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English-Chinese Translation of Scientific and Technological Texts from the Perspective of Text Typology

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Abstract

Based on the linguistic function model proposed by linguist Karl Bühler, Katharina Reiss classified texts into three types, namely informative texts, expressive texts, and operative texts. Under the guidance of text typology, the linguistic features of English scientific and technological texts are analyzed and summarized in this paper. Then, the translation skills and methods suitable for English-Chinese translation of scientific and technological texts are explored with some specific examples. It is hoped that this paper can provide some references for the translation of scientific and technological texts, thereby effectively improving the quality of translations.

Keywords

Reiss, text typology, translation of scientific and technological texts, informative texts

1. Introduction

Science and technology serve as the primary productive force, an important component of comprehensive national strength, and the key to contemporary competition in comprehensive national strength. With the continuous deepening of globalization, China's scientific and technological exchanges with other countries around the world have become increasingly frequent, making the importance of scientific and technological translation more prominent. English scientific and technological texts are characterized by specialized vocabulary, formal style, and rigorous logic, which differ significantly from the translation of other types of texts. Based on the text typology, this paper classifies and analyzes examples from three syntactic features of English scientific and technological texts, explores some conversions in the process of English-Chinese translation, so as to improve the quality of target text of such texts and ensure their scientific nature and professionalism.

2. Features of English Scientific and Technological Texts

2.1 Textual Level

English scientific and technological texts generally refer to English-language materials such as scientific works, research papers, and technical reports in the domains of natural sciences and engineering. Compared with other texts, the most prominent characteristic of scientific and technological texts is to convey information, describe facts, and fulfill communication functions. The purpose of the texts is to transmit and acquire relevant scientific and technological information and apply it effectively in practice. Therefore, English scientific and technological texts are more formal, with a rigorous structure, clear logic, and objective presentation.

2.2 Lexical Level

The scientific and technological text in English features accurate and concise words and clear expressions. It focuses on describing objective facts without any personal subjective emotional judgments, and often involves a large number of specialized terms. Some of these terms are specialized scientific and technological words, while others are semi-specialized ones. The specialized scientific and technological words are characterized by their professionalism, accuracy, and monosemy. That is, each word represents only one specific concept, with a one-to-one correspondence between the word and its meaning, and cannot be replaced by other words during translation. Moreover, these words are usually applicable only to a particular field rather than multiple ones, such as “transistor (晶体管 in Chinese)” and “polyethylene (聚乙烯 in Chinese)”. Most semi-specialized words are derived from common English words, but they are given new meanings in specific fields. The main characteristic of this type of words is polysemy, which means they have both professional term meanings and common word meanings. For instance, the common meaning of the word “stain” is “a dirty mark on sth, that is difficult to remove”, while its professional term meaning is “a liquid used for changing the colour of wood or cloth”.

2.3 Syntactic Level

Most scientific and technological texts are objective descriptions of things, phenomena, or processes. Their function is to convey objective information, emphasizing the transmission of information and facts as well as the accuracy and logic of the presentation. Therefore, the scientific and technological texts in English also have three characteristics: frequent use of nominalized structures, long sentences, and the passive voice. Firstly, using nominalized structures can avoid the use of subjective personal pronouns and effectively reduce the frequency of subject-predicate sentences, thereby enhancing the objectivity, conciseness, and accuracy of the text. Secondly, the use of long sentences reflects the characteristic that English emphasizes hypotaxis. Thirdly, the use of the passive voice can clearly highlight the key information in a sentence and better emphasize objective facts.

3. Text Typology and Scientific and Technological Texts Translation

In 1934, Karl Bühler divided the semantic functions of language into three types: the informative function, the expressive function, and the appellative function. Based on Bühler’s classification of linguistic

functions, in 1971, the German translation theorist Katharina Reiss introduced the text-function theory into translation practice and translation criticism in her book *Translation Criticism: The Potentials & Limitations*, and for the first time proposed the text typology. She used whether the translated text achieves the text function as the evaluation criterion, emphasizing that the target language text should achieve equivalence in terms of text content, communicative function, and language form at the discourse level (Reiss, 2004). Reiss classified texts into three main types: informative texts, expressive texts, and operative texts (Zhang Meifang, 2009).

