

# The Cooperative Principle Based Study on Passive Sentence Translation in Science and Technology English—To Improve the Quality and Efficiency of Non Literature Translation

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## Abstract

With the development of technology and science, more and more multi-country cooperated institutes emerging. Developers from different countries work together in solving different problems and creating high technology products through translators. In the hope of improving the communication quality in Science and technology English translation based on scientific method, this paper focuses on the passive sentence translation in science and technology English based on cooperative principles. The first part of this paper points out that the progress of science and technology has made the application of scientific English translation more and more widely, which has brought a lot of convenience to people. However, passive sentences are often used in English sentences, while passive sentences are rarely used in Chinese, which often leads to a lot of misunderstandings in the translation process, leading to inaccurate translation. Therefore, correctly translating passive sentences in S & T is one of the key factors to improve the quality of S & T translation. The second part points out that the translation of passive sentences in Scientific English should also follow the four principles of cooperation that people follow in communication. Finally, this paper concludes that translators as bilingual communication media should also follow the principle of cooperation to achieve the goal of effective communication.

## Keywords

Science and Technology English, the Cooperative Principle, Passive Sentence, the Efficiency of Translation

## 1. Background Introduction

In recent years, technology has developed rapidly, and more and more transnational cooperative organizations have emerged, where developers from different countries work together to solve different problems and create high-tech products. In this particular work environment, sometimes developers from different countries who speak different languages need to use a second language to communicate with their colleagues. In addition, many of the research and development documents of these multinationals are written in two or even three languages. However, not all developers can master a second language, so translation and communication of technical texts and documentation help. English for Science and Technology can be written in the form of papers, reviews, test reports, textbooks, patents, manuals and so on. As an independent non-literary form, English for Science and Technology is often rigorously structured and logically rigorous. It does not emphasize the artistic beauty of language expression. But be more factual, be precise. The text of S & T requires strict sentence structure in syntax. Always use long or complex sentences. English speakers tend to put nature first and the external world as the center of observation, analysis, inference and research, which is reflected in their language, which tends to use the passive voice. According to (Swales, 1980), at least one-third of predicates in scientific English is passive because the passive voice puts an important concept, question, fact or structure at the beginning of the sentence, making the reader focus on the thing, phenomenon or process being described and giving the reader a sense of excluding “subjective assumptions”. In Chinese, however, passive voice is rarely used. Therefore, how to correctly translate passive sentences in S & T is one of the key factors to improve the quality of S & T translation.

In the past half century, many scholars have conducted systematic and in-depth studies on translation theory and practice. In recent years, with the development of linguistics, many scholars began to pay attention to the application of linguistics in the study of translation studies from multiple perspectives, which has given new breadth and depth to translation studies. Therefore, linguistics, as an emerging scientific research, should also be applied to sci-tech translation to help us improve the quality of translation. As an important theory in linguistics, the Cooperative principle proposed by Grice, an American philosopher of language, has become an essential part of the research of many translation scholars, which is of guiding significance to translation activities. This principle was originally put forward by Grice in his talks. The principle of cooperation can help people overcome cultural barriers, avoid cultural conflicts and misunderstandings, and thus make communication go smoothly. At present, these principles are also widely used in the translation and analysis of written texts and translation of written texts to help people understand and communicate with two different languages. Therefore, scientific translation, as a kind of translation, should reconstruct the translation process according to this communicative goal.

This paper focuses on the translation of passive sentences based on the cooperative principle to improve the translation quality of EST.

## 2. Cooperation Principle

People use language to communicate in society. In order to make communication effective, both parties will always consciously or unconsciously abide by certain established communication principles. The American Language philosopher (Grice, 1975) put forward the Principle of Cooperation in his book *Logic and Conversation*, arguing that people generally follow these four principles in communication; Which are: Quantity Maximum, Quality Maximum: Relation Maximum: Manner Maxim. These four maxims have become the principle of the communication; obeying one of these principles may cause conversational implications (Grice, 1975).

Technology and science can also be seen as the communication between researchers and their readers. Researchers and readers from different countries read the same paper through translation to lay the ground for their own research. Hence, Technology and science text could be considered as the long-distance communication between researchers worldwide. So, the translation of such text also needs to obey the Cooperative Principles to ensure the accuracy and consistency of the target text. Therefore, due to their particular characteristics, the translation of passive sentences in science and technology English should reconstruct the translation process according to this communicative goal.

