

An Optimality-Theoretical Analysis of the Tonal pattern in the Near-Native Mandarin by English L2 learner: A Case of Kevin Rudd

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Abstract

This project takes Kevin Rudd, the former Prime Minister of Australia, as a case to conduct a preliminary research on the tonal pattern in the near-native Mandarin produced by second language learners (L2 learners) whose first language is English. It is noticed that Kevin Rudd always produces a underlying high-level tone (H) as a falling tone (HL) in his speech, when the syllable of the high-level tone appears in a position that fulfills the following three conditions simultaneously: 1) the initial position of a disyllabic or tri-syllabic word; 2) followed by a syllable with a low tone (low-level tone (L) or rising tone (LH)); 3) the head position of a syntactic phrase. The account for this *H-to-HL transformation* is formulated within a framework of Optimality Theory: firstly, based on the 'non-head stress pattern', a positional faithfulness constraint IDENT (T)/Ft_s guarantees the possibility of the *H-to-HL transformation* in the syntactic head (unstressed) position; secondly, based on the 'affinity between high/low tone and stressed/unstressed syllable', when an initial high-level tone is followed by a low tone, an individual positional markedness constraint PARSE-SYL/[_{word} COMPTCOMB] triggers these two tones to construct a left-headed foot. That stress pattern fits for the positional licensing constraint LICENSE (CONTOUR, [_{word} σ_s]), which allows the *H-to-HL transformation* appear on the initial stressed syllable of the word. A proper rank of all relative constraints is provided to display the selection process for the optimal candidates - both the *H-to-HL transformations* and those retained high-level tones in Kevin Rudd's Mandarin speech.

I. Introduction

For L2 learners, it is very difficult to acquire Mandarin tonal pattern completely. Even near-native speakers always produce some "incorrect tones". Those "incorrect tones" are not produced at random, but they follow some fixed phonological patterns. This project presents a case study of Kevin Rudd, the former Prime Minister of Australia, to explore the phonological patterns of near-native Mandarin speaker whose first language is English.

The language material comes from a five-minute interview of Mandarin News Australia on 2010. Although he can speak near-native Mandarin, Kevin Rudd still bears an accent that

sometimes a high-level tone (H) is converted into a falling tone (HL)¹, which is named as *H-to-HL transformation* for convenience in this paper.

This paper is organized as follows: section 2 describes the data and generalize the distribution of the H-to-HL transformation; section 3 reviews some previous studies and gives a preliminary analysis of the generalization; section 4 provides an interpretation of the H-to-HL transformation within the framework of Optimality Theory and displays the selection process for the optimal output; section 5 is the conclusion of this study.

II. Data Investigation

In the five-minute interview, Kevin Rudd produces 77 utterances, including 785 syllables in total. Among them 112 are each linked to an underlying high-level tone²; 22 of them are converted into falling tones in the speech. The distribution of the 22 converted tones are examined as follows:

A. Firstly, 18 of the 22 H-to-HL transformations are linked to the initial syllables of disyllabic or tri-syllabic words. For example:

- (3) ⁸[_{word} 中文字] (*Chinese token*): [_{word} HL+LH+HL]
⁶⁸[_{word} 资格] (*quality*): [_{word} HL+LH]

The other four are each linked to a monosyllabic word:

- (4) ⁶⁵[_{word} 他] (*he*), ⁷³[_{word} 她] (*she*), ^{86/88}[_{word} 书] (*book*): [_{word} H]

Since most high-level tones linked to monosyllabic words are retained in Kevin Rudd's speech, the four in (4) will be treated as exceptions and not considered in this study.

B. Secondly, in the 18 disyllabic and tri-syllabic words, 17 H-to-HL transformations precede low tones. For example:

- (5) ^{21/92/98}[_{word} 中国] (*China*), ⁵⁵[_{word} 生涯] (*career*): [_{word} HL+LH]
^{25/26}[_{word} 杯子] (*cup*), ^{52/62/97/102}[_{word} 开始] (*start*) : [_{word} HL+L]

There is only one appears before a falling tone:

- (6) ⁵⁷[_{word} 三次] (*three times*): [_{word} HL+HL]

(6) is not common in the data: most underlying high-level tones keep before the falling tone are retained. Therefore the exception (6) will also be excluded in this study.

