Neutral Tones in Disyllabic Sequences Across Chinese Dialects: An OT Account

A Thesis Submitted in Partial Fulfillment
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ABSTRACT

This thesis attempts to give an overview of neutral tone among Chinese dialects within the framework of Optimality Theory (OT). The following topics are discussed:

(i) *The Unmarked Value of Neutral Tone*. This thesis tries to find out the unmarked value of neutral tone, and give an OT analysis of this unmarkedness. Analysis is also made on the difference between neutral tones and full tones in terms of unmarked value.

(ii) *Full-tone-related Neutral Tone and Long Neutral Tone*. It is reported that in some dialects "neutral tones" are related to the full tone of the syllable concerned. In other dialects, neutral tones are reported to be long, rather than short. This paper tries to analyze these problems.

(ii) *Realization Patterns of Neutral Tone Values*. Neutral tone values are divergent among dialects, with different realization patterns concerning the relationship between neutral tone and its neighboring tone. In this paper, I summarize three realization patterns with different ranking of certain OT constraints.

This thesis contains six chapters. An introduction is given before Chapter 1. Chapter 1 gives a unified account of the markedness status of H for neutral tone and the unmarked status of H for full tones. Chapter 2 discusses the "*full-tone-related neutral tones*" attested in dialects, adopting the constraints proposed in Chapter 1. Chapter 3 deals with *long neutral tones*, which violate the constraints proposed in Chapter 1. Chapter 4 focuses on the domain of neutral tone realization and provides reanalysis of Mandarin neutral tone through constraint ranking. In Chapter 5, three patterns of neutral tone realization are detailed with examples. Chapter 6 concludes the paper with a summary.

Key Words: Chinese Dialects Neutral Tone Optimality Theory

TABLE OF CONTENTS

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Introduction

1. Studies on Neutral Tone

N*eutral tone* is a special phonological phenomenon in Chinese tonology. It is first analyzed in Beijing Mandarin. In the disyllabic sequence, for example, *zhuozi* 'table', the second syllable is commonly pronounced light and short. In citation form, the syllable containing *zhuo* bears a tonal value 55 and the *zi* syllable bears a tonal value 214. In the disyllabic sequence, *zhuo* is read as 55, however, *zi* is not read as 214 but a low tone comparatively short and light. *Neutral tone* refers to the phonological event like the one concerning the tonal value of *zi* syllable.

Since its initialization by Chao Yuen-Ren in 1920s, *neutral tone* has become one of the subjects most frequently discussed in Chinese tonology. Termed *qingsheng* 'light tone' in Chinese, neutral tone is an important phonological phenomenon. According to W. Li (1981), there is one neutral-tone syllable in every five to seven syllables in modern Chinese (Mandarin). However, neutral tone words are reported to take up 80% of disyllabic and trisyllabic words in Hongdong dialect, a branch of Jin dialects (Qiao 1994).

Neutral tone, especially that of Mandarin, has been studied from the perspectives of *phonetics* (Jin-Song 2002, Lin & Yan 1990, L. Liang 2001, Y. Wang 1995, etc.), *phonology* (Z. Li 1996, Z. Wang 1996 1999, J. Wang 1997 for Mandarin; J. Wang 2002b for Tianjin Dialect, 2002a for three dialects; Wang & Jiang 1997 for Tianjin Dialect, etc.), *syntax* (T. Lin 1962) and *historical linguistics* (Jin 1982; S. Li 2002, S-J. Li 2000, Hirayama 1992, 1998, etc.). Some phonetic/phonological phenomena related to neutral tone have also been analyzed (Chao 1968, Luo & Wang 1957, Lin & Yan 1980 for Beijing; R. Li 1990 for an overview across dialects; M. Li 2003a, b for a phonological analysis, etc.).

2. Phonological Studies of Neutral Tone

According to L. Liu (2002), views on the *nature* of Mandarin neutral tone fall into the following schools: (i) neutral tone is a tonal category; (ii) neutral tone is a (special) kind of tone sandhi; (iii) neutral tone is an unstressed syllable. G. Shi (2002) classifies views of neutral tone into the following categories: neutral tone is (i) not an

independent phoneme, (ii) an independent *toneme*, (iii) related to durational contrast, (iv) related to stress contrast.

Nevertheless, neutral tones reported in other dialects are different from Mandarin in terms of length, stress, and pitch contour, e.g. D. Cao (1987), Z. Cao (1998, 2001), J. Liu (1997), Ma & Wu (2003), Qian (2001), R. Shi (1988, 1996), Su (1997), H. Wang (2003), Y. Wang (1998), G. Wei (2000), Xiang (2000), Zhai (2002), A. Zhang (2000, 2001), Y. Zhang (1996), Zhou (2001), etc. R. Shi (1988) is one of the first articles to give an overview of neutral tones across Chinese dialects. Shi's (1988) attempt is insightful in that neutral tone should be studied with an eye across different dialects, rather than confined to Mandarin.

Classical Generative Phonology and Optimality Theory turns out to be fruitful in the analysis of neutral tones among dialects, e.g. Z. Li (1996) and J. Wang (1997) for Mandarin, M. Wang (1995) for Cangzhou dialect, P. Wang (2001) for Handan dialect, Kong (2003) for Hefei dialect, Lü (2003) for Huailai dialect, S. L (1996) for Jinnan dialect, Zhai (2002) for Taiyuan dialect, J. Wang (2002b) and Wang & Jiang (1997) for Tianjin dialect, Y. Wei (2001a, b) and X. Zhang (2001, 2002) for Urumqi dialect, H. Yu (2001) for Yangzhou dialect, Fang (2002, 2003) for Xiangtan dialect, etc.

3. Outline of This Paper

This paper intends to give an overview of neutral tone in disyllabic sequences among Chinese dialects within the framework of Optimality Theory. The following topics will be discussed: (i) the unmarked value of neutral tone, (ii) full-tone-related neutral tone and long neutral tone, (iii) realization patterns of neutral tone values.

This thesis contains six chapters. An introduction is given before Chapter 1. Chapter 1 gives a unified account of the markedness status of H for neutral tone and the unmarked status of H for full tones. Chapter 2 discusses the "*full-tone-related neutral tones*" attested in dialects, adopting the constraints proposed in Chapter 1. Chapter 3 deals with *long neutral tones*, which violate the constraints proposed in Chapter 1. Chapter 4 focuses on the domain of neutral tone realization and provides reanalysis of Mandarin neutral tone through constraint ranking. In Chapter 5, three patterns of neutral tone realization are detailed with examples. Chapter 6 concludes the paper with a summary.

4. Optimality Theory

Optimality Theory (Prince & Smolensky 1993) is a linguistic theory which deals with linguistic problems with interaction of constraints. The theoretic framework of OT runs as follows:

Input → **Gen**(erator) → {Candidate A, B, C,…} → **Eval**(uator) → Output

Gen(nerator) generates output candidates for some input, and submits these to Eval(uator), which is a set of ranked constraints. Evaluator evaluates output candidates according to their harmonic values and selects the optimal candidate (Kager 1999). OT assumes that a surface form results from the resolution of conflicts between competing constraints; the resolution of constraint conflict is determined by the hierarchical ranking of the constraints (Ma 2001a). The evaluation of candidates is usually demonstrated by a tableau like the following one:

Input:	Constraint I	Constraint II	Constraint III	Constraint IV
☞ Candidate A				*
Candidate B			*!	**
Candidate C		*!		
Candidate D	*!			

In the tableau, a asterisk (*) indicates the violation of a constraint. An exclamation mark (!) indicates a fatal violation which implies a sub-optimal status of a candidate. The dotted line between Constraint I and Constraint II implies that the order of the two constraints is unimportant regarding a particular grammar. J. Wang (1995) and B. Li (1998) give concise introduction to Optimality Theory, and Kager (1999) and McCarthy (2002) provide insightful and comprehensive analysis in OT.

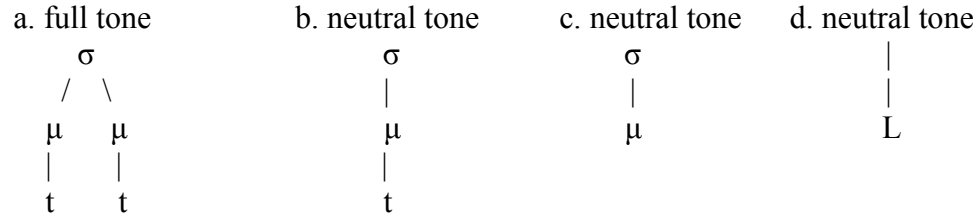
Chapter 1

Phonological Representation of Neutral-tone Syllable

1.1 J. Wang's Representation of Neutral-tone Syllable

J. Wang (1997) assumes *mora* to be a timing unit as well as a tone-bearing unit (TBU), as proposed in Wright (1983). Related acoustic test (Lin & Yan 1980) and perceptual test (T. Lin 1985) show that the chief acoustic correlate of stress in Mandarin is duration, and that the length of an unstressed (neutral tone) syllable is about half the length of a stressed (full tone) syllable. To capture this difference, J. Wang (1997) adopts the representation (1-1a b), where two morae are connected with a syllable carrying a full tone while only one mora is connected with a syllable carrying the neutral tone.

(1-1) J. Wang's Representations of Full Tone and Neutral Tone



In J. Wang (2000, 2002a, 2003), however, (1-1c) is adopted to further capture the *atonic* ,i.e. toneless, nature of neutral tone, that is neutral tone is toneless underlyingly. This representation is different from that of H. Lin (1999), in which neutral tone is underlyingly L, as shown in (1-1d). In my opinion, Wang's representation is more insightful in that it captures a basic characteristic of neutral tone— *atonicity*, because atonicity is virtually what makes neutral tone distinct from full tones. Duanmu (2000) also treats neutral tone as *unspecified for tone*, rather than tonally low, and he holds that intrinsic tonelessness can better account for the fact that the pitch of weak syllable depends on the tone of the preceding syllable.

Though applicable for the analysis of Mandarin, H. Lin (1999)'s L-hypothesis fails to account for the pitch of neutral tones in other dialects, as will be shown in the following chapters. Thus, Lin's analysis is somewhat *ad hoc* compared with that of Wang and Duammu.

1.2 Markedness of H for Neutral Tone

1.2.1 Statistics of Neutral Tone Values

With statistics of 55 dialects, I work out the occurrence of different neutral-tone values on five-degree-scale, as is shown in Table (1-2). Details in the sampling and calculation will be elaborated in Statistics I. The following table and charts show the comparative occurrences of the 5 degrees respectively.

(1-2) Table A *Occurrence Rate of Pitch Values of Neutral Tone*

Pitch Value	N=1	N=2	N=3	N=4	N=5
Percentage	24.70%	19.84%	26.32%	16.60%	12.55%

The following are two graphs illustrating the same statistics:

(1-3) Chart 1 Percentage of Occurrences

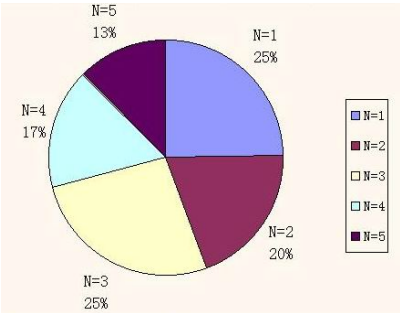


Chart 2 Comparative Occurrences

In general, three tendencies can be identified for the distribution of pitch value in neutral-tone syllables: (i) value 1 and 3 have the biggest percentages; (ii) value 1 and 3 are of equal occurences approximately; (iii) value 4 and 5 are of minimal proportion.

The tendency implied in the above table and charts reflects the distribution of phonetic value for neutral tone. I also find the following five dialects, as in Table (1-4), for which neutral tone values are marked by L, M, H in the original material. The distribution is consistent with the tendency illustrated in Table (1-2).

Note that in the following table, *tonal categories* are listed in shadowed column; the tonal values of corresponding disyllabic sequences of "full tone +neutral tone" are listed in the adjacent column on the right. Tonal categories are ordered in the order *Pingsheng* (P), *Shangsheng* (S), *Qusheng* (Q) *and Rusheng* (R); for each tonal category, there are two registers: *Yin* register (Y) and *Yang* register (y). Thus, YP stands for the *Yin* Register of *Pingsheng* Tone (*Yin Ping* for short), and hereafter.

(1-4) Neutral Tones in Five Dialects

Dialects	YP	YP+N	yP	yP+N	S	S+N	YQ yQ	YQ+N yQ+N	YR yR	YR+N yR+N
Nantong	21	21+L	35	35+H	55↓	55+M	42 213	42+L 213+M	42 55	42+L 55+H
Tongguan	21	T+L	24	T+L	51	T+L	44	T+L	--	--
Yanchi	44	44+L	13	11+H 13+L	53	53+L	35	35+L	--	--
Yinchuan	44	44+M	53	53+L	53	35+L	13	11+H 13+M	--	--
Zhenjiang	42	42+L	35	33+H	31	22+L	55	55+H	5	5+H

Nantong: Bao & Wang (2002); Tongguan: F. Li (2003); Yanchi: A. Zhang (1992); Yinchuan: Li & Zhang (1995); Zhenjiang: H. Zhang (1985).

1.2.2 H for Neutral Tone: Marked

Maddieson (1978) notes that phonetically *mid* tone is unmarked for tonal system, and *polar tones* are more marked (i.e. H and L). Pulleyblank (1986) states that the default value of tone is L, rather than H, when there are only two features H and L; Pulleyblank also says that when there are three tonal values L, M, H, then M is the default value. As far as neutral tone is concerned, the statistics above is consistent with Maddieson (1978) and Pulleyblank (1986), since both of them regard H as marked.

With regard to Pulleyblank (1986), J. Wang (2002a, b) proposes a constraint *Neutral tone-H, which bans H tone in neutral-tone syllable.

(1-5) ***NEUTRAL TONE-H** (J. Wang 2002b)

Neutral-tone syllable cannot be linked to H.

This constraint is insightful in taking only H to be the marked value for neutral tone, as confirmed by my statistics above. (I will return to decompose this constraint at the end of this chapter.)

The markedness of H value for neutral tone is further supported by two facts:

First, in dialects with only one neutral tone value, the value is never H, as shown by the eight dialects in Table 1 of Appendix I. The value is 1 on five-degree-scale, equal to L, in dialects such as Dali, Hancheng, Taiyuan, Tongxin (South), Tongxin (Xiamaguan); the value is 3, equal to M, in dialects like Luoyang, Qingyun and Weihui. Thus, I hypothesize a universality closely related to (1-5):

(1-6) If a dialect has one and only one value for the tonal realization of a short neutral tone, the value is never H.

Second, when consecutive neutral tones follow a full tone, the tonal values also show a tendency of avoiding H. Evidence comes from reports of several dialects, such as Beijing (J. Wang 1997), Cangzhou (M. Wang 1995), Handan (P. Wang 2001), Huailai (Lü 2003), Jinnan (S. Li 1996), Taiyuan (Zhai 2002), Tianjin (H. Jiang 1994) and Xiangtan (Fang 2002). Details of these details are listed in Appendix 2. As indicated by these dialects, tonal H is normally avoided in consecutive neutral tones before pause, i.e. T+ N_1+N_2, T+ N_1+N_2+N_3; the values in these sequences tends to be either L or M.

In contrast, the markedness status of phonological H for neutral tone is different from that in full tones.

1.3 Unmarkedness of H in Full Tones

1.3.1 Unmarked Status of H in Full Tones

In view of phonetics and typology, Jiao (2003) makes a summarization of the distribution of *full tones* in 40 dialects, as in (1-7):

(1-7) Recasting of Jiao (2003)

Level tone	HH	MM	LL	No Level
Number of dialects	*29*	*19*	*1*	*6*
Falling tone	HL	HM	ML	No Falling
Number of dialects	*5*	*28*	*20*	*1*
Rising tone	LH	MH	LM	No Rising
Number of dialects	*4*	*27*	*7*	*3*

In light of Jiao (2003), the following "harmonic ordering" can be *roughly* proposed for different tonal shapes in general, without strict OT consideration:

(1-8) "Rough" Harmonic Ordering of Tonal Shapes:

Level Tone: HH > MM > LL

Rising Tone: MH > LM, LH

Falling Tone: HM > ML > HL

General Ordering: HH, MH, HM > ML, MM, > HL, LL, LM, LH

This sequence illustrates that H tone is more frequent in full tones (citation tones in most cases) than L and M tone.

