

## The Acoustical Realization of Narrow Focus and Second Occurrence Focus in Taiwan Mandarin

*Chu-ting CHEN, Ho-Hsien PAN*

[modi0819.flg96g@g2.nctu.edu.tw](mailto:modi0819.flg96g@g2.nctu.edu.tw), [hhpan@faculty.nctu.edu.tw](mailto:hhpan@faculty.nctu.edu.tw)

Department of Foreign Languages & Literatures,  
National Chiao Tung University, Hsinchu, TAIWAN

### Abstract

This study syntagmatically and paragrammatically compares the acoustical realization of narrow focus (NF) and second occurrence focus (SOF) in Taiwan Mandarin. Spontaneous production data were elicited via interactive conversations describing images displayed on a computer screen. The F0 (fundamental frequency) range and the duration of target lexical items were taken from the target lexical items of the conversation. Preliminary results show that the performance of second occurrence focus of Taiwan Mandarin is quite similar to that of narrow focus. In other words, the second occurrence focused lexical items which carry old information but under the scope of the F-marking operator 'only,' are indistinguishable from the narrow focused items under the same focus position.

### 1. Instruction

With respect to discourse analysis, given information is not supposed to be a focus, while from the perspective of semantic theory sensitive operators, such as 'only,' it is. For example, in sentence (1) a, adapted from Partee (1999: 215), the word "vegetables" is the item which receives narrow focus (NF). Therefore, the potential for conflict exists between discourse analysis and semantic theory: the given information is not meant to be a focus according to the former, but it is under a sensitive operator and, therefore, a focus for the latter. A Second Occurrence of Focus (SOF), in which a sensitive operator within semantic theory carries given information, addresses this conflict. For example, in sentence (1) b, the word "Paul" is the new information with NF, but the given information "vegetable" placed within the domain of focus sensitive operator is proposed to receive SOF. (Fery and Ishihara, 2005)

- (1)a. Everyone already knew that Mary only eats [vegetables]<sub>NF</sub>  
b. If even [Paul]<sub>NF</sub> knew that Mary only eats [vegetables]<sub>SOF</sub>, then he should have suggested a different restaurant

Narrow focus (NF) in English is marked by a nuclear pitch accent, while SOF is marked by other prosodic cues, such as increased duration and intensity. In addition, Fery and Ishihara (2005) have reported that, in German, (1) the phonetic marking of SOF in pitch and duration is revealed prenuclearly, but in duration only postnuclearly, and (2) in contrast to First Occurrence of Focus (FOF), SOF is realized in different ways. It has to be noted that the convention FOF and NF mentioned above have the same definition in this paper. The term NF is used hereafter to be consistent with Beaver (2002, 2004).

Xu (1999) found that the duration of the target syllable under focus increased and the F0 range expanded under varying focus conditions. Under one narrow focus condition the F0 high points were found to be higher, while the F0 low points were lower in non-final focused

words]; in other words, the F0 range experienced expansion. However, Hsiung (2002) has reported that duration, which increased under narrow focus, is the most salient acoustic parameter for sentence focus in Taiwan Mandarin. Moreover, Hsiung also found that speakers of Taiwan Mandarin do not always expand the F0 range significantly under narrow focus, unlike Mandarin speakers on Mainland China according to the research conducted by Xu (1999). Huang (2004) found that durations of target items under narrow focus are extremely longer than for their counterparts. Moreover, Huang has suggested that the F0 range might be a salient acoustic cue, although it is not as prominent as duration.

Existing research has not investigated the comparison between NF and SOF, which in this paper is all revealed postnuclearly, in tone-based languages, such as Mandarin. Therefore, this study attempts to explore how NF and SOF are realized and to investigate the differences between them by comparing the acoustical realization of lexical items of NF and of SOF on Object (O) and Verb (V) to their defocused counterparts, respectively, in Taiwan Mandarin.

## 2. Methods

### 2.1. Participants

Three female native Taiwan Mandarin speakers who speak neither Taiwan Min nor Hakka (two dominant dialects spoken in Taiwan) participated in this experiment. They were all undergraduates at National Chao Tung University at the time of the recording.

