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Effectiveness of ChatGPT in Translating Non-Fiction Under the Perspective of Syntactic Iconicity: A Case Study of Shark's Fin and Sichuan Pepper

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Abstract

Shark's Fin and Sichuan Pepper, a popular non-fiction, is an evocative memoir that traverses the rich tapestry of Sichuan cuisine, intertwining truthfulness and artistry. Fuchsia Dunlop's narrative is peppered with vivid descriptions and linguistic nuances that serve not only to convey information but also to evoke sensory experiences and emotional responses. As syntactic iconicity is a significant source of psychological and aesthetic effects in textualization, it can be seen as both a pivotal point of observation and a method of measurement in the translation of stylistically sensitive literary works. This paper aims to find out whether AI translation models are able to discern the phenomenon of syntactic iconicity, and accordingly retain this linguistic mechanism observed in the source texts so as to render stylistically sensitive translation.

Keywords: Non-fiction, Iconicity, AI translation, Efficacy

1. Introduction

The advent of automation and artificial intelligence (AI) heralds a transformative era in the field of translation. Translation-specific artificial intelligence has gone through three stages of development: CAT (Computer Aided Translation) represented by Trados, MemoQ, Lan-bridge MH; MT (Machine Translation) tools such as Google, DeepL, and LLM (Large Language Model) as ChatGPT, Spark Desk and ERNIE Bot, and has considerably reshaped the translation landscape. Though there exist burgeoning concerns that machines will replace human translators in the near future, some scholars still believes that computer translation is not suitable for texts with strong literary or cultural flavors (Hutchins and Somers, 1992). Toral and Way (2015) and his project team members attempted English—French translations of metrical poetry, contending machine translation can only choose between being formally correct or meaningfully accurate. Through qualitative and

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quantitative analyses, they found that "the performance of MT has improved", "but the applicability of MT does not only depend on the text to be translated but also on the type of translation that we are trying to produce." In examining the literature on the application of ChatGPT in translation, it is apparent that there is a scarcity of research, with the existing studies primarily focusing on two key areas. Some scholars (Biao Zhang *et al.*, 2020; Papineni *et al.*, 2002) concern the evaluation of translation quality using automated metrics, such as BLEU, TER, and CHRF.

Currently, researches on machine translation in Chinese academia are mostly focused on formal discourses such as technology, politics, and news, with research contents centering on the quality assessment and comparison of machine translated texts, statistical analysis of translation errors, and post-editing analysis, while studies on machine translation of literary discourses, especially which contain a large amount of rhetorical methods and emotions, are still very limited.

To address this gap, this research evaluates the feasibility of the Large Language Models such as the latest ChatGPT 4.0 version and iFlyTEK Spark Desk in E-C translation of non-fictions from the perspective of syntactic iconicity. The material for the study is *Shark's Fin and Sichuan Pepper*, a work that features both truthfulness and artistry. Additionally, evaluations from experienced human translators has been added to assess the translation quality of artificial intelligence models.

2. Research Design

The study adopts a qualitative approach. This study randomly selects eight sentences embedded with syntactic iconicity from the original text, which is then translated by ChatGPT and Starkdesk to obtain the corresponding translations. Since the source text for both human and machine translations are the same, strong comparability can be secured, making them ideal experimental corpora for translation studies. A total of 151 English words were obtained. The selected example sentences in their original form are as follows in the Table 1 below:

Table 1: Example Sentences in the Source Text
1. But nothing had prepared me for the gastronomic assaults of that first trip to Hong Kong and China in the autumn of 1992.
2. Soon after that dinner with Sebastian and his friends, I crossed the border into Mainland China and took the slow train to Guangzhou.
3. Surly taxi drivers waxed lyrical as they recounted to me, in great detail, their favourite recipes.
4. We fantasized about it, discussed it, and begged anyone coming to see us from Europe to bring some (cheese).
5. Now I meet young people who tell me they prefer sports to martial arts, pills to Chinese herbal medicine, and hamburgers to Chinese food, because they are "modern".
6. I know its breadth and its heaviness, the exact shape of its handle, the pewter tones of its carbon-steel blade.
7. The constant barrage of dialect was a gruelling initiation for me.
8. I watch, captivated by yet another of the endlessly fascinating little events that mark my daily life in Chengdu.

