

The Reconstruction of Logic in Popular Science Translation—A Case Study of C-E Translation of *Discovery of Fu-Tea*

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How to cite this paper: Guo, M. W., & Guo, P. Y. (2022). The Reconstruction of Logic in Popular Science Translation—A Case Study of C-E Translation of *Discovery of Fu-Tea*. *Open Journal of Modern Linguistics*, 12, 275-282.
<https://doi.org/10.4236/ojml.2022.123021>

Received: May 3, 2022

Accepted: May 24, 2022

Published: May 27, 2022

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Abstract

Popular science is an important carrier in popularizing the knowledge, methods as well as the ideology of science and technology. By using publicly accepted language, popular science translation facilitates the international exchange and development of science and technology. To reflect the scientificity and preciseness of popular science texts, the translation of popular science texts should be logically clear and strictly structured. This paper includes five parts: the first part is about the introduction of the background, the source text, and its significance. Then this paper analyzes the characteristics of popular science texts, which is followed by the discussion of the necessity of the reconstruction of logic in the translation of popular science texts based on the logical differences between Chinese and English sentences. Finally, with the C-E translation of *Discovery of Fu-tea* as an example, three methods based on the reconstruction of logic are discussed. The case analysis shows that methods such as emphasizing the objectiveness of the subject, using connective devices for the explicitness of logical relations, and reorganizing the word order are efficient in improving the translation quality of popular science texts.

Keywords

Popular Sciencetranslation, Differences between Chinese and English Sentences, C-E Translation of *Discovery of Fu-Tea*, Reconstruction of Logic

1. Introduction

As one of the outstanding traditional Chinese cultures, tea culture has been widely concerned by foreign people in recent years. With the increasing number of foreign readers of popular science texts on Chinese tea culture, there is an in-

creasing demand for popular science translation on tea culture. Tea culture and scientific and technological knowledge can be better disseminated to foreign readers through popular science translation. The source text is extracted from *Discovery of Fu-tea*, which is a popular science monograph about Fu-tea with novel concepts and basic knowledge in the fields of tea science, microbiology, analytical chemistry, pharmacology, etc. Popular science readings refer to natural science knowledge as the content, to the general public or non-professional people for reading, in the form of easy to understand, to popularize knowledge for the purpose. The main content of *Discovery of Fu-tea* is about Fu-tea knowledge, and the text is easy to understand, the purpose is to popularize scientific and technological knowledge to the public and spread tea culture. The language of the book is simple, with more run-on sentences and parallel sentences, emphasizing subject awareness and implicit coherence. Due to the different logic between English and Chinese, the reconstruction of logic is required in the process of translation to meet the reading habits of target language readers. The C-E translation of *Discovery of Fu-tea* can better popularize Fu-tea culture to foreign readers. This paper summarizes the strategy of reconstruction of logic in the translation of *Discovery of Fu-tea* as an example, so as to provide new ideas for the translation of popular science texts and promote the dissemination of Chinese tea culture.

2. Literature Review

Logic refers to the laws or rules of human thought. In general, logic is usually embodied in the principles of correct reasoning that must be followed in order to identify good patterns of reasoning (Geng & Liu, 2010). Only by relying on facts and following the laws of logic can new information be generated or conclusions drawn. The reconstruction of logic is the process of re-expression of the original logic.

The reconstruction of logic in translation refers to converting the expressions of the source language into that of the target language based on the logical thinking differences between two languages, on the basis of ensuring the integrity of the content and information of the source language, so as to conform to the logical habits of the target language. The process of logical reconstruction in translation is to identify the inner logical relation of the source language, reconstruct the logic of words, phrases or sentences in the source language, and determine the structure of the translation to conform to the logical thinking of the target language (Wang, 2001). The popular science text should spread scientific knowledge that is correct and error-free, and the logic should be strict and stand up to scrutiny (Xu, 2014). Therefore, the translation of popular science texts should not only convey scientific knowledge, but also, more importantly, reproduce the logical relation of the source text to the target text in a strict and clear manner. In view of logical differences between Chinese and English, such as subject thinking of Chinese and object thinking of English, the paratactic of

Chinese and hypotactic of English, and the circular line thinking of Chinese and the straight line thinking of English, the translation of popular science texts should do logical reconstruction and accurately reproduce the logic of the source text in the target text, so as to conform to the thinking habits of the target language readers.

