Phonetic and Phonological Realization of Narrow Focus in English Declarative Sentences by Zhenjiang EFL Learners

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Abstract

Focus is of communication function in discourse. How it is realized by native speakers has long been in vigorous discussion. However, studies on focus concerning language learners are few, with the ones taking dialects into account even fewer. This study takes eight Zhenjiang dialect speakers as the subjects and investigates if their phonetic and phonological realization of narrow focus in English declarative sentences is distinct from native English speakers'. Detailed F_0 inspection reveals that Zhenjiang EFL learners' pitch range of the unstressed syllable(s) in the focused word is suppressed more greatly than the native speakers'. Besides, their F_0 contours may not always peak on the on-focus stressed syllable as native English speakers'. Moreover, the scope of post-focus suppression seems to include only the unstressed syllables in the focused words, but not all post-focus words.

Index Terms: prosody, focus, Zhenjiang EFL learners

1. Introduction

Focus is of communication function in discourse. The words under focus are always considered as bearing new information, which is neither inferable from the context nor shared by the interlocutors (Schwarzschild [1]). Focus can be either broad or narrow in scope. Ladd [2] defined broad focus as "focus on whole constituents or whole sentences not just on individual words", while narrow focus refers to the cases when fewer constituents are put under focus within one sentence. This study will take the narrow focused declarative sentences as its interest. How focus is realized in speech by native speakers has been studied domestically and abroad, concerning languages like English (Xu [3]), Mandarin (Xu [4]), Italian (D'Imperio [5]). etc. However, studies concerning language learners are fewer. In addition, the existing few concerning Chinese EFL learners failed to consider the effect of dialects, which, actually, may differ remarkably from one another both in tone and intonation. Therefore in this study, Chinese EFL learners speaking Zhenjiang dialect are taken as the subjects and their prosodic realization of focus in English declarative sentences is examined from the perspectives of phonetics and phonology.

In languages like English, focus is always realized by highlighting a particular piece of information against information already shared by the conversation participants (Bolinger [6]), more specifically, giving prominence to the syllables that are lexically stressed, primarily by assigning them a pitch accent (Xu [3]). Its manifestation will be discussed from both phonetic and phonological perspectives.

A focused word always has higher F_0, longer duration and greater amplitude compared to its unfocused counterpart (Cooper et al. [7]). As manifested on the F_0 contour, a narrow focus is realized by expanding the pitch range of the on-focus stressed syllables, suppressing the pitch range of post-focus syllables, and leaving the pitch range of pre-focus syllables largely intact (Xu [3]). In regard with the phonological representation of accent conveyed by focus, according to Gussenhoven [8], focus manifests itself via a process of placing nuclear pitch accent on the syllables intended. Moreover, Pierrehumbert [9] describes intonation in terms of three pitch events, specifically, pitch accents, phrase accents and boundary tone.

Chinese EFL learners' performance on English prosody is in vigorous discussion domestically. It has been revealed that their English speech, both read and spontaneous, sounds rather plain in intonation (He [10]), manifested as they stressed more than enough syllables (Adam [11]). However, most of the studies are from the impression point of view and conclusions are mostly drawn out of teaching practice or daily communication. Scientifically designed empirical studies are rare in number, except a very few, findings of which will be systematically reviewed as below.

For overall intonation features, Wang [12] compared Chinese EFL learners' supra-segmental features with that of native English speakers and found that Chinese learners generally have narrower pitch range, less F_0 fluctuations and more stressed syllables. This agrees with what has been concluded by Juffs [13]. Besides, researchers also looked into specific problems. Studies about Chinese EFL learners' acquisition of English focus found that Chinese EFL learners always fail to place nucleus on the units that bear new information (Juffs [13], Chen [14]). In addition, studies on intonation patterns employed by Chinese EFL learners are emerging in recent years. Ji [15] compared the prosodic characteristics of *yes-no* questions of native American speakers and Chinese EFL learners and found that when the focused words are in the middle of the sentence, native American speakers tended to use low tone (L*) or low-rising tone (L*H) to realize nuclear accent, while Chinese EFL learners prefer high tone (H*) or falling tone (H*L). The diversities remain when focus is located at the end of the sentence.

Though contributing the existing studies are, they are still found limited in two aspects. First, there might be subtle distinctions in Chinese EFL learners' and native English speakers' F_0 contours shape, even if they had their nucleus assigned at the same language unit. Therefore this study will dwell on this problem and find out if there are any differences between Zhenjiang learners' and native speakers' F_0 contours in and around the focus.