### 2.2 Corpus

The sentence structures for NF were ‘Subject + [first Verb + second Verb]<sub>NF</sub> + Object,’ and ‘Subject + Verb + first Object + second Object.’ As for the SOF, they were ‘Subject + only + [Verb]<sub>SOF</sub> + Object,’ and ‘Subject + Verb + only + [Object]<sub>SOF</sub>.’ The sensitive operator ‘only’ was placed before either V or O according to different interrogative patterns. S and O consisted of the same four targets, carrying four lexical tones, whereas the other four targets with four lexical tones composed V. The noun that occupied the subject and object was never the same one. The lexical tones of the four lexical items for nouns were /jiang<sup>55</sup>+ju<sup>55</sup>/ (a general), /zhai<sup>35</sup>+nan<sup>35</sup>/ (a nerdy), /mei<sup>214</sup>, nv<sup>214</sup>/ [mei<sup>35</sup>+nv<sup>214</sup>] (a beauty) and /jiao<sup>51</sup>+lian<sup>51</sup>/ (a coach). With regards to lexical items for verbs, they were /gen<sup>55</sup>+zong<sup>55</sup>/ (to follow), /cha<sup>35</sup>+xun<sup>35</sup>/ (to inquire), /dai<sup>214</sup>, bu<sup>214</sup>/ [dai<sup>35</sup>+bu<sup>214</sup>] (to arrest), and /shi<sup>51</sup>+fang<sup>51</sup>/ (to release). It must be noted that tone sandhi phenomenon took place in this experiment.

There were two SOF conditions, namely (1) “only” placed before verb to govern the verb, and (2) “only” placed before object to govern the object. By matching the four lexical items for S, V and O, there were 64 sentences (4 S x 4V x 4O): after excluding the sentences with the same S and O, 48 target sentences remained. Again, by matching the two focus conditions with the 48 target sentences and by repeating each sentence six times, 576 sentences were elicited (48 target sentences x 2 focus locations x 6 repetitions). The same focus conditions were found in NF; therefore, the total number of target sentences elicited was 1152 (576 x 2).

### 2.3 Procedures

Spontaneous speech was elicited through dialogues which described images displayed on a computer screen. In order to elicit the interactive conversation from the subjects, the experiment included a program which was designed to display simultaneously five images on the computer screen at a time. The experimenter then asked the first question in order to elicit NF on the target lexical items. After the subject explicated the first answer with NF, the

experimenter proceeded to ask the next question to elicit the second answer with SOF without taking the response time into consideration. The following section provides the images and some examples of the sentence structures for the two focus locations (Subject and Object):