C. Among the 17 disyllabic and tri-syllabic words with the tonal combination 'H+L/LH', 15 are in the head position of syntactic phrases. For example:

¹ There are four types of tone in Mandarin: the high-level tone, the low-level tone, the rising tone and the

² In Appendix I give all the 112 tokens and the contexts they appear. The 112 tokens are underlined and numbered; the words they exist are bracketed; for each token its underlying tonal context is described, but the H-to-HL transformation is marked as a 'HL', e.g. ²¹[_{word} 中国] (*China*): HL+LH.

(7) a. the head of VP: ¹⁰²[开始]学习汉语 (*start to learn Mandarin*): [word HL+L]

b. the head of NP: 不同的 ³²[观点] (*the different viewpoint*): [word HL+L]

In (7a) '开始'(*start*) is the head of a verb phrase, with '学习汉语' (*to learn Mandarin*) as its complement; in (7b) '观点'(*viewpoint*) is the head of a noun phrase, which is modified by the attributive '不同'(*different*). Both of them are linked to the H-to-HL transformation. However, two exceptions are found in the data as well:

(8) a. 所以当然, 在这些{不同的 ¹³[观点]}, [word H+L]

(*Thus, of course, for these different opinions, ...*)

b. 百分之八十五以上, 有{全面一样的 ⁴³[观点]}。 [word H+L]

(*The complete identical opinions occupy more than 85%.*)

In the two sentences the syntactic phrases are braced. Compare (8) with (7b), the contexts of the three '观点' are almost the same; the only difference is that the syntactic phrases in (8) are each modified by an additional attributive. These two examples will be discussed again in section 3.

Besides, two additional examples display another kind of exception: the words are not in the syntactic head position, but they bear the H-to-HL transformation as well:

(9) a. 但是 ⁸⁹[当然], 有希腊, 有罗马, 有埃及, 等等。 [word HL+LH]

(*But of course, there is also Greece, Rome, Egypt...*)

b. 我认为, 我{对于 ⁹⁸[中国]}, 感兴趣 [word HL+LH]

(*I thought I was interested in China.*)

In (9a) '当然' (*of course*) is a conjunction; in (9b) '中国' (*China*) is the complement of the preposition '对于'(*to*); both are not in the syntactic head positions. These two exceptions will be explained in section 3 as well. I suppose they actually do not violate the distributional pattern of the H-to-HL transformation, but they are influenced by some pragmatic factors that overlap the syntactic conditions.

As a **generalization**, the H-to-HL transformation happens iff the underlying high-level tone fulfills the following three conditions simultaneously:

(10) a. The syllable linked to the high-level tone is in the initial position of a disyllabic or a tri-syllabic word.

b. The high-level tone must precede a low tone.

c. The word linked to the high-level tone occupies a head position of a syntactic phrase.

Additionally, the distribution of those retained high-level tones is also worth describing, since it

may indicate some constraints that prevent the H-to-HL transformation. In contrast to the generalization above, the 89 retained high-level tones distribute in the following contexts:

A. 24 are linked to the only syllable of a monosyllabic word:

(11) 有很多的中文字我⁹[都]不懂。 (*Many Chinese tokens that I do not know.*) [word H]

B. 38 are linked to the non-initial syllable of a word:

(12) a. 我的¹[普通]话说得非常不好。 (*My Mandarin is very bad.*) [word L+H+HL]

b. 有⁷[很多]的中文字我都不懂。 (*the same as (11)*) [word L+H]

C. 11 are linked to the initial syllable of a word, but it is not followed by a low tone:

(13) a. 令人⁶⁷[钦佩]的一种领导人的资格。 (*An admiring leader quality*) [word H+HL]

b. 我们现在^{33/34}[应该]注意到, …… (*We should notice that ...*) [word H+H]

D. 17 are linked to the initial syllable of a word and followed by a low tone, but the word is not on the head position of a syntactic phrase:

(14) a. 我的普通话说得³[非常]不好。 (*the same as (12)*) [word H+LH]_{adverb}

b.⁹⁴[它们]的传统建筑。 (*their traditional architectures*) [word H+LH]_{attributive}

Based on the generalization above, two **research questions** are proposed as follows:

First, why does the H-to-HL transformation happen under the condition (10)? What factors trigger it?

