ISSN : 2394-2975 (Online)
ISSN : 2394-6814 (Print)

The Role of L1 Syntactic Skills in Processing Extrapositional L2 Sentences

Hulin Ren
Division of Foreign Languages, College of Biochemistry, Beijing Union University, Beijing, China
Professor, School of Foreign Languages, North China Electric Power University, Beijing, China

Abstract
The paper aims to investigate the role of Chinese syntactic skills in Chinese learners' processing of relative clause extrapositional English sentences such as A book appeared which was written by Chomsky. Two groups of Chinese learners with different Chinese syntactic skills (i.e. 15 high skill (group 1), 15 low level (group 2) and one control group (15 native English speakers) took part in the grammaticality judgment and an off-line English comprehension test. Results showed that group 1 had the same comprehension accuracy as control group, but different in grammaticality judgment. Group 2 had higher scores in grammaticality judgments than group 1, indicating that L1 proficiency had negative effect on L2 learners' grammaticality performance. That group 2 obtained lower scores in comprehending these English sentences indicates that L1 proficiency had positive effects on L2 learners' comprehension accuracy. Results of the study are discussed in terms of the connectionist and/or rule-based approach to L2 sentence processing, and conclusions are made with regard to Chinese learners' ability in processing English syntactic structures.

Key Words
Syntactic Skills, Sentence Processing, Comprehension Accuracy, Reading Times

I. Introduction

Studies on second language (L2) sentence processing have shown that L2 language proficiency affects the processing of L2 sentences[15]. For example, L2 English proficiency has effect on Chinese learners' individual differences in the comprehension of complex English sentences[14]. In this regard, it was found that Chinese learners of English with good English skill had a better performance than those with poor English skill in the comprehension of the complex English sentences with tough movement structure such as Tom will be difficult to get the President to vote for. However, there are relatively few studies on the effect of first language (L1) on the processing of L2 sentence processing, as it involves the transfer role of L1 in L2 processing.

As for the effect of L1 transfer in L2 sentence processing, researchers hold controversial opinion (e.g. [12], [10]). Some researches show that there is the effect of L1 transfer on L2 sentence processing (e.g. [9], [5], [11]), as different exposure/ experience with L2 language can make differences in sentence processing, which is the connectionist account of differences in L2 sentence processing. Other studies indicated that there is no L1 transfer effect in processing performance among learners from typologically different language backgrounds (e.g. [3], [13], [12]), as there is universal rules facilitate L2 sentence processing, which is assumed by the rule-based approach to L2 sentence processing[16] . To clarify the different views of L2 sentence processing between the connectionist approach and the rule-based approach, and have a clear picture of the role of L1 in L2 sentence processing, it is necessary to investigate the effects of Chinese syntactic proficiency on Chinese learners' individual differences in processing the extrapositional complex English sentences. The study is to investigate the role of L1 Chinese proficiency in the comprehension of four types of extrapositional English sentences. In section 2, experimental studies of Chinese syntactic skill in L2 English sentence processing are reported. Findings of these experiments are discussed in section 3 and conclusions are made in section 4.

II. Current Study of L1 Syntactic Skill in L2 Sentence Processing

The study uses grammaticality judgment and comprehension test to examine the effect of Chinese learners with high L1 syntactic skill on the comprehension of four types of extrapositional English sentences such as *A book appeared which was written by Chomsky*. Chinese learners' L1 (Chinese) syntactic skill is measured by Chinese syntactic proficiency (i.e. HSK), which is a national standard for measuring Chinese proficiency.

A. Subjects

The Chinese subjects are divided into two groups. One group is 15 full-time Chinese learners with high HSK score (group 1). Their average age is 19. They are Chinese-learners of English selected from the HSK test. None of this group had ever been to the countries outside China. The other group is another 15 full-time Chinese learner with low HSK scores (group 2). Their mean age is 20. English proficiency of the two groups is at the intermediate level according to their scores of TOEFL test. The control group is 15 native English speakers who are now teaching English at university level in Beijing. Their mean age is 24.

