

Meaning Construction in Documentary Subtitle Translation: A Multimodal Discourse Analysis of *Amazing China: Stories of Panda*

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Abstract

Nature documentaries serve as a crucial medium for showing China's ecological civilization, and the quality of the subtitle translation directly affects the effectiveness of cross-cultural communication. At present, multimodal discourse analysis has been widely applied to the study of audiovisual subtitle translation. However, research on the subtitle translation of nature documentaries remains scarce. Based on Zhang's synthetic theoretical framework for multimodal discourse analysis [1], this paper analyzes the subtitle translation of the documentary *Amazing China: Stories of Panda* from the aspects of culture, context, content, and expression. And it explores its strategies for multimodal meaning construction. The study finds that the translator achieves cross-cultural meaning transfer through the reconstruction of cultural information, constructs meaning through the coordination of multimodal resources. And under the physical constraints of the medium, the translator adopts strategies such as omission to promote cross-cultural communication. This study enriches the multimodal perspective on the subtitle translation of nature documentaries and could serve as a reference for the subtitle translation practice of similar documentaries.

Keywords

multimodal discourse analysis, subtitle translation, nature documentary, cross-cultural communication

1. Introduction

As globalization continues to advance, cross-cultural communication has become increasingly frequent, and modes of cultural communication have gradually shifted from a unimodal form centered on language to a multimodal form integrating multiple semiotic resources such as images, sound, and text [2]. Nature documentaries construct discourse meaning through the synergy of multiple modes including language, visuals, and music. And they possess unique advantages in disseminating ecological civilization, presenting national image, and promoting cultural communication [3]. However, the multimodal nature of documentaries has also expanded subtitle translation beyond the scope of traditional linguistic transfer. Subtitles are required not only to accurately convey information but also to coordinate with other modes such

as visuals and sound effects to jointly achieve meaning construction [4]. Therefore, documentary subtitle translation from a multimodal perspective has become an important topic in linguistic research.

Amazing China: Stories of Panda employs giant pandas, the cultural symbol with strong international recognition, as its carrier. And it vividly presents China's achievements in ecological civilization and the philosophy of harmonious coexistence between humanity and nature, possessing high value for international communication. As a crucial part in cross-cultural communication, the quality of its subtitle translation directly affects overseas audiences' understanding of the documentary's content and the image of China. Currently, research on subtitle translation of nature documentaries remains scarce. Therefore, this paper draws on the synthetic theoretical framework for multimodal discourse analysis proposed by Zhang to examine the subtitle translation of this documentary from four levels: culture, context, content, and expression. It could explore how subtitles collaborate with other modes to realize meaning construction. The aim is to enrich the application cases of multimodal theory in the field of the translation of nature documentaries, and to provide reference for research on subtitle translation of nature documentaries and the international communication of documentaries.

2. Literature Review

Li defines multimodality as composite discourse that incorporates non-verbal modes such as images and sound in addition to text, or any text whose meaning is realized through multiple semiotic codes [5]. Within multimodal discourse analysis, discourse meaning is not only constructed by linguistic signs, but also generated by a variety of semiotic resources such as language, images, sound, and color [6]. Its theoretical roots of this perspective can be traced to Barthes' essay *Rhetoric of the Image*. This essay departed from the traditional view that images only serve a representational function [7]. Later, Halliday proposed the theory that language is a social semiotic and he regarded language as a social resource for meaning construction. It provides an important theoretical basis for the functional analysis of non-linguistic signs [8]. Based on this foundation, Kress and van Leeuwen extended the three metafunctions of systemic functional linguistics to the visual mode and then proposed the visual grammar framework. It marked a major step forward in the development of multimodal discourse analysis [9]. As research objects shifted from static images and texts to dynamic audiovisual discourse, Forceville further introduced multimodal metaphor theory. It emphasized that metaphorical meaning can be jointly constructed by multiple modes such as language, images, and sound, offering a new analytical perspective for the study of audiovisual discourse such as film and advertising [10]. At the same time, Martinec and Salway investigated the relations between image and text in dynamic images and proposed a system of choices that includes Status Relations and Logical-Semantic Relations [11]. Pérez-González argued that the research object of audiovisual translation should turn to multimodal discourse. That means viewing subtitles, images, and sound as an integrated system that jointly participates in meaning construction, thereby promoting the application of multimodal theory in subtitle translation [12].

