosodic word and a prosodic phrase in prosodic hierarchy. It is formed by a clitic element plus the lexical hood, which is its host.

Phonological Phrase(PPh) is a unit higher than prosodic word or clitic group in the prosodic hierarchy and consists of one or more prosodic words or clitic groups. The PPh is a phonological unit that is established on the basis of mapping rules that make reference to syntactic concepts and includes all the constituents from prosodic words up to syntactic phrase. PPh across languages have demonstrated a great similarity.

Intonation phrase(IP) constitute the domain of a coherent intonational contour.

3.3 Summary and Reflection

Section 3.1 presents a general review on the representative theory of prosodic phonology, including Selkirk, Nespor and Vogel, Duanmu and Zhang's model. There are two major problems that prosodic phonology is concerned with. One is the set of the prosodic categories and the second is the hierarchical nature of prosodic domains. The earliest Selkirk's model divides the prosodic constituency into six levels, which is syllable, foot, phonological word, phonological phrase, intonational phrase and utterance. Hayes, Nespor & Vogel inserts the prosodic constitutes, Clitic group between the phonological word and phonological phrase and Zec (1988) proposes another domain, the mora, which is located as the lowest constituent.

Section 3.2 introduced Zhang (2017)'s trisected prosodic hierarchy model, in which he divides the hierarchy into three parts, which are rhythm-based, morphosyntax-based and discourse/focus-based hierarchy. The inventory of prosodic constituents and the definition of prosodic domain in languages might be different. Zhang argues that there is no foot in Mandarin Chinese since there is no metrical binary contrast. The following is the possible prosodic hierarchy in Mandarin.

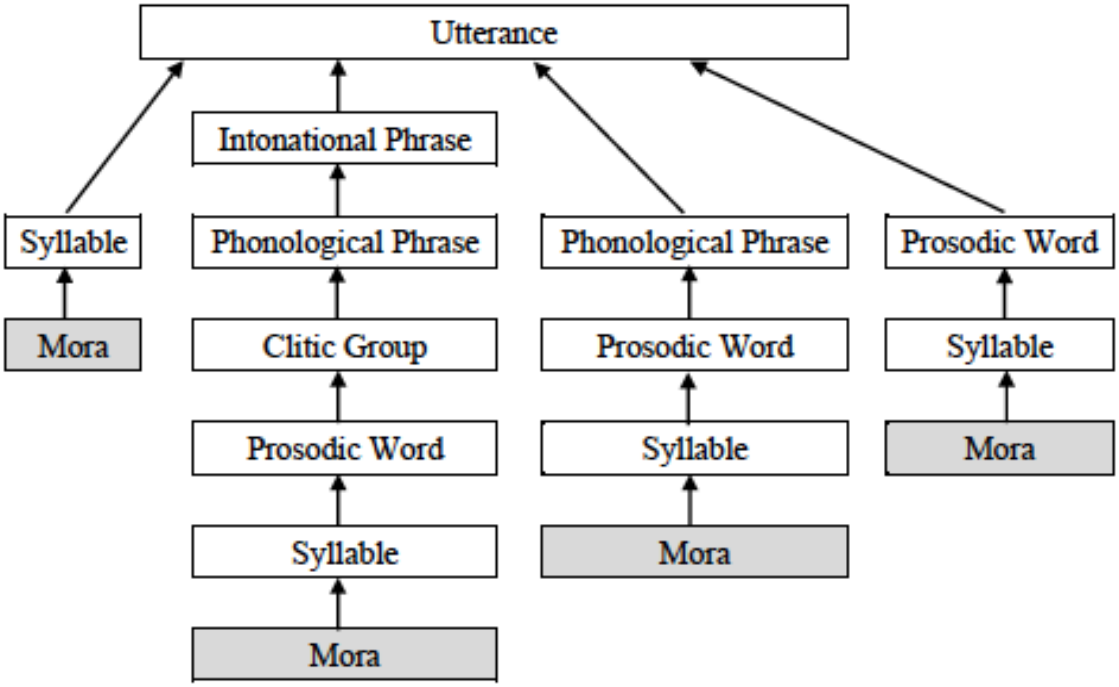
Similarly, although SLH is the only well-formedness condition in the original model of prosodic phonology, evidence and criticism have challenged that it is not a universal rule. The violation of Exhaustivity, Nonrecursivity and Layeredness have been widely found across languages, especially in Chinese dialect. Zhang (1992, 2017) suggests that the prosodic recursivity actually reflects syntactic recursivity, and thus only occurs between prosodic constituents in the morph-syntax-based hierarchy. Therefore, SLH may happen on a language-specific basis.

As mentioned in Chapter II, section 2.3, Shanghai dialect is a word-tone sensitive language, and all the lexical items undergo tone-sandhi change. The account of the phonological system of the Shanghai dialect developed in this dissertation will be based on the framework of the aforementioned prosodic phonology theory. The following hierarchy is the tentative prosodic hierarchy I will adopt in the following analysis.

Since Mandarin Chinese is not a quantity-sensitive language (Chan 1985, Zhang 2014, 2017, among others), and the mora plays no important role in applying any phonological rules, the mora level will not be discussed. In brief, the level of Clitic Group is explicit and the level of

Foot is implicit in Chinese language as well as in Shanghai dialect, therefore, the commonly used prosodic hierarchy is concluded as the following graph:

Figure 8. Prosodic hierarchy in Mandarin Chinese



As for SLH, Zhang proposes that prosodic recursivity is prohibited between the units of different hierarchies (language universal), but optionally in the units of the same hierarchy (language specific), therefore, the violation of constraints of Exhaustivity, Nonrecursivity, and Layeredness may all be allowed in the Shanghai dialect in my analysis. In other words, PW+PW can be dominated by another PW', CG+CG can be dominated another CG', however, PPh+PPh

cannot be dominated by PPh', instead it must be dominated by its higher level IP, because IP and PPh belong to different hierarchies. Therefore, the following two layers are acceptable in my analysis,

(14)

Chapter IV: Quantitative Analysis of *Huju*

4.1 Research Question

Different research methods to quantify the correspondence, such as native speaker observation, note shape/tone shape comparison, F_0(pitch) comparison and contour comparison have been introduced in Chapter II. Most previous research focused on the relationship between two adjacent syllables or the adjacent words with its related musical notes. For example, Sun (1998) claims that the music pitch of two adjacent Mandarin syllables should follow the principle that *Ying Ping* (55)> *Qu* (51)> *Yang Ping* (35)> *Shang*(214) , so the listeners can understand the lyrics. Their core idea is based on the fact that "the expression of tone in speech is always in relations to what came before and what comes after it" (Wee 2007). However, merely comparing the adjacent syllables as the unit may lead to problems. It is very easy to find the counterevidence even in Mandarin songs. For example, in Chinese Children's song,

(15) Lyrics [再] 捏][一 个][大][鬼 脸]
tsai ne ji kɤ ta kwi lɛ
again make one big ghost face
"make a ghost face again"

Music tier	53	5	6	1	2	2	1
Mandarin tone	51	55	35	51	51	35	214

For the word *ne'make'* and *ji'one'*the music pitch of *ne* is lower than the *ji*, it violates the rules that within an IP since Yin Ping should be higher than Yang Ping. However, the word *ne* and *ji* actually belong to different prosodic words, so they don't need to follow the rules claimed before. If this line doesn't follow the rule, how the listeners still understand the lyrics? Therefore, there must be a level or a certain domain other than the adjacent syllables that cause the listeners to understand the lyrics.

Nespor and Vogel (1986, 2007) claimed that it is the prosodic constituency rather than syntactic structure that accounts for the ability of listeners to understand the ambiguous sentence. Nevertheless, the prosodic constitutes have never been involved in the research in this area. Therefore, my analysis will focus on the comparison between contour shape between linguistic tone and music tune within different prosodic constitutes.

4.2 Analysis Method

4.2.1 Data Collection

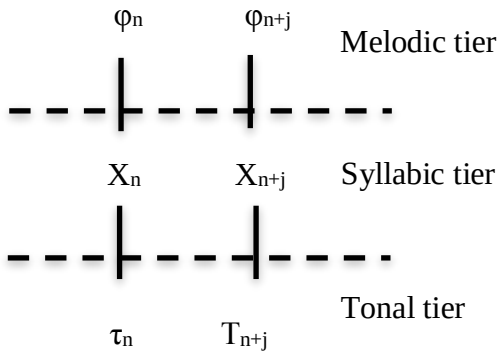
The main data/music scores used in my analysis come from the book 沪剧唱段 108 首 [108 collection of Huju pieces], published by Shanghai Music Press. Currently, there is no official corpus of Chinese dialectical opera for academic study. This book is considered as the most authoritative music collection of *Huju*. All my transcriptions are based on the music track provided by the book. Ten pieces representing different aria singing types are selected. For *changqiang* style, the piece include 春二三月草青青(Green grass in the spring), 金丝(Canary), 我代表工人到此地(I represent workers to be here), 志超读信(Zhichao read letter); For *xiaodiao* style, the pieces include 为你打开一扇窗(Open a window for you), 燕燕说媒 (Yanyan as matchmaker), 思柳(Willow), 洪湖水浪打浪(Honghu River) and 睡吧睡吧(Sleep, sleep); For *huangqiang* style, the piece includes 盘凤(Question Feng). The scores of ten selected pieces wills be provided in the Appendix.

4.2.2 Analysis method

4.2.2.1 Overview

Each music piece is analyzed through three tiers: melodic tier, syllable tier and tonal tier.

Figure 10. Three tiers



The syllable X_n represents the syllables in texts, and syllables X_nX_{n+j} forms a prosodic domain.

τ_n in tonal tier represents the linguistic tonal feature associated with syllables X; τ_{n+j} represents the tonal feature associated with syllables X_{n+j}.

φ_n in melodic tier, which is associated with the syllables X_n, represents the musical note pitch at the edge; φ_{n+j} represents the musical note pitch at the edge associated with the syllables X_{n+j}.

Therefore, the following metric is proposed,

(16) Within a prosodic unit, the syllable X_n X_{n+j}[9]

a. Music tune and language tones have an optimal match

When $\tau_n < \tau_{n+j}$, $\varphi_n < \varphi_{n+j}$, or

$\tau_n > \tau_{n+j}$, $\varphi_n > \varphi_{n+j}$, or

$\tau_n = \tau_{n+j}$, $\varphi_n = \varphi_{n+j}$,

b. Music tune and language tones have a non-optimal match,

When $\tau_n < \tau_{n+j}$, , $\varphi_n = \varphi_{n+j}$ or

$\tau_n > \tau_{n+j}$, $\varphi_n = \varphi_{n+j}$,, or

c. Music tune and language tones mismatch,

When $\tau_n < \tau_{n+j}$, $\varphi_n > \varphi_{n+j}$ or

[9] The quantity of J depends on the number of syllables within a single prosodic unit

$\tau_n > \tau_{n+j}$, $\varphi_n < \varphi_{n+j}$,, or

$\tau_n = \tau_{n+j}$, $\varphi_n > \varphi_{n+j}$, or

$\tau_n = \tau_{n+j}$, $\varphi_n < \varphi_{n+j}$,

Briefly speaking, to get matched between music and language tier, if τ_n is lower than τ_{n+j}, the φ_n cannot be higher than the φ_{n+j}; if τ_n is higher than τ_{n+j}, φ_n cannot be lower than φ_{n+j}.

4.2.2.2 Sample Analysis

In this section, a sample analysis of the piece 为你打开一扇窗 'Open a window for you' will be provided. Figure 10 is a numbered musical notation score[10]. The numbered musical notation is widely used in music publication in China. As for octave transcription, I used subscript b, $_b$, to represent the low key, and the superscript #, $^{\#}$, to represent the high key for

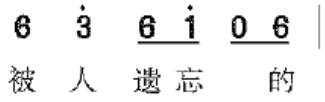
[10] Number musical notation score is known as *jianpu* 简谱. The number 1 to 7 represents the scale degrees. The number always correspond to the diatonic major scale. For example, in the key of C, their relationship with the notes and the solfege is as follows

Note: C D E F G A B

Solfege: do re mi fa sol la si

Notation: 1 2 3 4 5 6 7

In addition, dots above the or below a musical note raise or lower it to other octaves. The number of dots equals to the number of octaves. For example, is an octave higher than 1, is an octave lower than 7



convenience. For example, , I transcribed as 6 $3^{\#}$ 6 $1^{\#}$ in the music tier. As for the transcription of the syllabic and tonal tiers, I used the following line as an example,

Since it is a song with a time signature of 4/4, the line 为你打开一扇窗 is a full musical phrase, which includes four music bars.

Within a Prosodic Word, 打开 tã k^{h}E 'open'

(17)	tã	k^{h}E
	打	开
Gloss	beat	open
BT	MH	HL
ok	M =	H

Therefore, the full analysis of this PW is listed as follows,

(18) Melodic tier φ_n =6 $\varphi_{n+1=}$ 65 $\varphi_n > \varphi_{n+1}$

Syllabic tier [打 开] $_{pw}$

X X+1 j=1

Tonal tier τ_n =M τ_{n+1} =H $\tau_n < \tau_{n+1}$

Result Mismatch

Example 18 shows that within the prosodic word tã k^{h}ɛ ‘open’, the music melody presents a descending trend since the musical note of tã is 6 and the ending edge note of k^{h}ɛ is 5. As for the linguistic tonal contour change, the word undergoes a TS change, therefore it has an ascending trend in the tonal tier (M=H). According to metric (16), the melody and tonal tier mismatch with each other within the prosodic word unit.

Analogously, the analysis of clitic group 为你 ɦuɛ ŋi̯ ‘ for you’ is listed as follows,

(19)	ɦuɛ	ŋi̯
	为	你
Gloss	for	you
BT	LH	MH
ok	L =	H

(20) Melodic Tier φ_n =6 $\varphi_{n+1=}$ $3^{h}1^{h}$ φ_n φ_{n+1}

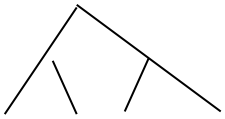
Syllabic Tier [为]$_{pw}$ 你] $_{cg}$

X X+1 j=1

Tonal Tier τ_n =L τ_{n+1} =H τ_n τ_{n+1}

Result Optimal Match

Within the Clitic Group 为你 ɦuᴇ ɳi ‘for you’, both the music and tonal tier show an ascending change, therefore, the tone and tune have an optimal match. Although *ɦuᴇ ɳi* together as clitic group has an optimal match, the *ɳi* as a clitic pronoun, has a mismatch between tone and tune. In conclusion,



(21)

为 你 打 开

for you open

“open for you”

BT LH MH MH HL

TS L=H=L=L

Therefore, within a phonological phrase, 为你打开 ɦuᴇ ɳi tã $k^hᴇ$ ‘open for you’

(22) Melodic Tier φ_n =6 $\varphi_{n+3=}$ 65 $\varphi_n > \varphi_{n+1}$

Syllabic Tier [[为]$_{pw}$ 你] $_{cg}$ [打 开]$_{pw}$]$_{pph}$

X	X+3

j=3

Tonal Tier τ_n =L τ_{n+3} =L $\tau_n = \tau_{n+1}$

Result Non-optimal Match

There is a descending trend in melodic tier since only the edge musical notes are considered, while the tonal tier doesn't show any change. Therefore, tone and tune has a non-optimal match.

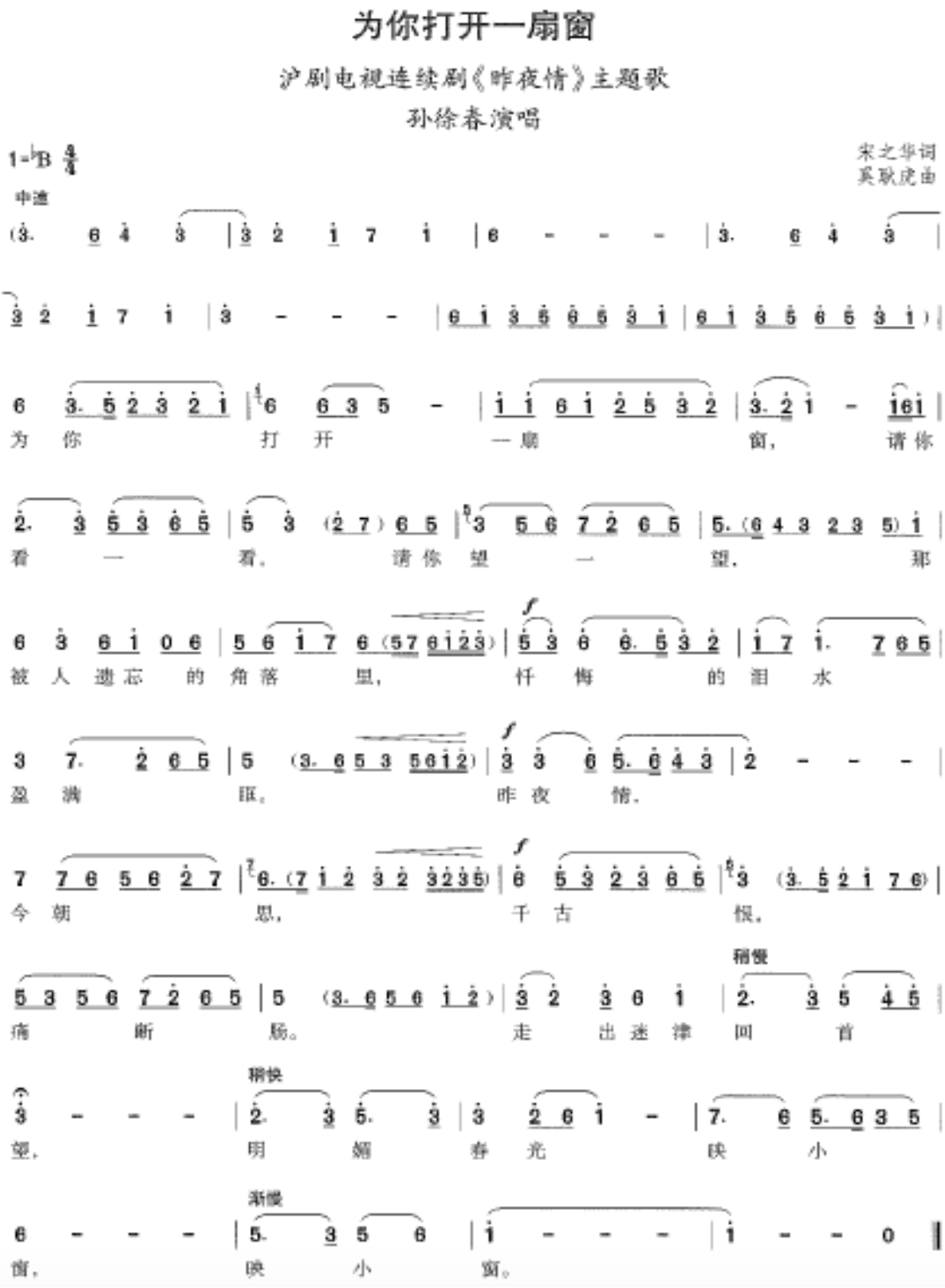
The summary of the whole sentence is listed as follows

(23)	ɦuᴇ	ɳi	tã	kʰᴇ	iɪ	sø	tsʰɑ̃	Match
Lyrics	为	你	打	开	一	扇	窗	
	[[[[为] 你]$_{cg}$ [打开]$_{pw}$]$_{pph}$ [[[一]扇]$_{cg}$[窗]$_{pw}$]$_{pph}$]$_{ip}$							
BT	LH	MH	MH	HL	MH	MH	HL	
Melodic tier	6	3^h1^h	6	65	1^h	1^h2^h	3^h1^h	
TS within PW	LH # MH	#	M=	H#	MH	#MH#	HL	ok/ * / */ok/OK/OK[11]

[11] Method of Transcription: OK=optimal match; ok=non-optimal match ; *=mismatch

TS within CG	L = H	M=H	OK/ OK
TS within PPh	L=H=L=L #	M=H=L	ok/ok
TS within IP	L =	L	*

Figure 10. Music score of Huju piece



4.2.2.3 Evidence from F_0 illustration

Previous studies have compared the fundamental frequency of tone within music interval. Although the comparison between F_0 is not the focus of my analysis, I will use it as an evidence to support my research method. Figure 11 is the pitch illustration of the singing melody and Figure 12 is the pitch illustration of the speech melody.

Figure 11: Pitch illustration of singing，为你打开一扇窗

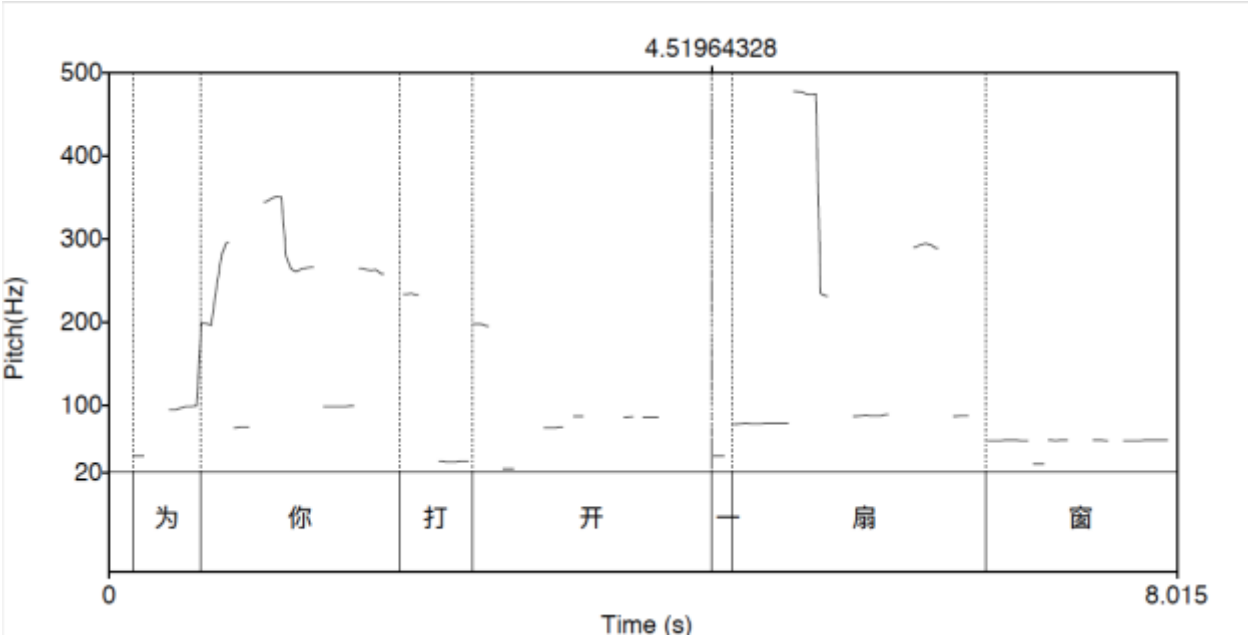


Figure 12. Pitch illustration of speech，为你打开一扇窗

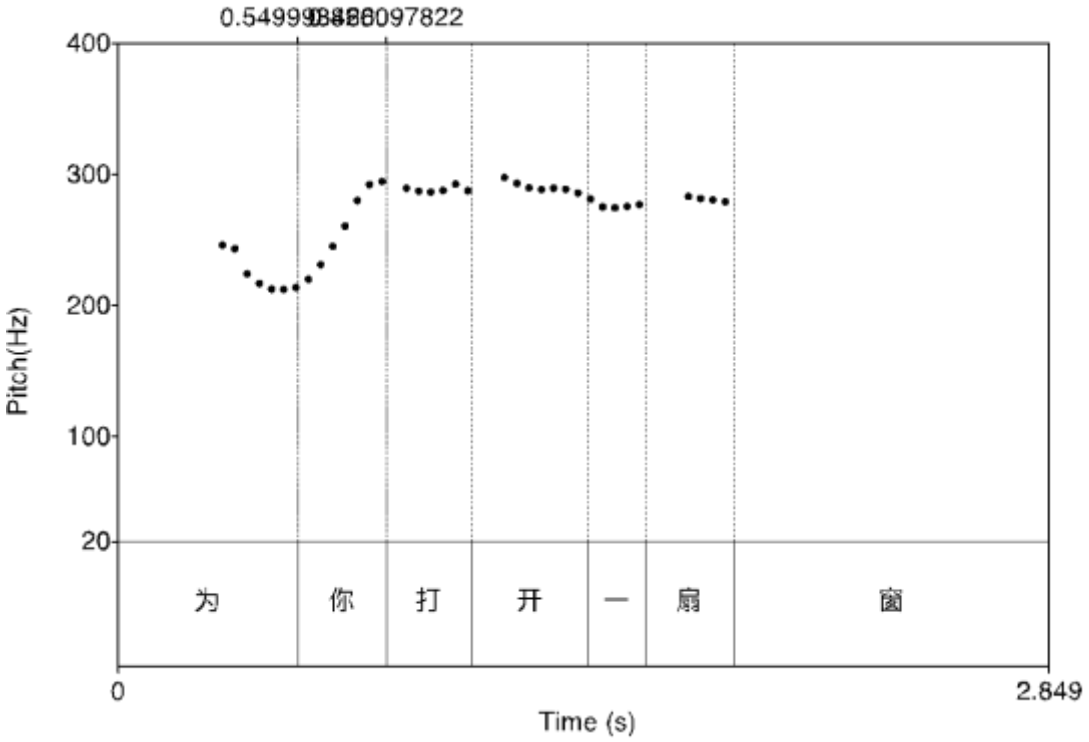
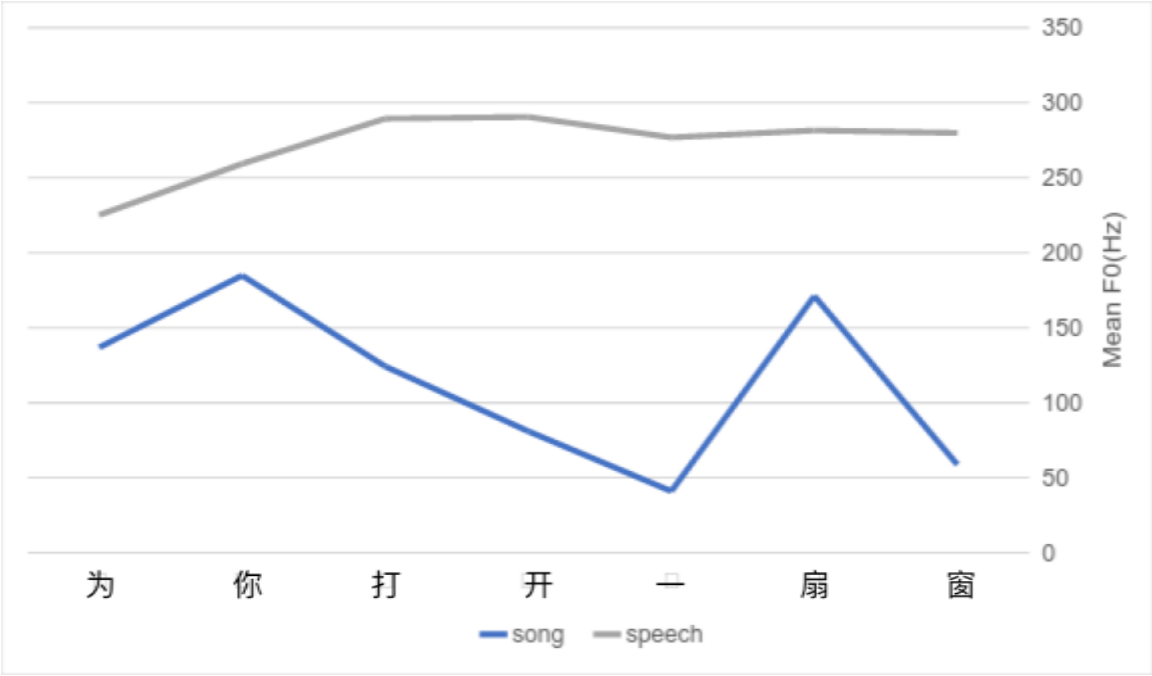


Figure 13. F_0 Comparison between tone and tune of the sentence 为你打开一扇窗



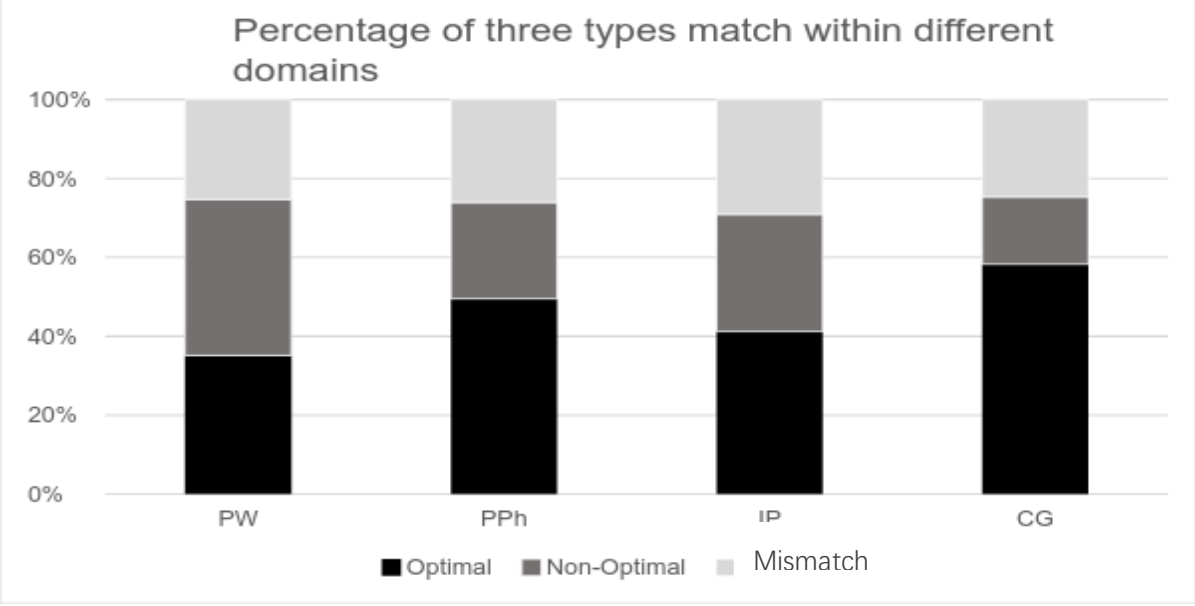
When comparing the F_0 of each syllable between sung and speech melody, it is obvious that the contour change match with the results I proposed before. For example, for the PW, tã k^hE the mean of F_0 presents a level change in speech, however, in song singing, tã k^hE has a significant declining change (See Figure 13), which match with the analysis result provided before. Also, for the entire sentence, the speech F_0 presents an ascending trend. In contrast, the singing F_0 presents a declining trend. Therefore, tone and tune mismatch with each other within the Intonational Phrase(IP), and such finding is the same with the linguistic analysis result. No matter what method I adopt to analyze the tone-tune relationship, the result should be similar. Therefore, the F_0 comparison between singing and speech melody provided a strong evidence for my research method.