J. Lu (1999) samples 28 dialects and concludes that high-level tone (HH) show stability in tone sandhi, while low-level tone (LL) undergoes changes in most cases.

Significantly, this conclusion implies an *asymmetry* between high-level tone and low-level tone. J. Lu (1999) notes that the stability of high-level tone can be captured as an OT constraint, and this idea also presents itself in Jiang (1996a, b, 1999).

With data of 26 dialects from both South and North Chinese dialects, Jiang (1999) sums up the asymmetric distribution of tonal values in full tones: high level tones (in 24 dialects) occurs more frequently than mid-level tones (in 12 dialects), and low level tones occurs the least (in 6 dialects), i.e. HH >MM > LL.

1.3.2 Jiang's OT Analysis of Full Tones

To account for the asymmetry between H and L in full tone, Jiang (1996a, b) proposes Tonal Sonority Hierarchy:

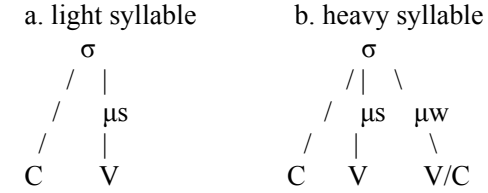
(1-9) ***Tonal Sonority Hierarchy*** (Jiang 1996a, b, 1999)

| H | > | M| > | L |

This hypothesis is supported by (i) the general distribution of high-level tone and its stability in tone sandhi, (ii) the priority of high tone in acquisition, and (iii) the psychological prominence of high tone (Jiang 1999).

Following van der Hulst (1984), Hymam (1985) and Hayes (1989), Jiang (1999) assumes *mora* to be a tone-bearing unit (TBU), and distinguishes *head mora* (μs hereafter) and *non-head mora* (μw hereafter) within a syllable, as shown in (1-10).

(1-10) Moraic Structure of Syllable (Jiang 1999)



(μs = nucleus mora= head mora, μw = non-nucleus mora = non-head mora)

In a heavy syllable, the two morae differ in their contribution to the syllable in that head mora (μs) is the nucleus of the syllable, while non-head mora (μw) is not, as cast by *Tonal Alignment Constraint* in (1-11).

(1-11) ***Tonal Alignment Constraint*** (TAC) (Jiang 1996a,b; recast in 1999)

a. *μs/[L]: L tone cannot be linked to head mora;

b. *μs/[M]: M tone cannot be linked to head mora;

c. *μs/[H]: H tone cannot be linked to head mora.

Ordering in hierarchy: *μs/[L] >> *μs/[M] >> *μs/[H]

Jiang (1999) also notes that within a syllable, non-head mora (μw) cannot be

linked to H tone, with a constraint triplet as follows:

(1-12) *μw/[H] >> *μw/[M] >> *μw/[L]

From (1-9) to (1-11), Jiang captures the distributional asymmetry between H and L *within a syllable*, cf. Jiang (1999) for detailed discussion. Jiang's account can be simplified into (1-13):

(1-13) Within a syllable, head mora (μs) bans L and non-head mora (μw) bans H.

Regarding 1.1 and 1.2, it may be simply hypothesized that H is preferred in full tone and H is avoided in neutral tone. How can there be such a difference? Is there any relationship between the claims in Jiang (1996a, b, 1999) and J. Wang (2002a, b)? Namely, are these two phenomena irrelevant or closely-connected? In the following, I attempt to provide a unified account.

1.4 Recasting the Representation of Neutral-tone Syllable

Before I go into detailed discussion, it is essential to make clear the phonological property and representation of neutral tone. Yet, this appears to be a perplexing problem, because *neutral tone* is referred to with various terms, such as *neutral tone*, *weak stress*, *neutralized syllable* (cf J. Cao 1995) etc. Then, what is the *nature* of neutral tone --- tone, stress or syllable?

I hold that the divergence in terminology virtually implies that neutral tone is essentially not a phonological event on a single level; rather, it involves hierarchical levels of phonological structure, namely *foot*, *syllable* and *tone*. In other words, a neutral tone involves different levels on the Prosodic Hierarchy (Selkirk 1980; McCarthy & Prince 1986). In phonological analysis, Prosodic Hierarchy is often assumed, with mora as the lowest constituent, as is shown in (1-14). Following J. Wang (1997) and Jiang (1999), I also assume that tone is linked to mora rather than directly docked below syllable.

(1-14) **Prosodic Hierarchy** (Selkirk 1980; McCarthy & Prince 1986)

Pw = prosodic word
|
Ft = foot
|
σ = syllable
|
μ = mora

When it comes to stress, syllable and tonal characteristics, neutral tone is characterized as following:

(i) A neutral tone occurs in un-stressed/weak syllable (σw for short), rather than in stressed/strong syllable (σs for short), as far as syllabic foot is concerned;

(ii) Neutral tone is usually shorter than full tone, with its duration half the length of full tone, i.e. neutral-tone syllable is mono-moraic (σ/μ), not bi-moraic (σ/μμ).

(iii) The single mora in the neutral-tone syllable usually bears no tone underlyingly (i.e. atonic), with its tonal value decided by the tonal environment.

Summarizing (i), (ii) and (iii), neutral tone is (a) under a weak/non-head syllable, (b) mono-moraic and (c) atonic. With this regard, I assume (1-15) to be the representation of neutral-tone syllable, which is a slight amendment on the representation in J. Wang's (2000, 2002a, 2003).

(1-15) Recasting the Representation of Neutral-tone Syllable

σw (unstressed/nonhead syllable)
|
μw (short & atonic)

I argue for such a representation owing to the following reasons:

In metrical theory (Liberman & Prince 1977; Hayes 1980, 1995; Halle & Vergnaud 1987), stress is connected with the *head* in a prosodic foot (Gussenhoven & Jacobs 1998; Kager 1999). Since neutral-tone syllable bears no stress, it follows that neutral-tone syllable is non-head/weak syllable (σw), as far as a *syllabic foot* is concerned.

It has been shown, through (1-1) to (1-5), that neutral tone is normally short (mono-moraic) and bans H tone. What can be deduced from this? Recalling the *Tonal Alignment Constraint* in (1-11) and (1-12), non-head mora bans H tone. Regarding these two arguments, it follows that the single mora under the non-head/weak syllable is a *non-head/weak mora* (μw), as far as *moraic foot* is concerned.

Through the above analysis, a *unified account* can be made on phonological H for its unmarked status in full tones and its marked status of H in neutral tone, as expressed in (1-16):

(1-16) **Markedness Status for Tonal H**

Tonal H is unmarked for head-mora (μs) within a syllable.

Tonal H is marked for non-head mora (μw) within a syllable or a moraic foot.

Thus, the asymmetry of H and L tone in full tones and the scarcity of H in neutral tone are in essence inter-related, rather than two irrelevant phenomena.

1.5 Decomposition of *NEUTRAL TONE-H

Now recall the constraint *NEUTRAL TONE-H proposed in Wang (2002a, b).

Recall (1-5) ***NEUTRAL TONE-H** (J. Wang 2002a, b)

Neutral-tone syllable cannot be linked to H.

With neutral-tone syllable represented as (1-15), and marked status of tonal H (1-16), I *decompose* Wang's constraint into the following three constraints:

(1-17) **NON-HEADSYLLABLE/MONO-MORA (*σw/μμ)**

Non-head syllable (σw) in a syllabic foot bans two morae.

This constraint is an alternative expression of Weight-to-Stress Principle (Prince 1983, Prince & Smolensky 1993), in which the matching of syllable weight and prominence is highly supported by cross-linguistic evidence.

(1-18) **Weight-to-Stress Principle (WSP)** (Prince 1983; Prince & Smolensky 1993)

Heavy syllables are stressed.

This matching is also supported by the absence of stress on neutral-tone syllable.

(1-19) **NON-HEADSYLLABLE/NON-HEADMORA (*σw/μs)**

Non-head syllable bans head mora.

The stresslessness of neutral-tone syllable indicates its non-head/weak status (σw), as far as a *syllabic foot* is concerned. Likely, the single mora under the neutral-tone syllable takes a *non-head/weak* position (μw), in terms of *moraic foot*. Head mora (μs), as in Jiang (1999), is a concept closely related to full tones. Thus, non-head syllable (σw) is not expected to bear head mora (μs).

(1-20) **NONHEADMORA-NONHIGH (*μw/[H])**

Non-head mora bans tonal feature H.

This constraint is consistent with Jiang (1999)'s account of full tones, as well as J. Wang's (2000, 2002a, 2003) claim for neutral tone, and is supported by my statistics of 55 dialects as illustrated by (1-2) and (1-3).

Following Jiang (1999), I adopt a three-degree scale for phonological values, i.e. L=Low, M=Mid, H=High. Tonal representation is usually transcribed into a

two-degree scale of H and L in classical generative phonology (cf. J. Wang 1997); however, a scale of L, M, H is workable for a linguistic theory like Optimality Theory, which is more surface-oriented (Kager 1999).

Thus, the constraint of *NEUTRAL TONE-H in J. Wang (2002a, b) can be decomposed into the following constraint triplet:

(1-21) *σw/μμ, *σw/μs, *μw/[H]

A simple tableau is given below for the selection of optimal candidates. It can be seen that this constraint triplet can predict the unmarked form regardless of the input form. In an OT sense, this is caused by the absence of faithful elements in constraint triplet (1-21).

(1-22) a.

Input: σw / \ μ μ	*σw /μμ	*σw /μs	*μw /[H]
a. σw | ☞μw | L			
b. σw | μw | H			*!
c. σw | μs | H		*!	
d. σw / \ μ μ | | t t	*!		

b.

Input: σw | μ	*σw /μμ	*σw /μs	*μw /[H]
a. σw | ☞μw | L			
b. σw | μw | H			*!
c. σw | μs | H		*!	
d. σw / \ μ μ | | t t	*!		

1.6 Summary

This chapter begins with the representation of neutral–tone syllable. By means of statistics, I verify J. Wang's constraint *NEUTRAL-TONE H. With consideration on the asymmetry between full-tone syllable and neutral-tone syllable, I recast the representation of neutral-tone syllable, and decompose *NEUTRAL TONE-H into a constraint triplet *σw/μμ, *σw/μs, *μw/[H].

Chapter 2

"Full-tone-related Neutral Tone": Ranking of *σw/μs

2.1 "Fulll-tone-related Neutral Tone" vs. Neutral Tone

In dialects like Mandarin, neutral tone is *atonic* underlyingly, with its realization irrelevant to the citation form of the full tone concerned. However, there are dialects in which the "neutral tone" reflects the property of its relevant full tone, such as Jiangxiang dialect (Jiang & Xie 2001), Liuyang dialect (Xia 1989), Shantou dialect (L. Lin 1995) etc. I propose that these "full-tone-related neutral tones" are results of the dominance of *σw/μs in some dialects, and the violation of it in others.

Before going into discussion, one thing must be made clear. As noted in J. Wang (2000, 2002a 2003 etc.), one basic property of neutral-tone syllable is its *atonicity*. However, the tonal realization of "full-tone-related neutral tone" is related to its base tone (input). In view of OT, the output preserves faithfulness to the input. In pre-OT phonology, this kind of "neutral tone" was analyzed as *phonologically tonal*. Thus these so-called "neutral tones" are not really neutral tone in terms of their tonality; however, they are similar to Mandarin neutral tone in the aspects of length and stress. Therefore, I would call this kind of tonal realizations "pseudo-neutral tone".

2.2 Dominance of NON-HEADSYLL/NONHEADMORA (*σw/μs)

Recall the constraint *σw/μs, which bans head-mora in an unstressed/non-head syllable. If this constraint is undominated, head-mora will be thrown off in full-tone-related "neutral tone" syllable.

2.2.1 "Full-tone-related Neutral Tone" in Liuyang Dialect

Full-tone-related "neutral tones" are attested in Liuyang Dialect (Hunan Province). In this dialect, the last syllable in multi-syllabic sequences is usually read as "pseudo-neutral tone", which is slight and short. These "pseudo-neutral tones" are realized as H, M, L respectively, decided by their base/full tone (Xia 1989). I transcribe Xia's recording into Table (2-1):

(2-1) "Neutral" Realization in Liuyang Dialect

Dialects	YP	NT	yP	NT	S	NT	Q	NT	R	NT
Liuyang	33	+M	55	+H	24	+H	11	+L	44	+M
	MM	+M	HH	+H	LH	+H	LL	+L	MM	+M

It can be seen that the "neutral shapes" are universally the ending points of the

tonal contours in the corresponding full-tone syllable. Similar "full-tone-related" neutral realizations occur in other dialects in Changde (Zheng 1997), Leiyang (Zhong 1987) and Lianyuan (H. Chen 1999), as shown in Table (2-2):

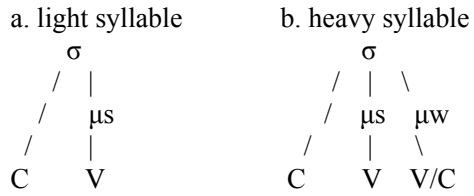
(2-2) "Neutral" Realization of Full Tones in Changde, Leiyang & Lianyuan

Dialects	YP	NT	yP	NT	S	NT	YQ yQ	NT NT	R	NT
Changde	55	+3	13	+3	21	+1	35	+3	--	--
Leiyang	55	+H[5]	35	+H[5]	41	+L[1]	213	+M[3]	--	--
Lianyuan	44	+3	13	+3	42	+21	45 211	+4 +21	33	+4 /+3

2.2.2 Liuyang Dialect: "Head-cutting" Model

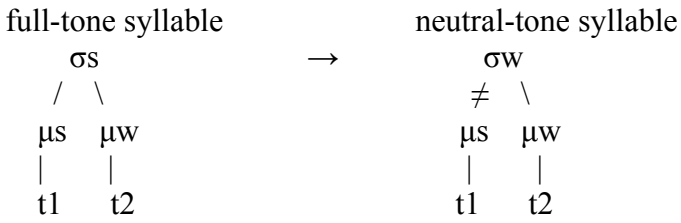
In bi-moraic representation of heavy, full-tone syllable (1-10b), the first mora is the head-mora (μs), and the second mora is the non-head mora (μw).

Recall (1-10) **Moraic Structure of Syllable** (Jiang 1999)



In light of this, the "neutral" realization of full-tones in Liuyang dialect falls into a regular pattern— the deleted mora is unanimously the *head-morae*; the single mora in the "neutral" realization can be regarded as the *correspondent* of the *non-head mora* in the full-tone syllable. In other words, the full-tone syllable has been *head-cut* to meet the requirement of *σw/μμ and *σw/μs in an unstressed, non-head position, as is shown in (2-3):

(2-3) "Head-cutting" Process in Liuyang Dialect



Recall the constraint *σw/μs which bans head mora on a non-head syllable. It can be seen that this "head-cutting" effect can be attributed to the higher ranking of *σw/μs and *σw/μμ over faithfulness constraint MAX-IO (T), which bans deletion of input tonal features. Note that there is no change of the tonal features in the non-head mora, another faithfulness IDENT-IO (T) is expected to sit at the top of the constraint

ranking. However, in Liuyang dialect, *μw/[H] is violated— H, M, L are all attested for the value of "full-tone-related neutral tone". Thus, I expect a sandwiching position of *σw/μμ, *σw/μs between IDENT-IO (T) and MAX-IO(T), *μw/[H]. The following constraint hierarchy is proposed for "Neutral Realization" in Liuyang dialect:

(2-4) Liuyang Grammar for "Neutral Realization" of Full Tones

IDENT-IO (T) >> *σw/μμ, *σw/μs >> Max-IO (T), *μw/[H]

Sample tableaux are given for the optimal selection in the case of Yinping Tone and Shangsheng Tone:

Input: σw / \ μs μw | | M M	ID-IO-T	*σw /μμ	*σw /μs	Max--IO -T	*μw /[H]
a. σw ☞ | μw | M				*	
b. σw | μs | M			*!		
c. σw / \ μs μw | | M M		*!			
d. σw / \ μs μw | | L L	*!	*			

Input: σw / \ μs μw | | L H	ID-IO-T	*σw /μμ	*σw /μs	Max--IO -T	*μw /[H]
b. σw ☞ | μw | H				*	*
c. σw | μs | L			*!		
d. σw / \ μ μ | | L L	*!	*			
e. σw / \ μs μw | | H M	*!*	*			

2.3 Violation of NON-HEADSYLL/NONHEADMORA (*σw/μs)

Compared with derivational rule in classical generative phonology, one feature of OT constraint is its *violability*, namely the constraint is violable. Actually, a constraint is *not a good* OT constraint *if it is inviolable* (Kager 1999). Now I turn to the violation of *σw/μs in "full-tone-related neutral tone" with explanation concerning Jiangxiang dialect.

