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Analysis of Tone-Melody Relationship Problems in Huju

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This study provides a quantitative analysis of comparing the relationship between music melody and linguistic tone through different prosodic domains. The result suggests that there is a high correspondence (70%) between music melody and language tone in Huju, which differs from musicians' opinion that the word tones have a limited restriction on the music melody of Huju. Besides, the fewer tones a language has, there tends to be fewer possibilities to link tone and music melody. Most of the mismatch conditions happen when the linguistic property is sacrificed to satisfy the music property in Huju. The study tries to fill the vacancy and provides a preliminary model of studying the tone-melody relationship in tonal languages.

0. Introduction

Language and music are the two qualities of which we human beings are born with. There are at least three research perspectives from which a possible relationship between language and music has been studied. 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. 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. 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.

For tonal languages like Chinese, 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. The 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?

Different research methods are used to quantify the correspondence, such as native speaker observation, note shape/tone shape comparison, F_0 (pitch) comparison and contour comparison. Previous researches focused a lot on the relationship between two adjacent syllables or the adjacent words with its related musical notes. The 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). Nevertheless, previous studies in Chinese languages 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 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.

Nespor and Vogel (1986, 2007) claim that it is the prosodic constituency rather than the syntactic structure that accounts for the ability of listeners to understand the ambiguous sentence. However, the prosodic constitutes have never been involved in the research in this area among Chinese languages. Therefore, this paper aims to answer the above questions through studying the linguistic tone and music melody mapping problems in *Huju* through prosodic domains.

1. Background

1.1 Studies on Cantonese and Mandarin

Among all the existing tone-melody 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 melody varies with languages and genres.

Chao (1956) first posits a hierarchy of song types in Mandarin: singsong, chanting, recitative, tonal composition, and atonal composition. Singsong have the most correspondence with tone while the atonal compositions, such as contemporary songs, have the least correspondence between tone and melody. Wong and Dieh (2002)'s perception experiment on four Cantonese songs finds 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%. Schellenberg (2009) finds that Cantonese and Mandarin singers employ different approaches 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 recognize it. A match happens when the transition from one syllable to the next moves 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 is set, while a mismatch happens when the transition goes in the opposite direction. Besides, Wee (2007) proposes that headship in music and linguistics is the prominent features when preserving tonal integrity in music.

1.2 Tones in *Huju*

Huju, also known as Shanghai Opera, is a Shanghai dialect based regional opera, which is popular in the Yangtze River delta. There are three major aria singing types in Huju, including changqiang 长腔, huang qiang 簧腔 and xiaodiao 小调. According to You (2006), there are 28 initials and 41 vowels in Shanghai Opera. The only differences found between tones in Huju and tones in Shanghai dialect are the yangqu and yinru tones. But the differences are too minor that it can be disregard. Therefore, I adopt the same tonal system of Shanghai dialect to analyze the Huju in this paper (see Table 1).

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

T 11 1	T .		•	C1 1 1	1. 1
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		TOHES		Shanghai	unateu

1.3. Basics of Tone-sandhi rules in Shanghai Dialect

Shanghai dialect is known for word-tone sensitive language; therefore, all the lexical items undergo tone-sandhi change. 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; Selkirk & Shen 1990; Duanmu 1992). This paper 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,

(1) 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 (2),

(2)		紫 tsŋ	罗 h		兰 le		花 ho
		\bigwedge		~	\bigwedge		
a.	Underlying form	M tsŋ		H L le		Η	L
b.	Tone deleting	MH	-				
c.	Association line deleting	tsj / M H		le	ho		
		tsງ	lu 	le	ho		
d.	Association convention	M tรา	H lu	lE	ho		
e.	Assign default tone	 M tsj		 L lE	L ho		
		-1	10				
f.	Surface form	Μ	Η	L	L		

2. Prosodic Studies in Shanghai Dialect

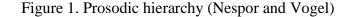
2.1 Selkirk and Nespor and Vogel

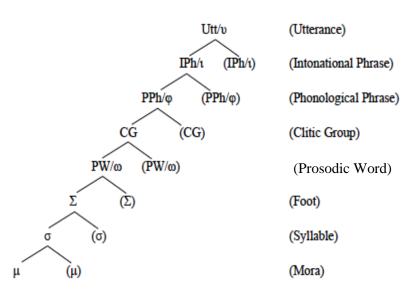
Prosodic phonology is considered as the representative theory of the interface studies between phonology and other linguistic components, such as syntax, semantics, etc. Selkirk (1978) develops the first model of prosodic phonology, which is a six-layer prosodic hierarchy, including Utterance (Utt /v), Intonational Phrase (IP /t), Prosodic Phrase (PPh / ϕ), Prosodic Word (PW / ω), Foot (Ft/ Σ), and Syllable (Syl/ σ). 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. 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 (3),

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

Nespor and Vogel's (1986) book is another authoritative work in prosodic phonology. Nespor and Vogel propose their prosodic constituency hierarchy: the syllable, the foot, the phonological word, the clitic group, the phonological phrase, the intonational phrase, and the phonological utterance.





