Review Article

A Translation Study of Scientific Text from the Perspective of Relevance Theory: A Case Study of *Under a White Sky: The Nature of the Future*

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| Abstract |

Over the centuries, with the development of economy, the excessive interference of human activities on the natural environment has caused profound changes in the earth's ecosystem. *Under a White Sky: the Nature of the Future* by American environmental journalist Elizabeth Kolbert is based on the relationship between man and nature, focusing on climate change. This article is based on the first part of chapter 1 of this book which describes the author's field investigation of river pollution in the United States, carp invasion of hydrological system and control measures. The paper hopes that more readers will recognize the destruction that human activities have caused to the Earth's ecosystem, and awaken more people's awareness of respecting nature and protecting ecology. Under the guidance of relevance translation theory, the author takes the optimal relevance principle as the translation criterion. Based on the cognitive context of the target audience, the translator adopts some translation skills including adding comments, meaning extension, part of speech conversion, division and combination, and word order adjustment, which will make the translation readable and in line with the Chinese language norms and expression habits.
Keywords: Climate Changes, Relevance Theory, Translation Practice.

1. INTRODUCTION

Over the centuries, with the development of economy and society, excessive interference by human activities in the natural environment has caused profound changes in the earth's ecosystem. Too much human intervention will make the earth lack of natural things. Under a White Sky: The Nature of the Future is written by American environmental journalist and author, Elizabeth Kolbert, based on the relationship between humans and nature, focusing on climate change, human impact on the natural environment, and the corresponding measures.

This part of the book tells of Kolbert's field investigation of the Chicago River system in Illinois, which was once hooked up to water pipes to discharge municipal sewage. The author documented the measures to combat an invasive fish deliberately introduced into the Mississippi River basin and prevent it from damaging the Great Lakes ecosystem. These measures include electrifying sections of the river, fishing festivals and exaggerated inventions such as a noise-emitting "disco" water barrier and the bait made with sweets. Different sentences and expressions have different hidden meanings, including the use of metaphor, metaphor and other rhetorical devices, which require the translator to translate and express in the best way. Therefore, relevance theory is used to guide the translation of this material.

2. THEORETICAL OVERVIEW
2.1 The Origin of Relevance Theory

Relevance theory is put forward by the French linguist Dan Sperber and British linguist Deirdre Wilson in 1986 in Relevance: Communication and Cognition. The article analyzes discourse theory in speech communication based on relevance concept and relevance principle. Relevance Theory is based on two fundamental claims, one about cognition, the other about communication. The cognitive principle of relevance represents that human cognition tends to be geared to the maximization of relevance. The cognitive principle of relevance represents that every act of ostensive communication communicates a presumption of its own optimal relevance. In relevance theory, relevance is regarded as a characteristic of words, thoughts, behaviors, situations, etc. that are input into the cognitive process.

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448

2.2 Research Status
2.2.1 Foreign Research Status

Relevance: Communication and Cognition, based on the theory of cognitive linguistics, puts forward relevance theory, which has aroused strong repercussions in linguistics field. Since its publication, the book has aroused the research interest of western linguistics community, and related monographs and textbooks have been published continuously. Sperber and Wilson [1] proposed that "a hypothesis is relevant if and only if it has a certain situational effect in the context". Wilson [2] summarized this approach as relevance theory which regards discourse understanding as an inference process, which takes the speaker's discourse production and contextual information together as inputs. And produces an interpretation of the speaker's meaning as output. Discourse comprehension can be regarded as an exercise of mental reading in essence. For relevance theorists trying to build a sound pragmatic theory, the challenge is to explain how the closed formal system of language combines contextual information to provide valid evidence for successful understanding.

Translation is also a pragmatic act [3]. Therefore, relevance theory is also applicable to translation studies. In a narrow sense, the process of translation is a dynamic ostensive inferential process, which consists of three communicators, namely, the author, the translator and the reader. In Translation and Relevance: Cognition and Context, the German scholar Gutt [4] combined the pragmatic relevance principle with the general principles of cognitive psychology, transplanted the core viewpoints of relevance theory into translation studies, and proposed relevance translation theory to study translation from the perspective of cognitive pragmatics. Relevance translation theory [4] introduced relevance theory into translation studies, broadened the research field of relevance theory, and found a new perspective for translation studies. Since then, relevance translation theory has gradually gained a place in the field of translation studies. In foreign countries, relevance translation theory is mainly reflected in the research of Tirkkonen-Condit *et al.*, [5].

