The Construction of Ecological Concepts in the Advanced Chinese Reading and Writing Course from a Multimodal Discourse Perspective

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Abstract: International Chinese language textbooks serve as crucial educational tools for disseminating ecological values and promoting environmental awareness among learners. This study integrates systemic functional linguistics with multimodal discourse analysis to explore how ecological concepts are presented in the "Understanding Contemporary China" series, with a focus on the "Advanced Chinese Reading and Writing Course." The findings reveal that material and relational processes are predominant in the verbal modes, highlighting China's commitment to ecological conservation and sustainable development. In the visual modes, non-human participants such as elephant herds and the Saihanba Forest Farm present readers with authentic ecological scenes, aiming to reveal the concept of harmonious coexistence between humans and nature. The interaction between verbal and visual modes, through exemplification and extension, effectively conveys concepts of sustainable development and the co-construction of a shared ecological community. It is contented that the verbal modes and visual modes employed in the textbook have successfully conveyed beneficial ecological concepts. This not only facilitates international students' better understanding of China, but also contributes to enhancing their awareness of ecological protection.

1. Introduction

Since the 1960s and 1970s, the intensification of global environmental issues has spurred interdisciplinary scholarly interest[1], with a notable focus on linguistics. Ecolinguistics, as an emerging subfield, bridges language studies with environmental concerns through its distinct theoretical framework and methodological approaches. This field aims to reveal the ecological concepts embedded within language and to examine how linguistic practices both reflect and shape environmental attitudes and behaviors. In recent years, localized research in ecolinguistics has garnered widespread attention both internationally and domestically. International studies primarily focus on interdisciplinary integration within the Haugen paradigm, examining the impacts of sustainable development and social factors on ecology. Despite these advancements, the application of Hallidayan frameworks remains insufficient, particularly in analyzing how linguistic structures contribute to ecological understanding[2]. Domestic studies have made progress in ecological

discourse analysis, predominantly centering on the linguistic dimensions of ecological texts. However, these studies have often neglected multimodal perspectives, which are essential for a comprehensive analysis of how ecological concepts are conveyed. Additionally, while there is significant research on the ecological characteristics of English as a Foreign Language (EFL) textbooks, there is a lack of studies on the ecological features of international Chinese language textbooks[3]. Therefore, this study aims to investigate the ecological discourses within the international Chinese language textbook "Advanced Chinese Reading and Writing Course." It employs Halliday's transitivity system, Kress & van Leeuwen's visual grammar, and Martine & Salway's image-text relationship as theoretical foundations. By analyzing three selected ecological discourses from the textbook, this research explores how verbal modes, visual modes, and their interaction construct ecological values. This approach not only contributes to ecolinguistics by incorporating multimodal perspective but also enhances our understanding of ecological representation in educational materials.

2. Theoretical Framework

2.1 Transitivity

In systemic functional grammar, transitivity refers to the specific processes, participant roles, and environmental elements within semantic relationships that represent experiential meanings and reflect the conceptual functions of language. Halliday puts forward that the transitivity system comprises six fundamental processes: material processes, mental processes, relational processes, behavioral processes, verbal processes, and existential processes. Within an ecological framework, He Wei and Wei Rong (2017b) have redefined the participant roles based on the presence of "life": living entities and non-living entities. Living entities are further divided into human participants, primarily signifying citizens, and non-human participants, which encompass living entities outside of humans, such as animals and plants. Meanwhile, non-living entities are categorized into "physical participants" and "social participants". "Physical participants" refer to the physical factors of a country, such as geographical location, mountains, and rivers, while "social participants" represent the social factors of a country, including politics, economy, and culture. Additionally, in alignment with the ecosophy of "harmony in diversity, mutual love, and mutual benefit", the process system is also endowed with ecological significance, specifically encompassing three types: beneficial processes, destructive processes, and ambivalent processes. These two nuanced classification construct an analytical model of transitivity for international ecological discourse on the basis of transitivity analysis within systemic functional linguistics, which is highly beneficial for more accurately describing the characteristics of international ecological discourse, deconstructing the interrelationships between ecological factors in the international ecosystem, and thereby promoting the ecological well-being and sustainable development of the international community[4].