2.3.1 Two Kinds of "Neutral Tones" in Jiangxiang Dialect

Jiang & Xie (2001) reports that there are two kinds of neutral tones in

Jiangxiang dialect (Nanchang County, Jiangxi Province): the first kind occurs in the middle syllable of a trisyllabic sequence SNN (a strong, stressed syllable followed by two consecutive unstressed, "neutral tone" syllables). Neutral tone of this kind is realized as short 3 on five-degree-scale, regardless of its corresponding full tone. This is obviously the unmarked type of neutral tone: it is short, implying mono-mora and no violation of *σw/μμ, and it is M in pitch value, indicating an unmarked value and no violation of *μw/H.

The second kind of "neutral tone" is full-tone-related. These "pseudo-neutral tones" occurs in the final syllable of disyllabic SN sequences (one stressed syllable followed by one unstressed syllable) and trisyllabic SNN sequences (one stressed syllable followed by two unstressed syllables). They are short, indicating the existence of one single mora. However, the tonal realization of these "neutral tones" is related to the base/full tone of the syllable concerned. Jiang & Xie (2001) summarizes the realization into (2-5):

(2-5) If the citation tone contains H or H' (relatively high), the "neutral realization" takes the value H. Otherwise, the value is L… Yinru 5 and Yangru 2 don't undergo the change, and preserve their original tones.

I transcribe Jiang & Xie's (2001) description of the second type of "neutral tones" into the following table.

(2-6) "Neutral Realization" of Full Tones in Jiangxiang Dialect

Dialect	YP	NT	yP	NT	S	NT	YQ	NT	YR	NT
							yQ	NT	yR	NT
Jiangxiang	42	+05	33	+02	24	+05	11	+02	5	No
							31	+02	2	

"Full-tone-related neutral tone" in Lüsi (Lu 1994) is similar to the type in Jiangxiang dialect. The only difference is that, in Lvsi, the "neutral" realizations fall into two values: M for full tones with H feature, and L for those without H feature.

(2-7) "Neutral" Realization of Full Tones in Lüsi Dialect

Dialect	YP	NT	yP	NT	YS	NT	YQ	NT	YR	NT
					yS	NT	yQ	NT	yR	NT
Lüsi	44	+M	13	+L	51	+M	35	+M	4	No
					131	+L	213	+L	2	

2.3.2 Jiangxiang Dialect: "H-preserving" Model

I transcribe (2-6) into the phonological representation in (2-8).

(2-8) Phonological Representation of "Neutral" Realization in Jiangxiang Dialect

Dialect	YP	NT	yP	NT	S	NT	YQ	NT	YR	NT
							yQ	NT	yR	NT
Jiangxiang	HL	+H	MM	+L	LH	+H	LL	+L	H	No
							ML	+L	L	

Now I try to work out the realization pattern in Jiangxiang, with the two properties illustrated in Jiang & Xie's (2001):

Firstly, Faithfulness to the Full Tone. From Jiang & Xie (2001), it is clear that the second kind of neutral tone is "full-tone-related neutral tone". In view of pre-OT generative phonology, this "full-tone-related neutral tone" is a kind of *alternant* of the base tone in the position of unstressed syllable. Jiang & Xie's (2001) description (2-5) reveals that in the "neutral" realization of a tone concerned, no tonal element is added. In the framework of OT, the full-tone-relatedness of "neutral tone" means its *faithfulness* to its base/full tone. In Jiangxiang dialect, this faithfulness holds true even for the two Ru tones, which are said not to undergo this manifestation in Jiang & Xie(2001). Thus, I adopt the widely used faithfulness constraint DEPENDENCY-IO (or DEP-IO) after McCarthy & Prince (1995):

(2-9) **DEPENDENCY-IO (or DEP-IO)**

Output segments must have input correspondents. (No epenthesis!)

To adapt it to tonal faithfulness, I formulate it as DEPENDENCY-IO (T) or DEP-IO(T)

(2-10) **DEPENDENCY-IO (T) or DEP-IO(T)**

Output tonal features must have input correspondents. (No epenthesis!)

Secondly, Preference for H Tone. As said in (2-5), the "neutral" realization of full tones in Jiangxiang dialect shows preference for H tone, within the limits of faithfulness. Recalling Jiang's account of H preference in full tones, in (1-9) through (1-12), it can be realized that H preference is the property of *head mora* (μs), rather than non-head mora (μw). Recall also the *Tonal Alignment Constrain*t, which bans L tone in head mora. Here, I recall the Tonal Alignment Constraint (TAC) with the intrinsic ordering of the constraint triplet in (2-11):

(2-11) Recall Ordering of TAC (Jiang 1996a,b; recast in 1999):

*μs/[L] >> *μs/[M] >> *μs/[H]

Jiang (1999) also notes that, in light/short syllable, the single mora can serve as the head mora. This claim confirms the *possibility* of violating the constraint *σw/μs (1-19), namely it is possible for a non-head syllable (σw) to be linked to a single

head mora (μw). In the "neutral realization" of full tones in Jiangxiang dialect, the preference for H tone is *within the limits* of faithfulness to the base/full tone. This implies the dominance of faithfulness constraint DEP-IO (T) over markedness constraint *μs/[L]. The head mora does persist in the syllable concerned, which means the markedness constraint is *σw/μs given least consideration.

From the above analysis, I propose (2-12) to be the grammar for "full-tone-related neutral tone" in Jiangxiang dialect, with tableaux for illustration:

(2-12) Jiangxiang Grammar for "Full-tone-related Neutral Tone":

*σw/μμ >> DEP-IO(μ) >> *μs/[L] >> *σw/μs

Input: σ / \ μs μw | | H L	*σw /μμ	DEP-IO-T	*μs /[L]	*σw /μs
a. σ | ☞ μs | H				
b. σ | μs | L		*!	*	
c. σ /\ μ μ | | H L	*!			

Input: σ / \ μs μw | | L L	*σw /μμ	DEP-IO-T	*μs /[L]	*σw /μs
a. σ | ☞ μs | L			*	
b. σ | μs | H		*!		
c. σ /\ μ μ | | L L	*!			

2.3.3 "Neutral Realization" of *Ru* Tones in Jiangxiang Dialect

The two Ru Tones, Yinru Tone 5 and Yangru Tone 2, preserve their original tones, as noted in (2-5). Ru tones are normally short and thus mono-moraic. As cited above, Jiang (1999) notes that in light/short syllable, the single mora may serve as the head mora, as in (1-10a). It follows that the tonal feature H may dock under the single head mora (μs) in the Yinru-tone syllable, and a similar case is expected for Yangru-tone syllable.

(2-13) Ru-tone syllables in Jiangxiang

a. Yinru σ \| μs \| H

b. Yangru σ \| μs \| L

Thus, the two Ru tones vacuously satisfy the ranking (2-12). In other words, the full tone forms of the two Ru Tones are equal to their "neutral realizations" respectively.

2.3.4 Problems of "Neutral Realizations" in Other Dialects

In Wuhan dialect, "full-tone-related neutral tones" show irregularity for Yinping Tone and Qusheng Tone, according to the data.

(2-14) "Full-tone-related Neutral Tone" in Wuhan Dialect (*Record of Wuhan City* 1997)

Dialect	YP	NT	yP	NT	S	NT	Q	NT
Wuhan	55	+3	213	+3	42	+3	35	+5

Unlike the above dialects, "full-tone-related neutral tones" are relatively longer in Chenghai dialect (L. Lin 1994) and Shantou dialect (L. Lin 1995). These full-tone-related neutral tones show no unified faithfulness to the base tones.

(2-15) "Full-tone-related Neutral Tone" in Chenghai Dialect and Shantou Dialect

Dialects	YP	NT	yP	NT	YS	NT	YQ	NT	YR	NT
					yS	NT	yQ	NT	yR	NT
Chenghai	33	+11	55	+11	52	+212	212	+21	1	+1
					35	+21	11	+11	5	+1
Shantou	33	+11	55	+11	53	+212	213	+21	2	+2
					35	+21	11	+11	5	+2

All that can be predicted for these two dialects is that level tones tend to be realized as 11 for "neutral form", and contour tones tend to be realized as 21(2).

"Full-tone-related neutral tones" in the above three dialects indicate more complicated interaction of faithfulness constraints and markedness constraints, which deserves further research.

2.4 Summary

Adopting the constraint proposed in Chapter 1, *σw/μs, I try to analyze the so-called "full-tone-related neutral tone" attested in some dialects. I argue that "full-tone-related neutral tone" is not real neutral tone; rather, it results from the dominance of *σw/μs, as in Liuyang dialect, or from the lower ranking of *σw/μs, as in Jiangxiang dialect. Some remaining problems are listed at the end of this chapter.

Chapter 3

Long Neutral Tone: Violation of *σw/μμ

3.1 Violation of *σw/μμ and Identification of Neutral Tone

3.1.1 Violation of *σw/μμ in Dialects

Non-head/ unstressed syllable in a syllabic foot is usually uttered shorter than full-tone syllable. Assuming mora to be a timing unit, a full-tone syllable contains two morae, and non-head/unstressed syllable normally involves one single mora. In terms of OT, a non-head syllable bans two morae, as cast by the constraint *σw/μμ (1-17).

Recall (1-17) **NON-HEADSYLLABLE/MONO-MORA (*σw/μμ)**

Non-head syllable in a foot bans two morae.

However, neutral tone is not necessarily short. Neutral tones are reported to be long in dialects like Bailikun (D. Cao 1987), Fukang (Y. Zhang 1999), Wusu (*Record of Wusu County* 1999), Urumqi (Y. Wei 2001a, b for Urumqi Han dialect; X. Zhang 2001, 2002 for Urumqi Hui dialect), Yanqi (L. Liu 1988), etc.

(3-1) Long Neutral Tones in Four Dialects

Dialect	YP	YP+N	yP	yP+N	S	S+N	Q	Q+N
Fukang	55	55+51	--	--	51	55+21 21+51	213	21+13
Urumqi Han	44	44+51	51	44+31 31+51	--	--	213	21+13
Urumqi Hui	21/32	32+52	24	24+42	51	52+21	44	44+41
Wusu	55	55+51	--	--	51	55+21	213	21+13

3.1.2 Identification of Neutral Tone

The above kind of tonal realization is regarded as neutral tone, because the pitch contour is unrelated to the tone in the full tone of the syllable concerned. In other words, this kind of syllable is underlyingly *toneless*.

By regarding this kind of tones as 'neutral tone', I am leaving aside one of the properties of Mandarin neutral tone, namely shorter duration.

As discussed in Chapter 2, "full-tone-related neutral tone" is not 'true' neutral tone— because its tonal output involves faithfulness to the tonal input in full-tone syllable concerned. Syllable involving "full-tone-related neutral tone" was

commonly regarded as neutral-tone syllable in dialectical studies (cf. G. Wei 2000, H. Wang 2003, etc), this is because "full-tone-related neutral tone" appears like the unmarked shape of neutral-tone syllable, namely light and short. However, it is different form neutral tone in that its tonal realization is related to the base/full tone, namely it is underlyingly *tonal*.

Following J. Wang (1997, 2000), I argue for a Single Criterion for the Identification of Neutral Tone:

(3-2) **Single Criterion for the Identification of Neutral Tone**

The basic and only characteristic of neutral tone is atonicity.

In terms of OT, the *tonal output* in a neutral-tone syllable involves *no faithfulness* to the *tonal input* in the full-tone syllable concerned.

To sum up, short & atonic syllable is *unmarked* neutral-tone syllable; long & atonic syllable is *marked* neutral-tone syllable; "full-tone-related-neutral-tone" syllable is *pseudo-neutral-tone* syllable.

3.2 Long Neutral Tone in Urumqi Dialect

Long neutral tone in Urumqi dialect has been analyzed in Y. Wei (2001a, b for Urumqi Han) and X. Zhang (2001 2002 for Urumqi Hui). Their analyses focus on the tonal realization of the bi-moraic neutral tone. I try to analyze exclusively the durational aspect of long neutral tone.

J. Wang notes that long neutral tone is a marked phenomenon (Wang 2003). In view of OT, long neutral tone indicates a violation of the constraint *σw/μμ. The violation of a markedness constraint cannot occur randomly; rather, it must be the "by-product" of satisfying a higher ranked constraint (Kager 1999). As for long neutral tone, I argue that the higher ranked constraint concerned is FT-BIN(Prince 1980; Kager 1989; Prince & Smolensky 1993; Gussenhoven & Jacobs 1998), which is a rhythmic requirement, as shown in (3-3):

(3-3) **FT-BIN-μ**

Feet are binary under moraic analysis.

As for syllable and tone, this constraint requires that every syllable must bear two morae. Long neutral tone satisfies the bi-moraic requirement on syllabic structure, though violating *σw/μμ. As for long neutral tone, the conflict between FT-BIN-μ and *σw/μμ is solved by the higher ranking of FT-BIN-μ over *σw/μμ.

(3-4) Interaction between FT-BIN-μ and *σw/μμ in Urumqi Dialect

Input: σs σw / \ / \ μ μ μ μ	FT-BIN-μ	*σw/μμ
a. σs σw ☞ / \ / \ μ μ μ μ		*
b. σs σw / \ | μ μ μ	*!	

Input: σs σw / \ | μ μ μ	FT-BIN-μ	*σw/μμ
a. σs σw ☞ / \ / \ μ μ μ μ		*
b. σs σw / \ | μ μ μ	*!	

The tonal realization of long neutral tone in Urumqi dialect is well discussed in Y. Wei (2001a, b) and X. Zhang (2001 2002), and I will not recapture it here.

3.3 Long Neutral Tone Valued LL

The violation of *σw/μμ leads to long neutral tones; however, there are divergent tonal realizations of long neutral tones among dialects. Now I try to account for two simplest realizations valued HH and LL respectively.

3.3.1 Neutral Tone in Weinan Dialect: LL

Long neutral tone in Weinan (M. Ma 2003) is reported to be LL.

(3-5) Neutral Tone LL in Weinan Dialect

Dialect	YP	YP+N	yP	yP+N	S	S+N	Q	Q+N
Weinan	**21**	T+21	24	T+21	51	T+21	33	T+21
	LL	T+LL	LH	T+LL	HL	T+LL	MM	T+LL

The long neutral tone in this dialect can be characterized in two aspects. *Firstly*, it is long rather than short, indicating a priority of FT-BIN-μ over *σw/μμ. *Secondly*, the neutral tone is of L value, indicating no violation of *σw/μs and *μw/[H].

Thus, I argue the following ranking for neutral tone in Weinan dialect.

(3-6) Weinan Grammar for Neutral Tone

FT-BIN-μ, *σw/μs, *μw/[H] >> *σw/μμ

Tableaux are given to show that tonal LL emerges as the optimal tonal realization of neutral tone, oblivious of the input form of the non-head syllable.

Input: σw / \ μ μ | | t t	FT-BIN -μ	*σw /μs	*μw /[H]	*σw /μμ
a. σw ☞ / \ μw μw | | L L				*
b. σw / \ μw μw | | L H			*!	*
c. σw / \ μs μw | | H H		*!	*	
d. σw | μ | L	*!			