Second, why are the other high-level tones retained, namely, what factors can prevent the H-to-HL transformation?

III. Previous Studies and the Preliminary Analysis

In some previous studies that focus on the 'tonal errors' of English L2 Mandarin learners (Shen, 1989; Wang, 1995; Gui, 2000), it has been mentioned that learners recognized the high-toned syllables as stressed syllables, while they also treated low tones as the marker of unstressed syllables. However, this opinion was just proposed as a supposing; no one has provided a phonological interpretation that can account for how the mis-mappings between tone and stress affect the tonal pattern of L2 learners' Mandarin.

For the H-to-HL transformation of Kevin Rudd's, I suppose that stress pattern should be a crucial factor. In this section I cite some phonological theories to give some initial analyses.

A. Positional Faithfulness

According to Beckman (1998), prominent positions tend to maintain the segmental and feature contrasts, while non-prominent positions tend to neutralize them. Stressed syllable is a

typical prominent position. Therefore, the positional faithfulness always retains the tonal feature of a stressed syllable; namely, the tone of a stressed syllable is hard to change.

B. Non-head Stress Pattern

Duanmu (1990) provided the 'non-head stress pattern' (NHS) as follows:

(15) In a head-nonhead structure, stress the nonhead. (Duanmu, 1990: 142)

Combining with the positional faithfulness, the non-head stress pattern can account for the retained high-level tones in Kevin Rudd's speech which appear in the non-head position of a syntactic phrase. The prosodic units in non-head position are stressed and thus become prominent, which helps to maintain their original tonal features. Meanwhile, these two theories also indicate the H-to-HL transformation in head position: the unstressed, non-prominent position gives rise to the possibility for the original tonal features to be substituted.

Now consider the four exceptions mentioned in the last section, which seem not consistent with the general distribution of high-level tones. I propose that they actually follow the same pattern as others: the tone is retained in stressed position and changed in unstressed position, but those stressed and unstressed positions are no longer determined by syntactic structures. For (9a) and (9b), which is repeated in (16), the word '当然' and '中国' are located in unstressed positions for pragmatic reasons:

(16) a. 但是⁸⁹[当然], 有希腊, 有罗马, 有埃及, 等等。 [word_{HL}+LH]

b. 我认为, 我{对于⁹⁸[中国]}, 感兴趣 [word_{HL}+LH]

In (16a), the interview video shows that the word '但是'(but) is particularly emphasized by Kevin Rudd. That makes the next word '当然' unstressed; in (16b) the word '认为'(think) is unusually emphasized, which causes the whole following utterance '我对于中国'(I, to China) unstressed. Therefore these two high-level tones obtain the opportunities to be converted.

As to the two '观点' in (8), which is repeated in (17), two possible accounts are pending further consideration:

(17) a. 所以当然, 在这些{不同的¹³[观点]}, [word_H+L]

b. 百分之八十五以上, 有{全面一样的⁴³[观点]}。 [word_H+L]

One possibility is the peripheral attributives '这些'(these) and '全面'(comprehensive) eliminate the stress which should have been assigned to the inner modifiers '不同'(different) and '一样'(same) (c.f. Duanmu, 1990: 143). The other is a pragmatic account: in the video Kevin Rudd stops a little longer after these two '的'; it may disconnect the syntactic relation between the modifier and the head in a prosodic way. Without a syntactic structure, the two '观点' are no longer in unstressed position; therefore they lose the opportunity for H-to-HL transformation.