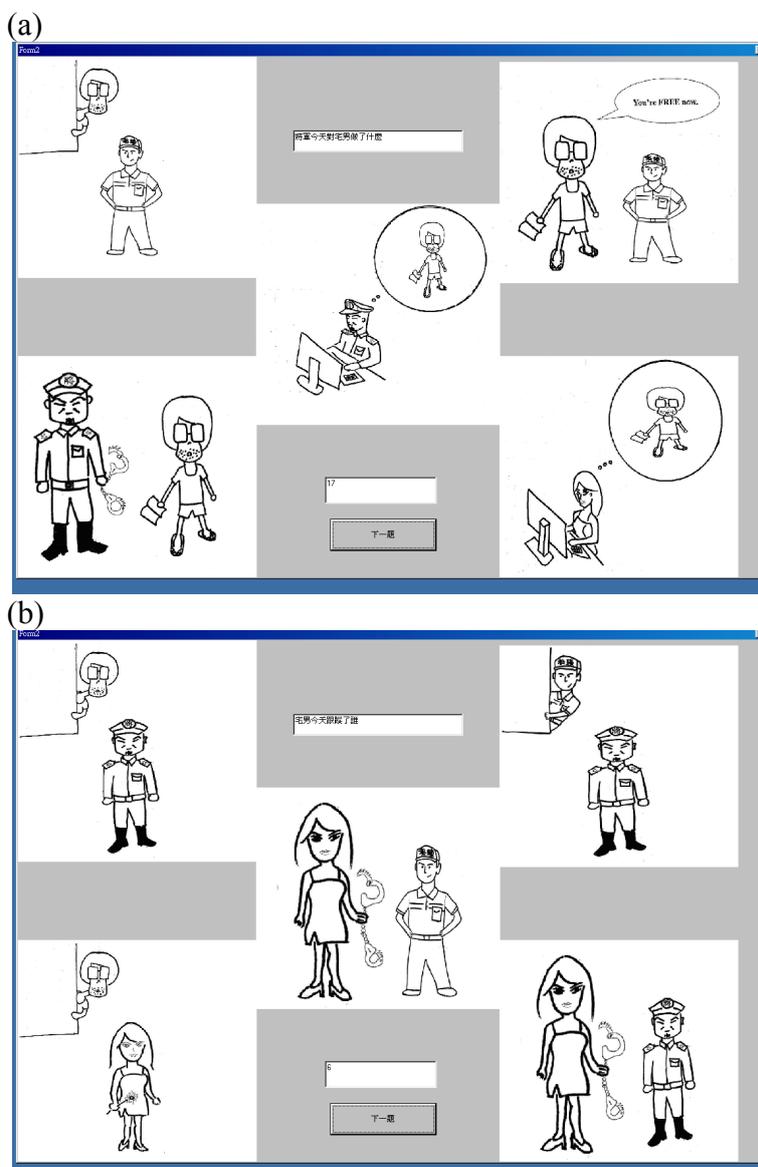


Figure 1: Examples of pictures showed on the screen to elicit the interactive spontaneous conversation.  
(a) picture to elicit the sentences which had NF and SOF on verb  
(b) picture to elicit the sentences which had NF and SOF on object

(a) NF/SOF on V

Question1. Experimenter: ‘From the five images, what do you think the general did to the nerdy today?’

Answer 1. Subject: ‘The general [inquired and arrested]<sub>NF</sub> the nerdy today.’

Question2. Experimenter: ‘In the other three images, the nerdy released and followed the coach. What else did you see?’

Answer 2. Subject: ‘The beauty only [arrested]<sub>SOF</sub> the general.’

(b) NF/SOF on O

Question1. Experimenter: ‘From the five images, who do you think the nerdy followed today?’

Answer 1. Subject: ‘The nerdy followed [the general and the beauty]<sub>NF</sub> today.’

Question2. Experimenter: ‘In the other three images, the beauty arrested the general and the coach. What else did you see?’

Answer 2. Subject: ‘The coach followed only [the general]<sub>SOF</sub>.’

It should be noted that the order of verbs or objects in NF is not bound; that meant in (a), ‘The general [inquired and arrested]<sub>NF</sub> the nerdy today,’ and ‘The general [arrested and inquired]<sub>NF</sub> the nerdy today,’ and in (b), ‘The nerdy followed [the general and the beauty]<sub>NF</sub> today,’ and ‘The nerdy followed [the beauty and the general]<sub>NF</sub> today’ were all acceptable. In order to make a clear and careful comparison, the verb or the noun uttered earlier was named ‘the first verb’ or ‘the first noun,’ while the verb or the noun uttered later was named ‘the second verb’ or ‘the second noun.’

3. Results

Data on duration were taken at the points of onsets and offsets of the lexical items for target verbs and objects. Moreover, for the F0 ranges, they were derived by subtracting the minimum values of F0 (F0 valleys) from the maximum values of F0 (F0 peaks) within the target verbs and objects. The F0 range of the first verbs, the second verbs, the first objects, and the second objects were recorded and compared respectively for the NF condition.