Jiao *et al.* (2023) assess the efficacy of ChatGPT across three dimensions: translation prompts, multilingual translation, and robustness in translation, and conclude the directive "Please provide the [TGT] (short for Target Language Text) translation for these sentences" was found to induce superior outcomes in machine translation. Therefore, this study also adopts the prompt.

Taking BLEU's inherent limitations into account, this study includes evaluations from two seasoned translators and two professors without disclosing the source, thereby facilitating a multi-faceted evaluation of the translation quality of LLMs through both machine and human assessments.

3. Research Questions

This study aims to address the following three questions within the framework of cognitive linguistics:

RQ1: Regarding non-fiction literary works, how does ChatGPT, as a representative of large language models (short for LLMs), fare in translating truthfulness and literariness?

RQ2: Can ChatGPT fully consider the principle of Syntactic Iconicity? How well does it reflect this principle in its translations?

RQ3: How can translation-specific LLMs be improved in the future?

4. Materials

Shark's Fin and Sichuan Pepper, written by Fuchsia Dunlop and published in 2008, is an easy-to-read non-fiction work that enjoys great reputation. Dunlop is better known in her motherland UK, where her volumes on Sichuanese and Hunanese cuisine carves out her niche and eventually becomes contemporary must-reads. Based on her eat-and-travel trip in China, this book features an exact description of the local cuisines in Sichuan, giving an interesting illustration on Chinese culture and her personal experience. Celia Barbour, from The Oprah Magazine, acclaims it as "not just a smart memoir about cross-cultural eating but one of the most engaging books of any kind in recent years." The Chinese version of the book is also a big hit, due in large part to the efforts of He Yujia, its translator, who lives in Chengdu. In July 2020, the Shanghai Translation Publishing House released the Chinese version, reprinting it four times in three months and selling over 50,000 copies. He Yujia version (referred to as He version in the following parts) is well received and critically acclaimed, effectively maintaining the syntactic iconicity of the original text. Hence it could be employed as optimal reference material, in an attempt to test the efficacy of AI translation models.

Non-fiction, as a literary genre, belong to literature as they are often welters of recordings, letters, news, prose, etc. They vary from fictions in the pursuit of real-life representation, and meanwhile they differ from documentary works in the attempt to create an artistic and emotional resonance. In a word, non-fiction is the interweaving of reality and fantasy. The author of this paper regards iconicity not only as a prospective tool to balance truthfulness and artistry in the composition and translation of non-fictions, but also an insightful dimension to evaluate the effectiveness of ChatGPT in the translation of Non-fictions. Specifically, in this study, four major iconicity principles are employed in the text analysis of *Shark's Fin and Sichuan Pepper*, so as to check whether ChatGPT translated version can present truthfulness and artistry of the original by preserving the already appeared iconicity in it.

5. Results and Analysis

Zhou Chengbin and Liu Zhongbao (2022) posit that, if a translation tool's BLEU scores reach 31.4%, then good quality and adequacy of machine translation tools can be secured. According to the data presented in Table 2, most statistical data for both LLMs have indicated the desired good outcomes for machine translation. We propose an initial analysis of the performance of two LLMs based on BLEU score evaluations from the following three perspectives:

Table 2: BLEU Scores Indicating the Translation Quality of ChatGPT Compared to SparkDesk (2 gram)									
LLMs	**Example 1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Mean**
ChatGPT 4.0	27.6	36	38.8	37.1	47.4	63.3	22.3	42.1	39.33
SparkDesk	52.3	32.1	38	34.7	50	50	17.3	35.3	38.71

(1) **Overall Sufficiency in Translation Quality:** Statistical analyses indicate that ChatGPT boasts the highest average BLEU score at 39.33%, followed closely by Starkdesk with an average BLEU score of 38.71%. This suggests that ChatGPT's translation quality is relatively superior.

(2) **Frequency of High-Quality Translations:** Among eight sentences, ChatGPT scored higher than Starkdesk in six instances, indicating a greater consistency in producing high-quality translations.

(3) **Poor Performance in Translation Quality:** Neither translation tool produced translations with BLEU scores approximating 0%, demonstrating that both tools consistently deliver translations of reasonable quality.