### 1) Quantity Maxim

The quantity maximum requires that during social communication, the speaker should only speak the needed information in order to serve the goal of communication. But one shall not speak of irrelevant information not required in the communication. Make your contribution as informative as is required for the current purpose of the exchange, but not more or less than is required (Grice, 1975). In communication, the goal is to inform the other party of the information they need, but cut down the nonsense. Accordingly, while translating the passive sentences technology text, the translator needs to include all the information that mentioned in the source text to the target text, making sure the reader understands the research development process, background or the results in the source text. On the other hand, as a rigorous non-literature form, while reading English technical text, readers should understand the meaning of the original author' as much as possible, but this does not mean adding an excessive explanation in the target text.

Example:

Source text: A great deal of engineering effort has been focused on characterizing the spatial extent of stimulation, which is primarily dictated by the electrode design, active contacts, and parameters of the stimulus pulse (i.e. amplitude and duration) (McIntyre et al., 2015).

Target text 1: 首先, 基于电极设计、有效接触和刺激脉冲的参数, 大量的工程工作都集中在空间幅度刺激的特征。(leave out the information in the brackets)

Target text 2: 首先, 基于电极设计、有效接触和刺激脉冲的参数 (比如:

幅度和持续时间)，大量的工程工作都集中在空间幅度刺激的表征。(keep the information in the brackets in the target text)

Target text 3: 首先，基于电极设计、有效接触和刺激脉冲的参数（即幅度和持续时间），大量的工程工作都集中在空间幅度刺激的表征。(keep the right information in the brackets in the target text)

Brackets are often used by researchers in their papers as a way of supplementing the information. Since these words or information are noted within the brackets, translators may sometimes believe the information is unimportant subjectively, and leave them out of the translation. However, in these sentences, the writer uses amplitude and technology to illustrate stimulus pulse, stating what kind of parameters are included. The information is critical for readers to grasp the detail of the source text, leaving them out of the target text, shown in target text 1, may seem concise and clear, but could, in the end, leave readers wondering the specific parameters used or collected. In target text 2, information within the bracket was reserved. However, word “i.e.” was translated as “比如” (such as). “i.e.” means in other words, or that is to say, implicating that the parameters are merely amplitude and duration. But the word “比如” (such as) means that the many parameters are applied in the characterizing, amplitude and duration are two of which writer mentioned as an example, which may cause readers to have the wrong idea of the parameters included in the characterizing. Target text 2 added information to the source text, leaving the target text inaccurate and confusing, which went against the principles of quantity maximum. In target text three, the information in the bracket was reserved and translated appropriately.

So, in technology and science translation, it is the responsibility of the translators to follow the quantity maximum, and make sure the information is neither added nor deleted subjectively by the translator in the target text, in the hope of generating an accurate target text.

## 2) Quality Maxim

Grice wrote that quality maximum means speaking nothing that is known to be false, don't speak of things that lack sufficient evidence (Grice, 1975). This implies that speakers should not speak of anything without evidence. Scientific and technological texts are extremely logical and they are supported by a large amount of data or evidence, and sentences without the support of evidence usually never appear, which means that when translating passive sentences in scientific and technological texts, the translator needs to grasp meaning of the source text and translated it into the corresponding sentences in the target language, so that the translation maintains the same strict logic also.

Example A:

Source text: While there are a tremendous number of variations, the relatively simple nature of the data ultimately collected implies that there can be a common set of requirements (Moses et al., 2009).

Target text 1: 尽管两种系统有很多的不同，最终收集的数据的特性却相对

比较简单，这也意味着系统可能存在一系列相同的需求。(many variations)

Target text 2: 尽管两种系统有极多的不同，最终收集的数据的特性却相对比较简单，这也意味着系统可能存在一系列相同的需求。(tremendous variations)

Both Chinese and English scientific and technological articles require strict sentence structure in syntax. Long sentences or complex sentences are often used. The target texts in these sentences are almost identical. However “a tremendous number of variations” in the source text are translated into “很多的不同” (many variations) and “极多的不同” (tremendous variations) in Target text 1, and 2 respectively. In a dictionary, tremendous is explained as: very great in amount, scale or intensity. In the source text, the writer intended to emphasize that with all these significant differences, somehow the two systems may still have a set of requirements that are the same. Target text 1 somehow limits the original meaning of the source text, without paying attention to the emphasis the original text writer adds, leaving the target text unreliable.

