

Narrow Focus Patterns of Disyllabic Words with Different Morphosyntactic Structures in Standard Chinese

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Abstract

The present study investigates the phonetic realization and phonological patterns of focal accents of disyllabic words with different inner morphosyntactic structures in standard Chinese. This was done through the study of phonetic realization of disyllabic focused words with *Modifier-Head*, *Reduplicated* and *Prefix-Stem* (*MH*, *Rd*, and *PS* hereafter, respectively) structures in short declarative sentences of Mandarin. These target sentences each consists of seven syllables with three kinds of focused words in different positions of the sentences. The sentences involved in the present study were applied with only one focus condition: narrow focus, and by one speaker. Results of acoustic and frequency analyses show that the distribution of focal accents is restricted by the inner morphosyntactic structure of the focused words; therefore, we propose the phonological patterns of disyllabic narrow focused constituents through the theoretical model of Metrical phonology (Lieberman and Prince, 1977[1]), that is, w-s relation for *MH* structure, s-w for *Rd* structure and w-s for *PS* structure.

1. Introduction

In the previous literature, particularly on English, focus is usually said to have three correlates: a phonological correlate, a semantic and/or pragmatic correlate, and a syntactic correlate. Many authors may choose one of the correlates as their angle of approaching focus phenomena. In Chomsky (1971) focus is seen as a reflex of phonology since it is determined by “the intonation center of surface structure” [2]. This early work thus presented what can be called the phonological view of focus. The semantic/pragmatic view of focus, particularly in the realm of work on intonation, which includes two main branches: the highlighting-based approach and the structure-based approach (the terms are taken from Ladd 1996 [3]). In the highlighting-based approach, focus and consequently pitch accent distribution depend on semantic and discourse factors, such as semantic predictability, relative informativeness, and utterance context (Bolinger 1972[4], and Schmerling 1976[5]). By contrast, in the structure-based approach (Ladd 1980[6], and Gussenhoven 1983[7], 1992[8]), once focus is defined according to the speakers’ intent and the context, pitch accent

distribution is determined by language-specific rules or structural factors. Despite the differences between the two approaches, both rely on pitch accents to mark focus. The syntactic view of focus shares the assumption of some sorts of focus structure with the structure-based version of the semantic/pragmatic view. The two views differ, however, in the way that the former explicitly provides syntactic features and the syntactic trees and the latter does not. The syntactic view was first proposed by Jackendoff (1972) [9]. In his work, focus is a syntactic feature relevant to both phonology and interpretation. His syntactic focus marker “contains a feature marking the pitch contour” to be syntactically associated with the focus constituent.

In the study of focus in Mandarin, many researchers pay attention to the phonetic realization of focus and post-focus constituents. Yi Xu (1999) [10] discusses the contribution of focus on the formation and alignment of f_0 contours. The sentences used in Xu’s experiment each consists of three words (two disyllabic and one monosyllabic), and the second, third and fourth syllables in these sentences have various tones. Results of his experiment show that the f_0 range is expanded by focus, and the high points become higher and the low lower. The f_0 of all the words after the focus is substantially lowered.

The previous paragraphs have shown that, although the phonetic realization of focus has commonly been discussed, studies of focus of Mandarin rarely have noticed that the morphosyntactic composition of focused words leads to different distributions of focal accents; moreover, phonological interpretation has scarcely, if ever, been adopted to approach the phenomena regarding focal accents. The present study, in this regard, examines the phonetic realization and phonological description of accent distribution of focal words in differing morphosyntactic structures. In particular, it endeavors to answer a couple of questions: 1) Do the language-specific structural rules play the restrictive role in the distribution of focal accents? 2) What can the phonological pattern be of the focal accents? In order to seek the answers, the acoustic analysis, frequency analysis and metrical interpretation are adopted here.

2. Method

2.1. Research design

There are three focused words in the present experiment, *gan1ge1* (tone1+tone1, *MH*), *ge1ge0* (tone1+natural tone, *Rd*), *alge1* (tone1+tone1, *PS*), with all these words located in the different position in target sentences. Syllables adjacent to the focused words have four tones: tone1, tone2, tone3 and tone4. Apart from the focused words and their adjacent syllables, the tones of the rest of the syllables in the target sentences are set invariably in tone1. The target sentences are all declarative sentences each containing seven syllables and the word order of these sentences are SVO. In order to manipulate the focus of the target sentences, we design guide sentences to highlight the focused words by applying the tauto-positional *Wh* operators. The target and guided sentences are repeated for three times.