4.3 Results

There are in total 165 lines in ten selected pieces of *Huju*. According to the aforementioned analysis metric, 74.79% of the pairs of syllables confirm to metric (16) within PW, among which 35.18% are optimal match and 39.61% are non-optimal match. 74.84%

confirms with CG, among which 57.86% are perfect match, and 16.98% are non-optimal match; 73.89% confirms within PPh, among which among which 49.49% are perfect match, and 24.40% are non-opposing match. 70.91% confirms within IP, among which 41.21% are perfect match and 29.09% are non-optimal match. Figure 14 is the conclusion chart of the data. Such findings suggest that the music pitch depicts with language tones in a high percentage in *Huju* within different prosodic domains. The CG group has the highest percentage of optimal match, followed by PPh, IP and PW.

Figure 14. Percentage of three types matches within different prosodic domains



Greenhouse-Geisser correction was conducted to compare the match situation of music tunes and language tones within PW, CG, PPh and IP. There was a significant difference on the tone-tune parallel situation between different prosodic domains, $F(2, 162) = 60.417$, $P<0.05$. Post hoc tests using the Bonferroni correction reveals that the tone-tune match condition within PW are significant different from those within CG, PPh and IP, $p<0.05$, which indicates that for those tone-tune match within PW are not necessarily match within CG, PPh and IP. Similar findings were found that tone-tune match situation within CG are significantly different from PPH and IP, $p<0.05$, and the match condition within PPh are significantly different from IP, $p<0.05$. See Table 11 for the summary of the results.

Table 11. Summary of parallel conditions between different prosodic domains

	t	Sig(2-tailed)
PW vs. PPH	6.363	.000
PW vs. IP	11.962	.000
PW vs. CG	9.848	.000
PPh vs. IP	9.296	.000
PPh vs. CG	5.057	.000
IP vs. CG	2.094	.000

The data suggest that there are variations in tone-tune relationship in *Huju*. The music tune does not always correspond to language tone although there is a high percentage of correspondence. In regardless of the tone-tune condition within the prosodic word or the phonological phrase or the intonation phrase, the musical melody is greatly influenced by the tones of Shanghai dialect. However, for those tone-tune match within PW do not necessarily match within CG, PPh or the IP.

Nespor and Vogel (1983, 1984) suggested that it is not syntactic constituents, but rather the prosodic constituents that provide the relevant information in the first stage of processing of a given string of speech. However, the analysis results suggest that prosodic constituent is not sensitive in the music speech, at least for the tone-tune relationship. The effect that influence people's understanding of the lyrics in *Huju* are based on the surface form of linguistic tones, not the prosodic constituents. In addition, Zhuang (2013), as a *Huju* musician, provides a comment based on the musician intuition that the word tones have a limited restriction on the music melody in *Huju*. My linguistic analysis seems to provide an opposite evidence, which I will discuss more in section 4.4.

4.4 Discussion

In this section, I will provide a detailed analysis with interesting tone-tune match/mismatch cases within each prosodic domain, followed by a discussion about Foot(Ft) problem in Mandarin.

4.4.1 Prosodic Word

According the data, 74.79% of the pairs of syllables confirms to metric (16) within Prosodic Word (PW), among which 35.18% are optimal match and 39.61% are non-optimal match. Among all the groups, PW has the least percentage of optimal match. Most of the mismatch happen on Qu ‘entering’ Group, including *yinqu* and *yangqu* group. For example,

(24) Yingqu Group 阴去

	2	6♭		6	65
草	tsʰɔ		打开	tã	kʰɛ
	M	H		M=H	
	2	5b		6♭6♭	5♭
对	tɛ		向往	ɕiã	uɑ̃
	MH			M=H	

	32		65
采	tsʰᴇ	去	tɕʰy
	MH		MH

(25) Yangqu Group 阳去

	2# 5		54
银	ŋʑiɲ	情	zʑiɲ
	LH		LH
	32#		75
像	zʑiã	断	dø
	LH		LH
	37b 6b		1#6 55
			2#5# 5#1#
良心	liã ɕiɲ	翱翔	ŋɔ zʑiã
	L=H		L=H
	16b		25 67b
在	zᴇ	远方	ɦyø fɑ̃
	LH		L=H
	3b 5b 5b		
大少爷	du sɔ ɦiᴀ		

Some *yangru* word also have mismatch, but the number of words is much smaller compared with the Qu group. For example,

(26) Yangru Group 阳入

	7_b 25_b
岳父	ŋoʔ vu
	L=H
	2 17_b
泪水	li sɻ
	L=H
	66 53
也许	ɦʌ ɕy
	L=H

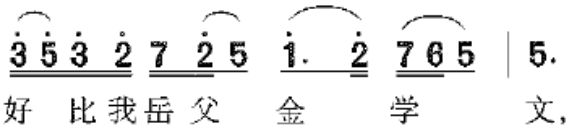
The position of the mismatch word is random. It can happen either at the beginning of the sentence or the middle or the end of the sentence. But there is a trend that *changqiang* style has less mismatch PW groups than *xiaodiao* and *huangqiang*. For example, there is only 18.04% mismatch PW word in 志超读信, while there is 36.67% of mismatch PW word in 思柳.

4.4.2 Clitic Group

Clitic Group(CG) is the most special group among all prosodic constituents. It has the highest percentage of optimal match. See samples below,

a) Pronoun

(27)



Lyrics	好比我岳父金学文	Match
	[[好比]pw 我]cg[岳父]pw[金学文]pw	
BT	MH LH LH LH LH HL LH LH	
Melodic tier	35 3 2 7♭ 25♭ 12 7♭5♭ 5♭	
TS within PW	M=H# LH# L=H# H=L=L	ok/ok/*/OK
TS within CG	M=H=L	OK
TS within PPh	M=H=L=L=L# L=L=L	OK/ OK
TS within IP	M L	OK

This is a very typical case of CG in *Huju*. The pronoun is clearly attached with preceding lexical item. In fact, I can also get evidence from the rhythm. There are four beats in each measure, and 好比我 is grouped together in one measure. The way of singing pronoun in *Huju*

resemble the way of speech. The tonal change also matches with the melody change. Similar examples are found in different aria singing types. For example,

In *changqiang* style,

(28) Lyrics	玉 茹 印 象 侬 阿 忘 记	Match
BT	LH LH MH LH LH HL LH MH	
Melodic tier	6♭ 33 2 2 1 22 1 1	
TS within PW	L=H# M=H# LH# HL# L=H	OK/ok/ok/ok/ok
TS within CG	M=H=L # H=L=L	OK/OK

In *huangqiang* style,

(29) Lyrics	听 说 他 要 到 矿 上 去	Match
BT	HL MH HL MH MH MH LH MH	
Melodic tier	5 5 51 6♭ 1 11 52 31	
TS within PW	H=L# HL# M=H# M= H=L	ok/*/OK/ok
TS within CG	H=L=L	OK

(30) Lyrics	是 你 太 太 吩 咐 我 回 去	Match
BT	LH MH MH MH HL MH LH LH MH	
Melodic tier	6♭1 3 3 27♭ 6♭5♭ 1 3♭ 15♭	
TS within PW	LH# MH# M=H# H=L# LH# L=H	ok/ok/ok/OK/ok/OK
TS within CG	L=H H=L=L	OK/OK

In *xiaodiao* style,

(31) Lyrics	身 影 在 你 心 上 留	Match
BT	HL MH LH MH HL LH LH	
Melodic tier	23 5 3 51 53 $36_{\flat}$ 1	
TS within PW	H=L# LH# MH# H=L# LH	*/ok/*/OK/ok
TS within CG	H=L=L=L	OK

However, there are cases that are not match between music tune and linguistic tone. For example,

(31) Lyrics	等 你 答 复 谈 一 谈	Match
BT	MH MH MH MH LH MH LH	
Melodic tier	$2^{\#}$ $3^{\#}6$ $5^{\#}$ $5^{\#}3^{\#}$ $2^{\#}6$ $1^{\#}$ $1^{\#}$	
TS within PW	MH# MH# M=H# L=H=L	ok/*/*/ok
TS within CG	M=H	*

(32) Lyrics	有 话 对 侬 婶 婶 讲	Match
BT	LH LH MH LH MH MH MH	
Melodic tier	3 $1^{\#}$ $1^{\#}6$ 65 35 65 5	
TS within PW	L=H# MH# LH# M=H#MH	OK/*/*/OK/ok
TS within CG	M = H	*

(33) Lyrics	大 概 是 他 事 情 忙	Match
BT	LH MH LH HL LH LH LH	
Melodic tier	1 3 $27_{\flat}$ $6_{\flat}5_{\flat}$ $3_{\flat}3_{\flat}$ $5_{\flat}5_{\flat}$ $5_{\flat}$	
TS within PW	L=H# LH# HL# L=H# LH	OK/*/OK/OK/ok
TS within CG	L = H	*

No regulated rules have been found to prove that tone and tune always match with each other within clitic group. However, the way of singing pronoun in *Huju* is confirmed to be exactly the way of speaking in Shanghai dialect.

b) Preposition

(34) Lyrics	身 影 在 你 心 上 留	Match
BT	HL MH LH MH HL LH LH	
Melodic tier	23 5 3 51 53 36_{b} 1	
TS within PW	H=L# LH# MH# H=L# LH	*/ok/*/OK/ok
TS within CG	H=L=L=L	OK

(35) Lyrics	我 们 要 求 速 把 凶 手 严 厉 办	Match
BT	LH LH MH LH MH MH HL MH LH LH LH	
Melodic tier	$3^{\#}$ $3^{\#}$ $2^{\#}$ 7 5 6 $2^{\#}$ 7 63 5 5	
TS within PW	L=H# M=H# MH#MH# H=L# L=H# LH	ok/*/OK/ ok/*/*
TS within CG	M=H	OK

The mismatch cases include the following examples,

(36) Lyrics	愿 与 侬 永 远 在 一 起	Match
BT	LH LH LH MH LH LH MH MH	
Melodic tier	3 5 6 7 $2^{\#}5$ 35 6 6	
TS within PW	LH# LH#LH# M=H# LH# M=H	ok/ok/ok/*/ok/ok
TS within CG	L=H=L# L=H=L	*/*

(37) Lyrics	那 一 日 勒 啦 狂 风 暴 雨 夜	Match
BT	HL MH LH LH HL LH HL LH LH LH	
Melodic tier	7 7 7 7 6 5 67 6 76 63	
TS within PW	H=L=L# L=H# L=H# L=H#LH	ok/*/OK/ok/*
TS within CG	L=H	*

(c) Lining word and auxiliary word

As mentioned before, *Huju* singing, especially for the *changqiang* aria, is similar to chanting. One prominent difference between singing and speech is the insert of auxiliary word, also known as lining word 衬字. The function of the lining word in the musical sentence is to enrich the expressiveness and the music rhythm. It is common to use lining words in Chinese operas or folk song singing. The most common lining word is iA 呀, which is usually placed at the end of a sentence. For example,

(38) Lyrics	洪 湖 水 呀	Match
BT	LH LH MH HL	
Melodic tier	12 3 26_b 2	
TS within PW	L=H# MH# HL	OK/*/ok
TS within CG	L=H=L=L	*

iA or A can also be placed in the middle of the sentence.

(39) Lyrics	是 呀 是 家 乡	Match
BT	LH HL LH HL HL	
Melodic tier	6♭ 1 23 65 51	
TS within PW	LH# HL#LH#H=L	ok/ok/OK/OK
TS within CG	L=H=L	OK

(40) Lyrics	乖 乖 地 睡 吧	Match
BT	HL HL LH LH LH	
Melodic tier	6 6 5 3 51	
TS within PW	H=L#LH# LH#LH	ok/ok/ok/*
TS within CG	H=L=L# L=H	OK/*

Example 41-46 present the example of the particle, 的, 得, 地, 着, 了

(41) Lyrics	今 年 逢 着 交 春 早	Match
BT	HL LH LH LH HL HL MH	
Melodic tier	5 53 2 2 5 51 12	
TS within PW	H = L # LH #LH# H= L# MH	OK/ok/ok/OK/OK
TS within CG	L = H	ok

(42) Lyrics	攀 了 迪 门 亲	Match
BT	HL MH LH LH HL	
Melodic tier	1# 65 35 63 5	
TS within PW	HL#MH# LH# LH#HL	ok/*/OK/*/ok
TS within CG	H=L # L=H	OK/ok

(43) Lyrics	只 要 做 得 对	Match

BT	MH MH MH MH MH	
Melodic tier	1# 1#7 65 6 5	
TS within PW	M=H# MH# MH#MH	*/ */ok/ok
TS within CG	M=H	ok

d) Classifier

(45) Lyrics	燕 燕 侬 是 个 小 姑 娘	Match
BT	MH MH LH LH LH MH HL LH	
Melodic tier	66 53 66 5 3 23 26_{b} 1	
TS within PW	M=H# LH# LH#LH# M=H=L	*/ok/ */OK
TS within CG	M=H=L # L=H	ok/ *

(46) Lyrics	我 只 晓 得 少 爷 房 里 的 佣 人 们	Match
BT	LH MH MH MH MH LH LH LH MH LH LH LH	
Melodic tier	6_{b} 1 32 15_{b} 1 27_{b} 5_{b} 6_{b} 5_{b} 3_{b} 5_{b} 3_{b}	
TS within PW	LH#MH# M=H#M=H#L=H#MH #L=H#LH	ok/ok/*/*/*/ok/OK/ok
TS within CG	M=H=L=L=L #L=H=L	OK/OK

Similar to PW, it is hard to find a regulated rule of the tone-tune match condition within CG, but to certain extent, the way of handling the function word in *Huju* is very similar to the normal speech. The CG loses its base tone and receive sandhi tone from the preceding lexical item through left to right association.

The lining word is a special case. People never use the lining words in daily talk. The major function of the lining word is to express the emotion. The listeners feel the singing more approachable with the lining word. The lining words are also used to balance and enrich the rhythm of the musical phrase. Not all the lining words are matched between linguistic tone and tune, and to be more accurate, most of the lining words mismatch between tone and tune.

Such finding suggests that the music property of the lining words seems to play an upper hand compared with the linguistic property in *Huju*. The function of the lining words is to service the singing. Although lining words still keep its linguistic features, when used in *Huju*, its linguistic property is scarified to satisfy its music property. When the music property of the lining word is prior than its linguistic feature, the tone-tune match integrity is not taken into consideration, and the mismatch happen.

4.4.3. Phonological phrase and Intonational phrase

Zhuang (2003) claims from music perspectives that word tones have a limited restriction on music melody. The word contour change reflects the general melody change. He also mentions

that the general change of the music pitch in one musical phrase switch from high to low. It is one of the fixed aria singing style, and it is matched with the daily speech. According to my analysis, there is no significant difference of tone-tune match condition between PW, CG, PPh, and IP. I can find mismatch examples of phrase and intonation phrase from all three arias types.

In *changqiang* style,

(47) Lyrics	自 由 翱 翔	Match
BT	LH LH LH LH	
Melodic tier 2	6 $1^{\#}$ $2^{\#}5^{\#}$ $5^{\#}1^{\#}$	
TS within PW	L=H# L=H	OK/*
TS within PPh	L=H=L=L	*
TS within IP	L L	*

In *huangqiang* style,

(48) Lyrics	大 概 是	他	事	情	忙	Match
BT	LH MH LH	HL	LH	LH	LH	
Melodic tier	1 3 $27_{\flat}$	$6_{\flat}5_{\flat}$	$3_{\flat}3_{\flat}$	$5_{\flat}5_{\flat}$	$5_{\flat}$	
TS within PW	L=H# LH#	HL# L=H# LH				OK/*/OK/OK/ok
TS within CG	L =H					*
TS within PPh	L=H=L=L#L=H=L					ok/*
TS within IP	L			L		*

In *xiaodiao* style,

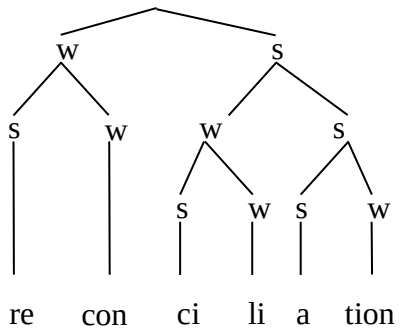
(49) Lyrics	洪 湖 岸 边 是 家 乡	Match
BT	LH LH LH ML LH HL HL	
Melodic tier	3♭ 5♭ 6♭ 16♭ 12 53 55♭	
TS within PW	L=H# L=H# LH# H=L	OK/ok/OK/OK
TS within PPh	L=H=L=L# L=H=L	*/ok
TS within IP	L L	*

4.4.4 Foot

There is a discussion about if there is a foot in Mandarin. Zhang proposes that Foot(Ft) is a prosodic unit that is higher than a syllable and lower than a prosodic word in the prosodic hierarchy. The definition of foot is related to the metrical binary contrast that in stressed language, a foot consists of a strong syllable and a weak syllable, with the strong syllables carrying the primary stress. Whether foot as a prosodic unit exists in a language or not is determined by the existence of foot formation. Mandarin does not have the feature of metrical binary contrast like stressed language. Therefore, there is no foot in phonological hierarchy in Mandarin. We can also find evidence from music to support this idea.

Linguistics seek for the similarities in music structure. Lerdahl and Jackendoff (1983) has proposed the deep structure between metrical structure and time-span reduction[12] (more details will be presented in Chapter V). The metrical rules determined the position of word stress in various language. For example, for the idea of feet, in Liberman and Prince (1977),

(50)



In their notion, each node of the tree dominates either a surface syllable or two other branches, one strong(s) and one weak(w), and such sw comparison are organized into the prosodic unit, foot.

When comparing the rhythm with prosodic structure, I only examine the tree itself. In both trees, each branch divides into braches that are classified according to a binary opposition. In the

12 Time-span reduction is a tree and grid construction based on the metrical structure and the grouping structure of a part of a music piece, as to reflect the hierarchical relationships between all pitches in relation to the tonality of the pieces (Lerdahl and Jackendoff, 1983; Gibber and Schreuder, 2002)

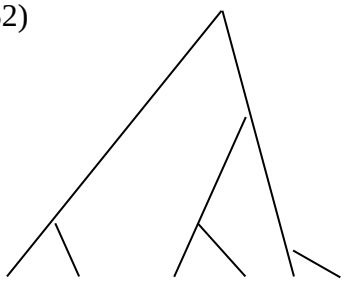
time-span-reduction tree, the opposition is head versus elaboration, while in the prosodic tree, the opposition is strong vs. weak. See example (51)

(51)

prosodic time-span prosodic time-span

With this equivalence, it is possible to convert a prosodic tree into time-span reduction notion by systematically substituting time-span configurations for the corresponding prosodic nodes in the tree. Therefore, the word reconciliation can be converted into the following tree

(52)



re con ci li a tion

Selkirk's prosodic categories is also compared with the time-span segmentation. Lerdahl compares the subgroup and group of time-span segmentation with prosodic hierarchy. For example,

(53)	at	tire
syllable level	[	][ ]
foot	[	[ ]]
word	[	]

The initial syllable is not simply an odd syllable added at the beginning of the word, but is adjoined to the rest as the beginning of an extra foot level, which is a particularly significant parallel with the treatments of upbeats in time-span segmentation.

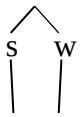
In each case, a weak segment separated by a major boundary from the preceding strong segment is instead adjoined to the following segment. Although we can't say for sure these two systems are interchangeable, it is at least an interesting coincidence. Both the time-span and prosodic trees represent a hierarchy of binary opposition: head vs elaboration and strong versus weak.

Each of the layers in the prosodic hierarchy has a characteristic rule of set of rules for determining relations of prominence. For example,

a. In a foot that immediately contains two syllables, the first syllable is strong

b. In a foot that immediately contains a foot and a syllable, the foot is strong

(54)



mo dest

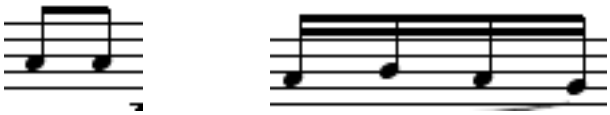
syllable level [ ] [ ]

foot [ ]

The grouping in music is achieved by actual stress. When the stress occurs at regular intervals, the beats fall into natural time measure, and such measure is by periodically making one note stronger than the others. I will use duple meter as an example. Duple meter is a meter in which each measure is divided into two beats, or a multiple quadruple meter. For instance, in the time signature 2/4, each measure contains two quarter notes (2) and four beats (4).

In duple meter, the first meter is the stressed beat and the second meter is unstressed beat. Within one beat, there are still differences in strong and weak position. If a beat is evenly divided into two parts (two eighth notes), the first part is on a strong position and the second is on the weak position. If a beat is divided into four parts (sixteenth note), the first and the third position

is on the strong and second-strong position, and second and the fourth position are the weak and second-weak position. For example,

(55)

S W S W s w

(X O) (X O x o)

The capital s and w stand for primary strong and primary week position, and s and w stand for second-strong and second-weak position.

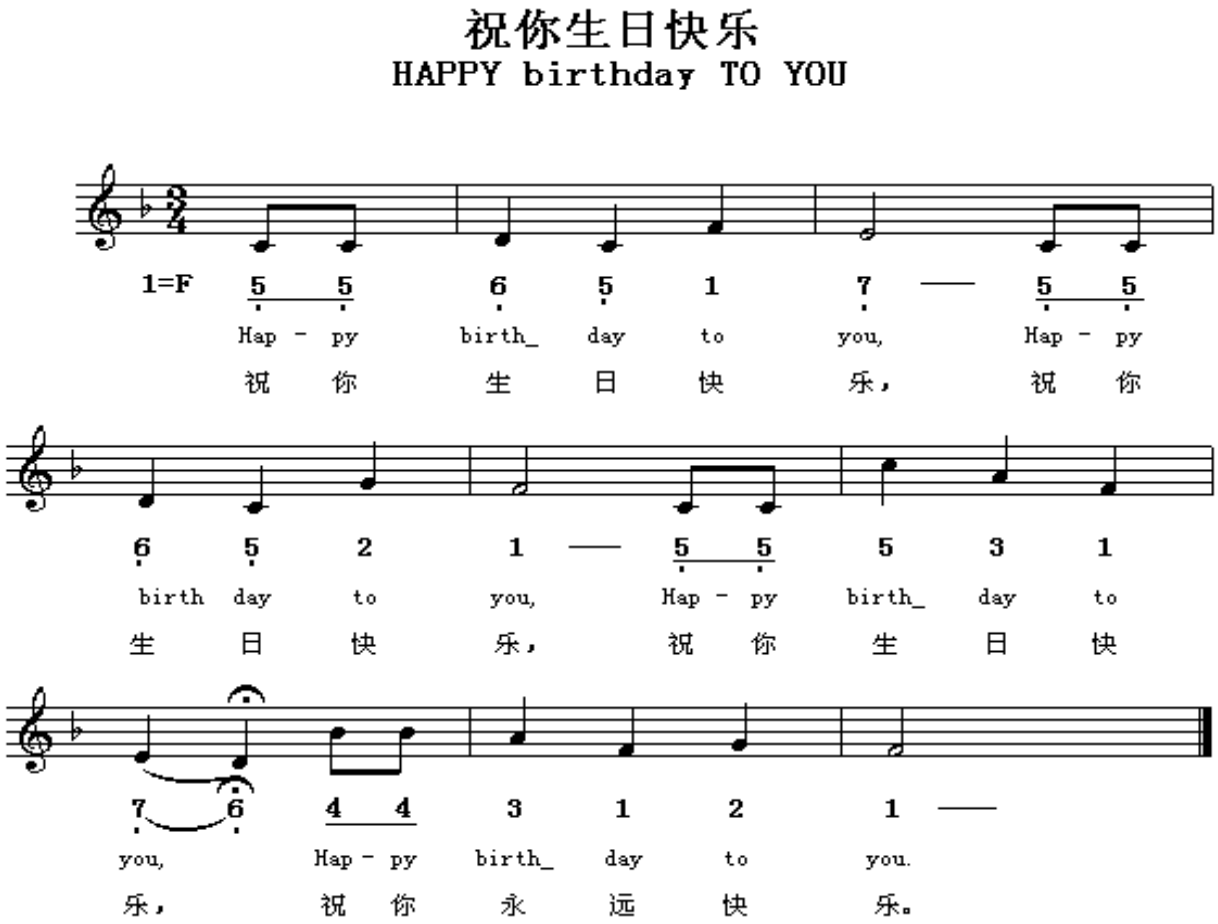
Syncopation has a special division of stress. Syncopation involves a variety of rhythms, which are in some way unexpected, which make part or all a tune or piece of music offbeat. Syncopation breaks the normal strong-week relationship in the meter. It creates two stresses, the beat stress and the syncopation stress. Usually, the syncopation is more salient than beat stress. For example,

(56)

W S S

(o X) X

In English song, there is clear match between the music rhythm rule with the prosodic structure. I will use the song, Happy Birthday as an example,

Figure 15. Music Score of the song, Happy birthday to you

(57)

Ft		Ft		Ft	Ft
σ_s	σ_w	σ_s	σ_w	σ	σ
Hap	py	Birth	day	to	you
s	w	S	w	w	S

The song, *Happy birthday* is an example of anacrusis forms in rhythm. Anacrusis, also known as pickup note, is a note or notes that precede the downbeat in a bar. Usually, the first measure has fewer beats per measure than the time signature indicates. The regular measure starts with a stressed beat(downbeat); however, the anacrusis is not always stressed. Therefore, as example (57) shows that the start position of the word Hap-py is second-strong instead of primary-strong in this measure. The strongest beat lies on Birth-day. Example (57) shows that the stressed and unstressed syllable are perfectly matched with the strong and weak beat in music.

However, when we compare it in the Chinese version,

(58)

祝	你	生	日	快	乐
S	w	S	w	w	S

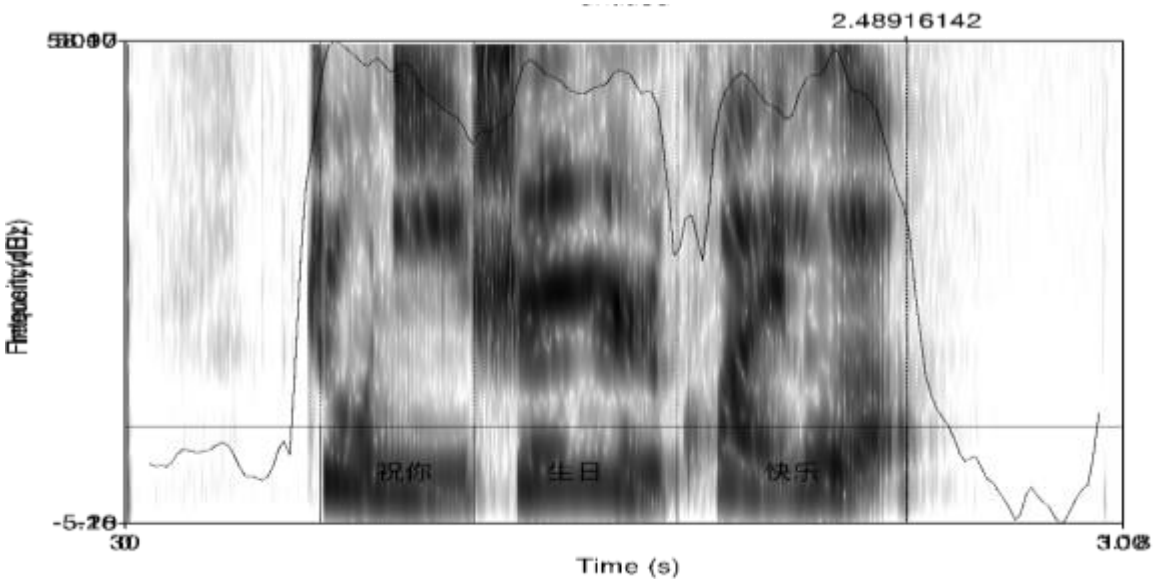
There is a metrical binary contrast in musical rhythm. Chinese is not a stressed language, so there is no metrical contrast. But even though we assume that there is a strong-weak contrast in the sentence 祝你生日快乐. The contrast should be listed in example (59)

(59)

Ft		Ft		Ft	Ft
σ_s	σ_w	σ_s	σ_w	σ	σ
祝	你	生	日	快	乐
s	w	S	w	w	S

However, in speech, the stress wont' be placed on the syllable 生 in 生日. Similarly, we won't place stress on 乐 in 快乐. The following is the intensity graph of the sung melody 祝你生日快乐. There is no significant difference of the change within 生日 and 快乐.

Figure 16. Pitch contour of the singing line, 祝你生日快乐



Therefore, the above discussion can provide evidence to Zhang's idea that there is no foot in the prosodic hierarchy because Mandarin is a syllable-based tonal language without prominent metrical contrast between two adjacent syllables.

4.5 Summary and Reflection

This chapter provides a thorough analysis to investigate the match situation between music tune and linguistic tone within different prosodic domains. The analysis of the structure of the music rhythm also provide evidence to support the linguistic question that if there is no foot in Mandarin.

The study originally tries to present a new perspective of adopting the scientific way to reveal the tone-tune relationship in *Huju*. Although the findings reveal that the tone-tune relationship is not restricted by prosodic units in *Huju*, there is still a high percentage of match with respect to the contour shape between music and language. Compared with the 91.81% tone-tune match in Cantonese music (see section 2.1.2.4), and entirely mismatch condition in Mandarin pop songs, the results confirm with my hypothesis that fewer tones in a language, there

are also smaller probabilities of a link between tone and tune. Furthermore, the findings from the linguistic perspective are different from the musicians' idea that the word tones have a limited effect on *Huju*. When examining the examples of match/mismatch across different prosodic domains, in spite of the fact the optimal or non-optimal match situation may be inclined to present "rules" within different aria singing types, it is hard to conclude a well-formedness rule in general. However, some mismatch cases indicate that the clash between tone and tune usually happen on those words or types of arias that include more musical property than linguistic property. If the linguistic property of a word in music piece plays an upper hand, the tone and tune are inclined to be matched; if the music property of a word in music piece are more prior than its linguistic property, the tone and tune are inclined to be mismatched with each other.