C. The Affinity for Tone and Stress

Lacy (2002) introduced the affinity between tones and stresses as follows:

- (16) a. Foot heads and higher tone have an affinity for each other.
- b. Foot non-heads and lower tone have an affinity for each other.
- c. (a) and (b) can motivate:
 - i. attraction of (non-)heads to tone;
 - ii. attraction of tone to (non-)heads;
 - iii. neutralization of tone on (non-)heads. (Lacy, 2002: 4)

This theory manages to explain how English intonation affects the tonal pattern of L2 learners' Mandarin. The attraction between the high tone and the stress is a universal pattern; therefore it is certain that L2 Mandarin learners mix the two if they have not completely acquired the stress pattern and the tonal system of Mandarin. For Kevin Rudd, however, as a near-native Mandarin speaker he may have acquired that Mandarin stress pattern is more relative to the syntactic structure³ rather than the tonal pitch; only strong triggers may arouse another stress pattern which is more relative to tonal pitch. At that time, "incorrect tones" are produced.

D. Maximal Prominence and Positional Licensing

Kaplan (2015) proposed 'positional licensing' to account for the 'overwrite' in the prominent positions. She demonstrated that some of those prominent positions are 'maximal prominence'; while positional faithfulness may target every non-minimal prominent position, positional licensing can only happen in three types of maximal prominent position: initial syllable, primary stress, and root or stem.

This theory can directly account for the H-to-HL transformation, since initial syllable is a prominent position, without positional licensing the initial high-level tone must obey the positional faithfulness constraint and thus have no opportunity to be substituted.

IV. An Optimality-Theoretical Account for the H-to-HL Transformation

In this section, three sets of constraints will be introduced to interpret the H-to-HL transformation as well as those retained high-level tones in the Mandarin speech of Kevin Rudd. These constraints will be ranked to present the selection processes of these optimal outputs.

A. The first set of constraints is to explain the generalization of (10c), which is repeated in (17):

- (17) The word linked to the high-level tone occupies a head position of a syntactic phrase.

³ Here I follow Duanmu (1990)'s the non-head stress account for the stress pattern of Mandarin.

The non-head stress pattern provides a positional markedness constraint. The domain of the constraint may be either a syntactic phrase expressed in (18a), or a grammatical word expressed in (18b):

- (18) a. $NHS_{(GrPr)}$: no stress will be assigned to a head component in a syntactic phrase.
 b. $NHS_{(GrWd)}$: no stress will be assigned to a head morpheme in a grammatical word.

Besides, Li (2003) provided a set of faithfulness constraints on tone retention. Two of them that are significant to explain the H-to-HL transformation are listed in (19a) and (19b). (19c) follows (19b) but it takes foot head as its prominent position:

- (19) a. IDENT (T): If a tone-bearing unit has a tonal specification in the input, then its correspondent has identical specification in the output.
 b. IDENT (T)/ σ_s : If a strong syllable has a tonal specification in the input, then its correspondent has identical specification in the output. (Li, 2003: 173)
 c. IDENT (T)/ Ft_s : If a foot head has a tonal specification in the input, then its correspondent has identical specification in the output.

The ranking between (18a) and (19c) can explain the retained high-level tones on the syntactic non-head position. The rank should be as follows:

- (20) $NHS_{(GrPr)} \gg IDENT (T)/Ft_s$

Take the adjective phrase '非常不好' (*verb bad*) as an example:

- (21) ${}^3[AP[modifier \text{非常}][head \text{不好}]]$

[INPUT] H LH $\sigma \sigma \quad \sigma \sigma$	$NHS_{(GrPr)}$	IDENT (T)/ Ft_s
H LH ☞ $[(\sigma\sigma)_s.(\sigma\sigma)_w]$		
HL LH $[(\sigma\sigma)_s.(\sigma\sigma)_w]$		*!
H LH $[(\sigma\sigma)_w.(\sigma\sigma)_s]$	*!	
HL LH $[(\sigma\sigma)_w.(\sigma\sigma)_s]$	*!	

This rank can also indicate the opportunity for the high-level tones on head position to become a falling tone. Take the noun phrase '不同的观点' as an example:

(22) ⁵⁰[_{NP}[_{modifier} 不同的][_{head} 观点]]

[INPUT] H L σ σ σ σ σ	NHS (GrPr)	IDENT (T)/Ft _s
H L ☞ [[σ σ σ] _s . (σ σ) _w]		
HL L ⁴ ☞ [[σ σ σ] _s . (σ σ) _w]		
H L [(σ σ σ) _w . (σ σ) _s]	*!	
HL L [(σ σ σ) _w . (σ σ) _s]	*!	