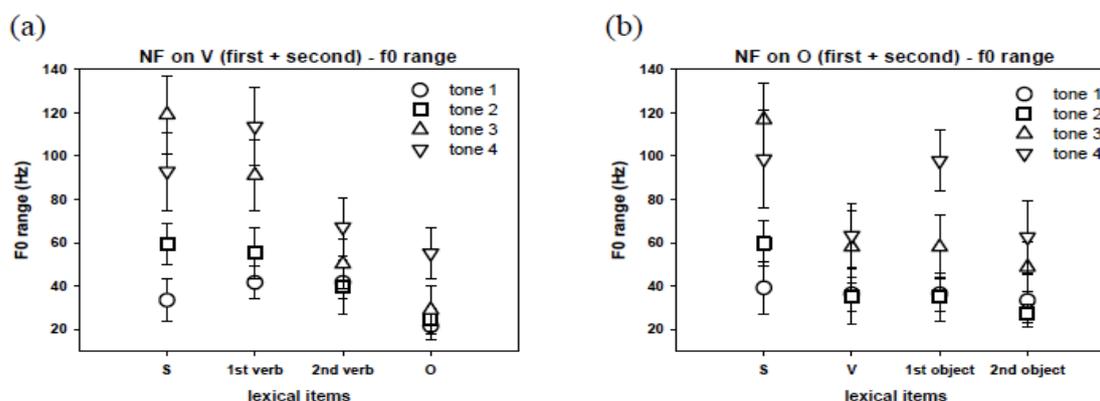


Figure 2: F0 range of NF on V

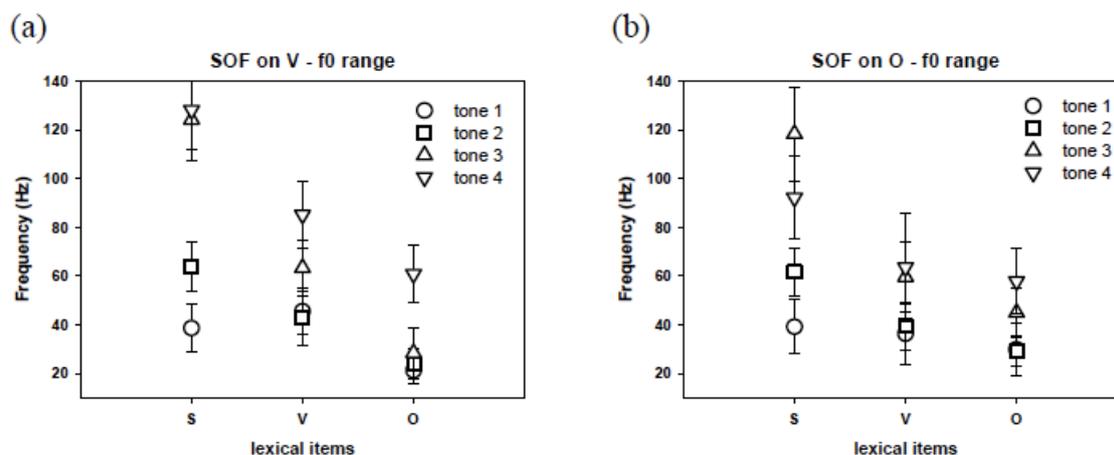


Figure 3: F0 range of SOF on O

### 3.1 F0 range: NF on V vs. NF on O

In Figure 2(a), it was found that the expansion of the F0 range for the narrow focused first verb was much greater than that of the narrow focused second verb. Moreover, by making a comparison of the narrow focused first verb and the second verb (Figure 2(a)), it can be seen that the F0 range expansions of the narrow focused first verb carrying tone 3 and tone 4 were larger than those carrying tone 1 and tone 2. A similar pattern of F0 range expansion was also found with the narrow focused object in Figure 2(b); that is, the F0 ranges of the narrow focused first object were greater than that of the narrow focused second object. In addition, the F0 range expansions of tone 3 and tone 4 of narrow focused first object were also found to be much greater than those of tone 1 and tone 2 as found in Figure 2(a).

With reference to the F0 range, Figures 2 reveals that the value of the F0 range of the first targets under NF was greater than for their defocused counterparts, and these findings do correspond to those of Xu (1999), Hsiung (2002) and Huang (2004).

### 3.2 F0 range: SOF on V vs. SOF on O

In Figure 3(a) the F0 ranges of the focused verbs under SOF were found to expand, especially in lexical items carrying tone 3 and tone 4. As for the Object under SOF in 3(b), little expansion of the F0 range was observed in the lexical item carrying tone 3. This might be due to declination effect which decreases the upper limit of the F0 range at a faster rate than the lower limit F0 range toward the sentence final. Thus it can be seen that little room was available for the F0 range to expand when the second occurrence focused object at sentence final position was involved.

### 3.3 F0 range: Focus (NF vs. SOF) on V

By comparing the narrow focused verb in 2(a) and the focused verb under SOF in 3(a), it was found that the F0 range of the narrow focused second verb performed similarly to that of the focused verb under SOF. The F0 range of lexical items carrying tone 4 was greater than tone 3, tone 3 greater than tone 1, and tone 1 greater than tone 2. The scale of the F0 range expansion was approximately from 40 Hz to 80 Hz.

### 3.4 F0 range: Focus (NF vs. SOF) on O

Just like what has been mentioned above in 3.3, the narrow focused second object in 2(b) performed similarly to the focused object under SOF in 3(b). The expansion of the F0 range

was found to be greater on lexical items bearing tone 4, then tone 3, then tone1, and finally the least on tone 2. With respect to the scale of the F0 range expansion, it was from 20 Hz to 60 Hz approximately.