Since the prosodic domains do not have a direct influence on the interface between music and language, what elements should we compare then? In other words, what structure can be compared between music and language? Also, the cognitive understanding of the music and language are different. For example, there won't be a huge divergence among people to decide if a sentence or speech sounds ungrammatical or bad, but people may hold opposite opinions when

decide if the music piece sounds appealing or good. Therefore, there are well-formedness rules in linguistic area, is such kind of rule still applicable to music? Those questions are what I am going to explore for the next chapter.

Chapter V: GTTM and OT analysis of Huju

5.1 Introduction

5.1.1 GTTM Theory

To answer the questions raised at the end of the Chapter IV, Generative Theory of Tonal Music(GTTM) need to be introduced and explored. According to the previous analysis, it indicates that the tone-tune relationship is not sensitive to prosodic structure, which means prosodic domain might not be the right structure to explore the parallel between language and music. The question has then been raised as to what kinds of elements can be compared between the two areas.

Jackendoff and Lerdahl (1983) proposes a claim about the parallels between language and music, known as Generative Theory of Tonal Music(GTTM). GTTM is based on Western tonal music. They have used and discussed the linguistic methodology in generative grammar and the possibility of applying Optimality Theory (OT) to study music. The OT Theory is then brought to music by Gilbers and Schreuder (2002) and Van der Werf and Hendriks (2004). Gilbers and

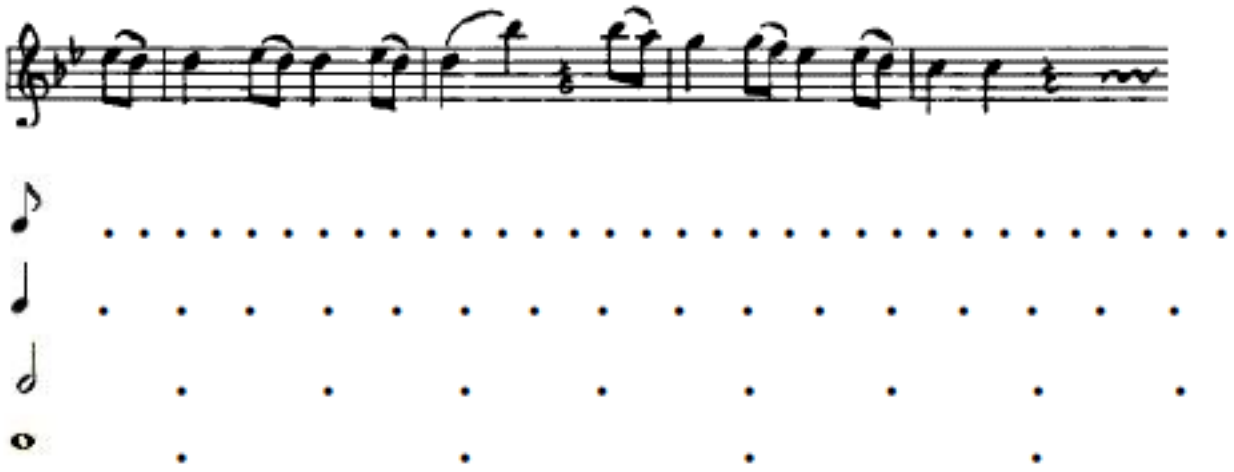
Schreuder (1987, 2002) shows that music theory can be useful to describe linguistic rhythmic variability, and a system like OT can describe the processes of musical cognition as well.

Two major findings emerged from the GTTM: 1) they both use metrical grids to "mark off temporal regularities" and 2) the trees for time-span reduction in music are a notational variant of the prosodic trees of the Liberman-Prince (1977) theory of stress. Regarding the first parallel addressed by Jackendoff (1989), he finds that in both music and language, metrical weights strongly rely on length. Below are illustrations of metrical grids. Example (60) and example (61) are adapted from Hayes (1995) and Jackendoff (1989)

(60)

```
                x
x               x
x       x       x
x   x   x   x   x
Mississippi   mud
```

(61)

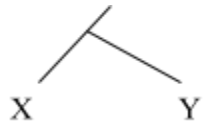


The Xs in the bottom row of (60) and the dots in the top row of (61) are the place markers. A place marker in phonology indicates a syllable. Analogously, a place marker in music indicates a beat of the lowest level in metrical structure. The other Xs in (60) mark the stressed syllables. Syllables that are more stressed have more Xs than others. The dots in example (61) are used to mark stressed beats of any given level, and the beat with the most dots has the most stressed. The Xs and dots are equally spaced.

As for the time-span reduction, it concerns the head-elaboration relationship among pitches in a musical piece and describes the implicit knowledge about surface structures (Yan 1993). A time-span is the interval between beats. A beat is a point in time, so it has no duration. It is the time-span which has duration. Musical heads refer to those relatively more important

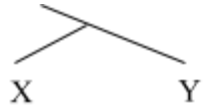
pitches, while elaborations refer to less important pitches (Lerdahl & Jackendoff 1983). Elaborations are considered as the ornamental pitches to the heads, therefore they can be deleted, without affecting the overall structure of a piece in some way. The deletion of the elaborations reduces the time-spans, so this process is termed time-span reduction. The reduction takes place at the smallest level of the time-spans to larger levels. It is represented with tree diagrams in GTTM.

(62)



Y is a right-branching elaboration of X, X is downbeat, downbeat dominate afterbeat. Y is a less stable event

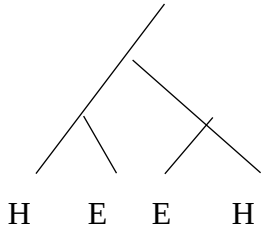
(63)



X is a left-branching elaboration of Y, afterbeat dominates downbeat. X is the less stable event

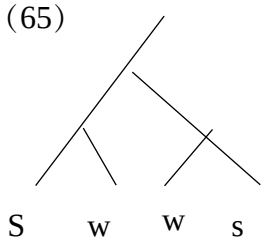
Below is a simplified version of a time-span reduction tree, where H stands for head and E stands for elaboration

(64)



Such structures fairly resemble the prosodic trees in phonology

(65)



S and W refers to strong and weak syllables respectively. A musical head may be taken as like a strong syllable in a prosodic tree and an elaboration as being like a weak syllable. As mentioned in Chapter II, many of the *Huju* songs reflect people's everyday lives. In certain respects, the musical grammars of *Huju* should be closer to the nature of Shanghai dialect

speakers' unconscious knowledge of music. For this reason, GTTM is able to account for *Huju* as well.

In Chapter IV, a question has been raised that what elements can be compared between music and language. Based on the fundamental concept of GTTM is language and music, as form of temporally ordered behavior, is deeply structured the same way. Gilbers and Schreuder (2002) demonstrate the similar processes between musical and linguistic cognition through OT analyses. In GTTM, Lerdahl and Jackendoff claim that so called music heads and dependents are defined by preference rules. Preference rules "designate out of the possible structural descriptions that correspond to experienced listeners' hearings of any particular pieces" (Lerdahl & Jackendoff 1983). Preference rules is not strict on the outputs. Since some outputs are more favored than other, it is possible for a preferred interpretation to violate the other rules in a music pieces. Although there is no direct counterpart in standard linguistic theory, the idea of violable output-oriented preference rules in GTTM is similar to Prince and Smolensky's Optimality Theory (1993). The idea of using well-formedness condition on outputs and constraints to

determine grammaticality, and the constraints are not strict but violable is very similar. The comprehensive form of the GTTM theory is concluded in Figure 17.

Although the GTTM is based on the western tonal music, it is reasonable to find music universals across different music genres. It would be interesting to see a comparison of Chinese classical music and Western classical music, because in the literature these two music genres are claimed to be very different from each other.

Yang (1986) mentioned that unlike Western classical music, metrical shifts (i.e. switch of meters) appear often in Chinese classical music. Shen (1982) and Yang (1986) even argue that regular stresses do not occur in Chinese classical music. They claim that stress can be imposed on any note anywhere in a piece by performers. Moreover, Yang (1986) also claim that the segmentation of musical flow in Chinese classical music is determined by Ju 句 (a sentence) and Dou 逗 (a pause), and that it is more flexible than in Western classical music. If the concept that language and music structure in the same way is true, the music features in *Huju* can also represent the linguistic features of Shanghai dialect.

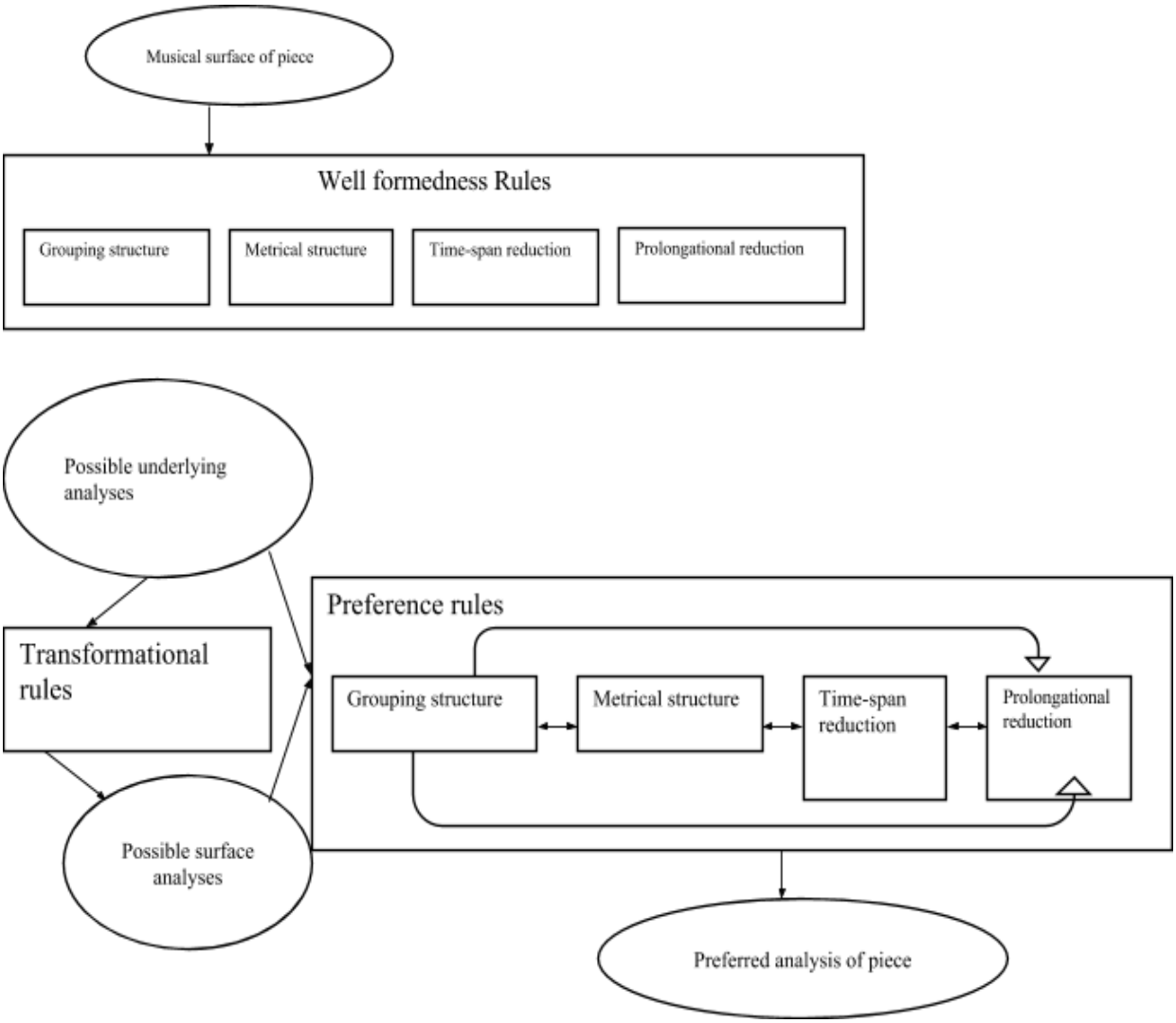
5.1.2 Five levels in GTTM

Lerdahl and Jackendoff (1983) considered the GTTM to be "a formal description of the musical intuitions of a listener who is experienced in a musical genre". By musical intuition, they refer to a listener's unconscious knowledge of music as that which enables a listener to perceive the organization of a musical piece. The musical grammar is affected by the different genres. In other words, Lerdahl and Jackendoff (1983) claim that all human beings basically share the same cognitive capacities for music, but that musicians get their talent from a richer experience in music. There are five levels of mental representation for music in the GTTM: 1) Musical Surface, 2) Grouping Structure, 3) Metrical Structure, 4) Time-span Reduction and 5) Prolongational Reduction. The first level has a flat sequential organization, while the other four levels are all hierarchical. The rest of the four hierarchical levels are all derived from the Musical Surface. In the following analysis, only grouping structure and metrical structure will be introduced and discussed.

GTTM comprises a system of rules and derives interpretations of the fixed musical pieces. There are two main sets of rules in GTTM, which are Well-Formedness rules and Preference

rules. As introduced before in section 5.1.1, the Well-Formedness rules establish the formal structures and their relationship to the string of pitch-events that form a piece. Preference rules establish which of the possible formal structures can be assigned to a piece to correspond to the listeners' actual intuitions (Lerdahl and Jackendoff 1983). The GTTM shows that Preference Rules are genre-specific. In addition, all the rules in the GTTM can be applied to structures in a single piece. As I have mentioned earlier, GTTM defines music universals to be universals of musical grammars—"the principles available to all experienced listeners for organizing the musical surfaces they hear, no matter what genre they are experienced in". In this sense, simple musical forms are constructed on the same knowledge base as complex music forms. Therefore, GTTM should be able to account for opera tunes as well as western tonal music like Beethoven's and Mozart's symphonies.

Figure 17. Comprehensive theory of music (Lerdahl and Jackendoff)

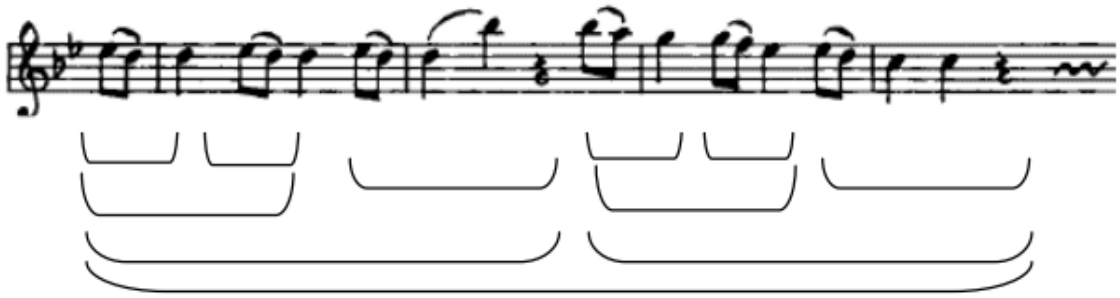


5.2 Grouping Structure

5.2.1 Introduction

Grouping refers to the segmentation of the musical surface, decomposing it into groups, such as motives, themes, phrases and so on. In music theory, the music stream of sounds or defined as grouping structure here, is hierarchically divided into domains. Each domain contains some smaller domains. The smallest domain in music is motif, which has at least two notes and one of them should be strong. Several motifs form themes. A theme generally covers two measure long. The listener is always able to recognize the theme. Several themes together form a phrase, and it is usually four measures long. Compared with the concept in languages, the motif in music is like morpheme. Several morphemes together and form a larger meaning-bearing unit, such as words, compound, constituents, etc.

In GTTM, grouping structures are notated by the use of slurs under the notes of a musical score. A grouping example on the opening of Mozart's Symphony in G Minor, K. 550 is shown below (Lerdahl & Jackendoff 1983).

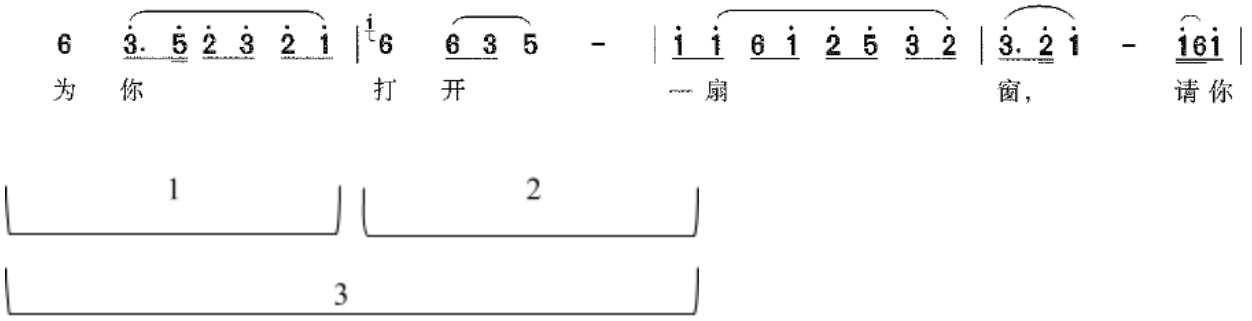
(66)

The grouping structure is not unique to musical cognition. Lerdahl and Jackendoff (1983) mentioned that the grouping structure is a common property found in many areas of human cognition. It is quite natural for us to segment a series of elements into chunks or groups in our daily life. For example, a person's telephone numbers can be segmented into three or four digital chunks. Analogously, when people listen to music, a series of pitches will be segmented into groups unconsciously. Moreover, the process of grouping is not arbitrary. There are principles behind it. Most of the factors encoded by the principles are the relative distance (proximity) and similarity among the elements. These two main principles tell us a lot about optimal groupings. In GTTM, there are overall restrictions on the group structure, and those rules are termed Grouping Well-Formedness Rules (GWFRs) and Grouping Preference Rules (GPRs). There are

five GWFRs and seven GPRs in total, but in this study, only rules that are relevant to the analysis of *Huju* will be introduced.

5.2.2 Examples in Huju

Below is the application of Grouping Well-Formedness Rules (GWFRs) and Grouping Preference Rules (GPRs) in the first four measures of *为你打开一扇窗*. I will first introduce the GWFRs that are relevant to the grouping and then go to the GPRs. Notice that the arcs which mark the groupings are numbered for our convenience in the discussion. These groupings are intended to reflect real psychological structures. The purpose of the rules in GTTM is to describe these structures.

(67)



All the slurs above obey the first Grouping Well-Formedness Rule (GWFRs), because the pitch-events grouped together are all successive.

(68) GWFR 1: Any contiguous sequence of pitch-events, drum beats, or the like can constitute a group, and only contiguous sequences can constitute a group.

Some bigger groups embrace smaller groups in the above graph. For instance, slur 3 embraces slur 1 and slur 2; This embracing relationship obeys GWFR 3.

(69) GWFR 3: A group may contain smaller groups.

However, there are restrictions on the embracing relationship. These are encoded in GWFR 4 and GWFR 5.

(70) GWFR 4: If a group G1 contains part of a group G2, it must contain all of G2.

(71) GWFR 5: If a group G1 contains a smaller group G2, then G1 must be exhaustively partitioned into smaller groups

As for the Grouping Preference Rules (GPRs)

(72) GPR 1: strongly avoid groups containing a single event.

According to Lerdahl and Jackendoff (1983), small groups are not preferred in musical grouping, because they are not easy to be perceived in musical flow. Therefore, I don't mark those pitch-events with arcs beneath them into smaller groups. Another reason for the grouping is based on GPR 3 (Lerdahl and Jackendoff 1983).

(73) GPR 3

(Change) Consider a sequence of four notes $n_1n_2n_3n_4$. All else being equal, the transition n_2-n_3 may be heard as a group boundary if

a. (Register) the transition n_2-n_3 involves a greater intervallic distance than both n_1–n_2 and n_3–n_4, or if b.

b. (Dynamics) the transition n_2-n_3 involves a change in dynamics and n_1–n_2 and n_3–n_4 do not, or if c.

c. (Articulation) the transition n_2-n_3 involves a change in articulation and n_1–n_2 and n_3–n_4 do not, or if d.

d. (Length) n_2 and n_3 are of different lengths and both pairs n_1, n_2 and n_3, n_4 do not differ in length.

According to GPR 3 in the example sentence, the transition of the second and third pitch-events do not involve a change in register, so there is no boundary between them. The pitch-events in measure two cannot be divided into smaller groups, because they don't involve a change in register either. On the other hand, a group boundary will be heard between the first and second measures caused by GPR 2.

(74) GPR 2: (Proximity) Consider a sequence of four notes $n_1n_2n_3n_4$. All else being equal, the transition n_2-n_3 may be heard as a group boundary if ,

a. (Slur/Rest) the interval of time from the end of n_2 to the beginning of n_3 is greater than that from the end of n_1 to the beginning of n_2 and that from the end of n_3 to the beginning of n_4, or

b. (Attack-point) the interval of time between the attack point of n_2 and n_3 is greater than that between the attack points of n_1 and n_2 and that between the attack points of n_3 and n_4

As has been noted earlier, the term *slur* in GPR 2 refers to the arcs below or above pitch-events in a musical score. These musical slurs do not correspond to grouping slur. An attack-point is a point in time when a pitch-event begins to be played. Based on GPR 2a, since there is an unslurred transition between slurred transitions, a boundary must be placed between the first

and second measures. Notice that the grouping structures in the first measure is the same as the one in the third measure. This is not purely a coincidence, but a reflection of their parallel constructions described in GPR 6,

(75) GPR 6: (Parallelism) Where two or more segments of the music can be construed as parallel, they preferably form parallel parts of groups.

As a final point, these four measures can further be treated as a bigger group in a larger level, as shown by group 7. The principle that allows this is stated in GPR 5 (Lerdahl and Jackendoff 1983).

（76） GPR 5: (Symmetry) Prefer grouping analyses that most closely approach the ideal subdivision of groups into two parts of equal length.

The parallelism of groupings in the first four measures causes symmetry, and therefore those smaller groups form a larger group.

The rules I picked above represent part of the features in *Huju*. As mentioned in Chapter II, different arias styles in *Huju* have special music features. For example, *changqiang* style is very similar to chanting, and the lyrics follow certain rhythmic patterns. For a seven-character line,

the combination is usually (2+2) +3. The last three syllables can be also sung as 2+1.Such word combination is quite similar to GPR3 that there is a group boundary on the transition n_2-n_3.

5.3 Metrical Structure

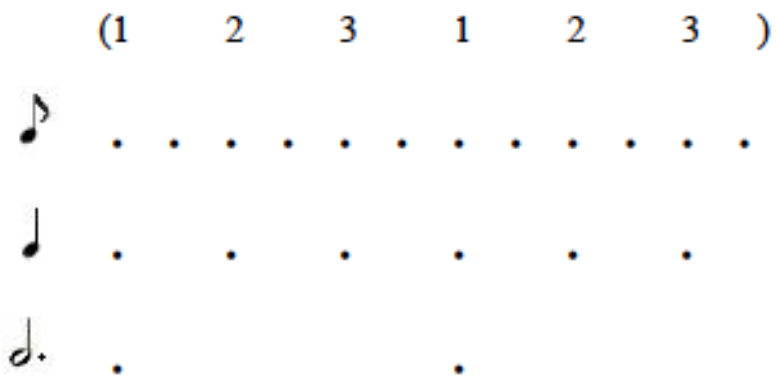
5.3.1 Introduction

Metrical structure is a hierarchical organization concerned with the patterns of strong and weak beats in a piece. Recall what we have introduced before that in both language and music, metrical weights rely on length. A heavy beat is regarded as a strong beat, which means a strong beat is relatively more stressed, and the time-span of a pitch-event on a strong beat has relatively longer duration. Lerdahl and Jackendoff (1983) clarify musical stress as follows. They point out there are three kinds of stress in music: phenomenal, structural and metrical. Phenomenal stress is free and can occur anywhere at the musical surface. A performer may use this kind of stress to emphasize any pitch-events in a piece he or she wants. Structural stress, as implied by its name, is caused by the musical structure. For example, the cadence of a phrase is likely to be stressed. This kind of stress doesn't occur regularly in a piece. As for the metrical stress, it is a regular

mental construct that listeners impose on music. This is the kind of stress that GTTM is concerned with.

In addition, the GTTM claims that metrical structure is a relatively local phenomenon. Lerdahl and Jackendoff (1983) stated, “Even though the dots in a metrical analysis could theoretically be built up to the level of a whole piece, such an exercise becomes perceptually irrelevant except for short pieces”. To capture the metrical structure, a metrical grid is used to mark off the metrical regularity. Since the organization of metrical structure is hierarchical, there are two or more levels of beats in the metrical grid of a piece. In the metrical grid, a dot represents a beat at a given level, and each dot should be equally spaced at any given level. For example, here are two measures of a 3/4-meter grid (Lerdahl & Jackendoff 1983).

(77)

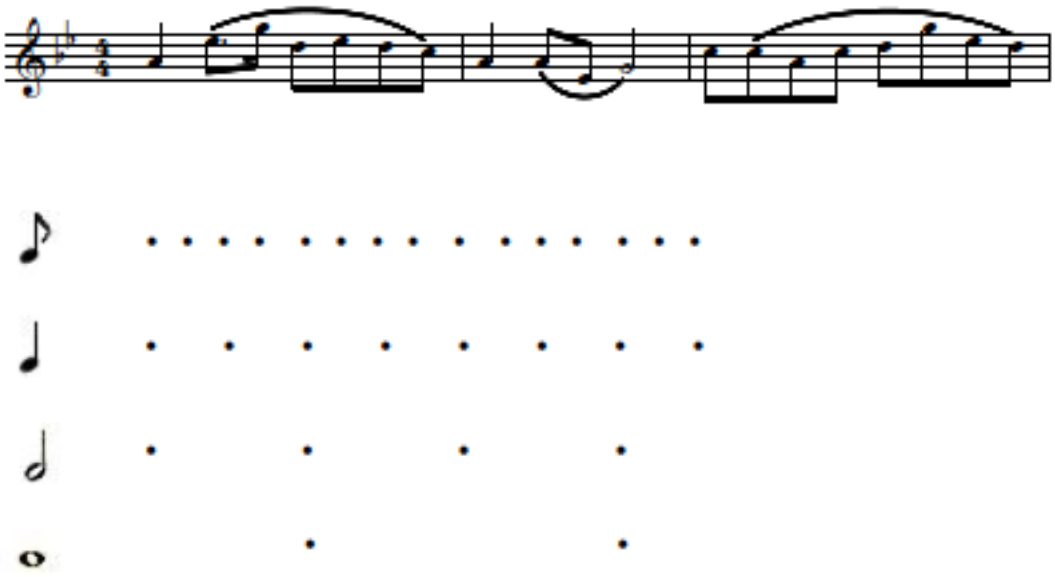


There are three levels in this grid. The smallest level is the eighth-note ( ) level. It is the note with the shortest time-span in a piece that occurs in this level. The intermediate level is the quarter-note ( ) level and the largest level in this grid is the dotted-half-note ( ). The dots in the largest level indicate the most stressed beat. Therefore, this metrical grid indicates that the first beat of a measure in 3/4-meter is the strongest beat. Lerdahl and Jackendoff (1983) also pointed out that in Western music, "the time-spans between beats at any given level must be two or three times longer than the time-spans between beats at the next smaller level." Like the grouping structure, the overall restrictions on the metrical structure are stated in rules in the GTTM. There are four Metrical Well-Formedness Rules (MWFRs) and ten Metrical Preference rules (MPRs) in total. Rules that are relevant to our analysis will be described in the following discussion.

5.3.2 Examples in *Huju*

I still adopt the piece “为你打开一扇窗” to analyze the metrical structure of its first three measures. Each metrical level will be given the time-span note value to its left for the convenience in the discussion,

（78）



There are four levels in this analysis. The note which has the shortest time-span in this song is the eighth-note, and it is also the lowest metrical level. Since this is a 4/4-meter piece, the time-spans of the beats at each level are two times longer than the time-spans of the beats at the next lower level. Every note in the analysis is associated with a beat at the lowest level.

（79） MWFR 1: Every attack point must be associated with a beat at the smallest metrical level present at that point in the piece

Given that an attack point refers to a point in time when a pitch-event begins to be played, and it is treated as a note or a pitch-event. Furthermore, in the metrical grid, a beat at a larger level is also a beat at a smaller level. This is a restriction stated by MWFR 2,

（80） MWFR 2: Every beat at a given level must also be a beat at all smaller levels present at that point in the piece.

As mentioned before, a dot at a given level, except for the smallest level, indicates a strong beat at that level. So, the dots at the quarter-note and half-note levels indicate stronger beats in the metrical grid. Note that the strong beats at each level are spaced two beats apart. This is consistent with the statement of MWFR 3 and MPR 10.

（81）MWFR 3: At each metrical level, strong beats are spaced either two or three beats apart.

（82）MPR 10 (Binary Regularity): Prefer metrical structures in which at each level every other beat is strong.

As in Grouping Structure, the two parallel constructions in the first four measures will receive the same metrical analysis. MPR 1 formalizes this phenomenon.

（83） MPR 1 (Parallelism): Where two or more groups or parts of groups can be constructed as parallel, they preferably receive parallel metrical structure.

To link up the metrical analysis with grouping structure, I find that at the quarter-note and half-note levels, the strongest beat in a group is always the first beat in that group, though this is not strongly preferred in GTTM.

（84） MPR 2 (Strong Beat Early): Weakly prefer a metrical structure in which the strongest beat in a group appears relatively early in the group.

A strong beat in music tends to be stressed. It is shown clearly in the metrical grid that the strongest beats have the most dots. MPR 4 describes this preference.

（85） MPR 4 (Stress): Prefer a metrical structure in which beats of level L_i that are stressed are strong beats of L_i.

As in language, strong beats are dependent on weights. Here are the ways to decide a strong beat listed in MPR 5

（86） MPR 5: (Length) Prefer a metrical structure in which a relatively strong beat occurs at the inception of either

a. a relatively long pitch-event

b. a relatively long duration of a dynamic,

c. a relatively long slur,

d. a relatively long pattern of articulation,

e. a relatively long duration of a pitch in the relevant levels of the time-span reduction, or a relatively long duration of a harmony in the relevant levels of the time-span reduction (harmonic rhythm).