Example B:

Source text: They would also need support, in the form of instructions, user manuals, and a knowledge base, and would also like to have fabricated circuit boards to be readily available (Moses et al., 2009).

Target text 1: 用户必须要如下方面的支持：技术指导、用户手册、知识库。而且，用户还必须获得已制作好的电路板。

Target text 2: 用户也需要如下方面的支持：技术指导、用户手册、知识库。而且，用户还希望能够获得已制作好的电路板。

The source text presents a situation where a customer purchased equipment, and as an end user, they will need all kinds of support for the equipment to fully function. The writer uses the first “would” in the sentences to describe an imaging scenario. However, these supports are not all necessary to the customer, one may only need one or a few of them, especially for the need of the circuit boards. The writer uses “would also like to” to emphasize that point. In target text 1, it somehow gives an idea of customer would need every support the writer mentioned, which the translator of target text 1 has no evidence in proving that. By following the maximum of quality maximum, the translator of target text 2 grasped the meaning implicated in the source text without altering the original text into sentences that lack sufficient evidence.

In this example, we can see that “want” and “must” are two completely different concepts with completely different meanings. Therefore, in the process of translation, the translator needs to have enough understanding of Chinese and English words, accurately grasp the depth of the meaning of each word, and accurately and effectively express the meaning of the author.

### 3) Relation Maxim

The definition of relation maximum can be easily deducted in the word “relation”. It means, “Be relevant, speak of related information (Grice, 1975).” Many common words in English have different interpretations in different fields and in

different contexts. The pragmatic meaning implied by the word when it is actually used, which is closely related to the context. Therefore, understanding and expressing the pragmatic meaning of words cannot be separated from the context of bilingual communication. Speak of nothing that are irrelevant means that the common characteristic of ambiguity meaning in the words are not allowed in technology translation for this type of translation.

For example:

Source text: We present the design for OpenPET, an electronics readout system designed for prototype radiotracer imaging instruments (Moses et al., 2009).

Target text 1: 我们提出一个开放宠物设计, 即一个为原型放射成像设备设计出的电子读出系统。

Target text 2: 我们提出一个开放正电子发射型计算机断层显像(PET)的设计, 即一个为原型放射成像设备设计出的电子读出系统。

In the example above, the word PET normally means animals we kept in our house for companionship or pleasure. However, this particular technology context is used as a name for an insert in the MRI, which stands for positron emission tomography. Target text 1 mistaken the word “PET” for the first above mentioned meaning, which have no correlation with what the writer actually means. In target text 2, PET was correctly translated and as an abbreviation, it is also noted in the bracket followed by it. Another advantage for target text 2 is that, the abbreviation can, later on, be used directly in the following translation, since the full name is already explained.

Many words in technical English have special explanations, and cannot be translated into other words. Therefore, the critical point of the translation of the Science and Technology English depends on whether the translator can correctly understand the original words and sentences, and choose the most appropriate translation for these English words according to the original meaning.

In complex sentences, there are almost always several clauses. It is crucial to determine the meaning of these clauses and the noun or verb that explains them, which this is very important for the translator to translate the sentence correctly. Therefore, as mentioned above, translation errors will occur if the sentence is not well interpreted, or if the clause is not able to judge which word is related to it.

Another example is shown in the following:

Example B:

Source text: The system is open-source, meaning that all technical data (specifications, schematics and board layout files, source code, and instructions) will be publicly available (Moses et al., 2009).

Target text 1: 该系统的来源是开放的, 意味着所有的技术数据(规格说明书、图表、以及电路板布局设计文件、源代码、以及操作说明)都是可以公开获得的。

Target text 2: 该系统为开发源, 意味着所有的技术数据(规格说明书、图表、以及电路板布局设计文件、源代码、以及操作说明)都是可以公开获得的。

Like example A, open source can be open-source and a technical term in computer science. Apparently, the word's meaning was mismatched in target text 1, but correctly used in target text 2. Correctly selecting the corresponding meaning in the target text requires translators to be diligent in acquiring the information in science and technology. A professional, scientific and technological translator is familiar with the basic knowledge, of the development trend of science and technology and can fully grasp or explain the information provided in the source text. The translation activity itself is a complex process. The source text needs to be understood, analyzed, selected and re-created by the translator, and this process involves knowledge in various fields such as language, culture and specialized knowledge since language is also complex and ever-changing, especially for technology and science text.

