北京语言大学

汉语言文字学论丛

崔希亮　总主编

· 语音和文字卷

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序

  自 2005 年起，北京市教育委员会加大了重点学科投入的力度，立项支持学校重点学科建设，并给予经费支持。在这样的背景下，我牵头申报了"汉语言文字学基础平台建设"这个课题，并组织了一个阵容强大的课题组，曹志耘教授、张博教授、张旺熹教授、张维佳教授、张希峰教授、万业馨教授、程娟教授、郑贵友教授、陈曦教授、赵日新教授、魏德胜教授、张赪教授、李立成教授、陈前瑞教授和一批年轻有为的博士们都参加了课题组，后来华学诚教授也加入了课题组。北京市教育委员会批准了这个项目，并把该课题列为北京市教委共建项目。2006、2007、2008 年北京市教委对这个项目继续给予支持，使得我们有机会在一个优裕的环境里专心于学术而心无旁骛。现在我们以"汉语言文字学论丛"的形式呈献给读者的这五本书就是我们的部分研究成果。在这套丛书即将付梓之际，作为课题组织者，我对北京市教育委员会的领导们和课题组的同事们充满敬意和感激。北京语言大学出版社愿意出版这套丛书，我也要对出版社的戚德祥社长和诸位编辑表示感谢！

  这套丛书分为《方言卷》《语法卷》《词汇卷》《语音和文字卷》以及《汉语史卷》，选收了课题组成员在这个课题的支持下完成的学术论文 133 篇。按照我们的研究规划，这些论文大都在杂志上发表过，并在学术界产生了比较大的影响。这次结集出版，一是为了方便读者检索和阅读，二是为了对项目主管单位和各位同仁有个总结，也是对自己的一个交代。与此同时，我们也想借此机会集中展示一下北京语言大学汉语言文字学的研究成果和学科队伍，尤其

是新一代学者的研究成果和精神风貌，以便进一步凝练方向，将学术研究推向更深的领域和更高的层次。这些学术成果都致力于解决汉语言文字学的前沿问题，在中国语言学的发展进程中产生过重要的影响。我相信这些成果的结集出版，不仅可以为首都的学术繁荣作出应有的贡献，也可以为我国汉语言文字学学科领域的学术发展贡献绵薄之力。

北京语言大学是一所特色鲜明的国际型大学，每年接受的外国留学生数量都超过一万多人次。因此语言学及应用语言学、汉语言文字学、比较文学和世界文学、外国语言文学等学科都是支撑性的学科，这些学科也得到了教育主管部门和学界的大力支持。对外汉语教学首先要解决的是"教什么"的问题，因此汉语言文字学的研究是对外汉语教学这个学科基础的基础。我们搭建汉语言文字学基础建设平台的目的就是要把全校汉语言文字学的研究力量整合起来，在这个平台上，大家可以进行学术交流，共享学术资源，共同营造出一个学者们可以潜心学术的氛围，不为名，不为利，只为了一块学术净土。

十月末的北京秋意渐浓，校园里色彩斑斓，这里有我们精心培育的花草树木和学术精神。秋天是收获的季节。我想我们这个课题组收获的不仅仅是这五部学术论集，我们收获的还有为学的快乐和耕耘的喜悦。我衷心希望我们这个团队能够一如既往地团结协作，勤奋敬业，多培养一些新人，持之以恒、淡定从容地在汉语言文字学这个学术园地里春种秋收，晴耕雨读，为繁荣学术贡献力量。

崔希亮

2008 年 10 月 29 日

目 录

音系学与实验语音学

A Preliminary Analysis of Focus and Ending in Chinese Intonation

Wen Cao

Abstract: The present paper investigates the issue of focus types and the ending situations in Chinese declarative and interrogative intonations. Differing only in focus of each, five statement sentences and five interrogative sentences with the same words and the same syntax in Chinese are designed for the experiment. A male Standard Chinese speaker reads them in random order three times. The results show that there are two types of foci in Chinese intonation: H* and L*, subject to Chinese lexical tone features. Besides, both H* and L* can be identified by the D-value between the two H peaks. In particular, the shift of the focus location seems to have effects on boundary tone H%. The findings in this research seem to be able. to make Chinese intonation curves somewhat predictable.