The principles that MPR4 and MPR5 state are similar to those for phonology in language. Heavy syllables, also known as strong syllables, carry stress in many languages. This has been contributed to the Weight-to-Stress Principle in Prince (1983) that if a syllable is heavy, then it is stressed. The weight of a syllable depends on the number of moras it has. A light syllable has only one mora and a heavy syllable has two moras. In terms of length, the vowels in heavy

syllables are relatively longer than those in light syllables. However, in phonology, length is supposedly quantized (heavy vs. light), but in music, it's gradient.

5.4 OT Analysis of Huju

Yan (1993) demonstrated how to apply OT on music in Chinese folk songs. She found similarities between constraints for music and prosody, and the constraints are listed in (87). As mentioned before, one of the goals of GTTM is to find the music universals across different music genres, which means the OT constraints and rules should be similar in different music genres. Yan (1993) has already proved that her constraints work in Chinese folk song and western tonal music. Therefore, my analysis on *Huju*, or Chinese opera music will take the previous rules as a reference.

(87)

Purpose	Music	Prosody
Making boundaries	Align (Group, Left/right, slur, Left/right)	ALIGN-RED-L, etc.
Feet (Groups)	BINARITY, TERNARITY	BINARITY, TERNARITY
Stress	Weight-BY-POSITION Weight-To-STRESS	Weight-BY-POSITION Weight-To-STRESS

5.4.1 Grouping Structure

I will still use “为你打开一扇窗”as the main example for the OT analysis of Grouping Structure. The second measure of “打开”is given again above in example (67). In this measure, all four pitch-events form one group at the smallest level. This is due to an interaction of five constraints, which will be discussed one by one as follows. The MIN-BINARITY constraint has the greatest effect on the grouping of measure one. The principle behind this constraint is GPR 1, which strongly disfavors groups containing a single pitch-event.

(88) MIN-BINARITY

A group contains no fewer than two pitch-events.

Since GTTM claims that single-pitch-event groups are strongly avoided, I predict the MIN-BINARITY constraint to be ranked high. This constraint is illustrated in the tableau 1 below. Notice that the pitch-events have been digitized, 1 is for the first pitch-event, 2 is for the second pitch-event, and so on. Brackets are used to mark groupings.

Tableau 1 Demonstration of MIN-BINARITY in the second measure of 为你打开一扇窗

Input: 1 2 3 4	**MIN-BINARITY**
a. [1][2 3 4]	*
b. [1][2][3 4]	**
c. [1][2][3][4]	****
d. [123][4]	*
e. [1][2 3][4]	**
f. [1 2][3 4]	
g. [1 2 3 4]	
h. [1 2] [3] [4]	**

As shown in the tableau, the MIN-BINARITY constraint blocks all but two grouping combinations with single-pitch-events, leaving two (f and g). One divides the four pitch-events into two groups, and the other makes the four pitch-events into one group. The constraints relating to these two groupings are given below.

（84） PITCH(X)PITCH(X)

Adjacent pitch-events that have a same pitch are grouped together.

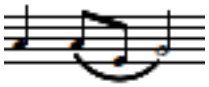
（89）ALIGN (Group, Left, Slur, Left)

Align the left edge of a musical slur with the left edge of a group.

The PITCH(X)PITCH(X) constraint derives from GPR 3a. It states a transition of two pitch-events may be heard as a group boundary if it is involved in a greater change of interval than its neighbors. PITCH(X)PITCH(X) says that the second and third pitch-events should not be separated into different groups. The constraint ALIGN (Group, Left, Slur, Left) comes from GPR 2a, in which a musical slur is said to symbolize a group, while a rest indicates a group boundary.

The interaction, among MIN-BINARITY, PITCH(X)PITCH(X) and ALIGN (Group, Left, Slur, Left), which are related to the first measure, is described by the following:

Tableau 2. Analysis of the second measure of 为你打开一扇窗

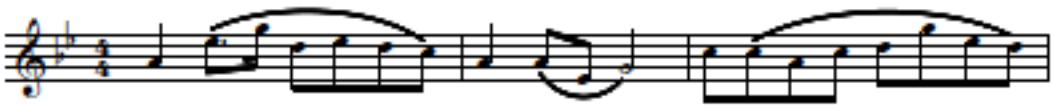
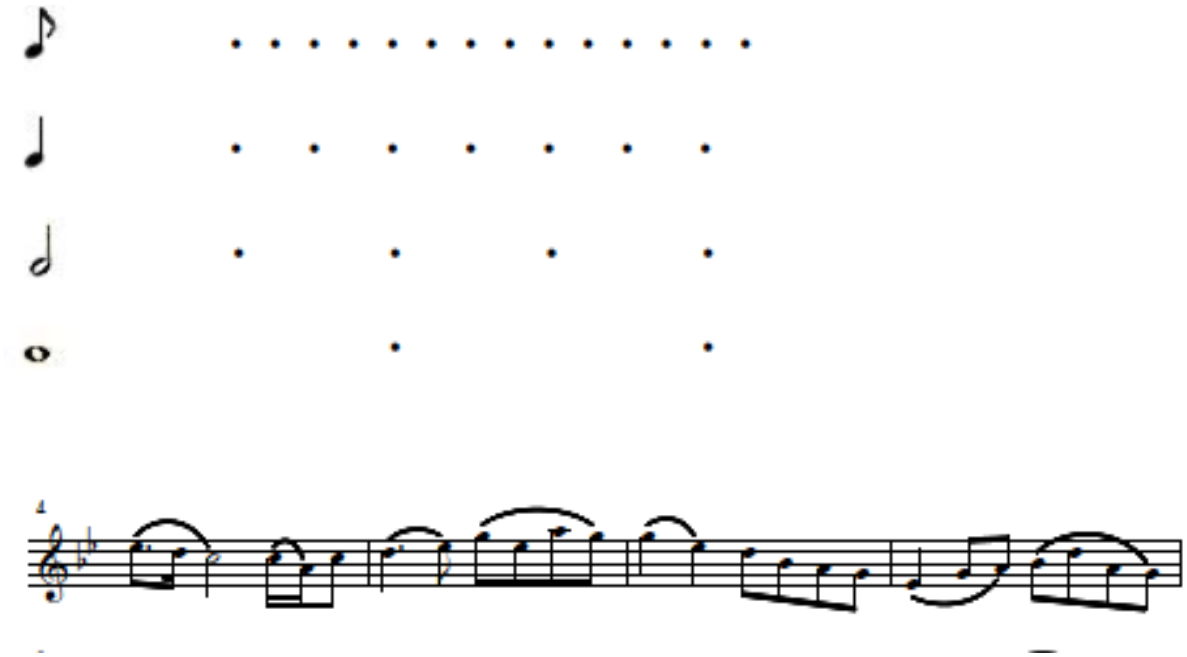
Input: 1 2 3 4	MIN-BINARITY	PITCH(X)PITCH(X)	ALIGN (Group, L, Slur, L)
a. [1][2][3][4]	****!	*	
b. [1][2 3][4]	**!		*
c. [1][2 3 4]	*!	*	

d. [12][3 4]		*!	*
e. ☞[1 2 3 4]			*
f. [1][2][3 4]	**!	*	*
g. [1 2] [3] [4]	**!	*	*
h. [1 2 3][4]	*!		*

Since PITCH(X)PITCH(X) itself implies having more than one pitch-event, it's hard to figure out the ranking of MIN-BINARITY and PITCH(X)PITCH(X). However, it is certain at both of them must outrank the alignment constraint. As for the interaction with ALIGN (Group, Left, Slur, Left), ALIGN (Group, Left, Slur, Left) would favor incorrect candidates like (a), (c), and block the optimal candidate (e). To prevent candidate (a) and (c) from winning, both MIN-BINARITY and PITCH(X)PITCH(X) should outrank ALIGN (Group, Left, Slur, Left). On the other hand, ALIGN (Group, Left, Slur, Left) would put boundaries around the second and third pitch-events, thus blocking the optimal candidate. To protect candidate (e), PITCH(X)PITCH(X) must outrank ALIGN (Group, Left, Slur, Left).

In the preceding discussion, the MIN-BINARITY constraint was said to have a great effect on groupings. Consequently, the ranking schema for Grouping Structure: MIN-BINARITY, PITCH(X)PITCH(X) >> ALIGN (Group, Left, Slur, Left).

5.4.2 Metrical Structure

Before analyzing the metrical structure of *Huju*, a concept about the metrical structure in GTTM need to be reclaimed that metrical structure is a local phenomenon, which means the analysis of metrical structure only makes sense on small scale. Lerdahl and Jackendoff (1983) even claimed that "the large level of metrical analysis is open to interpretation". Therefore, the following analysis of metrical structure will focus on small-scale metrical structures. In the GTTM analysis of the metrical structure in "为你打开一扇窗". Four metrical levels are listed in (90)

(90)



Only the largest two levels, whole-note and half-note levels, which directly tell about the most stressed beat will be discussed. With respect to the half-note level, there are three constraints involved in our analysis.

（91） BINARITY

Every other beat is stressed.

（92） WEIGHT-BY-POSITION

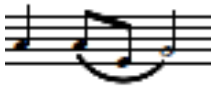
Beats aligned with the first pitch-event of a group are heavy.

（93） WEIGHT-TO-STRESS

A heavy beat is stressed. The weight of beats is counted on the duration of a pitch-event's time-span, a dynamic, a musical slur, a pattern of articulation, a pitch in the relevant levels of time-span reduction and a harmony in the relevant levels of time-span reduction. The beat with most weight in a group is claimed to be heavy.

BINARITY derives from MWFR 3, which states that strong beats are spaced either two or three beats apart. The WEIGHT-BY-POSITION constraint comes from MPR 3, which claims that pitch-events which coincide with initial beats are heavy, and the WEIGHT -TO-STRESS constraint is based on MPR 5. Below is an analysis of the first measure of "为你打开一扇窗". It describes the interaction among these constraints at the half-note level. Note that this piece is in 4/4 meter, therefore there are four beats in each measure. The numbers in the table stand for the four beats and the Xs beneath them symbolize heavy beats in the level.

Tableau 3. Analysis of the quarter-note pitch level in the second measure of 为你打开一扇窗

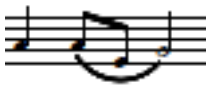
Input: 1 2 3 4	Weight-to-stress	Binarity	Weight-By-Position

a. 1 2 3 4	*	**	*
b. 1 2 3 4 x x x x		**	
c. 1 2 3 4 x x	*		
d. ☞1 2 3 4 x x			*
e. 1 2 3 4 x x		*	
f. 1 2 3 4 x x	*	*	
g. 1 2 3 4 x x	*	*	*
h. 1 2 3 4 x x		*	*

As seen in the score in (90), the fourth pitch-event has the longest duration of time-span in the group. Thus, according to WEIGHT -TO-STRESS, it should be a heavy beat. As a result, candidates without a heavy-beat mark on the fourth beat are blocked. Equally, the BINARITY constraint has a great effect on this level, since the tune is in 4/4 meter. It stipulates that stress is imposed on every other beat, which would also favor the optimal candidate. Finally, the WEIGHT-BY-POSITION constraint blocks candidates without a heavy-beat mark on the first

beat. Despite this, these three constraints do not interact with each other within this level, so that I am not able to learn the ranking of them.

Now let us look at the half-note level, which is focused on the heaviest beat, i.e. the most stressed beat. Since the whole-note level is built on the fourth-note level, I present both levels to illustrate this in the table.

Tableau 4. Analysis of the half-note level in the second measure of 为你打开一扇窗

Input: 1 2 3 4	Weight-to-stress	Weight-By-Position
a. 1 2 3 4 x x x	*!	
b. 1 2 3 4 x x x	*!	*
c. 1 2 3 4 x x x	*!	*
d. ☞1 2 3 4 x x x		*

For the same reason mentioned earlier, the fourth beat is the heavies, thus stressed. To prevent candidate (a) from winning, WEIGHT-TO-STRESS must outrank WEIGHT-BY-POSITION. Furthermore, to make sure candidates (d) is the optimal candidate, WEIGHT-TO-STRESS should be ranked above WEIGHT-BY-POSITION. The analysis so far reveals a rough constraint ranking for the metrical structure. Such findings are same with the constraints proposed by Yan (1993). The ranking schema is presented below.

（94） Ranking schema for Metrical Structure: WEIGHT-TO-STRESS (, BINARITY) >>
WEIGHT-BY-POSITION (, BINARITY)

5.5 Summary and Reflection

This chapter provides a preliminary OT analysis on *Huju*, of which goal is to reveal the evidence for music universals. Different musical genres may use the same constraints in their groupings and metrical structures, especially in grouping structures. Likewise, in GTTM, the rules for grouping structure are claimed to be universal than those for metrical structure. This supports GTTM’s claim about music universals.

Based on the OT analysis, there are resemblances between music and language. Since the constraints proposed for music adhere to the conventions developed for linguistic constraints, the OT analysis provides more specific resemblances between language and music. The corresponding constraints in language and music are that language and music both use alignment constraints to mark edges. A musical slur in music marks a group, so the ALIGN (Group, Left Slur, Left) constraint aligns the left and right edge of a group with the left and right edge of a musical slur. With a similar process, a linguistic constraint like ALIGN-RED-L (Kager, 1999) aligns the left edge of a reduplicant with the left edge of a prosody word. In addition, the constraints BINARITY are found in the metrical structures of both language and music. In language, stress feet are typically binary. Like heavy syllables in phonology, a strong beat is stressed. In a 4/4-meter piece of music, strong beats are spaced two beats apart at each level in music, that is, the stress pattern is binary. The idea of BINARITY is also analogous to the concept of BinMin (φ, ω) which requires a phonological phrase contains at least two prosodic words. Furthermore, the WEIGHT-BY-POSITION principle proposed by Prince (1983) and Smolensky (1993) is also found in music. It shows a structural property in music that pitch-

events coinciding with the first beat of a row bear stresses. In addition, the WEIGHT-TO-STRESS constraint is similar to that proposed for phonology whereby heavy syllables are determined by the weights. GTTM formalizes valid insights into music cognition by proposing rules. These rules describe our cognitive capacities of music and make the study of music scientific, rather than just artistic. What's more, GTTM is concerned with the universality among musical grammars. This follows the idea of Universal Grammar (UG), the central goal of linguistic theories. Such an approach can help in arguing for the innateness of music capacity.

Chapter VI. Conclusion and Discussion

This dissertation investigates the interface tone-tune relationship between music and language in *Huju*. The following questions await to be answered: 1) What is the relationship between music and speech melody in tonal languages? Does music follow melody or is there a clash between them? 2) If there is a clash, under what circumstances will there be a clash? 3) How are music/songs understood if there is a clash between music and langue, and 4) What interface areas can be studied between music and language?

Two research methods have been applied. The first approach is to conduct a quantitative research on the mapping conditions via comparing the music melody and linguistic tone in *Huju* through prosodic domains. The second approach is to apply the linguistic OT analysis to study the music structure in *Huju* based on music theory GTTM. A summary of tone-tune relationship studies across tonal languages is also provided.

For the quantitative analysis, an evaluation metric (three tiers: melodic, syllabic and tonal tiers; See Figure 10 and Example 16) on tone-melody matching within prosodic units is proposed. The comparison is based on the linguistic concept—prosodic constituency—including

Prosodic Word(PW), Clitic Group(CG), Phonological Phrase(PPh), Intonational Phrase(IP) and Foot(Ft). The results suggest that there is about 70% correlation between music melody and language tone in *Huju* (See Figure 14). Such findings support the hypothesis that the more tones in a language, there is a higher probability of a link between language tone and music melody. The results also differ from many musicians' opinions that the word tones have a limited restriction on the music melody of *Huju*. However, the prosodic constituents are not sensitive in the cognition of sung melody, which is different in speech cognition.

Although 70% is considered a relatively high correlation, there is still a 30% clash between music and language in *Huju*. Unfortunately, there is no regulated rules have been found from the mismatch conditions. However, some examples indicate that the mismatch cases are likely to happen when the music form plays a more prominent role than languages form in a music piece. For example, a preference has been found that *changqiang* style has less mismatch groups than *xiaodiao* and *huangqiang* within the domain of prosodic word. Compared with *xiaodiao* and *huangqiang*, changqiang is one of the arias types that have the most chanting patterns in singing, so it has more linguistic property. In addition, most of the mismatches of clitic group happen on

lining word. Lining words are only used in singing, of which music property is more prominent than linguistic property. Therefore, the mismatch conditions happen in *Huju* when the linguistic property is sacrificed to satisfy the music property in a music piece.

The second approach is to apply the OT analysis to investigate the innate structure between music and language on grouping and metrical structures according to GTTM. The ranking schema in *Huju* for grouping structure is MIN-BINARITY, PITCH(X)PITCH(X) >> ALIGN (Group, Left, Slur, Left), and the ranking scheme for metrical Structure: WEIGHT-TO-STRESS (, BINARITY) >> WEIGHT-BY-POSITION (, BINARITY). Such findings match with the constraints ranking proposed by Yan (1993) in Chinese folk song and Western tonal music. It suggests that music resembles in language from innate structure in certain ways with constraints. For examples, both language and music use alignment constraints to mark edges. The idea that it is because of the resemblances in innate structures between music and language that lead to listeners' understanding of the clash part seems to be plausible, yet music and language are indeed different. Language is an ability with which most people are born, but music is an art form created by people. Different music genres have its special music features or patterns

regardless of melody, rhythm, timbre, etc. Listeners have their preferences of music. Therefore, merely analyzing a musical piece from its structures is not enough when considering the interface between music and language. Listeners' preferences are constraints which also need to be considered. In other words, both well-formedness condition and preference condition need to be considered in the interface between music and language. It is not wise to borrow a linguistic concept and apply it in the music field directly or vice versa. Therefore, for future studies in the area of interface between music and language, there are two directions: 1) Explore the resemblances on the structure between music and language under the "universal" concept; 2) different types of music have their specific well-formedness patterns, and listeners have preference rules to help them understand the music and language. How to find the match between the well-formedness pattern and preference pattern is the focus.

This dissertation provides a preliminary model of studying the tone-tune relationship in tonal languages. Although different languages may have different constraints on music and linguistic tonal types, the innate essence of these two areas is seen to be universal. This study remains limited when it comes to the sample size, types of language and music. Future studies

can investigate other languages with respect to the proposed metric. Psychological tests on the perception of sung melody, can be considered for future studies as well.

References

Agawu, Kofi. V. 1988. Tone and Tune: The Evidence for Northern Ewe Music. *Africa: Journal of the International African Institute* 58 (2): 127–46.

Baart, Joan. L. 2004. Tone and song in Kalam Kohistani (Pakistan). *On Speech and Language: Studies for Sieb G. Nooteboom. Utrecht: Netherlands Graduate School of Linguistics*, 5–16.

Becker, Judith, and Alton Becker. 1982. A grammar of the musical genre Srepegan. *Asian Music*, 30-73.

Bodomo, Adams. and Manolete Mora. 2000. *Language and Music in the Dagaare and Twi Folktales of West Africa*. CRCG Project notes, University of Hong Kong.

Butenschon, Sine, and Hans Borchgrevink. 1982. *Voice and song*. Cambridge University Press.

Bright, William.1957. *Singing in Lushai*. Indian Linguistics. 17.24-8

Carr, Philip. 2008. *A Glossary of Phonology*. Edinburgh University Press.

Carnie, Andrew. 2013. *Syntax: A generative introduction*. John Wiley & Sons.

Chao, Yuen-Ren. 1956. Tone, intonation, singsong, chanting, recitative, tonal composition,

and atonal composition in Chinese. *For Roman Jakobson*, 52-59.

Chan, Marjorie K. M.1987. Tone and Melody in Cantonese. In Berkeley Linguistic Society, *Proceedings of the Thirteenth Annual Meeting*, 26-37.

Chan, Sau Y. 1991. Improvisation in Singing. I*n Improvisation in a Ritual Context: The Music of Cantonese Opera*, 177-262.

Chapman, Adam. 2001. Lexical tone, pitch and poetic structure: Elements of melody creation in khap-lam Vocal Music Genres of Laos. *Context: A Journal of Music Research*, 21: 21-40

_____.2003. A Crow Jumps on Rocks: Indigenous Approaches to composing and performing text in Lao Vocal Music. *Yearbook of Traditional music*, 35: 97-129

Chen, Matthew Y. 1979. Metrical structure: Evidence from Chinese poetry, *Linguistics Inquiry*, vol.10:371-420

_____. 1980. The primary of rhythm in verse: a linguistic perspective, *Journal of Chinese Linguistics*, vol.8:15-41

_____. 1984. Unfolding latent principles of literary taste—poetry as a window onto

language. *The Tsing Hua Journal of Chinese Studies*, 16, 203-240.

_____.2000. *Tone sandhi: patterns across Chinese dialects*. Cambridge & New York, NY: Cambridge University Press.

Chomsky, Noam. and Morris Halle. 1968. *The sound pattern of English*. New York: Harper & Row.

Chow, Man-ying. 2012. *Singing the right tones of the words: the principles and poetics of Tone-melody mapping in Cantopop*. Ph.D dissertation. Hongkong University

Duanmu, San. 1991. Stress and Syntax-phonology mismatches: Tonal domains in Danyang and Shanghai, *WCCFL*, vol. 10

_____. 1992. End-Based Theory, Cyclic stress, and tonal domains. *Chicago Linguistics Society*, vol. 28.

_____. 2007. *The phonology of standard Chinese* (2nd ed.). Oxford University Press.

Ekwueme, Lazarus N. 1974. Linguistic determinants of some Igbo musical properties. *Journal of African Studies*, *1*(3), 335–353.

Fodor, Jerr. 1983. *The modularity of mind: An essay on faculty psychology*. MIT press.

Gilbers, Dicky, and Maartje Schreuder. 2002. Language and music in Optimality Theory. Ms., *Rutgers Optimality Archive* [ROA-571]

Hall, Morris. and JR. Vergnaud. 1987. *Stress and the Cycle*. MIT and Tilburg University

Hayes, Bruce. 1984/1989. The prosodic hierarchy in meter. In Paul Kiparsky and Gilbert Youmans (eds.), Rhythm and meter, 201-260. Orlando, Florida: Academic Press.

_____. 1995. Metrical Stress Theory: Principles and Case Studies. Chicago: The University of Chicago Press.

Herzog, George. 1934. Speech-melody and primitive music. *The Music Quarterly*, 20:452-466

Ho, Wing-See V. 2006. "The Tone-Melody Interface of Popular Songs Written in Tone Languages". Paper presented at the 9th International Conference on Music Perception and Cognition, University of Bologna, Italy, 22-26.

_____. 2009. Fine-tuning Tone-melody Constraints through the Investigation of Mismatches in Cantonese Pop Music.I*n Multi-disciplinary Approaches to Cantonese Studies*: Papers from the 13th International Conference on

Cantonese and Yue Dialects, edited by Andy C. Chin, Kwok Bit-chee, Peppina

Huang, C-T. James, Yen-hui Audrey Li, and Yafei Li.2009. *The syntax of Chinese*. Cambridge & New York, NY: Cambridge University Press.

Hyman, Larry M., Francis Katamba, and Livingstone Walusimbi. 1987. Luganda and the Strict Layer Hypothesis, Phonology Yearbook, 4, 87-108.

Jackendoff, Ray. 1989. A Comparison of Rhythmic Structures in Music and Language. In Phonetics and Phonology, vol. 1: Rhythm and Meter, P. Kiparsky and G. Youmans, eds., pp. 15-44. New York: Academic Press.

Jackendoff, Ray and Fred Lerdahl. 1982. A Grammatical Parallel Between Music and Language. In Music, Mind and Brain, M. Clynes, ed., pp. 83-117. New York: Plenum Press.

Jackendoff, Ray, and Fred Lerdahl, eds. 1983. *A Generative Theory of Tonal Music*. Cambridge, Mass: MIT Press.

Kager, René, Qiuwu Ma, and Jialing Wang. *Optimality theory*. 1999.Vol. 2. Cambridge: Cambridge University Press.

Karlgern, Bernhard. 1950. *The book of documents*. Stockholm:Far Eastern Antiquities, Bulletin

22.

Kenstowicz, Michael J. 1994. *Phonology in generative grammar*. Oxford: Blackwell.

Ladd, Robert. D, 1986. Intonational phrasing: the case for recursive prosodic structure. Phonology Yearbook, 3, 311-340.

_____, 1996. Intonational phonology. Cambridge & New York, NY: Cambridge University Press.

Lau, Elaine. 2010. Tone-Melody relationship in Cantonese. *Working papers in Linguistics: University of Hawai'i at Manoa,* 41.3 (2010): 1-12.

Liberman, Mark and A. Prince. 1977. On Stress and Linguistic Rhythm. Linguistic Inquiry 8 (2), pp. 249-336.

List, George. 1961. Speech melody and song melody in Central Thailand. *Ethnomusicology*. 5(1), 16-32

Marin, Oscar S.M., & Perry, David.W. 1999. Neurological aspects of music perception and performance. In: D. Deutsch(Ed.), *The Psychology of Music* (2 nd ed., pp.653-724). San Diego, CA: Academic Press

Nespor, Marina. 1999. *The phonology of clitic groups*. In Henk van Riemsdijk (ed.), Clitics in the languages of Europe, 865-887. Berlin: Mouton de Gruyter.

Nespor, Marina and Irene Vogel. 1986. *Prosodic phonology*. Dordrecht: Foris.

_____ . 2007. *Prosodic phonology: with a new foreword*. Vol. 28. Walter de Gruyter.

Odden, David. 1987. Kimatuumbi phrasal phonology. Phonology Yearbook, 4, 13-26.

Palmer, Caroline. 1992. Linguistic prosody and musical meter in song. *Journal of Memory and Language, 31*(4), 525-542.

Patel, Aniruddh D. 2008. *Music, Language, and the Brain*. Oxford; New York: Oxford University Press.

Peretz, Isabelle. 2006. The nature of music from a biological perspective. *Cognitive*, 100:1-32

Pugh-Kitingan, Jacqueline. 1981. *An Ethnomusicological study of the Huli of the southern highlands, Papua New Guinea*. PhD. Dissertations, University of Queensland

Richards, Paul. 1972. A quantitative analysis of the relationship between language tone and melody in a Hausa song. *African Language Studies, 13*, 137–161.

Rycroft, David. K. 1980. *The depression feature in Nguni languages and its interaction with*

tone (No. 8). Department of African Languages Rhodes University.

Schellenberg, Murray H. 2009. Singing in a tone language: Shona. In *Selected Proceedings of the 39th Annual Conference on African Linguistics* .137–144.

_____. 2013. Tone realization in sung Mandarin. In *Proceedings of the 3rd International Symposium on Tonal Aspects of Language, Nanjing*.

Selkirk, Elisabeth. 1972. *The phrase phonology of English and French*. Ph.D.Dissertation, MIT.

_____. 1978. On prosodic structure and its relation to syntactic structure. Published 1981, in Thorstein Fretheim (ed.), *Nordic Prosody II*, 111-140. Trondheim: Tapir.

_____. 1980a. Prosodic domains in phonology: Sanskrit revisited. In Mark Aronoff and Mary-Louise Kean (eds.), *Juncture*, 107-129. Saratoga, CA: Anma Libri.

_____. 1980b. The role of prosodic categories in English word stress. *Linguistic Inquiry*, 11, 563-605.

_____. 1981. On the nature of phonological representation. In J. Anderson, J. Laver and T. Meyers (eds.), *The Cognitive Representation of Speech.* Amsterdam: North Holland.

_____. 1984. *Phonology and syntax: the relation between sound and structure*. Cambridge, MA: MIT Press.

_____.1995. Sentence prosody: intonation, stress and phrasing. In John Goldsmith (ed.), *The handbook of phonological theory*, 550-569. Malden, MA & Oxford: Blackwell.

_____. 1996. The prosodic structure of function words. In James L. Morgan and Katherine Demuth (eds.), *Signal to syntax: bootstrapping from speech to grammar in early acquisition*, 187-214. Mahwah, NJ: Lawrence Erlbaum Associates.

_____. 2001. *The syntax-phonology interface*. The handbook of phonological theory 2 : 435-483.

Selkirk, Elisabeth and Tong Shen. 1990. Prosodic domains in Shanghai Chinese. In Sharon Inkelas and Draga Zec (eds.), *The phonology-syntax connection*, 313-337. Chicago, Illinois: The University of Chicago Press.

Shen, qia 沈洽. 1982. Yinyun lun 音韵论[Discussion on Chinese historical phonology]. *Zhongyang yinyuexueyuan xuebao* 中央音乐学院学报，vol. 4

Sherard, M. 1972. *Shanghai Phonology.* Ph.D Dissertation. Cornell University.

Sollis, Michael. 2010. Tune–Tone Relationships in Sung Duna Pikono. *Australian Journal of Linguistics, 30*(1), 67–80.

Steele, Joshua.1779. *Prosodia Rationalis: Or, An Essay Toward Establishing the Melody and Measure of Speech, to Be Expressed and Perpetuated by Peculiar Symbols* (2 nd ed.) London: J. Nichols. (Reprinted by Georg Olms Verlagm, Hildesheim, 1971)

Stock, Jonathan. P. 2003. *Huju: Traditional opera in modern Shanghai*. Oxford University Press.

Swangviboonpong, Dusadee. 2003. Thai *classical singing: its history, musical characteristics, and transmission / Dusadee Swangviboonpong* Ashgate Aldershot, Hampshire, England ; Burlington, VT

Tan, Siu-Lan., Pfordresher Peter., and Harré, R. 2010. P*sychology of music: From sound to significance*. Psychology Press.

Tanese-Ito, Yoko.1988. The relationship between speech-tones and vocal melody in Thai Court Song. *Musica Asiatica*, 5:109-139

Temperley, David. 1999. Syncopation in rock: a perceptual perspective. *Popular Music, 18*(01), 19-40.

Todd, Neil. 1985. A model of expressive timing in tonal music. *Music Perception*, 33-57.

Van der Werf, Sybrand and Petra Hendriks. 2004. A Constraint-based Approach to Grouping in Language and Music. In Proceedings of the Conference on Interdisciplinary Musicology, R. Parncutt, A. Kessler and F. Zimmer, eds.. Graz/Austria.

Ward, W. E. (1932). Music of the Gold Coast. *The Musical Times*, 73(1047), 707-710.