Despite Gutt's emphasis on the meaninglessness of translation theory itself, relevance translation theory is cited in translation theory not as a compilation of practical advice, but because it attempts to define the concept of equivalence [6] or to discuss the role of context in translation [7]. The lack of practical application of relevance theory in translation practice is the strongest criticism in literary circles. Generally speaking, western scholars have paid little attention to relevance translation theory [8]. Despite this early criticism, relevance theory is still used as a tool in translation theory because it seems to capture the complexity of translation and interpretation processes. And "it may well prove to be the most reliable tool for processing the interpretive richness shown by real data" [9].

2.2.2 Domestic Research Status

The introduction of relevance theory in China began in the late 1980s. The influential introduction begins with Zhang Yafei and Qu Weiguo's comments on relevance theory, Liu Shaozhong's discussion on the communicative view of relevance theory, and Liu Jiarong's analysis of discourse and cognitive environment. Later, some scholars began to systematically introduce, comment and expand relevance theory.

The study of relevance theory in China began in 1994 when Lin kenan published a book review of Relevance and Translation in Chinese Translation. In recent years, there are also special chapters on relevance theory in the pragmatic works published in China [10]. Relevance translation theory has gained some development in China.

The study of relevance translation theory is developing rapidly, and the research field covers all aspects of translation studies. At present, the study of relevance translation theory in China involves more than 20 topics [11]. On the whole, the research of Chinese relevance translation theory is manifested in three aspects. Macroscopically, it is reflected in the theoretical construction. In the middle view, it is reflected in the analysis of translation concept. On the micro level, it is manifested in the interpretation and application of translation phenomena [12]. A comprehensive review of the development of relevance translation studies in China shows that cognitive interpretative studies of translation processes (especially the construction process of the target language discourse) will remain the mainstream orientation of relevance translation theory [13].

Based on the research status of relevance theory at home and abroad, it can be seen that relevance theory has its own advantages and has been further improved in the process of development. Especially after the introduction of relevance theory into China, many scholars have discussed, criticized and improved it. The application of relevance theory in translation has also been continuously improved and developed, which provides substantial reference resources for this article.

3. CASE STUDY

Relevance theory plays an important role in translation, helping translators establish the relationship between the source language and the target language to ensure the accuracy, fluency, coherence and consistency of the translation. At the three levels of words, sentences and texts, relevance theory can guide translators to carry out accurate and effective translation.

3.1 Case studies on lexical cognitive environment
Example1
ST: Morris might be thought of as the Gettysburg in the war against Asian carp. （P16）

T1: 摩里斯县可被视为对抗亚洲鲤鱼中的葛底斯堡战役。

T2: 摩里斯县可被视为对抗亚洲鲤鱼中的转折点。

Gettysburg is a place name which is famous for being the site of a famous battle. The Battle of Gettysburg, a decisive battle fought from July 1 to July 3, 1863, is the most famous battle of the American Civil War and is often cited as a turning point in the Civil War. Here the author wants to show the strong role of Morris County in controlling the Asian carp epidemic. After understanding the communicative intention of the original author and judging the cognitive environment of the audience, the reader may not be aware of Gettysburg and the major events that took place there, so it is more appropriate to treat this phrase as "转折点" in order to achieve a strong explicit effect and seek the best connection between the original author and the reader. By analyzing the source text, we can see that both "war" and "Gettysburg" use metaphorical expression techniques. Therefore, after translating "Gettysburg" as "转折点", the translation method of "war", which has a strong correlation with it, is adopted to achieve harmony and unity within the target sentence.

Example 2
ST: These have overwhelmed the region' s water-treatment system, resulting in "combined sewer overflows, " or CSOs. (P4)

T1: 这些污水使该地区的水处理系统不堪重负，造成了"合流制污水溢流"(CSOs)。

T2: 这些污水的排放给该地区水处理系统带来了巨大的负担，导致了"合流制污水溢流"(CSOs)的污染问题。

Compared with the literal translation of T1, T2 adopts the method of additional translation on the basis of T1, adding "的排放" and "的污染问题" respectively. According to the discharge problem of Stickney factory mentioned above, it can be seen that the sewage here refers to the sewage discharged by the Stickney factory. After adding "的排放", the translation echoes the sewage discharge problem of Stickney factory mentioned above, so as to achieve the optimal relevance. Literal translation of "这些污水" makes the translation unclear, inconvenient for readers to establish connections with contextual information, and may even lead to ambiguity. After the addition of "的排放", readers can clearly understand the meaning of the sentence in a shorter time, and achieve the optimal relevance between the translation and readers. The second The second use of amplification is reflected in the adding phrase "的污染问题". According to the data, the combined sewage overflows refer to the pollution phenomenon that during the rainfall (or snowmelt) period, when a large amount of rainwater flows into the drainage system, the sewage flow in the combined drainage system exceeds the sewage interception flow, and the mixed sewage exceeding the load of the drainage system will be directly discharged into the receiving water [14], which has strong pollution characteristics, and the source text is more inclined to emphasize the pollution problem caused by sewage discharge, so the translation is added to point out that "合流制污水溢流" is a pollution problem, so that readers can understand the nature of CSOs without knowing it, and establish the optimal relevance between the text and readers.