In addition, the inadequacy of the existing research also lies in subjects recruiting. People with Chinese as their native language are recruited as subjects without considering their dialects. This criterion might be too general since some of the accents, actually, vary considerably from each other in tones and intonation. Considering of this, the present study will focus on Chinese Zhenjiang EFL learners and further research is expected to investigate if the conclusions drawn in this

study could be generalized across other dialects areas. Zhenjiang dialect is chosen as the interested area for it bears the characteristics of Wu dialect, which is one of the major dialect areas in China.

In this study, Zhenjiang EFL learners' F_0 contours in short declarative sentences in English produced with narrow focus, varying in syllable number and word stress positions, will be examined to address the following three questions: i) Are Zhenjiang EFL learners' F_0 contours on the focus distinct from the native English speakers'? ii) Does the scope of post focus lowering include all post-focus words for Zhenjiang EFL learners as it does for native speakers? iii) Do Chinese EFL learners employ fewer types of intonation patterns than native speakers do?

2. Methodology

2.1. Material

The stimuli are short declarative sentences with *trisyllabic* words as the new information bearing units. The words chosen vary in number of syllables and stress patterns as seen in Table 1. They are inserted into the carrier sentence "I said xxx ten times". To add variety, they are mixed with disyllabic and four-syllable words. All sentences are from "AESOP(Asian English Speech Corpus Project)_CASS_Zhenjiang".

Table 1. *Words under narrow focuses*

Positions of lexical stress	Di-syllabic words	Trisyllabic words	Quadrisyllablic words
The first syllable	money, morning	video, January, hospital	elevator, supermarket
The second syllable		apartment, experience, tomorrow, department, available	
The third syllable		Japanese, afternoon, overnight	California, information
The fourth syllable			misunderstand

2.2. Subjects and recording

Eight Zhenjiang EFL learners were recruited as subjects, four females and four males. They were all born and raised in Zhenjiang province and have learned English for more than ten years. They spoke Zhenjiang dialect in daily communication and their Mandarin are perceived as strongly accented. Six native speakers of American English were taken as the referential group. They all reported having no speech disorders. Recording was carried out in the quiet room at Jiangsu University of Science and Technology. The equipment of the recording are the laptop and the head-wear with microphone and its type is Sennheiser PC166, with the built-in type sound card. The sampling rate is 16kHz.

2.3. Data annotation and extraction

All recordings were annotated under a modified labeling system, which has combined IViE (Intonational Variation in English) and ToBI (Tone and Breaks Indices) to better reflect and describe the variations of pitch. Neither of the above two would be satisfying in that IViE fails to distinguish intermediate phrase from intonation phrase and ToBI does not specify how to identify nucleus representation (Jia [16]). Five tiers, as shown in Fig 1, would be labeled for each sound tract:
i). *Orthographic tier:* scripts of the recordings.
ii). *Break Index (BI)*: "3" is marketed at the boundary of intermediate phrase and "4" intonation phrase.
iii). *Prominence tier (PT)*: the most prominent vowel is marked by "P". Noticeably, in one intermediate phrase there must be one and only one prominent vowel.
iv). *Phonetic tier (PhT)*: the phonetic variations within one intermediate phrase.
v). *Phonological tier (PhoT)*: the phonological description within one intonation phrase.

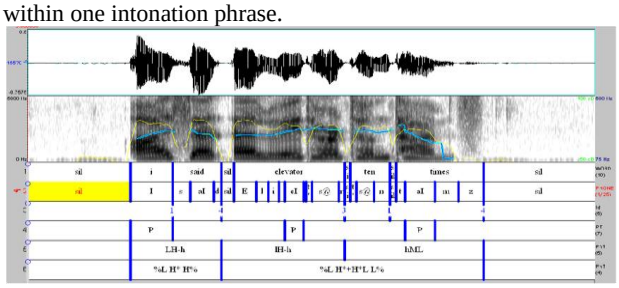

Fig 1. An annotation sample for one of the stimuli "I said elevator ten times".

All sound tracts were first automatically processed by a segmentation software. It generates both word level and phone level transcriptions for the recordings, which can be read by Praat. Since automatic alignment may not generate accurate word and phone boundaries, manual correction was conducted to mend the inaccurate boundaries. And then the above mentioned five tiers were annotated manually for all sound tracts and double checked by experienced professionals of phonetics. While annotating, the F_0 for each target sentence was modified manually. After annotation, F_0 of each voiced phone was extracted in ten points by Praat scripts.