The total number of target-guide sentences pairs is as follows:

3 (focused words) × 4 (various tones) × 3 (the positions of focused words) × 3 (repetitions) = 108.

The types of target sentences are:

- (1) Focused word is at the beginning of the sentences:
shei2 jin1 (ming2/mei3/hou4) tian1 fei1 dong1 jing1?
 who today (tomorrow/every/the day after tomorrow) fly Tokyo
 Who will fly to Tokyo today?
gan1ge1 (ge1ge0/alge1) jin1 (ming2/mei3/hou4) tian1 fei1
dong1 jing1.
 god-brother (brother/AFFIX-brother) today (etc.) fly Tokyo
- (2) Focused word is in the middle of the sentences:
jin1 tian1 (chen2/wan3/ye4) shei2 fei1
 (morning/evening/night) who
 (hui2/fan3/qu4) dong1 jing1?
 back/back/to
jin1 tian1 (chen2, wan3, and ye4) gan1 ge1 (ge1ge0/alge1) fei1
 (hui2/fan3/qu4) dong1 jing1.
- (3) Focused word is at the end of the sentences:
jin1 tian1 zhang1 san1 jie1 (pei2/qing3/song4) shei2?
 Zhangsan pick up (accompany/invite/see off)
jin1 tian1 zhang1 san1 jie1 (pei2/qing3/song4) gan1ge1
 (*ge1ge0/alge1*).

2.2. Subject and recording

A female speaker of standard Mandarin working in the Chinese Academy of Social Sciences was invited in the experiment. The recording was conducted in the sound-treated booth in Linguistic Institute, CASS. All the sentences were recorded and saved directly in the computer through sound recording software. During the recording procedure, each sentence appeared on the computer screen in random order, meanwhile, the guide sentence was broadcast and the subject was asked to read each sentence in normal speed without any irregular pause.

In case of mistake, the subject was asked to repeat the sentence.

2.3. Speech annotation and data extraction

Speech was first labeled by automatic segmentation software, and then the syllable boundaries were modified by hand. Before extracting the data, the manual refinement of the pitch tier was conducted in order to ensure the accuracy of the data. The data were retrieved by praat script with each syllable for 10 points, and the duration of the utterances was normalized. Finally, SPSS10.0 was used to get the means of f_0 and duration for every word, the effect of tones adjacent to the focused word were smoothed. Consequently, we attained the means of 12 samples for each focused word.

3. Results and analysis

Figure 1 and 2 display mean f_0 curves and duration when focused words are at the beginning of the sentences:

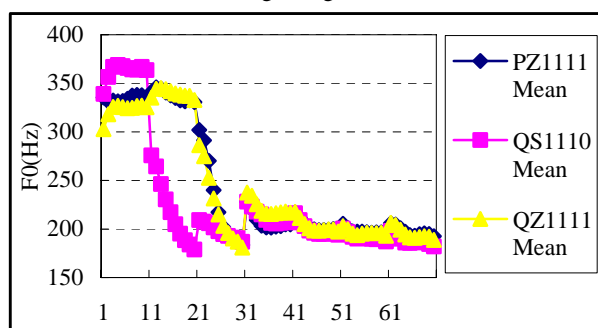


Figure 1: F_0 means of initial focus (Unit: Hz)

PZ1111 indicates that the morphosyntactic structure of focused word is *MH* and the tonal combination is tone1+tone1, QS1110 demonstrates that this morphosyntactic structure is *Rd*, and the tonal combination is tone1+tone0. QZ1111 represents *PS* structure and tonal combination tone1+tone1.

Closer examination of Figure 1 shows that the f_0 patterns are differing in the position of focused words. As for the focused constituent *ge1ge0*, the steep fall of the pitch of the second syllable reveals that the accent locates on the first syllable; as for *alge1*, on the contrary, the pitch register of the second syllable is higher than that of the first, which demonstrates that the accent falls on the second syllable. But in the case of *gan1ge1*, on which syllable, *gan1* or *ge1*, the focal accent dwells, is hardly perceptible, for the fact that no obvious difference in pitch register height can be identified from the above figure.

