Abstract

By reviewing popular theories of RC processing strategy in Chinese and numerous previous studies, this study argues for a testing-environment-dependent processing of Chinese relative clauses. A "local-summation model" is proposed to describe the asymmetry between subject- and object-extracted relative clauses in Chinese. Based on the above observations, this study also provide suggestions regarding methods and designs for future studies on Chinese relative clauses.

Introduction

Relative Clauses (RCs) have been a widely-studied topic in language processing in recent years. RCs are defined as subordinate clauses that modify a noun phrase, which is relativized. RCs of major interests can be divided into two categories: Subject-extracted RCs (SRCs) and Object-extracted RCs (ORCs). In languages with head-initial RCs, ORCs are more difficult than SRCs. Tree structures of English SRC and ORC are shown below.

Numerous hypotheses have been proposed to explain such pattern, and all predicts a relative advantage in SRC processing in languages with head-initial RCs. Nonetheless, such theories yield different predictions in Mandarin Chinese, where RCs are head-final. Tree structures of Chinese SRC and ORC are shown below.

Chinese can therefore be a testing ground for all the hypotheses regarding RC processing. Unfortunately, studies on RC processing in Chinese yield controversial results, with some supporting SRC advantage, and others supporting ORC advantage. Experimental paradigms are also widely different, and different hypotheses are used to explained the results.

Analysis of Previous Studies

Multiple theories of RC processing have been proposed, and they yield different predictions about the processing asymmetry of RCs in Chinese, as well as the critical region that contribute to the asymmetry. Table 1 list eight popular theories in literature, in addition to the prediction they yield when applied to Chinese RC. "RL" stands for the relativizer word "de", and "MCHN" stands for main clause head noun. These eight theories fall into 2 main categories as shown in Table 1: Expectation-Based theories and Movement-Based theories. The former attribute the RC processing asymmetry to the syntactic expectation readers have for possible developments of the sentences. The latter focus more on the processing cost due to syntactic movement in RC structures.

Experimental paradigms also varies. Some created active reading environments (e.g. self-paced reading), and others created passive environments (e.g. EEG). Table 2 and Table 3 list the region-specific findings of existing studies using active and passive environments respectively.

Discussion

Great controversy still exists in explaining the mechanism of Chinese RC processing. As shown in Table 2 and 3, there exist region-specific differences in findings across different studies. The only thing for sure is that the asymmetry between SRC and ORC processing exists, but whether a SRC advantage or an ORC advantage underlies the asymmetry is still widely disputed. Based on the analysis of different studies, we can see that difficulty asymmetry in Chinese RC processing is not determined by a single factor. Even though most scholars try to explain the ORC or SRC advantage using one single theory that, as they claim, works cross-linguistically, it is very likely that more than one factor decides the RC processing difficulty. This is supported by the observations that SRC and ORC advantages at different regions can co-exist in the same condition. Therefore, multiple linguistics factors that are location dependent need to be "summed" to yield the overall asymmetry in RC processing. In other words, we need to adopt a "local-summation model" in explaining Chinese RC processing.

In addition, there exist a possible correlation between experiment environment and the parsing strategy, as shown in Chart 1 and Chart 2. Therefore, future studies should try to study the influence experimental paradigms tend to parsing strategies readers use. Also, position-branch subject positions should be the focus for future studies to avoid potential ambiguity. Matrix-subject position RCs may share sentence initial portions with other constructions like DE-construction and Pro-dropped sentences. Thus, such structures should also be tested to study the validity of Expectation-Based theories.

Suggested Future Study

To solve the problems associated with previous studies as mentioned in previous sections, the following study is proposed. The proposed study will used EEG device time-locked to eye-tracking device to create an active reading environment while using ERP technique, which is commonly associated with passive reading environments. This study will test if participants would show SRC advantage as in similar environments created by self-paced reading paradigms. Also, in addition to reading time, ERP data can provide more understanding of expectancy and surprisal effects in active reading environments.

In addition to the two RC conditions, pro-drop imperative and SVO sentences will also be tested. By comparing SRC with pro-drop sentences, we can verify reader's default expectation, if there is any for constructions with sentence initial positions like RC in RVs. SVO condition will also be used as a comparison with ORCs, as these two constructions share the same sentence-initial portions. This design can help us further verify the argument in most studies suggesting Expectation-Based theories for Chinese RC processing. The four conditions are listed in Table 4.