Example 3
ST: Typhoid and cholera outbreaks were routine. (P5)

T1: 爆发伤寒和霍乱更是日常。

T2: 爆发伤寒和霍乱更是家常便饭。

The literal translation of the word "日常" in T1 is "日常", while T2 translates it into the Chinese idiom "家常便饭", which is used to represent extremely ordinary things. As mentioned above, all urban garbage flows into the Chicago River, which is the cause of frequent typhoid and cholera outbreaks, and the consequences are inevitably serious, so the use of the word "家常便饭" can better reflect the severity of the results, and establish the optimal relevance with the previous content. The naturalized translation technique is used to increase the readability and appreciation of the target text, which is conducive to the readers of the target language to better understand the original text and establish the best relationship between the readers and the text.

3.2 Case studies on sentence cognitive environment
Example 4
ST: A person, I noted, is pretty big, too. (P9)

T1: 一个人，我注意到，也是相当大的。

T2: 我注意到，人的体积同样庞大，也有受到电击的风险。

T1 is translated according to the word order of the source text, while T2 adjusts the word order and combines short sentences. The original text first lists the subject "a person" and then the parenthetical "I noted", while Chinese sentences are used to elaborate according to logical relations. By comparing the two versions of the translation, it is not difficult to find that the second version is more in line with the Chinese expression, saying "我注意到" first, and then stating the things I have noticed, that is, "人类的体积同样是庞大的", so that readers can achieve the best understanding with the least reasoning. As mentioned above, Asian carp is large in

size, and the effect of using electric current method to control carp flooding is good, it is also mentioned here that human beings are also large in size, and the following points out that human beings are subject to different degrees of electric shock. What the author wants to express here is that the electric current method which can effectively control carp flooding will also pose a potential threat to human beings, so the translation strategy of amplification is adopted. An explanatory component "也有受到电击的风险" is added, enabling readers to quickly make connections between texts and reason. After the word order is adjusted and translated, not only the optimal relevance between the sentences in this paragraph is achieved, but also the maximum expressiveness is achieved, and the optimal relevance between the author and the reader is realized.

Example 5
ST: The good news is that Asian carp are very big fish. They're public enemy number one. (P9)
　　T1:好消息是，亚洲鲤鱼体型很大。他们是头号公敌。
　　T2:亚洲鲤鱼堪称头号公敌，但好在其体积庞大。

　　T1 is translated according to the source text. T2 combines the two sentences in the source text and adjusts the word order. The analysis found that the two sentences of the original text are short and have a hidden transition relationship, the first sentence was intended to state the benefits of the large size of the Asian carp, and the second sentence was intended to state the phenomenon of the Asian carp as public enemy number one. The subject of the two sentences is Asian carp, so the translator combined the two sentences to describe the advantages and disadvantages of the "亚洲鲤鱼"as the subject. The Chinese expression often holds off before starting up, so when translating, the translator put the Asian carp's title of "头号公敌" in front, and then show the "好消息" that is "体积庞大". This order not only realizes the best correlation between the two sentences, but also makes the expression clear and concise, and realizes the optimal relevance between the original author and the readers.

Example 6
ST: The canal is a hundred and sixty feet wide and runs as straight as a ruler. (P4)
　　T1: 这条运河有 160 英尺宽，像尺子一样笔直。
　　T2: 该运河宽达 160 英尺，笔直如尺。

　　T1 adopts the literal translation method, the expression is relatively plain and has a certain translationese. T2 refines the translation on the basis of T1, and changes "这条运河" to "该运河" to make the translation expression more written. Meanwhile, when expressing the width of the canal, T1 is directly translated as "有 160 英尺宽", and T2 is translated as "宽达 160 英尺". Compared with T1, the expression of T2 is more concise and can better reflect the width of the canal. Finally, compared with "像尺子一样笔直" in T1, "笔直如尺" in T2 is more concise and natural. By comprehensive comparison, it is found that the expression of T2 is more natural and more inclined to domestication translation method, which is more in line with Chinese expression and Chinese readers' reading habits, so as to achieve the optimal relevance between text and readers.