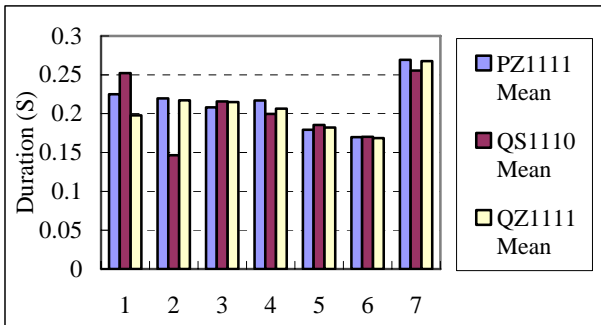


Figure 2: Mean duration distribution of 7 syllables in initial focus (Unit: S)

Further examination of the duration of the focused words exhibits no significant difference in duration between the two syllables within *ganlge1* whereas the duration of the first syllable *ge1* in *ge1ge0* is much longer than *ge0*, the second one; and the second syllable is longer than the first in the word *alge1*.

Figure 3 and Figure 4 illustrate the mean f_0 curves and duration when focused words are in the middle of the sentences:

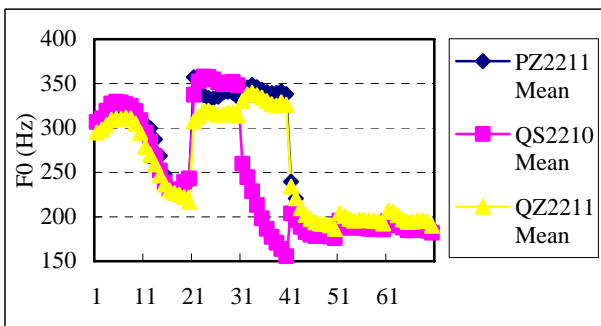


Figure 3: F_0 means of middle focus (Unit:Hz)

It can be clearly seen that the focal accent falls on the first syllable in the word *ge1ge0* and on the second in *alge1* when the focused words are in the middle of the sentences. For *ganlge1*, the actual dwelling of the accent, on the first syllable or the second, still fails to be noticeable.

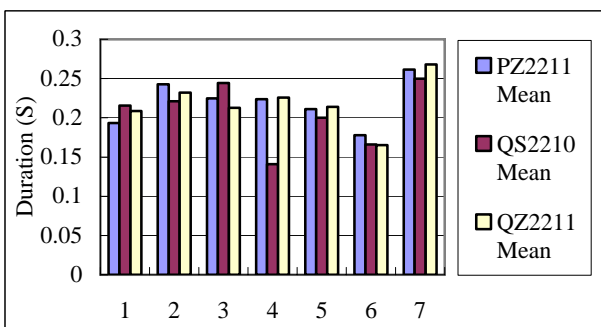


Figure 4: Mean duration distribution of 7 syllables in middle focus (Unit: S)

Similar results can be obtained from Figure 4 that the two

syllables have nearly equal duration in *ganlge1*. The duration of *ge1* is significantly longer than *ge0*, and the *ge1* is lengthier than *al* in the word *alge1*.

Figure 5 and Figure 6 present the mean f_0 curves and duration when focused words are at the end of the sentences:

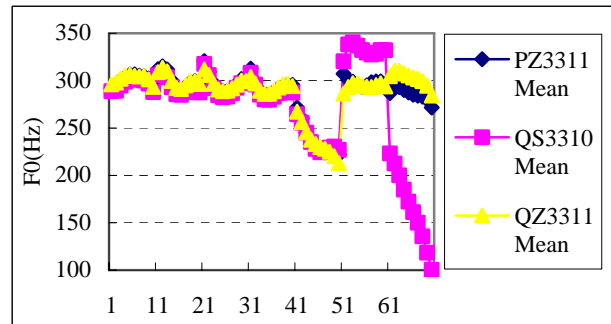


Figure 5: F_0 means of ending focus (Unit: Hz)

In Figure 5, the distribution of focal accents is similar to what have been shown in Figure 1 and 3.

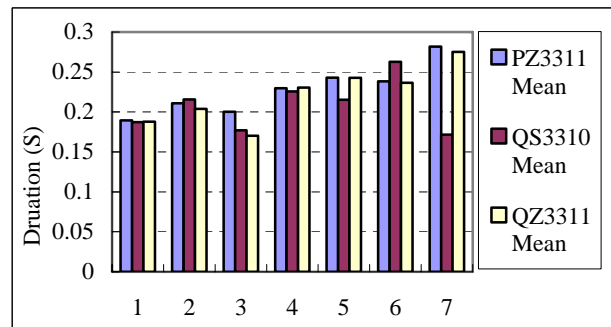


Figure 6: Mean duration distribution of 7 syllables in ending focus (Unit: S)

Results of Figure 6 are slightly different from those of Figure 2 and 4 in the way that the second syllable of word *ganlge1* is longer than the first. The cause is the lengthening of the last syllable in the sentence.