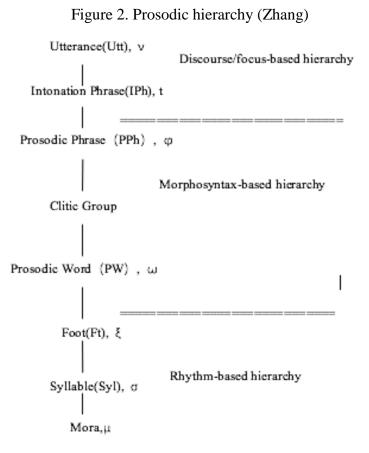
2.2 Strict Layer Hypothesis

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 assumes 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. Therefore, the recursive prosodic structure does not occur. For example, a prosodic word can only contain foot, and may not include prosodic word or clitic group or phonological phrase.

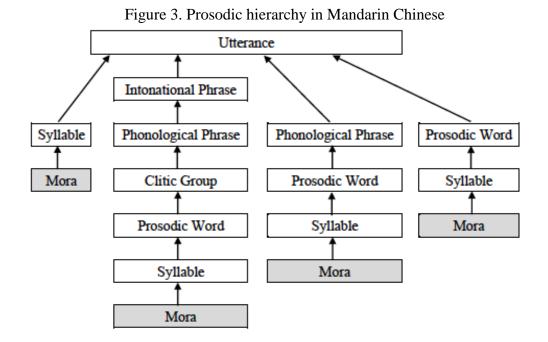
Later on, within the OT framework, Selkirk (1996) proposes four general constraints for Strict Layer Hypothesis (Hereafter SLH). Selkirk holds that the constraints of Layeredness and Headness are inviolable and should not be dominated in the constraint ranking universally, while the Exhaustivity and Non-Recursivity are not observed by all languages. SLH is a well-formedness condition on the prosodic constituency, however, it may not be the universal principle for all the 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).

2.3 Zhang (2017)

Zhang (2017) proposes a trisected model for prosodic hierarchy.

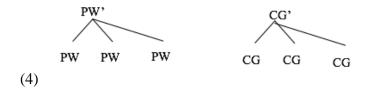


He also agrees that SLH is not applicable in all languages and the prosodic recursion is allowed. A prosodic hierarchy, which entails four possible types of organization of prosodic constituents in Mandarin Chinese is proposed. Level-skipping or the violation of Exhaustivity is allowed.



As for Shanghai dialect, according to Zhang, regardless of its internal structure, it must undergo tone sandhi. 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. 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 conclusion, the account of the phonological system of the Shanghai dialect developed in this paper will be based on the framework of the aforementioned prosodic phonology theory. In the following analysis, 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,



3. Analysis on Shanghai Opera

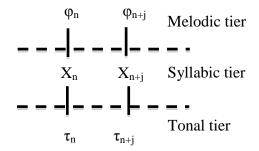
3.1 Data Collection

The main data/music scores used in this paper come from the book 沪剧唱段 108 首 [108 collections 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 the transcriptions are based on the music track provided by the book. Ten selected pieces represent the three aria singing types in Shanghai Opera.

3.2 Overview

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

Figure 4. Three Tiers



The syllable X_n represents the syllables in texts, and syllables $X_n X_{n+j}$ 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,

(5) Within a prosodic unit, the syllable $X_n X_{n+i}^{-1}$

Music melody and language tones have an optimal match

 $\begin{array}{lll} \text{When} & \tau_n \!\!\!\! < \!\!\!\! \tau_{n+j}, \, \phi_n \!\!\!\! < \!\!\!\! \phi_{n+j}, & \text{or} \\ & \tau_n \!\!\!\! > \!\!\!\! \tau_{n+j}, \, \phi_n \!\!\!\! > \!\!\!\! \phi_{n+j}, & \text{or} \\ & \tau_n \!\!\!\! = \!\!\!\!\! \tau_{n+j}, \, \phi_n \!\!\!\! = \!\!\!\! \phi_{n+j}, \end{array}$

¹ The quantity of J depends on the number of syllables within a single prosodic unit.