Wee, Lian He. 2007. Unraveling the relation between Mandarin tones and musical melody. *Journal of Chinese Linguistics*, *35*(1), 128.

Wightman, Colin. W., Stefanie Shattuck-Hufnagel, Mari Ostendorf and Patti Price (1992). Segmental durations in the vicinity of prosodic phrase boundaries. *The Journal of the Acoustical Society of America*, *91*(3), 1707-1717.

Wong, Patrick. C., and Randy Diehl. 2002. How can the lyrics of a song in a tone language be understood? *Psychology of Music, 30*(2), 202–209.

Wright, Martha.S. 1983. *A metrical approach to tone sandhi in Chinese dialect*. Ph.D. dissertation. University of Massachusetts, Amherst

Xi, Genghu 奚耿虎. 2015. Huju changduan 108 shou 沪剧唱段 108 首[*108 collection of Huju*

pieces].Shanghai Music Press

Xu, Jin. 2006. Huju yinyun yu huyu yuyin de lishi bijiao yanjiu 沪剧音韵与沪语语音的历时比较研究[The diachronic comparison of historical Chinese phonology between Huju and Shanghai dialect]. *Shanghai University*, Master Thesis

Yan, Xiufang. 1993. *Constraints and ranking in language and music*. MA. thesis, National Chung Cheng University.

Yang, Yinliu 楊蔭瀏.1986. Yuyanyinyuexuechutan 语言音乐学初探[The primary discussion of language and music]. Yuyan yu yinyue 语言与音乐, 1-92

Yip, Moira. 1980.*The tonal phonology of Chines*e. Ph.D. dissertation, MIT

_____.1989. Contour tones. *Phonology Yearbook*, vol.6.

_____. 2002. *Tone: Cambridge Textbooks* in Linguistics. Cambridge University Press.

You, Rujie. 2006. *Di fang xi qu yin yun yan jiu*. 地方戏曲音韵研究(The studies of historical phonology in Chinese local operas) . Beijing: The Commercial Press

You, Shuxiang. 2017. *Prosodic Phonology of the Fuzhou Dialect.* Ph.D. dissertation, University of Wisconsin-Madison

Yu, Huiyong 于會泳. 2008. Qiang Ci Guanxi Yanjiu 腔詞關係研究[A Study of Text-Melody Relationship]. Beijing: Central Conservatory of Music Press.

Yung, Bell. 1983. Creative process in Cantonese opera I: the role of linguistic tones. *Ethnomusicology*, *27*(1): 29–47.

Zee, Eric and Maddieson, I. 1980. Tones and tone sandhi in Shanghai: Phonetic evidence and phonological analysis. *Glossa*, vol.16:225-264

Zec, Draga. 1988. Sonority constraints on prosodic structure. Ph.D. Dissertation, Stanford University.

Zhang, Hongming. 1992. Topics in Chinese phrasal tonology. Ph.D. Dissertation.UCSD.

_____. 2013. Handouts of course EA932 (Seminar-Chinese Linguistics-Chinese Prosodic Studies). University of Wisconsin-Madison.

_____. 2017. *Syntax-Phonology Interface:Argumentation from Tone Sandhi in Chinese Dialects*, Routledge, New York

Zhang, Hongming 张洪明. 2014. Yunlu yinxixue yu Hanyu yunlu yanjiu zhong de

ruogan wenti 韵律音系学与汉语韵律研究中的若干问题[Some issues on prosodic phonology and Chinese prosodic studies]. Dangdai yuyanxue, 16, 303-327.

Zhang, Hongming 张洪明 and Hui Yu 于辉. 2009. Cihui yinxixue yu Hanyu chongdieshi de yinxi yanjiu 词汇音系学于汉语重叠式的音系研究[Lexical phonology and the phonological study of the reduplicated forms in Chinese].Yuyanxue luncong 语言学论从, 39, 506-521.

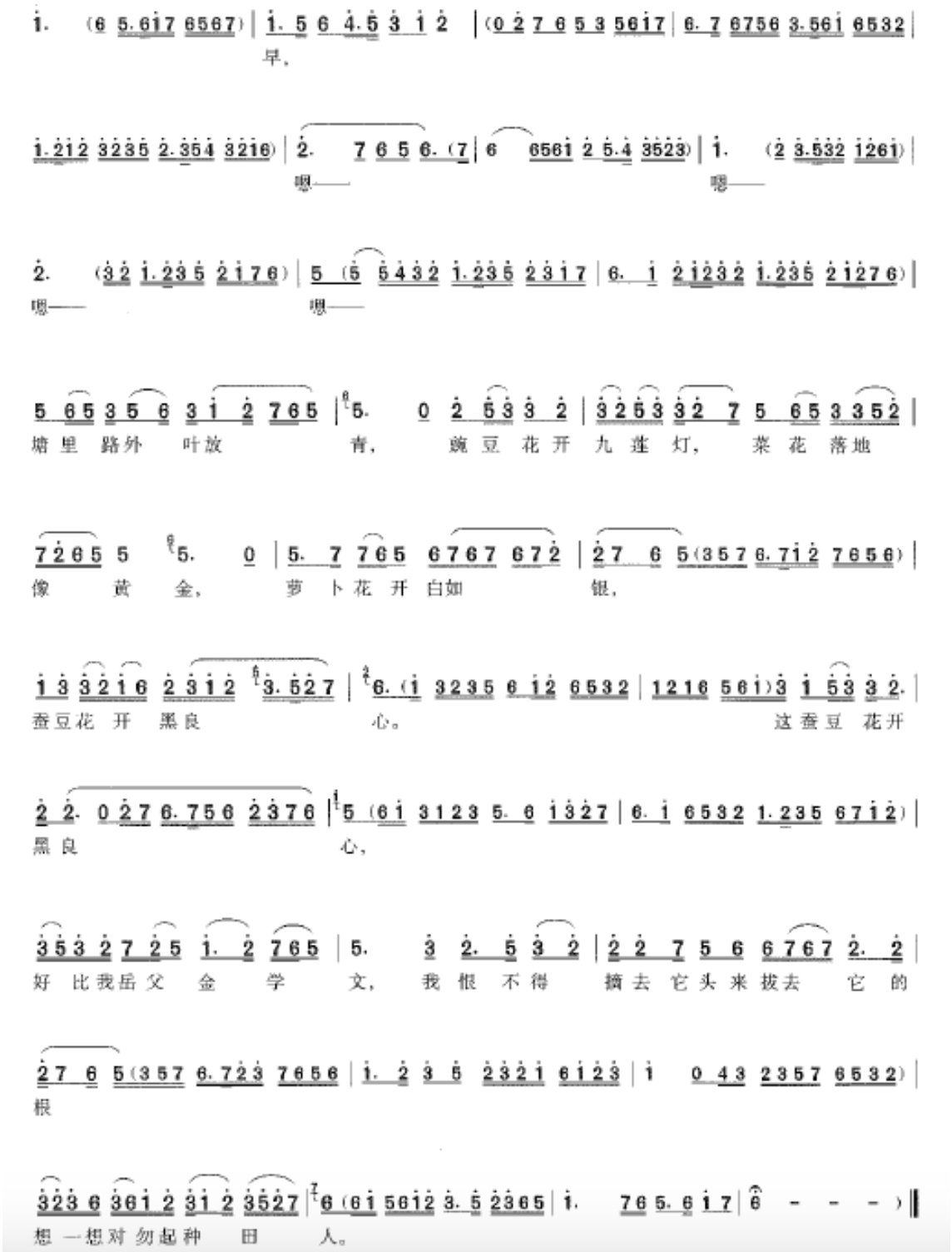
Zhang, Hong. 2010. Developing Language Proficiency through Singing, *Journal of Chinese Teaching and Research in the U.S.* 98-101.

Zhu Qianzhi. 1989. *The history of Chinese music literature*. Beijing: Peking University Press

Zhuang, Yongping. 2013. *Huju changqiang shangxi* 沪剧唱腔赏析[The appreciation of Huju aria]. Shanghai: Shanghai Music Press

Appendix: Full Analysis

1. 春二三月草青青(长腔中板)


早，
嗯——
嗯——
嗯——
嗯——
塘里 路外 叶放 青， 豌豆 花开 九莲 灯， 菜花 落地
像 黄 金， 萝卜花 开 白如 银，
蚕豆花 开 黑良 心。 这蚕豆 花开
黑良 心，
好 比我岳父 金 学 文， 我恨 不得 摘去 它头来拔去 它 的
根
想 一想对 勿起种 田 人。

Lyrics	春 二 三 月 草 青 青	match
BT	HL HL HL LH MH HL HL	
Melodic tier	5 53 32 2 26♭ 26♭ 5♭	
TS within PW	H= L# H=L# MH# HL# HL	OK/OK/*/OK/ok
TSwithin PPh	H=L=L=L # M=H=L	OK/OK
TSwithin IP	H L	OK

Lyrics	百 花 开 放 鸟 齐 鸣	Match
BT	MH HL HL MH MH HL LH	
Melodic tier	1# 1#7 6 63 1#2# 75 5	
TS within PW	M = H # H=L# MH # HL#LH	*/OK/OK/OK/ok
TS within PPh	M=H=L=L # M=H=L	OK/OK
TS within IP	M L	Ok

Lyrics	蝴蝶高飞成双对	Match
BT	LH LH HL HL LH HL MH	
Melodic tier	2 5 53 32 6♭7♭ 22 25♭	
TS within PW	L =H # H =L # LH # HL# MH	OK/OK/OK/ok/*
TS within CG	H=L	OK
TS within PPh	L=H=L=L# L=H=L	OK/ok
TS within IP	L L	ok

Lyrics	蜜蜂成群采花芯	Match
BT	LH HL LH LH MH HL HL	
Melodic tier	1 31 6♭ 1 32 37♭ 6♭	
TS within PW	L=H # LH #LH # MH# H=L	ok/ok/ok/*/OK
TS within PPh	L=H=L=L # M=H=L	OK/OK
TS within IP	L L	ok

Lyrics	今年逢着交春早	Match
BT	HL LH LH LH HL HL MH	
Melodic tier	5 53 2 2 5 51 12	
TS within PW	H = L # LH #LH# H= L# MH	OK/ok/ok/OK/OK
TS within CG	L = H	ok
TS within PPh	H=L=L=L# H=L=L	OK/OK
TS within IP	H L	OK

Lyrics	塘里路外叶放青	Match
BT	LH LH LH LH LH MH HL	
Melodic tier	5 65 3 56 3 1#5 5	
TS within PW	L= H # L=H # L=H #HL	OK/OK/OK/ok
TS within PPh	L=H=L=L# L=H=L	*/*
TS within IP	L L	OK

?Lyrics	豌豆花开九莲灯	Match
BT	HL LH HL HL MH LH HL	
Melodic tier	2 53 3 2 32 53 37♭	
TS within PW	H=L # H=L# M=H=L	*/OK/OK
TS within PPh	H=L=L=L# M=H=L	ok/OK
TS within IP	H L	ok

Lyrics	菜花落地像黄金	Match
BT	MH HL LH LH LH LH HL	
Melodic tier	5 65 3 32# 75 5 5	
TS within PW	M=H# L=H#LH# L=H	OK/OK/*/ok
TS within PPh	M=H=L=L# L=H=L	*/*
TS within IP	M L	ok

Lyrics	萝卜 花 开白 如 银	Match
BT	LH LH HL HL LH LH LH	
Melodic tier	5 7 76 5 6 $72^{\#}$ $2^{\#}5$	
TS within PW	L =H# H=L# LH # LH#LH	OK/OK/ok/OK/*
TS within PPh	L=H=L=L# L=H=L	OK/*
TS within IP	L L	OK

Lyrics	蚕 豆花 开黑良心	Match
BT	LH LH HL HL MH LH HL	
Melodic tier 1	1 3 32 $16_{\flat}$ 2 $37_{\flat}$ $6_{\flat}$	
Melodic tier 2	1 53 3 2 2 $26_{\flat}$ $5_{\flat}$	
TS within PW	L=H# H=L#MH#L=H	OK/OK/ok/*
		OK/OK/ok/*
TS within PPh	L=H=L=L# M=H=L	OK/OK
		*/OK
TS within IP	L L	ok

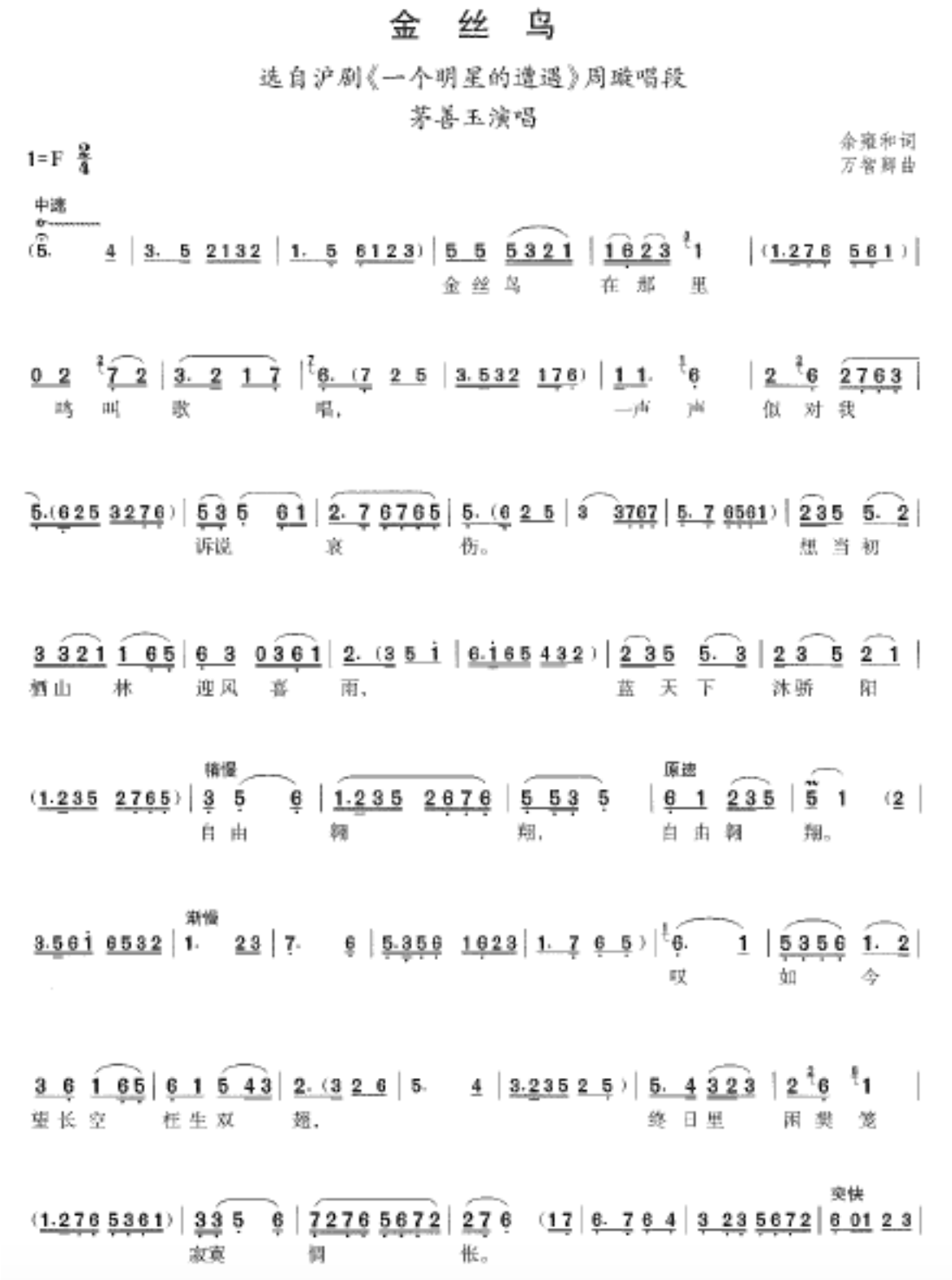
Lyrics	好比我岳父金学文	Match
BT	MH LH LH LH LH HL LH LH	
Melodic tier	35 3 2 $7_{\flat}$ $25_{\flat}$ 12 $7_{\flat}5_{\flat}$ $5_{\flat}$	
TS within PW	M=H# LH# L=H# H=L=L	ok/ok/*/OK
TS within CG	M=H=L	OK
TS within PPh	M=H=L=L=L# L=L=L	OK/ OK
TS within IP	M L	OK

L	我恨不得 摘去它头来拔去它的根	
BT	LH LH MH MH HL MH MH LH MH	
	MH MH MH MH HL	

Melodic tier	3 2 5 32 2 2 7♭ 5♭ 6♭ 6♭ 7♭7♭ 2 2 25♭	
TS within PW	LH# L=H=L# H=L# MH#L=H#M=H# M=H#	ok/OK/ok/ok/OK/OK/ok/OK
TS within CG	L=H=L=L#H=L=L=L=L M=H=L	OK/OK /OK
TS within PPh	L=H=L=L# H=L=L=L=L#M=H=L=L=L	OK/OK/OK
TS within IP	L L	ok

Lyrics	想一想对勿起种田人	Match
BT	MH MH MH MH LH MH LH LH LH	
Melodic tier	32 3 6♭ 36♭ 1 2 32 37♭ 6♭	
TS within PW	M=H=L # M=H=L# L=H=L	OK/OK/ok
TS within PPh	M=H=L= L=L=L# L=H=L	OK /ok
TS within IP	M L	OK

2. 金丝鸟（长腔-反十字板）



金 丝 鸟

选自沪剧《一个明星的遭遇》周璇唱段

茅善玉演唱

余雍和词
万智耕曲

1=F 2/4

中速

(5. 4 | 3. 5 2132 | 1. 5 6123) | 5 5 5321 | 1623 1 | (1.276 561) |
金 丝 鸟 在 那 里

0 2 7 2 | 3. 2 1 7 | 6. (7 2 5 | 3.532 176) | 11. 6 | 2 6 2763 |
鸣 叫 歌 唱， 一声 声 似 对 我

5.(625 3276) | 53 5 61 | 2. 7 6765 | 5. (6 2 5 | 3 3767 | 5. 7 6561) | 235 5. 2 |
诉说 哀 伤。 想 当 初

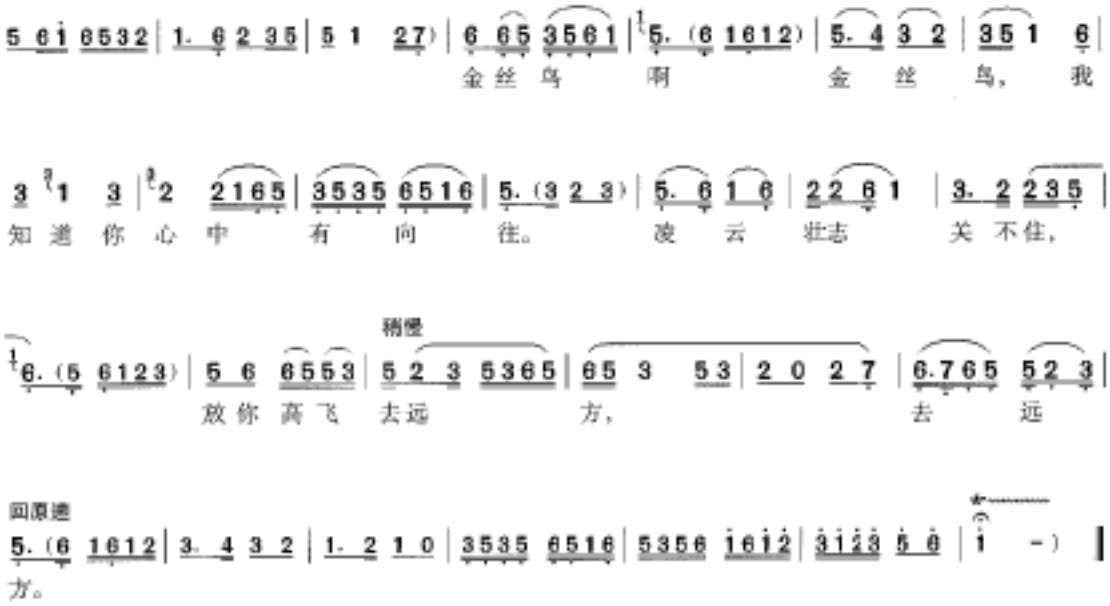
3321 165 | 6 3 0361 | 2. (3 5 i | 6.i65 432) | 235 5. 3 | 23 5 21 |
栖山 林 迎风 喜 雨， 蓝 天 下 沐骄 阳

(1.235 2765) | 稍慢 3 5 6 | 1.235 2676 | 5 53 5 | 原速 61 235 | 5 1 (2 |
自 由 翱 翔， 自 由 翱 翔。

3.561 6532 | 渐慢 1. 23 | 7. 6 | 5.356 1023 | 1. 7 6 5) | 6. 1 | 5356 1. 2 |
叹 如 今

36 165 | 61 543 | 2. (3 26 | 5. 4 | 3.235 25) | 5. 4 323 | 2 6 1 |
望长空 枉生双 翅， 终日里 困樊 笼

(1.276 5361) | 335 6 | 7276 5672 | 276 (17 | 6. 764 | 3 23 5672 | 变快 601 23 |
寂寞 啊 怅。



Lyrics	金 丝鸟在那里	Match
BT	HL HL MH LH HL LH	
Melodic tier	5 5 51 16♭ 23 1	
TS within PW	H=L=L# LH # H=L	OK/*/OK
TS within CG	L=H=L	OK
TS within PPh	H=L=L= L=L=L	OK
TS within IP	H L	OK

Lyrics	鸣 叫 歌 唱	Match
BT	LH MH HL MH	
Melodic tier	2 7♭2 37♭ 6♭	
TS within PW	L=H# H=L	ok/OK
TS within PPh	L=H=L=L	OK
TS within IP	L=L	OK

Lyrics	一声声似对我诉说忧伤	Match
BT	MH HL HL LH MH LH MH MH HL HL	
Melodic tier	1 1 6♭ 2 6♭ 25♭ 5♭ 3♭1 25♭ 5♭	

TS within PW	M=H=L#H=L#LH#M=H#H=L	OK/OK/*/ OK/OK
TS within CG	H=L=L	OK
TS within PPh	M=H=L=L=L=L# M=H=L=L	OK/ok
TS within IP	M L	OK

Lyrics	想当初栖山林迎风喜雨	
BT	MH HL HL HL HL LH LH HL MH LH	
Melodic tier	23 5 52 3 31 15_{b} 6_{b} 3 31 2	
TS within PW	MH# H=L# HL# H=L# L=H# M=H	OK/OK/OK/OK/OK/*
TS within PPh	M=H=L# H=L=L# L=H=M=H	ok/OK/OK
TS within IP	M L	ok

Lyrics	蓝天下 沐骄阳	Match
BT	LH HL HL MH HL LH	
Melodic tier	23 5 53 2 35 21	
TS within PW	L=H#HL# MH# H=L	OK/OK/ok/OK
TS within PPh	L=H=L# M=H=L	*/OK
TS within IP	L = L	ok

Lyrics	自由翱翔	Match
BT	LH LH LH LH	
Melodic tier 1	3 56 $1^{\#}$ 6 55	
Melodic tier 2	6 $1^{\#}$ $2^{\#}5^{\#}$ $5^{\#}1^{\#}$	
TS within PW	L=H# L=H	OK/*
		OK/*
TS within PPh	L=H=L=L	*
		*
TS within IP	L L	*

*

Lyrics	如今望长空枉生双翅	Match
BT	LH HL LH LH MH MH HL HL HL	
Melodic tier	5♭6♭ 12 3 6♭ 15♭ 6♭ 1 53 2	
TS within PW	L=H # LH# L=H# M=H# H=L	OK/ok/*/OK/OK
TS within PPh	L=H = L=L=L #M=H=L=L	OK/*
TS within IP	L L	*

Lyrics	终日里闲樊笼	Match
BT	HL LH LH MH LH LH	
Melodic tier	5 4 33 2 6♭ 1	
TS within PW	H=L# LH# MH# L=H	OK/ok/ok/OK
TS within CG	H=L=L	OK
TS within PPh	H=L=L# L=H=L	OK/ok
TS within IP	H=L	OK

Lyrics	寂寞 惆怅	Match
BT	LH LH HL MH	
Melodic tier	3 36 72# 2#6	
TS within PW	L=H# H=L	OK/OK
TS within PPh	L=H=L=L	*
TS within IP	L=L	*

Lyrics	金丝鸟,	Match
BT	HL HL MH	
Melodic tier 1	6 65 31#	*
Melodic tier 2	5 32 1	OK

TS within PW	H=L=L	
TS within PPh	H=L=L	*
TS within IP	H=L	*

Lyrics	我知道你心中有向往	Match
BT	LH HL LH MH HL HL LH MH MH	
Melody Pitch	6♭ 3 1 3 2 25♭ 3♭5♭ 6♭6♭ 5♭	
TS within PW	LH# H=L# MH#H=L#LH#M=H	ok/OK/ok/OK/OK/*
TS within CG	L=H=L=L	*
TS within PPh	L=H=L=L#H=L=L=L=L	*/OK
TS within IP	L=L	OK

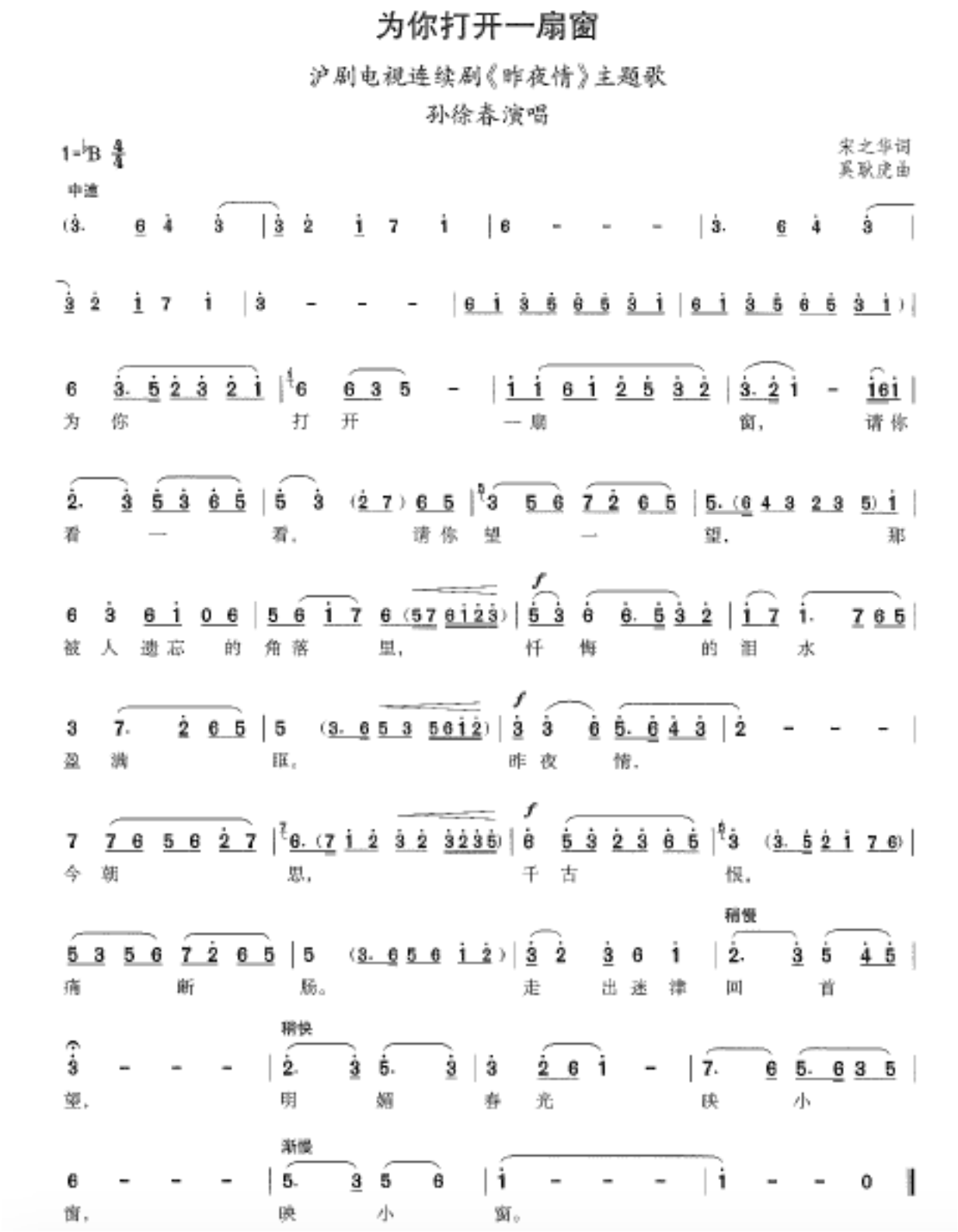
Lyrics	凌 云壮志关不住	Match
BT	LH LH LH MH HL MH MH	
Melody Pitch	5♭6♭ 16♭ 2 21 3 2 26♭	
TS within PW	L=H# L=H# HL# M=H	OK/*/ok/*
TS within PPh	L=H=L=L# H=L=L	*/OK
TS within IP	L= L	*

Lyrics	放你高飞去远方	Match
BT	MH MH HL HL MH LH HL	
Melody Pitch	5 6 65 53 5 25 67♭	
TS within PW	MH#MH#H=L#MH#L=H	ok/ok/OK/ok/*
TS within CG	M=H	OK
TS within PPh	M=H=L=L # M=H=L	OK/OK
TS within IP	M=L	OK

Lyrics	去远方	Match

	[[去]pw[远方]pw]pph]ip	
BT	MH LH HL	
Melody Pitch	65 53 5	
TS within PW	MH#L=H	*/ok
TS within PPh	M=H=L	OK
TS within IP	M=L	OK

3． 为你打开一扇窗（小调）


为你打开一扇窗
沪剧电视连续剧《昨夜情》主题歌
孙徐春演唱
1=♭B 4/4
宋之华词
吴耿虎曲
中速
为 你 打 开 一扇 窗， 请你
看 一 看， 请你 望 一 望， 耶
被 人 遗忘 的 角落 里， 忏 悔 的 泪 水
盈 满 眶， 昨夜 情，
今 朝 思， 千 古 恨，
痛 断 肠。 走 出迷 津 回 首
稍慢
稍快
望， 明 媚 春 光 映 小
渐慢
窗， 映 小 窗。