3. Analysis and results

3.1. Phonetic representation

3.1.1. Trisyllabic words with primary stress on the first syllable.

For each stimulus, mean pitch values were calculated by SPSS and then the time-normalized F_0 contours were obtained according to LZ-Score Zhu (Zhu [17]) to exclude between-speaker tonal variations. Its formula is as below. Fig 2 to Fig 4 display the time-normalized mean F_0 contours of three of all stimulus produced by eight Zhenjiang subjects (darker) and six native speakers of English (lighter). In each graph, the ordinate is the transformed F_0 indices and the abscissa is. The breaks on the curves indicate vowel boundaries.

$$Z_i^t = \frac{y_{i-m_y}}{s_y} \quad (1)$$

Through visual inspection of Fig 2, there is a general tendency in Zhenjiang EFL learners' F_0 changes that, if the word in focus is lexically stressed at the first syllable, there is a sudden F_0 rise around the onset of lexically stressed syllables and F_0 drops from the offset of the stressed syllable. It is

consistent with what has been disclosed for native English speakers (Xu [3]). However, their F_0 contours differ in that the lowest F_0 of Zhenjiang EFL learners are much lower than that of native speakers' and Zhenjiang EFL learners' F_0 contours are of a rather steeper slope.

Fig 2. F_0 contours of "I said hospital ten times"

At the post-focus place, Zhenjiang EFL learners' F_0 contour has been reset. A remarkable F_0 gap is observed between the offset of the word-final unstressed syllable and the onset of the post-focus words. Native speakers' F_0, however, falls somewhat continuously and no F_0 gap of comparable size is observed.

3.1.2. Trisyllabic words with primary stress on the second syllable.

For tri-syllabic words with the primary stress on the second syllable, how narrow focus is realized by the two groups is identical with that when words are stressed on the first syllable. Moreover, it is worth attention that F_0 remains rather constant before the onset of the stressed syllable, and then decreases sharply afterwards. However, as best exemplified by Fig 3, the lowest F_0 of Zhenjiang EFL learners are, once again, much lower than that of native speakers'.

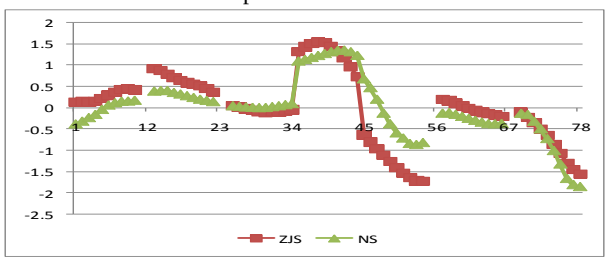

Fig 3. F_0 contours of "I said experience ten times"

Fig 3 reveals that at the words after the focus, as what has been discussed for the on-focus words with lexical stress on the first syllable, Zhejiang learners start their F_0 from a noticeable higher point above the offset of focus, leaving a gap which is much bigger than that of English speakers between the two adjacent points. This may be a visual reflection of abrupt ups and downs in Chinese EFL learners' read speeches.

3.1.3. Trisyllabic words with primary stress on the last syllable.

For on-focus words lexically stressed at the third syllable, Zhenjiang EFL learners are observed with abnormal F_0 contours, which fail to peak at the lexically stressed syllables. However, it is unsafe to draw the conclusion that Zhenjiang EFL learners' acquisition of the word-final stressed multi-syllable words is inadequate, due to the rather limited research scale. Moreover, even though their F_0 does peak at the lexically stressed syllable as native speakers do, their F_0 peaks are generally not as high as native speakers as shown in Fig 4.

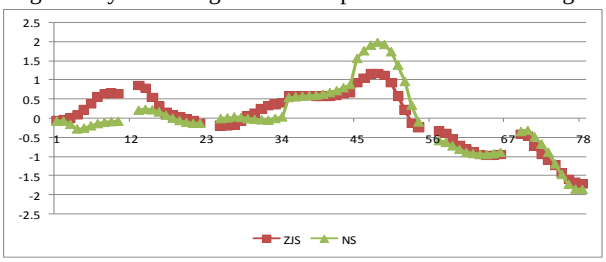

Fig 4: F_0 contours of "I said afternoon ten times"

Besides, considering the post focus places, both Zhenjiang EFL learners and native speakers move their F_0 downwards continuously when the nucleus is finished as in Fig 4. Nevertheless, these features are not observed in Zhenjiang EFL learners' F_0 contours if the on-focus word is lexically stressed at either the first or the second syllable, as discussed before.