The BLEU score provides a quantitative method for assessing translation quality, whereas human evaluation can more precisely capture aspects of the translated texts such as iconicity, style-aesthetic, and cultural adaptability, which are difficult to quantify. The Combination of both approaches is recommended for a more comprehensive assessment of translation quality. In this experiment, two seasoned translators and two senior professors specializing in translation were invited to conduct the human evaluation. The evaluation outcomes are respectively illustrated in Tables 3 to 6.

Table 3: Scores Given by the First Human Evaluator			
Versions	**He Yujia Version**	**ChatGPT 4.0**	**SparkDesk**
Example sentence 1	80	70	80
Example sentence 2	90	65	70
Example sentence 3	60	80	90
Example sentence 4	80	70	70
Example sentence 5	90	60	60
Example sentence 6	90	70	60
Example sentence 7	70	85	80
Example sentence 8	60	80	70
Mean	77.5	72.5	72.5

Table 4: Scores Given by the Second Human Evaluator			
Versions	**He Yujia Version**	**ChatGPT 4.0**	**SparkDesk**
Example sentence 1	83	61	65
Example sentence 2	85	65	70
Example sentence 3	68	75	81
Example sentence 4	83	68	63
Example sentence 5	93	76	86
Example sentence 6	88	73	67
Example sentence 7	72	87	80
Example sentence 8	77	86	73
Mean	81.1	73.9	73.1

Considering the average number of figures, it can be concluded that human version claims unequivocally the best performance, while ChatGPT and Starkdesk are on a par. Evaluators have reached a consensus that human translations surpass machine translations in all but sentences 3 and 7. The justification provided for sentence 3 is that the human translator employed three Chinese phrases to convey the meaning of merely two phrases from the original text, in contrast to machine translations that maintained an equivalent phrase count. Regarding sentence 7, the human translator was unsuccessful in accurately conveying the meaning of the term "initiation" as found in the source text, whereas machine translations managed to achieve a word-for-word accurate translation.

Table 5: Scores Given by the Third Human Evaluator

Versions	He Yujia Version	ChatGPT 4.0	SparkDesk
Example sentence 1	75	70	75
Example sentence 2	75	70	65
Example sentence 3	70	70	75
Example sentence 4	70	65	65
Example sentence 5	85	70	70
Example sentence 6	80	75	70
Example sentence 7	65	60	70
Example sentence 8	65	70	70
Mean	73.1	68.9	70

Table 6: Scores Given by the Fourth Human Evaluator

Versions	He Yujia Version	ChatGPT 4.0	SparkDesk
Example sentence 1	85	76	78
Example sentence 2	80	85	78
Example sentence 3	80	78	83
Example sentence 4	85	80	78
Example sentence 5	88	80	85
Example sentence 6	86	82	82
Example sentence 7	83	86	80
Example sentence 8	82	87	80
Mean	83.6	81.8	80.5

Why does the human version consistently secure top scores? Through an in-depth analysis, which involved comparing versions provided by respectively the human translator He Yujia, ChatGPT and Starkdesk as the object for comparison, it was found that evaluators unanimously believe ChatGPT surpasses the other tool in aspects such as the recognition of iconicity, sentence construction, cultural sensitivity, and rhetorical effectiveness. However, it still falls significantly short when compared to the human translator. A detailed analysis is as follows:

6. Major Principles of Iconicity

Iconicity refers to the resemblance-based mapping between linguistic structures and experiential structure or conceptual structure, following the sequence of "Reality-Cognition-Language" (Wang Yin, 2021) - linguistic forms are reflections of language users' conceptual systems, which are largely constructed on their "experiential bases" (Lakoff and Johnson, 2003). Icon has been defined by Peirce (1931) as a non-arbitrary intentional sign, or a designation bearing an intrinsic resemblance to its referent (the object it designates).

The concept was initiated by Peirce at the end of the 19th century and subsequently developed over the following decades by eminent linguists including Chafe (1970), Hopper and Thompson (1980 and 1984), Slobin (1981), Haiman (1980 and 1985), Givón (1979, 1984 and 1990), Croft (1990) and Landsberg (1995).