Input: σw | μ | t	FT-BIN -μ	*σw /μs	*μw /[H]	*σw /μμ
a. σw ☞ / \ μw μw | | L L				*
b. σw / \ μw μw | | L H			*!	*
c. σw / \ μs μw | | H H		*!	*	
d. σw | μ | L	*!			

3.3.2 LLM in Tangyang Dialect: Faithfulness to Moraic Structure

Tangyang dialect (Zhou 2001) is a branch of Jianghuai Mandarins. This dialect involves a pattern of tone sandhi, in which the second syllable is pronounced with a tonal value long and low, regardless of the full tone concerned and the preceding tone. Regarding OT, this pattern involves no faithfulness to input tone, and thus the syllable involved is underlyingly *toneless.* Following this line of reasoning, this kind of syllable contains neutral tone, according to the Single Criterion Identification in (3-2). However, the long "neutral tone" is reported as 213, equal to the citation form of Shangsheng Tone in Tangyang dialect, as shown in (3-7) with representation in phonological H, M, L.

(3-7) Long Neutral Tone in Tangyang Dialect

Dialect	YP	YP+N	yP	yP+N	S	S+N	Q	Q+N	R	R+N
Tangyang	31	T+213	35	T+213	212 /**213**	T+213	43	T+213	5	T+213
									35	T+213
	ML	T+LLM	MH	T+LLM	LLM	T+LLM	MM	T+LLM	H	T+LLM
									MH	T+LLM

In the long neutral tone in Tangyang dialect, the ending M after LL is unexpected since it incurs violation of FT-BIN-μ, which bans syllable that is not

bi-moraic. I argue that the emergence of the ending M can be attributed to the higher ranking of the constraint (3-8).

(3-8) ***LL#**

Tonal LL sequence is disallowed before pause.

This Markedness Context-sensitive (MC-sensitive) constraint is based on the observation that utterance-final LL is commonly disallowed. This tendency is embodied by the scarcity of LL value in citation tones (i.e. the tonal condition "before pause") as shown in Jiao (2003) and Jiang (1999). Such an idea also manifests itself in Duanmu's (2000) discussion for Mandarin neutral tone. In the following chapter, this constraint will re-surface for the explanation of the ending 4 in Mandarin Shangsheng Tone. Now we simply regard that *LL# dominates FT-BIN-μ in ranking.

To account for long neutral tone LLM in Tangyang dialect, another constraint is needed — MAX-μ-IO, which bans deletion of morae in the input syllable.

(3-9) **MAX-μ-IO** (Rosenthall 1994; Kager 1999)

All morae in the input syllable should have correspondents in the output.

This constraint is needed for the exclusion of L as optimal candidate. I propose the following to be the grammar of neutral tone in Tangyang dialect.

(3-10) Tangyang Grammar for Neutral Tone

MAX-μ-IO >> *σw/μs, *μw/[H], *LL# >> FT-BIN-μ, *σw/μμ

Input: σw # / \ μ μ	MAX-μ	*σw/μs	*μw/[H]	*LL#	FT-BIN-μ	*σw/μμ
a. ☞ LLM#					*	**
b. LL#				*!		*
c. LH#			*!			*
d. HH#		*!	*			*
e. L#	*!				*	

It can be seen that the neutral tone in Tangyang dialect is different from that in Weinan dialect. In Weinan dialect, the optimal output can be captured without reference to faithfulness constraint. However, in case of Tangyang dialect, consideration should be given to *faithfulness* to the morae in input bi-moraic syllable. Otherwise, (3-10) e will incorrectly surface as the optimal candidate.

If the analysis for Tangyang dialect holds true, it follows that it is possible for

neutral-tone syllable to involve faithfulness to input *moraic structure*, and simultaneously *no* faithfulness to the *tonal features*. On the other hand, it is also possible for a light/weak syllable does involve faithfulness to the input tonal features, like the "full-tone-related neutral tone" in Jiangxiang dialect.

From the above reasoning, I argue that neutral tone is characterized by an exclusive concern on *atonicity*.

(3-11) Exclusive Concern on Atonicty

Neutral-tone syllable is characterized by atonicity, and *nothing else*. Neutral-tone syllable tolerates input-output faithfulness concerning moraic structure and segmental structure.

This is virtually a sister notation of Single-Criterion Identification in (3-2).

3.4 Long Neutral Tones Valued HH

3.4.1 Neutral Tones in Nayong /Zhenlong Dialect: HH

Nayong dialect (Guizhou Province) has a tonal phenomenon similar to Mandarin neutral tone in many aspects. This tonal phenomenon differs from Mandarin neutral tone only in that the output tone doesn't come about as "slight and short", nor does it appears to be L. Instead, the output tone is valued 55, equal to Yinping Tone in the tonal system of Nayong dialect (*Records of Nayong County* 1999). I visualize this phenomenon as neutral tone on the ground that the tonal contour of the outcome syllable bears no relationship (faithfulness) to the input syllable. In other words, the syllable is underlyingly tonelss, which satisfies Exclusive Concern on Atonicty in (3-11). Xiang(2000) identifies similar tonal realization to be neutral tone in Zhenlong dialect (Sichuan Province).

(3-12) Neutral Tones of HH Value in Nayong/Zhenlong Dialect

Dialect	YP	YP+N	yP	YP+N	S	S+N	Q	Q+N
Nayong	55	55+55	21	21+55	53	T+55	34	T+55
Zhenlong	44	44+44	21	21+44	53	53+44	213	213+44

The HH neutral tones in Nayong dialect and Zhenlong dialect should not be accidental. S. Li (2002) reports similar tonal phenomena— *quasi-neutral tones*, which exist in several other dialects of South-east Mandarins.

(3-13) **Quasi-neutral Tone** (according to S. Li 2002)

Quasi-neutral tone refers to tonal change in which the second syllable in a disyllabic sequence bears no relation either to its full tone or to the tone in its preceding syllable. This "neutral tone" is termed "quasi" in the sense that this tonal change is applicable only to a specific subset of the disyllabic sequences in a concerned dialect.

For example, in Bijie dialect, only the disyllabic sequence of *er*-suffixation undergoes the tonal changes (Ming 1997). In Chengdu dialect, reduplication forms experience this tonal change (D. Liang 1982). In Chongqing dialect, *tou*-suffixation demonstrates such a tendency; however, this tonal change is not obligatory (S. Li 2002).

(3-14) Quasi-neutral Tone in Four Dialects of South-east Mandarin

Dialects	YP	YP+N	yP	yP+N	S	S+N	Q	Q+N
Bijie	55	55+55	21	21+55	42	T+55	213	T+55
Chengdu	55	55+55	21	21+55	53	53+31	213	213+55
Chongqing	45	45+55	21	21+55	53	53+55	213	213+55
Guiyang	55	55+55	21	21+55	53	53+55	24	24+55

These tonal changes await further research.

3.4.2 Nayong/Zhenlong Dialect: Preservation of Moraic Structure

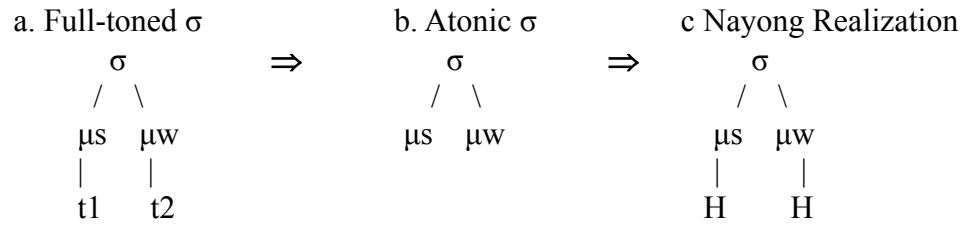
Now consider the values of the neutral tones in Nayong dialect and Zhenlong dialect. The values are 55 and 44 respectively, equal to phonological HH. As to this H value, we are reminded of the H preference for full tones and the prevalence of HH tones in tonal inventories, as discussed in Jiao (2003) and Jiang (1999).

Recalling my discussion for "full-tone-related neutral tone" in Jiangxiang dialect, the preference for H tone can be ascribed to the existence of head-mora (μs)— that is, head mora attracts H tone and non-head mora bans H tone. Following this line of reasoning, the surface HH tone entails the existence of head-mora in neutral-tone syllable in Nayong/Zhenlong dialect.

On the other hand, the "neutral tones" in these tow dialects are pronounced like Yinping Tones, which implies a bi-moraic structure. Regarding the existence of head mora (μs) and the bi-moraic structure, it can be argued that the moraic structure of the input syllable (μs+μw) is utterly preserved in the output form.

For Nayong dialect, it can be proposed that the input moraic structure is well preserved in the output, so much that even the head/non-head specification for morae is well preserved in the output correspondents, as is shown in (3-15)a-b:

(3-15) Preservation of Input Moraic Structure & Moraic Specification



Within the framework of OT, this preservation of moraic structures can be captured by two faithfulness constraints. Firstly, MAX-μ-IO (Rosenthall 1994; Kager 1999), which bans deletion of morae in the input syllable, as cited in (3-9). Secondly, IDENT-μ-IO, which bans any output changes on the moraic specification of the input.

(3-16) **IDENT-μ-IO**

Moraic headedness in the output must be identical to the correspondent specification in the input.

Recalling Jiang's (1999) discussion about unmarked status of HH in full tones (as related in Section 1.2), it is not accidental for (3-15)b to be realized as (3-15)c. Virtually, (3-15b) is precisely the format for full tones that Jiang(1999) discusses, as in (1-10). Assuming the *Tonal Alignment Constrain*t (TAC) (Jiang 1996a,b, revised in 1999), the H under the head-mora (3-15c) can be accounted for in that it fulfill the requirement of TAC.

Recall (1-11) **Tonal Alignment Constraint** (Jiang 1996a, b, revised in 1999)

*μs/[L] >> *μs/[M] >> *μs/[H]

Now consider the emergence of H on the non-head mora (μw). Recalling the Constraint *μw/[H], the emergence of this H is obviously an violation of *μw/[H].

Recall (1-12) **NONHEADMORA-NONHIGH (*μw/[H])**

Non-head mora bans tonal feature H. (Jiang 1999)

Following our previous reasoning, the violation of a markedness constraint must be the result of satisfying a higher ranked constraint. Regarding the output HH, the violation of *μw/[H] is *sacrificed* for the identity of tonal features of the head mora (μs) and the non-head mora (μs). This syntagmatic identity is captured by another well-formedness constraint S-IDENT(F):

(3-17) **SYNTAGMATIC-IDENT(F) [S-IDENT(F)]** (Ma 2001a, b, c)

Adjacent segments in the output must be identical in their features/values.

This is a general constraint for *assimilation* in utterance. As for the identity of tonal H under μs and μw in Nayong dialect, I specify the constraint as S-IDENT(T):

(3-18) **SYNTAGMATIC-IDENT(T) [S-IDENT(T)]**

Adjacent morae in the output must bear identical tonal values.

Therefore, two forces ensure the outcome HH in the bi-moraic neutral-tone syllable: the existence of head-mora, defying *μw/[H], attracts H tone, and the dominance of S-IDENT(T) render the non-head mora in the syllable as H.

Considering this, I propose (3-19) to be the grammar for neutral tone in Nayong dialect and Zhenlong dialect, with tableau illustration.

(3-19) Nayong/Zhenglong Grammar for Neutral Tone:

FT-BIN-μ, MAX-μ-IO, IDENT-μ-IO » *μs/[L] » S-IDENT-T »

*σw/μμ, *σw/μs, *μw/[H]

Input: σw / \ μs μw | | t t	FT-BIN -μ	MAX -μ-IO	IDENT -μ-IO	*μs /[L]	S-IDENT -T	*σw /μμ	*σw /μs	*μw /[H]
a. σw / \ ☞ μs μw | | H H						*	*	*
b. σw / \ μs μw | | H L					*!	*	*	
c. σw / \ μs μw | | L L				*!		*	*	
d. σw / \ μs μs | | t t		*!	*			*	**	
e. σw | μs | H	*!	*					*	

Adopting all the constraints so far, I now recast the grammars for long neutral tone in dialects of Weinan, Tangyang, Nayong and Zhenlong, with a full ordering of the nine constraints I mentioned previously. These nine constraints includes: *σw/μμ (1-17), *σw/μs (1-19), *μw/[H] (1-20), FT-BIN-μ(3-3), MAX-μ-IO (3-9), IDENT-μ-IO (3-16), *μs/[L] (2-11), S-IDENT-T (3-18), *LL# (3-8).

(3-20) Grammar for Neutral Tone in Weinan Dialect (LL)

FT-BIN-μ, MAX-μ-IO, *σw/μs, *μw/[H] »

S-IDENT-T » *σw/μμ, IDENT-μ-IO, *μs/[L], *LL#

(3-21) Grammar for Neutral Tone in Tangyang Dialect (LLM)

MAX-μ-IO » *σw/μs, *μw/[H], *LL# »

FT-BIN-μ, *σw/μμ, IDENT-μ-IO, *μs/[L], S-IDENT-T

(3-22) Grammar for Neutral Tone in Nayong/Zhenglong Dialect (HH)

FT-BIN-μ, MAX-μ-IO, IDENT-μ-IO » *μs/[L] »

S-IDENT-T » *σw/μμ, *σw/μs, *μw/[H], *LL#

3.5 Long Neutral Tones in Other Dialects: Asymmetry

3.5.1 Divergent Values in One Dialect

There are dialects in which neutral tones bear divergent values.

Z. Cao (1998) reports that, in Dunhuang (Hedong) dialect, the neutral tone after Yinping Tone is 13, equal to the citation form of Pingsheng Tone in the tonal system, while the neutral tone after Yangping Tone is read as 53, equal to the citation form of Shangsheng Tone. Similar "*neither-light-nor-short* neutral tones" are attested in other North-West Dialects (Z. Cao 1998).

J. Liu (1997) states that, in Boshan dialect (Shandong Province), neutral tone after Pingsheng Tone has two tonal realizations: one is 23, relatively short, and the other is 33, comparatively longer. Qian (2001) further notes that neutral tones in many dialects in Shangdong Province are not "slight and short" tones. These tonal realizations are regarded as neutral tones because "their pitch is not decided by their citation tone, but by the tones of their preceding syllables" (Qian 2001).

3.5.2 Different Lengths in One Dialect

There are dialects in which neutral tones has different durations after different tones.

In Wangrong dialect (Shaanxi Province), neutral tone appears short after

Yinping Tone (51), Shangsheng Tone (55) and Qusheng Tone (33); however, after Yangping Tone (24), neutral tone is read as 33, equal to the citation form of Qusheng Tone (Wu & Zhao 1998).

In Hedong dialect (Shangdong Province), the neutral tones after Yangping Tone (53), Shangsheng Tone (55) and Qusheng Tone (31[2]) are short; however, the sequence of "Yinping Tone (214) + neutral tone" is read as 21+214, in which neutral tone is comparatively longer (Ma & Wu 2003).

In Huojia dialect (Henan Province), the neutral-tone syllable after Qusheng Tone is light and short, recorded as 3 on five-degree scale; however, neutral-tone syllables after other tones are relatively longer, recorded as 13 (Hou 2002).

It needs further research to account for the length asymmetry in these dialects.

3.6 Summary

Attributing long neutral-tone syllable to the violation of *σw/μμ, I argue that atonicity is the only criterion to identify neutral tone. In the discussion of long neutral tone LL, LLM, and HH among dialects, I argue that long neutral tone may preserve faithfulness to input moraic structure as far as it show no faithfulness to input tonal features. A set of constraint is adopted to account for the grammar of neutral tone in four dialects. I end this chapter with some residual issues.

Chapter 4
Metrical Foot and Dissimilation in Mandarin Neutral Tone

The violation of constraint *μw/[H] is no less common than the violation of the other two constraints in the triplet *σw/μμ, *σw/μs, *μw/[H]. The following two chapters focus on this issue.

