Sentence Final Particles and Wh-indeterminates in Beijing Mandarin

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In this study, we used a speech production experiment to study whether and how Beijing Mandarin native speakers (n=6) use prosody to disambiguate wh-indeterminates, and to explore whether and how sentence final particles (SFPs) signal the clausal types and interact with focus marking. Wh-indeterminates refer to wh-phrases that are ambiguous between interrogative and indefinite readings, which has been attested in many languages (cf. Kuroda, 1965). For example, wh-phrases in Mandarin like shenme ‘what’ can be interpreted as a wh-interrogative in a wh-question (e.g., (1a)), or as an indefinite in a yes/no question (e.g., (1b)). Previous syntax-semantic studies have identified contexts that license the indefinite reading of wh-indeterminates, and the occurrence of SFPs such as ma for yes/no questions as in (1b) is one of such wh-indefinite-licensing contexts (Li, 1992; Cheng, 1994). While most linguistic studies have focused on sentences like (1a-b) for wh-indeterminates, we notice that in declarative sentences like (1c) with SFP ba indicating weak epistemic judgment, the wh-phrase also obtains an indefinite reading.

(1) a. Zhangsan mai-le shenme (ne)?
   ‘What did Zhangsan buy?’
   Zhangsan buy-ASP what WH-PARTICLE
b. Zhangsan mai-le shenme (ma)?
   ‘Did Zhangsan buy something/anything?’
c. Zhangsan mai-le shenme (ba).
   ‘Zhangsan probably bought something/anything’
   Zhangsan buy-ASP what S-PARTICLE

Examples in (1) show that wh-indeterminates in Mandarin not only are lexically ambiguous but are also relevant to structural ambiguity, given that SFPs often are not obligatory in Chinese.

Considering prosody as one of the disambiguation devices, some prior studies have reported that wh-indeterminates while functioning as wh-interrogatives manifest more acoustic prominence (due to the focus status) than wh-indefinites in languages such as Korean (Jun and Mira, 1996), Japanese (Ishihara, 2003; Kitagawa, 2007), and German (Truckenbrodt, 2013). Yet, some studies reported that no acoustic differences on the wh-indeterminates that distinguished interrogative and indefinite readings, and distinction may be found on the following units (e.g., Yon, 2018).

Different results were also reported for wh-indeterminates in Mandarin. Hu (2002) studied wh-subject shei ‘who’ and shenme ‘what’ and reported that Mandarin speakers expressed wh-interrogatives acoustically different from wh-indefinites: it was reported that wh-phrases had higher mean F0 in wh-questions, and the verb phrase of a sentence showed higher mean F0 in yes/no questions. In this study, only descriptive statistics results were reported for mean F0, duration and amplitude (with SD), and some inter-participant differences were found. For Taiwan Mandarin, Shyu and Tung (2018) reported two different findings; first, based on eight tokens from a speech corpus, they reported that some differences were found between wh-interrogatives and indefinites, however the syntactic and the phonetic contexts where these eight tokens occurred were different; second, their production study showed that participants did not acoustically disambiguate the two meanings of wh-indeterminates; since all their participants responded to the same two items for one context, it is difficult to draw a general conclusion for Taiwan Mandarin. Thus far, the findings about Mandarin wh-indeterminates remains inconclusive.

In this study, we examined the prosody of wh-questions and yes/no questions like those in (1) containing wh-indeterminates, and use declarative sentences as the baseline. Four wh-phrases (shei ‘who’, shen.me ‘what’, na.li ‘where’, and shen.me-dong.xi ‘what thing’) were used to constructed each type of sentences with five versions of the Tone4 verbs. In total, 60 target sentences (3 sentence types x 4 wh-phrases x 5 verb) and 40 filler sentences (in different sentence structure with no SFPs) were used in an experimental session. Each trial consisted of a pre-recorded leading context (25 character long) and a target sentence (like those in (1)) that participants used to respond. The leading contexts were pre-recorded by a female speaker of Beijing Mandarin. The acoustic measurements were generated by ProsodyPro 5.7.6 (Xu, 2013) for duration, fundamental frequency (F0) range and time normalized F0. Linear Mixed Effects models were conducted on duration and F0 range using the lme4 package in R (Bates et al. 2015). Example trails are shown below.
Our results show distinction between declarative sentences and questions on the regions of wh-phrases and on the region of SFPs. This suggests that Mandarin speakers prosodically disambiguate wh-indeterminates. We also found very interesting and consistent patterns of duration and F0 range across four wh-phrase types. Unlike the on-focus lengthening effect reported in previous studies, in our study the last syllable of wh-phrases in both questions was shorter than that syllable in declarative sentences, especially when their wh-phrases were what (y/n: p < .001) and where (y/n: p < .001; wh: p < .001). However, the SFPs (which immediately following the wh-phrases) in both types of questions were significantly longer than the SFP in declaratives (p < .001). Furthermore, the duration of SFPs was the longest in yes/no questions across four wh-phrase types rather than SFPs in wh-questions. The focus marking pattern in terms of F0 range across four types of wh-phrases. When comparing with declaratives, the F0 range of statements tended to be wider than questions in the last syllable of wh-phrases, especially in what (y/n: p = .004) and where (y/n: p = .008; wh: p = .076).

These patterns seem to suggest that the occurrence of SFPs specifically defines the sentence types, and this information requires the prosodic organization to comply in expressing the differences between questions from statements. In sum, these results suggest that the internal organization at different structural levels may interact with the prosody system.

References