Within China, research on multimodal discourse analysis began with Li's systematic introduction of multimodal social semiotic theory. Afterwards, scholars such as Zhu [13] and Zhang have refined both the theoretical framework and the methodology of the field. Zhang and other researchers have contributed to localizing the theory for Chinese contexts [14]. Among these efforts, Zhang's synthetic theoretical framework for multimodal discourse analysis has been particularly influential, this framework integrates four levels: the cultural level, the contextual level, the content level, and the expression level. It provides crucial guidance for the application of multimodal theory in translation studies and discourse analysis.

As the theories have matured, the research objects of multimodal discourse analysis have also expanded, with several well-established paradigms taking shape. Existing studies mainly concentrate on areas such as education and teaching, journalism and communication, advertising and brand communication, audiovisual discourse, and digital media [15][16]. Within audiovisual discourse, Pérez-González points out that audiovisual translation should break through text-based analytical traditions and instead treat multimodal resources as a unified system of meaning construction. Taking the film *Hero* as a case, Ouyang explores how the translator integrates the interplay among sound, image, and subtitles to achieve accurate subtitle translation [17]. Lin and Rao use the film *The Lychee Road* as an example to investigate how film subtitle translation weaves together textual, visual, and other modalities to convey the film's emotions and values

[18]. Xin and Chen take the international publicity documentary *Seasons of China* as a case to examine the synergistic role of modal resources such as subtitles, images, animation, and sound in documentary translation [19]. However, existing research mainly focuses on audiovisual discourse such as films and humanistic international publicity documentaries, the attention to the multimodal meaning construction of nature documentaries remains insufficient. To address this gap, this paper adopts Zhang's synthetic theoretical framework for multimodal discourse analysis as its analytical framework to examine the multimodal discourse meaning construction in the subtitle translation of the nature documentary *Amazing China: Stories of Panda*, with the aim of enriching multimodal discourse research.

3. Synthetic Theoretical Framework for Multimodal Discourse Analysis

Zhang constructed a synthetic theoretical framework for multimodal discourse analysis on the basis of systemic functional linguistics. The theoretical foundation of this framework can be traced back to Halliday's systemic functional linguistics. Zhang clarified the four levels of multimodal discourse analysis: the cultural level, the contextual level, the content level, and the expression level.

The cultural level is the foundation of multimodal communication. It is related to the social ideology of discourse and determines the overall communication strategy and meaning construction of the discourse. Without the cultural level, the interpretation of the contextual level will lose its underlying support. There are significant differences among different civilizations in terms of cognitive patterns, value perceptions, and cultural symbols. They may lead to cross-cultural communication barriers in the process of communication between different civilizations. In documentary subtitle translation, this level constrains the translation methods for various culture-specific concepts, the translator needs to take into account the local cultural connotations and the cognition of overseas audiences, and reduce cross-cultural understanding barriers through multimodal resources such as images and sound.

Context is the realization of culture in a specific situational context, including the contextual factors determined by field, tenor, and mode. In documentary subtitle translation, field refers to the domain of subject matter and activity involved in the communication, tenor refers to the stance between the participants in the communication, and mode refers to the media and channels used in the communication. During the translation, all subtitle translations and shots must fit the overall communication context to ensure that the plot and inner emotions of the documentary can be fully conveyed to the audience.

The content level includes two dimensions: discourse meaning and formal features. The discourse meaning dimension involves ideational meaning, interpersonal meaning and textual meaning, bearing the documentary's overall narrative information and emotional orientation. The formal features dimension concerns various modes and their interrelations, which can be divided into complementary relations and non-complementary relations. Among these, the complementary relation refers to the situation in which the discourse of one mode cannot fully express its meaning, or cannot express its entire meaning, and thus requires supplementation by another mode. This requires that in documentary subtitle translation, the translator must ensure both the integrity of the documentary's essential content and information, and balance narrative coherence with emotional expression.