For most dialects reported, neutral tone appears on the second syllable of disyllabic sequences, i.e. in a *trochaic pattern*. However, neutral tone may also occupy the initial position in disyllabic or multi-syllabic sequences, i.e. in an *iambic pattern*. Such iambic patterns coexist with trochaic patterns in dialects like Wenzhou (Wu Dialects), Suzhou, Rongcheng (Jiao-Liao Mandarins), Wuhan (South-east Mandarins), Nanjing (Jianghuai Mandarins) (Hou 2002). Iambic pattern will not be discussed in this paper due to the scarcity of data at my disposal.

4.1 Metrical Foot and Tonal Sequence

T. Lin (1962) states that, in Mandarin, neutral-tone syllable is *unlikely* to be independent: utterance pause can only occur *after* a neutral-tone syllable, but not *before* it, which implies a closer relationship between a neutral-tone syllable and its preceding syllable; in a disyllabic sequence, the tonal contour of the first syllable exhibits a tendency to transcend its syllabic boundary and to incorporate the succeeding neutral-tone syllable (Lin 1962). Lin's view holds true for many other dialects besides Mandarin, thus it entails that the sequence of "full tone + neutral tone" should be regarded as a prosodic unit. Admittedly, it is within this prosodic unit that a neutral tone gets its tonal value from the phonological environment.

4.1.1 Neutral-tone PhWd, Stress Domain and Tonal Envelope

Divergent terms are proposed to define the phonological sequence of "full tone + neutral tone".

Neutral-tone Phonological Word (*PhWd*). Wu-Tai (1986) holds that in utterance, a *Phonological Word* is the sequence of segments between two pauses; every phonological word has a tone; one tone may cover a phonological word with two or more syllables. Based on this view, R. Shi (1988) proposes the concept of *Neutral-tone Phonological Word*, equivalent to the notion of "full tone + neutral tone" sequence. In a disyllabic sequence, the tonal pattern of the neutral-tone

phonological word is mainly decided by the tone in the first stressed syllable (R. Shi 1988).

Stress Domain. Z. Li (1996) notes that a stressed syllable and the ensuing neutral-tone syllables following it form a *stress domain*, as proposed by Duanmu.

Tonal Envelope. In the discussion of tone sandhi in Shanghai dialect, Sherard (1980) initiates the concept of *tonal envelope*, referring to the syllable sequence controlled by a tonal contour.

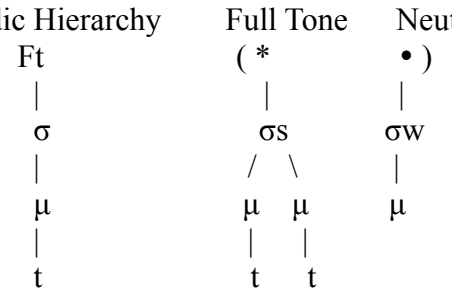
This terminology reflects that, in the study of tonal realization, attention has been paid to different phonological aspect. In this thesis, however, I will adopt the concept of *metrical foot*.

4.1.2 Metrical Foot and Head-faithfulness

In pre-OT studies, Yip (1980) assumes that a full-tone syllable constitutes a *metrical foot* by itself, and a *metrical foot* may also consist of a full-tone syllable followed by one (or more) neutral-tone syllable. In Classic generative phonology, the S+N(+N) sequence is considered to be the *domain* of rule application (J. Wang 1997). Following Yip (1980) and J. Wang (1997), I regard the sequence discussed as metrical foot, that is, the *domain* of the tonal realization.

As discussed in Chapter II, neutral tone involves different levels of phonological hierarchy — *foot, syllable, mora*, as well as *tone,* as in (4-1):

(4-1) Prosodic Hierarchy



On the foot (Ft) level, the *metrical foot* entails a strong/stressed element and a weak/unstressed element. The concept of *metrical foot* captures two facts: in a "full tone + neutral tone" sequence, (i) the head syllable usually bears stress, while the non-head, neutral-tone syllable is commonly weak and unstressed; (ii) the head syllable usually preserves its *underlying tone*, while non-head/neutral-tone syllable is underlyingly *toneless* in most cases.

The term *metrical foot* is also consistent with the relationship between the headedness and its tonal stability in a metrical foot, as proposed in Yip (1996) and Duanmu (2000). Yip (1996) proposes two constraints of *positional faithfulness* about

head syllable and *head foot*:

(4-2) **HEADSYLL-MAX-(F)**

Every feature in S1 associated in S1 with a segment whose correspondent is contained in a head syllable in S2 has a correspondent in S2.

(4-3) **HEADFOOT-MAX-(F)**

Every feature in S1 associated in S1 with a segment whose correspondent is contained in a head foot in S2 has a correspondent in S2.

The covariance of *tonelessness* and *stresslessness* in Standard Chinese also leads Duanmu (2000) to generalize a universal *Tone–Stress Principle*,

(4-4) **Tone–Stress Principle** (Duanmu 2000)

A stressed syllable can be accompanied by an underlying tone pattern; an unstressed syllable is not accompanied by an underlying tone pattern.

Therefore, the option for the term "metrical foot" captures both the stress and tonal characteristics of the two syllables in the "full tone + neutral tone" sequence. What's more, the data in Statistics I re-confirm the assumption that the tonal features in the head/stressed syllable demonstrate intactness in tone sandhi. Thus, following Yip (1996) and Duanmu (2000), I assume the following constraint for faithfulness in head syllable, as in (4-5):

(4-5) **HEADSYLL-IDENT-T (σs-IDENT-T)**

Tonal features in head/stressed syllable (σs) ban any changes.

4.1.3 Dissimilation in the Tonal Realization of Metrical Foot

R. Shi (1988) initiated three major types of the tonal realization of "full tone + neutral tone" sequences (metrical foot), namely *Pitch-declining*, *Contour-splitting* and *End-spreading*; however, there are some exceptions which cannot be captured by the above three types (R. Shi 1988). I will re-summarize the patterns of tonal realization in Chapter 5.

Before going into discussion, the effect of *dissimilation* must be mentioned. In her analysis, X. Zhang (2002) concludes that neutral tone in Urumqi exhibits a tendency of "*dissimilation*". Such an idea is insightful in that dissimilation deserves consideration in the study of the tonal realization of metrical foot.

In this thesis, I argue for a particular status for *dissimilation* in the tonal realization of metrical foot (S+N). Dissimilation exists widely among dialects in the tonal manifestation of metrical foot, yet it is *not* an independent pattern. That is, no

dialect adopts *pure dissimilation* to realize the metrical foot. Consider a hypothetical dialect with pure dissimilation pattern:

(4-6) Hypothetical Pure Dissimilation in Value Realization of Neutral Tones

Phonological Paradigm:	HH	LH	HL	LL
Neutral Tone Realization:	HH+L	LH+L	HL+H	LL+H

Virtually, such a dialect fails to manifest itself, which implies that dissimilation cannot work independently as a pattern in the tonal realization of a metrical foot. Rather, it must interact with other forces to influence the outcome of phonological process.

4.2 Dissimilation: A Case Study of Mandarin "214"

By "214" in Mandarin, I mean both the citation form of Mandarin Shangsheng Tone and the tonal realization of "Shangsheng Tone + neutral tone" sequence. Before discussing Shangsheng Tone in disyllabic sequence, I examine its citation form.

4.2.1 Paradigmatic Exceptionality of Shangsheng Tone 214

Mandarin Shangsheng Tone is perhaps the topic most frequently discussed in Chinese tonology. I venture to reanalyze this phenomenon from a new perspective.

Mandarin full tones are usually recognized as follows:

(4-7) Mandarin Tonal Paradigm

Tonal Category:	Yinping	Qusheng	Yangping	Shangsheng
Phonetic Value:	55	51	35	214
Phonological Feature:	HH	HL	LH	LLH

There is one conspicuous exception in this phonological paradigm— all the full tones are bi-featural and bi-moraic, except Shangsheng Tone. Shangsheng Tone is reported to be longer than other full tones, and is usually represented by three features (LLH) and three morae (cf J. Wang 2002a) in phonological analysis. To cater for the irregularity of Mandarin Shangsheng Tone, H. Lin (1998) even renders all the other three tones to be tri-featural, as in (4-8):

(4-8) Tri-featural Representation of Mandarin Shangsheng Tone (H. Lin 1998)

Yinping	Yangping	Shang	Qu
/ | \	/ | \	/ | \	/ | \
H H H	M H H	L L M	H M L

Then why does it ruin the neat paradigm of HH, HL LH and LL? J. Wang (2002a) notes that the paradigm of HH, HL, LH, LLH is attested in some dialects.

Virtually, this "imperfect" paradigm, instead of the neat pattern, proves to commonly exist among dialects according to my data.

4.2.2 Citation Form as a Phonological Context

For the sake of paradigmatic uniformity, I propose that all Mandarin full tones are bi-moraic underlyingly (in pre-OT phonology), or input-wise (in OT). That is, no exception holds at the moraic level and tonal value, which leads to a neat paradigm as in (4-9). The essence of such an idea manifests itself in pre-OT analysis such as Yip (1980), J. Wang (1997), Bao (1999), etc..

(4-9) Neat Paradigm of Mandarin Full Tones

Tonal Category:	Yinping	Qusheng	Yangping	Shangsheng
Phonological Feature:	HH	HL	LH	LL

I argue that, for Shangsheng Tone, 214 is the *citation form* rather than *input form* or *underlying form*. The implication is that citation form is *not necessarily* the input or the underlying representation of a tonal category. Such an idea finds its precedents in the studies of Chinese dialects, like F. Wang (1999:162).

Duanmu (2000) also opts for the simple representation LL for Shangsheng tone, and claims that the occasional tail end H in utterance-final forms "comes from a polarity constraint that requires L to be followed by H in a disyllabic foot". I disagree with this argument in that, if a polarity constraint can exert influence on Shangsheng Tone, why not elsewhere? For instance, why doesn't Qusheng Tone HL undergo the polarity process and be realized as 514?

I argue that citation form 214 is only one realization of LL *in prepausal position*. That is, the position of "*pre-pause*" may have requirements on tonal shapes (cf. J. Wang 2003), and thus cause some underlying form to undergo phonological changes.

In view of OT, I maintain that citation LL (i.e. LL#) is a *marked* form. Markedness in OT is closely related to linguistic typology, and the markedness status of LL# is supported by typological evidence. As shown in Jiao (2003), in 40 dialects, only one LL tone is reported, compared with 29 HH tones and 19 MM tones. Jiang (1999) also shows that, in 26 dialects, citation LL tone occurs only in 6 dialects, in contrast to HH in 24 dialects and MM in 12 dialects. According to my data of 134 dialects, citation 11 or 12 is not found; citation tone 21 is reported in some dialects (mainly from Shangdong Dialects). Despite the discrepancy in the above statistics, it is shown clearly that citation form LL (i.e. LL before pause) is a *marked* form in

view of OT.

Thus, I formulate the following markedness constraint, which has been used in analysis for Tangyang dialect (Section 3.3):

(4-10) ***LL#**

Tonal LL sequence is disallowed before pause.

*LL# itself cannot predict the citation form 214, because a form like L can easily satisfy this constraint and a form like 211 also meet this requirement. Then how can this two possibilities be crossed out?

4.2.3 Citation 214 as LL+M

In the citation forms for Mandarin tones, a single L doesn't surface as the optimal candidate for input LL#. Thus, the constraint (4-11) is expected to take a dominance position in the grammar of Mandarin citation form.

(4-11) **MAX-T-IO**

All tonal features in the input should have correspondents in the output.

Surface form LM, ML and so on also doesn't surface for the citation form of Shangsheng Tone LL, which indicates the dominance of IDENT-T-IO in the grammar.

(4-12) **IDENT-T-IO**

Tonal features in the output must be identical to the correspondents in the inputs. (No change!)

The input LL in Mandarin citation form surface with three tonal features, thus the following faithfulness constraint DEP-T-IO is violated in the grammar.

(4-13) **DEP-T-IO**

All tonal features in the output should have correspondents in the input.

Thus, for Mandarin, if Shangsheng Tone is taken as underlyingly LL, DEP-T-IO must sit at a very low position in the ranking.

Now consider the tonal value of the added mora. The single added mora is obviously a *non-head mora*. Thus, according to *μw/[H] (1-20), the added non-head mora should not be phonological H.

Recall(1-20) **NONHEADMORA-NONHIGH (*μw/[H])**

Non-head mora bans tonal feature H.

However, the added mora after Shangsheng LL doesn't surface as L, that is, LL.L

doesn't surface as citation form for Shangsheng Tone as expected by *μw/[H]. Why?

I argue that the absence of the expected citation form LL.L is due to the higher ranking of another markedness constraint— *LL.L.

(4-14) ***LL.L**

Tonal sequence of LL.L is disallowed.

This constraint is drawn from the statistics. My statistics demonstrate that three consecutive L's is generally disallowed in both citation form and "full tone + neutral tone" sequence. This constraint can be regarded as the instantiation of *dissimilation effect*, or OCP. The higher ranking of this constraint ensures the absence of LLL for the citation form of Shangsheng Tone.

Then what is the phonological representation of the phonetic 4 in the citation 214? I maintain that it is M, rather than H. This is because the added mora is not expected to be head-mora, and consequently is less likely to be linked to H, which violates *μw/[H] with no gains.

In view of OT, the following constraint ranking can capture the emergence of 214 as LL+M in a parallel style.

(4-15) Mandarin Grammar for Citation Form

HEADFOOT-MAX-(F), IDENT-T-IO » *μw/[H], *LL.L »*LL# » DEP-T-IO

The above reasoning is illustrated in the following tableau:

Input: LL#	HEADFOOT -MAX-(F)	IDENT -T-IO	*μw /[H]	*LL.L	*LL#	DEP-T-IO
a. LL#					*!	
b. LL.L#				*!		
c. ☞ LL.M#						*
d. LL.MM#						**!
e. LL.H#			*!			
f. LM.L#		*!				
g. L.M#	*!					

4.2.4 "214" in Disyllabic Sequence S+N: J. Wang's Analysis

In Mandarin, the neutral tones after the Yinping, Yangping and Qusheng Tone are L, but the tonal form after Shangsheng Tone is H. J. Wang (2002a, c) adopts the

following constraints to account for the tonal realization of Mandarin metrical foot:

(4-16) **MORA-TONE**

Every mora must be linked to one tonal feature only.

(4-17) ***NEUTRAL TONE-H**

The mora in the neutral-tone syllable cannot be linked to H.

(4-18) **ANCHOR-IO-L**

The tonal feature on the left edge of the output should correspond to the tonal feature on the left edge of the input.

(4-19) **CONTIGUITY-IO**

The tonal sequence in the output should correspond to that in the input, without any medial skipping or intrusion.

As for the exceptionality of Shangsheng Tone, J. Wang (2002a, c) holds that this exception is caused by the preservation of the ending H in Shangsheng Tone; the following constraint is adopted to explain the neutral tone H after Shangsheng Tone:

(4-20) ***3-MORAE**

No syllable can bear three morae, except before pause.

J. Wang (2002a, c) ranks the constraints in the following order, with a tableau:

(4-21) Mandarin Neutral Tone Realization

*3-morae >> MORA-TONE, ANCHOR-IO-L,

CONTIGUITY-IO >> *NEUTRAL TONE-H

Imput: LLH.ON	*3-MORAE	MORA-TONE	ANCHOR-IO-L	CONGUITY-IO	*NEUTRAL TONE-H
a. LLH.ON	*!	*			
b. LL.ON		*!			
c. ☞ LL.HN					*
d. LL.LN				*!	
e. HL.HLN		*!	*	*	*

4.2.5 "214" in Disyllabic Sequence of S+N

Based on J. Wang (2002a, c), I try to explain the tonal realization of "Shangsheng Tone + neutral tone" with LL taken as the input of Shangsheng Tone.

In the disyllabic sequence, the tonal features in the head syllable are LL, equal

to the input of Shangsheng Tone. This consistence indicates the dominance of HEADSYLL-MAX-(F) and HEADSYLL-IDENT-(T), which bans any change or deletion in the head syllable.

The neutral tone appears to be L after Yinping Tone, Yangping Tone and Qusheng Tone. This can be ascribed to the constraint triplet *σw/μμ, *σw/μs, *μw/[H]. In view of uniformity, the neutral tone after Shangsheng Tone is "expected" to be L alike. Rather, higher ranked *LL.L render the L in the neutral tone into M.

