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Strategies for Translating Scientific and Technical Texts: A Case Study of the E-C Translation of Climate Change and Pediatric Skin Health

Yanling Wu
School of Foreign Studies, Yangtze University, Jingzhou 434023, China
Email: 2010955810@qq.com

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Abstract

With the intensification of global climate change, the demand for translating medical literature on this topic has grown significantly. This paper explores strategies for translating scientific and technical texts through a case study of the English-Chinese translation of the medical paper Climate Change and Pediatric Skin Health. Selected from the International Journal of Women's Dermatology, the source text draws on multiple disciplines, including dermatology, meteorology, and biology, presenting a high degree of specialization. The main challenges in translation lie in the handling of terminology and long sentences. At the lexical level, this paper analyzes the translation methods for technical terms and semi-technical terms, employing strategies such as amplification, omission, literal translation, and transliteration. At the syntactic level, it discusses techniques such as linear translation, reverse translation, and division. The study shows that translating scientific and technical texts requires a flexible combination of translation strategies based on accurate comprehension of the source text, balancing professionalism with readability. This paper aims to provide a reference for the translation of medical and scientific texts.

Keywords

Scientific and Technical Translation; Medical Texts; Terminology Translation; Long Sentence Translation; Translation Strategies

1. Introduction

In recent years, climate change has exerted an increasingly significant impact on global public health, with particular concern for children's skin health. The medical paper Climate Change and Pediatric Skin Health systematically examines the pathogenic mechanisms and epidemiological effects of climate change on pediatric skin diseases. Published in the International Journal of Women's Dermatology by Elsevier, the paper is authored by physicians specializing in dermatology, rendering the text highly professional, scientific, and normative.

English for Science and Technology (EST) constitutes a functional variety with distinctive lexical, syntactic, and discursive features. As Chen Hongfan (2020) notes, medical English, as a branch of EST, exhibits linguistic characteristics primarily at the lexical and syntactic levels. Drawing on the translation practice of this medical paper, this paper systematically analyzes the core challenges in translating scientific and technical texts—namely, the translation of terminology and long sentences—and explores corresponding strategies through specific case studies, with the aim of providing a reference for the translation of similar texts.

2. Overview of the Translation Task

The source text for this translation practice is a medical research paper of approximately 3,800 words. Its content covers the mechanisms by which climate change affects pediatric skin health, epidemiological changes in common skin diseases, and related public health response strategies. The text involves multiple disciplines, including dermatology, immunology, meteorology, and biology, and contains a substantial number of technical terms and complex long sentences, making the translation task highly challenging.

The translation process followed a three-stage workflow: comprehension, expression, and revision. Pre-translation preparation involved consulting specialized dictionaries and relevant literature to establish a terminology database. During translation, problematic points were marked and analyzed. Finally, multiple rounds of revision ensured the accuracy and fluency of the target text.

3. Lexical Features of Scientific and Technical Texts and Translation Strategies

The vocabulary of scientific and technical texts primarily consists of three categories: technical terms, semi-technical terms, and common words (He Gujia, 1998). Each category requires different translation approaches.

3.1. Translation of Technical Terms

Technical terms are specialized vocabularies used in specific disciplines, characterized by monosemy, stability, and systematicity. As Fan Caiyun and Zhong Hanchun (2003) point out, terminology refers to special words or expressions used in relevant subjects or activities. The source text contains over 120 dermatological technical terms, which can be classified according to their word-formation patterns and translation methods.

3.1.1. Technical Terms with Fixed Translations

Some technical terms have established translations in the medical field and can be accurately rendered by consulting specialized dictionaries. As shown in Table 1, such terms are rarely used in everyday contexts and require the assistance of tools such as the Comprehensive Medical and Pharmaceutical Dictionary.

Table 1. Examples of technical terms with fixed translations.

English	Chinese
atopic dermatitis	特应性皮炎
erythema	红斑
xerosis	干燥症
psoriasis	银屑病
impetigo	脓疱病

3.1.2. Technical Terms without Fixed Translations

Some terms lack direct equivalents in dictionaries and require translation based on context and specialized knowledge.

Example 1:

SL: vector-borne illness

TL: 媒介传播疾病

This compound term was translated using literal translation. The rendering proved appropriate as the subsequent content mentioned both viral and insect-borne diseases, which this translation encompasses.