The expression level refers to the material carrier of discourse meaning, the medium form through which meaning is realized. And it can be divided into linguistic and non-linguistic dimensions. In the process of documentary subtitle translation, the linguistic dimension can be manifested in aspects such as sentence structures. The non-linguistic dimension can involve audiovisual elements such as shot composition and background music. Through synchronized playback, the two constitute the final presentation of multimodal meaning construction. At the same time, conditions such as the spatial size of the screen and the speed of camera switching directly constrain the size and length of subtitles, which is also a core consideration that needs to be taken into account in the process of translation.

Compared with other frameworks for multimodal discourse analysis, Zhang's synthetic framework integrates four interconnected levels: culture, context, content, and expression. It not only considers the interaction among different semiotic resources but also explains how discourse meaning is shaped by cultural backgrounds, situational contexts, semantic resources, and material forms. Therefore, it is particularly

suitable for documentary subtitle translation, where subtitles need to collaborate with images, sound, and other modes to achieve multimodal meaning construction.

4. Case Analysis

The CCTV documentary *Amazing China: Stories of Panda* takes the protection, breeding, and reintroduction of China's giant pandas as its narrative themes, presenting the development of giant panda conservation in China and the achievements of ecological civilization construction. This paper takes the content of this documentary as its research corpus and selects representative cases of subtitle translation. Then, it examines them from four levels: culture, context, content, and expression to explore how subtitles collaborate with other modal resources to realize discourse meaning construction.

4.1 Cultural Level

Different cultures possess different life styles and expressive habits. Therefore, culture-specific items often cause translation obstacles. In subtitle translation, Chinese-unique symbols and imagery are difficult to translate literally. The translator needs to consider the target language culture, and reduce the difficulty of cross-cultural meaning comprehension as much as possible while preserving the distinctive characteristics of the source culture.

Example 1

Source text: 大熊猫从久居山林中的“隐士”以科学认定的身份走进了全球视野。

Translation: The remote giant pandas have descended from the mountains and stepped onto the global stage.

In traditional Chinese culture, the image “隐士” carries the spiritual connotation of seclusion and self-cultivation in Taoist philosophy. Originally it refers to refined scholars who live in seclusion in the mountains and are isolated from the outside world. Here it refers to wild giant pandas that live in the deep mountains all year round and have little contact with humans. The translator did not translate “隐士” literally as hermit, but instead used a free translation as descended from the mountains. This is because the word hermit has the meaning of Christian connotations and implies religious ascetics in Western culture. When overseas audiences see this word, they would first associate it with religious believers, thus causing misunderstandings. In addition, the word descend contains the meaning of coming down, which fits the behavior of the pandas originally inhabiting the deep mountains and now going down to enter public view. At the same time, it fits the idea in traditional Chinese culture that a recluse could step out of the mountains and devote themselves to the secular world at an appropriate moment. This choice remains the artistic conception of the original text while avoiding cognitive biases caused by different cultural backgrounds, thereby realizing cross-cultural communication.

Example 2

Source text: 而“老来得子”的莉莉也更是对自己的孩子们十分的宠爱。

Translation: Li Li became a mother in her autumn years, however, she loves her babies more than the young mothers around her.

The expression “老来得子” is a traditional Chinese idiom. It conveys the happiness of having children in one's later years in traditional Chinese culture. Here, the translator translated “老” as in her autumn years rather than literally translating it as in her old age. In Western culture, autumn symbolizes the stage of life moving toward its later years, which vividly conveys the meaning of “老”. The translator chooses autumn years to refer to old age, which enables overseas audiences to understand the meaning without additional explanation. This not only avoids the rigidity brought by the literal translation as old age, but also fits with the core meaning of the giant panda Li Li giving birth in old age. It also conveys gentle emotions and effectively reduces obstacles to cross-cultural understanding.