Following J. Wang (2002a,c), I adopt ANCHOR-IO-L and MORA-TONE to account for the fact that there is no empty mora in the tonal realization of Mandarin neutral tone. Thus, I propose the following ranking for Mandarin neutral tone:

(4-22) Mandarin Grammar for Neutral Tone

MORA-TONE, ANCHOR-IO-L, HEADSYLL-MAX-T, HEADSYLL-IDENT-(T) »

*LL.L » *σw/μμ, *σw/μs, *μw/[H]

A brief illustration is given for the selection of "Shangsheng Tone + neutral tone":

Input: σs σw / \ | L L	MORA-TONE	ANCHOR-IO-L	HEAD SYLL-MAX-T	HEAD SYLL-IDENT-T	*LL.L	*σw /μμ	*σw /μs	*μw /[H]
a. ☞ LL.M								
b. LL.H								*!
c. LL.MM						*!		
d. LL.L					*!			
e. LH.L				*!				
f. L.L			*!					
g. LL.LL		*!						
h. LL.O	*!							

4.3 Summary

This chapter adopts the concept of metrical foot to capture the tonal realization of neutralization in "full tone + neutral tone" sequence. I refer to dissimilation as a non-independent, yet commonly existing effect in the tonal realization of neutral tone in metrical foot. A case study is given for the citation form of Mandarin Shangsheng Tone and the tonal contour of "Shangsheng Tone + neutral tone" within the framework of OT. Taking LL to be the input for Shangsheng Tone, I argue that the same "214" in the above two cases are the outcomes of two irrelevant phonological processes.

Chapter 5

Tonal Realization of Neutral Tone: Three Patterns

5.1 Patterns of Neutral Tone Realization

5.1.1 R. Shi's Classification of Three Types

R. Shi (1988) is one of the first articles to summarize the relationship between neutral tone and the tone in its preceding syllable. From the viewpoint of metrical foot, R. Shi (1988) can also be regarded as a discussion of the patterns for tonal realization of a metrical foot, which consists of a full tone ensued by one or more neutral-tone syllable. R. Shi generalizes the patterns into three types: (1) *Pitch-declining*: the ending high pitch of the first syllable is followed by a neutral tone of L or M, e.g. Mandarin Yinping Tone + neutral tone (55+2); (2) *Contour Splitting*: the tonal contour of the first syllable is shared by the two syllables in the "full tone + neutral tone" sequence, e.g. Mandarin Shangsheng Tone + neutral tone (21+4); (3) *End-spreading*: the pitch value of the second neutral syllable takes the ending of the first syllable, e.g. Mandarin Qusheng Tone + neutral tone (51+1).

Insightful as this generalization is, it is only descriptive. Can we work out some pattern to predict the realization of neutral tone in a particular language?

5.1.2 Unified Pattern for One Dialect

J. Wang (1997, 2002a, b, c) and Z. Li (1996) use the *default value* analysis to account for the sequences of "Yinping Tone + neutral tone" and "Qusheng Tone + neutral tone", ignoring the distinction as made by R. Shi (1998). This default-L analysis highlights that the same dialect should have a *unified realization pattern* for a metrical foot "full tone + neutral tone".

In other words, I assume that there should be exclusively *one grammar* for the tonal realization of neutral tone in a specific dialect. Based on R. Shi (1988), J. Wang (1997, 2002a, b, c) and Z. Li (1996), I classify the tonal realizations of "full tone + neutral tone" sequences into three types, namely *Default Value*, *Spreading* and *Stretching*. And I argue that *dissimilation effect*, as mentioned in last chapter, interacts with each type.

5.2 Typology in OT and the Set of Universal Constraints

As Kager (1999) notes, "the key assumption of OT is that grammars are means

to resolve conflicts between universal constraints. More specifically, the grammar of an individual language is a specific way, out of many possible, to rank a set of universal and violable constraints. Differences between languages must therefore be the due to different rankings of a single set of universal constraints. To state it differently, we can build one grammar out another by rearrangement of its basic universal material, that is by 'ranking' the constraints".

In Chapter1, I decompose the constraint *NEUTRAL TONE-H into a constraint triplet *σw/μμ, *σw/μs, *μw/[H]. By different rankings of the constraint *σw/μs, I explain the "full-tone-related neutral tones" in Liuyang dialect and Jiangxiang dialect respectively. With the lower ranking of *σw/μμ, I capture long neutral tones attested among dialects. Now I will try to analyze the different tonal realizations of "full tone + neutral tone" among dialects with the following set of universal constraints.

(5-1) **NON-HEADSYLLE-MONOMORA(*σw/μμ)**

Non-head syllable in a foot bans two morae.

(5-2) **NON-HEADSYLL-NONHEADMORA (*σw/μs)**

Non-head syllable cannot bear head mora.

(5-3) **NONHEADMORA-NONHIGH (*μw/[H])**

Non-head mora cannot bear tonal feature H.

The above three constraints result from the decomposition of *NEUTRAL TONE-H proposed in J. Wang (2002a).

(5-4) ***LL.L, *HH.H**

Tonal sequence of LL.L or HH.H is generally disallowed.

(5-5) **HEADSYLL-IDENT-T (σs-IDENT)**

Tonal features in head/stressed syllable (σs) ban any changes.

This is a simplified expression of the idea in Yip (1996) and Duanmu (2000), as explained in Chapter IV.

(5-6) **MORA-TONE (μ-T)**:

Every mora must be linked one tonal feature only.

(5-7) **ANCHOR-IO-L**

The tonal feature on the left edge of the output should correspond to the tonal feature on the left edge of the input.

The above two are from J. Wang (2002a, c), as explained in Chapter 4.

Now I try to elaborate each pattern with analyzed examples of dialects.

5.3 Pattern I: Default Value

The default value of the neutral tone, as discussed in Chapter 1, is Low (or Mid), and metrical feet in many dialects assume this realization. I argue that, with consideration of dissimilation effect, dialects taking this pattern can be subdivided into two categories: *pure default value* and *default value with dissimilation*.

5.3.1 Pure Default Value: Dali Dialect

Dali dialect (Bai 2003) exhibits an exclusive application of unmarked L for neutral-tone syllable. I transcribe the data into phonological representations.

(5-8) Neutral Tone Value in Dali Dialect

Dialect	YP	YP+N	yP	yP+N	S	S+N	Q	Q+N
Dali	21	21+1 [53+1]	24	24+1	53	53+1 [21+1]	44	44+1
	LL	LL+L	LH	LH+L	HM	HM+L	HH	HH+L

Following R. Shi (1988), I regard that the 53+1 in the brackets after Yinping Tone is a realization of Shangsheng Tone rather than one of Yinping Tone, because the variant tonal shape has nothing to do with the 'base' of Yinping Tone; the treatment of 21+1 after Shangsheng Tone is similar.

Because of the length requirement of this thesis, I will not elaborate the ranking process and simply list the ranking for each dialect in this chapter. Constraints are ranked as follow for Dali grammar for neutral tone, with tableau:

(5-9) Dali Grammar for Tonal Realization of Metrical Foot

ANCHOR-IO-L, σs-IDENT, μ-T >> *σw/μμ, *σw/μs, *μw/[H] >> *LL.L

Input: σs σw \ | L L	ANCHOR -IO-L	σs-IDENT	μ-T	*σw /μμ	*σw /μs	*μw /[H]	*LL.L
a. ☞ σs σw \ | L L L							*
b. σs σw \ | L L H						*!	
c. σs σw \ \ L L L L				*!			*
d. σs σw / \ L L			*!				
e. σs σw / \ | H L H		*!					

The following dialects share the same pattern with Dali. One minor difference is

that the neutral tone value is M in Hefei dialect and Xiangtan dialect:

(5-10) Neutral Tone Realizations in Five Dialects

Dialect	YP	YP+N	yP	yP+N	S	S+N	YQ yQ	YQ+N yQ+N	YR yR	YR+N yR+N
Hancheng	21	T+1	24	T+1	53	T+1	44	T+1	--	--
Hefei	21	32+22	55	45+53	24	24+43	53	43+32	5	55+53
Shenmu	24	24+2[1]	44	44+2[1]	213	24+4 24+2[1]	53	53+2[1]	4	4+2[1]
Taiyuan	21	21+[2]1	--	--	53	53+[2]1	45	45+[2]1	2 5	3+[2]1 5+[2]1
Xiangtan	33	23+33	12	12+32	42	44+33	55 21	55+33 22+33	24	24+33
Yanchi	44	44+L	13	11+H 13+L	53	53+L	35	35+L	--	--

Hancheng: Ru (1997); Hefei: Kong (2003); Shenmu: Xing (1996, 1999); Taiyuan: Zhai (2002); Xiangtan: Fang (2003); Yanchi: A. Zhang (1992).

5.3.2 Default Value with Dissimilation: Mandarin

Apart form pure default value, there are dialects like Mandarin, in which the underlying LL tones are followed by an M tone. This dissimilation effect is due to the higher ranked constraint *LL.L. Related discussion is recalled below:

Tonal category:	Yinping	Qusheng	Yangping	Shangsheng
Input/Paradigm:	HH	HL	LH	LL
Output Casting:	HH+L	HL+L	LH+L	LL+M

(5-11) Mandarin Grammar for Neutral Tone:

ANCHOR-IO-L, σs-IDENT, μ-T >> *LL.L >> *σw/μμ, *σw/μs, *μw/[H]

Input: σs σw /\ | L L	ANCHOR -IO-L	σs- IDENT	μ-T	*LL.L	*σw /μμ	*σw /μs	*μw /[H]
a. σs σw ☞ /\ | L L M							
b. σs σw /\ | L L H							*!
c. σs σw / \ | L L			*!				
d. σs σw /\ /\ L L L L	*!				*		

The following dialects share the same pattern with Beijing dialect, dialects in Changdao and Suqian await further study to specify the tonal value of "Shangsheng

Tone + neutral tone" and "Yinping Tone + neutral tone' respectively.

(5-12) Dialects of Default Value with Dissimilation

Dialect	YP	YP+N	yP	yP+N	S	S+N	Q	Q+N
Anguo	31	31+2	**213**	**31+4**	34	34+2	52	52+1 [31+4]
Changdao	31	31+3	55	55+2	**214**	**214+3** [55+2]	42	42+2
Suqian	**213**	**213+4**	55	55+2	35	35+3	41	41+1
Yantai	31	31+21	--	--	**214**	214+55 [55+31]	55	55+31

Anguo: G. Wang (2000); Changdao: Qian (2001); Suqian: Li-liang (1998); Yantai: Qian (2001).

5.4 Pattern II: Spreading

Different from the default value pattern of Mandarin, neutral tone in some dialects take the value of the ending point of the tone in its preceding syllable, oblivious of the markedness of the neutral tone value. Following R. Shi (1988), I call this pattern "Spreading", that is, the tonal realization of the neutral tone comes from the spreading form the tone in the initial syllable, in the metrical foot, to the neutral-tone syllable. Like those in default pattern, these dialects can be subdivided into two kinds, namely *pure spreading* and *spreading with dissimilation*.

5.4.1 Pure Spreading: Jishou Dialect

In Jishou dialect (Hunan Province), the following rules holds for strong-weak disyllabic sequences: (i) when the preceding syllable bears Yinping Tone (55) or Qusheng Tone (35), the tone in the following syllable is realized as 54 (or 5), which is light and short; (ii) when the preceding syllable bears Yangping Tone (11) or Shangsheng Tone (42), the tone in the following syllable is manifested as 21 (or 2), which is light and short (Q. Li 2002).

(5-13) Neutral Tone Realization in Jishou Dialect

Dialect	YP	YP+N	yP	yP+N	S	S+N	Q	Q+N
Jishou	55	55+5	11	11+2	42	42+2	35	35+5
	HH	HH+H	LL	LL+L	HL	HL+L	MH	MH+H

The pitch value of neutral tones after Yinping Tone and Qusheng Tone are recorded as 5 (equal to H), indicating a violation of *μw/[H]. According to OT, the violation of a markedness constraint should be the result of satisfying a higher ranked constraint. Then what is the relevant constraint in Jishou?

The answer lies in the realization of neutral tone in Jishou grammar. From Li Qiqun's description, it can be seen that the values of neutral tones are in consistency

with the ending point of full tones in the preceding stressed syllable. This agreement is obviously a kind of *assimilation*, which can be captured by the following constraint, S-IDENT(F) (Ma 2001a, b, c):

(5-14) **SYNTAGMATIC-IDENT(F) [S-IDENT(F)]**

Adjacent segments in the output must be identical in their features/values.

This is a general constraint for assimilation in utterance. As for tonal assimilation in Jishou dialect, the constraint should be specified as S-IDENT(T):

(5-15) **SYNTAGMATIC-IDENT(T) [S-IDENT(T)]**

Adjacent mora in the output must be identical in their tonal values.

From the data, it is expected that S-IDENT(T) should dominate *μw/[H], as shown by the emergence of HH+H and MH+H; it is also expected that S-IDENT(T) should dominate *LL.L and *HH.H, as embodied in the emergence of LL+L for Yangping Tone and HH+H for Yinping Tone. The tones in the stressed syllable are not affected by S-IDENT(T), implying priority of σs-IDENT to S-IDENT(T). Constraint ranking for Jishou neutral tone is proposed as follows, with tableau illustration:

(5-16) Jishou Grammar for Neutral Tone

ANCHOR-IO-L, σs-IDENT, μ-T >> S-IDENT(T) >>

*σw/μμ, *σw/μs, *μw/[H], *LL.L, *HH.H

Input: σs σw / \ | L L	ANCHOR -IO-L	σs-IDENT	μ-T	S-IDENT -T	*σw /μμ	*σw /μs	*μw /[H]	*LL.L	*HH.H
a. σs σw ☞ / \ | L L L								*	
b. σs σw / \ | L L H				*!			*		*
c. σs σw / \ | L L			*!						
d. σs σw / \ / \ L L L L	*!				*				

Rudong dialect (Ji 2002) applies the same pattern as Jishou dialect:

(5-17) Realization of Neutral Tones Rudong Dialect

Dialect	YP	YP+N	yP	yP+N	S	YS+N	YQ	YQ+N	YR	YR+N
							yQ	yQ+N	yR	yR+N
Rudong	21	21+1	35	35+5	32	32+2	44	44+4	5	5+5
							33	33+3	24	24+4

5.4.2 Spreading with Dissimilation: Nantong Dialect

Lincheng dialect (*Record of Lincheng County* 1999) and Nantong dialect (Bao & Wang 2002) show similar pattern to Jishou, as shown below. The only difference lies in the tonal realization of the sequence "Shangsheng Tone + neutral tone": the expected HH+H (45+5, 55+5) is replaced by HH+M (45+3, 55+M respectively).

(5-18) Tonal Realization of Neutral Tones in Lincheng Dialect and Rudong Dialect

Dialect	YP	YP+N	yP	yP+N	S	YS+N	YQ yQ	YQ+N yQ+N	YR yR	YR+N yR+N
Lincheng	13	13+5	42	42+2	**45**	**45+3**	31	31+1	--	--
Nantong	21	21+L	35	35+H	**55**	**55+M**	42	42+L	42	42+L
							213	213+M	55	55+H

This exception of Shangsheng Tone is can be attributed to avoiding tonal sequence HH.H. Now I take a closer look at Nantong dialect. Following the analysis of Mandarin Shangsheng Tone, I assume the input of Yangqu Tone to be LL, and that of Yinping Tone to be ML.

(5-19) Tonal Realization of Neutral Tone in Nantong Dialect

Dialect	YP	YP+N	yP	yP+N	S	S+N	YQ yQ	YQ+N yQ+N	YR yR	YR+N yR+N
Nantong	21	21+L	35	35+H	**55**	**55+M**	42	42+L	42	42+L
							213	**213+M**	55	55+H
	ML	ML+L	MH	MH+H	**HH**	**HH+M**	HL	HL+L	HL	HL+L
							LL	**LL+M**	H	H+H

Constraints for neutral tone in Nantong Dialect are ranked as follows:

(5-19) Nantong Grammar for Neutral Tone Realization

ANCHOR-IO-L, σs-IDENT, μ-T » *LL.L, *HH.H »

S-IDENT(T) » *σw/μμ, *σw/μs, *μw/[H]

A simplified tableau is given for the sequence of "Yangqu Tone + neutral tone".

