Influence of Semantic Factor on the Comprehension of Do/s Garden-Path Sentences

Wang Bo

Dalian Neusoft University of Information, Liaoning Dalian, China

Abstract: This thesis is a survey research which is set to investigate Chinese non-English majors' comprehension of English DO/S garden-path sentences influenced by semantic factor. The author hypothesizes that semantic factors play an important part in affecting the chances that parsers achieve a full and complete reanalysis of the DO/S garden-path sentences. In order to examine this hypothesis, a survey is designed to investigate how semantic factors influence Chinese non-English majors' interpretation of English DO/S garden-path sentences, aiming to help Chinese non-English majors understand such garden-path sentences effectively and improve their ability and efficiency of reading comprehension.

1. Introduction

Garden-path phenomenon was first recognized by T.G. Bever, a psycholinguist, in his book *The Cognitive Basis for Linguistic Structures*, which has aroused heated discussion among psycholinguistic and linguistic scientists at home and abroad.

Earlier studies in the 1970s and 1980s were carried out from the perspective of psychology and psycholinguistics. Researchers endeavored to offer explanations for the generation of garden-path effect by putting forward particular sentence parsing strategies such as the Late Closure Principle and the Minimal Attachment Principle. Psycholinguist Christianson in 2006 gave out a definition to Garden-path sentences that "lead human sentence processors to construct an initial syntactic structure, which turns out to be incorrect, and thus requires syntactic and semantic reanalysis." (Christianson, 2006)

Since the late 1990s, more and more Chinese linguistic researchers have paid large attention to the Garden-path phenomenon. Many of them focused on how to disambiguate and form complete interpretations of garden-path sentences, such as Yan Xiaoqin made a research on the process of three kinds of Garden-path sentences interpretation (Yan Xiaoqin, 2008). In recent years, more research attention has been paid to the ultimate outcome of the reanalysis of garden-path sentences, for example, Gu Qiyi and Cheng Xiuping made a survey on Chinese students' interpretation on Garden-path sentences in terms of their language level and working memory, which found the misinterpretation cannot be totally erased after reanalysis (Gu Qiyi, 2010); Shi Yunfeng and Xie Yuhong analyzed the interpretation process of Garden-path sentence from the view of functional approach (Shi Yunfeng, 2017).

2. Methodology

2.1 Research Purpose and Assumption

However, Direct Object/Subject (DO/S) Garden-path sentence is the kind that Chinese English learners always misinterpret and hardly get the correct meaning based on the survey result from Yan Xiaoqin(2008). For example, the sentence "*While the woman was eating the cheese/brandy that was expensive and very tasty was brought out*" is the typical one that belongs to the DO/S garden-path sentences. Generally speaking, English learners at first tend to interpret this sentence as "the woman was eating the cheese/brandy" by following the SVO sentence structure, but the rest part "that was expensive and very tasty was brought out" cannot be understand based on English syntactic rules.

Actually they are in the garden without finding the correct path. The misinterpretation of DO/S garden-path sentences has many reasons, such as the English learners' language level, syntactic factors and semantic factors, etc. The illustrated misinterpretation of the upper sentence is attributed to the syntactic factor but it will be easily avoided if the sentence is rewrote into "*While the woman was eating, the cheese/brandy that was expensive and very tasty was brought out*" by adding a comma to separate "eating the cheese/brandy". Without the distraction of syntactic factor, the aim in this paper is to examine whether semantic factors would influence the comprehension of DO/S garden-path sentences and whether semantic reanalysis takes place in the process of the DO/S garden-path sentences' processing. To be more specific, "eating the cheese" is more acceptable usually in learners' analyzing process even "eating" and "the cheese" has been separated by a comma. But what is most expected to see is that whether they can replace that "cheese" that was expensive and very tasty is brought out with "brandy" after necessary semantic reanalysis is undertaken. The author hypothesizes that first, Chinese non-English majors tend to have partial analysis of DO/S garden-path sentences so that they derive incomplete interpretations. Second, semantic plausibility plays an important part in affecting the chances that parsers achieve a full and complete reanalysis of garden-path sentences. Furthermore, they will grasp the correct sentence meaning after reanalysis.

