

A Study on the Influence of English Proficiency on English Learners' Understanding of DO/SC Garden Path Sentence

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Abstract: Garden path sentence is a local ambiguity in language that reveals the characteristics of human language processing, so it has obtained the focus of linguistic research. This study uses introspective multiple choice test and question-response test to explore whether there is a correlation between the ability to interpret DO/SC garden path sentence, the phenomenon of misinterpretation residue and Chinese learners' English proficiency. The result shows both groups exist garden path phenomenon, but influenced by their English level, there are significant differences in understanding target sentences and in the phenomenon of misinterpretation residue between the high and middle English level group. Therefore, efforts should be made to improve learners' English proficiency to avoid the garden path phenomenon in the future.

Keywords: English Proficiency; DO/SC Garden Path Sentence; Misinterpretation residue

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1 Introduction

The term “garden path sentence” comes from the saying “to be led down the garden path”, which means misleading. People will be led into the garden path because of the sentence structure. When analyzing sentences, they usually interpret them most easily, but the interpretation that people are not willing to accept is often the correct interpretation of sentences.

Some early psycholinguistic studies have shown that the garden path sentence can still be correctly

interpreted after ambiguity resolution, but in recent years, some studies have claimed that even if the syntactic structure of garden path sentence is re-analyzed and disambiguated, the residual misinterpretation still exists. Therefore, this study chooses 53 non-English major learners of different English proficiency and examines their understanding of garden path sentence through two tests. It aims to investigate whether there are significant differences in interpreting DO/SC garden path sentence and the phenomenon of misinterpretation residue among different English proficiency.

2 Literature Review

The related research of garden path sentence began in 1970s. Bever, Frazier, and Ford mainly discussed from the perspective of cognition or syntax, which provided some theoretical basis for later research. The early research focused on the description of people's syntactic analysis strategies in dealing with garden path sentence. Then, since the late 1980s, researchers began to focus on the grammatical structure of “garden path sentence”, trying to explain the sentence through grammatical analysis. In the 21st century, the research of “garden path phenomenon” has been introduced into China. Following is a brief review of the main contents of the research on garden path sentence at home and abroad.

2.1 Previous studies on garden path sentence abroad

In the early stage, linguists and psycholinguists abroad mainly discussed from the perspective of psycholinguistics, trying to find and describe the

parsing strategy of brain's processing "garden path sentence". Later, some scholars carried out research from the perspective of grammar. At the end of 1980s, foreign scholars tried to explain "garden path sentence" from the perspective of language structure itself.

Bever put forward "a hierarchy of canonical schemas", which held that in the process of language processing, the information receiver inputs language into the canonical schema whose level is matched with brain, according to the receiving order^[1]. Frazier proposed the "late closure strategy" and "minimum attachment strategy", claimed that different error analysis to which syntactic analysis strategies lead will not always cause "garden path phenomenon"^[2]. Then he put forward the "interpretation theory", pointing out that in the process of syntactic analysis, the "main relationship" of sentences is fixed and cannot be re-analyzed; what can be re-analyzed and processed is the "non main relationship". Based on the "interpretation theory", some scholars proposed the thematic monotonic model. On the one hand, the theory recognizes that the process of language processing is essentially the process of components adding word by word. On the other hand, it emphasizes that the subject plays a very important role in determining the semantic function nodes.

2.2 Previous studies on garden path sentence in China

Until the beginning of the 21st century, China began to carry out the study of garden path sentence. Some scholars thought there are also "garden path sentences" in Chinese, and put forward "potential ambiguity theory".

Researchers began to pay attention to the causes of garden path phenomenon, trying to explain it from the perspective of cognitive linguistics and syntactic analysis. Jiang claimed that the emergence of "garden path phenomenon" involves many factors, including semantics, syntax and pragmatics, and syntactic analysis can describe the specific process of language understanding and explain the language processing principles and psychological factors that lead to "garden path phenomenon"^[3]. Yan conducted a qualitative study on the processing of "garden path sentence" in English. It is found that the processing of ambiguous sentences is a dynamic thinking process: error detection -- error diagnosis -- error repair, and the main processing methods of ambiguous sentences are translation^[4]. Gu and Cheng tested the students' comprehension

of the subject and clause of "garden path sentence", working memory and language ability, and found that Chinese English learners' understanding of "garden path sentence" is the coexistence of disambiguation and misinterpretation^[5].

3 Methodology

3.1 Research questions

(1) Does garden path phenomenon exist in Chinese English learners' interpretation of DO/SC garden path sentence?

(2) Is there a significant difference in the understanding of DO/SC garden path sentence among students with different English proficiency?

(3) Is there a significant difference in residual misinterpretation among students with different English proficiency?

3.2 Research object

This study chose 53 12th grade students as research objects. According to the average score of their four monthly English exams (150 points in total) last semester, 24 students with scores above 115 are classified as high English proficiency group, 29 students with scores between 90 and 115 are classified as middle, and students with scores below 90 are not taken into account. Through independent sample T-test, there are significant differences in English language proficiency between the two groups.

3.3 Research instruments

This study adopted Christianson's experimental materials and research methods, using multiple introspective choice test and question-response test^[6]. There are five questions in multiple introspective choice test, aiming to test whether there is garden path phenomenon in the process of understanding DO/SC garden path sentences. An example for multiple introspective test:

When reading the sentence "I knew this book was boring." for the first time, which of the following statements is in line with your understanding process?