1 Introduction

There are four lexical tones in Standard Chinese, which have been traditionally described as /55/, /35/, /214/, and /51/ for Tones 1, 2, 3 and 4 respectively[1]. But in fact, /212/ and /211/ are more frequently uttered in speech for Tone 3, as mentioned in [1, 2]. That is why some phoneticians also analyze the four tones as H, R, L, F or H, LH, L, HL as well [3, 4, 5]. There is an atonic syllable, or "neutral tone" in Chinese, too [1, 5]; and it could be H or L. For example, when it follows H, LH, or HL, which have H feature, it is L; when it follows L, it becomes H.

Tone and intonation in Chinese have interactive effects on each other, and this has attracted much attention in phonetic researches [1, 3–14]. In their researches, some authors took focus effect into account as well. Gårding modeled Chinese intonation with 'grids', qualitatively marking time-varying pitch ranges, and lexical tones fit into these ranges. She declared that focus was a combination of expansion and compression of such 'grids'[8]. Kratochvil set up six stages for modifications of suprasegmental features in Chinese sentence without considering focus at first in[6], but later in [7], he proposed four intonational devices in Chinese: channeling, tempo, focusing, and intonation carriers. He made a point similar to Gårding's, saying that the focus is reached by a gradual enlargement followed by a gradual diminishing of the channel [7]. Xu found that while the lexical tone acted as the most important factor for the FO local contour of the syllable, focus modulated the global shape of the FO curve, and FO range after the focus was lowed as well as compressed [4]. J. Shen argued that there were two independent prosodic systems in Chinese intonation: the top line of a pitch contour for accent or focus and base line for speech act (declarative or interrogative) [9, 10].

From these analyses it is clear that focus has great effects on Chinese intonation, but there is still something unclear. For example, most researchers above stated that the focused syllable had expanded pitch range.

Then, two questions could be raised: (1) Do all tones have the same quantitative expansion if they are emphasized? Or to say, are there any identifying properties of different tone foci? (2) In addition to the effect of post focus compression, is there any kind of influence of focus on boundary tones? The aim of this paper is to put forward a preliminary study with an effort to answer these two questions.

2   Method

2.1 Materials and procedure

Two groups of short SVO sentences of Chinese were designed for the experiment: one for statements, and the other for morphosyntactically unmarked yes-no questions. Every stimulus sentence is in fact composed of the same three words, totaling five syllables in the series: Tone3 –Tone4 –Tone3 – Tone4 –Neutral Tone, which could be simply featured as L–HL–L–HL–L. Lexically, the sentence is 马力买柚子 'Ma3 Li4 mai3 you4zi' ('Ma Li buys shaddock'). But each group has five such sentences with different focus locations:

(1) Broad focus (FB). No intended emphasis on any word.

(2) Subject focus (FS). The accent falls on 'Li4', the second syllable of the first word, carrying the given name.

(3) Verb focus (FV). The accent falls on the monosyllable word 'mai3' (to buy).

(4) Object focus (FO). The accent falls on 'you4', the first syllable of the last word (i.e. shaddock).

(5) Initial focus (FI). The accent falls on 'Ma3', the very beginning syllable carrying the family name.

These sentences might be described with tone features as in the following Table 1.

Table 1: **Part of the stimuli sentences with different foci. (The foci are in italics.)**

	Tone series	Chinese	English meaning
FB	*L–HL–L–HL–L*	马力买柚子	*Ma Li buys shaddocks*
FS	*L–HL*–L–HL–L	马力买柚子	*Ma Li* buys shaddocks
FV	L–HL–*L*–HL–L	马力买柚子	Ma Li *buys* shaddocks
FO	L–HL–L–*HL–L*	马力买柚子	Ma Li buys *shaddocks*
FI	*L*–HL–L–HL–L	马力买柚子	*Ma* Li buys shaddocks

In general, Chinese word stress falls on the final syllable. However, for the word containing a neutral tone, the stress falls on the foregoing syllable[1]. Normal in Chinese, the sentence accent is realized by word stress, but then any syllable except a neutral tone can be stressed to express unconventional meaning. That is why we see in the present paper that the nuclear prominences are distributed in the second syllable of the subject focus, the third for the verb, and the fourth for the object. As for the initial focus, it has special emphasis on the family name, meaning 'it is Ma Li, not Sun Li, Liu Li, etc. who does something'.

