

# Integrating Environmental Education into English Language Teaching: An Ecological Discourse Analysis of Chinese Junior High School English Textbooks\*

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The integration of ecological civilization into disciplinary education has made the environmental value guidance of English textbooks a key research issue in foreign language education. Drawing on Systemic Functional Linguistics (SFL) and Ecocriticism, this study conducts a transitivity analysis of nature-related ecological discourses in Chinese junior secondary English textbooks (FLTRP edition) to examine the ecological values embedded in the textbooks. The findings show that material, relational, and mental processes dominate the textbooks' ecological discourses, featuring extensive depictions of human ecological activities, psychological responses, and entity relationships. The high frequency of animate and physical participants reflects human attention to the ecological environment and efforts toward ecological protection. Based on the analysis, this paper identifies three types of ecological values in the textbooks and proposes suggestions for making ecological ethics explicit in English teaching, providing a reference for integrating environmental education into foreign language instruction.

*Keywords:* ecological discourse analysis, junior high school English textbooks, transitivity system, ecological values, environmental education

## Introduction

Entering the 21st century, with the acceleration of technological progress and industrialization, humanity's exploitation and utilization of natural resources have reached an unprecedented scale, exerting immense pressure and far-reaching impacts on the Earth's environment. Humanity is facing severe environmental challenges and ecological crises, making the relationship between humans and nature a critical issue of our time that urgently needs to be addressed.

The construction of an ecological civilization relies to some extent on environmental education, particularly the cultivation of ecological awareness in young students. In April 2024, China's newly revised compulsory education curriculum standards were officially implemented, emphasizing the development of students as builders and practitioners of an ecological civilization. The new curriculum standards integrate the concept,

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\* **Funding:** This research was funded by 上海市教育科学研究项目 (Shanghai Municipal Educational Science Research Project), under the project "Exploring the Construction of Multimodal Discourses for Ecological Civilization Education in English Textbooks" (Grant No. C2023030).

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educational goals, and implementation pathways of an ecological civilization into textbooks, providing significant opportunities for ecological civilization education among primary and secondary school students. As a vital component of education, textbooks promote ecological civilization education through scientific content, diverse methods, and value shaping. Therefore, the ecological values embedded in textbooks are crucial for cultivating students' ecological consciousness. Grounded in Systemic Functional Linguistics (SFL) and Ecolinguistics, this study analyzes the processes and participants in natural ecological discourses from the FLTRP junior high school English textbooks in China from a transitivity perspective. Specifically, this study seeks to address the following research questions:

1. What are the distributional features of process types and participant roles in the natural ecological discourses of the FLTRP junior high school English textbooks?
2. What ecological values are embedded in the natural ecological discourses of the FLTRP junior high school English textbooks?

### **Literature Review**

Over the past few decades, advanced technologies have significantly enhanced humanity's ability to transform nature; however, this has led to a series of global problems. Consequently, a growing number of researchers have adopted an ecological perspective, reexamining past and present human thoughts and behaviors while envisioning future possibilities. This shift has driven an ecological turn in many academic disciplines (Huang, 2016), giving rise to Ecolinguistics, an interdisciplinary field integrating ecology and linguistics.

Ecolinguistic research primarily follows two models: the Haugen model (Haugen, 1970), which focuses on the interaction between language and its environment, and the Halliday model (Halliday, 1990), which emphasizes the impact of language on the ecological environment. Due to its applicable nature, SFL provides analytical frameworks and tools for studying ecological issues. Language has three metafunctions: ideational (including experiential and logical meanings), interpersonal, and textual metafunctions (Halliday & Matthiessen, 2014). The transitivity system is a key semantic system for realizing the ideational function. It represents people's experiences and events through six process types: material, mental, relational, behavioral, verbal, and existential. Each process involves associated participants and circumstantial elements. Through transitivity analysis of ecological discourses, we can better understand how such discourses shape perceptions of the environment and influence public views and behaviors toward ecological issues. SFL-based ecological discourse analysis also seeks to reveal how these discourses construct and perpetuate ideologies such as anthropocentrism and ecological symbiosis (Miao & Lei, 2019).

Eco-discourse analysis comprises two interrelated approaches: the analysis of ecological discourses and the ecological analysis of discourses. The former focuses primarily on discourses explicitly related to ecology, whereas the latter examines the ecological elements embedded in various types of discourse (Huang & Zhao, 2017). Guided by a specific ecosophy and grounded in linguistic theories, eco-discourse analysis evaluates the ecological orientation of discourses (Stibbe, 2015). Moreover, it extends beyond explicitly ecological discourses to include any discourse that may potentially impact the ecological system (Alexander & Stibbe, 2014). Scholars have conducted in-depth research on eco-discourse analysis, covering theoretical interpretation and refinement (Alexander & Stibbe, 2014; Bang & Trampe, 2014; Stibbe, 2015), framework construction (Steffensen & Fill, 2014; He & Zhang, 2017; Wei, 2019), and applicability studies (Li & Liu, 2020; Cao & Yang, 2022).