A. The first time I read this sentence, I knew that "this book was boring" should be the object of "knew";

B. The first time I read this sentence, I thought that "this book" was the object of "knew", but when I read "was", I realized that "this book was boring" should be the object of "knew".

Then there are 15 subject-subordinate complex

sentences in the question-response test. Each sentence contains two questions (question A & question B), aims to check whether there is a significant difference in understanding DO/SC garden path sentence and in phenomenon of residual misinterpretation among students with different English proficiency. An example is as follows:

“While Susan dressed the baby spit up on the bed.”
Please answer the following questions according to this sentence:

Question A: Who spit up on the bed?

Question B: Did Anna dress the baby?

3.4 Data collection and processing

The subjects first completed the multiple introspective test in 3 minutes, 5 minutes later, completed the question-response test in 10 minutes, and then hand in

test paper immediately after completion. After paper is recycled, the author makes statistical analysis on the test results. For the multiple introspective test, the author mainly counts the frequency of choosing option a and option b. For the question-response test, each student’s total number of each correct answers to each two question will be recorded and sorted out. Using the independent sample T-test in spss22.0 to solve the later two questions.

4 Results and Discussion

4.1 Results

4.1.1 The result of multiple introspective choice test

The author counted the number of different options in the introspective multiple choice test, shown in Table 1.

Table 1. The result of multiple introspective choice test

	Number of choices		Total
	Option a	option b	
High level group	88	32	120
Intermediate group	69	76	145

“Option a” means the existence of the phenomenon of garden path in the process of understanding. From table 1, 73.33% (88/120) subjects in the high English level group chose “option a”, 26.67% (32/120) subjects chose “option b”, and the total number of “option a” was higher than that of “option b”; for the middle English level group, 47.59% (69/145) subjects chose “option a”, 52.41% (76/145) subjects chose “option b” (180/280), and the total number of the two options was almost the same. The data shows

that almost all English learners have garden path phenomenon in understanding DO/SC garden path sentence.

4.1.2 The result of question-response test

Firstly, independent sample T-test was conducted on the data of correct scores on question A of two groups, to test whether there was significant difference between the two groups’ ability of interpreting target garden path sentences (Table 2).

Table 2. The result of Question A

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Question A Ture									
Equal variances assumed	.454	.504	5.856	51	.000	2.568	.438	1.687	3.448
Equal variances not assumed			5.830	48.263	.000	2.568	.440	1.682	3.453

From results in Table 2, $p=.000<.05$, that is, there is a significant difference between the high and the low English level group in understanding DO/SC garden path sentence, which means the garden path interpretation ability of the high-level English group is significantly higher than that of the low-level English group.

If the objects can correctly answer question B, it means that they will not have misinterpretation residue after eliminating local ambiguity. In order to further test the correlation between English language level and the phenomenon of misinterpretation residue, the researcher also conducted independent sample T-test analysis on the accuracy of answer B of all the objects (Table 3).

Table 3. The result of Question B

	Levene's Test for Equality of Variances		t-test for Equality of Means							
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
								Lower	Upper	
Question B Ture	Equal variances assumed	.625	.433	4.137	51	.000	1.878	.454	.967	2.789
	Equal variances not assumed			4.076	45.574	.000	1.878	.461	.950	2.805

In Table 3, the data shows that there is a correlation between English learners' language proficiency and their residual misinterpretation in understanding DO/SC garden path sentence ($p=.000 < .05$). It also shows that, although some of them successfully disambiguate, the residual misinterpretation still exist according to subsequent responses. And the higher the level of English, the lower the residual misinterpretation.

4.2 Discussion

The above data shows that both high-level group and the middle-level group will produce garden path phenomenon when understanding DO/SC garden path sentence, and the higher the language level of the learners, the stronger the ability of interpreting garden path sentence, the weaker the phenomenon of residual misinterpretation. The predicates of the subject clause in DO/SC garden path sentences are two-place arguments which can select different types of structures as their complements: directly selecting the DP(determiner phrase) after it and selecting CP(complementizer phrase). When the latter predicates choose, people interpret the sentence correctly; if the former is chosen, the garden path phenomenon will occur.

According to the principle of minimum node attachment, in DO/SC garden path sentence, if the predicate correctly selects the CP phrase as the complement in the interpretation, it needs to add a new CP node on the existing node; if the DP phrase is directly selected, then DP can be directly attached to the existing VP node, which could simplify the complexity of the language but led to the garden path phenomenon. Therefore, the lower the language level of learners, the more they tend to associate with the least nodes to simplify the language processing, and the more difficult for them to re-select the affiliated nodes, which causes the weaker the ability to interpret garden path sentences and the more misinterpretation remains.

5 Conclusion

In this paper, the multiple introspective choice test and question-response test are used to investigate the interpretation of DO/SC garden path sentence and the phenomenon of residual misinterpretation. The test results show that learners with different English proficiency will have garden path phenomenon and misinterpretation residue phenomenon, which is mainly caused by the tendency to choose the interpretation method with principle of minimal attachment; however, the higher the English proficiency, the higher the ability to interpret garden path sentence, the lower the residual misinterpretation phenomenon, which is mainly due to the influence of language level on sentence reinterpretation ability. This paper is helpful to further understand the sentence processing mechanism of second language learners, but only one typical type of garden path sentence is discussed. In the future, we can try to further study the interpretation mechanism of other types in order to get a more comprehensive conclusion in the research of garden path sentences.

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