#### 4) Manner Maxim

Manner Maxim suggests that, each party should avoid obscure words, avoid ambiguity, and be concise and organized (Grice, 1975). There are many long and sophisticated sentences in technical English, numbers, data, formulas, equations, molecular formulas, various symbols, marks and diagrams often appeared in them, all of which should be accurately regenerated in the translation. A minimal error or deviation may result in wide divergence, especially in technical translation, which requires translators pay great attention in details and try the best to present the target text without any errors.

On the other hand, while translating passive voice sentences in English, the structure of the sentences often needed to be changed in order to achieve a concise and organized goal in target text. People who are beginners in translation can easily making the mistake by translating the passive sentence into equally passive sentences in Chinese as soon as they see it because passives voice are rarely used in Chinese sentences.

In Chinese, only a few auxiliary words can barely be regarded as the formal signs of passive sentences, such as “被” (by), “叫” (ask), “让” (let), “给” (give). The reason is that Chinese is a prominent language topic. The object of the sentence is explained in advance as the topic of the speech. Passive voice is often implied in verbs, or other words to express the passive meaning. In addition, it may also be related to the main habit of Chinese people, that is, “harmony between man and nature”, emphasizing “comprehension”, and attaching importance to “Human effort as the decisive factor” and personal feelings. Therefore, In Chinese language, active voice is often used to express the passive meaning. On the other hand, the Westerners believe “Man is the measure of all things”, there is a clear distinction between the object and the self in their culture, and the subject and object are opposed to each other. However, language and culture are inseparable to a certain extent, so the languages of different countries have different characteristics. Comparing Chinese and English, Chinese is a language that pays attention to harmony of meaning, while English pays attention to harmony of the form, that is, to express various meanings through language



structure and form. So passive voice is frequently used in English, but it is rarely used in Chinese.

Example A: Many hypotheses have been proposed for the mechanisms by which DBS operates (Table 2) (McIntyre et al., 2015).

Target text 1: 对于 DBS 的运作机制, 许多假设已经被提出(表 2)。(hypotheses be proposed)

Target text 2: 已经提出了许多关于 DBS 运作机制的假设(表 2)。(propose the hypotheses)

Target text 1 fully translated the meaning of the source text without leaving or mistranslating any information. However, it is very strange to a Chinese reader. And if the translator understands the language using the difference between Chinese and English, the structure of the target text can be altered in order to adapt the idiomatic Chinese. Target text 2, on the other hand, changed the structure of the sentences to cope with the Chinese writing habit. When translating from English to Chinese, translators should not be limited by the structure of the passive voice sentences in the original text, but make some necessary changes in the target text based on different language habits. Improper use of the passive voice will make the target text appear strange and affect the expression. In addition to this, the source text used a straightforward sentence to express that many hypotheses have been proposed. However, in target text 1, a long sentence (two short sentences with a comma in the middle) is used in target text 1, while in target text 2 uses only short sentences (in line with the source text) without leaving out any information mentioned in the source text, which is also concise and organized, without any obscure word.

### 3. Conclusion

Communication is a process where parties participating are exchanging information. According to Grice, this exchanging process needed cooperation. Following the cooperation, the principle helps achieve the goal of communicating effectively. As a medium in bilingual communication, translators also follow these rules to facilitate the information exchange process between the writers and the readers. However, translation activity itself is a complex process. Technology and Science English translation as a communication channel between technology and science the researchers, require strictly faithful, and high-quality translation for these target text can be used to lay the ground in another researcher's study. So Technology and Science English translation, specifically the passive sentences which take a tremendous amount of content in those texts, also need to comply with this maximum for a better transfer of the information. To be more specific, while translating technology and science text, translators should follow quantity maximum, and guarantee that every information, no more or less is included in the target text. And for quality maximum, faithful and logical world choices are required in the target text to cope with the characteristic and intended use of the technology and science text. As to relation



maximum, the translators should comprehend the exact meaning in the source text. Manner Maximum should also be followed by avoiding ambiguity and paying attention to the sentence structure distinction between two different languages.

Based on the understanding of S & T translation and cooperation principles in this paper, it can be found that S & T translation is highly professional. Therefore, if the translator can understand more about a certain field in practice, the translation process will be more rigorous and efficient, and readers can better understand the content of the article. In addition, many words have completely different meanings in everyday sentences than in scientific writing, and scientific writing requires more concise and straightforward language. Therefore, translators need to be more rigorous in this aspect.

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### Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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