B. Materials

The tasks used in the experiments are English relative clause extrapositional sentences by Francis [4] and have some modification: 1) *A book appeared which was written by Chomsky* (type1). 2) *A letter arrived yesterday which was addressed to Mary (*type 2*);* 3) *A handsome man entered that we knew in school* (type3); 4) *We will discuss the announcement tomorrow that John made yesterday* (type 4). For the sake of comparison, similarities and differences of each structure between English and Chinese are illustrated as follows. The rational for using these structures is that they are different in the embedding level of extrapositional position, which requires the recursive application of grammatical rules.

English extraposional sentences are formed by positing a modifying clause that is co-indexed with the head noun into the noncanonical order. For example, in sentence 1) *A book appeared which was written by Chomsky*, the modifying clause *which was written by Chomsky* was put at the end of the whole sentence, rather than following the position of the head noun *book*. Thus, the modifying

clause changes its canonical order at the extrapositional position (i.e. at the end of the sentence). In Mandarin Chinese, however, there is no change of such extrapositional position, thereby eliminating the need for a extrapositional change. For example, the English question sentence *Which car did the tourist buy?* would have the word order *tourist buy which car?* in Chinese. In this sense, a comparison between the different Chinese groups will indicate to what extent the existence of English-like processing routines in the Chinese impact on native-like parsing strategy can be acquired/employed in the L2.

The Chinese *wh*-phrases, however, differs in English in that there is a lack of S-structure wh-movement. Take the complex English sentence c) *Who did the manager that the secretary claimed that the new salesman had pleased talk to* as an example, the equivalent Chinese is as follows:

Nage mishu shengcheng nage xin shouhuoyan manyi de
The secretary claimed the new salesman pleased aux.
jingli he shei tanhua?
manager to who talk

As can be seen above, in the Chinese version of the sentence, the *wh*-phrase (i.e. *shei*) does not have a movement. That is, *shei* remains in situ and does not move to the head of the sentence, it is in the middle of the sentence followed by *he*, whereas the *wh*-movement takes place differently in the English version, the *wh*-phrase (*who*) is placed at the initial position of the sentence.

C. Procedure

The procedure followed Chipere' [1] study in complex English sentence processing. 120 Chinese learners of English whose English proficiency was at the high level were recruited from Beijing Union University, Beijing, China to have a HSK Test. Three groups were classified by their HSK level. Namely, high level (group 1), low level (group 2) and intermediate level (group 3). Then two groups (i.e. high and low Chinese proficiency groups) were selected as experimental groups, and each group consisted of 15 individuals, had the off-line English comprehension test at Beijing Union University, China. The control group was recruited from native English speakers who were in teaching English at Beijing Union University and North China Electric Power University. The control group did the same off-line English comprehension test as the two experimental groups at Beijing Union University and North China Electric Power University.

The three groups were given the writing versions of the test sentences and required to have a general reading of all the extrapositional sentences. The purpose of doing this was to rule out the potential problem in literacy that might disturb the comprehension test. After doing this, all subjects were required to read the sentences one by one and are told that they are allowed to backtrack whenever necessary so that they can process the sentences at their own pace. After studying the sentences to their satisfaction, the subjects were then asked to answer questions to the sentences under the condition that they thought they are ready for it. The subjects were told that they should not worry if they could not answer some of the questions, but they were urged to do the best they could. Questions to the sentences were written on the blackboard in the classroom. The grammaticality judgment test took place in one weeks' time after the test of comprehension. The subjects were given the same sentences used for comprehension test and were asked to judge grammaticality on a scale of 1 to 5, 1 is very ungrammatical; 2 is ungrammatical, 3 is neutral, 4 is grammatical, 5 is very grammatical.