The informative text is mainly content-centered. The primary goal of this text is to convey information, and its most important linguistic function is to accurately transmit objective facts, featuring strong logicality. The scope of informative texts is quite broad, commonly found in non-literary works such as academic reports, scientific treatises, legal documents, and textbooks. When translating such texts, the emphasis should be on accurately conveying the objective content of the source text. Expressive texts are mainly form-centered, with highly aesthetic language. These texts are mainly used to convey the thoughts, emotions, and styles of the original author, and most of them are imaginative and creative literary works, such as poems, novels, biographies, and plays. When translating such texts, the translator should imitate the language features of the source text to make the translation closer to the original. Operative texts refer to functional texts that, after being read, can inspire readers and potentially prompt them to take actions. Their purpose is to appeal to or persuade readers to act in a certain way, with the functions of persuasion and guidance. Examples include announcements, promotional slogans, speeches, advertisements, and rules and regulations, which focus on persuading and guiding readers. When translating such texts, the readers come first, and the original author comes second. Therefore, the readers' reactions should be taken into account to ensure that the target language readers can be persuaded and guided with the same feelings as the source language readers.

Reiss believed that the decisive factor in evaluating a translation is whether the main function of the source text is conveyed. No single translation method can be applied to all text types. She suggested that different translation methods should be used for different types of texts (Reiss, 1989). Before translation, the translator should first determine the type of the source text. Generally speaking, a text usually has more than one text type. Most texts combine all three types, but the proportions of different types vary in a single text. Some texts may focus on information transmission, some on expressing emotions, and others on appealing to readers. Therefore, before translation, the text type can be classified according to the main function of the text, and then different translation methods can be selected according to different text types. The text typology plays a guiding role in objectively analyzing text functions, which helps translators determine the type of the source text and efficiently select translation strategies.

The main purpose of scientific and technological texts is to convey objective information, emphasizing the transmission of information and facts as well as the accuracy and logic of the presentation, with the informative function being dominant. Therefore, according to the classification of text types, scientific and technological texts are typical informative texts. During the translation process, attention should be

paid to the accuracy of sentence meaning expression and the faithfulness to the source text's presentation. The information and content of the source text should be presented in an accurate, objective, and faithful language, and appropriate translation methods should be adopted accordingly. Based on the functions and language features of scientific and technological texts, the text typology has a certain guiding role in the translation of such texts.

4. Case Analysis

In this chapter, some examples will be classified according to three characteristics of English scientific and technological texts at the syntactic level, and be analyzed to explore what translation strategies and methods should be adopted in English-to-Chinese translation of such texts.

4.1 Nominalized Structures

The most prominent characteristic of scientific and technological texts is the simple and objective description of facts or conceptual matters. Employing static nominalized structures can enhance objectivity. In texts of this type, the nominalized structure, "abstract noun + of + ..." are mostly adopted to avoid overusing subject-predicate structures (Fu Yonglin & Tang Yueqin, 2012). However, Chinese is a dynamic language that favors dynamic expressions. Therefore, during English-to-Chinese translation, it is necessary to transform these nominalized structures into more dynamic verb structures in Chinese according to the logical relationships within the sentences. This approach not only accurately conveys the original meaning of the source text but also makes the target text natural and fluent.

Example 1

Source Text: Television is the transmission and reception of images of moving objects by radio waves.

Target Text: 电视通过无线电波发射和接收移动物体的图像。

In this example, "the transmission and reception of images..." is a nominalized structure in English and serves as the object in the sentence. The central words "transmission" and "reception" are the nominalized forms of the verbs "transmit" and "receive" respectively. Considering the syntactic variations between Chinese and English, during translation, it is necessary to convert the English nominalized structure into a Chinese verb structure (Guo Kanjun, 2009). Therefore, this nominalized structure "the transmission and reception of images..." should be translated as "发射和接收.....图像" rather than ".....图像的发射和接收". Moreover, from the perspective of sentence structure, if the subject-linking verb-predicate structure in the English sentence is literally translated into "电视是.....的发射和接收" which uses "是" as the predicate of the Chinese sentence, the target text will be obscure and difficult for readers to understand. It will hardly fulfill the information conveying function of scientific and technological texts. So, in this translation, the Chinese verbs "发射"and "接收" are used as the predicates of the sentence, which makes the translation natural and fluent and conforms to the characteristic of Chinese that favors the use of verbs.