3.3 Case studies on text cognitive environment
Example 7
　　ST: Everyone pulls out a cell phone or a camera. We photograph the water, the warning signs, and each other. There's joking on board that one of us should dive into the river electric, or at least stick a hand in to see what happens. Six great blue herons, hoping for an easy dinner, have gathered, wing to wing, on the bank, like students waiting on line in a cafeteria. We photograph them, too. (P6)
　　T1: 每个人都拿出手机或相机，拍下了水面，警示标志，还有彼此。船上有人开玩笑说，我们中的一个人应该跳进河里，或者至少把手伸进去看看会发生什么。六只大蓝鹭，希望能轻松地吃上一顿晚餐，它们聚集在岸边，翅膀对着翅膀，就像学生们在自助餐厅排队一样。我们也拍了他们。

　　T2: 每个人都拿出手机或相机拍下了水面，警示标志，还有彼此。船上有人开玩笑说，应该有人跳进河里，或者至少把手伸进去看看会发生什么。我们也拍了六只大蓝鹭，它们聚集在岸边，翅膀对着翅膀，就像学生们在自助餐厅排队一样，六只大蓝鹭也希望能轻松地吃上一顿晚餐。

　　The thinking way of the British and Americans is "linear", they are more accustomed to following the principle from the general to the specific, from the generalization to the example, from the whole to the individual. In Chinese, it is customary to divide first and then sum up, to say the cause first and then say the result, that is, the so-called "前因后果". T1 is directly translated according to the text structure of the English source text, while the T2 adjusts the sentence structure and order in the text according to the Chinese expression thinking and habits on the basis of T1, so as to make it more in line with the reading habits of the target language readers. In English expression, emphasis is often placed on the front part of the expression content, that is, the first expression of "六只大蓝鹭希望能轻松地吃上一顿晚餐", and then the further description of their behavior and actions. According to the Chinese expression habit, T2 puts the key message "希望能轻松地吃上一顿晚餐" at the end of the description of the blue herons, first describes the details, and then points

out the key points. In English expression, words or phrases are not used repeatedly, and pronouns are often used, but words are often repeated or superimposed in Chinese to achieve vivid images and clear reference, which conforms to the characteristics of curvilinear Chinese discourse. Therefore, before "希望能轻松地吃上一顿晚餐" in T2, the subject "六只大蓝鹭" is added, which plays a role in establishing the internal connection of the text, providing a coherence in paragraphs or the whole article, helping readers to follow the author's ideas, and establishing optimal relevance between readers and the text.

Example 8

ST: Just beyond the city limits, we skirt the outflow pipes of the Stickney plant, said to be the largest sewage operation in the world. From the deck of City Living, we can't see the Stickney, but we can smell it. Conversation turns to the recent rains. These have overwhelmed the region's water-treatment system, resulting in "combined sewer overflows," or CSOs. (P4)

T1: 在城市边界之外，我们绕过斯蒂克尼工厂的排水管道，据说这是世界上最大的污水处理厂。在 City Living 的甲板上，我们看不到斯蒂克尼工厂，但我们能闻到味道。话题转到最近的降雨。这些污水使该地区的水处理系统不堪重负，造成了"合流制污水溢流"（简称 CSOs）。

T2: 斯蒂克尼工厂就在城市边界之外，据说这是世界上最大的污水处理厂。我们乘坐 City Living 绕过了工厂的排水管道，在甲板上，我们看不到斯蒂克尼工厂，但我们能闻到其污水的味道。这些污水的排放本就使该地区的水处理系统不堪重负，再加上最近的降雨，造成了"合流制污水溢流"（简称 CSOs）的污染现状。

On the basis of T1, T2 rearranges the sentences and uses amplification translation method to make the text express more clearly. The first sentence of T1 mainly conveys two messages, one is to introduce the discharge of sewage of the Stickney plant, and the other is to show that we have bypassed its drainage pipe. Therefore, the sentence is divided into two sentences to make the meaning of the sentence more clear. From the second sentence of T1, the translator can know that "我们" passed the factory by City Living, and the second sentence of T1 mentions City Living. Therefore, the relevant information is connected in series to achieve the optimal relevance of the chapter and the expression is clear. The expression of "话题转到最近的降雨" is slightly stiff, not natural enough, and is not conducive to readers' understanding. The formation of "合流制污水溢流" in the following text is precisely caused by the dual action of precipitation and sewage discharge, so it is expressed before "合流制污水溢流". In this way,

readers can clearly judge the pollution caused by both precipitation and sewage discharge through the text without knowing about "合流制污水溢流". Establish optimal relevance between the text and the reader.