Lyrics	为你打开一扇窗	Match
BT	LH MH MH HL MH MH HL	
Melodic tier	6 $3^{\#}1^{\#}$ 6 65 $1^{\#}$ $1^{\#}2^{\#}$ $3^{\#}1^{\#}$	
TS within PW	LH# MH# M=H# MH# MH#HL	ok/ * / */ok/OK/OK
TS within CG	L=H M=H	OK/OK
TS within PPh	L=H=L=L # M=H=L	ok/ ok
TS within IP	L = L	*

Lyrics	请你看一看	Match
BT	MH MH MH MH MH	
Melodic tier	$16_{\flat}$ 1 23 55 53	
TS within PW	MH# MH# MH#MH#MH	*/ok/OK/ok/*
TS within CG	M=H # M=H=L	ok/*
TS within PPh	M=H=L=L=L	*
TS within IP	M=L	*

Lyrics	请你望一望	Match
BT	MH MH LH MH LH	
Melodic tier	6 5 36 75 5	
TS within PW	MH# MH# LH# MH#LH	ok/ok/OK/*/ok
TS within CG	M=H# L=H=L	*/*
TS within PPh	M=H=L=L=L	OK
TS within IP	M=L	OK

Lyrics	那 被 人 遗 忘 的 角 落 里	Match
BT	HL LH LH LH LH MH MH LH LH	
Melodic tier	$1^{\#}$ 6 $3^{\#}$ 6 $1^{\#}$ 6 5 67 6	
TS within PW	HL# LH# LH#L=H#MH#M=H#LH	ok/ok/ok/OK/ok/OK/ok
TS within CG	L=H L=H=L M=H=L	OK / OK/ *

TS within PPh	H=L=L=L=L=L# M=H=L	OK/*
TS within IP	H=L	OK

Lyrics	忏悔的泪水盈满眶	Match
BT	MH MH MH LH MH LH LH HL	
Melodic tier	53 63 2 17♭ 15♭ 3 75 5	
TS within PW	M=H#MH # M=H# MH# LH#HL	*/ok/* /ok/*/ok
TS within CG	M=H=L	OK
TS within PPh	M=H=L=L=L# M=H=L	OK/*
TS within IP	M=L	ok

Lyrics	昨夜情	Match
BT	LH LH LH	
Melodic tier	3 36 52	
TS within PW	L=H# LH	OK/*
TS within PPh	L=H=L	ok
TS within IP	L=L	ok

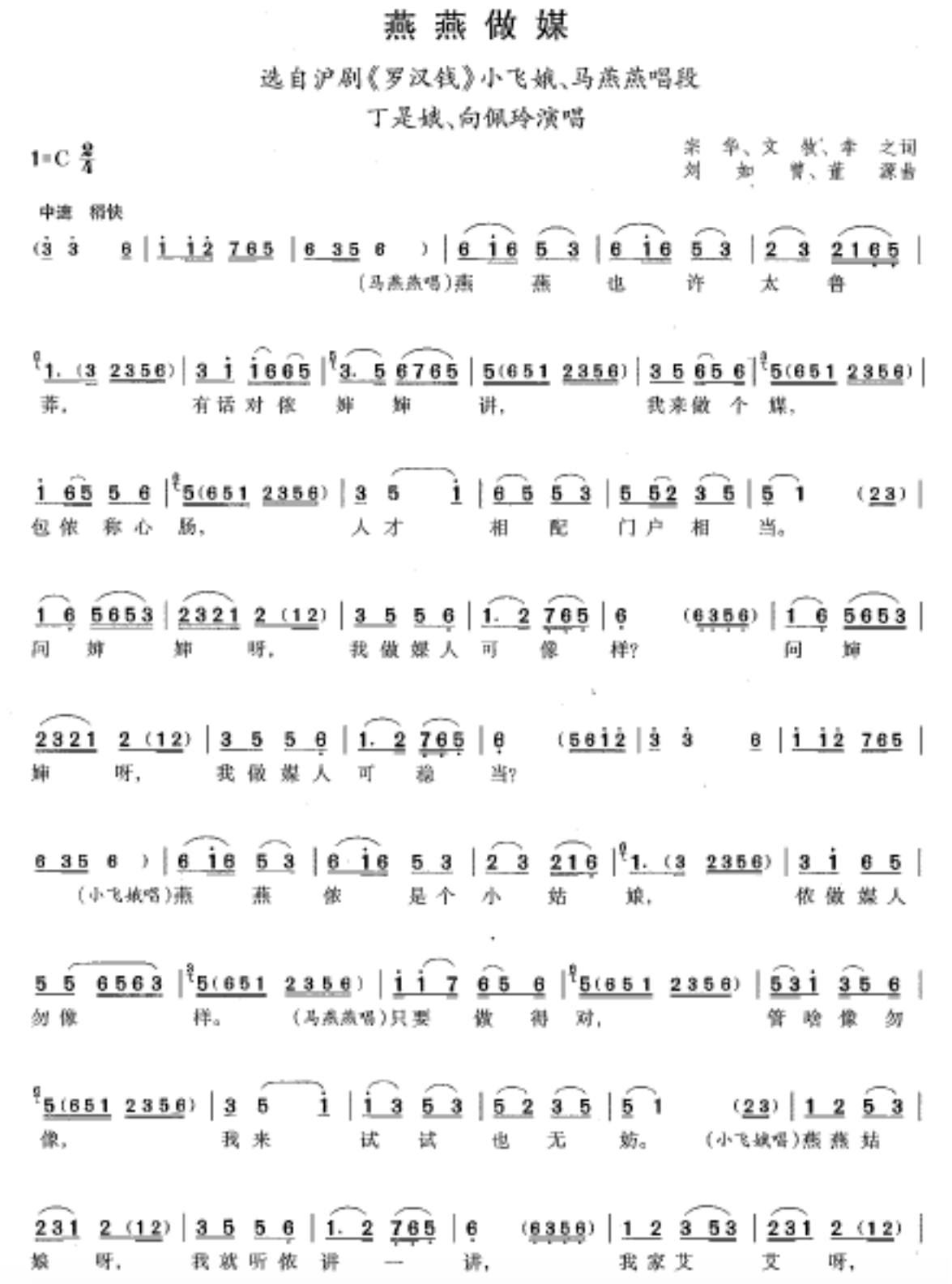
Lyrics	今朝思	Match
BT	HL LH HL	
Melodic tier	7 77 6	
TS within PW	H=L# HL	ok/ok
TS within PPh	H=L=L	OK
TS within IP	H=L	OK

Lyrics	千古恨	Match
BT	HL MH LH	
Melodic tier	6 55 3	
TS within PW	H=L # LH	OK/ok

TS within PPh	H=L=L	OK
TS within IP	H=L	OK
Lyrics	痛断肠	Match
BT	MH LH LH	
Melodic tier	56 75 5	
TS within PW	MH# LH#LH	OK/*/ok
TS within PPh	M=H=L	ok
TS within IP	M=L	ok
Lyrics	走出迷津回首望	Match
BT	MH MH LH MH LH MH LH	
Melodic tier	32 3 6♭ 1 23 55 3	
TS within PW	M=H # L=H# L=H# LH	ok/ OK/ OK/ ok
TS within PPh	M=H=L=L # L=H=L	OK/ *
TS within IP	M=L	ok
Lyrics	明媚春光映小窗	Match
BT	LH LH HL HL MH MH LH	
Melodic tier	23 53 3 21 7♭6♭ 5♭5♭ 6♭	
TS within PW	L=H # H=L# MH# M=H	OK/ OK/*/OK
TS within PPh	L=H=L=L # M=H=L	ok/ OK
TS within IP	L=L	ok
Lyrics	映小窗	Match
BT	MH MH LH	
Melodic tier	53 56 1♯1♯	
TS within PW	MH# M=H	*/ OK
TS within PPh	M=H=L	*

TS within IP	M=L	*

4. 燕燕说媒（小调：紫竹调）



燕燕做媒

选自沪剧《罗汉钱》小飞娥、马燕燕唱段

丁是娥、向佩玲演唱

宋　华、文　牧、李　之词

刘　如　曹、董　源昌

1=C $\frac{2}{4}$

中速　稍快

(3 3 6 | 1 12 765 | 6 35 6) | 6 16 5 3 | 6 16 5 3 | 2 3 2165 |

(马燕燕唱)燕　燕　也　许　太　鲁

1. (3 2356) | 3 1 1665 | 3. 5 6765 | 5(651 2356) | 3 5 65 6 | 5(651 2356) |

菲，　有话对侬　婶　婶　讲，　我来做个　媒，

1 65 5 6 | 5(651 2356) | 3 5 1 | 6 5 5 3 | 5 52 3 5 | 5 1 (23) |

包侬　称心　肠，　人才　相　配　门户　相　当。

1 6 5653 | 2321 2 (12) | 3 5 5 6 | 1. 2 765 | 6 (6356) | 1 6 5653 |

问　婶　婶　呀，　我做媒人　可　像　样？　问　婶

2321 2 (12) | 3 5 5 6 | 1. 2 765 | 6 (5612 | 3 3 6 | 1 12 765 |

婶　呀，　我做媒人　可　稳　当？

6 35 6) | 6 16 5 3 | 6 16 5 3 | 2 3 216 | 1. (3 2356) | 3 1 6 5 |

(小飞娥唱)燕　燕　侬　是个　小　姑　娘，　侬做媒人

5 5 6563 | 5(651 2356) | 1 1 7 65 6 | 5(651 2356) | 531 35 6 |

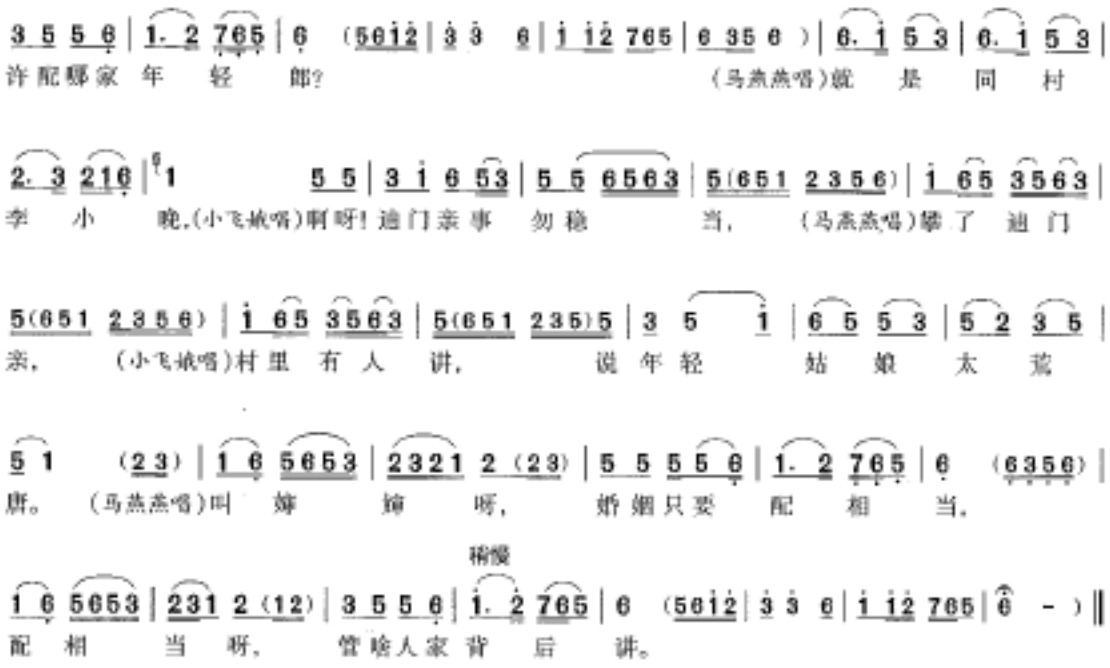
刻像　样。　(马燕燕唱)只要　做　得　对，　管啥像　勿

5(651 2356) | 3 5 1 | 1 3 5 3 | 5 2 3 5 | 5 1 (23) | 1 2 5 3 |

像，　我来　试　试　也　无　妨。　(小飞娥唱)燕燕姑

231 2 (12) | 3 5 5 6 | 1. 2 765 | 6 (6356) | 1 2 3 53 | 231 2 (12) |

娘　呀，　我就听侬　讲　一　讲，　我家艾　艾　呀，



Lyrics	燕燕也许太鲁莽	Match
BT	MH MH LH MH MH LH LH	
Melodic tier	66 53 66 53 23 25♭ 1	
TS within PW	M=H # L=H# MH# L=H	*/*/OK/*
TS within PPh	M=H=L=H# M=H=L	*/OK
TS within IP	M=L	OK

Lyrics	有话对侬婶婶讲	Match
BT	LH LH MH LH MH MH MH	
Melodic tier	3 1# 1#6 65 35 65 5	
TS within PW	L=H# MH# LH# M=H#MH	OK/*/*/OK/ok
TS within CG	M=H	*
TS within PPh	L=H=L=L#M=H=L	*/*
TS within IP	L=L	*

Lyrics	我来做个媒	Match
BT	LH LH MH LH LH	
Melodic tier	3 5 65 6 5	
TS within PW	LH # LH# MH#LH# LH	ok/ok/*/ok/ok
TS within CG	L=H M=H	OK/ok
TS within PPh	L=H#M=H=L	OK/OK
TS within IP	L=L	*

Lyrics	包侬称心肠	Match
BT	HL LH HL HL LH	
Melodic tier	$1^{\#}$ 65 5 6 5	
TS within PW	HL# LH# HL#H=L	ok/*/ok/OK
TS within CG	H=L	OK
TS within PPh	H=L# L=L=L	OK/OK
TS within IP	H=L	OK

Lyrics	人才相配门户相当	Match
BT	LH LH HL MH LH LH HL HL	
Melodic tier	3 $51^{\#}$ 65 53 5 52 35 51	
TS within PW	L=H# H=L# L=H# H=L	OK/OK/*/OK
TS within PPh	L=H=L=L# L=H=L=L	OK/ok
TS within IP	L=L	ok

Lyrics	问婶婶呀	Match
BT	LH MH MH HL	
Melodic tier 1	$16_{\flat}$ 53 21 2	
Melodic tier 2	$16_{\flat}$ 53 21 2	

TS within PW	LH# M=H# HL	*/*/ok
TS within CG	M=H=L	OK
TS within PPh	L=H=L=L=L	*
TS within IP	L L	*

Lyrics	我做媒人可像样	Match
BT	LH MH LH LH MH LH LH	
Melodic tier	3 5 5 6♭ 12 7♭5♭ 6♭	
TS within PW	LH# MH # L=H# MH# L=H	ok/ok/*/OK/*
TS within CG	L=H	OK
TS within PPh	L=H=L=L# M=L=L	ok/OK
TS within IP	L=L	ok

Lyrics	我做媒人可稳当	Match
BT	LH MH LH LH MH MH HL	
Melodic tier	3 5 5 6♭ 12 7♭5♭ 6♭	
TS within PW	LH# MH # L=H# MH# M=H	ok/ok/*/OK/*
TS within CG	L=H	OK
TS within PPh	L=H=L=L# M=H=L	ok/OK
TS within IP	L=L	ok

Lyrics	燕燕侬是个小姑娘	Match
BT	MH MH LH LH LH MH HL LH	
Melodic tier	66 53 66 5 3 23 26♭ 1	
TS within PW	M=H# LH# LH#LH# M=H=L	*/ok/ */OK
TS within CG	M=H=L L=H	ok/ *
TS within PPh	M=H=L=L=L# M=H=L	OK/OK
TS within IP	M=L	OK

Lyrics	侬做媒人勿像样	Match
BT	LH MH LH LH LH LH LH	
Melodic tier	3 1# 6 5 5 53 5	
TS within PW	LH# MH# L=H# LH# L=H	ok/ok/*/ok/ok
TS within CG	L=H	OK
TS within PPh	L=H=L=L# L=H=L	*/OK
TS within IP	L=L	*

Lyrics	只要做得对	Match
BT	MH MH MH MH MH	
Melodic tier	1# 1#7 65 6 5	
TS within PW	M=H# MH# MH#MH	*/ */ok/ok
TS within CG	M=H=L	OK
TS within PPh	M=H=L=L=L	OK
TS within IP	M=L	OK

Lyrics	管啥像勿像	Match
BT	MH HL LH LH LH	
Melodic tier	53 1# 35 6 5	
TS within PW	MH# HL# LH# LH# LH	*/ok/OK/ok/ok
TS within PPh	M=L# L=H=L	*/*
TS within IP	M=L	ok

Lyrics	我来试试也无妨	Match
BT	LH LH MH MH LH LH MH	
Melodic tier	3 51# 1#3 53 52 35 51	
TS within PW	LH# LH# M=H# LH# L=H	ok/OK/*/*/*
TS within CG	L=H	OK

TS within PPh	L=H=L=L# L=H=L	OK/ok
TS within IP	L=L	ok
Lyrics	燕燕姑娘呀	Match
BT	MH MH HL LH HL	
Melodic tier	1 2 53 21 2	
TS within PW	M=H# H=L#HL	OK/OK/ok
TS within CG	H=L=L	OK
TS within PPh	M=H=L=L=L	*
TS within IP	M=L	*
Lyrics	我就听侬讲一讲	Match
BT	LH LH HL LH MH MH MH	
Melodic tier	3 5 5 6_b 12 7_b5_b 6_b	
TS within PW	LH# LH#HL#LH#M=H=L	ok/ok/ok/ok/OK
TS within CG	L=H# H=L	OK/OK
TS within PPh	L=H=L=L# M=H=L	ok/OK
TS within IP	L=L	ok
Lyrics	我家艾艾呀	Match
BT	LH HL LH LH HL	
Melodic tier	1 2 33 21 2	
TS within PW	LH#HL# L=H# HL	ok/ok/*/ok
TS within CG	L=H # L=H=L	OK/ok
TS within PPh	L=H=L=L=L	*
TS within IP	L=L	*
Lyrics	许配哪家年轻郎	Match
BT	MH MH LH HL LH HL LH	

Melodic tier	3 5 5 6♭ 12 7♭5♭ 6♭	
TS within PW	M=H# LH#HL# L=H#LH	OK/ok/ok/*/ok
TS within CG	L=H	*
TS within PPh	M=H=L=L# L=H=L	OK/ok
TS within IP	M=L	OK

Lyrics	就是同村李小晚	Match
BT	LH LH LH HL LH MH MH	
Melodic tier	61# 53 61# 53 23 26♭ 1	
TS within PW	L=H# L=H# L=H=L	*/*/ok
TS within PPh	L=H=L=L# L=H=L	ok/ok
TS within IP	L=L	ok

Lyrics	迪门亲事勿稳当	Match
BT	LH LH HL LH LH MH HL	
Melodic tier	3 1# 6 53 5 53 5	
TS within PW	LH#LH# H=L# LH#M=H	ok/ok/OK/ok/ok
TS within CG	L=H	OK
TS within PPh	L=H=L=L# L=H=L	*/OK
TS within IP	L=L	*

Lyrics	攀了迪门亲	Match
BT	HL MH LH LH HL	
Melodic tier	1# 65 35 63 5	
TS within PW	HL#MH# LH# LH#HL	ok/*/OK/*/ok
TS within CG	H=L # L=H	OK/ok
TS within PPh	H=L=L=L=L	OK
TS within IP	H=L	OK

Lyrics	村里有人讲	Match
BT	HL LH LH LH MH	
Melodic tier	$1^{\#}$ 65 35 63 5	
TS within PW	H=L# LH#LH# MH	OK/OK/*/ok
TS within PPh	H=L# L=H=L	OK/*
TS within IP	H=L	OK

Lyrics	说年轻姑娘太荒唐	Match
BT	MH LH HL HL LH MH HL LH	
Melodic tier	5 3 $51^{\#}$ 65 53 52 35 51	
TS within PW	MH# L=H# H=L# MH# H=L	ok/OK/OK/*/OK
TS within PPh	MH# L=H=L=L# M=H=L	ok/OK/OK
TS within IP	M=L	ok

Lyrics	婚姻只要配相当	Match
BT	HL HL MH MH MH HL HL	
Melodic tier	5 5 5 $56_{\flat}$ 12 $7_{\flat}5_{\flat}$ $6_{\flat}$	
TS within PW	H=L# M=H# MH# H=L	ok/*/OK/OK
TS within PPh	H=L=L=L# M=H=L	OK/OK
TS within IP	H=L	OK

Lyrics	配相当呀	Match
BT	MH HL HL HL	
Melodic tier	$16_{\flat}$ 53 21 2	
TS within PW	MH#H=L# HL	*/ OK/ ok
TS within CG	H=L=L	OK
TS within PPh	M=H=L=L	*
TS within IP	M=L	*

Lyrics	管啥人家背后讲	Match
BT	MH HL LH HL MH LH MH	
Melodic tier	3 5 5 6_{b} $1^{\#}2^{\#}$ 75 6	
TS within PW	M=H# L=H# M=H# MH	OK/*/ */ ok
TS within PPh	M=H=L=L# M=H=L	OK/ OK
TS within IP	M=L	ok

5. 盘凤（簧腔类.反阴阳）

盘　凤

选自沪剧《雷雨》繁漪、四凤唱段

丁是娥、杨飞飞演唱

1=F $\frac{2}{4}$

宗　华词
姚　牧曲

(5.435 2361) | 2 3. 3216 | 1 3.5 2 21 | 3 5 5. (6 | 1.235 2365) | 1 3 2765 |
(繁漪唱)这几 天 为何 不见 大少爷? (四凤唱)大概是 他

3 53 5 65 | 5 (5.4 3523) | 5. 5 5321 | 6 1.(2 1765) | 161 532 | 32 1 (23 |
事 情 忙。 (繁漪唱)听 说他 要到 矿 上 去,

1 23 1765) | 1 3 2765 | 1 3 5 65 | 5 (5.4 3523 | 1.235 231)6 | 1 32 165. |
难道无 人 对 你 讲? (四凤唱)我 只晓 得

1 27 5 65 | 3 5 3 (56) | 1 5. 3 | 6.16 5.653 | (2.354 3216) | 1 32 2365 |
少爷 房里的 佣人 们, 相 帮 他 在 理衣

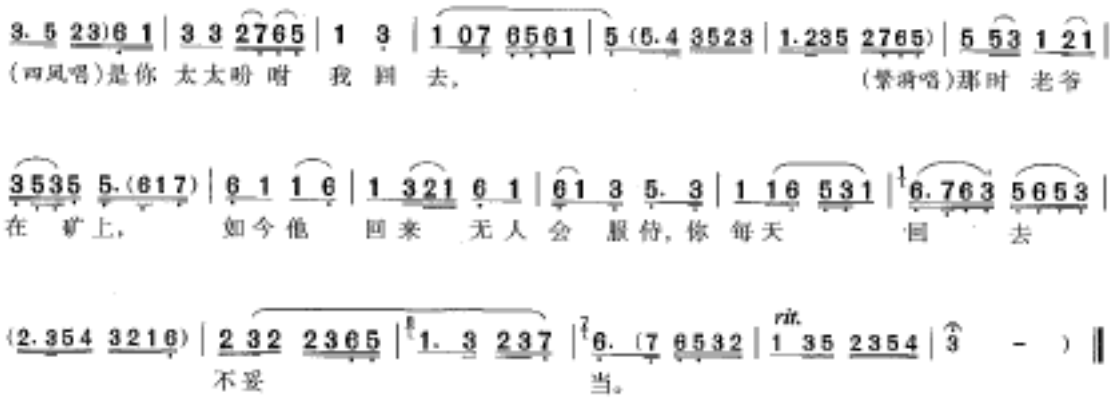
1 7 | 6. (7 6532 | 1.235 2354 | 3. 5 212)5 | 3 5 | 6 5332 | (2 5 6 1) |
裳。 (繁漪唱)他 现 在 可 曾

5. 3 1 | 3. 5 27 6 | 5. (6 5761 | 5635 2376 | 5656 5656 | 5635 237)6 |
起 了 床? 他

1 13 276 5 | 1356 5. (6 | 5635 2376 | 5656 57)6 1 | 3 3 27 | 6 7 65 |
昨夜 回 来是 啥 辰 光? (四凤唱)我是 每 天 晚 上

(6.561 2365) | 1 32 216 | 5.653 212 | 3.535 656 | (6123 2165 | 3.523 545 |
回去 睡,

5.435 2365) | 1 3 3216 | 5 53 2 36 | 1 3 2327 | 6. (7 6532 | 1.235 2354 |
(繁漪唱)为何 要 每 天 晚上 走 能 忙?



Lyrics	这几天为何不见大少爷	Match
BT	MH MH HL LH LH MH LH LH MH LH	
Melodic tier	2 3 36♭ 1 35 2 21 3♭ 5♭ 5♭	
TS within PW	MH#MH#HL# L=H# MH#LH# L=H=L	ok/ok/OK/OK/ok/*/*
TS within CG	M=H=L	OK
TS within PPh	M=H=L# L=H=L=L=L=L=L	OK/ok
TS within IP	M L	ok

Lyrics	大概是他事情忙	Match
BT	LH MH LH HL LH LH LH	
Melodic tier	1 3 27♭ 6♭5♭ 3♭3♭ 5♭5♭ 5♭	
TS within PW	L=H# LH# HL# L=H# LH	OK/*/OK/OK/ok
TS within CG	L =H	*
TS within PPh	L=H=L=L#L=H=L	ok/*
TS within IP	L=L	*

Lyrics	听说他要到矿上去	Match
BT	HL MH HL MH MH MH LH MH	
Melodic tier	5 5 51 6♭ 1 11 52 31	

TS within PW	H=L#HL#M=H#M=H=L	ok/*/OK/ok
TS within CG	H=L=L	OK
TS within PPh	H=L=L=L=L# M=H=L	OK/ok
TS within IP	H=L	OK

Lyrics	难道无人对你讲	Match
BT	LH LH LH LH MH MH MH	
Melodic tier	1 3 27♭ 6♭5♭ 13♭ 5♭5♭ 5♭	
TS within PW	L=H# L=H# MH# MH# MH	OK/*/*/ok/ok
TS within CG	M=H=L	OK
TS within PPh	L=H=L=L# M=H=L	ok/OK
TS within IP	L=L	ok

Lyrics	我只晓得少爷房里的佣人们	Match
BT	LH MH MH MH MH LH LH LH MH LH LH LH	
Melodic tier	6♭ 1 32 15♭ 1 27♭ 5♭ 6♭ 5♭ 3♭ 5♭ 3♭	
TS within PW	LH#MH# M=H#M=H#L=H#MH #L=H#LH	ok/ok/*/*/*/ok/OK/ok
TS within CG	L=H=L=L# M=H=L=L=L #L=H=L	ok/OK/OK
TS within PPh	L=H=L=L#M=H=L=L=L=L=L	ok/OK
TS within IP	L=L	ok

Lyrics	相帮他在理衣裳	Match
BT	HL HL HL LH LH HL LH	
Melodic tier	1 5♭3♭ 6♭6♭ 5♭3♭ 1 37♭ 6♭	
TS within PW	HL# HL# HL# LH#LH# H=L	ok/OK/ok/*/ok/OK
TS within CG	H=L=L=L	OK
TS within PPh	H=L=L=L# L=H=L	OK/ok
TS within IP	H=L	OK

Lyrics	他现在可曾起了床	Match
BT	HL LH LH MH MH MH LH LH	
Melodic tier	5 3 5 6 52 5♭3♭ 1 6♭	
TS within PW	HL# L=H#M=H# MH#LH#LH	ok/OK/*/*/ok/ok
TS within CG	H=L=L M=H	ok/OK
TS within PPh	H=L=L=L=L# M=H=L	OK/*
TS within IP	H=L	OK

Lyrics	他昨夜回来是啥辰光?	Match
BT	HL LH LH LH LH LH HL LH HL	
Melodic tier	6♭ 1 13 27♭ 6♭ 5♭ 13♭ 5♭6♭ 5♭	
TS within PW	HL# L=H#L=H#LH#HL#L=H	ok/OK/*/ok/ok/ok
TS within CG	H=L=L=L=L	ok
TS within PPh	H=L=L=L=L=L#H=L=L	OK/OK
TS within IP	H=L	OK

Lyrics	我是每天晚上回去睡	Match
BT	LH LH MH HL MH LH LH MH LH	
Melodic tier	6♭ 1 3 37♭ 6♭ 7♭5♭ 1 32♭ 3♭6♭	
TS within PW	LH# LH# M=H# M=H# L=H# LH	ok/ok/*/*/*/OK
TS within CG	L=H	OK
TS within PPh	L=H=L=L=L=L#L=H=L	*/ok
TS within IP	L=L	OK

Lyrics	为何要每天晚上走慌忙?	Match
BT	LH LH MH MH HL MH LH MH HL LH	
Melodic tier	1 3 36♭ 5 53 2 36♭ 1 3 26♭	
TS within PW	L=H# MH#M=H# M=H# MH#H=L	OK/*/*/*/ok/OK
TS within PPh	L=H=L#M=H=L=L# M=H=L	ok/OK/OK

TS within IP	L=L	OK

Lyrics	是你太太吩咐我回去	Match
BT	LH MH MH MH HL MH LH LH MH	
Melodic tier	6♭ 1 3 3 27♭ 6♭5♭ 1 3♭ 15♭	
TS within PW	LH# MH# M=H# H=L# LH# L=H	ok/ok/ok/OK/ok/OK
TS within CG	L=H H=L=L	OK/OK
TS within PPh	L=H=L=L# H=L=L=L=L	*/OK
TS within IP	L=L	ok