Example 2

Source Text: The slightly porous nature of the surface of the oxide film allows it to be colored with either organic or inorganic dyes.

Target Text: 氧化膜表面具有轻微的渗透性，因此可以用有机或无机燃料着色。

In this example, the subject is a relatively long nominalized structure, “the slightly porous nature of the surface of the oxide film”. Using such a structure enhances the objectivity and conciseness of the language expression, and it can also connect the information of this sentence more closely. However, Chinese tends to use a rich variety of verbs. If this English nominalized structure is directly translated into the subject of a Chinese sentence, the target text will not conform to the dynamic nature of the Chinese language. Upon understanding and analysis, it can be seen that “the slightly porous nature” is subordinate to “the surface of the oxide film” in terms of structure. Therefore, during this translation, the Chinese verb “具有” can be added to transform this long nominalized structure into a sentence. The predicate verb in the source text is “allow”. Based on the meaning of the sentence, the logical relationship within it can be figure out. There is a cause-and-effect relationship before and after “allow”. So, in the target text, “allow” is converted into the Chinese word “因此” and is placed after the sentence “氧化膜.....渗透性”, which makes the translation smooth, fluent, and logically clear, meeting the original intention of informative texts to convey information.

Scientific and technological English texts tend to use fewer verbs and more nominalized structures. In Chinese, verbs are not restricted by tenses, voices and other factors as they are in English, and can be used more flexibly. Therefore, verbs are frequently employed in Chinese texts. When translating English scientific and technological texts, upon encountering nominalized structures, we can restore the logical relationships within them and transform them into more dynamic verb structures in Chinese, which is more in line with the reading preferences of the target language readers.

4.2 Long Sentences

English emphasizes hypotaxis, and sentence structures can be expanded and combined with the help of various connectives to form long and intricate sentences. In contrast, Chinese emphasizes parataxis, rarely or even never using connective words. As a result, the structure of Chinese passages seems loose, but the semantic levels are distinct. During the process of translating long sentences from English into Chinese, flexible approaches such as decomposition, disassembly, and recombination are often used (Lian Shuneng, 2010).

To clearly expound on the inherent characteristics and interrelationships of objective things, in scientific and technological English texts, long sentences with complex structures are often used to highlight the logic and rigor of the text. Due to the differences in sentence structures between the two languages, during the English-Chinese translation, long English sentences need to be broken down into short Chinese sentences. Moreover, the logical relationships between these short sentences should be clarified, and the order of these sentences in the target text should be rearranged according to these logical relationships.

Example 3

Source Text: Human beings have distinguished themselves from other animals, and in doing so ensured their survival, by the ability to observe and understand their environment and then either to adapt to that environment or to control and adapt it to their own needs.

Target Text: 人类把自己和其他动物区别开来。与此同时，人类还具有观察和了解周围环境的能力。他们要么适应环境，要么控制环境，或根据自身的需要改造环境。人类就这样一代代地生存下来。

In order to understand such a long sentence, the main structure of the sentence has to be identified first. The subject of this sentence in source text is "human beings", and the main predicates are "distinguish" and "ensure". The part from "by" to the end of the sentence serves as an adverbial of manner for "ensured their survival". If the source text in this example were translated into one long Chinese sentence, it would be overly complex and lengthy, which doesn't conform to the characteristic of the loose structure in Chinese. Therefore, it is divided into several shorter Chinese sentences in target text. The whole sentence in the source text actually tells two things. The first is that human beings distinguish themselves from other animals, and the second is that human beings can survive from generation to generation by virtue of certain abilities. So, the translator treats these two semantic groups separately in the target text. First, the translator translates the first semantic group as the first sentence. During the process of translating the second semantic group, the adverbial of manner introduced by "by" is placed at the beginning of the sentence and the Chinese verb "具有" is added in order to transform the source sentence into a subject-predicate sentence in Chinese, which aligns with the dynamic nature of the Chinese language. After analysis, it's found that there are multiple parallel verbs after "the ability to". These verbs are "observe", "understand", "adapt", and "control and adapt". If all of them were translated in parallel, the translation would be overly cumbersome and difficult for readers to comprehend. So, the translator breaks the sentence after the verbs "observe" and "understand", turning them into two separate sentences. Finally, the main information before the adverbial of manner is placed at the end of the sentence, translated as "人类.....生存下来". This way of handling the translation makes the logic clearer, allows readers to read it more smoothly, and renders the target text effectively convey information and conform to the characteristics of informative texts.