Eco-discourse analyses have also been applied to investigation of textbooks. These include comparative studies on the ecological orientation of Chinese and foreign textbooks (Gao, 2022; He & Tian, 2024). Existing research has covered textbooks across different educational stages, including explorations of high school English textbooks (Huang, 2023), analyses of college English textbooks (Yu & Wang, 2020), a transitivity-based analysis of eight sets of junior high school English textbooks prescribed by the Ministry of Education (Xu, 2023), as well as studies on primary school textbooks and textbook series (Jacobs & Goatly, 2000). While previous research has extensively covered high school, college, and non-local textbooks, studies focusing on junior high school English textbooks remain limited.

This study investigates the ecological values embedded in the FLTRP junior high school English textbooks. Grounded in Systemic Functional Linguistics (SFL) and Ecolinguistics, it conducts an eco-discourse analysis from a transitivity perspective. Using a combination of qualitative and quantitative methods, supported by UAM Corpus Tool and AntConc, the study examines the distribution of transitivity patterns in the textbooks' ecological discourses and the ecological orientations and values conveyed.

## Corpus and Methodology

### Data Source

This study uses the FLTRP junior high school English textbooks (2012 edition) as its corpus. Recognized for its advanced educational concepts, well-structured design, diverse cultural content, and wide usage, this textbook series is one of the key resources for junior high school English education in China. The author identified all units and texts related to natural ecology, totaling 6 volumes, 17 units, and 59 texts (7,677 words).

### Data Analysis

To investigate the ecological nature of the texts, all clauses were categorized and counted according to Halliday and Matthiessen's (2014) classification of process types. AntConc was then used to count the high-frequency verbs realizing these processes. Subsequently, following the participant role framework proposed by He and Wei (2017) and taking process types into account, the participant roles within the clauses were categorized. Figure 1 presents the annotation scheme for transitivity analysis, which includes the sub-systems of process and participant. Participants are divided into animate and inanimate. Animate participants are further classified by their nature (human or non-human) or feature (individual or group); inanimate participants are classified into physical and social types.

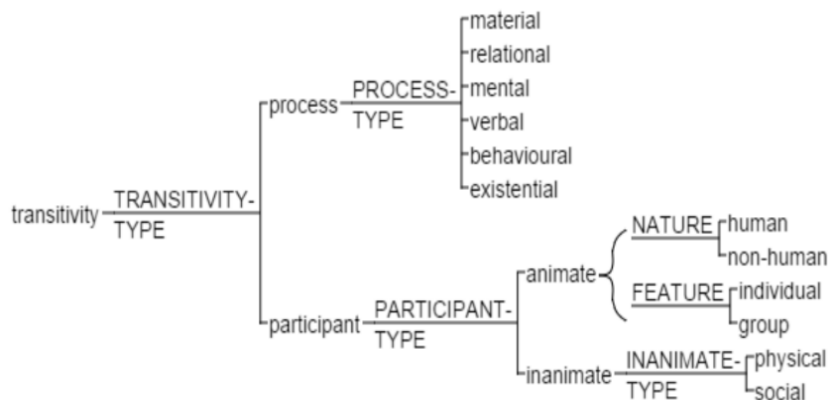


Figure 1. Annotation scheme for transitivity analysis.

## Findings and Discussion

### Process Types

As shown in Table 1, the distribution of the six process types varies considerably. The material process accounts for the highest proportion (46.93%, 581 occurrences), followed by the relational process at 23.34% (289 occurrences), and the mental process at 15.27% (189 occurrences). The behavioral, verbal, and existential processes account for relatively smaller proportions, at 4.85%, 4.36%, and 5.25% respectively. Specifically, the material process primarily represents human actions toward the ecological environment; the relational process mainly describes the attributes and characteristics of entities; the mental process primarily depicts human psychological activities and views on ecological issues; the existential process presents the elements contained within the ecosystem; the behavioral process refers to physiological activities; and the verbal process refers to communicative behaviors such as information exchange.