2.2 Visual Grammar

Inspired by Halliday's systemic functional grammar, Kress and van Leeuwen argue that the meta-function of language system is also applicable to visual symbol system. Therefore, they propose that "Visual Grammar" covers corresponding three aspects, representational function, interactive function and compositional function. The representational meaning is about what happens in a picture. According to the main feature of vector or not, it can be divided into narrative representation and conceptual representation. Interactive meaning pertains to the relationship between the depicted visual participants and viewers, encompassing aspects such as eye contact, social distance, and attitude (modality and perspective)[5]. Compositional meaning involves the

organization of various elements within the image and how this arrangement influences the overall conveyance of meaning. This is realized through strategies such as information value, salience, and framing.

2.3 Image-Text Relations

In any multimodal discourse, logical relationships between different modes are present and warrant exploration[6]. The theory of image-text systems, proposed by Radan Martinec and Andrew Salway in 2005, builds upon previous theories of image-text status and positioning by establishing two subsystems: the status relationship and the logical-semantic relationship[7]. This study primarily focuses on the logical-semantic relationship, as it addresses the internal logical connections between textual components, which helps to more accurately understand the ecological concepts embedded in the textbook.

Logical-semantic relations are categorized into two types: expansion and projection. Expansion is further divided into elaboration, extension, and enhancement. Elaboration involves the transmission of the same participant, process, and context meanings by both text and image, including exposition and exemplification. Extension refers to the introduction of new relevant information by either the image or the text, thereby expanding the content provided by the other modality. Enhancement involves the provision of relevant temporal, spatial, and causal information by both text and image. Projection refers to the representation of content already depicted by text or image in another modality and can include projection of speech or thought.

3. Method

3.1 Research questions

This study mainly explores the following questions: 1) How are ecological concepts constructed through the verbal modes in the "Advanced Chinese Reading and Writing Course"? 2) How are ecological concepts constructed through the visual modes in the "Advanced Chinese Reading and Writing Course"? 3) How do the verbal modes and the visual modes interact to construct the ecological concepts in the "Advanced Chinese Reading and Writing Course"?

3.2 Data

The "Advanced Chinese Reading and Writing Course," one of the Understanding Contemporary China international Chinese textbook series, covers a wide range of topics including Chinese culture, economy, education, and ecology. This textbook is designed to enhance students' language proficiency while also deepening their understanding of Chinese cultural and intellectual traditions. To explore the ecological concepts promoted by the textbook, three articles from Unit 9 have been selected for detailed analysis. This is because they provide a comprehensive exploration of ecological protection, encompassing both theoretical insights and practical applications, as well as present a rich array of ecological information through verbal and visual modes.

3.3 Analytical Procedures

This study employs a three-step linguistic analysis. Firstly, at the level of the verbal modes, a transitivity annotation model is established from an ecolinguistic perspective using the UAM Corpus Tool 6.0 system. The transitivity processes and participant roles are then identified and annotated. The ecological orientation of these processes is assessed based on the ecological view of

"harmony in diversity, mutual benefit, and mutual love." Next, the frequency of occurrence of various components is statistically analyzed, and case studies are conducted to reveal the ecological concepts embedded within the texts.

Secondly, at the level of the visual modes, the study examines how ecological concepts are conveyed through visual modes using Kress and van Leeuwen's visual grammar framework.

Finally, at the level of image-text relations, Martinec and Salway's theory is applied to analyze how the interaction between images and texts constructs ecological values. This approach elucidates the ecological principles articulated through the integration of these two modes.

4. Data Analysis and Discussion

4.1 Ecological Ideas in Verbal Mode

Table 1: Distribution of Transitivity Processes

Process Type	Frequency	Percentage
Material Process	101	62.3
Mental Process	10	6.1
Relational Process	38	23.4
Verbal Process	11	6.7
Behavior Process	1	0.6
Existential Process	1	0.6
Total	162	100%

In table 1, statistical analysis reveals that out of 162 transitivity processes in the data, material processes (62.3%) and relational processes (23.4%) are the most prevalent. Therefore, this study mainly focuses on analyzing these two types of processes.

4.1.1 Material Process

Example 1:

wèi tuī dòng shí xiàn tàn dá fēng、tàn zhōng hé mù biāo, zhōng guó jiāng lù xù fā bù zhòng diǎn lǐng yù hé háng yè tàn dá fēng shí shī fāng àn hé yī xì liè zhī chēng bǎo zhàng cuò shī, gòu jiàn qǐ tàn dá fēng、tàn zhōng hé "1+N" zhèng cè tǐ xì.