In recent years, the relationship between translation and logical thinking has received increasing attention from translators. The thinking comprehension and expression process of translation are inseparable from logical activities (Wang, 2006). The translation is a logical activity and the target text is the product of logical activities (Altarriba, 1993). This shows that logical activities are necessary for the process of translation. Translation is the expression of the same thinking in a different language, not only the translation of words and sentences, but also the reproduction of logical thinking process. Correct logical judgment and reasoning are the prerequisites for correct translation, and logical thinking is helpful to correct understanding of the source text and the accurate expression of the target text (Wang, 2010). The necessity of logic is reflected in the fact that the translator should follow the basic rules of logical thinking of the source language and pay attention to the logical relation between sentences and paragraphs.

This paper will take the popular science monograph *Discovery of Fu-tea* as an example to discuss the necessity of logical reconstruction in the translation of popular science texts, analyze the logic of the source text of *Discovery of Fu-tea*, and summarize the strategy of logical reconstruction in the translation of popular science texts.

3. The Logic of Discovery of Fu-Tea

Discovery of Fu-tea is a popular science monograph of Golden Fungus Fu-tea with the logical interpretation of Fu-tea and Golden Fungus through tea science, microbiology, analytical chemistry, pharmacology, physiological medicine and sports medicine. The logic of the source text has the following three main features:

1) Subject thinking

There are more sentences with the subject logical thinking, emphasizing the sense of the subject. Personal expression is often used, where the point of the observation or narrative falls on the sender of the action and the sender of the action is used as the subject of the sentence. In addition, the generic person “someone”, “people”, and “everyone” is also used as the subject of sentences. The subject less sentence, subject-omitted sentence and passive with no grammatical marks are widespread in the source text.

2) Implicit coherence

There are many Chinese sentences in chronicle style, coordination and composite sentence, with a less logic-grammatical connector between words or clauses. The sentences appear to be loosely structured, but the internal logical relation is tight and focuses on implicit coherence.

3) Natural order

The information in sentences is arranged in the natural order, focusing on the logic of reality and chronological order and narrating layer by layer. The sentence mainly is first cause and then result, first narrative and then statement, first condition and then the conclusion, and the key information is often placed at the end of the sentence.

The source text of *Discovery of Fu-tea* has typical Chinese logical thinking, that is, subject thinking, implicit coherence and natural order, which is different from the logical thinking of English. Therefore, in the process of C-E translation, it is necessary to according to the characteristics of logical thinking of English corresponding to emphasizing the objectiveness of the subject, using connective devices for the explicitness of logical relations and reorganizing the word order for logical reconstruction, so as to comply with the English expression habits.

4. Reconstruction of Logic in English Translation of *Discovery of Fu-Tea*

The C-E translation of *Discovery of Fu-tea* is required to conform to the linguistic and logical norms of English, so as to promote the dissemination of Fu-tea culture. In the process of translation, the translator understands and traces the logical relation of the source text, and uses three strategies: emphasizing the objectiveness of the subject, using connective devices for the explicitness of logical relations and reorganizing the word order, to reproduce the logical expression of the source text, achieving the objectivity, preciseness and hierarchy of popular science texts.

4.1. Emphasizing the Objectiveness of Subject

Chinese focuses on personalization because of its subject thinking, tends to describe the behavior of people, and uses active voice, personal, notional passive, and sometimes also implies or omits the personal. In contrast, English focuses on depersonalization because of its object thinking, and puts the point of view of observation or narration on the result or the bearer of the behavior or action. It often goes with an impersonal style and avoids the pronouns. Passive voice is more often used to narrate facts or opinions in an objective, indirect and roundabout tone.