Music melody and language tones have a non-optimal match,

 $\begin{array}{lll} \mbox{When} & \tau_{n<}\tau_{n+j,\,,}\,\phi_n{=}\,\phi_{n+j} & \mbox{or} \\ & \tau_n{>}\tau_{n+j,\,}\,\phi_n{=}\phi_{n+j,,} & \mbox{or} \end{array}$

Music melody and language tones mismatch,

 $\begin{array}{lll} \text{When} & \tau_{n < } \tau_{n + j,} \, \phi_{n >} \phi_{n + j} & \text{or} \\ & \tau_n > & \tau_{n + j,} \, \phi_{n <} \phi_{n + j,}, & \text{or} \\ & \tau_n = & \tau_{n + j,} \, \phi_{n >} \phi_{n + j}, & \text{or} \\ & \tau_n = & \tau_{n + j,} \, \phi_{n <} \phi_{n + j}, \end{array}$

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} .

3.3 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. Appendix I is a numbered musical notation score². 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

6
$$\dot{3}$$
 $\underline{6}$ $\dot{1}$ $\underline{0}$ $\underline{6}$ $\dot{8}$ λ $\ddot{8}$ $\ddot{8}$ $\ddot{9}$ represent the high key for convenience. For example,
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,
 $\dot{1}$ $\dot{1}$ $\dot{1}$ 6 $\dot{3}$ $\dot{5}$ $\dot{2}$ $\dot{3}$ $\dot{2}$ $\dot{1}$ $\dot{1}$ 6 $\dot{3}$ $\dot{5}$ $\dot{2}$ $\dot{1}$ $\dot{1}$ $\dot{6}$ $\dot{1}$ $\dot{2}$ $\dot{5}$ $\dot{3}$ $\dot{2}$ $\dot{1}$ 6 $\dot{3}$ $\dot{5}$ $\dot{2}$ $\dot{1}$ $\dot{1}$ 6 $\dot{1}$ $\dot{2}$ $\dot{5}$ $\dot{3}$ $\dot{2}$ $\dot{1}$ 6 $\dot{3}$ $\dot{5}$ $|$ $\dot{1}$ $\dot{6}$ $\dot{1}$ $\dot{2}$ $\dot{5}$ $\dot{3}$ $\dot{2}$ $\dot{1}$ 7 $\dot{7}$ $\ddot{7}$ $\ddot{$

Note: C D E F G A B

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

 $^{^{2}}$ 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

Solfege: do re mi fa sol la si

of dots equals to the number of octaves. For example, 1 is an octave higher than 1, 7 is an octave lower than 7

Since it is a song with a time signature of 4/4, the line 'Open a window for you' is a full musical phrase, which includes four music bars.

Within a Prosodic Word, 打开 tã k^hE 'open'

(6)	tã	$k^{\mathrm{h}}\mathrm{E}$
	打	开
Gloss	beat	open
BT	MH	HL
ok	M =	Н

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

(7) Melodic tier	$\varphi_n = 6$	$\phi_{n+1=}65$	$\phi_n > \phi_{n+1}$
Syllabic tier	[打	开] _{pv}	v
	Х	X+1	j=1
Tonal tier	$\tau_n = M$	$\tau_{n+1} = H$	$\tau_n \! < \! \tau_{n+1}$
Result	Misma	tch	

Example 8 shows that within the prosodic word tã k^hE 'open', the music melody presents a descending trend since the musical note of tã is 6 and the ending edge note of k^hE 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 the phonological phrase, 为你打开 fiue η tã k^he 'open for you' is listed as follows,

(8) Melodic Tier $\varphi_n = 6$ $\varphi_{n+3=} 65$ $\varphi_n > \varphi_{n+1}$ Syllabic Tier $[[为]_{pw}$ 你] $_{cg}$ [打 开]_{pw}]_{pph} X X+3 j=3Tonal Tier $\tau_n = L$ $\tau_{n+3} = L$ $\tau_n = \tau_{n+1}$ Result Non-optimal Match Within the Clitic Group 为你 fue η 'for you', both the music and tonal tier show an ascending change, therefore, the tone and melody have an optimal match. Although *hue* ηi together as clitic group has an optimal match, the ηi as a clitic pronoun, has a mismatch between tone and melody. Within the phonological phrase, 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 melody has a non-optimal match.