III. Results And Discussions

The results of comprehension accuracy of the extrapositional English sentences are presented in table 1. The results show that high Chinese proficiency learners of English obtained the same comprehension scores as that of the native English speakers. The low Chinese proficiency learners of English did not obtain the same comprehension accuracy as that of the high Chinese proficiency learners and native English speakers, indicating that Chinese proficiency played a positive role in the English sentence comprehension. The main effects of groups for the key questions was significant ($p<0.05$). The comprehension results between group 1 and 2 can be explained in terms of positive effects of Chinese proficiency on comprehension, because if Chinese proficiency functions in the comprehension, group 1 with high Chinese proficiency should outperformed group 2 with low Chinese proficiency.

Table 1: Mean Comprehension Scores of sentence structure (percentage)

Structure	Group 1	Group 2	Control Group
type 1	0.725	0.617	0.731
type 2	0.653	0.528	0.661
type 3	0.591	0.432	0.593
type 4	0.525	0.416	0.527
Total mean score	0.624	0.498	0.628

The results that group 1 had almost the same accuracy performance as native English speakers could be explained by explicit grammatical instruction given to the non-natives while learning English [2], which benefit them in the comprehension accuracy as the native speakers did, as relatively more schooling with English makes it possible for the high Chinese proficiency learners perform the same as the native English speakers. The result that high Chinese proficiency learners outperformed low Chinese proficiency learners could be ascribed to the positive role of Chinese proficiency, as they have the same English proficiency level.

The results of grammaticality judgment of the extrapositional English sentences are listed in table 2. These results clearly indicated that both high and low Chinese proficiency learners respected the constraints on canonical violation of extrapositional sentences in English, despite the fact that there were differences in their grammaticality judgment. The interesting thing was that low Chinese proficiency learners of English had a better performance than high Chinese proficiency learners, suggesting that Chinese proficiency played a negative role in judging the grammaticality of the sentences.

Table 2: Mean Scores of Grammaticality Judgment (percentage)

Structure	Group 1	Group 2	Control group
type 1	0.775	0.787	0.826
type 2	0.612	0.702	0.835
type 3	0.512	0.627	0.825
type 4	0.535	0.648	0.843
Total mean score	0.609	0.691	0.832

The result that both group 1 and 2 did worse grammaticality judgment than native English speakers was difficult to be explained in terms of the effect of formal instruction on grammatical rules. Given that formal instructions functioned in the process

of judgment, Chinese learners of English should have better or at least the same scores in the grammaticality judgment as native English speakers, as Chinese learners had relatively more formal instructions on English grammar training than native English speakers. One possible explanation might be that the grammaticality judgment of the extrapositional sentences was related to language experience, since native English speakers had more experience with the sentences than Chinese learners of L2 English, and Chinese learners of English got relatively less experience with these structures.

The results are consistent with the hypothesis that universal parsing strategy constraints the processing of English by high skilled Chinese learners, as Chinese displays no options of canonical violation. For example, In English, a modifying phrase occurs at the end of the sentence. However, in Chinese, there are no such rules, where modifying element must occur in the beginning of the head position.

If Chinese learners of English transfer nontargetlike processing strategies from their native language Chinese to English, according to Felser *et al* [3] predication, which is a barrier to acquiring full nativelike performance in English. However, the findings in the experiment do not support this predication. English is a word-order-relative dependent language, that is, the position of the words in the sentence determines their grammatical roles [6]. While Chinese marks the grammatical relationships among the words in the sentence through some use of prepositions (e.g. the preposition *bei* to mark a human direct object), but mainly through the verbal inflectional system, i.e. by adding a auxiliary verb such as *le* to mark the verb tense [17].

The results seem to indicate that process of L2 sentences is a complex picture in that high proficient Chinese learners of English had the same performance as low Chinese proficient, even for features that are not present in the L1 Chinese. However, the reanalysis and repair processes normally associated with the P600 component (e.g. [7], [8]) would seem to be engaged only for features that are present in L1, suggesting that rules may function in the process.