B. The second set of constraints is to explain the generalization of (10b), which is repeated in (23):

(23) The high-level tone must precede a low tone.

The affinity between stress and tone gives two positional markedness constraints as follows:

(24) a. *Hd/L: A foot head will not be a low-toned syllable.

b. *Non-Hd/H: A foot non-head will not be a higher-toned syllable.

Meanwhile, an individual positional markedness constraint operates for the construction of a foot:

(25) PARSE-SYL/[_{word} C_{OMP}T_{COMB}]: All syllables of a word must be parsed by feet, if there are two adjacent syllables that one bears a high tone and the other bears a low tone.

In Kevin Rudd's internal phonological pattern, the context-free constraint PARSE-SYL is converted into a positional markedness constraint. It is natural since as a near-native Mandarin speaker, he does not always conduct the constraints of the second set, which are actually not Mandarin phonological patterns, but the ones of Kevin Rudd's interlanguage. As what is said in section 3, in most situations he has acquired the Mandarin stress pattern and thus does not connect stress with tonal pitch; however, the adjacency of a high tone and a low tone strongly arouses the another stress pattern, in which two syllables in a foot always bear a high pitch and a low pitch respectively. In this situation, the affinity between stress and tone is motivated and overlaps the non-head stress pattern; (25) has to be conducted to support (24), which requires the tonal syllables to be parsed by a foot. Once the foot is constructed, two more constraints also

⁴ The constraints for the changes of tone will be introduced in the third set. Without those constraints the evaluator will select more than one optimal candidates.

participant:

(26) ALIGH (Ft, L, GrWd, L): every foot stands at the left edge of the grammatical word.

(27) *CLASH: No stressed syllables are adjacent. (Kager, 1999: 165)

The (26) comes from the format of Generalized Alignment (McCarthy and Prince, 1993), which conducts when a high tone is adjacent to two low tones simultaneously; (27) is to cope with two adjacent high tones.

The rank of (24)-(27) can display the construction of a foot. The rank should be as follows:

(28) **PARSE-SYL/[_{word} COMPTCOMB] >> *CLASH >> *Hd/L, *Non-Hd/H**

>> ALIGN (Ft, L, GrWd, L)

Take '普通话', '独一无二' and '观点' as examples:

(29) ¹[_{word} 普通话] L+H+HL

[INPUT] L H HL σ σ σ	PARSE-SYL/[_{word} COMPTCOMB]	*CLASH	*Hd/L	*Non-Hd/H	ALIGH (Ft, L, GrWd, L)
L H HL ☞ (σ.σ) ⁵			*		
L H HL (σ.σ).σ	*!				
L H HL (σ.σ).(σ)		*!			**
L H HL (σ.σ).(σ)			*		*!*

(30) ⁵⁰[_{word} 独一无二] LH+H+LH+HL

[INPUT] LH H LH HL σ σ σ σ	PARSE-SYL/[_{word} COMPTCOMB]	*CLASH	*Hd/L	*Non-Hd/H	ALIGH (Ft, L, GrWd, L)
LH H LH HL ☞ (σ.σ)(σ.σ)					**
LH H LH HL σ.(σ.σ).σ	*!*				*
LH H LH HL (σ.σ).σ.(σ)	*!				***
LH H LH HL (σ.σ)(σ.σ)		*!	*	*	**
LH H LH HL (σ.σ)(σ.σ)				*!	**

⁵ In this paper stressed syllables are bolded.

(31) ³²[_{word} 观点] HL+L

[INPUT] H L σ σ	PARSE-SYL/[_{word} COMPTCOMB]	*CLASH	*Hd/L	*Non-Hd/H	ALIGN (Ft, L, GrWd, L)
H L ☞ (σ.σ)					
HL L ⁶ ☞ (σ.σ)					
H L σ.σ	*!*				
H L (σ.σ)		*!			
H L (σ.σ)			*!	*	
H L (σ.σ)				*!	
H L (σ).(σ)					*!

C. The third set of constraints is to explain the generalization of (10a), which is repeated as (32):

(32) The syllable linked to the high-level tone is in the initial position of a disyllabic or a tri-syllabic word.