4.2 Contextual Level

Zhang points out that context is the realization of culture in a specific situational context, reflected by three elements: field, tenor, and mode. In documentary subtitle translation, the translator needs to consider the subtitle translation based on the specific context to ensure the accurate expression of its concrete content and emotion.

Example 3

Source text: 大熊猫“草草”试验的成功让全世界看见了更多圈养大熊猫走向野外的可能。

Translation: The success of the giant panda Cao Cao's trial has opened more possibilities for captive giant pandas to their natural habitat.

Figure 1. Giant Panda Activity I

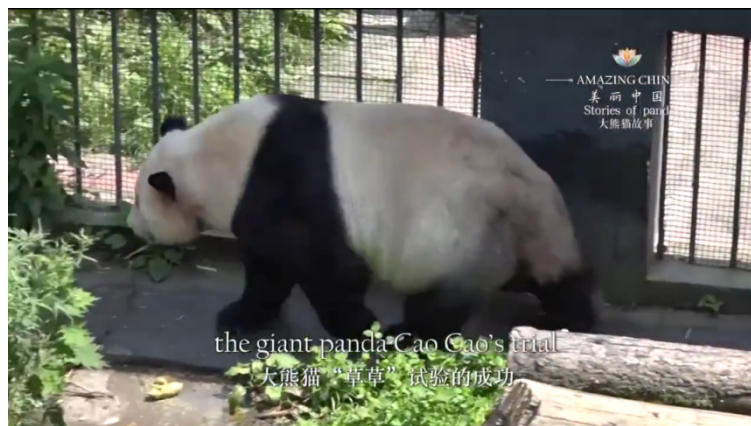


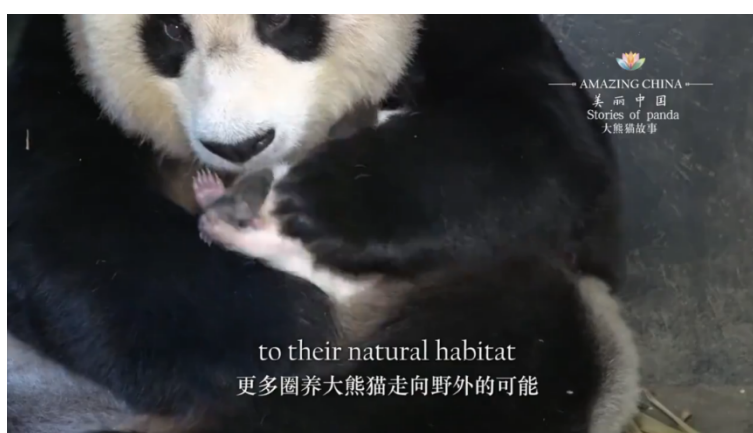
Figure 2. Giant Panda Activity II



Figure 3. Giant Panda Activity III



Figure 4. Giant Panda Activity IV



Here, the field focuses on the background of giant panda conservation and reintroduction to the wild. The tenor is reflected in the equal stance between the narrator and the audience. And the narrator conveys accurate information to the audience through objective commentary. The mode is a documentary, integrating multimodal factors such as images, sound, and subtitles. The images present the state of giant pandas in a captive environment, reflecting the theme of giant panda conservation. Therefore, “走向野外” should also be understood as returning to the living environment exclusive to giant pandas, which refers to the natural habitat here. Based on the contextual meaning of giant panda conservation, the translator translated “野外” as natural habitat through free translation rather than literally as the wild. Moreover, the word wild refers to the natural environment or the wild state; translating it as wild would be too broad in scope. So natural habitat is more specific and fits the context of returning pandas to their original habitat better, thereby achieving a positive discourse effect in cross-cultural communication. At the same time, the shots in the images sequentially switch between the state of pandas in a captive environment and the state of the panda mother and its cub in the wild, which fully connect the giant panda conservation process from artificial breeding to reintroduction. The term natural habitat chosen in the translation precisely echoes this logic. This linguistic mode integrates the real scenes from the visual mode, directly highlights China’s initiative of reintroducing pandas into their exclusive, original natural spaces. Moreover, it can give overseas audiences a clearer understanding of China’s giant panda conservation efforts. Figure 1 to 4.