The summary of the whole sentence is listed as follows

(9)	hue ni tã k ^h e i1 sø ts ^h ã	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	$6 3^{h}1^{h} 6 65 1^{h} 1^{h}2^{h} 3^{h}1^{h}$	
TS within PW	LH # MH # M= H# MH #MH# HL	ok/ * / */ok/OK/OK ³
TS within CG	L = H $M=H$	OK/ OK
TS within PPh	L=H=L=L # M=H=L	ok/ok
TS within IP	$\mathbf{L} = \mathbf{L}$	*

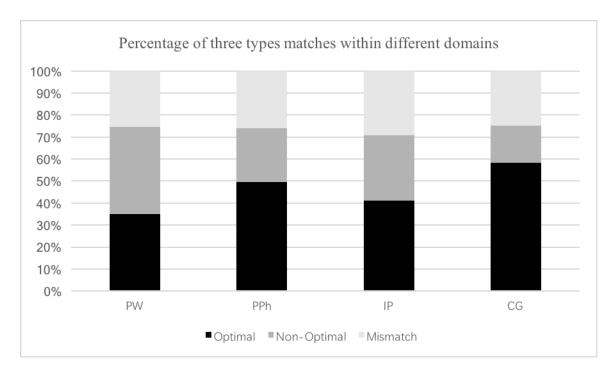
3.4 Results

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 (Figure 4) 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. A summary of the percentage of optimal match, non-optimal match and mismatch are shown in Figure 5

Figure 5. Percentage of three types matches within different prosodic domains

³ Method of Transcription: OK=optimal match; ok=non-optimal match; *=mismatch

LU: TONE-MELODY RELATIONSHIP IN HUJU



A one-way within subjects group ANOVA with a Greenhouse-Geisser correction was conducted to compare the match situation of music melodys and language tones withinPW, CG, PPh and IP. There was a significant difference on the tone-melody 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-melody match condition within PW are significant different from those within CG, PPh and IP, p<0.05, which indicates that for those tone-melody match within PW are not necessarily match within CG, PPh and IP. Similar findings were found that tone-melody 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 2 for the summary of the results.

	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	

Table 2. Summary of	f norollo	loonditiona	hotwoon	different	proceedia domaina
Table 2. Summary C	n parane.	conditions	Detween	unificient	prosoure domains

The data suggest that there are variations in tone-melody relationship in *Huju*. The music melody does not always correspond to language tone although there is a high percentage of correspondence. In regardless of the tone-melody 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-melody match within PW do not necessarily match within CG, PPh or the IP.

4. Discussion

Nespor and Vogel (1983) suggest that it is not the 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-melody relationship. The effect that influences people's understanding of the lyrics in Huju is 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. However, the linguistic analysis seems to provide an opposite evidence.

On the one hand, although the findings reveal that prosodic units do not restrict the tone-melody relationship in *Huju*, there is still a high percentage of match concerning the contour shape between music and language. Compared with the 91.81% tone-melody match in Cantonese music, and entirely mismatch condition in Mandarin pop songs, the results confirm with the hypothesis that fewer tones in a language, there are also smaller probabilities of a link between tone and melody. On the other hand, although 70% is considered a relatively high correlation, there is still a 30% clash between music and language in *Huiu*. 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 fewer 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.

5. Conclusions

This paper provides an analysis to investigate the match situation between music melody and linguistic tone within different prosodic domains. The study tries to present a new perspective of adopting the scientific way to reveal the tone-melody relationship in *Huju*. 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 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.

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 wellformedness rule in general. However, some mismatch cases indicate that the clash between tone and melody 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 melody are inclined to be matched; if the music feature of a word in music piece is more prior than its linguistic property, the tone and melody are tempted to be mismatched with each other.

This study remains limited when it comes to the sample size, types of language and music. Since the prosodic domains do not have a direct influence on the tone-melody relationship, what else elements affect the relationship 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 deciding if the music piece sounds appealing or good. Therefore, there are well-formedness rules in the linguistic area, is such kind of rule still applicable to music? Those questions can be all investigated in the future studies.

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APPENDIX I. Music score

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

21°小小小口、10
1= ^b B 2 宋之华词 买取定由
中進
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6 3 <u>6 i 0 6 5 6 i 7 6 (57 6 i 2 3</u>) <u>5 3</u> 6 <u>6 5 3 2</u> <u>1 7</u> 1 . 7 6 5 被人 遗忘 的 角落 里, 忏悔 的 泪 水
3 7. <u>2 6 5</u> 5 (<u>3. 6 5 3 5 6 1 2</u>) <u>3</u> <u>3</u> <u>6</u> <u>6</u> <u>4 3</u> <u>2</u>] 盈 满 旺, 昨夜情.
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