The positional licensing provides the allowance for contour tones. The maximal prominent position can be either the initial syllable expressed in (33a), or the primary stress syllable expressed in (33b):

(33) a. LICENSE (CONTOURT, [_{word} σ_s): the initial syllable of a word can bears a contour tone.

b. LICENSE (CONTOURT, σ_s): the primary stress syllable of a word can bears a contour tone.

Besides, in parallel with the positional faithfulness constraint (19b), which retains the tonal feature of a stressed syllable, (32) is to prevent the tonal change of an initial syllable:

(34) IDENT (T)/[_{word} σ : If an initial syllable has a tonal specification in the input, then its correspondent has identical specification in the output.

These three constraints rank with (19a) and (19b) can explain why the H-to-HL transformation has to happen in the condition generalized in (10). The rank should be as follows:

(35) LICENSE (CONTOURT, [_{word} σ_s) >> IDENT (T)/[_{word} σ, IDENT (T)/σ_s
>> LICENSE (CONTOURT, σ_s) >> IDENT (T)

⁶ The same as footnote 4.

Take the word '观点' as an example:

(36) ³²[_{word} 观点] HL+L

[INPUT] H L $\sigma \sigma$	LICENSE (C _{ONTOUR} T, [_{word} σ_s])	IDENT(T)/ [_{word} σ	IDENT (T)/ σ_s	LICENSE (C _{ONTOUR} T, σ_s)	IDENT(T)
HL L ⓘ (σ.σ)		*	*		*
H L (σ.σ)	*!			*	
HL LH (σ.σ)		*	*		**!

It is noticed in both (22) and (31) there are two optimal candidates for the input ³²[_{word} 观点]. This problem does not exist any more when the positional licensing constraints interact with positional faithfulness constraints. However, tableau (36) cannot exclude all other candidates. For example, the tonal pattern 'LH+L' with an initial stressed syllable will also be an optimal candidate according to this tableau. Therefore it is necessary to rank all the constraints above to combine a more efficient evaluator.

D. The final rank and the selection process

The final rank is listed as (37):

(38) NHS_(GrPr) >> IDENT (T)/Ft_s >> PARSE-SYL/[_{word} C_{OMP}T_{OMB}] >> *CLASH
>> *Hd/L, *Non-Hd/H >> ALIGH (Ft, L, GrWd, L) >> LICENSE (C_{ONTOUR}T, [_{word} σ_s])
>> IDENT (T)/[_{word} σ , IDENT (T)/ σ_s] >> LICENSE (C_{ONTOUR}T, σ_s)
>> IDENT (T) >> NHS_(GrPr)

Take the noun phrase '不同的 ³²[_{word} 观点]', which bears a H-to-HL transformation, as the input to show the selection process for the optimality outputs, i.e., the surface forms of all the underlying high-level tones in the Mandarin speech of Kevin Rudd.

(39) [NP [_{modifier} 不同的] ³²[_{word/head} 观点]]

the tokens in each context. Then the study mainly focuses on the 22 H-to-HL transformations: the underlying high-level tones are realized as falling tones in Kevin Rudd's speech. Their distribution is generalized as follows: 1) in the initial position of a disyllabic or tri-syllabic word and 2) followed by a syllable with a low tone and 3) in the head position of a syntactic phrase.

To chase the phonological patterns that can account for this distribution, I reviewed previous relative studies and provided an interpretation within the framework of Optimality Theory. To be specific, the two research questions can be discussed as follows:

First, the H-to-HL transformation is mainly triggered by the interaction between positional licensing constraints and positional faithfulness constraints. The positional licensing gives the opportunity for a underlying high-level tone to change into a contour tone; while the positional faithfulness prevents it from changing into a rising tone, since the underlying high-level tone is also in a stressed position, which requests a high tone to maintain the affinity between stress pattern and tonal pitch. As a result, the underlying high-level tone can only be converted into a falling tone.

Second, the stressed position that the converted high-level tone occupies is provided by the stress pattern of Kevin Rudd's interlanguage, which is different from and competes with the real Mandarin stress pattern during the interlanguage developmental process. Only in this non-Mandarin stress pattern can the high-level tone be linked with a stressed syllable; that triggers the high-level tone to be parsed as a foot head, by which it can obtain a stressed position to prevent the transformation into a low tone.