Example 4

Source text: 但是在这群“芝麻团子”里面居然还夹杂着“褪色”的大熊猫。

Translation: Among these darlings, however, gray ones unexpectedly appear.

Figure 5. Giant Panda Cub I



Figure 6. Giant Panda Cub II



The field of this sentence focuses on the introduction of the gray giant panda family. The tenor is reflected in the equal and intimate stance between the narrator and the audience. The narrator narrows the distance from the audience through a relaxed and commentary style and an equal stance. The mode is a documentary which integrates multimodal factors such as soft light music, close-up shots, and subtitles. The images show the appearance of soft and cuddly panda cubs in piles, directly conveying that the panda cubs are very young and adorable. Therefore, the metaphor of “芝麻团子” is used here. The translator translated “芝麻团子” as darlings through free translation, which fits the affection for panda cubs in the context. If translated literally as sesame balls, it can not fully convey the emotion here and would also conflict with the images of panda cubs. Translating it as darlings not only coordinates with the visual mode but also fully conveys its inner emotion. Figure 5 to 6.

4.3 Content Level

The content level involves discourse meaning and formal features. Discourse meaning includes ideational meaning, interpersonal meaning, and textual meaning. While formal features refer to the interaction of modes such as images and sound. In documentary subtitle translation, when subtitles do not fully express the complete semantic content, modes such as images and sound can collaborate with them to accomplish meaning construction.

Example 5

Source text: 数千米的海拔差距在垂直高度上催生了“一山有四季”的原始森林。

Translation: The altitude gap vertically induces a primeval forest with distinctive features in all four seasons.

Figure 7. High Mountain with Distinct Seasonal Variation I



Figure 8. High Mountain with Distinct Seasonal Variation II



In this sentence, the visual mode slowly shows the distinctly differentiated topography and vegetation features of a high mountain with the change of altitude through a long shot. In the linguistic mode, the expression “一山有四季” is used to describe and summarize the visual content. The two modes form a complementary relationship and jointly construct the discourse meaning, and the audience can intuitively understand the characteristics of the mountain vegetation. The translator applies omission to “一山” in “一山有四季”, translating it as distinctive features in all four seasons. Although the reference to the mountain is omitted, the visual mode has already presented the coexistence of four types of vegetation features on the same high mountain, supplementing the missing spatial information in the subtitles. The audience can understand that all four seasons here corresponds to the vegetation features of different altitudes of the same mountain only by the visual mode. Here, the translated multimodal text generates ideational meaning through the synergy of visual and linguistic modes, and fully conveys the discourse meaning of this sentence. Figure 7 to 8.

Example 6

Source text: 基地科研人员设法从妈妈那里挤来初奶，为其人工补奶。

Translation: Personnel at the base found ways to acquire milk from its mother, to feed the tiny cub.

Figure 9. The Personnel Supplementing a Panda Cub's Feeding I



Figure 10. The Personnel Supplementing a Panda Cub's Feeding II



Figure 11. The Personnel Supplementing a Panda Cub's Feeding III



The visual mode uses close shots to present the scenes of the research personnel obtaining the breast milk from the panda mother and holding a bottle to supplement the panda cub's feeding. The overall color in the images is warm yellow, creating a warm atmosphere. The linguistic mode describes and summarizes the visual information through the precise expression “人工补奶”. The research personnel's operation in the visual mode and the word “人工” in the linguistic mode form a certain redundant relationship, and together they construct the discourse meaning that the research personnel are supplementing the panda cub's feeding. In the translation here, the translator omitted the word “人工” in “为其人工补奶”, but the discourse meaning of “人工” is instead embodied by the action of the research personnel feeding the cub in the visual mode. At this point, the visual mode and the linguistic mode form a complementary relationship, and through

their synergistic interaction they construct ideational meaning. The translator achieves the conveyance of discourse meaning by reconstructing the relationship between modes. Figure 9 to 11.