The stimuli were read and recorded by a middle-aged male college teacher who speaks and teaches Standard Chinese. The recordings were carried out in a quiet environment, using Maya 5.1 USB Audiotrack Sound-Blaster and Somic earphone which were connected to a laptop Toshiba Satellite 2410. The subject read the ten sentences in random order three times. When a reading error occurred, the speaker was asked to read the sentence once more. The material comprises 30 correct utterances.
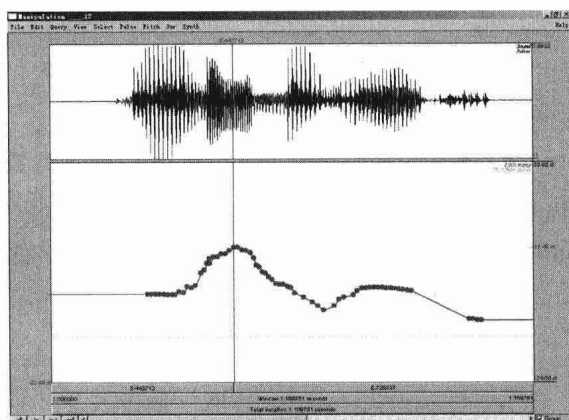
Figure 1: Subject focused statement 'Ma Li mai youzi.' The nuclear accent falls on the second syllable 'Li', as the curser marks it.
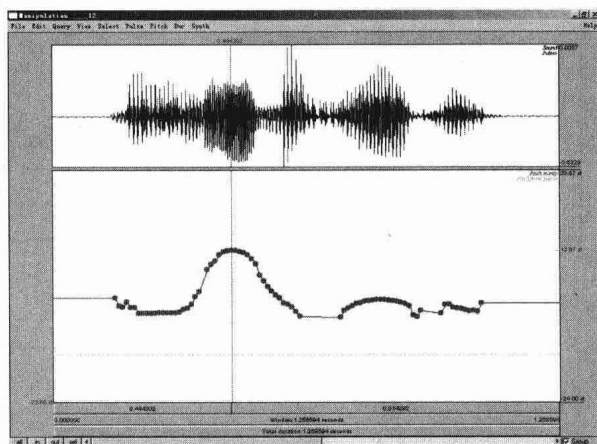

Figure 2: Subject focused question 'Ma Li mai youzi?' The nuclear accent falls on the second syllable 'Li', as the curser marks it.

2.2 Analysis

The data were saved as digital wave files at 22,050 Hz sampling rate, 16 bits resolution, mono, and were analyzed with the help of Pratt [http://fonsg3.let.uva.nl/praat/], as shown in Figure 1 and Figure 2. FO values of each utterance were measured at six feature points: the beginning point, the lowest points of the first and third syllables, the highest points of the second

and fourth syllables, and the ending point. The measurements were taken in semitones (st, f-reference=100 Hz) in order to make a perceptually relevant comparison between all data.

D-values between some points were calculated in order to check the focus expansion and following compression. The duration and intensity of each syllable was also recorded. However, the present paper is only investigating the FO influence of focus shift on intonations, leaving the others for further work.
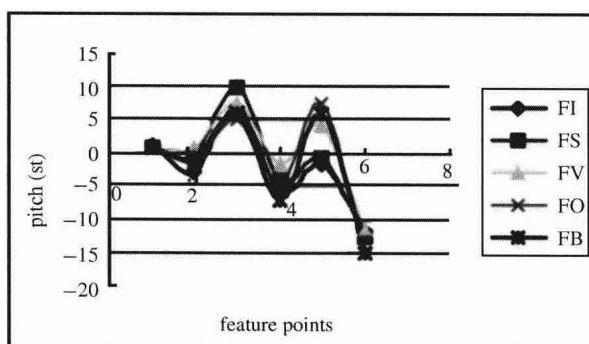
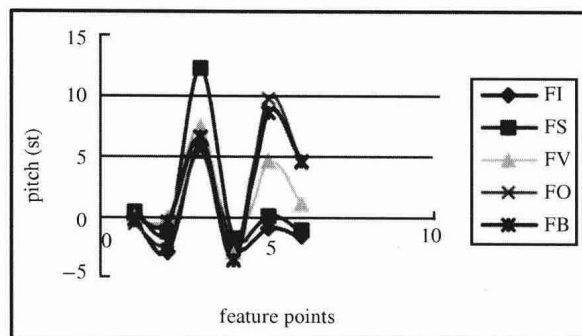# 3　Results

Figure 3：Statement trends with different foci.