Example 2:

SL: infections and infestations

TL: 病毒感染和害虫侵扰

A literal translation of “感染和侵扰“ would be semantically ambiguous. Based on the context, the term refers to viral infections and infestations by pests such as head lice and scabies mites. Amplification was therefore employed to clarify the meaning. Amplification involves supplying necessary words in translation based on accurate comprehension of the source text to achieve clarity and naturalness (Li Yang, 2012).

Example 3:

SL: Sarcoptes scabiei var. hominis

TL: 人疥螨虫

A literal translation of this term would yield ”疥螨属人疥疮,” which is neither accurate nor concise. Omission was therefore applied. Tian Yan (2001) notes that various forms of redundant information arise during translation, necessitating omission to enhance communicative efficiency.

3.1.3. Translation of Derivatives

Derivation is a major word-formation pattern in technical terminology, involving roots combined with affixes. According to Wei Mengfen (2014), derivatives follow clear formation rules, with prefixes and suffixes having relatively fixed meanings.

Table 2. Examples of derivatives.

English	Affix Analysis	Chinese
polycyclic	poly- (many)	多环

transepidermal	trans- (across)	经表皮
interdigital	inter- (between)	指间
subcutaneous	sub- (under)	皮下
ultraviolet	ultra- (beyond)	紫外

Although meanings can be inferred from affixes, verification through specialized dictionaries remains essential for accuracy.

3.1.4. Translation of Compound Words

Compound words consist of two or more roots, often derived from Greek or Latin.

Table 3. Examples of compound words.

English	Word Formation Analysis	Chinese
thermoregulatory	thermo- (heat) + regulatory	体温调节
pathophysiology	patho- (disease) + physiology	病理生理学
photochemistry	photo- (light) + chemistry	光化学
hypothermia	hypo- (under) + thermia (temperature)	体温过低

The translation of compounds typically combines the meanings of their components, though adjustments may be required based on context. For instance, hydrocarbon is rendered as "烃" (the professional term) rather than a literal "碳氢化合物" in the context of "polycyclic aromatic hydrocarbon."

3.1.5 Transliteration of Technical Terms

Terms named after persons or places are typically translated using transliteration, sometimes combined with semantic elements (Guo Aiping, 2007).

Table 4. Examples of transliteration.

English	Chinese
kwashiorkor	夸希奥科病
Casal's necklace	卡萨尔颈蜀黍红疹
dengue fever	登革热
Zika virus	寨卡病毒

3.2. Translation of Semi-Technical Terms

Semi-technical terms originate from common vocabulary but acquire specialized meanings in professional contexts. Accurate translation requires determining the appropriate meaning based on the register.

Example 4:

SL: Growing evidence supports the hypothesis that air pollution adversely influences the incidence and severity of AD.

TL: 越来越多的证据支持空气污染对特应性皮炎发病率和严重程度产生不利影响的假设。

While incidence commonly means "occurrence rate," in medical contexts it specifically denotes "morbidity" or "incidence rate."

Example 5:
SL: A variety of skin disorders are associated with malnutrition and food shortages.
TL: 多种皮肤病症与营养不良和粮食短缺密切相关。
Disorder typically means “confusion” in general usage but refers to “disease” or “disorder” in medical contexts.

3.3. Translation of Common Words

Challenges in translating common words in scientific and technical texts primarily involve polysemy and nominalization.

3.3.1. Translation of Polysemy

Polysemy is a universal linguistic phenomenon. Appropriate meanings must be selected based on collocation patterns and context (Lin Zhengjun & Yang Zhong, 2005).
Example 6:
SL: PM10 levels positively correlated with outpatient clinic visits for AD.
TL: PM10 浓度与特应性皮炎门诊人数呈正相关。
Level was rendered as ”浓度” (concentration) based on its collocation with PM10 (particulate matter); visit was rendered as ”就诊人数” (number of outpatient visits) in conjunction with “outpatient clinic.”
Example 7:
SL: pollen exposure may become an increasingly important risk factor.
TL: 花粉接触可能成为越来越重要的危险因素。
Example 8:
SL: ultraviolet exposure
TL: 紫外线照射
Exposure was rendered differently depending on its collocations: ”接触” (contact) for pollen and ”照射” (irradiation) for ultraviolet light.

3.3.2. Translation of Nominalization

Nominalization is extensively used in scientific and technical English to express actions or states through nouns (Li Bingwu & Yan Jingmin, 2002). Chinese, by contrast, tends to use verbs, necessitating part-of-speech conversion during translation.
Example 9:
SL: reliance on adults for care and protection
TL: 依赖于成人的照看和保护
Example 10:
SL: alterations in food supply
TL: 食物供应改变
The nouns reliance and alterations were converted into verbs “依赖“ and ”改变,” aligning with Chinese idiomatic expression.