Example 7

Source text: 瞧瞧现在这只“烫头”“染发”，穿着灰色“皮夹克”的“绩笑”。

Translation: Take a look. The one called Ji Xiao, who's gray all over.

Figure 12. The Panda Cub "Ji Xiao" I



Figure 13. The Panda Cub "Ji Xiao" II



The visual mode uses close shots to display the adorable scene of the gray panda cub “Ji Xiao” resting on the ground. The panda cub in the images has fluffy fur and is entirely gray and white in color. The linguistic mode, through the anthropomorphic expressions “烫头” and “染发”, vividly describes and summarizes the information presented in the images. The visual mode and the linguistic mode form a complementary relationship and jointly accomplish the construction of discourse meaning, allowing the audience to intuitively perceive the physical characteristics of the gray panda cub. The translator omitted the expressions “烫头” and “染发”, but the visual mode already presents the physical characteristics of the gray panda cub, that is, its fluffy fur and entirely gray and white color. Thus it supplements the information missing from the subtitles. The audience can directly understand the physical characteristics of the gray panda cub through the visual mode. In the translated multimodal discourse, the visual mode and the linguistic mode synergistically interact to jointly construct ideational meaning. In this way, it successfully achieves the conveyance of the discourse meaning of this sentence. The translator chose to delete anthropomorphic terms in the translation and instead convey them through the visual mode. This choice not only avoids any loss of sentence information, but also maintains conciseness in the subtitles while ensuring the preciseness required for international communication. Figure 12 to 13.

4.4 Expression Level

According to Zhang's synthetic theoretical framework for multimodal discourse analysis, the expression level is the medium through which meaning is realized. It involves linguistic and non-linguistic types. In the process of documentary subtitle translation, subtitle translation is constrained by factors such as screen space and play duration, and must interact synergistically with modes such as images and sound to accomplish meaning construction.

Example 8

Source text: 这位坚强的“成浪”小朋友。

Translation: This resolute cub named Cheng Lang.

Figure 14. The Panda Cub "Cheng Lang"



Here, the anthropomorphic form of address “小朋友” is used to refer to the panda cub. The translator translated “小朋友” as cub through omission. If translated literally as a little baby, the word combination would be longer. It could also extend the overall subtitle and occupy the screen space of the images. Meanwhile, the camera focuses on the panda cub, which already visually conveys the information of its youth. In this way, the visual mode compensates for the information omitted from the text and establishes synergy between the visual mode and the linguistic mode. Furthermore, the word cub is short and semantically exact, it perfectly fits with the requirements and constraints of the medium such as screen space. Figure 14.

Example 9

Source text: 这只可爱的小肉团子健康地一天天长大着。

Translation: The adorable little cub grew every day.

Figure 15. Close-up of the Newborn Panda Cub



In this context, the term “小肉团子” refers to the newborn panda cub, emphasizing its adorable and lovely appearance. The translator translated it simply as little cub and omitted the literal meaning of meatball. A direct translation such as a little meatball would cause the English subtitles to be too long. Also it could occupy too much screen space and even deviate from the regular norms of subtitle translation. Therefore, it is reasonable to omit the expression “小肉团子”. Similarly, the adverb “健康地” is not translated. The visual mode compensates for these omissions. And a close-up shot of the cub directly presents its round and lovely appearance, which visually conveys the endearing quality implicit in “小肉团子”. At the same time, the visible growth of the cub supplements the missing meaning of healthy in the subtitles. In this way, the visual and linguistic modes form a complementary relationship. They realize multimodal meaning construction. The translation only remains the core semantic information while other information is expressed through visual mode. This strategy not only meets the specification that subtitle length is limited by screen space, but also ensures the complete meaning construction through the integration of verbal and visual modes. Figure 15.