2.2 Methodological Approaches and Data

The quantitative and qualitative research method is employed in this study to test the assumptions proposed in this thesis based on the statistics collected from the comprehension questionnaire. To be exact, the comprehension questionnaire is used to investigate participants' understanding of English DO/S garden-path sentences. Subjects will be presented garden-path sentences of the DO/S type twice, for example:

1) While the woman was eating, the <u>*cheese/brandy*</u> *that was expensive and very tasty was brought out.*

And they are required next in 10 mins to select the noun they consider as the appropriate constituent according to their first response rather than the answer that they prefer after their second thought. For the second time, subjects are asked to think twice to choose out the answer they think correct within equal long time.

The questionnaire material used in this study is taken from Roger P.G. van Gompel, Martin J. Pickering, Jamie Pearson, and Gunnar Jacob (2006). And some minor adoptions are made in accordance with the vocabulary capacity of the subjects. The comprehension questionnaire paper consists of 10 sets of sentence items (see in Table 1). And each individual set includes a plausible DO/S garden-path sentence item; every sentence is a temporal adverbial clause in which there is a predicative verb that can be used both as a transitive verb and as an intransitive verb. Following the time clause, two noun phrases that have different meanings are available for the subjects to choose.

Table 1 Questionnaire of Subjects' Comprehension on Do/s Garden Path Sentences

S1	While the woman was eating, the <u>cheese/brandy</u> that was expensive and very tasty was brought out.	Answer
S2	While the lady was baking, the <u>cake/wine</u> that was fruity and thought to be extremely tasty fell over.	
S3	As the mother was cooking, the <u>pizza/video</u> that the teenager had kept on asking for was delivered.	
S4	As the owner was interviewing, the <u>chairman/computer</u> that was from the accounting department broke down.	
S5	While the housemaid was sewing, the <u>jumper/teapot</u> that was fairly old and quite badly stained was washed.	
S6	While the secretary was typing, the <u>document/engineer</u> that was awfully long and tedious had disappeared.	
S7	While the boy was swimming, the <u>river/horse</u> that was very fast and quite impressive was pointed out.	
S8	While the driver was parking, the <u>vehicle/rubbish</u> that had been left on the street for a while was removed.	
S9	While the comedian was performing, the <u>comedy/porter</u> that was really popular and well-liked was stopped.	
S10	While the officer was interrogating, the <u>suspect/shotgun</u> that was found at the crime scene was locked away.	

The subjects are freshmen, non-English majors. They are 20 convenient samples we selected from class A in which students generally have higher English level in Dalian Neusoft University of Information. After delivering the questionnaires to them, they are required to finish the questionnaires in 10 minutes. Finally, the data collected from the subjects are analyzed and calculated to get the percentage of their tendency in each set of sentence items by means of computer and make a table and columnar section to compare and contrast the results.

3. Results and Discussion

The results that will be reported next are just focused on data collected from the questionnaire. In order to demonstrate the statistics, we design a table and a columnar section to compare the subjects' tendencies.

The experiment results got from the questionnaire will be reported in Table 2 and a comparative analysis of these results will be presented in the following Columnar Section 1. Table 2 focuses on the data of the subjects' first preferences for which noun in each question about the English DO/S garden-path sentences in comparison with their choices in the second time. Meanwhile, the data of the percentage of subjects' first preferences that are above 50.0% is also shown in Table 2.