From a macroscopic perspective, iconicity can be seen as an ubiquitous phenomenon in many aspects as illustrated by Elleström (2016, 440):

Iconicity is a semiotic notion that comprises creation of meaning based on resemblance, whether the signifying and signified entities are visual, auditory, or cognitive; iconicity includes phenomena such as verbal sound representing natural sound (onomatopoeia), moving visual images representing visual occurrences (as in film), static visual images representing abstract relations (for instance, graphs), and word order representing an order of events in what is signified by the words (syntactic iconicity, for instance "she (1) started to read but (2) soon fell asleep").

This paper focuses on the narrow sense of iconicity - syntactic iconicity. The seminal paper of Jakobson (1965) *Quest for the essence of language* challenges Saussure's principle of "arbitrariness" and highlights a form of iconicity in the structural composition of language: the arrangement of clauses in a complex sentence mirrors the actual chronological order of the events they describe, as exemplified by Caesar's famous phrase "Veni, vidi, vici" (I came, I saw, I conquered). Haiman (1980) also categorizes iconicity into two types: isomorphism and motivation. Isomorphism refers to the correspondence between form and meaning, whereas motivation refers to the correspondence between the relationships among linguistic structural components and the relationships among experiential structural components.

In brief, researchers have not reached a consensus on the classification of all types of iconicity. However, four major principles of iconicity are repeatedly mentioned in recent research. They are quantitative iconicity, sequential iconicity, symmetrical iconicity, and markedness iconicity.

6.1. Sequential Iconicity

Also known as iconicity principle of order, the sequential principle refers to the correspondence between the order of language units and the order of thinking (Haiman, 1980). Similarly, Shen Jiaxuan (1993) concludes more explicitly, "The order of syntactic elements reflects the actual state or sequence of events".

Wang Yin (2003) claims that the feasibility of this principle lies in the fact that when the order of linguistic structure is consistent with humans' cognitive experience, it is easier for the recipient to extract information, thus in turn facilitating cognitive procession. Conversely, if a group of linguistic units are placed against common rule or logic, it demands more efforts from the reader to handle the information.

In a nutshell, the practicality of this principle lies in people's tendency to record events in accordance with their sequence of actual occurrence. In verbal practice, words and sentences can be organized in a progressive way, revealing an inner order ranging from spatial sequence, temporal sequence, to logic sequence.

6.2. Quantitative Iconicity

Haiman (1980) argues that the length and complexity of an expression reflects "the extent to which it conveys new or unfamiliar information". Lakoff and Johnson compare linguistic expressions to the containers, and the meanings conveyed to the contents. The larger container holds more contents (Lakoff and Johnson, 1980a). Hence, an increase in the number of linguistic symbols leads directly to a higher requirement for readers' attention (Wang Yin, 2021).

To sum up, the number of linguistic symbols is proportional to the meaning expressed and the attention needed for information processing. In other words, the quantity, complexity and importance of concepts could be expressed by the quantity of linguistic units. Consequently, a typical approach to displaying this principle is repetition.

6.3. Symmetrical Iconicity

Symmetrical principle of iconicity suggests that notions of symmetry are expressed through symmetric word forms (Pericliev, 2022). Symmetrical representation corresponds to the symmetrical relationship of the concepts (Hiraga, 1994). Norman holds the view that symmetrical iconicity in expression arises from the symmetry of human body (Norman, 2004).

In cognitive translation studies, structural symmetry responds to conceptual symmetry. Accordingly, coordinated information can be viewed as symmetrical. As a result, evidence of symmetrical iconicity could be

found first, in the typical figures of speech such as parallelism and antithesis, which are used to express balanced meanings. Justifications can also be found in usually fixed patterns, and this linguistic phenomenon is more common in Chinese than in English, as seen ubiquitously in Chinese four-character idiom with pared parts.

6.4. Markedness Iconicity

Wang Yin (2021) defines the marked item as the component with distinguishable characteristics. As such, the unmarked item carries ordinary meanings, used in a common way. Likewise, Haiman (1985) proposes that familiar items are usually expressed in a succinct form.

In short, markedness iconicity can be considered as meaning beyond words. The marked term is often associated with special meaning and indicates special connotations. Facing the unpredictability caused by a marked term, an inexperienced reader may sometimes get lost. Marked item takes the readers more time to figure out the irregular meaning. When marks are absent, cognitive processing and reasoning entails less effort.