5. Conclusion

Based on Zhang’s synthetic theoretical framework for multimodal discourse analysis, this paper systematically examines the subtitle translation of the documentary *Amazing China: Stories of Panda* from four dimensions of culture, context, content, and expression. The study draws the following three conclusions: First, in the process of cross-cultural communication, the translator needs to consider both cultural and contextual factors in discourse production. And the culture-specific information in the source language should be appropriately reconstructed and transformed into acceptable expressions in the target language culture. Second, subtitle translation should not be limited to the linguistic mode. Instead, other semiotic resources should also be considered and the translator should make full use of the distinctive features of different modes to achieve synergistic meaning construction. Third, the translator should consider the physical constraints of subtitle translation and take into account the screen space and other media constraints to make necessary omissions. In conclusion, this study may provide certain reference for the subtitle translation of nature documentaries.

Due to the limitation of the scope, the conclusions of this study need to be further verified. Future research could expand the scope by incorporating more nature documentaries for analysis and deepen the study of subtitle translation strategies from a multimodal perspective.

References

- [1] Zhang, D. On a synthetic theoretical framework for multimodal discourse analysis. *Foreign Languages in China*. 2009; 6(1):24-30.
- [2] Li, Z., Han, Z. Exploring multimodal discourse in the AI age: Opportunities and prospects. *Contemporary Foreign Language Studies*. 2025; (3):119-128.
- [3] Kress G., Leeuwen, T.V. *Multimodal Discourse: The Modes and Media of Contemporary Communication*. London: Edward Arnold; 2001.
- [4] Qian, S. Audiovisual translation: An increasingly important domain in translation studies. *Chinese Translators Journal*. 2000; (1):61-65.
- [5] Li, Z. Social semiotic approach to multimodal discourse. *Foreign Languages Research*. 2003; (5):1-8+80.
- [6] Xin, Z. New developments in discourse analysis: Multimodal discourse analysis. *Social Science Journal*. 2008; (5):208-211.
- [7] Barthes, R. Rhetoric of the image. In S. Heath (Trans.), *Image, Music, Text*. London: Fontana Press; 1977:32-51.
- [8] Halliday, M. A. K. *Language as social semiotic: The social interpretation of language and meaning*.

London: Edward Arnold; 1978.

- [9] Kress, G., Leeuwen, T.V. Reading images: The grammar of visual design. London: Routledge; 1996.
- [10] Forceville, C. Pictorial metaphor in advertising. London: Routledge; 1996.
- [11] Martinec, R., Salway, A. A system for image-text relations in new (and old) media. *Visual Communication*. 2005; 4(3):337-371.
- [12] Pérez-González, L. Audiovisual translation: Theories, methods and issues. London: Routledge; 2014.
- [13] Zhu, Y. Theory and methodology of multimodal discourse analysis. *Foreign Language Research*. 2007; (5):82-86.
- [14] Zhang, D. A systemic-functional synthetic framework for multimodal discourse analysis. *Modern Foreign Languages*. 2018; 41(6):731-743.
- [15] Cheng, R., Zhang, D. Multimodal discourse analysis in China: Taking journal articles as an example. *Foreign Languages in China*. 2017; 14(3): 36-44.
- [16] Jewitt, C. The Routledge handbook of multimodal analysis (2nd ed.). London: Routledge; 2016.
- [17] Ouyang, Z. On subtitle translation of Hero from the perspective of multimodal discourse analysis. *Overseas English*. 2015; (13):142-144.
- [18] Lin, H., Rao, P. An exploration of subtitle translation in the film The Lychee Road from the perspective of multimodal discourse analysis. *English Square*. 2026; (10):19-22.
- [19] Xin, H., Chen, K. A study on the translation of international publicity documentaries from the perspective of multimodal discourse analysis: The case of Seasons of China. *International Communications*. 2020; (2):54-56.

Funding

This research received no external funding.

Conflicts of Interest

The authors declare no conflict of interest.

Acknowledgment

This paper is an output of the science project.

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