Table 2 the Data and the Percentage of the Subjects' Tendencies

	None	No. of choosers	Time 1		No. of choosers	Time 2
S1	cheese	13	65.0%	>50.0%	8	40%
	brandy	7	35.0%	<50.0%	12	60%
S2	cake	15	75.0%	>50.0%	9	45%
	wine	5	25.0%	<50.0%	11	55%
S3	pizza	18	90.0%	>50.0%	12	60%
	video	2	10.0%	<50.0%	8	40%
S4	chairman	8	40.0%	<50.0%	2	10%
	computer	12	60.0%	>50.0%	18	90%
S5	jumper	7	35.0%	<50.0%	1	5%
	teapot	13	65.0%	>50.0%	19	95%
S6	document	17	85.0%	>50.0%	18	90%
	engineer	3	15.0%	<50.0%	2	10%
S7	river	12	60.0%	>50.0%	5	25%
	horse	8	40.0%	<50.0%	15	75%
S8	vehicle	10	50.0%	=50.0%	1	5%
	rubbish	10	50.0%	=50.0%	19	95%
S9	comedy	15	75.0%	>50.0%	11	55%
	porter	5	25.0%	<50.0%	9	45%
S10	suspect	6	30.0%	<50.0%	2	10%
	shotgun	14	70.0%	>50.0%	18	90%

Take the first sentence "While the woman was eating, the <u>cheese/brandy</u> that was expensive and very tasty was brought out." in the questionnaire for instance, there are two noun phrases following the time clause for the subjects to choose. They are the cheese and the brandy. When the subjects first analyze the sentence, most of them are likely to choose the first of the two noun phrases.

As Table 2 shows, more than 10 subjects choose the first of the two noun phrases in question 1, question 2, question 3, question 6, question 7, question 8 and question 9. For example, in question 1, 13 subjects choose the first noun phrase "the cheese", which accounts for 65.0% of the total; whereas, only 7 subjects choose the correct answer "the brandy", which occupies 35.0%.

As we can see from Table 2, the data of the percentage of subjects' first preferences that are above 50.0% is 70.0%.
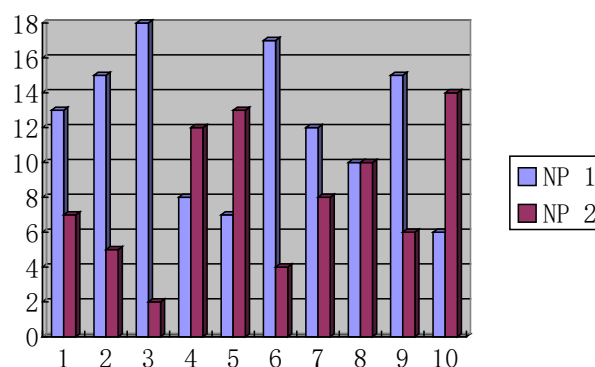
Columnar Section 1: The Data of the Subjects' Tendencies

In order to compare the tendency of the subjects' choices in each question, we try to present the result by virtue of a columnar section. The first column of each group represents the noun phrase that is likely to mislead the subjects, while the second column is not. As is clearly shown by the column chart, in most cases, the number of the subjects that choose the first noun phrase is much higher than that those choose the second noun phrase. However, we have to admit that there exist exceptions, such as in question 4, question 5 and question 10.

The results show that the subjects' performance in understanding the main clause and the subordinate clause of English DO/S garden-path sentences makes it apparent that subjects could usually recognize the noun phrase "the cheese" to be the object of the time clause with the help of their semantic knowledge perhaps and then gain an improper understanding of the sentence. Therefore, they are very likely to be incapable of discarding the noun phrase "the cheese" from the object thus fail to analyze the sentence correctly, let alone to get a rightful meaning from the sentence. In other words, when the subjects first analyze the above-mentioned questions, most of them consider the verbs in the time clauses as the transitive verbs, that is, the transitive meanings of the verbs are activated. As a result, even a comma has separated the main clause and time clause, based on their early formed thinking habits, they still tend to find a suitable direct object in accordance with their previous semantic knowledge. Such a kind of knowledge leads them to a shortcut when dealing with the English DO/S garden-path sentences instead of the real road that will take time. According to the subsequent observation, in the second round when the subjects are given equal long time to reanalyze the ten questions, they will deactivate the former semantic analysis and more than half of them change their former choices and are capable of making the correct ones. In Table 2, 7 questions in 10 have got more than 50% subjects' correct answer in the second time with offering them a chance of reanalyzing the given DO/S garden-path sentences, but there are still a part of subjects without making a correct choice after reanalyzing process.

To take the above results together, it was safe to infer that, for English DO/S garden-path sentences, most Chinese non-English majors will meet the difficulties in understanding them, but subjects have the tendency to grasp the correct sentence meaning after reanalysis.