Markedness iconicity and sequential iconicity, as mentioned above, form a dialectical unity. Both English and Chinese employ the practice of placing most significant information at the beginning of sentences; in English, salience can also be achieved by the syntactic device of end focus, where sequential iconicity yields to markedness iconicity-positioning highlighted information where it is most easily attended to by individuals, balancing the importance and accessibility of information.

7. Analysis of Translations for *Shark's Fin and Sichuan Pepper* in Terms of Principles of Iconicity

7.1. Analysis of Sequential Iconicity

In general, the logic of sentences often dovetails with temporal order, which is the main pillar of sequential iconicity. The "Universal Grammar", based on rationalism and widely accepted in the 17th and 18th centuries, also discussed the phenomenon of natural order in language. The ECM (short for Event-domain Cognitive Model), proposed by Wang Yin (2021) as the latest development of earlier linguistic theories, also helps to elucidate the underlying mechanism of sequential iconicity. Effective translation involves reproducing the event domain described in the source language within the target language in terms of sequential iconicity.

(1) **Source Text:** But nothing had prepared me for the gastronomic assaults of that first trip to Hong Kong and China in the autumn of 1992.

He version: 但是一九九二年秋天，我第一次去中国，落脚香港，面前的这道菜还是叫我猝不及防.

ChatGPT (4.0) version: 但是，在1992年秋季首次前往香港和中国的那次旅行中，没有任何事情让我准备好面对那些美食的冲击.

SparkDesk version: 然而，1992年秋天我第一次去香港和中国的美食之旅，却让我措手不及.

The translated Chinese versions provided by ChatGPT(4.0) and SparkDesk do not align with Chinese expression habits, resulting in an incoherent and unnatural Chinese rendition, due to two reasons:

a. Normally, the agent should occupy the place of subject when a person is involved in a series of actions;

b. Clauses in the Chinese version should be organized in accordance with the time order.

Girard Gabriel (1747) categorized the world's languages into three major types:

a. Analogical languages, where word order follows a natural temporal sequence, (into which Chinese can be categorized, the conclusions presented in the brackets are drawn by the author);

b. Displacement languages, which are contrary to analogical languages, such as Latin;

c. Hybrid languages, which possess characteristics of the previous two categories, like Greek (and English), etc.

According to the analysis by Chinese scholar James (1985), Chinese predominantly falls under the category of language with natural order. There exists a high correspondence between word order and temporal sequence in Chinese, leading to the proposal of the "Principle of Temporal Sequence" in Chinese. In other words, sequential iconicity is considerably noticeable in Chinese. English, on the contrary, is mainly considered a hybrid language with less prominent sequential iconicity, characterized by two scenarios: (1) Natural order, which refers to the compliance with temporal sequence; (2) Unusual order: The word order is subject to English-specific syntactic rules, which are grammaticalization of cognitive patterns of English speakers.

In terms of habitual word order of English, the expressions about time and location can be put at the head or tail of a sentence, or anywhere else within a sentence, to form sequential order, flashback, backward narration or retrospection. Hence, when an English text is to be translated into Chinese, the clauses representing a series of actions should be managed in sequential order by putting the expressions regarding time at the beginning of a sentence. Hence, He Yujia divides the sentence into four parts, to accustom the order to the readers' preference. This change not only adjusts the sentence structure to the reading habit of Chinese readers, but also adds a rhythmical beauty to it. By contrast, both ChatGPT and SparkDesk versions fail to achieve sequential iconicity and meet the expectation of Chinese readers.

(2) Source Text: Soon after that dinner with Sebastian and his friends, I crossed the border into Mainland China and took the slow train to Guangzhou.

He version: 和塞巴斯蒂安他们**吃完**那顿饭后不久，我**过了**口岸，**进入**内地，从火车站**搭了**列慢车**去**广州.

ChatGPT (4.0) version: 那次与塞巴斯蒂安及其朋友**共进**晚餐后不久，我就**越过**我就**越过**了边境**进入**中国大陆，并**乘坐**慢车**前往**广州.

SparkDesk version: 那次与塞巴斯蒂安及其朋友们**共进**晚餐后，我不久便**越过**边境，**进入**了中国大陆，并**乘坐**慢火车**前往**广州.