Figure 4：Question trends with different foci.

Figures 3 & 4 compare traced feature points for statement and interrogative intonations with different foci.

In Fig. 3, we find that the final point has the lowest pitch in each trace,

and all traces have a declination on the L tones. The results have somewhat proved the existence of a downtrend base line in statement intonation, whatever the focus is.

However, the top line changes according to the focus. As mentioned above, in order to check the focus expansion and following compression, we calculated some D-values. They could be categorized into several types: D1, between points 1 & 2; D2, between points 2 & 3; D3, between points 3 & 4; D4, between points 4 & 5; D5, between points 5 & 6; D6, between points 3 and 5. Among these types of D-values, only D6 (i.e. the D-value between the two highest points in each curve) was found to have constancy and adequate explainability. Comparisons using paired samples t-tests show a significant difference in D6 values between all pairs except the pair of FB and FO ($t(2)=3.53$, $p>0.05$). This indicates that: (1) the D-value between pitch peaks is a good metric to locate different Chinese statement intonation trends that have different foci; (2) the broad focus utterance (FB) and the object focused utterance (FO) are perceptually the same, although they have slight acoustical differences shown in Fig. 3. The latter phenomenon has been found in both Chinese and English intonations [4, 9, 10, 17, 18, 19, 20].

Moreover, in Fig. 3, all statement curves start with almost the same value at the FO beginning point, without significant effect of focus on it ($F(4,10) = 1.20$, $p>0.05$). As for the final point, although four trends end with different values in average, they do not show significant difference ($F(4,10)= 2.03$, $p>0.05$), either.

Seen in Fig. 4, the final point is obviously not the lowest any longer in question trend, but it is still lower in pitch than the foregoing HL tone in the trace, keeping its lexical L feature. Besides, it seems that there is a significant effect of focus location on the final point ($F(4,10) =13.05$, $p<0.01$). Paired samples t-tests show a significant difference between the ending FO values of FI and FV ($t(2)=-3.85$, $p<0.05$), FI and FO ($t(2)=-4.88$, $p< 0.05$), FI and FB ($t(2)=-5.86$, $p<0.05$), FS and FO ($t(2)=-9.43$, $p<0.05$),

FS and FB （t（2）=−4.60，p<0.05），but not between those of FI and FS （t（2）=−1.02，p>0.05），FS and FV （t（2）=−1.68，p>0.05），FV and FB （t（2）=−3.54，p>0.05），FO and FB （t（2）=−0.68，p>0.05）. It can be interpreted as follows：（1）The broad focused and the object focused utterances may have the same ending；（2）When the focus shift to the right neighboring position，e.g. from initial the first syllable to subject the second syllable，or from subject the second syllable to the verb the third syllable，etc.，the interrogative utterance may have the similar ending as its original.

Just as shown in statements，the results of the interrogatives also show that the focus location has significant influence on the D-values between two H peaks （F（4,10） = 52.12，p<0.01）. Paired samples t-tests show a significant difference of D-values between all pairs except FB and FO （t(2)=−1.24，p>0.05）. This indicates that：（1）the broad focus interrogative （FB） and the object focused interrogative （FO） are still almost the same in intonation；（2）the D-value between pitch peaks plays the decisive role in locating different Chinese interrogative intonation trends that have different foci.

Comparing between the data of the statements and questions，we find that the question curves have lower beginning pitch than the statement ones （see Table 2）.

Table 2：Pitch values of beginning points in statements and questions.

	in statements	in questions
FB	1.17st	−0.17st
FI	0.68st	0.51st
FS	0.84st	0.17st
FV	0.84st	−0.53st
FO	0.84st	−0.17st
Average	0.88st	−0.03st