3.2. Intonation patterns at the narrow focus

Table 2. *Intonation patterns on nucleus employed by Zhenjiang EFL learners and native English speakers*

Intonation patterns on nucleus	ZJS	NS
H*L	111	52
L*HL	19	50
L*H	8	1
L*	1	
H*H	1	
H*	1	2
H*LH		8
Total	141	113

In this part, Chinese EFL learners and native speakers' intonation patterns in the intonation domain with the narrow focus are compared. Before analysis, nuclear position of each stimulus are closely examined in case that some subjects may produce the sentences with the nucleus assigned at words other than the narrow focus designed and those failed are excluded from analysis. It turns out that 19 stimuli produced by Zhenjiang EFL learners and 7 by native speakers have been left out.

Table 2 shows that native speakers have more variations in their intonation patterns than Zhenjiang EFL learners do. A dominant number, total 111, of Zhenjiang EFL learners adopt H*L on nucleus, while 19 adopt L*HL. However, English speakers who employed those two intonation patterns are almost equal in number, being 52 and 50 respectively. Though it is correct to apply falling tone on the nucleus in statement (Chen [18]; Wang [19]), the speech would sound plain if H*L is employed whenever it is a declarative sentence. Noticeably, remarkable distinctions are found on the phonetic tier. Take focused words with lexical stress on the first syllable for instance, a dominant number of Zhenjiang EFL learners employ H-l while English speakers mostly prefer H-m. Wang [19] also reported Chinese EFL learners are distinct from native English speakers on the phonetic tier when producing English mild imperatives even though their phonological representation is identical.

Besides, Chinese EFL learners employed pitch patterns that are improper in the designed circumstances. The data reveal that for Zhenjiang EFL learners, 8 out of a total of 141 stimuli are assigned L*H on the focus. However, none of these pitch patterns is employed by native speakers. L*H is considered improper here for it indicates a tone of questioning and doubt, which is always employed in *yes-no* questions (O'Connor & Arnold [20]; Chen [18]; Wang [19]). This finding agrees with what has been mentioned in Chen's [18] study that Chinese EFL learners always employ intonation patterns that are improper in certain context.

4. Discussion and Conclusion

The analyses above address the questions raised earlier. The results reported in section 3 reveal the following patterns: i) Zhenjiang EFL learners' F_0 contours peak at the stressed syllable as native English speakers do if the focused words are stressed at the first or the second syllable, but not always so if the focused word is lexically stressed at the third syllable. Moreover, Zhenjiang EFL learners' F_0 contours may peak at words other than the narrow focus; ii) If the on-focus words are lexically stressed on latter syllables, it is a within focus F_0 contour feature that F_0 contour remains rather constant before the onset of the stressed syllable, then undergoes a sharp decrease from the offset of the stressed syllable. However, the lowest F_0 of Zhenjiang EFL learners is much lower than that of native speakers'; iii) Considering the pre-focus F_0 shape, if the focus is word-initial stressed, both Zhenjiang EFL learners and native speakers' F_0 contours step up from the offset of words before focus. However, if the focused word is stressed at the latter syllable, no abrupt F_0 rise is observed until the lexical stressed syllable; iv) Considering the post-focus place, F_0 contour is of a falling trend. At the post-focus place, Zhenjiang EFL learners' F_0 contour has been reset, except for the cases when the focused word is word-final stressed; v) Native speakers have more variations in their intonation patterns. Besides, Zhenjiang EFL learners employed pitch patterns that are improper in the designed circumstances.

It may be concluded that Zhenjiang EFL learners' pitch range of the unstressed syllable(s) in the focused word is suppressed more greatly than the native speakers' and Zhenjiang EFL learners' F_0 contours are of a rather steeper slope. This may be a visual manifestation of the discontinuities in Chinese EFL learners' speech. Besides, Zhenjiang EFL learners' F_0 contour may not always peak at the on-focus stressed syllable. It is possibly due to dual effects of both the inadequate intonation acquisition and negative transfer of their dialect. Larger data size is expected to figure that out.

Additionally, for Zhenjiang EFL learners, the scope of post-focus suppression seems to include only the unstressed syllables in the focused words, but not all post-focus words, while for native English speakers, the scope of post-focus suppression seems to include not only the word-final unstressed syllables in the focused words but also all post-focus words (Xu [3]). This is possibly due to Chinese being a syllable-timed language and intonation depends on the number of syllables rather than the number and position of stressed syllables (Clark [21]). Further investigation is in need to find out if the findings above are Zhenjiang EFL learners specific or shared by other dialects speaking learners. It is also left undetermined if these features are transferred from Zhenjiang dialect.

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