Table 1

#### *Distribution of Process Types*

Process Type	Frequency	Percentage
Material process	581	46.93%
Mental process	189	15.27%
Behavioral process	60	4.85%
Verbal process	54	4.36%
Existential process	65	5.25%
Relational process	289	23.34%
total	1238	100%

The following examples illustrate the typical uses of these process types:

- (1) The elephant lives in Africa and in Asia. (Grade 7, Book 1, p. 39)
- (2) I think we all need to help animals live in peace. (Grade 8, Book 1, p. 42)
- (3) The zebra is an African animal. (Grade 7, Book 1, p. 39)

Example (1) is a material process. It objectively describes the habitat of elephants, indicating that they are mainly distributed across Africa and Asia. Understanding their distribution facilitates a better comprehension of their living habits and conservation needs. Example (2) belongs to the mental process. It expresses the speaker's personal opinion, emphasizing, from an individual perspective, the necessity of helping animals live peacefully and promoting harmonious coexistence between humans and nature. Example (3) is a relational process, offering an objective description of the geographical distribution of zebras.

The textbook places considerable emphasis on the use of material, relational, and mental processes, employing substantial content to highlight the living conditions of animals and plants, as well as various ecological problems faced by humanity, such as water scarcity and environmental pollution. In addition, the textbook does not overlook the unremitting efforts made by humans to address these challenges. The representation of these process types not only enhances students' understanding and awareness of ecological issues but also helps stimulate their consciousness and motivation to participate in environmental protection and sustainable development.

Table 2

*High Frequency Instances in Different Process Types*

Process Type	Instance	Frequency
material process	eat	24
	go	23
	take	23
	help	21
	live	21
	make	19
	get	19
	protect	18
	save	18
	use	18
mental process	look	40
	see	27
	think	24
existential process	be	59
relational process	be	227
	have	37

Table 2 presents the most frequent lexical items across process types, further revealing the deeper orientations of the textbook's ecological discourse. In the material process, the high-frequency verbs can be grouped into two categories. The first category consists of survival and protection verbs, including "eat" (24 times), "live" (21 times), "help" (21 times), "protect" (18 times), and "save" (18 times). These words convey positive values such as protecting animals, cherishing resources, and maintaining ecological balance, reflecting the textbook's effort to cultivate students' sense of environmental responsibility. The second category consists of acquisition and utilization verbs, including "take" (23 times), "get" (19 times), and "use" (18 times). These verbs construct natural objects (water, food, and resources) as "goals" that satisfy human needs, implying an instrumental positioning of nature as a resource pool and subtly reinforcing an anthropocentric cognitive framework. In the mental process, the high-frequency verbs "look" (40 times), "see" (27 times), and "think" (24 times) all belong to the category of perceptual and cognitive verbs, rather than emotional verbs (such as "love" or "hate"). This indicates that the textbook tends to guide students to "observe" ecological phenomena, "recognize" environmental problems, and "think about" solutions, rather than to stimulate strong emotional responses. This orientation helps cultivate students' rational analytical abilities, but it may also weaken the emotional impact and moral urgency brought about by ecological crises.

In the relational process, the copular verb "be" appears 227 times, occupying a dominant position. The verb "have" appears 37 times, mainly used to express possessive relationships between ecological elements. The extensive use of the verb "be" constructs a static and definite discourse style, presenting various relationships within the ecosystem as objective facts rather than value judgments. This approach both enhances the authority of the knowledge presented and may obscure the complex social, economic, and political factors behind ecological issues.

### Participants

As shown in Table 3, among living being participants, human individual participants occur 277 times, human group participants 408 times, non-human individual participants 117 times, and non-human group

participants 109 times. Among non-living being participants, physical participants appear 264 times and social participants 63 times. Human group participants are the most frequent, followed by human individual participants, physical participants, non-human individual and group participants, with social participants being the least frequent.

Table 3

*Distribution of Participants*

participant	process type							total
	material	mental	behavioral	verbal	existential	relational		
animate	human individual	108 (8.72%)	82 (6.62%)	22 (1.78%)	27 (2.18%)	2 (0.16%)	36 (2.91%)	277
	human group	256 (20.68%)	78 (6.30%)	18 (1.45%)	19 (1.53%)	4 (0.32%)	33 (2.67%)	408
	non-human individual	58 (4.68%)	8 (0.65%)	10 (0.81%)	3 (0.24%)	2 (0.16%)	36 (2.91%)	117
	non-human group	52 (4.20%)	9 (0.73%)	7 (0.57%)	0	13 (1.05%)	28 (2.26%)	109
inanimate	physical	78 (6.30%)	8 (0.65%)	3 (0.24%)	0	39 (3.15%)	136 (10.99%)	264
	social	29 (2.34%)	4 (0.32%)	0	5 (0.40%)	5 (0.40%)	20 (1.62%)	63
total	581	189	60	54	65	289		

**Human individual participant.** Human individual participants refer to individual citizens or nationals. As shown in Table 3, among all process types, human individual participants occur most frequently in material processes (108 times), followed by mental processes (82 times), then relational processes (36 times), and finally verbal (27 times), behavioral (22 times), and existential processes (2 times). The textbook primarily depicts individual humans' views on ecological issues and the actions they take, which explains the relatively high frequency of material and mental processes. Examples are provided below:

