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The two sides of Wh-indeterminates in Mandarin : a prosodic and processing account

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Summary

Mandarin is a *wh*-in-situ language, in which *wh*-words remain at their base position just as their declarative counterparts do, and hence Mandarin has no *wh*-movement to type the clause as a *wh*-question. Mandarin is also known to be a *wh*-indeterminate language, in which *wh*-words like *shénme* can have both interrogative ('what') and non-interrogative interpretations (e.g. existential interpretation, 'something'), but unlike other *wh*-indeterminates languages like Japanese and Korean, Mandarin has no particles to license the interpretations of the *wh*-indeterminates. Due to the *wh*-in-situ and *wh*-indeterminates nature of Mandarin, clausal typing in Mandarin and the licensing of Mandarin *wh*-indeterminates have long been two intriguing topics in the fields of syntax and semantics. Different from traditional studies, this dissertation investigates the licensing of Mandarin *wh*-indeterminates and the clausal typing of sentences containing them from the perspective of prosody and processing. To better explore the topics, a variety of methodologies are adopted in this dissertation, including production / acoustic study, audio-perception / gating paradigm, self-paced reading and electrophysiological means. These diversified empirical studies provide evidence for the role of prosody in clausal typing in Mandarin, based on which an extended clausal typing hypothesis is proposed; the licensing evidence and constraints of *wh*-interrogatives (e.g. 'what') and *wh*-existentials (when *wh*-words have existential interpretations, e.g. 'something') are also explored in Mandarin, the two most frequently used interpretations of *wh*-indeterminates.

This dissertation consists of seven chapters. **Chapter 1** briefly introduces the background of the main research issues to be discussed, lays out the research questions and provides an overview of the dissertation.

Chapter 2 investigates the prosodic markings of *wh*-questions and *wh*-declaratives (declaratives containing *wh*-words interpreted as *wh*-existentials, which are string identical to *wh*-questions in our study) through a production experiment on native Mandarin speakers from Beijing. The fine-grained analysis of the audio recordings demonstrates that *wh*-declaratives differ from *wh*-questions in terms of different prosodic properties such as duration, F0, F0 range and intensity range. It shows that already from the clause onset the two clause types already show prosodic differences. In particular, *wh*-declaratives are longer than *wh*-questions in terms of duration starting from the subject and the pattern reverses at the *wh*-word; *wh*-declaratives are lower in F0 and smaller in F0 range than *wh*-questions at the *wh*-word and there is a F0 range compression in the post-*wh*-word region in *wh*-questions. *Wh*-declaratives show larger intensity range than *wh*-questions at the verb and the pattern reverses at the *wh*-word. The production study in this chapter demonstrates that prosody is indeed utilized in clausal typing.

Based on the results of Chapter 2, **Chapter 3** further explores whether listeners can identify as well as anticipate the clause types (*wh*-questions and *wh*-declaratives) based on prosodic cues only. This chapter reports an audio-perception experiment, in which participants were asked to listen to a sentence (containing *wh*-questions or *wh*-declaratives) and complete a dialogue. The audio-perception study includes an

audio-gating experiment, where the audios of sentences (*wh*-questions or *wh*-declaratives) are segmented into different lengths of fragments / gates for listeners. The audio-gating experiment investigates whether participants can anticipate clause types before hearing the *wh*-word and if so, at which gate they succeed in doing that. The results of the audio-perception and gating experiment show that 1) Participants can make use of prosody to differentiate the two clause types; 2) Starting from the onset of the first word of the sentence (*wh*-question or *wh*-declarative), participants already demonstrate a preference for the clause type that was intended by the speaker. Moreover, the more listeners hear of the sentence, the more accurate their anticipation for the clause type becomes.

Chapter 4 discusses the licensing of the existential interpretation of *wh*-indeterminates (i.e., *wh*-existentials) in Mandarin. *Wh*-existentials have been considered to be licensed only in non-veridical contexts in previous literature, for instance, in contexts containing non-veridical operators such as negation, questions, conditionals and epistemic modalities, in which the truth of a proposition cannot be entailed in the sentence. In this chapter I challenge this claim, by demonstrating that Mandarin *wh*-existentials can also be licensed in veridical contexts. I focus on the investigation of veridical *wh*-sentences containing *diǎnr* ‘a little’ and discuss the licensing of *wh*-existentials with *diǎnr*. I conducted a sentence reading experiment where participants read veridical sentences containing *wh*-indeterminates with and without *diǎnr* and the results show that *wh*-sentences containing *diǎnr* are ambiguous between *wh*-questions and *wh*-declaratives. This provides empirical evidence that *wh*-existentials can also be licensed in veridical contexts. In order to further shed light on the licensing conditions of *diǎnr* on *wh*-existentials, a special gate in the gating study was designed. The result of this gating study shows that listeners are reluctant to interpret a *wh*-word as a *wh*-existential when the verb and *diǎnr* are separated into different prosodic domains.

I discuss the licensing of Mandarin *wh*-interrogatives in **Chapter 5**. I conducted self-paced reading studies on Mandarin simplex *wh*-questions (containing simplex *wh*-words such as ‘who’) in comparison with their declarative counterparts containing ‘someone’, and on complex *wh*-questions (containing *wh*-words such as ‘which x’; also known as discourse-linked *wh*-words) in comparison with their declarative counterparts containing ‘an x’. The results show that questions are processed with a higher cost than declaratives, providing empirical evidence for covert dependency between the in-situ *wh*-word and the Spec-CP or C⁰ domain. This study also implies that complex *wh*-questions are processed differently from simplex *wh*-questions due to the discourse-linking property of the former.

In **Chapter 6** I report the results of two ERP experiments and provide electrophysiological evidence for the role of prosody in clausal typing during online sentence processing. As the audio-perception study (Chapter 3) shows that listeners can identify *wh*-questions and *wh*-declaratives accurately by hearing the *wh*-word, in the first ERP Experiment, I cross-splice audio-recordings of *wh*-questions and *wh*-declaratives from *wh*-words onwards and test *wh*-declaratives (D), *wh*-questions (Q) and their cross-spliced conditions D-Q and Q-D, all preceded by contexts biasing towards the clause type of the pre-*wh*-word region. Furthermore, as our audio-gating study (Chapter 3) shows that listeners can anticipate clause types by hearing the sentence beginning (e.g. subject), the second ERP experiment manipulates the

congruity between contexts biasing *wh*-questions (Q) / *wh*-declaratives (D) and target sentences of *wh*-questions (Q) / *wh*-declaratives (D). Electrophysiological results of both experiments reveal (early) prosodic negativities, indicating an early detection of clause type incongruity based on prosody during online sentence processing; but the negativities are only found in the incongruent condition of D-Q, which implies a different accommodation in processing the incongruities.

Lastly, **Chapter 7** returns to the research questions raised in Chapter 1 and summarizes the main findings of the dissertation. At the end of this chapter, I conclude this dissertation and provide suggestions for future work.

