Processing Topic structures by native and non-native Chinese speakers

Chinese has the basic word order of Subject-Verb-Object (SVO), like English. But different from subject-prominent English, Chinese is a topic-prominent language with a variety of topic-comment structures (Chao 1968; Li & Thompson 1976). As shown below, the patient NP 'novel' in (1) can be topicalized to the sentence-initial position, forming the Topic-Subject-Verb (TSV) structure in (2), which is one of the Chinese topic structures.

1. SVO: 也许 很多 同学 都 读过 [这本 小说] ……。

   yexu heduo tongxue dou du-guo [zhe-ben xiaoshuo]$_i$
   perhaps many student all read-ASP this-CL novel …….
   'Perhaps many students have read this novel …….'

2. TSV: [这本 小说]$_i$ 也许 很多 同学 都 读过 t_i ……。

   [zhe-ben xiaoshuo]$_i$ yexu henduo tongxue dou du-guo t_i
   [this-CL novel]$_i$ perhaps many student all read-ASP t_i…….
   'This novel, perhaps many students have read …….'

Unlike other topic-prominent languages such as Korean and Japanese, topics in Chinese are not overtly marked, due to a lack of morphosyntax, rendering them an ideal testing ground for different sentence processing theories, specifically, experience-based and working memory-based accounts. According to the Dependency Locality Theory (DLT, Gibson 1998, 2000), which measures comprehension difficulty through storage and integration cost, the TSV structure should generate high reading times at the verb ('du-guo', read, in ex. 2) where the information of the patient NP ('zhe-ben xiaoshuo', this novel) needs to be retrieved to complete the parsing of the filler-gap dependency, as co-indexed by the subscript in ex.2, regardless of comprehenders' familiarity with the TSV structure. In contrast, the SVO structure does not involve any filler-gap relationship, hence no extra working memory cost and easier. However, we argue that processing difficulty cannot be measured independently from comprehenders' experience of the language statistics, so that a highly frequent structure, e.g. TSV, is not more difficult than the basic SVO word order (MacDonald & Christiansen 2002). Furthermore, a difference in the amount of exposure to the topic structure across individuals should entail a difference in the processing pattern. This study, using self-paced reading, aims to evaluate the two processing accounts by comparing the comprehension patterns of SVO vs. TSV sentences read by native and non-native Chinese speakers.

Exp.1 tested 32 native Chinese speakers from the mainland China. We created 16 pairs of TSV and SVO sentences, both of which contained the same words (totaling 7 positions as shown in figures 1-2), except that the object NP serving as the patient 'this novel' in (2) was topicalized to the sentence-initial position in (1). For each of 7 word positions, we replaced outliers with mean RTs plus 2.5 standard deviations from the mean RTs across the two conditions for each participant. Then we aligned words by part of speech for statistical analyses.

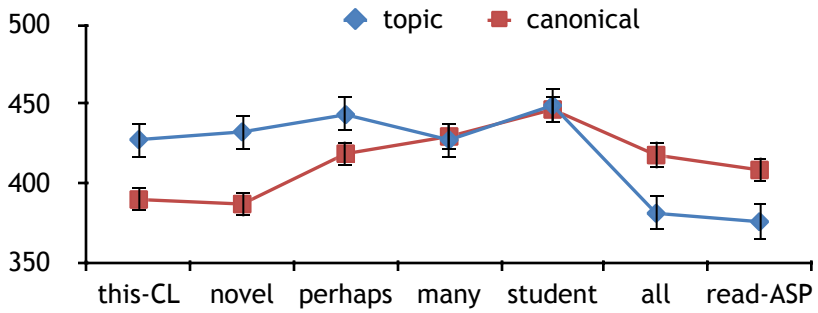

Fig.1 trimmed reading time in Exp.1

As shown in Fig1, no significant difference was found at 'student', 'perhaps', 'this-classifier', but for the rest of regions, the RT differences between TSV and SVO are all significant (*p*'s < .05). Crucially, TSVs were read even significantly faster than SVOs at the position of Verb 'read', showing that Chinese participants in the TSV condition didn't experience processing difficulties when reading the verb, but rather felt easier than in the SVO condition, suggesting no need to retrieve and integrate the patient NP for TSV sentences.

To further investigate the extent to which experience/exposure affects online sentence processing, we examined L2-Chinese learners whose native language is not topic-prominent but who have had a few years of exposure to Chinese topic structures.

Exp.2: We recruited 27 native speakers of English from Hopkins-Nanjing Center, Nanjing University. They were all highly advanced L2 learners of Chinese who passed Chinese Proficiency Test (HSK) Level-8 (mean years of study: 4.5) prior to participating in our experiment. As shown in Fig. 2, SVOs were read significantly faster than TSVs at patient-NP 'novel' ($t = -2.78$, $p < .05$) – a pattern similar to native speakers. Critically, no significant difference was found at the verb 'read', where DLT predicts that processing difficulties will arise.

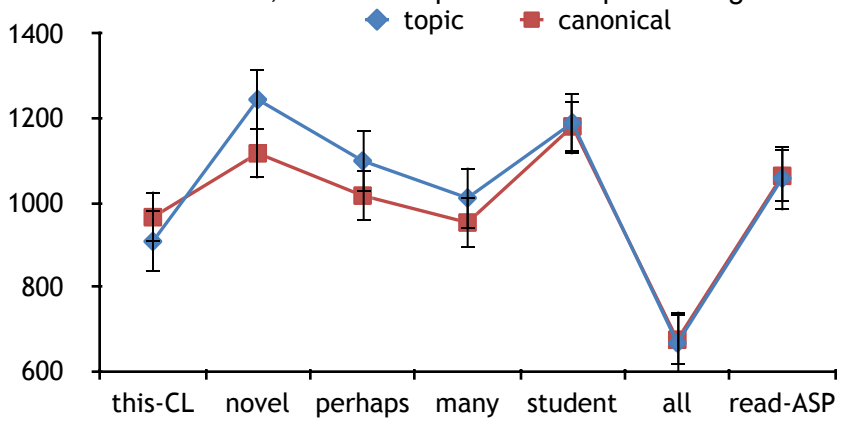

Fig. 2 trimmed reading time in Exp.2

Conclusion: Generally, the results are not consistent with the storage and retrieval account, but provide evidence for the experience-based account. The processing difficulties found in online sentence comprehension by native and non-native Chinese speakers converge to indicate that people don't always experience difficulty at the verb even when its dependent patient NP is at the distant sentence initial position. Given that topic structures are prevalent and frequent in Chinese, our results show a clear effect of prior language experience. Furthermore, results from the two experiments suggest that TSV, a topic-comment construction, does not necessarily involve filler-gap dependency processing, hence casting doubt on the psychological reality of *gap* in Chinese TSVs (cf. Huang & Kaiser 2008; Yang & Liu 2014).

Selected references

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