4. Conclusion

4.1 Approaches to Interpretation of the Do/s Garden-Path Sentences

To begin with, Chinese non-English majors should establish their theoretical foundation of the garden-path sentences, that is, the definition, the categories, and the characteristics of such sentences. By doing so, they could have a better understanding of the garden-path sentences which can help them comprehend such plausible sentences correctly and immediately.

Moreover, when Chinese non-English majors encounter such kind of garden-path sentences, they need to recognize the type of such sentences and avoid hurrying into making an absolute comprehension of the sentences. On the contrary, they are suggested to analyze the sentences repeatedly so that they can master the complete meanings of the garden-path sentences, especially the DO/S garden-path sentences which is with high ambiguity and frequently appear in reading

comprehension.

4.2 Research Limitations

To take all the evidences from the experiment into consideration, it can be concluded that first, Chinese non-English majors have the tendency to just partially analyze English garden-path sentences and arrive at incomplete interpretations from them, in which part of the analysis is correct and the other part of the analysis is incorrect. Second, semantic plausibility plays an important part in affecting Chinese non-English learners' decisions to preserve or abandon the initial misinterpretation. Third, Chinese non-English majors to some extent are able to deactivate the semantic ambiguity after their reanalysis.

Owing to the authors' narrow horizon and limited knowledge of linguistics as well as statistics, the study had its inevitable limitations. Actually, this study was far from being flawless.

First, the experimental materials in this study include only DO/S garden-path sentence which is relatively difficult to parse. Experimental results would have been more convincing and have more generality if other sentence patterns such as the DO/SC structure and MV/RR structure were included in the investigation. In addition, this study would have been more lively and of more practical value if corpus from real-life situations in English and other languages such as Chinese were incorporated into the experiment. Moreover, the author just examined in the study whether the semantic factor exerts possible influence on the interpretation of garden-path sentences. It is a pity that other elements that might affect the comprehension garden-path sentences such as subjects' working memory capacity that has generally been deemed important in testing their sentence processing, especially syntactic ambiguity resolving, are not explored in this study. Besides, the subjects selected are not at a random level and the number of the subjects is limited, which will make the consequence less convincing. In addition, the total number of the questions in the questionnaire is restricted. Nevertheless, this paper provides a new and exciting way to investigate sentence comprehension and hopefully could offer some idea to solve the problems of English reading comprehension.

References

[1] Bever, T. G. The Cognitive Basis for Linguistic Structures [A]. Cognition and the Development of Language[C], ed. by R. Hayes. New York: Wiley & Sons, Inc, 1970, 279-362.

[2] Christianson, K., Hollingworth, A., Halliwell, J. F., & Ferreira, F. Thematic Role Assigned Along the Garden Path Linger[J]. Cognitive Psychology, 2001, (42) , 368-407.

[3] Christianson, K., Williams, C. Younger and Older Adults' "Good Enough" Interpretations of Garden–Path Sentences[J]. Discourse processes, 2006, (42), 205-238.

[4] Roger P.G. van Gompel, Martin J. Pickering, Jamie Pearson, and Gunnar Jacob. The activation of inappropriate analyses in garden-path sentences: Evidence from structural priming [J]. Journal of Memory and Language, 2006, (55) 335–362.

[5] Yan Xiaoqin. Qualitative Research on the Processing of English Garden Path Sentence[J]. Foreign Language and Literature Studies, 2008, (01), 39-45.

[6] Gu Qiyi, Cheng Xiuping. A Study on Chinese English Learners' Understanding Garden Path Sentences: Working Memory Capacity and Language Proficiency[J]. Modern Foreign Languages, 2010, 33(03) , 297-304+330.

[7] Yunfeng Shi, Yuhong Xie. Viewpoint in Garden Path Sentence: A Functional Approach[J]. Open Journal of Modern Linguistics, 2017, 7(1), 33-40.

[8] Meng Yao. A Study on the Influence of English Proficiency on English Learners' Understanding of DO/SC Garden Path Sentence[J]. Journal of Contemporary Educational Research, 2020, 4(4), 12-19.