4. Strategies for Translating Long Sentences in Scientific and Technical Texts

Long sentences in scientific and technical English are structurally complex, often containing multiple subordinate clauses and modifiers. Different strategies are required based on the differences between English and Chinese word order.

4.1. Linear Translation

When the narrative order of an English sentence aligns with that of Chinese, linear translation can be employed, rendering the text in the original sequence (Yu Jianping, 2000).

Example 11:

SL: Atopic dermatitis (AD) is a chronic, pruritic dermatitis characterized by weeping erythema with associated scale of the cheeks and extensor extremities in infancy, typically transforming with age into a chronic, dry, and lichenified dermatitis in a flexural distribution.

TL: 特应性皮炎是一种慢性、瘙痒性皮肤病，其特征是婴儿时期面颊和四肢伸肌处出现伴有鳞屑的渗出性红斑，通常随年龄增长转变为一种慢性、干燥、苔藓样变的皮炎，多发于四肢屈侧。

The sentence unfolds chronologically (infancy → with age), mirroring Chinese narrative logic, making linear translation appropriate.

4.2. Reverse Translation

When English word order differs from Chinese conventions, reverse translation—adjusting the sequence—is necessary (Mao Xingeng, 2004).

Example 12:

SL: Climate change will add to this dire situation with unpredictable weather, including storms, floods, drought, and extremes in temperature, which would dramatically affect local agrarian practices and the ability to successfully grow food.

TL: 气候变化将导致难以预测的恶劣天气，包括暴风、洪水、干旱和极端气温，这些因素会严重影响当地农业实践和粮食生产能力，从而加剧本已严峻的形势。

Chinese typically presents causes before effects and specifics before summaries. The result ("add to this dire situation") was therefore placed at the end.

Example 13:

SL: Increased humidity and increased daily temperatures have been found to be protective against exacerbations of AD in other populations as well, although additional studies have demonstrated the opposite effect of these on AD prevalence.

TL: 尽管更多研究证明这些因素对特应性皮炎的患病率有不利影响，但湿度增加和日间温度升高同样能够防止其他人群的特应性皮炎恶化。

The concessive adverbial clause was moved to the front, following the Chinese pattern of "concession before conclusion."

4.3. Division

When subordinate clauses or modifying elements in English long sentences are loosely connected to the main clause, they can be divided into shorter sentences (Zhou Hongbo, 2007).

Example 14:

SL: Volatile organic compounds, particulate matter (PMx) of varying diameters (0.1, 2.5, or 10 lm), nitrogen oxide compounds (NOx), and sulfur oxide compounds (SOx) represent major classes of air pollution that may negatively affect those with AD and other allergic diseases, depending on their concentration and length of exposure.

TL: 挥发性有机化合物、不同直径（0.1、2.5 或 10 lm）的颗粒物（PMx）、氮氧化物（NOx）和硫氧化物（SOx）是主要的空气污染物类别。这些物质可能对特应性皮炎及其他过敏性疾病患者产生负面影响，具体取决于其浓度和暴露时间。

The attributive clause was separated into an independent sentence, making the translation more consistent with Chinese preference for short sentences.

5. Conclusion

Through a case analysis of the English-Chinese translation of the medical paper Climate Change and Pediatric Skin Health, this study yields the following conclusions:

First, lexical challenges in translating scientific and technical texts center on technical and semi-technical terms. Technical terms require analysis of word-formation patterns—such as derivation and compounding—combined with consultation of specialized dictionaries. For terms without established translations, strategies such as amplification, omission, literal translation, and transliteration can be flexibly applied. Semi-technical terms demand determination of their specialized meanings based on register, avoiding literal interpretation.

Second, the translation of common words requires attention to polysemy and nominalization. For polysemous words, appropriate meanings should be selected based on collocation and context. Nominalizations can be converted into verbs to align with Chinese stylistic preferences.

Third, the translation of long sentences in scientific and technical English should employ different strategies according to the alignment of English and Chinese word order. Linear translation is appropriate when orders coincide; reverse translation is needed when they diverge; division into shorter sentences is effective when subordinate clauses or modifiers are complex.

This translation practice has deepened understanding of dermatology and related fields while enhancing the ability to apply multiple translation strategies flexibly in handling scientific and technical texts. It is hoped that the case analyses presented will provide a useful reference for the translation of scientific and technical texts, particularly medical literature.

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