The original sentence is a typical English "grape-like" sentence with two main SVO structures (I crossed the border, took the train), to which affiliated a string of noun phrases and infinitive phrases functioning as various nodes. In contrast, Chinese people prioritize the chronological order of multiple minor actions, arranging words based on actual order of events perceived in daily life, thereby shaping Chinese into a language type with a pronounced temporal sequential resemblance.

However, different from the first example, this sentence places verbs "crossed", "took" and prepositions "into", "to" in the chronological order as implied by sequential iconicity. Therefore, both human translator and AI translation software easily recognize this arrangement feature and encounter no difficulty in expressing the inherent sequential iconicity. By showing a series of the character's movements, the sequence of actions is conveyed, the pace of the events is highlighted, and the brisk feeling of excitement is created.

In summary, it could be clearly seen that, in the E-C translation, AI software can achieve certain effectiveness when the sequential iconicity is plainly displayed by the surface structure. In other words, they can't recognize the underlying functioning of sequential iconicity in the arrangement of segments, or address the significant differences between Chinese and English.

7.2. Analysis of Quantitative Iconicity

The quantity of linguistic symbols resembles the quantity and complexity of concepts. Given a targeted text, the more complicated its structure is, the more time readers need to understand it. In practice, sometimes, the translator may simplify the original text, as long as all the information and intention of the writer are secured. In other cases, however, the translator is required to keep the original structure or even extend it, to achieve equal pragmatic effect.

Some typical examples are given as follows:

(3) Source Text: Surly taxi drivers waxed lyrical as they recounted to me, in great detail, their favourite recipes.

He version: 那些**最最沉闷或粗暴**的出租车司机跟我说起他们最喜欢的菜谱，也是**饱含深情、饶有兴致、极尽详细**.

ChatGPT (4.0) version: **脾气暴躁**的出租车司机们**滔滔不绝**地向我**详细讲述**他们最喜欢的食谱时，兴致勃勃.

SparkDesk version: 那些**脾气暴躁**的出租车司机们，却**滔滔不绝**地向我**详细描述**他们最喜爱的菜谱.

Haiman (1985) delineated the principle of iconicity and the principle of economy as two most significant driving forces within language systems. Any linguistic system is subject to the governance of both principles. While competing with each other, they contribute together to the evolving dynamics of a language, collectively propelling its development and evolution.

Though both AI versions conform to grammatical rules, they fail to convey the communicative intent of the source text because their syntactic structures lose the correspondence with semantic structures. In the source text, the slang "waxed lyrical" and the insertion ", in great detail, " are employed to emphasize underscore the taxi drivers' affection for their favorite recipes. Additionally, "in great detail" is placed between commas as parenthesis, a syntactic representation of markedness iconicity which will be discussed in the following part, so as to emphasize taxi drivers' attitude and emotion.

In the AI versions, the textual shell cannot adequately reflect the complexity of concepts expressed within discourse. This inevitably impacts people's comprehension of attitude and emotion of the described drivers towards local cuisine. This is when the human translator strategically takes advantage of the principle of quantitative iconicity, adopting three paratactic phrases "饱含深情、饶有兴致、极尽详细" to achieve end focus to stress drivers' affection, making a stark contrast to their impatient personality described as "最最沉闷或粗暴" in the beginning of the sentence, thereby achieving pragmatic effects consistent with the source text.

(4) Source Text: We fantasized about it, discussed it, and begged anyone coming to see us from Europe to bring some (cheese).

He version:（不过，我们最渴望的还是奶酪。）我们经常**痴迷地**幻想、**热烈地**讨论，要是有谁从欧洲来看我们，就**千请万求地**麻烦那人带点儿来

ChatGPT (4.0) version: 我们幻想着它，讨论它，并恳求每一个从欧洲来看我们的人带一些（奶酪）来

SparkDesk version: 我们幻想着它，讨论着它，还恳求任何从欧洲来看望我们的人带些（奶酪）来

In the original version, the three paratactic verbs "fantasize", "discuss" and "beg", elicit a rush of breath when readers say them aloud, which greatly resembles the voracious desire for cheese due to the scarcity of Western food in Sichuan at that time.