Input: yQ+N σs σw /\ | L L	ANCHOR -IO-L	σs- IDENT	μ-T	*LL.L	*HH.H	S- IDENT -T	*σw /μμ	*σw /μs	*μw /[H]
a. LL+L				*!					
b.☞ LL+M						*			
c. LL+H						*			*!
d. LL+O			*!						
e. HL+L		*!							
f. LL+LL	*!						*		

As for the sequence of "Shangsheng Tone + neutral tone", HH+L seems to be equally optimal to HH+M by avoiding of *HH.H. However, the optimal output is HH+M rather than HH+L. This can be ascribed to the different violation of S-IDENT-T, which requires that adjacent tonal features in the output be identical. Now that H (expected by the Spreading pattern) violates higher ranked *HH.H; consequently, it fails to become the optimal candidate. Therefore, regarding S-IDENT-T, M is relatively more optimal than L, because it is less *deviant* from the expected H.

(5-20) Violation of S-IDENT-T

Input: S+N σs σw /\ | H H	ANCHOR -IO-L	σs-IDENT	μ-T	*LL.L	*HH.H	S-IDENT -T	*σw /μμ	*σw /μs	*μw /[H]
a. HH+L						**!			
b.☞ HH+M						*			
c. HH+H					*!				
d. HH+O			*						
e. HL+M		*!							
f. HH+HH	*!								

5.5 Pattern III: Stretching

5.5.1 Pure Stretching: Yangzhou Dialect

Yangzhou dialect (Yu 2001) seems to take the *Spreading* pattern; however, difference exists in the tonal realization of Yangping Tone and Shangsheng Tone.

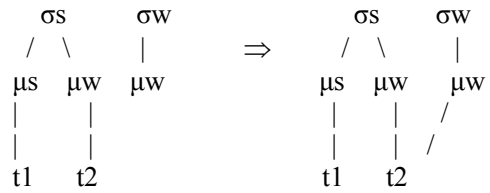
(5-21) Neutral Tone Realization in Yangzhou Dialect

Dialect	YP	YP+N	yP	yP+N	S	S+N	Q	yQ+N	R	R+N
Yangzhou	31	31+11	**35**	**32+25**	**42**	**44+31**	55	55+55	5	5+55
	ML	ML+L	MH	MM+H	HL	HH+L	HH	HH+H	H	H+H

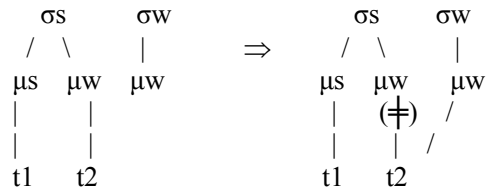
As shown in (5-21), "Yangping Tone + neutral tone" is realized as MM+H, rather than MH+M, and "Shangsheng Tone + neutral tone" is realized as HH+L, rather than HL+L. It seems that the metrical foot is solely covered by the tonal contour of the preceding head/stressed syllable. Thus, I call this realization pattern *Stretching*, to capture the fact that the tonal contour of the preceding syllable is stretched to occupy the metrical foot.

The difference between Spreading and Stretching is illustrated in (5-22):

(5-22) a. Spreading Pattern



b. Stretching Pattern



If one single pattern is expected for the tonal realization within an individual dialect, it follows that the tonal realization of the sequences containing Yinping Tone and Qusheng Tone also results from the stretching of the preceding tonal contour. This pattern can be captured by the cooperation of the following two constraints:

(5-23) **ANCHOR-IO-L**

The tonal feature on the left edge of the output should correspond to the tonal feature on the left edge of the input.

(5-24) **ANCHOR-IO-R**

The tonal feature on the right edge of the output should correspond to the tonal feature on the right edge of the input.

With the cooperation of these two constraints, the first tonal feature in the input-initial syllable is expected to anchor at the left edge of the metrical foot (under the head-mora within the first syllable); the second tonal feature is expected to dock at the right edge of the metrical foot (under the single non-head mora within the neutral-tone syllable). The second mora in the stressed syllable is expected to take a tonal value of *phonetic coarticulation* between the tonal values in the metrical-foot-initial head mora and the metrical-foot-final non-head mora.

Neutral-tone realization in Zhenjiang dialect (H. Zhang 1985) and Nanjing dialect (Sun 2001, Jiao 2003) is similar to that in Yangzhou dialect:

(5-25) Neutral Tone Realization in Zhenjiang Dialect & Nanjing Dialect

Dialect	YP	YP+N	YP	yP+N	S	S+N	Q	Q+N	R	R+N
Zhenjiang	42	42+L	**35**	**33+H**	31	22+L	55	55+H	5	5+H
Nanjing	31	31+1	**13**	**22+5**	22	22+3	44	44+4	5	55+5

5.5.2 Stretching with Dissimilation: Haian Dialect

Haian dialect (Y. Wang 1998) appears to take the pattern of Stretching in the tonal relization of "full tone + neutral tone", which can be taken as the cooperation of ANCHOR-IO-L (5-23) and ANCHOR-IO-R (5-24).

(5-26) Neutral Tone Realization in Haian Dialect

Dialect	YP	YP+N	yP	yP+N	S	S+N	Q	Q+N	YR	YR+N
									yR	yR+N
Haian	21	21+1	35	33+5	**213**	**21+3**	**33**	**33+3**	3	3+3
									35	3+5
	ML	ML+L	MH	MM+H	**LL**	**LL+M**	**MM**	**MM+M**	M	M+M
									MH	M+H

However, the tonal realizations of Shangsheng Tone and its disyllabic sequence deserve consideration. Following the reasoning in previous chapters, Shangsheng Tone, whose citation form is 213 (LLM), should be taken as underlying LL if the analysis for Mandarin is adopted.

Concerning Stretching Pattern, the disyllabic sequence "Shangsheng Tone + neutral tone" is expected to be LL.L. The emergence of LL.M indicates that in Haian grammar, the constraint *LL.L is higher ranked than ANCHOR-IO-R. In other words, dissimilation takes effect in the tonal realization of neutral-tone disyllabic sequence in Haian dialect.

What's more, the tonal shape of "Qusheng Tone + neutral tone" (MM.M) shows that the markedness of tonal sequence MM.M is given less consideration than that of the sequence LL.L. Therefore, it deserves further research whether any "intrinsic ranking" exists for the constraints *LL.L, *HH.H and *MM.M.

5.6 Paradigmatic Substitution

Xiamen dialect and other Min dialects are notorious in phonological literature for the Min *tone sandhi circle*. That is, in tone sandhi, T1 changes to T2, T2 changes to T3, T3 changes to T4, etc. In a cross-dialect study of Chinese tone sandhi, M. Chen (2000) states that these *tonal* (*paradigmatic*) *substitutions* often fails to fall into neat patterns; rather, they form a set of arbitrary correspondences.

Hirayama (1992, 1998) reports that *tonal paradigmatic substitution* appears before neutral tones in many dialects in Shangdong Province. Regardless of the paradigmatic substitution, the realization of neutral-tone disyllabic sequences in these (and other) dialects can also be roughly classified into the Pattern of Default Value, Spreading and Stretching respectively, with dissimilation occurring in each

pattern. No detailed analysis will be given owing to the length limit of this thesis.

(5-27) Default Value Pattern (with Dissimilation)

Dialect	YP	YP+N	yP	yP+N	S	S+N	Q	Q+N
Dezhou	213	21+3	42	55+2	55	213+2	21	42+2
Feixian	213	31+2	53	55+3	55	214+4	31	53+2
Qingyun	213	[31+3] 213 +3	--	--	55	55+3 [213+3]	31	53+3 31+3
Yinchuan	44	44+M	53	53+L	53	35+L	13	11+H 13+M
Zhaoyuan	214	21+44	--	--	42	45+3	55	53+3 55 +3

Dezhou: Y. Cao (1991); Feixian: Ma & Wu (2003); Qingyun: Qian (2001); Yinchuan: Li & Zhang (1995); Zhaoyuan: Qian (2001).

(5-28) Spreading Pattern (with Dissimilation)

Dialect	YP	YP+N	yP	yP+N	S	S+N	Q	Q+N
Linju	213	[21+1] 213+5	42	[55+5] 42+3	55	[213+5] 55+5	21	544+3 21+1
Linyi	213	31+2	42	45+4	55	323+5	31	42+1

Linju: Qian (2001), Qian & Luo (1992); Linyi: Qian (2001).

(5-29) Stretching Pattern (with Dissimilation)

Dialect	YP	YP+N	yP	yP+N	S	S+N	YQ	YQ+N
							yQ	yQ+N
Hongdong	21	21+1 [44 +1]	24	22+3	42	33+3	33	42+3
							53	44+1
Ji'nan	213	21+1	42	55+4	55	213+4	21	54+2
Qingzhou	213	21+1	42	445+5	55	213+5	21	55+3

Hongdong: Qiao (1994, 1999); Ji'nan: Qian (1995), Qian (2001); Qingzhou: Qian & Luo (1992)

5.7 Summary

Based on R. Shi's (1988) idea, I argue that one dialect should exclusively adopt one realization pattern for the metrical foot of "full tone + neutral tone" sequence. I put forward three realization patterns and elaborate each realization pattern with examples of dialects. Dissimilation alternatively takes effect in each pattern, resulting in virtually six modes of realizations. Last but not least, I list dialects that involve paradigmatic substitution yet still fall into the above three patterns discussed above.

Chapter 6
Concluding Remarks

6.1 Summary of Contents

With a statistical analysis of neutral tone values on the five-degree-scale, I assume that the marked value for neutral tone is H, with M and L as equally unmarked. Then I probe into the different markedness status of phonological H in full tone and neutral tone, and conclude that the asymmetry lies in the distinction between head mora (μs), which attracts H tone, and non-head mora (μw), which bans H tone. Following this line, I decompose the constraint *NEUTRAL-TONE-H (J. Wang 2002a) into three related constraints: *σw/μμ, *σw/μs, *μw/[H].

Some tonal phenomena are said to be "full-tone-related neutral tones". In view of the constraint *σw/μs, I argue that "base-related neutral tone" may results from the dominance of the constraint *σw/μs. Liuyang Dialect is a case in point, for which I give a "head-cutting" analysis. On the other hand, "base-related neutral tone" may also be due to the violation of *σw/μs. Jiangxiang dialect serves as an example, for which I make an "H Preservation" analysis.

Long neutral tone blurs the boundary between neutral tone and sandhi tone. Referring to the constraint *σw/μμ, I argue for a *Single Criterion* for neutral tone—atonicity. In discussion of long neutral tones, I propose that long neutral tone may even preserve faithfulness to the moraic structure in the input syllable.

I adopt the concept of metrical foot to define the domain of the tonal realization of "full tone + neutral tone" sequence. I also argue that dissimilation is not an independent pattern of the tonal realization of metrical foot, but is a commonly attested phenomenon. An OT analysis is made on the citation form of Mandarin Shangsheng Tone and corresponding "full tone + neutral tone" sequence.

Regarding the special status of dissimilation, I re-summarize three patterns of the tonal realization of "full tone + neutral tone" among Chinese dialects, namely *Default Value*, *Spreading*, and *Stretching*. I elaborate each pattern with analysis of dialects.

For the discussion of base-related neutral tone, long neutral tone and spanning realization of "full tone +neutral tone", some residual issues remain.

6.2 Light Syllable vs. Atonic Syllable

With the parameter of heavy/light and tonal/atonic, four kinds of syllables can

be identified, as is shown in (6-1). Tonal heavy syllable is virtually normal full-tone syllable in normal sense; atonic light syllable is the kind of neutral-tone syllable like the one in Mandarin. These two kinds of syllables are the most commonly observed types. However, heavy syllables may also be atonic, as in Urumqi Dialect, and light syllables may also be tonal, as in Jiangxiang Dialect.

(6-1) Paradigm of Tonality and Duration

Syllable Type	Heavy Syllable	Light Syllable
Tonal Syllable	σ / \ μ μ | | t t (full tone)	σ | μ | t (Jiangxiang)
Atonic syllable	σ / \ μ μ (Urumqi)	σ | μ (Mandarin)

G. Wei (2000) distinguishes two categories of "neutral-tone syllables" — *short neutral-tone syllables*, in which the base/citation tone may be either reflected or not, and *atonic neutral-tone syllables,* in which the syllable may be either short or long. From (6-1), it can be realized the *short neutral-tone syllable* is equivalent to light syllable, whereas *atonic neutral-tone syllable* refers to "true" neutral-toned syllable.

6.3 Neutral Tone and Continuum

J. Wang (2004a) and L. Liang (2003) expressed ideas about a 'continuum' view on neutral tone. Wang tries to show the continuum with the help of the following three parameters: (i) Duration of the neutral tone (long or short), (ii) Whether features of the preceding tone spread to the neutral tone or not? (iii) Is the end point of neutral tone determined phonologically or phonetically? (J. Wang 2004a). The finding in this thesis seems to confirm this idea.

S. Li (2002) regards that neutral tone exists in many dialects, "with different realization"; however, "the *synchronic* phenomena of neutral tone among dialects make up a panorama of *diachronic* development, which is expected to indicate the development of neutral tone". L. Liang (2003) proposes a prosodic continuum of neutral tone across Chinese dialects: Yue Dialects (No Neutral Tone) » Wu / Hui Dialects » Zhongyuan Mandarin » Northwest Mandarin.

It seems that the synchronic/diachronic continuum of neutral tone and the relationship between neutral tone and tone sandhi deserve much further discussion.

Statistics I

Neutral Tone Values in 55 Dialects on Five-degree-scale

The following data for neutral tone values are taken from dialect chronicles, journal papers, MA/Ph.D. thesis and local records, rather than from personal experimental analysis. Most of the referred works appear after 1985.

Sampling:

(1) All these 55 dialects are of the same kind as Mandarin in that their neutral tones are "short and light" and unrelated to corresponding citation tones. Neutral tones that are not "short and light" are not included here. Most of the 55 dialects are recorded in five-degree scale (initiated by Y-R Chao in 1930s). The records are kept close to its original form as possible.

(2) As neutral tone is too short to capture by ear accurately, the recorded value may be inaccurate. However, these data are only used to work out *general distribution*, rather than accurate statistics.

(3) In the tables below, the disyllabic sequences of "full tone +neutral Tone" for one dialect are listed in the order of *tonal categories*. The tonal categories are ordered like *Pingsheng Tone*, *Shangsheng Tone*, *Qusheng Tone and Rusheng Tone*. For each tonal category, there are two registers: *Yin* register and *Yang* register (cf. Dong 2001, Tang 2002 and L. Wang 1963 for more about tonal categories).

Tonal Category:	Abbr.	*Tonal Category*:	Abbr.
Yinping:	YP	*Yanping*:	yP
Yinshang:	YS	*Yangshang*:	yS
Yinqu:	YQ	*Yangqu*:	yQ
Yinru:	YR	Y*angru*:	yR

Most of the dialects distinguish between *Yin* register and *Yang* register of *Pingsheng Tone*, with variable case for *Shangsheng Tone*, *Qusheng Tone* and *Rusheng Tone*. For example,

Dialect	…	YQ yQ	YQ+N yQ+N
Hefei	…	53	43+2
Hongdong	…	33	42+3
		53	44+1

Hefei dialect doesn't distinguish between *Yin* and *Yang* register for *Qusheng Tone*, while Hongdong dialect does. In cases like Hefei dialect, there is no YQ vs. yQ contrast, so the figure stands for *Qu sheng*. In this table, "N" is the abbreviation for neutral tone, thus "YQ+N" stands for the tonal value of "a full tone *Yinqu* followed by a neutral tone". When figures like "T+2" occurs, it is meant that the original source doesn't specify the contour of the tonal category before neutral tone.