IV. Conclusions

The paper is aimed to examine the role of L1 proficiency in L2 sentence processing. The study generally shows that Chinese proficiency has negative effect on grammaticality judgment of the extrapositional English sentences, as high Chinese proficiency learners did not outperform the low Chinese proficiency learners in the performance. This finding supports the rule-based account of parsing in L2 sentence processing, which claims that there is universal parsing rules in L2 sentence comprehension. However, the connectionist account was supported by the finding that native English speakers had better performance in grammaticality judgment than Chinese learners of English, but not supported by the finding that high Chinese proficiency learners did better in the English comprehension than that of the low Chinese proficiency learners, as they differ in the level of Chinese proficiency, suggesting that L1 proficiency has positive role in L2 sentence processing. Thus, the findings in the study lead to the conclusion that the rule-based and the experience-based account for the role of Chinese proficiency in extrapositional English sentence comprehension for Chinese learners of English as a L2 can partially explain the nature of L2 sentence processing.

Acknowledgement

The paper was supported by Beijing Social Science Key Planning Project Fund (2015BJ0122), Beijing, China.

References

[1] *Chipere, N. (2003). Understanding Complex Sentences: Native Speaker Variations In Syntactic Competence. Palgrave, Basingstoke.*

[2] *Clahsen, H., & Felser, C. (2006). "Grammatical processing in first and second language Learners". Applied Psycholinguistics, 27, 3-42.*

[3] *Felser, C. Roberts L., Marinis, T., & Gross, R. (2003). "The processing of ambiguous sentences by first and second language learners of English". Applied Psycholinguistics. 24, 453-489.*

[4] *Francis, E. J.(2010).Grammatical weight and relative clause extraposition in English. Cognitive Linguistics, 21(1): 35-74.*

[5] *Frenck-Mestre, C. (2002). "An on-line look at sentence processing in the L2". In R. R. Heredia.,& J. Altarriba (eds.). Bilingual Sentence Processing. Amsterdam, Elsevier. 217-236.*

[6] *Hoover, M. L., & Dwivedi, V. D. (1998). Syntactic rocessing by skilled bilinguals. Language Learning, 48, 1-29.*

[7] *Hopp, H. (2006) "Syntactic features and reanalysis in near-native processing". Second Language Research, 22, 3, 369-397.*

[8] *Hopp, H., Mayra, E., & Arriaga, L (2016). Structural and inherent case in the non-Native processing of Spanish: constraints on inflectional variability. Second Language Research, 32(1), 75-108.*

[9] *Juffs, A. (1998). Some effects of L1 argument structure and morphosyntax on L2 sentence processing. Second Language Research, 14(4), 406-424.*

[10] *Juffs, A. (2006). "Grammar and parsing and a transition theory". Applied Psycholinguistics, 27, 69-91.*

[11] *Lieberman, M., Aoshima, S., & Phillips, C. (2005). Native-like biases in generation of wh-questions by non-native speakers of Japanese. Studies in Second Language Acquisition, 28, 423-448.*

[12] *Marinis, T., Roberts, L., Felser, C., & Clahsen, H. (2005). Gaps in second language sentence processing. Studies in Second Language Acquisition, 27, 53-78.*

[13] *Papadopoulou, D. & Clahsen, H. (2003) "Parsing strategy in L1 and L2 sentence processing: a study of relative clause attachment in Greek". SSLA, 25, 501-28.*

[14] *Ren H. L. (2011).Effects of L1 proficiency on L2 self-embedded complex sentence processing, IEA. 180-185.*

[15] *Roberts, L.(2013). Sentence processing in bilinguals. In van Gompel RPG (eds) sentence processing. New York: Psychology Press, 221-246.*

[16] *Williams, J. N., Mobius, P., & Kim, C. (2001) "Native and non-native processing of English wh-questions: Parsing strategies and plausibility constraints", Applied Psycholinguistics, 22, 509-540.*

[17] *Yao, Q (2014).The second-language acquisition of aspects in Chinese bei-constructions. In Jiang N (ed) Advances in Chinese a second language: acquisition and processing. Newcastle: Cambridge Scholar Publishers, 54-76.*

Author's Profile

Hulin Ren is now a Professor at Division of Foreign Languages, College of Biochemistry, Beijing Union University, Beijing, China. He is also working as a Professor at School of Foreign Languages, North China Electric Power University, Beijing, China.