Obeying the well-known principle of "faithfulness, expressiveness, and elegance" put forward by Xu Yuanchong, translators would barely use extra linguistic symbols if the meaning can be conveyed with fewer words. In this case, however, the word "beg" means asking somebody for something with humbleness. That is why while a single"麻烦" is basically sufficient to fulfil all of the grammatical functions, the translator still highlights how humble "we" are to beg for cheese, adding a taste of humor. So the phrase "痴迷地", "千请万求地" and serves as conspicuous signs on the preciousness of the cheese.

  To summarize, AI translation tools are able to faithfully convey denotational meaning, but barely manage to channel connotational meaning or achieve the same pragmatic effects as the source texts, by taking the quantitative iconicity into account.

7.3. Analysis of Symmetrical Principle

Haiman (1980) writes that in English, the conceptual meaning distance between elements that are linked by a coordination "and" is greater than the conceptual distance between elements that are placed side by side without a conjunction. The structure of parallelism and antithesis is the typical approach to crystallizing the symmetrical principle. Therefore, the faithful and appropriate reproduction of symmetrical features should be an important element in translation, because they can reproduce the form and beauty of the original language. Some typical examples are given as follows:

(5) Source Text: Now I meet young people who tell me they prefer sports to martial arts, pills to Chinese herbal medicine, and hamburgers to Chinese food, because they are "modern".

  He version: 现在我遇到的年轻人都跟我说，**不爱**武术**爱**运动、**不爱**草药**爱**西药**不爱**中餐**爱**汉堡，因为他们是"现代人".

  ChatGPT (3.5) version: 现在我遇到年轻人告诉我他们更喜欢运动而不是武术，药片而不是中药，还有汉堡而不是中餐，因为他们认为这更"现代".

  ChatGPT (4.0) version: 现在我遇到的年轻人告诉我，他们更喜欢运动而不是武术，更喜欢药片而不是中药，更喜欢汉堡而不是中餐，因为这些是"现代的".

  SparkDesk version: 现在，我遇到一些年轻人，他们告诉我，他们更喜欢运动而不是武术，药片而不是中草药，汉堡而不是中餐，因为这些都是"现代"的.

  This is a textbook example of parallelism used to channel strong emotions. In the original version, a balanced beauty is created visually and aurally with phrases such as "sports to martial arts" "pills to Chinese herbal medicine", and "hamburgers to Chinese food". The same effect is reached by repeated identical phrases. "不爱······爱", as in Chinese repetition is a common approach to emphasize key ideas, create rhythmic beauty and evoke emotional response.

  It is noticeable that latest ChatGPT (4.0) version has improved its translation on this matter compared to the previous version.

(6) Source Text: I know its breadth and its heaviness, the exact shape of its handle, the pewter tones of its carbon-steel blade.

  He version: 我**了解**这把菜刀的宽度和重量，**知晓**把手的形状，**熟悉**碳钢刀片青灰的色调.

  ChatGPT(4.0) version: 我知道它的宽度和重量，把手的确切形状，以及碳钢刀片的铅灰色调.

  SparkDesk version: 我了解它的宽阔和沉重，它手柄的确切形状，它碳钢刃口的锡灰色调.

  Parallelism is just in part adopted in the original version, partly because when writing in English, people tend to omit the same verb if it can lead several phrases. However, The human translator He Yujia keeps a balance among the subject, objects, and verbs by supplementing different verbs as "了解", "知晓", and "熟悉", which create the beauty in form as well as in sound. In comparison, both LLMs fail to take this distinct stylistic features in Chinese language into consideration.

7.4. Analysis of Markedness Iconicity

The concept of markedness encompasses a spectrum, with unmarkedness representing the default or expected

form and markedness indicating deviation from this norm. Unmarkedness corresponds to known or predictable information, whereas markedness signifies new or additional meaning. Markedness, in its essence, pertains to how language elements signify deviation from a norm or expectation, thereby imbuing sentences or phrases with additional layers of meaning. Unusual placement of words are major representatives of markedness principle, such as sentence-initial focus, sentence-final focus, abnormal positioning of segments, or adoption of rhetoric devices.

The aforementioned example 3 has shed light on markedness iconicity through the method of abnormal positioning - parenthesis, which introduces asides or supplementary information in a way that both disrupts and enriches the narrative flow.