Third, although the Mandarin non-head stress pattern is overlapped by the tone-stress affinity pattern in terms of assigning word stress, it still operates beyond grammatical word, assigning stress on the level of syntactic phrase and thus constructing prosodic units beyond the foot level. Therefore, the H-to-HL can only occur in the unstressed prosodic words, although its syllable is a foot head and therefore bears a word stress. That also reveals that the phonological pattern of Kevin Rudd's interlanguage is a 'mixed system': there may be different patterns controlling different domains under different conditions; the development process of Kevin Rudd's interlanguage phonological pattern might be a process that various phonological patterns keep on competing with each other.

As a conclusion, the H-to-HL transformation is determined by three factors: since it is in both word-initial and word-stressed position, the positional licensing constraint triggers the change of tonal feature; since it is in the foot-head position, it cannot change into low tones; since it only occurs in an unstressed prosodic word, there is no other stronger factors that can

guarantee its original tonal feature. Therefore, the only possibility for the surface form of a high-level tone in this position is the falling tone.

Then it will be easy to answer the second question: the other high-level tones cannot be converted into a falling tone, because they are not in the 'right positions'. To be specific, they are either in the syntactic head positions, which tend to retain their high-level tones; or they are not in the position of a foot head, only in which they can always bear the tonal feature [+high] to prevent the transformation to low tones; or they are not in the initial position and thus cannot get the privilege to become a contour tone.

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Appendix

Data: an interview of Kevin Rudd

普通话 / <u>HH</u>	the target syllable / the target tone
LL+ <u>HH</u> +HL	the tonal context of the word
<u>HL</u>	the tone which original tone is HH but it has changed into HL
<u>中文字</u>	the word that includes the tone converted from HH to HL
[... <u>HH</u> ...] word	the word boundary
{ ... [... <u>HH</u> ...] ... } GrPr	the boundary of grammatical phrase
但是	the word is specially emphasized in the context

我的 ¹[普通话]²[说 de]{³[非常]不好}。我还是个 ^{4&5}[百分之百]老外。

(1) LL+HH+HL (2) HH+HL (3) HH+LH (4)&(5) LL+HH+HH+LL

⁶[因此]有{⁷[很多]的 ⁸中文字}我 ⁹[都]不懂。

(6) HH+LL (7) LL+HH (8) HL+LH+HL (9) HH

肯定我们两个 ¹⁰[国家]的政治系统是不一样的。

(10) LL+HH

所以 ¹¹[当然], 在 ¹²[这些]{不同的 ¹³[观点]},

(11) HH+LH (12) HL+HH (13) HH+HL

我 ¹⁴[不知道]任何 ¹⁵[国家]¹⁶[跟]另外的一个 ¹⁷[国家],

(14) HL+HH+HL (15) LH+HH (16) HH (17) LH+HH

有 ^{18&19}[百分之百]的共同的看法。

(18)&(19) LL +HH+HH+LL

{澳大利亚 ²⁰[跟] ²¹中国}是一样的。

(20) HH (21) HL+LH

但是如果这是那个{²²⁻²⁴[双边关系]的 ²⁵杯子}呢,

(22)&(23)&(24) HH+HH+HH+HL (25) HL+LL

{这个 ²⁶杯子}是[^{27&28}百分之 ²⁹八十五]以上, 好;