In example 1, "China" acts as the Actor, with its semantic configuration as follows: "Actor (non-living social participant, China) + Process (material processes such as release and put in place) + Goal (non-living social participants, including implementation plans, policy framework)". This sequence of specific measures reflects China's firm commitment to a high-quality development trajectory that prioritizes ecological management and adheres to green, low-carbon principles. These efforts are precisely directed towards achieving the goals of carbon peaking and carbon neutrality, thereby advancing the nation toward a sustainable future of green and low-carbon development. This process not only demonstrates China's proactive approach in promoting ecological and economic harmony but also represents a beneficial material process, illustrating its contribution to the alignment of environmental protection with economic development.

Example 2:

kàn dào dà xiàng men hǎo xiàng méi chī bǎo de yàng zi, kūn míng shì jìn níng qū xī yáng yí zú xiāng gāo liáng dì cūn de cūn mín jiù juān chū zì jiā zhòng zhí de yù mǐ tóu wèi dà xiàng.

In Example 2, the villagers function as the Actor, with the semantic configuration as follows: "Actor (human group participants, villagers) + Material Process (donate, feed) + Goal (non-human group participants, such as corn, elephants)." This configuration highlights the villagers' active

involvement in caring for wildlife and supporting biodiversity. They transcend beyond anthropocentric perspectives and are committed to fostering harmonious coexistence between humans and nature. Thus, this action reflects a beneficial ecological process.

4.1.2 Relational Processes

Example 3:

lǜ shuǐ qīng shān jiù shì jīn shān yín shān.

Example 3 features a relational process of identification, characterized by the semantic configuration: "Identifier (non-human physical participant, lucid waters and lush mountains) + Relational Process (is) + Value." This configuration underscores the fundamental interconnection between environmental health and economic prosperity. It posits that respecting and protecting nature is not merely an environmental ideal but a critical principle that should permeate all dimensions of social and economic development. It implies that sustainable development and ecological conservation are essential for achieving long-term economic stability and growth. By advancing this principle, China aims to facilitate its transition towards a green economy, which prioritizes sustainable resource management and environmental protection. Besides, China contributes to the formation of a global eco-friendly community, where economic activities are aligned with ecological well-being. Consequently, this relational process embodies a beneficial ecological significance.

Example 4:

Sài hǎn bà jiàn shè zhě kě yǐ shuō shì quán qiú huán jìng zhì lǐ shí jiàn de diàn fàn.

Example 4 also involves a relational process of identification, with the semantic configuration as follows: "Identifier (human group participants, Saihanba builders) + Relational Process (is) + Value." This configuration views the Saihanba builders as a model of environmental management, emphasizing their crucial role in global environmental governance. By transforming degraded areas into flourishing forest ecosystems, the Saihanba builders exemplify China's dedication to ecological protection. Their achievements not only reflect their active responsibility in addressing environmental challenges but also illustrate how China's experiences and successes in environmental conservation offer valuable lessons and models for global efforts in environmental stewardship. This represents a beneficial relational process.

4.2 Ecological Ideas in Visual Mode

Figure 1: From the second article.

In figure 1, the elephants' trunks and advancing legs are utilized to create a directional vector, illustrating the narrative process. The recipient of this vector is bamboo. When combined with the caption in the upper left corner, which reads "Yunnan, Yuxi, wild elephants enter the village," the figure explicitly illustrates the material process of elephants moving towards a village in Hongta District, Yunnan, to feed on bamboo. Moreover, the absence of direct eye contact between the

elephants and the viewers serves to deliver "offer" information, implying that the viewers are positioned as passive observers rather than active participants in the elephants' activities. This visual detachment subtly advocates for a respectful and non-intrusive approach to wildlife. By focusing on the elephants' natural behavior and their interaction with the environment, the image implicitly promotes the concept of harmonious coexistence between humans and wildlife, reinforcing the need for ecological stewardship and protection of natural habitats.
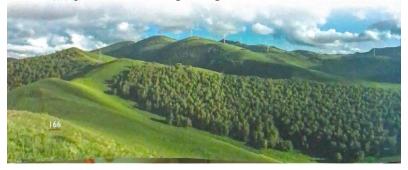

Figure 2: From the third article.