Therefore, in C-E translation, using “impersonal” instead of “personal” is often an effective means. Also, the conversion of active to passive can be used to conform to the language habits of the target language.

Example 1

ST: 一般来说, 人在 4 岁左右肠道中的微生物菌群结构基本稳定。

TT: Generally speaking, the intestinal flora structure becomes stable at the age of four.

Analysis: The source text in Example 1 is a simple sentence. For this sentence, “人” is used as the subject, which reflects the subject thinking of Chinese. Due to

the difference between English and Chinese, the method of object thinking should be adopted to conform to English expressions. So in the target text, the subject is changed from personal to impersonal. “The intestinal flora structure” is used as the subject instead of “people”, making the fact in the target text more objective.

Example 2

ST: 目前, 人们大都提倡顺产的生产方式, 这与人体菌群合理传承有关。

TT: Nowadays, natural labor for a baby is advocated for it is good for the reasonable inheritance of human flora.

Analysis: The source text in Example 2 is a simple sentence with an active voice. “人们” is the subject because it is the doer of the behavior “提倡顺产的生产方式”. But English focuses on object thinking, and uses the topic as the subject. Thus, in the target text, the topic “natural labor for a baby” is used as the subject, and passive voice is used to enhance its objective.

4.2. Using Connective Devices for the Explicitness of Logical Relations

The logical connection between English and Chinese is different. Chinese focuses on parataxis, which refers to the combination of subordinate linguistic units and major linguistic units by borrowing the meaning of discourse without conjunctions. Chinese people think highly of the whole, emphasize savvy and do not emphasize form. Context is the basis of understanding, and the grammatical structure is often derived from the context. It can be seen that as a parataxis language, the logical relation between the sentences is indirectly displayed by implicit coherence and the order of events in narration. The sentence structure is relatively loose but flexible without or with less use of conjunctions. Therefore, Chinese texts tend to be implicit in logical connection. As a language of hypotaxis, English sentence-making emphasizes formal cohesion, requiring complete structure, with the meaning implied in the sentence form, so it is strictly standardized and adopts the focus syntax. English sentences tend to use abundant connective devices, such as prepositions, conjunctions, relative pronouns, relative adverbs and so on (Gu, 2015). Therefore, English texts focus on explicit coherence.

Because of the difference between Chinese and English texts in the way of logical connection, the translator needs to adopt explicitation strategies for the logical relation between sentences in C-E translation. Explicitation refers to the process of introducing information into the target language which is present only implicitly in the source language, but can be derived from the context or the situation (Lian, 2010). The translator is required to translate according to the structure, meaning and context of the target language, and to add appropriate logical conjunctions implied in the source text to help readers understand the source text clearly.

Example 3

ST: 真菌壁所含的几丁质是一类特殊的膳食纤维，能促进肠道中的梭菌属 XIVa 簇形成，可减轻高脂和肥胖。

TT: Chitin in the fungal cell wall is a special dietary fiber that can promote the formation of Clostridium XIVa clusters in the intestine, thus reducing high fat and obesity.

Analysis: The source text in Example 3 includes three parts without conjunctions. By understanding the context, it can be seen that the logic is clear and the logical relation between three sentences is indirectly displayed by implicit coherence and the order of events in narration. “可减轻高脂和肥胖” is the result of the main sentence. So in the target text, the conjunction “thus” is added to show the explicit coherence.

Example 4

ST: 人为清除垃圾，就会出现呕吐、腹泻、腹痛。

TT: Symptoms such as toxins, vomiting, diarrhea, and abdominal pain will occur if the “waste” is artificially removed.

Analysis: The source text in Example 4 is a simple sentence without cohesive ties. It is the implicit coherence in Chinese. The sentence appeared with the conditional relation, that is, “如果人为清除垃圾，就会出现呕吐、腹泻、腹痛。”. Thus, in the target text, “if” clause is added to enhance the explicit coherence and conform to the habits of English readers.