(26) HL+LL (27)&(28)&(29) HH+HH+HL+LH+LL

[^{30&31}百分之十五]是{不同的 ³²[观点]}。

(30)&(31) LL+HH+HH+LH+LL (32) HL+LL

我们现在 ^{33&34}[应该]注意到, 不仅是那个 ^{35&36}[百分之十五]的{不同的 ³⁷观点},

(33)&(34) HH+HH (35)&(36) LL+HH+HH+LH+LL (37) HL+LL

也^{38&39}[应该]注意到, 那个{^{40&41}百分之⁴²[八十五]}以上, 有{全面一样的⁴³[观点]}。

(38)&(39) LH+LL+HH (40)&(41)&(42) LL+HH+HH+[HL+LH+LL] (43) HH+LL

那是^{44&45}[胡说八道]。

(44)&(45) HH+HH

邓小平,⁴⁶[他]是{在⁴⁷[中国], 以及全世界的历史}所起的作用是{⁴⁸[非常重要]}的。

(46) HH (47) HH+LH (48) HH+LH

⁴⁹[他]所起的角色, 我想是⁵⁰[独一无二]的。

(49) HH (50) LH+HH+LH+HL

为什么呢? {⁵¹[他]⁵²[开始]那个⁵³[经济]改革的过程}。

(51) HH (52) HL+LL (53) HH+HL

在{⁵⁴[他]政治的⁵⁵[生涯]} , ⁵⁶[他]一次两次可能⁵⁷[三次]下台了对不对。

(54) HH (55) HL+LL (56) HH (57) HL+HL

但是⁵⁸[他]每一次⁵⁹[都]回到他的^{60&61}[办公厅]去, {再⁶²[开始]⁶³[工作]}。

(58) HH (59) HH (60)&(61) HL+HH+HH (62) HL+LL (63) HH+HL

但是⁶⁴[他]继续下去。

(64) HH

在⁶⁵[他], ⁶⁶[他]的政治勇气, 是令人⁶⁷[钦佩]的一种{领导人的⁶⁸[资格]}。

(65) HL (66) HH (67) HH+HL (68) HL+LH

大概是我⁶⁹[母亲]的影响。⁷⁰[大家]⁷¹[都]是这样子对不对。

(69) LL+HH (70) HL+HH (71) HH

我的⁷²[母亲], ⁷³[她]没有什么教育……⁷⁴[她]没有上大学, ⁷⁵[她]没有上[高中]。

(72) LL+HH (73) HL (74) HH (75) HH (76)&(77) HH+HH

但是⁷⁸[她]特别喜欢看⁷⁹[书]。

(78) HH (79) HH

所以⁸⁰[她]一直鼓励我, ^{81&82}[研究研究], 看⁸³[书], 看历史。

(80) HH (81)&(82) LH+HH+LH+HH (83) HH

所以我特别记得我小学的时候, ⁸⁴[她]替我买一本⁸⁵[书]。

(84) HH (85) HH

那本⁸⁶[书]是什么样的⁸⁷[书], 那本⁸⁸[书]就是全世界的考古学, 考古。

(86) HL (87) HH (88) HL

但是⁸⁹[当然], 有⁹⁰[希腊], 有罗马, 有⁹¹[埃及], 等等。

(89) HL+LH (90) HH+HL (91) HH+LH

但是{最后一页的是⁹²[中国]}。

(92) HL+LH

所以我看了，我认为这个⁹³[国家]是比较感兴趣的。

(93) LL+HH

因为{⁹⁴[它们]的传统建筑}是，⁹⁵[跟]我们⁹⁶[西方人]是全面不一样的。

(94) HH+LH (95) HH (96)&(97) HH+HH+LH

所以{从那个时候⁹⁷[开始]}，我认为，我{对于⁹⁸[中国]}感兴趣。

(97) HL+LL (98) HL+LH

⁹⁹[当然]在澳大利亚呢那个华人¹⁰⁰[很多]。

(99) HH+LH (100) LL+HH

不仅是华人¹⁰¹[很多]，而且有不少的老外，或者在澳大利亚“老内”，也{¹⁰²[开始]学习汉语}。

(101) LL+HH (102) HL+LL

¹⁰³[因此]我想那个{用¹⁰⁴[中文]的{¹⁰⁵[新闻]¹⁰⁶[广播]}}，

(103) HH+LL (104) HH+LH (105) HH+LH (106) LL+HH

也是一个{¹⁰⁷[非常]有效}的一种途径，

(107) HH+LH

用{¹⁰⁸[中国人]的母语}，以及鼓励那个澳大利亚¹⁰⁹[学生]，

(108) HH+LH+LH (109) LH+HH

做{¹¹⁰[他们的]}、做好{¹¹¹[他们的]¹¹²[功课]}。

(110) HH+LH (111) HH+LH (112) HH+HL