### 3.5 Duration

Figure 4 compares the durations of verbs and objects under both NF and SOF conditions. The duration of the verbs under NF and SOF conditions was indeed lengthened, especially under NF condition, when compared to their defocused counterparts. Similarly, the duration of the focused objects under NF and SOF conditions, compared to their defocused counterparts, was also lengthened, especially under SOF condition in this case. Interestingly, in 4(a), the duration of the defocused verb seemed to decrease a little to enhance the lengthened duration of the focused object under NF. The result shows that the target lexical items under NF condition endure longer durations than do their defocused counterparts and this is consistent with the reported findings of to Xu's (1999), Hsiung's (2002) and Huang's (2004), in which reported that the focused items experienced longer duration than the defocused ones.

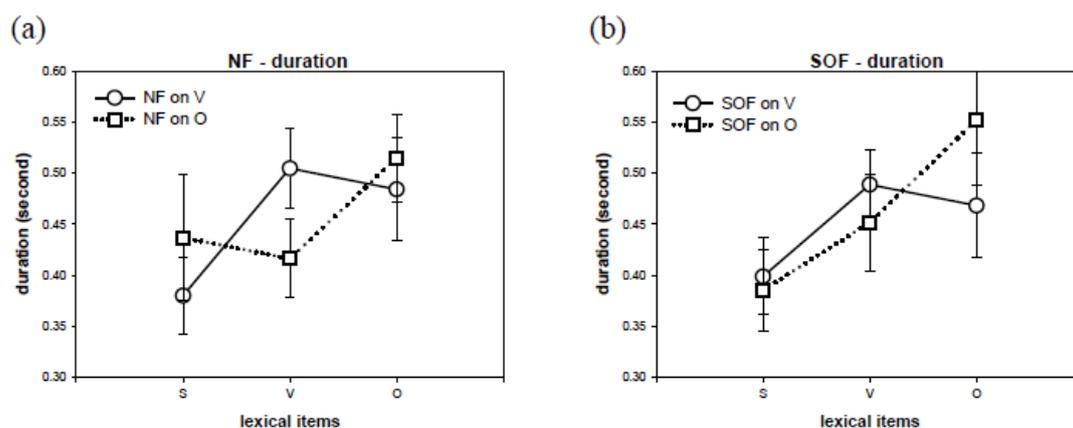


Figure 4: Duration of NF and SOF on both V and O

## 4. Discussion

Preliminary results supported the idea that the target lexical items under focus do carry an expanded F0 range, on the first target under NF in particular. Furthermore, with reference to the duration cue, the lengthened duration of the focused lexical items was found to be the most prominent acoustical cue when compared to that of their defocused counterparts was found under both NF and SOF conditions.

In other words, lexical items with given information were indeed ‘highlighted’, in duration and F0 range, by SOF within the scope of the F-marking operator ‘only’. With respect to NF, the performance of the F0 range for all the lexical items in the same position, without the sensitive operator ‘only’, was quite similar to that of those with SOF. In conclusion, the F0 ranges and duration of both NF and SOF in Taiwan Mandarin performed in quite similar ways. Finally, these results arouse the interests and highlight the need for the collection of more data from other subjects in order to establish the accuracy of this study.

## References

Caroline Fery and Shinichiro Ishihara (2005). Interpreting Second Occurrence Focus

- David I. Beaver, Brady Z. Clark, Edward S. Flemming, Maria K. Wolters (2002). Second Occurrence Focus is Prosodically Marked: *Results of a production experiment*
- David I. Beaver, Brady Z. Clark, Edward S. Flemming, T. Florian Kaeger, Maria K. Wolters (2004). "When Semantics meets Phonetics: *Acoustical studies of Second Occurrence Focus*"
- Hsiung, S. C. (2002). *Acoustic characteristics of sentential focus in Mandarin spoken in Taiwan*. MA thesis, National Hsinchu Teachers College.
- Huang, Y. H. (2004). *Focus Condition in Spontaneous Taiwanese Mandarin*. MA thesis, Graduate Institute of Linguistics and Cultural Studies, National Chao Tung University, Hsinchu, Taiwan.
- Xu, Y. (1999). Effects of tone on the formation and alignment of f0 contours. *Journal of Phonetics*, (27), 22-106.