Figure 2, with its high modality saturation, authentically depicts the significant achievements of the Saihanba Forest Farm's ecological management, vividly illustrating the positive changes in the forest's ecological environment. The salience of the image is the Saihanba Forest Farm, where the extensive and verdant green vegetation prominently signifies the success of the ecological restoration efforts undertaken. In the background, several wind turbines stand prominently in the forest, symbolizing the integration of green energy technology. This highlights the forest's commitment to sustainable development. Additionally, the blue sky and white clouds at the top of the image function as background elements of the natural environment, reflecting the excellent air quality and overall improvement of the ecological environment in the forest. Overall, Figure 2 embodies these ecological concepts, including ecological restoration and protection, sustainable development, as well as the harmonious coexistence between humans and nature.

4.3 Ecological Ideas in Multimodal Discourse

To gain a deeper understanding of the ecological concepts conveyed through the image-text relations, this section delves into the illustrations present in the three articles as well as the opening page of Unit 9. The analysis reveals that the image-text relations within the data are primarily classified into two categories: exemplification and extension.

In opening page of unit 9, the image-text relationship is exemplification. The uppercase title at the top of the page, "Promoting Green Development and Building a Beautiful Homeland," conveys an abstract concept, which emphasizes ecological protection and sustainable development goals. The background image, depicting Saihanba Forest Park in Chengde, Hebei, acts as a symbolic representation of China's achievements in ecological governance. The wind turbines are prominently featured in the image, serving as the most notable element. As key infrastructure for wind energy production, these turbines not only symbolize China's advancements in renewable energy but also concretize the abstract notion of "green development." Moreover, the lush green mountains and clear blue sky in the image further illustrate the natural beauty resulting from China's ecological efforts. These elements translate the ideal of a "beautiful homeland" into tangible, visual representations. By employing exemplification, the image transforms abstract linguistic concepts into concrete forms, thereby enhancing readers' understanding of China's commitment to building a shared community of life and achieving ecological civilization.

In the figure from the first article, the image-text relationship is extension. The first article is an

excerpt from keynote speech at the 15th Conference of the Parties to the Convention on Biological Diversity, delivered on October 12, 2010. The speech emphasizes the importance of biodiversity, the concept of harmonious coexistence between humans and nature, China's achievements in ecological civilization, and future commitments and actions for biodiversity conservation. The illustration depicts Sun Moon Lake in Taiwan, China, which is not mentioned in the text. However, in recent years, invasive species have damaged the biodiversity of Sun Moon Lake, prompting local government efforts in ecological restoration. Through a long shot, the photographer aims to present a comprehensive view of Sun Moon Lake to the audience. The "green water" in the image symbolizes environmental cleanliness, while the "lush mountains" represent dense vegetation. This new information extends the interaction between the image and text, helping students gain a better understanding of the concept of sustainable development.

5. Conclusion

After conducting a multimodal ecological discourse analysis on the selected 3 discourses from the "Advanced Chinese Reading and Writing Course", this study reveals that in the verbal modes, material and relational processes play a crucial role in conveying ecological values. Material processes document China's and the Chinese people's efforts in ecological protection, reflecting a commitment to environmental stewardship and sustainable practices. Relational processes elucidate the value of ecological concepts, emphasizing the importance of harmonious coexistence between humans and nature and showcasing China's achievements in ecological civilization and future commitments. In the visual modes, the focus on non-human participants—such as migrating elephant herds and the rehabilitated Saihanba Forest Farm—further enriches the depiction of ecological values. In terms of representational meaning, narrative process is predominantly used; for interactive meaning, the image is characterized by offer information and high modality; and for compositional meaning, the emphasis is on presenting authentic informational value. These elements collectively express the ecological concepts of "harmonious coexistence between humans and nature" and "sustainable development." By integrating both verbal and visual modes through exemplification and extension, the textbook effectively conveys the ecological principles of green development. These findings reveal that the verbal modes and visual modes in the textbook successfully convey beneficial ecological concepts. This not only facilitates international students' better understanding of China, but also contributes to enhancing their awareness of ecological protection.

However, this study has several limitations. Firstly, the analysis is based on only three articles from the "Advanced Chinese Reading and Writing Course," which constitutes a relatively small sample size. To achieve more generalizable results, a larger number of articles should be considered. Additionally, the coding of transitivity processes and participant roles was conducted manually using the UAM Corpus Tool. This manual approach introduces the potential for deviations and inconsistencies in the data. These issues could be mitigated by incorporating discussions with other researchers to enhance the accuracy and reliability of the analysis.

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