The author believes that markedness iconicity can also be manifested through rhetoric devices in a comparison to plain language.

(7) Source Text: The constant barrage of dialect was a gruelling initiation for me.

He version: 快速的四川话**像枪林弹雨般**射向我，把我搞得**高度紧张、精疲力尽**.

ChatGPT(4.0) version: 对我而言，方言的**持续轰炸**是一次严酷的**入门考验**.

SparkDesk version: 连绵不绝的**方言轰炸**对我而言是一场磨人的**入界仪式**.

Reference version: 快碎急促的话语像枪林弹雨般射向我，让第一次接触四川话的我招架不及，精疲力尽.

In the original version, the word "barrage" employs a rhetorical device – metaphor, comparing Sichuan dialect to the continuous firing of a large number of guns in a particular direction. Because it is indeed hard to learn this dialect, let alone respond to it in such a short time. This innovative comparison is designed to show that Sichuan dialect, vociferous and speedy, overwhelms the foreigners. The metaphor not only conveys the difficulty of adapting to a new linguistic environment but also evokes the sensory overload and emotional strain associated with such an endeavor. The choice of metaphor here is significant because it transcends mere description, offering instead a visceral, almost tangible experience of the challenge faced by the author. This use of metaphor as a form of iconicity not only enhances the reader's engagement with the text but also deepens their understanding of the author's personal journey and the broader cultural context.

He version changes the metaphorical form into simile, but insists on capitalizing on a rhetoric device to achieve markedness, thereby shedding light on the indicated meaning of the word "barrage". The idiom "枪林弹雨" in the He version compares the firing of guns to downpour, while the AI versions use "轰炸" to refer to continuous bombing, both of which emphasizing the semantic focus and preserving the aesthetic of the original text. The example again proves the hypothesis of the paper that syntactic iconicity can act as a pivotal point of observation and method in the the translation of stylistically sensitive literary works.

Though AI models manage to use the figure of speech to contain markedness iconicity, they provide confusing expressions "入门考验" and "入界仪式" due to insufficient understanding of the context and meaning lingering beyond the text. By contrast, He version and reference version (provide by the author) utilize the principle of quantity iconicity to emphasize tremendous confusion and stress of the speaker, as shown by "高度紧张、精疲力尽" or "招架不及，精疲力尽". Nevertheless, as previously indicated, He Yujia's interpretation falls short of fully encapsulating the entirety of the sentence's meaning, attributable to her oversight of the term "initiation".

(8) Source Text: I watch, captivated by yet another of the endlessly fascinating little events that mark my daily life in Chengdu.

He version: 我在成都的日常生活，充满了这些令人着迷的小剧场

ChatGPT(4.0) version: 我凝视着，深深被成都日常生活里那些无穷无尽、充满魅力的琐碎事件迷住了

SparkDesk version: 我注视着，再次被成都日常生活中无尽迷人的小事件所吸引

In this cited example, the expression "fascinating little events" is originally unmarked. However, He Yujia translates it as "小剧场" to intensify the extent to which "I" was captivated. With the employment of a metaphor, the Chinese version created a marked term. It helps to enrich the meaning of "little events", because after all, those events are by no means trivial, but matter a lot.

8. Conclusion

Taken together, AI LLMs have attained an effectiveness level, surpassing the established standard of 31.4%, even in the context of translating non-fiction literary works. When sequential iconicity is overtly presented in the surface structure, AI LLMs can achieve better scores. However, they fall short in comparison to the human translator across other categories of iconicity, particularly when the iconicity is subtly interwoven within the text.

Looking ahead, the author suggests incorporating advanced principles from cognitive linguistics and cognitive translatology into LLM training. This includes grounding these models in the nuanced understanding of not only iconicity, but also metaphor, metonymy and image schema mapping. By integrating these linguistic concepts with a plethora of real-life examples and their respective contexts, LLMs could potentially develop a deeper, more intuitive grasp of language complexities. Such advancements might enable these models to better interpret and convey subtle meanings, particularly those embedded in cultural nuances or implied through rhetorical devices. This approach could mark a significant leap forward in the quest to narrow the gap between AI and human cognitive capabilities in language understanding and translation.

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