(4) In some dialects, two sets of "full tone +neutral tone" are reported: one set for normal neutral tone, another for (verbal) reduplication. Such dialects include Jining (*Record of Rencheng Area* 1999), Jünan (Ma & Wu 2003) and Yishui (*Record of Yishui County* 1997; Ma & Wu 2003). These phenomena are triggered by: (i) free variation, (ii) different function, (iii) overlapping of historical stages in tonal development (Qian 2001). In that case, only the "normal" set is adopted, and the set for verbal reduplication is given no consideration. That is because reduplication is a kind of morphological phenomenon (cf. Kager 1999), rather than a pure phonological phenomenon.

Calculation:

(5) As said above, the pitch value of neutral tone is usually not easy to capture accurately. Moreover, the difference between two neutral tone pitch values like 2 and 3, seems to be of little phonological meaning. However, a total of 55 dialects suffice statistically to capture the *distributional pattern* of tonal values for neutral tone.

(6) In my calculation, both the occurrences of tonal value and the number of "full tone + neutral tone" (FT+NT) are counted for each dialect. For example,

Dialect	YP	YP+N	yP	yP+N	S	S+N	Q	Q+N	R	R+N	Pit. Patt.
Suqian	213	213+4	55	55+2	35	35+3	41	41+1	--	--	4: 1, 2,3,4
Nanjing	31	31+1	13	22+5	22	22+3	44	44+4	5	55+5	5: 1,3,4,5_2

In Suqian, there are four FT+NT patterns and four corresponding tonal values, thus I mark "4 " for the pattern number. Reported tonal values are given after the colon. For Suqian, the Pitch Pattern (Pit. Patt.) is "4:1,2,3,4". In Nanjing dialect, value 5 occurs twice, thus a subscript "2" is marked for "5", i.e. "5_2". The total number of pitch patterns and the occurrences for each tonal value of the 55 dialects is summed up to find out distributional pattern.

(7) In Jiang (1999) and Jiao (2003), tonal patterns are counted by *the number of dialects* that involve the tone concerned. Calculation in this paper differs in that what is counted is *the occurrences of tonal value.* Consider the following 2 dialects:

Dialect A: T1+L T2+L T3+L T4+H
Dialect B: T1+L T2+L T3+H T4+L

By counting *the number of dialects,* we will "wrongly" conclude that H and L are of equal frequency. By counting *the occurrences* of L and H, we find that L appears more frequently than H. Therefore, for neutral tone values, *the occurrences of tonal value* is more meaningful than *the number of dialects* statistically. Virtually, the calculating method in Jiang (1999) and Jiao (2003) is of no problem in that the same tonal pattern is unlikely to appear twice in one dialect.

(8) In some dialects, (i) one tonal category may have two or more "full tone + neutral tone" forms (e.g. Mandarin and Weicheng dialect), and (ii) different tonal categories may have the same "full tone + neutral tone" manifestation (e.g. Zhangqiu dialect). Consider the following dialects, for which cases of (i) and (ii) are boldfaced:

Dialect	YP	YP+N	yP	yP+N	S	S+N	Q	Q+N	R	R+N	Pit Pat
Beijing	55	55+2	35	35+3	**213**	**21+4 [35+3]**	51	51+1	--	--	4: 1,2,3,4
Weicheng	**214**	**[31+1] 214+5**	53	35+3	**55**	**[214+5]**	**31**	**55+3 31+1**	--	--	4: 1,3_2,5
Zhangqiu	**213**	**22+2**	54	24+4	55	[24+4] 21+3	21	43+3	**33**	**22+2**	5: 2_2,3_2,4

R. Shi (1988) notes that in Beijing dialect, the "full tone + neutral tone" 35+3 after *Shangsheng Tone* "bears no direct relationship with the citation/base tone of *Shangsheng Tone* 213", instead, the 35+3 here should "be regarded as Yangping Tone + neutral tone". This analysis "aims only at the tonal patterns, regardless of historical changes" (R. Shi 1988). Thus, I follow Shi's view and sum up tonal patterns in Beijing to be of 4 kinds, rather than 5.

In the study of neutral tone in Wenling dialect, R. Li (1992) points out that distinction should be made between neutral tone after *Shu Tonal Categories* (i.e. *Ping, Shang and Qu Categories*) and that after *Ru Categories*. Following R. Li (1992), I treat the "22+2" after *Yinping Tone* and that after *Ru Tone* in Zhangqiu dialect as different patterns.

Tables

The statistics are divided into four sub-tables, according to the number of tonal values reported. Note that this is merely for grouping convenience, without phonological consideration.

Table 1 Dialects with One Neutral-tone Value

Dialect	YP	YP+N	yP	yP+N	S	S+N	Q	Q+N	YR yR	YR+N yR+N	Pit Patt
Dali	21	21+1 53+1	24	24+1	53	53+1 21+1	44	44+1	--	--	4: 1_4
Hancheng	21	T+1	24	T+1	53	T+1	44	T+1	--	--	4: 1_4
Luoyang	33	T+3	31	T+3	53	T+3	412	T+3	--	--	4: 3_4
Qingyun	213	[31+3] 213 +3	--	--	55	55+3 [213+3]	31	53+3 31+3	--	--	4: 3_4
Taiyuan	21	21+1	--	--	53	53+1	45	45+1	2 5	3+1 5+1	5: 1_5
Tongxin S	214	24+01	24	24+<u>01</u>	53	53+<u>01</u> 35+<u>01</u>	44	44+<u>01</u>	--	--	5: 1_5
Tongxin X	53	53+01	13	13+01	44	44+<u>01</u>	35	35+<u>01</u>	--	--	4: 1_4
Weihui	33	T+3	31	T+3	53	T+3	213	T+3	3	T+3	5: 3_5

Number of Dialects: 8 Total Number of Pit.Patt.: 35
Occurrences of Tonal Degree: Degree-1: 22 Degree-3: 13

Table-2 Dialects with Two Neutral-tone Values

Dialect	YP	YP+N	yP	yP +N	S	S+N	YQ yQ	YQ+N yQ+N	YR yR	YR+N yR+N	PP
Bayanhaote	44	T+2	53	T+4	43	T+4	313	T+4	--	--	4: $2,4_3$
Changdao	31	31+3	55	55+2	214	214+3 [55+2]	42	42+2	--	--	4: $2_2,3_2$
Dezhou	213	21+3	42	55+2	55	213+2	21	42+2	--	--	4: $2_3,3$
Erlianhaote	22	T+4	--	--	53	T+2	24	T+2	33	T+4	4: $2_2,4_2$
Gaomi	213	21+1	42	55+5	55	213+5	21	544+5 [21+1]	--	--	4: $1,5_3$
Hongdong	21	21+1 [44+1]	24	22+3	42	33+3	33 53	42+3 44+1	--	--	5: $1_2,3_3$
Huhehaote	31	T+4	--	--	53	T+2	45	T+2	4	T+2	4: $2_3,4$
Jishou	55	55+5	11	11+2	42	42+2	35	35+5	--	--	4: $2_2,5_2$
Jining	22	T+4	--	--	53	T+2	24	T+2	54	T+4	4: $2_2,4_2$
Rongcheng	42	42+1	35	35+3	214	214+1 [35+3]	44	44+1 [35+3]	--	--	4 $1_3,3$
Shenmu	24	24+2	44	44+2	213	24+4 [24+2]	53	53+2	4	4+2	5: $2_4,4$
Wuxiang	112	T+40	33	T+20	213	T+20	55	T+20	3 53	T+20 T+20	6: $2_5,4$

Number of Dialects: 12 Total Number of Pit.Patt.: 52
Occurrences of Tonal Degrees: Degree-1:6 Degree-2:24 Degree-3:7 Degree-4: 10 Degree5: 5

Table-3 Dialects with Three Neutral-tone Values

Dialect	YP	YP +N	yP	yP +N	S	S+N	Q	Q+N	YR yR	YR+N yR+N	Pit Patt
Anguo	31	31+2	213	31+4	34	34+2	52	52+1 [31+4]	--	--	4: $1,2_2,4$
Anqiu	213	21+1	42	55+3	55	213+5	21	544+3	--	--	4: $1,3_2,5$
Changle	213	21+1	42	55+3	55	213+4	21	544+3	--	--	4: $1,3_2,4$
Changyi	213	21+1	42	55+5	55	213+5	21	544+3 [21+1]	--	--	4: $1,3,5_2$
Chifeng	55	T+2	335	T+4	213	T+4	52	T+1	--	--	4: $1,2,4_2$
Feixian	213	31+2	53	55+3	55	214+4	31	53+2	--	--	4: $2_2,3,4$
Haian	21	21+1	35	33+5	213	21+3	33	33+3	3 35	3+3 3+5	6: 1, $3_3,5_2$
Haila'er	55	T+3	35	T+3	213	T+4	51	T+1	--	--	4: $1,3_2,4$
Hanting	213	31+1	53	24+3	55	213+4	31	544+3	--	--	4: $1,3_2,4$
Jinan	213	21+1	42	55+4	55	213+4	21	54+2	--	--	4: $1,2,4_2$
Jining	213	21+4	42	54+3	55	35+3	312	42+2	--	--	4: $2,3_2,4$
Laiwu	213	31+2	--	--	55	55+4 435+4	31	31+1 35+1	--	--	5: 1_2, $2,4_2$
Lingju	213	[21+1] 213+5	42	[55+5] 42+3	55	[213+5] 55+5	21	544+3 21+1	--	--	5: 1, $3_2,5_2$
Qingzhou	213	21+1	42	445+5	55	213+5	21	55+3	--	--	4: $1,3,5_2$
Shouguang	213	21+1	53	24+5	55	213+5	21	55+3	--	--	4: $1,3,5_2$
Tongliao	55	T+3	35	T+3	213	T+4	51	T+1	--	--	4: $1,3_2,4$
Weicheng	214	[31+1] 214+5	53	35+3	55	[214+5]	31	55+3 31+1	--	--	4: $1,3_2,5$
Wuhai	55	T+3	35	T+3	213	T+4	51	T+1	--	--	4: $1,3_2,4$
Wulian	214	31+1	53	55+3	55	214+5	31	544+3	--	--	4: $1,3_2,5$
Yinan	213	21+1	53	213+3	55	21+5	31	55+1	--	--	4: $1_2,3,5$
Zhangqiu	213	22+2	54	24+4	55	[24+4] 21+3	21	43+3	33	22+2	5: 2_2, $3_2,4$

Number of Dialects: 21 Total Number of Pit.Patt.: 89
Occurrences: Degree-1:20 Degree-2:10 Degree-3:30 Degree-4:15 Degree5:14

Table-4 Dialects with Four Neutral-tone Values

Dialect	YP	YP+N	yP	yP+N	S	S+N	Q	Q+N	R	R+N	PP
Beijing	55	55+2	35	35+3	213	21+4	51	51+1	--	--	4: 1, 2,3,4
Hefei	21	32+1	55	45+4	24	24+3	53	43+2	5	45+4	5: 1, $2,3,4_2$
Jinxiang	213	21+5	42	55+5 42+2	55	45+3 [42+2]	312	31/32+4 [42+2]	--	--	5: 2, $3,4,5_2$
Liaocheng	13	131+3 13+1	42	44+2 42+1	55	35+4 55+2 [42+1]	313	31+3 313+2 [42+1]	--	--	8: 1_2, $2_3,3_2,4$
Lincheng	13	13+5	42	42+2	45	45+3	31	31+1	--	--	4: 1, 2,3,5
Nanjing	31	31+1	13	22+5	22	22+3	44	44+4	5	55+5	5:1, $3,4,5_2$
Linyi	213	[31+2] 213+4	42	45+4 42+1	55	323+5 55+2	31	[42+1] 31+2	--	--	6: 1, $2_2,4_2,5$
Suqian	213	213+4	55	55+2	35	35+3	41	41+1	--	--	4: 1, 2,3,4
Wudi	213	21+1	--	--	55	55+3 212+4	41	44+2	--	--	4: 1, 2,3,4
Xintai	213	212+4	42	55+3	55	213+5	31	54+2	--	--	4: 2, 3,4,5
Yangzhou	11 /21	11+1	35 /34	34+4	42	42+2	55	55+5	4	4+4	5: 1, $2,4_2,5$
Yishui	213	21+1	53	24+5	44	213+4	21	44+3	--	--	4: 1, 3,4,5
Zhucheng	214	31+1	53	24+3 53+2	55	214+5	31	55+3 31+3	--	--	6: 1, $2,3_3,5$

Number of Dialects: 13 Total Number of Pit.Patt.: 64
Occurrences: Degree-1:12 Degree-2:14 Degree-3:14 Degree-4:14 Degree5: 10

In addition to the above data, neutral tone in Rudong dialect is reported as follows.

Dialect	YP	YP+N	yP	yP+N	S	S+N	YQ yQ	YQ+N yQ+N	YR yR	YR+N yR+N	Pit. Patt.
Rudong	21	21+1	35	35+5	32	32+2	44 33	44+4 33+3	5 24	5+5 24+4	7: 1,2, 3, $4_2,5_2$

Sum

Summing up all the "full tone + neutral tone" patterns and the value occurrences, we get the total occurrences of the five tonal values on the five-degree-scale:

Degree Value	N=1	N=2	N=3	N=4	N=5	Total P.P.
Occurrences	61	49	65	41	31	247
Proportion	24.70%	19.84%	26.32%	16.60%	12.55%	100.00%

Statistics II:

Consecutive Neutral Tones in Pre-pausal Position in Trisyllabic and Quadrisyllabic Sequences

Dialect	**T1**+N_1+N_2 **T1**+N_1+N_2+N_3	**T2**+N_1+N_2 **T2**+N_1+N_2+N_3	**T3**+N_1+N_2 **T3**+N_1+N_2+N_3	**T4**+N_1+N_2 **T4**+N_1+N_2+N_3	**T5**+N_1+N_2 **T5**+N_1+N_2+N_3	**T6**+N_1+N_2 **T6**+N_1+N_2+N_3	Sources
Beijing	**T1**+L L L… L	**T2**+ M L L… L	**T3**+ H' L L.. L	**T4** + L L L..L	--	--	J. Wang (1997)
Cangzhou	**542** + 322+211	**345** + 543+211	**554** + 222+111	**T4**+ N+N	--	--	M. Wang (1995)
Handan	**53** + 32+21	**54** + 32+21	**44** + 33+21	**43** + 34+32	**43** + 33+21	--	P. Wang (2001)
Huailai	**44** + 42+21	**43** + 32+21	**34** + 42 +21	**53** + 32+21	**54** + 42+21	--	Lü (2003)
Jinnan	**32** + 21+32	**45** + 52+32	**52** + 21+21	**54** + 31+11	--	--	S. Li (1996)
	32 + 22+22+21	**34** + 42+22+21	**52** + 22+22+21	**53** + 32+21+21	--	--	
Taiyuan	**31** + 21+11	**52** + 21+11	**25** + 21+11	**3** + 21+11	**5** + 21+11	--	Zhai (2002)
Tianjin	**32** + 11+11	**33** + 31+12	**14** + 43+21	**21** + 21+11	--	--	H. Jiang (1994)
	32 + 22+21+11	**35** +54 +41+12	**24** + 44+41+12	**53** + 21+11+11	--	--	
Xiangtan	**33** + 32+22	**12** + 33+33	**44** + 43+32	**45** + 44+32	**32** + 22+22	**24** + 44+43	Fang (2002)
	34 + 44+43+32	**13** + 33+32+22	**55** + 44+43+33	**45** + 44+32+22	**22** + 33+33+43	**24** + 44+44+33	

Notes:

1. For the sake of simplicity, tonal categories are not specified for these dialects. Different tonal categories are just ambiguously marked as T1, T2, T3, etc. In the box, the tonal realization of the full stressed tone is boldfaced.
2. The figures in the above table are phonetic transcription of the neutral tone contour in the five-degree notation, rather than a phonological one. When there are sets of Male and Female subjects, the record for Male is adopted.
3. This table aims at the general pitch value of neutral tone, thus the duration of NT is given no consideration.
4. For Beijing Mandarin: J. Wang (1997) converts Qi (1956) into the representation of H, M, L. For Cangzhou dialect, M. Wang (1995) doesn't specify the value of neutral tone in another consecutive sequence, represented by T4+ N+N in the box.

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