4.3. Reorganizing the Word Order

There are great differences in logical thinking and word order between English and Chinese. Influenced by circular line thinking, the inductive structure is much more widely used in Chinese. Chinese sentences are mostly loosely flowing, and the meaning of the text needs to be deduced from the context. The natural order is often used in Chinese sentences. Chinese sentences explain the topic in detail from different aspects, so as to make readers gradually understand the meaning, and finally point out the theme or key points. Under straight line thinking, the deductive structure is basic in English. English sentences are mostly tree-shaped, and sentences are organized according to the importance of the content. In most cases, the sentence’s structure is divided into trunk and branch, in other words, main clause and subordinate clause. The salient order is often used in English sentences (Zhou & Liu, 2011). English sentences usually highlight key words or topic sentences, and then explain them in detail from general to specific, from the whole to the individual.

Due to the logical order difference between Chinese and English, the logical order of the source text is incompatible with the target text. The translator must analyze the logical thinking of the source text according to the context, and rearrange the sentence structure to make the logical order conform to the expression of the target language. Thus, in C-E translation, reorganizing the logical order and using salient order are common means.

Example 5

ST: 因为“糖蛋白”具有三维立体的结构，可以直接参与人体生理机能，所以具有较好的药理作用。

TT: Glycoprotein has good pharmacological effects because of its three-dimensional structure and direct participation in human physiological functions.

Analysis: The source text in Example 5 has a causal relationship through “因为...所以...”. Also, it put the key point at the end of the sentence, that is, the effect “所以具有较好的药理作用”. However, in English, the topic sentence is set down first, and then explained in detail. So in the target text, the effect “Glycoprotein has good pharmacological effects” is translated first, and then explain the reason “because of its three-dimensional structure and direct participation in human physiological functions”, which can be understood easily by target language readers.

Example 6

ST: 它是用来“占地盘”的，为自己营造一个安全的环境，为成为“优势菌”奠定基础。

TT: It is there to occupy space, to create a safe environment for itself, laying a foundation for being a “dominant species”.

Analysis: The source text in Example 6 exists several parallel verbs such as “用”，“占”，“营造”，“成为” and “奠定”，without the primary and secondary points. But English emphasizes the clear logic that its sentence structure can be divided into main clause and subordinate clause. The infinitive, the participle and the gerund can be used as the secondary level to make the logic clear. Therefore, “is”, “to occupy”, “to create”, “laying” and “being” are used in the target text.

5. Conclusion

Translation is the conversion of language form under the shift of thinking patterns rather than the conversion from one language to another (Liu, 2001). In terms of the differences between Chinese and English, the Chinese language features subjectivity and parataxis while the English language is characterized by objectivity and hypotaxis, resulting in the different logical relations between sentences. Thus, in translation, it is of great necessity of reconstructing the logical relations in the target text after understanding the logical relation of the source text.

By taking the C-E translation of *Discovery of Fu-tea* as an example, the paper explores the reconstruction of logic in popular science translation. Through case analysis, the methods such as emphasizing the objectiveness of the subject, using connective devices for the explicitness of logical relations, and reorganizing the word order are put forward.

This paper mainly discusses the translation of popular science texts from the reconstruction of logic. However, popular science translation involves representing some other linguistic features of the source text other than the log-

ical relations. How to reproduce the literary and rhetorical aspects of the source text are also worth further exploring in popular science translation. Besides, there are many fields of popular science texts, such as Chinese medicine, physics, materials, chemistry, etc. Different translation methods may exist for popular science texts of different disciplines. Appropriate translation methods should be adopted for different popular science texts, so as to highlight the professionalism of popular science texts. Therefore, the research on the reconstruction of logic in the translation of popular science texts needs to be further enriched, aiming to provide a reference for the study of the translation of popular science texts and the development of popular science.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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