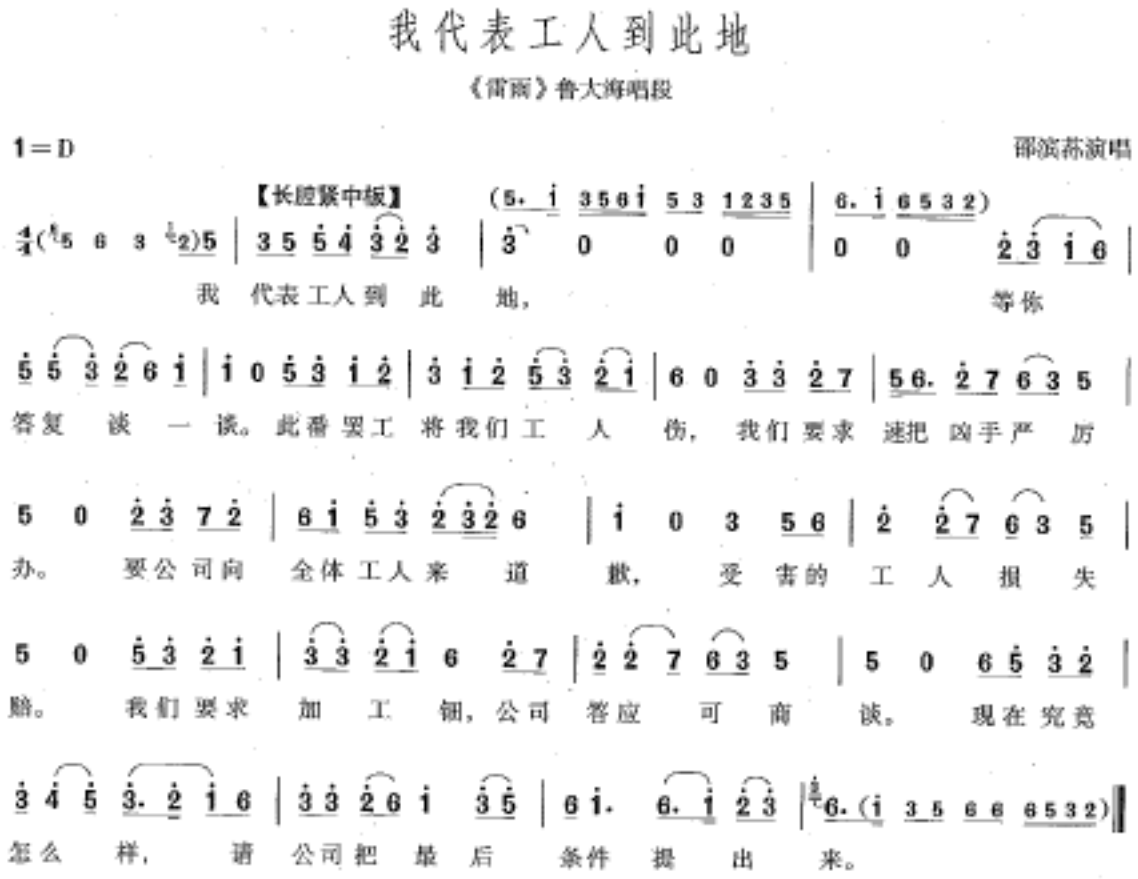
Lyrics	那时老爷在矿上	Match
BT	HL LH LH LH LH MH LH	
Melodic tier	5 53 1 21 3♭3♭ 5♭ 5♭	
TS within PW	H=L# L=H# LH# M=H	OK/ok/ok/ok
TS within PPh	H=L=L=L# L=H=L	OK/*
TS within IP	H=L	OK

Lyrics	如今他回来无人会服侍	Match
BT	LH HL HL LH LH LH LH LH LH LH	
Melodic tier	6♭ 1 16♭ 1 31 6♭ 1 6♭1 3♭ 5♭	
TS within PW	L=H# HL# L=H# L=H#LH#L=H	OK/OK/ok/OK/OK/OK
TS within CG	L=H=L	OK
TS within PPh	L=H=L=L=L#L=H=L=L=L	ok/ok
TS within IP	L=L	ok

Lyrics	你每天回去不妥当	Match
BT	MH MH HL LH MH MH MH HL	
Melodic tier	3♭ 1 11 6♭3♭ 5♭3♭ 2 37♭ 6♭	
TS within PW	MH# M=H# L=H#MH# M=H	ok/ok/*/*/*

TS within CG	M=H=L	*
TS within PPh	M=H=L=L=L# M=H=L	ok/OK
TS within IP	M=L	*

6. 我代表工人到此地（长腔中板）



Lyrics	我代表工人到此地	Match
BT	LH LH MH HL LH MH MH LH	
Melodic tier	5 3 5 $5^{\#}$ $4^{\#}$ $3^{\#}2^{\#}$ $3^{\#}$ $3^{\#}$	
TS within PW	LH# L=H# H=L# MH# M=H	ok/OK/OK/*/ok
TS within CG	L=H=L	OK
TS within PPh	L=H=L=L=L#M=H=L	*/ ok
TS within IP	L=L	*

Lyrics	等你答复谈一谈	Match
BT	MH MH MH MH LH MH LH	
Melodic tier	$2^{\#}$ $3^{\#}6$ $5^{\#}$ $5^{\#}3^{\#}$ $2^{\#}6$ $1^{\#}$ $1^{\#}$	
TS within PW	MH# MH# M=H# L=H=L	ok/*/*/ok

TS within CG	M=H	*
TS within PPh	M=H=L=L# L=H=L	*/ok
TS within IP	M=L	OK

Lyrics	此番罢工将我们工人伤	Match
BT	MH HL LH HL HL LH LH HL LH HL	
Melodic tier	5 3 1 2 3 1 2 53 21 6_b	
TS within PW	M=H# L=H# HL# L=H# H=L# HL	*/OK/ok/OK/OK/ok
TS within CG	M=H=L=L=L=L=L	OK
TS within PPh	M=H=L=L=L=L=L# H=L=L	OK/ OK
TS within IP	M=L	OK

Lyrics	我们要求速把凶手严厉办	Match
BT	LH LH MH LH MH MH HL MH LH LH LH	
Melodic tier	$3^{\#}$ $3^{\#}$ $2^{\#}$ 7 5 6 $2^{\#}$ 7 63 5 5	
TS within PW	L=H# M=H# MH#MH# H=L# L=H# LH	ok/*/OK/ ok/*/*
TS within CG	M=H	OK
TS within PPh	L=H=L=L=L=L#H=L=L=L=L	OK/ OK
TS within IP	L=L	ok

Lyrics	要公司向全体工人来道歉	Match
BT	MH HL HL MH LH MH HL LH LH LH MH	
Melodic tier	2 3 7_b 2 6_b 1 5 3 22 6_b 1	
TS within PW	MH# H=L# MH#L=H#H=L#LH# L=H	ok/OK/ok/OK/OK/ok/OK
TS within PPh	M=H=L# M=H=L=L=L#L=H=L	OK/*/ok
TS within IP	M=L	OK

Lyrics	受害的工人损失赔	Match
BT	LH LH MH HL LH MH MH LH	

Melodic tier	3 5 6 $2^{\#}$ $2^{\#}7$ 63 5 5	
TS within PW	L=H#MH# H=L# M=H# LH	*/OK/ */ok
TS within CG	L=H=L	*
TS within PPh	L=H=L=L=L# M=H=L	*/OK
TS within IP	L=L	*

Lyrics	我们要求加工钿	Match
BT	LH LH MH LH HL HL LH	
Melodic tier	5 3 2 1 33 21 $6_{\flat}$	
TS within PW	L=H# M=H# HL# H=L	*/*/ok/OK
TS within PPh	L=H=L=L# H=L=L	*/OK
TS within IP	L=L	OK

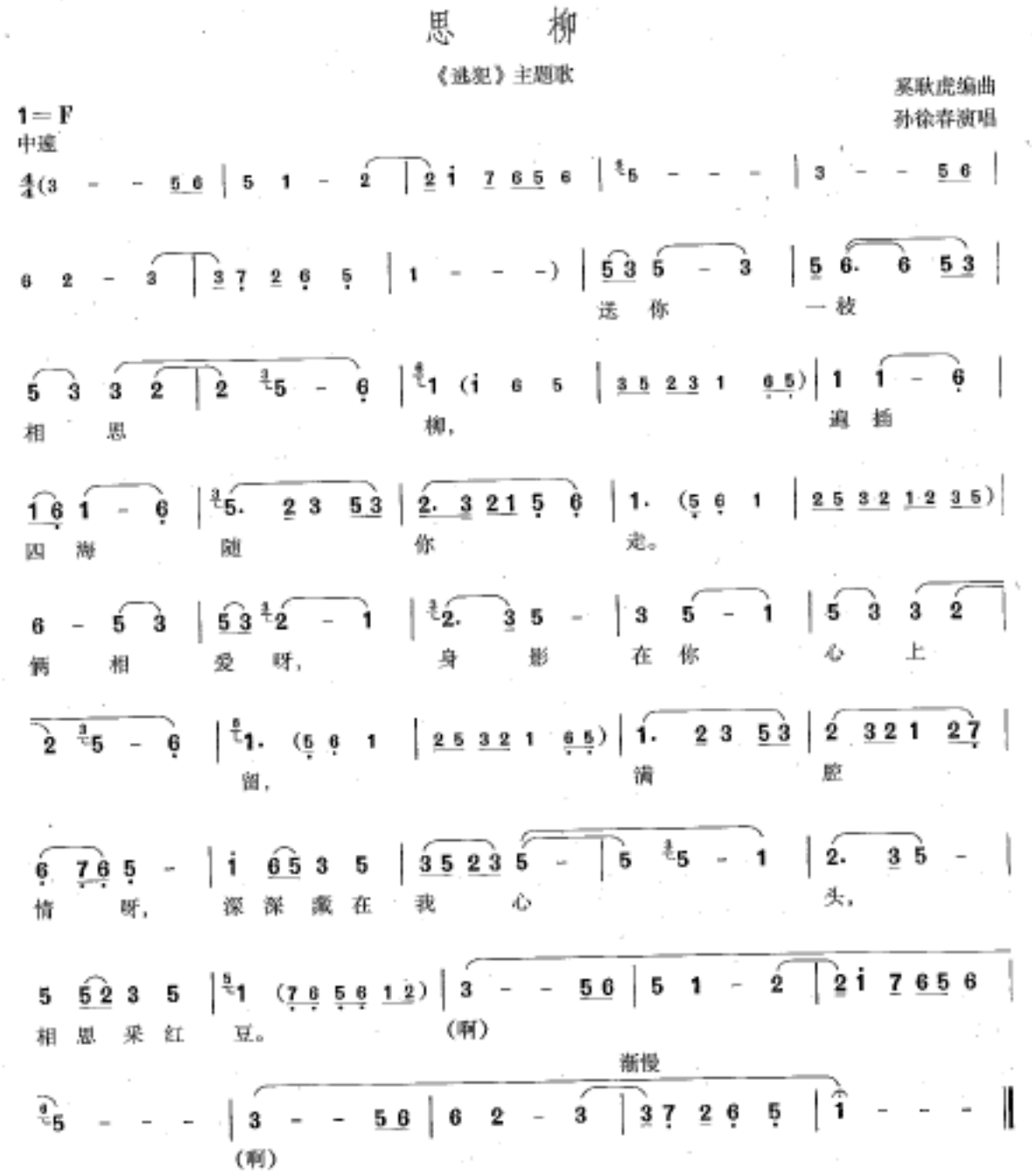
Lyrics	公司答应可商谈	Match
BT	HL HL MH HL MH HL LH	
Melodic tier	$2^{\#}$ 7 $2^{\#}$ $2^{\#}7$ 63 5 5	
TS within PW	H=L# M=H# MH# H=L	OK/*/*/ok
TS within PPh	H=L=L=L# M=H=L	OK/OK
TS within IP	H=L	ok

Lyrics	现在究竟怎么样	Match
BT	LH LH HL MH MH LH LH	
Melodic tier	$6_{\flat}$ 5 3 2 3 45 31	
TS within PW	L=H# H=L# M=H=L	OK/OK/OK
TS within PPh	L=H=L=L# M=H=L	*/OK
TS within IP	L=L	*

Lyrics	请公司把最后条件提出来	Match
BT	MH HL HL MH MH LH MH LH LH MH LH	

Melodic tier	6♭ 3 3 26♭ 1 35 6♭ 1 6♭1 23 6♭	
TS within PW	MH# H=L# MH# M=H#M=H#LH# M=H	ok/ok/*/OK/OK/OK/*
TS within CG	M=H=L	*
TS within PPh	M=H=L# M=H=L=L=L# L=H=L	*/OK/OK
TS within IP	M=L	ok

7. 思柳（小调寄生草）



Lyrics	送你一枝相思柳	Match
BT	MH MH MH HL HL HL LH	
Melodic tier	53　53　5　63　53　36♭　1	

TS within PW	MH# MH# MH#HL# H=L# LH	*/*/ok/OK/OK/*
TS within CG	M =H# M=H	*/*
TS within PPh	M=H=L=L#H=L=L	OK/OK
TS within IP	M=L	OK

Lyrics	遍插四海随你走	Match
BT	MH MH MH MH LH MH MH	
Melodic tier	1 16_{b} 16_{b} 16_{b} 53 26_{b} 1	
TS within PW	M=H# M=H# LH# MH# MH	*/*/*/*/ok
TS within CG	L=H=L	OK
TS within PPh	M=H=L=L# L=H=L	OK/ok
TS within IP	M=L	ok

Lyrics	俩相爱呀	Match
BT	LH HL MH HL	
Melodic tier	6 53 53 21	
TS within PW	LH# H=L# HL	ok/OK/OK
TS within CG	L=H=L=L	OK
TS within PPh	L=H=L=L	ok
TS within IP	L=L	ok

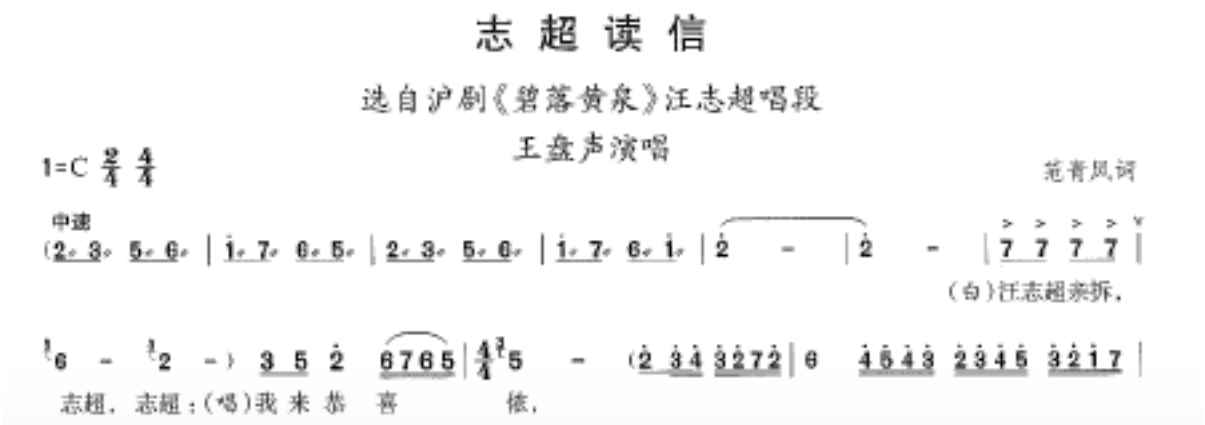
Lyrics	身影在你心上留	Match
BT	HL MH LH MH HL LH LH	
Melodic tier	23 5 3 51 53 36_{b} 1	
TS within PW	H=L# LH# MH# H=L# LH	*/ok/*/OK/ok
TS within CG	H=L=L=L	OK
TS within PPh	H=L=L=L# H=L=L	OK/OK
TS within IP	H=L	OK

Lyrics	满腔情呀	Match
BT	LH HL LH HL	
Melodic tier	13 27♭ 6♭6♭ 5♭	
TS within PW	L= H# LH# HL	*/ok/ok
TS within CG	L=H=L=L	ok
TS within PPh	L=H=L=L	ok
TS within IP	L=L	ok

Lyrics	深深藏在我心头	Match
BT	HL HL LH LH LH HL LH	
Melodic tier	1# 65 3 5 33 51 25	
TS within PW	H=L# LH#LH# LH# H=L	OK/ok/ok/ok/ok
TS within CG	L=H=L	OK
TS within PPh	H=L=L=L=L# H=L	OK/ok
TS within IP	H=L	OK

Lyrics	相思采红豆	Match
BT	HL HL MH LH LH	
Melodic tier	5 52 3 5 1	
TS within PW	H=L# MH# L=H	OK/ok/*
TS within PPh	H=L# M=H=L	OK/OK
TS within IP	H=L	OK

8. 志超读信（长腔中板）


志 超 读 信
选自沪剧《碧落黄泉》汪志超唱段
王盘声演唱
1=C 2/4 4/4
范青风词
中速
(白)汪志超亲拆，
志超，志超；(唱)我来恭 喜 侬，

6762 7657) 6 3 3 | 2/4 2 2 1 2 3 2 1 | 1 0 5 3 3 2 | 7 2 5 6 2765 | 3 0 5356 | 2765 5♯45 |
玉 茹 印象依阿 忘 记? 我搭依 一道求学书来 读, 朝暮 相聚 有 四

5 0 72 7 | 5 67 7 6 65 | ♭3 767 6 | 5 67 5♯45 | 5 0 2 3 3 2 | 7 2 2 3 2 6 76 | ♭7 3 0 3 5 6 |
年。感谢依 常来 指教 我,志超依 对我 最 知 己。志超啊我 唯一个希望只有 依, 愿与依

7265 3 56 | 6 0 7 3 2 | 5 6 3 232 | 76. 2276 | 5765 5♯45 | 5 0 72 7 | 7 7 7 7 6 5 67 |
永远 在 一 起。现在我 回想以往 事, 以往之事 好像就在眼 面 前: 阿记得 那一日勒啦狂风

6 76 653 | 7 2 3 2 7 | 5 67 6765 | 5 0 35 6 | 7 256 7 6 | 5 3 35 6 | 2765 5♯45 |
暴雨 夜, 受了风寒我 病倒啦宿舍 里, 幸亏 依 细心来照顾 我, 时 刻 相伴啦我 身

5 0 32 3 | 72 7 67. | 7 35 5 67 | 766 5 5♯45 | 5 0 72 7 | 5 37 6 76 | ♭3 2 2 7 |
边, 体 贴 入微 只有 依,这种情 深 义 重我难 忘 记。不久 我 病体 痊愈 后, 一直想

7 0 5 67 | 7265 5♯45 | 5. 5 3 5 | 56. 76 | ♭7 3 0 2 2 7 | ♭7 5 67 5♯45 | 5 0 7 2 2 |
如 何来 报答依的好 心 意, 我愿 将 一切 交付 依, 只要 依 对我 有 情 义。曾经依

7. 2 32 76 | 7 ˇ35 5 6 | 7 67 5♯45 | 5 0 272 | 6 6. 5♯45 | 3 0 767 7 | 5 67 5♯45 |
对 我安 慰 过,依说爱我 始终 爱 到 底, 海枯 石烂 情 不 灭, 比翼鸟 成对 同 伴

5 0 7 2 | 2 3. 3 32 | 7 6 7 7 | 6763 5 6. | 6 03 7656 | 7 77 676 | 5335 5 6 |
飞。 从 此 恋舞 卿恋 我, 花晨 月夕 不分 离。我认为无愁 生 活过一辈 子,谁知好景

7265 5♯45 | 5 0 773 | 2 27 6 7. | 7 0 55 3 | 277 6 5♯45 | 5 02 7 3 | 2 2 7 767 |
不长会得折 磨 起。学期 一满 毕了 业, 各自 分手回故 乡 去。我忍心 目送 依离 开

7 0 7 7 | 766 6 5♯45 | 5. 2 7277 | 5 67 7676 | 5335 6765 | 3 5 6 5 | 5 2 2. |
我, 千 言 万语我无 从 起,我只记得依 临走 对 我 说,依说一到 上 海书 信 寄, 家长

7 7 7676 | 5 3 7 7 | 6765 5♯45 | 5 0 2777 | 577 6 76 | 5 3 6756 | 2776 5♯45 |
面前讲明 白, 挽媒 说合 来成 婚 礼。那时间我 没法来留住 依, 一阵 阵 辛 酸往肚 里

5 0 2 3. | 3227 767 | 7 0 5 7 | 7 76 5#45 | 5 272 | 2. 7 767 | 6035 67. | 7665 5 6. |
唱。 一路 顺风 谅侬 好， 平安 无事 到 屋 里。转眼 相隔几个 月，为啥一封 书信都勿看

6 0 2777 | 5 67 6 76 | 5 3 5 67 | 7 65 5#45 | 5 0 7 3 | 3 27 76 7 | 7 0 3 23 |
见。 所有我的 环境 侬晓 得， 嫂嫂伊拿我看 勿 起。 含仔 眼泪 等 着 侬， 希望

27 7677 | 5765 5#45 | 5 0 7. 2 | 6 76 5#45 | 3 0 3 56 | 7 6 5#45 | 5 0 7 32 |
侬 救 出我 迫格一个 火 坑 里。 黄 鹂 杳然 无 消 息， 现在我 再也等 勿 及。 玉茹的

7 2 3276 | 7 0 3 56 | 5765 5#45 | 5 0 7 7 | 5 67 7 76 | 653 7. 7 | 766 5#45 |
命运已经 到， 大概我 没有选种 好 福 气， 伤势 沉重在医 院 里， 今 日 莲 妹到 此

5 0 7 33 | 7 2 3 32 | 76. 335 | 7 65 5#45 | 5 0 7 2 | 2 27 767 | 7. 7 677 |
地， 拿 侬的 喜讯告诉 我， 玉茹 听 见 很 欢 喜， 恨我 身浪 厢毛 病 重，我勿能到

567 765 | 3 07 6. 7 | 567 776 | 537 7 | 6765 5#45 | 5 0 23. | 3227 767 | 7 07 67. |
上海来道侬个 喜。我晓 得 志韬是多情 种， 始终 勿会 得负 情 义， 一定 有啥 困难 事，侬勿必

7673 5 6. | 6 0 277 | 57. 7 65 | 5 3 5 7 | 5765 5#45 | 5 0 272 | 3227 767 | 7 0 323 |
操 丧 勿必 气。恭祝那 白首 同到 老， 美满 结合成对好 夫 妻， 请侬 以后 忘记 我， 因为

稍慢 稍快
27. 67. | 7665 5#45 | 5 0 7 22 | 6756 7 76 | 5 3 6765 | 7 27 635 | 5 0 0 | 0 2 7 2 |
我 不久 人 世 就 要 死。也许侬 接着迭封书信 时， 玉茹已经 魂归 离 恨 天。 这字字

372 3 32 | 766 7 3 5 | 7 65 5#45 | 5 0 7 22 | 327 7 6 | 5 3 3767 | 5 6 765 | 5 0 5 3 |
句 句辛酸 话，好比万把 钢刀 刺 心 肺。我勒啦 此地婚来 结， 玉茹勒啦 杭州将要 死。 山盟

2 32 3 2 | 2 0 6 35 | 7 65 653 | 5 02 7 3 | 2 27 67. | 7 07 67 7 | 6 76 5#45 | 5 0 6 3 |
海誓我亲口 许， 金家的 婚 事我非 愿 意，我宁可 背上这不孝 罪，我不能让 玉 茹 含 恨 死。 自 问

稍慢
6 i i. 3 | 3 2. 3616 | i i. 656 | 6. (i 3 5 | 6 6i 6532 | 1 1 5631 | 2. 3 216i | 3 -) ‖
良心对 勿 起， 志 韬 不能 负 情 义。

Lyrics	我来恭喜侬	Match
BT	LH LH HL MH LH	
Melodic tier	3 5 $2^{\#}$ 65 5	
TS within PW	LH# LH# H=L# LH	ok/ok/OK/ok
TS within CG	L=H # H=L=L	OK/OK
TS within PPh	L=H=L=L=L	*
TS within IP	L=L	*

Lyrics	玉茹印象侬阿忘记	Match
BT	LH LH MH LH LH HL LH MH	
Melodic tier	$6_{\flat}$ 33 2 2 1 22 1 1	
TS within PW	L=H# M=H# LH# HL# L=H	OK/ok/ok/ok/ok
TS within CG	M=H=L# H=L=L	OK/OK
TS within PPh	L=H=L=L=L# H=L=L	*/OK
TS within IP	L=L	*

Lyrics	我搭侬一道求学书来读	Match
BT	LH MH LH MH LH LH LH HL LH LH	
Melodic tier	5 $3^{\#}$ $3^{\#}2^{\#}$ 7 $2^{\#}$ 5 6 $2^{\#}7$ 65 3	
TS within PW	LH# MH# LH# M=H# L=H# HL# LH#LH	ok/ok/*/OK/OK/OK/*/ok
/TS within CG	L=H=L H=L=L	*/OK
TS within PPh	L=H=L=L=L# L=H=L=L=L	*/*
TS within IP	L= L	*

Lyrics	朝暮相聚有四年	Match
BT	HL LH HL LH LH MH LH	
Melodic tier	53 56 $2^{\#}7$ 65 54 5 5	
TS within PW	H=L # H=L # LH# M=H	OK/OK/*/ ok

TS within PPh	H=L=L=L# L=H=L	ok/OK
TS within IP	H= L	ok

Lyrics	感谢侬常来指教我	Match
BT	MH LH LH LH LH MH MH LH	
Melodic tier	7 $2^{\#}$ 7 5 67 6 65 3	
TS within PW	M=H# LH# L=H# M=H# LH	OK/ok/OK/*/ok
TS within CG	M=H=L# M=H=L	ok/OK
TS within PPh	M=H=L=L=L# M=H=L	ok/OK
TS within IP	M= L	OK

Lyrics	志超侬对我最知己	Match
BT	MH HL LH MH LH MH HL MH	
Melodic tier	76 7 6 5 67 54 5 5	
TS within PW	M=H# LH # MH#LH # MH# H=L	ok/ok/ok/OK/*/ok
TS within CG	M=H=L# M=H# M=H=L	OK/OK/ok
TS within PPh	M=H=L=L=L# M=H=L	ok/ok
TS within IP	M=L	OK

Lyrics	志超啊我唯一希望只有侬	Match
BT	MH HL HL LH LH MH MH HL LH MH LH LH	
Melodic tier	2 3 3 2 7♭ 2 2 3 2 6♭ 7♭6♭ 3♭	
TS within PW	M=H# HL # LH# L=H#MH# H=L# M=H# LH	ok/ok/ok/OK/ok/OK/ok/ok
TS within CG	M=H=L=L#L=H=L M=H=L	ok/*/ OK
TS within PPh	M=H=L=L=L=L=L=L# M=H=L	ok/OK
TS within IP	M= L	*

Lyrics	愿与侬永远在一起	Match
BT	LH LH LH MH LH LH MH MH	
Melodic tier	3 5 6 7 $2^{\#}5$ 35 6 6	
TS within PW	LH# LH#LH# M=H# LH# M=H	ok/ok/ok/*/ok/ok
TS within CG	L=H=L# L=H=L	*/*
TS within PPh	L=H=L=L=L# L=H=L	*/*
TS within IP	L=L	*

Lyrics	现在我回想以往事	Match
BT	LH LH LH LH MH MH MH LH	
Melodic tier	7 $3^{\#}$ $2^{\#}$ 5 6 $3^{\#}$ $2^{\#}2^{\#}$ 76	
TS within PW	L=H # LH# L=H# M=H# LH	OK/ok/OK/*/*
TS within CG	L=H=L	*
TS within PPh	L=H=L=L=L# M=H=L	ok/ OK
TS within IP	L=L	ok

Lyrics	以往之事好像就在眼面前	Match
BT	MH MH HL LH MH LH LH LH LH LH LH LH	
Melodic tier	$2^{\#}$ $2^{\#}$ 7 6 5 7 6 5 54 5 5	
TS within PW	M=H#HL#LH# M*=H# L=H# LH# L=H	ok/ok/ok/OK/*/*/ok
TS within CG	M=H=L=L	OK
TS within PPh	M=H=L=L #M=H=L=L=L=L=L	OK/ok
TS within IP	M=L	OK

Lyrics	阿记得	Match
BT	HL MH MH	
Melodic tier	7 $2^{\#}$ 7	
TS within PW	HL# M=H	ok/ *

TS within PPh	H=L=L	ok
TS within IP	H=L	ok
Lyrics	那一日勒啦狂风暴雨夜	Match
BT	HL MH LH LH HL LH HL LH LH LH	
Melodic tier	7 7 7 7 6 5 67 6 76 63	
TS within PW	H=L=L# L=H# L=H# L=H#LH	ok/*/OK/ok/*
TS within CG	L=H	*
TS within PPh	H=L=L=L=L# L=H=L=L=L	OK/ ok
TS within IP	H=L	OK
Lyrics	受了风寒我病倒啦宿舍里	Match
BT	LH LH HL LH LH LH MH HL MH MH LH	
Melodic tier	7 $2^{\#}$ $3^{\#}$ $2^{\#}$ 7 5 6 7 6 75 5	
TS within PW	LH#LH# H=L# LH# L=H#HL# M=H=L	ok/ok/OK/ok/OK/ok/OK
TS within CG	L=H# H=L=L#L=H=L	OK/OK/*
TS within PPh	L=H=L=L=L=L=L=L# M=H=L	OK/OK
TS within IP	L= L	ok
Lyrics	幸亏侬细心来照顾我	Match
BT	LH HL LH MH HL LH MH MH LH	
Melodic tier	3 5 6 7 $2^{\#}5$ 6 7 6 53	
TS within PW	L=H# LH#M=H# LH# M=H# LH	OK/ok/*/ok/*/*
TS within CG	L=H=L#M=H=L#M=H=L	*/OK/OK
TS within PPh	L=H=L=L=L=L#M=H=L	*/ OK
TS within IP	L=L	ok
Lyrics	时刻相伴来我身边	Match

BT	LH MH HL LH LH LH HL HL	
Melodic tier	35 6 $2^{\#}7$ 6 5 54 5 5	
TS within PW	L=H# H=L#LH#LH#H=L	OK/OK/ok/*/ok
TS within CG	L=H	*
TS within PPh	L=H=L=L# L=H=L=L	*/ok
TS within IP	L=L	*

Lyrics	体贴入微只有侬	Match
BT	MH MH LH LH MH LH LH	
Melodic tier	$3^{\#}2^{\#}$ $3^{\#}$ 7 $2^{\#}7$ 6 7 7	
TS within PW	M=H# L=H#M=H# LH	ok/ok/OK/ok
TS within CG	M=H=L	*
TS within PPh	M=H=L=L# M=H=L	OK/*
TS within IP	M=L	OK

Lyrics	迪种情深意重我难忘记	Match
BT	LH LH LH HL MH LH LH LH LH MH	
Melodic tier	3 5 5 67 76 6 5 54 5 5	
TS within PW	L=H# L=H=L=L# LH# LH# L=H	OK/*/ok/*/ok
TS within CG	L=H=L=L=L	OK
TS within PPh	L=H=L=L=L=L=L#L=H=L	*/OK
TS within IP	L=L	*