4.3 Passive Voice

English writers widely use the passive voice for various considerations and needs, especially in scientific and technological articles, newspaper articles, and official documents (Lian Shuneng, 2010). The main functions of such texts are to expound objective facts, describe the development of things, and summarize scientific laws. Therefore, to demonstrate the objectivity of the article and avoid subjective assumptions, the passive voice is often used in scientific and technological English texts (Zhao Zhe, 2011). However, in Chinese expression habits, characters like "被" and "受" that indicate the passive voice are often used to describe unpleasant things happening to the subject, carrying a certain negative connotation. As a result, passive sentences are used less frequently in Chinese, while active sentences are more commonly

employed. Chinese verbs do not have the same morphological changes as English verbs, so the passive voice is mainly expressed through lexical means and sentence patterns (Liu Miqing, 2006). Therefore, in the English-Chinese translation of such texts, translators need to flexibly convert the voice of sentences according to specific circumstances.

Example 4

Source Text: In the 16 months since the first graft, the ersatz skin has not yet been rejected by any of the patients.

Target Text: 第一次植皮后的 16 个月，人造皮肤尚未在任何病人身上出现排异现象。

In this example, there is a passive voice construction which is "been rejected by". If an equivalent translation strategy is adopted, the target text would be "人造皮肤尚未被任何病人拒绝", but such a translation would sound rather awkward. Based on Reiss's text typology, in the translation of scientific and technological texts, apart from accurately conveying the content of the source text, the readers' acceptance should also be taken into account. Therefore, in the target text, "被拒绝" is converted to "出现排异现象", which changes the passive voice to the active voice. Such method skillfully avoids the use of the "被" construction in Chinese sentence, making the target text more natural, fluent, and in line with Chinese expression habits.

Example 5

Source Text: Thin layers of other impermeable materials are found in nature, too.

Target Text: 在自然界中也发现有其他非渗透性薄层物质。

Through understanding and analysis, it can be known that the doer of the predicate verb "found" in this source text is the general subject "people", which doesn't need to be stated. The recipient of the action is "thin layers of other impermeable materials", which is placed at the beginning of the whole sentence in the source text to highlight the theme and key information of the sentence. This reflects the difference between English and Chinese. English usually puts the key points at the beginning, while Chinese tends to place them at the end. In this example, the predicate verb is in the passive form. If we don't change its form when translating it into Chinese and literally translate it into "其他非渗透性薄层物质被发现", the target text won't conform to Chinese expression habits and will make readers of the target language feel uncomfortable. Therefore, the adverbial of place "in nature" introduced by the preposition "in" can be converted into the subject of Chinese sentence, and then the passive voice can be changed to the active voice. This approach can smoothly convey the information of the original text, enabling the target readers to effortlessly grasp the intended meaning and thereby achieving the essential function of effectively transmitting information in the translation process.

Scientific and technological texts are characterized by objectivity, which is why the passive voice is frequently used in such English texts. During the English-Chinese translation, the biggest challenge lies in how to render various forms of passive sentences into the most smooth and fluent Chinese. The author believes that, when translating, translators should not be restricted by the syntactic structure of English. Instead, they should first understand the underlying meaning and logic of the text, and then present it in

a language form that is most familiar to the readers of the target language.

5. Conclusion

Reiss's text typology provides valuable guidance for the translation of English scientific and technological texts. Such texts fall into the category of informative texts, which are characterized by rigor, standardization, and strong logic. During the translation of such texts, attention should be paid to the conciseness, objectivity, and accuracy of the language. Some nominalized structures in English can be transformed into verb structures in Chinese. As for long English sentences, they can be broken down into shorter Chinese sentences. After the logical relationships within the sentences are clarified, the order of the sentences in target text can be reorganized. With regard to the passive voice in English, it can be converted into the active voice in Chinese according to the logic, so as to avoid the use of the "被" construction in Chinese sentence. In short, under the guidance of the text typology, translators should flexibly apply translation skills to render the target text not only faithful to the source text but also conform to the scientific and technological texts' features, thereby objectively, accurately, and effectively conveying the information of the source text to the target readers.

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