The use of amplification translation method makes the expression more clear and establishes the optimal relevance between texts. The first use of amplification translation method is reflected in "其污水的味道", the translation of the T1 is literal translation, and T2 will be clear. The previous paragraph mentioned the sewage discharged by the Stickney factory, and the "味道"mentioned in the sentence is naturally"工厂排放的污水的味道". The second use of the amplification translation method is reflected in "这些污水的排放本就". The literal translation of T1 as "这些污水"may cause ambiguity to the readers, after all, proper sewage treatment will not cause a bad impact on the environment. To clearly express the information intended by the original author is to establish the optimal relevance between the translator and the original author, so to express its implied meaning. That is, "这些污水的排放", the word "本就" lays the groundwork for the formation of the precipitation and the combined sewage overflow, indicating that the discharge of sewage plays a primary and key role in the formation of the combined sewage overflow. The third use of amplification translation method is reflected in the "'合流制污水溢流'（简称 CSOs）的污染现状。" In this way, even readers who do not know about the combined sewage overflow can realize that it is a kind of pollution, which will establish optimal relevance between readers and the text.

Example 9

ST: "I never would have pictured when I was studying engineering years ago that I would spend so much time thinking about a fish," Shea told me. "But, actually, it's pretty good for party conversation." Shea is a slight man with graying hair, wire-rimmed glasses, and the diffidence that comes from dealing with problems words can' t solve. I asked him how the barriers worked, and he stuck out his hand, as if to shake mine. (P9)

T1: 谢伊告诉我:"几年前，当我还在学习工程学的时候，我从来没有想过我会花这么多时间思考一条鱼。""但实际上，它很适合在聚会上聊天。"谢伊个子瘦小，头发花白，戴着一副金属框眼镜，面对言语无法解决的问题，他总是显得缺乏自信。我问他障碍物是如何作用的，他伸出手，好像要和我握手。

T2: 谢伊个子瘦小，头发花白，戴着一副金属框眼镜，面对言语无法解决的问题，他总是不太自信。他告诉我:"几年前，我还在学习工程学的时候，从来没有想过会花这么多时间思考一条鱼。但实际上，亚洲鲤鱼的话题很适合在聚会

上聊起。"我问他如何治理亚洲鲤鱼的泛滥，他伸出手，好像要和我握手。

T2 rearranges the sentences on the basis of T1 to make the paragraphs more in line with Chinese expression and reading habits. First of all, the character description of Shea is mentioned at the beginning of the sentence, because the above only mentioned Shea's position, without further description, and the description of Shea's physical characteristics can form a certain echo and connection with the above. Then translate what Shea said, so that the reader can read his views more three-dimensional after having some knowledge of Shea. This adjustment of sentence word order enables readers to have a clearer understanding of what the author wants to convey in a shorter time, which can establish optimal relevance between readers and the text. The "障碍物是如何作用的" in T1 has obvious translation cavity, and the reader cannot quickly and accurately understand what the obstacle is here and what the effect is. T2 connects with the context, establishes optimal relevance between the texts, and makes the expression more explicit and concrete. As mentioned in the previous paragraph, Shea's occupation is an engineer who set up barriers to control the flood of Asian carp. In the following paragraphs, the setting and function of barriers are described, and the fundamental purpose of barriers is to control the flood of Asian carp. In summary, by concreting "障碍物是如何作用的" into "如何治理亚洲鲤鱼的泛滥", readers can accurately obtain information which can establish the best connection between the reader and the text.

4. CONCLUSION

The translator plays a bridging role in the process of translation, and the application of relevance theory in translation can help the translator reflect the true intention of the original author to the target language readers more objectively and clearly. In the process of translation, the translator first needs to understand and analyze the source text, analyze the information conveyed by the author and the real intention to express, then use certain translation skills to transform the information to a certain extent in order to present the information to the reader more clearly, and finally modify and polish the translation to make the translation more smooth and natural. This article analyzes the application of relevance theory in translation from the perspectives of words, sentences and texts. At the lexical level, the best correlation can be achieved through free translation, reduced translation and other translation methods. At the sentence level, the best correlation can be achieved through the methods and skills of sentence splitting and reorganizing, adjusting word order, etc. At the text level, the best correlation can be achieved by adjusting the word order, adding translation and other translation methods and techniques.

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