Lyrics	不久我病体痊愈后	Match
BT	MH MH LH LH MH MH LH LH	
Melodic tier	7 $2^{\#}$ 7 5 67 6 76 3	
TS within PW	M=H# LH#L=H# M=H#LH	OK/ok/OK/ok/ok
TS within CG	M=H=L M=H=L	ok/OK

TS within PPh	M=H=L=L=L# M=H=L	ok/OK
TS within IP	M=L	OK

Lyrics	一直想如何来报答侬的好心意	Match
BT	MH LH MH LH LH LH MH MH LH MH MH HL MH	
Melodic tier	2# 2# 7 5 6 7 7 2# 6 5 54 5 5	
TS within PW	M=H# MH#L=H#LH# M=H# LH#MH# MH#H=L	ok/ok/OK/ok/OK/ok/ok/*/ok
TS within CG	L=H=L L=H	*/*
TS within PPh	M=H=L=L=L=L#M=H=L=L#L=L=L	OK/OK/OK
TS within IP	M=L	OK

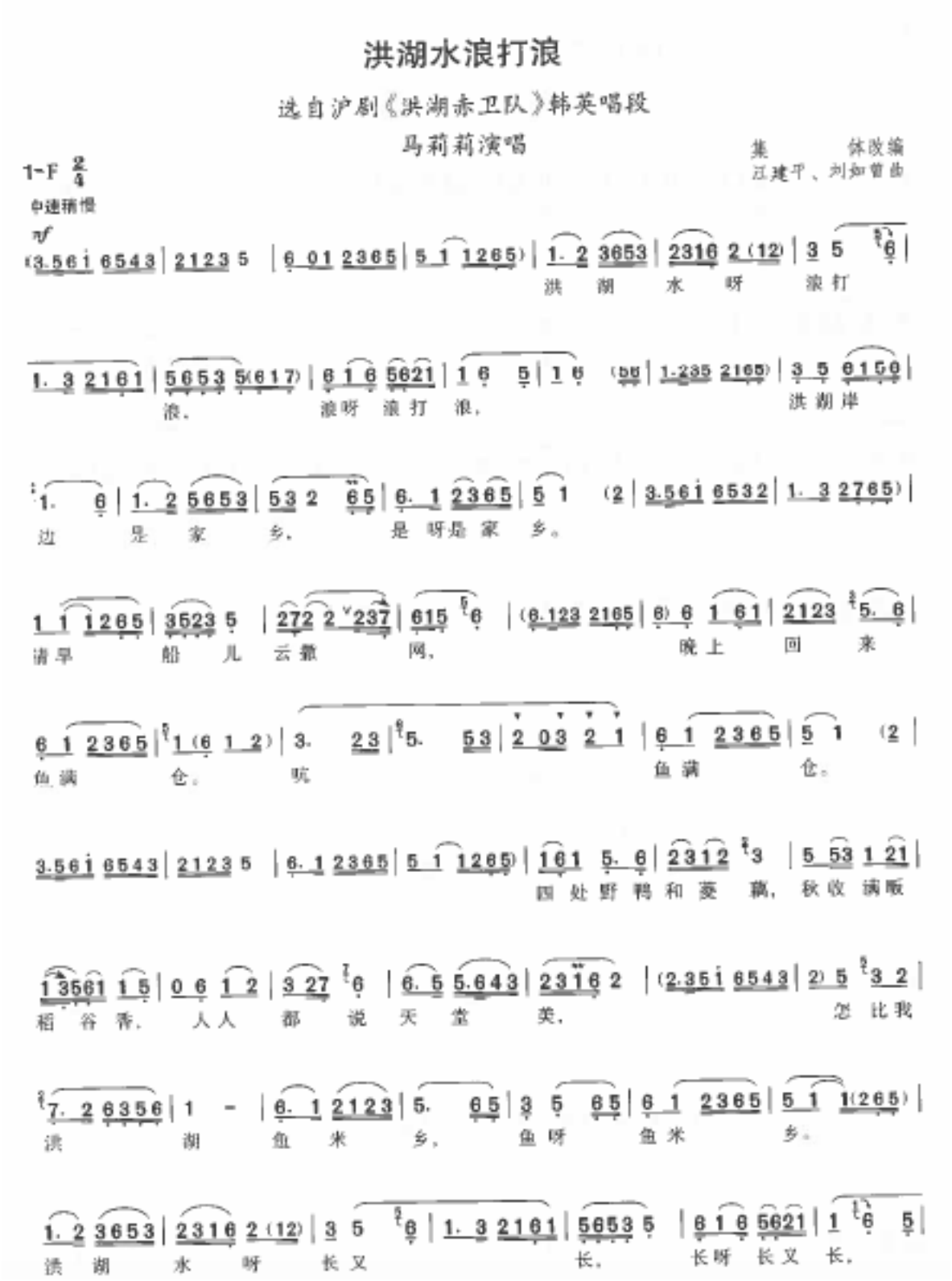
Lyrics	我愿将一切交付侬	Match
BT	LH LH HL MH MH HL MH LH	
Melodic tier	5 3 5 5 6 7 6 3	
TS within PW	LH# L=H# M=H#H=L#LH	ok/OK/OK/OK/ok
TS within CG	H=L=L	OK
TS within PPh	L=H=L=L=L# H=L=L	*/OK
TS within IP	L=L	*

Lyrics	只要侬对我有情义	Match
BT	MH MH LH MH LH LH LH LH	
Melodic tier	2# 2# 7 5 67 54 5 5	
TS within PW	M=H# LH# M=H# LH# L=H	ok/ok/OK/*/ok
TS within CG	M=H=L# M=H	OK/OK

TS within PPh	M=H=L=L=L# L=H=L	OK/OK
TS within IP	M=L	OK
Lyrics	曾经侬对我安慰过	Match
BT	HL HL LH MH LH HL MH MH	
Melodic tier	7♭ 2 2 7♭ 2 32 7♭6♭ 7♭	
TS within PW	H=L# LH# MH#LH#H=L#MH	*/ok/ok/ok/ok
TS within CG	H=L=L# M=H#H=L=L	*/OK/OK
TS within PPh	H=L=L=L=L# H=L=L	*/OK
TS within IP	H=L	ok
Lyrics	侬说爱我始终爱到底	Match
BT	LH MH MH LH MH HL MH MH MH	
Melodic tier	3 5 5 6 7 67 54 5 5	
TS within PW	LH#MH#MH#LH#M=H#MH#M=H	ok/ok/ok/ok/ok/*/ok
TS within CG	L=H#M=H#	OK/OK
TS within PPh	L=H=L=L# M=H#M=H=L	*/ok/ok
TS within IP	L=L	*
Lyrics	海枯石烂情不灭	Match
BT	MH HL MH LH LH MH LH	
Melodic tier	2#7 2# 6 6 54 5 3	
TS within PW	M=H=L=L# LH#M=H	OK/*/*
TS within PPh	M=H=L=L# L=M=L	OK/ok
TS within IP	M=L	ok
Lyrics	比翼鸟成对同伴飞	Match
BT	MH LH MH LH MH LH LH HL	
Melodic tier	76 7 7 5 67 54 5 5	

TS within PW	M=H=L# L=H#L=H#HL	ok/OK/ok/ok
TS within PPh	M=H=L= L=L# L=H=L	ok/OK
TS within IP	M=L	OK

9. 洪湖水浪打浪（小调.九连环）



洪湖水浪打浪

选自沪剧《洪湖赤卫队》韩英唱段

马莉莉演唱

集　　体改编

江建平、刘如曾曲

1=F 2/4

中速稍慢

mf

(3.561 6543 | 2123 5 | 6 01 2365 | 5 1 1265) | 1. 2 3653 | 2316 2 (12) | 3 5 6 |

洪　湖　水　呀　浪打

1. 3 2161 | 5653 5(617) | 6 1 6 5621 | 1 6 5 | 1 6 (56 | 1-235 2165) | 3 5 6150 |

浪。　浪呀 浪打 浪。　洪湖岸

1. 6 | 1. 2 5653 | 532 65 | 6. 1 2365 | 5 1 (2 | 3.561 6532 | 1. 3 2765) |

边　是　家　乡。　是 呀是家 乡。

1 1 1265 | 3523 5 | 272 2 237 | 615 6 | (6.123 2165 | 6) 6 1 61 | 2123 5. 6 |

清早　船 儿 云霭　网，　晚上　回　来

6 1 2365 | 1 (6 1 2) | 3. 23 | 5. 53 | 2 03 2 1 | 6 1 2365 | 5 1 (2 |

鱼满　仓。　吭　鱼满　仓。

3.561 6543 | 2123 5 | 6. 1 2365 | 5 1 1265) | 161 5. 6 | 2312 3 | 5 53 1 21 |

四处野鸭和菱　藕，秋收满畈

13561 15 | 0 6 1 2 | 3 27 6 | 6. 5 5.643 | 2316 2 | (2.351 6543 | 2) 5 3 2 |

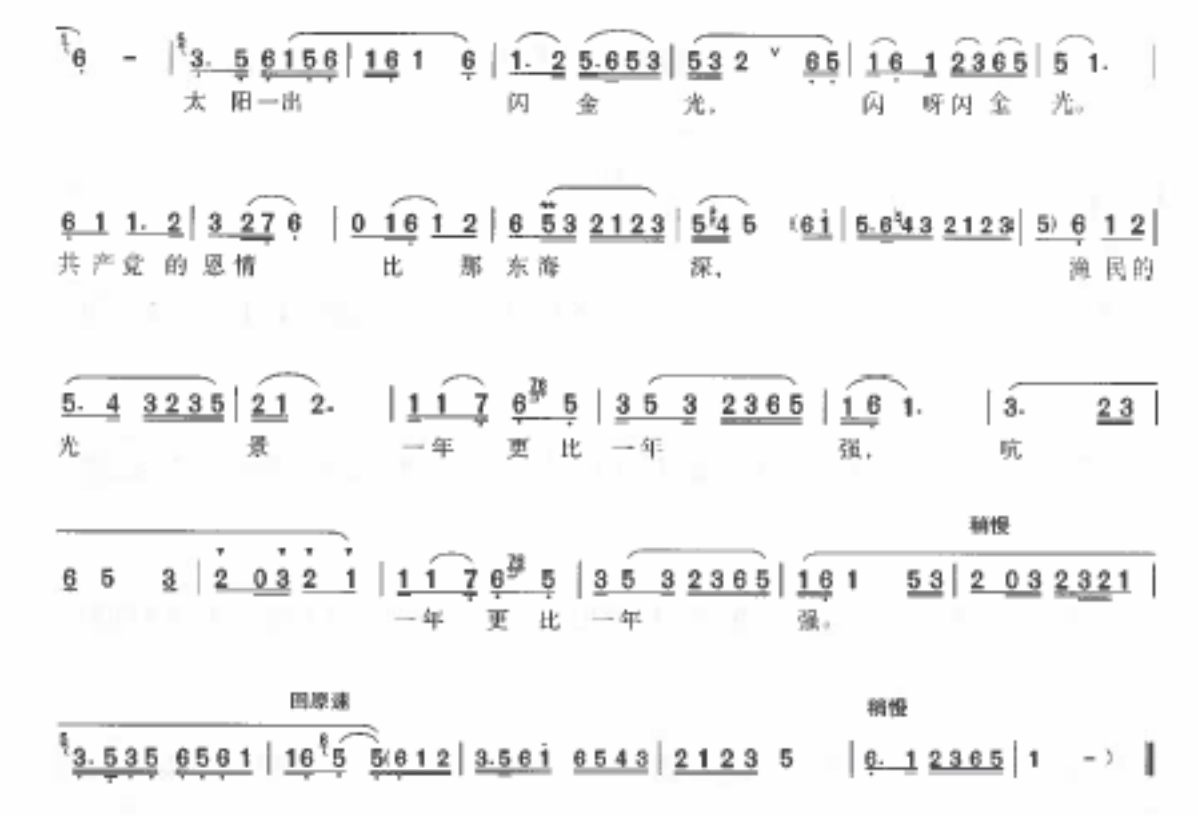
稻谷香，　人人　都　说　天　堂　美，　怎比我

7. 2 6356 | 1 - | 6. 1 2123 | 5. 65 | 3 5 65 | 6 1 2365 | 5 1 1(265) |

洪　湖　鱼　米　乡，　鱼呀　鱼米　乡。

1. 2 3653 | 2316 2 (12) | 3 5 6 | 1. 3 2161 | 5653 5 | 6 1 6 5621 | 1 6 5 |

洪　湖　水　呀　长又　长，　长呀 长又 长，



Lyrics	洪湖水呀	Match
BT	LH LH MH HL	
Melodic tier 1	12 3 26♭ 2	
Melodic tier 2	12 3 26♭ 2	
TS within PW	L=H# MH# HL	OK/*/ok
TS within CG	L=H=L=L	*
TS within PPh	L=H=L=L	*
TS within IP	L=L	*

Lyrics	浪打浪	Match
BT	LH MH LH	
Melodic tier	3 51 5♭	
TS within PW	LH# MH# LH	ok/*/ ok
TS within PPh	L=H=L	ok

TS within IP	L=L	ok
Lyrics	浪呀浪打浪	Match
BT	LH HL LH MH LH	
Melodic tier	6♭ 16♭ 5♭6♭ 21 16♭	
TS within PW	LH# HL# LH#MH#LH	ok/OK/OK/*/*
TS within CG	L=H	ok
TS within PPh	L=H# L=H=L	ok/*
TS within IP	L=L	OK
Lyrics	洪湖岸边是家乡	Match
BT	LH LH LH ML LH HL HL	
Melodic tier	3♭ 5♭ 6♭ 16♭ 12 53 55♭	
TS within PW	L=H# L=H# LH# H=L	OK/ok/OK/OK
TS within PPh	L=H=L=L# L=H=L	*/ok
TS within IP	L=L	*
Lyrics	是呀是家乡	Match
BT	LH HL LH HL HL	
Melodic tier	6♭ 1 23 65 51	
TS within PW	LH# HL#LH#H=L	ok/ok/OK/OK
TS within CG	L=H=L	*
TS within PPh	L=H# L=H=L	OK/ok
TS within IP	L=L	*
Lyrics	清早船儿云撒网	Match
BT	HL MH LH LH LH HL LH	
Melodic tier	1 15♭ 3♭ 5 27♭ 27♭ 6♭	

TS within PW	H=L# L=H# LH# H=L	OK/OK/*/OK
TS within PPh	H=L=L=L#L=H=L	*/ ok
TS within IP	H=L	OK

Lyrics	晚上回来鱼满仓	Match
BT	MH LH LH LH LH LH HL	
Melodic tier	6♭ 1 23 56♭ 6♭ 15 1	
TS within PW	M=H# L=H# LH# L=H	OK/*/ok/ok
TS within PPh	M=H=L=L# L=H=L	ok/*
TS within IP	M=L	*

Lyrics	鱼满仓	Match
BT	LH LH HL	
Melodic tier	6♭ 15 51	
TS within PW	LH# L=H	ok/ok
TS within PPh	L=H=L	*
TS within IP	L=L	*

Lyrics	四处野鸭和菱藕	Match
BT	MH MH LH MH LH LH LH	
Melodic tier	16♭ 1 5♭ 6♭ 23 12 3	
TS within PW	M=H# L=H# LH# L=H	ok/OK/OK/*
TS within PPh	M=H# L=H=L=L=L	ok/*
TS within IP	M=L	*

Lyrics	秋收满畈稻谷香	Match
BT	HL HL LH MH LH MH HL	
Melodic tier	5 53 1 21 15♭ 6♭1 15♭	
TS within PW	H=L# L=H# L=H# HL	OK/ok/ok/OK
TS within PPh	H=L=L=L# L=H=L	OK/OK
TS within IP	H=L	OK

Lyrics	人人都说天堂美	Match
BT	LH LH HL MH HL LH MH	
Melodic tier	6♭ 12 37♭ 6♭ 65 53 22	
TS within PW	L=H# H=L# H=L#MH	OK/OK/OK/ok
TS within PPh	L=H=L=L# H=L=L	OK/OK
TS within IP	L=L	*

Lyrics	怎比我洪湖鱼米香	Match
BT	MH MH LH LH LH LH LH HL	
Melodic tier	5 3 2 7♭6♭ 1 6♭1 23 55♭	
TS within PW	M=H#LH# L=H# L=H# HL	*/ok/ OK/ OK/ OK
TS within CG	M=H=L	OK
TS within PPh	M=H=L # L=H=L=L=L	OK/ok
TS within IP	M=L	OK

Lyrics	鱼呀鱼米乡	Match
BT	LH HL LH LH HL	
Melodic tier	3♭ 5♭5♭ 6♭ 15 51	
TS within PW	LH# HL# L=H# HL	ok/ok/OK/OK

TS within CG	L=H	OK
TS within PPh	L=H# L=H=L	OK/*
TS within IP	L=L	*

Lyrics	长又长	Match
BT	MH LH MH	
Melodic tier	3 51 5♭5♭	
TS within PW	MH# LH# MH	ok/*/ok
TS within PPh	M=H=L	OK
TS within IP	M=L	OK

Lyrics	长呀长又长	Match
BT	MH HL MH LH MH	
Melodic tier	6♭ 16♭ 5♭6♭ 21 16♭	
TS within PW	MH# HL# MH#LH#MH	ok/OK/OK/*/*
TS within CG	M=H	ok
TS within PPh	M=H# M=H=L	ok/*
TS within IP	M=L	ok

Lyrics	太阳一出闪金光	Match
BT	MH LH MH MH MH HL HL	
Melodic tier	3♭ 5♭ 6♭ 16♭ 12 53 55♭	
TS within PW	M=H# M=H# MH# H=L	OK/ok/OK/OK
TS within PPh	M=H=L=L# M=H=L	*/ OK
TS within IP	M=L	*

Lyrics	闪呀闪金光	Match
BT	MH HL MH HL HL	
Melodic tier	16♭ 1 23 65 51	
TS within PW	MH# HL# MH# H=L	*/ ok/ OK/ OK
TS within CG	M=H	ok
TS within PPh	M=H# M=H=L	ok/OK
TS within IP	M=L	ok

Lyrics	共产党的恩情比那东海深	Match
BT	LH MH MH MH HL LH MH HL HL MH HL	
Melodic tier	6♭ 1 1 2 3 26♭ 11 2 6 53 55	
TS within PW	L= H=L #MH #H=L# MH#HL#H=L# HL	*/ok/OK/ok/ok/OK/ok
TS within CG	L=H=L=L M=H	*/ OK
TS within PPh	L=H=L=L=L=L=L# M=H=L=L=L	OK/ *
TS within IP	L=L	*

Lyrics	渔民 的 光 景 一 年 更 比 一 年 强	Match
BT	LH LH MH HL MH MH LH HL MH MH LH LH	
Melodic tier	6♭ 1 2 55 22 1 17♭ 6♭ 5♭ 3 55 11	
TS within PW	L=H#MH#H=L# M=H# HL#MH#M=H# LH	OK/ok/OK/*/ok/ok/OK/ok
TS within CG	L=H=L H=L	*/OK
TS withinPPh	L=H=L=L=L# M=H=L=L# M=H=L	*/ OK/OK
TS within IP	L=L	*

Lyrics	一年更比一年强	Match
BT	MH LH HL MH MH LH LH	
Melodic tier	1 17_{b} 6_{b} 5_{b} 3 44 15_{b}	
TS within PW	M=H# HL#MH# M=H# LH	*/ ok/ ok/ OK/*
TS Within CG	H=L	OK
TS within PPh	M=H=L=L# M=H=L	OK/ OK
TS within IP	M=L	OK

10. 睡吧， 睡吧 （小调.柳青娘）

睡吧，睡吧……

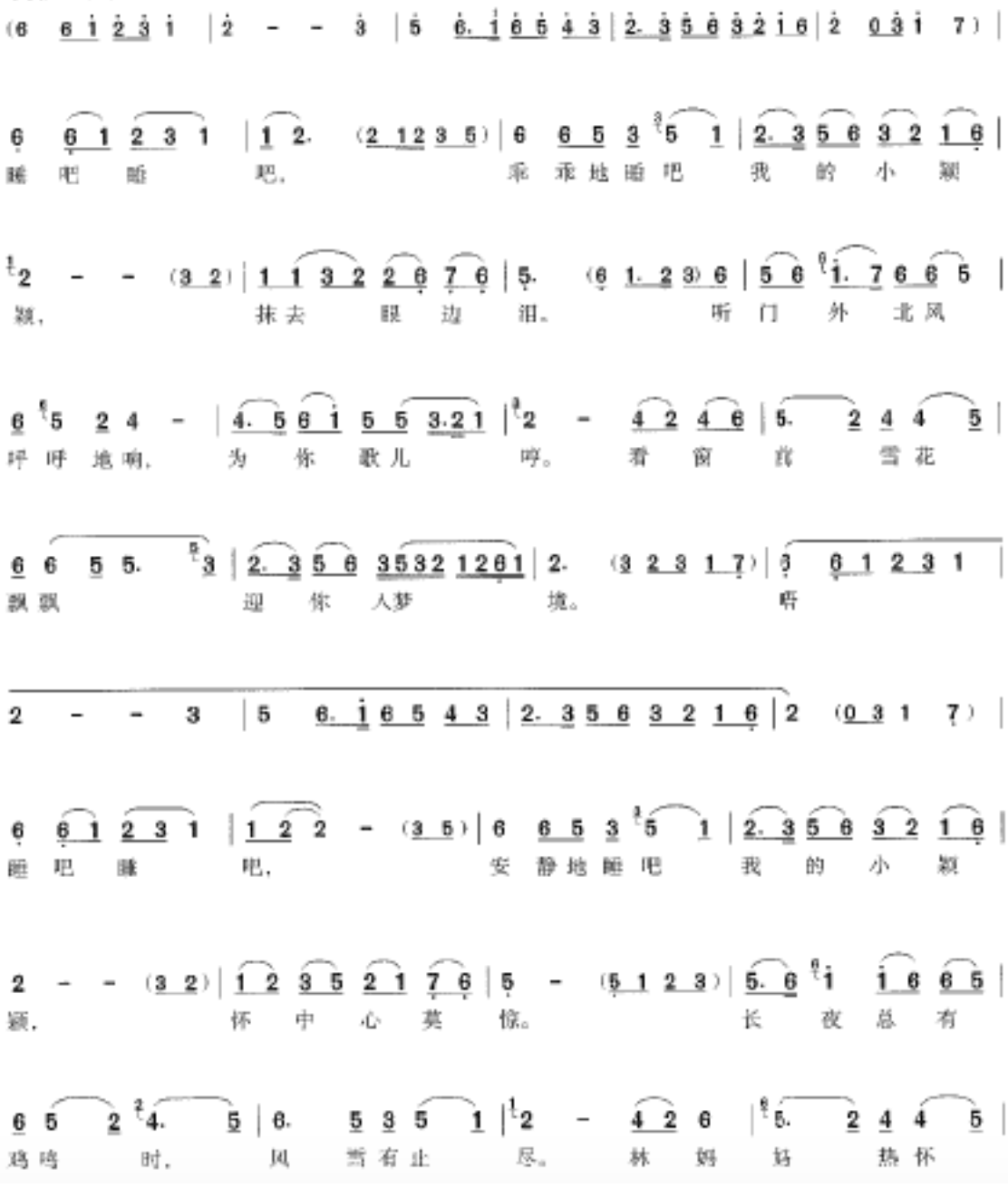
选自沪剧《被唾弃的人》插曲

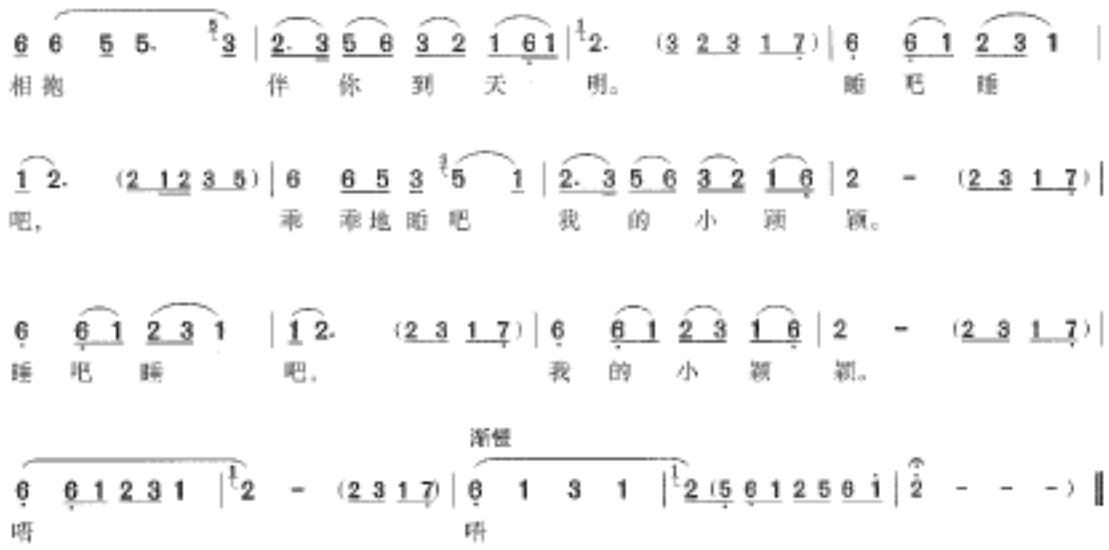
芳善玉演唱

1=C $\frac{4}{4}$

张东平等词
吴 耿 虎曲

中慢速 宁静地





Lyrics	睡吧睡吧	Match
BT	LH LH LH LH	
Melodic tier 1	6♭ 6♭1 21 12	
Melodic tier 2	6♭ 6♭1 21 12	
Melodic tier 3	6♭ 6♭1 21 12	
Melodic tier 4	6♭ 6♭1 21 12	
TS within PW	LH#LH# LH#LH	ok/OK/*/*
TS within CG	L=H# L=H	OK/ok
TS within PPh	L=H=L=L	*
TS within IP	L=L	*

Lyrics	乖乖地睡吧	Match
BT	HL HL LH LH LH	
Melodic tier 1	6 6 5 3 51	
Melodic tier 2	6 6 5 3 51	
TS within PW	H=L#LH# LH#LH	ok/ok/ok/*
TS within CG	H=L=L# L=H	OK/*
TS within PPh	H=L=L=L=L	OK

TS within IP	H= L	OK
Lyrics	我的小颖颖	Match
BT	LH MH MH LH LH	
Melodic tier 1	6♭ 6♭1 23 16♭ 2	
Melodic tier 2	23 56 32 16♭ 2	OK/OK/*/OK
Melodic tier 3	23 56 32 16♭ 2	
TS within PW	LH# MH# MH# L=H	ok/OK/OK/OK
TS within CG	L=H# M=H=L	OK/OK
TS within PPh	L=H=L=L=L	*
TS within IP	L=L	*
Lyrics	抹去眼边泪	Match
BT	LH MH LH HL LH	
Melodic tier	1 12 26♭ 7♭6♭ 5♭	
TS within PW	L=H# L=H# LH	OK/*/ ok
TS within PPh	L=H# L=H=L	OK/ ok
TS within IP	L=L	ok
Lyrics	听门外北风呼呼地响	Match
BT	HL LH LH HL HL HL HL LH MH	
Melodic tier	6 56 1#7 6 65 6 5 2 4	
TS within PW	HL# L=H# H=L# H=L#LH#MH	ok/OK/OK/OK/ok/ok
TS within CG	H=L=L=L	OK
TS within PPh	H= L=L=L=L#H=L=L=L	OK/OK
TS within IP	H=L	OK
Lyrics	为你歌儿哼	Match

BT	LH MH HL LH HL	
Melodic tier	45 $61^{\#}$ 5 51 2	
TS within PW	LH# MH# H=L# HL	OK/OK/OK/ok
TS within CG	L=H# H=L=L	OK/ok
TS within PPh	L=H=L=L=L	ok
TS within IP	L=L	ok

Lyrics	看窗前雪花飘飘	Match
BT	MH HL LH MH HL HL HL	
Melodic tier	42 46 52 4 45 6 63	
TS within PW	MH# H=L# M=H# H=L	*/ OK/ OK/ OK
TS within PPh	M=H=L# M=H=L=L	OK/OK
TS within IP	M=L	OK

Lyrics	迎你入梦境	Match
BT	LH MH LH LH MH	
Melodic tier	23 56 3 51 2	
TS within PW	LH# MH# LH# L=H	OK/ OK/ ok/ *
TS within CG	L=H	OK
TS within PPh	L=H# L=H=L	OK/ ok
TS within IP	L=L	OK

Lyrics	安静地睡吧	Match
BT	HL LH LH LH LH	
Melodic tier	6 6 5 3 51	
TS within PW	H=L#LH# LH#LH	ok/ok/ok/*
TS within CG	H=L=L#L=H	OK/*
TS within PPh	H=L=L=L=L	OK

TS within IP	H=L	OK
Lyrics	怀中心莫惊	Match
BT	LH HL HL LH HL	
Melodic tier	12 35 21 7♭6♭ 5♭	
TS within PW	L=H# HL# LH# HL	OK/OK/*/ok
TS within PPh	L=H=L# L=H	OK/*
TS within IP	L=L	ok
Lyrics	长夜总有鸡鸣时	Match
BT	MH LH MH LH HL LH LH	
Melodic tier	56 1# 1#6 65 6 52 45	
TS within PW	M=H# M=H# H=L# LH	OK/*/OK/OK
TS within PPh	M=H=L=L# H=L=L	ok/ok
TS within IP	M=L	ok
Lyrics	风雪有止尽	Match
BT	HL MH LH MH MH	
Melodic tier	6 5 3 51 2	
TS within PW	H=L# LH# M=H	OK/ok/*
TS within PPh	H=L=L=L=L	OK
TS within IP	H=L	OK
Lyrics	林妈妈热怀相拥	Match
BT	LH HL HL LH LH HL MH	
Melodic tier	42 6 52 4 45 6 63	
TS within PW	L=H=L# L=H#H=L	ok/*/ OK
TS within PPh	L=H=L# L=H=L=L	ok/ ok
TS within IP	L=L	ok

Lyrics	伴你到天明	Match
BT	LH MH MH HL LH	
Melodic tier	23 56 32 11 2	
TS within PW	LH# MH# MH#H=L	OK/OK/*/*
TS within CG	L=H	OK
TS within PPh	L=H=L=L=L	OK
TS within IP	L=L	OK