Therefore, the narrow focus pattern of *ge1ge0* (*Rd* structure) and *alge1* (*PS* structure) can be figured out from the above figures and analyses: *s-w* for *ge1ge0* and *w-s* for *alge1*.

As the location choice of the accent between the two syllables of the focused constituent *ganlge1* can not be observed directly from the above pictures, we adopt frequency analysis to compare the pitch means from the 10 points of each syllable which are extracted from all the 36 target sentences for word *ganlge1*. Results reveal that, even under the counteractive influence of declination, the mean pitch values of *ge1* which is higher than *ganl* occurs still 22 times in the 36 sentences, accounting for 61%. On the basis of this result, we reckon that narrow focus is signaled by *w-s* relation for *ganlge1* (*MH* structure).

So far, the case of *ge1ge0* has been discriminated from

both *alge1* and *gan1ge1* for the reason that the latter two share the pattern of “w-s”, and the former enjoys “s-w”. Then there comes the question: Are *alge1* and *gan1ge1* actually “identical” in pattern? The curves correspondent to them in Figure 1, 2, and 3 show that the answer is negative. The difference in pitch register between *al* and *ge1* is perceptibly *greater* than that between *gan1* and *ge1*. Other conditions having been equal, so the only explanation lies in syntax. Concretely, from lexical perspective, the prefix *al* can not bear any stress, leaving *ge1* to be the only bearer; whereas either *gan1* or *ge1* can bear the stress for their being respectively the meaning-conveying modifier and the head. It is natural, therefore, that when realized at the sentential level, *ge1* in *alge1* attracts the sentential accent, thus with regard to pitch register *ge1* is significantly higher than *al*. In the latter case, the fact that either *gan1* or *ge1* is able to attract stress leads to the attenuation of the difference in pitch register between the two syllables. Even in the case of *gan1ge1*, however, we found through frequency analysis that occurrences of *ge1* attracting sentential accents are *more* frequent than those of *gan1* despite that both could bear the stress at lexical level. The answer to why this occurs can only be that in our study *gan1ge1* is the emphatic focus as a whole, rather than contrastive ones in which cases only one of the two pulls the accent. This result is identical with Ladd’s[3] analysis that the stress pattern is w-s when the focus is on the phrase as a whole.

In general, from the means of f_0 curves, duration and specific frequency analysis, we can see that, although *gan1ge1*, *ge1ge0* and *alge1* are all narrow focus words, the tonal context and their morphosyntactic positions in the target sentence are identical, the accents distribution are quite different. The most significant difference concerning these words is in morphosyntactic structure which plays the restrictive role in the distribution of the focal accents. This point of view is a counterpart of the structure-based approach that when dealing with broad focus “once focused part of the utterance is specified, the accent pattern follows more or less automatically by language-specific rules or structural principles” (Ladd, 1996 [3]). What deserves clarification here is that in accordance with the present experiment the PS *alge1* and the MH *gan1ge1* share “w-s” as the narrow focus pattern, their realization process from underlying to surface forms are totally different. Based on this, we illustrate the phonological pattern of these focused words in metrical grids (Liberman and Prince, 1977[1]) (in the grid below, line 0 stands for syllabic level, line 1 for lexical level, and line 2, sentential):

	gan1	ge1		ge1	ge0		al	ge1
Line 2		×	Line 2	×		Line 2		×
Line 1		×	Line 1	×		Line 1		×
Line 0	(s)	(s)	Line 0	(s)	(s)	Line 0	(s)	(s)

4. Conclusion

In this study, we investigate the phonetic and phonological nature of the distribution of focal accents in standard Chinese. Results of acoustic experiment and frequency analysis demonstrate that other conditions being equal, focal accents may fall on the different syllables owing to the difference in morphosyntactic structure of focused words. From this we propose that it is the language-specific morphosyntactic rule that restricts the distribution of focal accent, which is comparable to the classic structure-based point of view. On this basis, we achieve the phonological pattern of these focused words: w-s for *Modifier-Head* structure, s-w for *Reduplicated* structure and w-s for *Prefix-stem* structure. Therefore, the present study provides a chain of three dimensions of analyses, i.e., literally, phonetic realization is restricted by the underlying morphosyntactic structure, and in its turn, it engenders the phonological description.

This study, of course, is open for later refinement on increased scale of data.

5. Acknowledgements

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6. References

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