(4) I've already tried my best to protect the environment. (Grade 9, Book 1, p. 102)

(5) I think we all need to help animals live in peace. (Grade 8, Book 1, p. 42)

(6) Lingling's uncle said that it was wrong to pull leaves off plants and that we should protect everything here. (Grade 8, Book 2, p. 66)

Example (4) is a material process, Example (5) is a mental process, and Example (6) is a verbal process. Example (4) describes, from a first-person perspective, the speaker's efforts to protect the environment. Example (5) calls on people to care for animals and create a peaceful living environment for them from an individual perspective. Example (6) adopts a third-person perspective, objectively reminding people to avoid harmful behaviors and protect the ecological environment.

**Human group participant.** Group participants refer to groups of people involved in an action. As shown in Table 3, among all process types, human group participants occur most frequently in material processes (256 times), followed by mental processes (78 times), then relational processes (33 times), and finally verbal (19 times), behavioral (18 times), and existential processes (4 times). The textbook devotes considerable attention to depicting collective human views on ecological issues and efforts to protect the environment, which explains the high frequency of human group participants in material and mental processes. Descriptions of physiological activities of human groups are relatively rare, and direct speech is seldom used, resulting in low frequencies in behavioral and verbal processes. Examples are provided below:

(7) We need to protect them better. (Grade 8, Book 1, p. 42)

(8) They (scientists) do important research to find out the best ways to protect animals. (Grade 8, Book 1, p. 48)

(9) People are very worried about the conditions of the ancient forests of Canada and want to save them. (Grade 9, Book 2, p. 31)

Examples (7) and (8) are material processes, and Example (9) is a mental process. Example (7) uses the first-person plural “we” to shorten the psychological distance between the writer and reader, calling on people to protect animals from a group perspective. Human group, such as scientists, is shown taking action, as illustrated in Example (8). Example (9) reveals, from a group perspective, people’s concern about Canada’s ancient forests and implicitly calls for action to protect them.

**Non-human individual participant.** Non-human individual participants refer to individual life forms other than humans, including animals and plants. They appear most frequently in material processes (58 times) and relational processes (36 times), with much lower frequencies in behavioral (10), mental (8), verbal (3), and existential processes (2). This distribution reflects the textbook’s focus on describing organisms’ habits, living conditions, and interrelationships. Examples include:

(10) The panda eats about 30 kilos of bamboo a day, as well as plants and leaves. (Grade 7, Book 1, p. 39)

(11) A tree is also something special for a festival or a new baby. (Grade 8, Book 2, p. 16)

(12) Baby Bear cried, “There’s nothing in my bowl and my chair is in pieces!” (Grade 7, Book 2, p. 50)

Example (10) is a material process, Example (11) is a relational process, and Example (12) is a behavioral process. Example (10) describes the panda’s diet and daily food intake. Example (11) describes the symbolic meaning of trees in certain cultural or social contexts, thereby calling for more tree planting. Example (12) depicts human-animal interaction. Through this behavioral process, it can be sensed that animals possess emotions and that their responses are, in some ways, similar to those of humans.

**Non-human group participant.** Non-human group participants refer to group life forms other than humans, such as animals and plants. As shown in Table 3, material processes (52 occurrences) and relational processes (28 occurrences) involve relatively high frequencies of non-human group participants, while existential (13), mental (9), and behavioral processes (7) have lower frequencies. No non-human group participants appear in verbal processes. This distribution indicates that the textbook primarily depicts the living conditions, habits, and interrelationships of non-human life forms such as animals and plants. Examples are provided below:

(13) But penguins cannot live for long in the warmer waters of the north. (Grade 8, Book 1, p. 54)

(14) Tigers are beautiful animals, but they are in danger. (Grade 8, Book 1, p. 47)

(15) There are only about 1,600 pandas in the wild today. (Grade 8, Book 1, p. 47)

(16) They (pandas) love bamboo. (Grade 7, Book 1, p. 36)

(17) First, pandas do not have many babies, and baby pandas often die. (Grade 8, Book 1, p. 44)

In Example (13), a material process shows penguins’ dependence on specific environments. In Example (14), a relational process presents tigers as beautiful but endangered. In Example (15), an existential process highlights the urgency of protecting giant pandas by stating their current population. In Example (16), a mental process attributes to pandas a fondness for bamboo, revealing their dietary preferences. In Example (17), a behavioral process reflects pandas’ reproductive characteristics and challenges. Across these examples, non-human group participants are granted agency and visibility. This representation positions humans as caretakers and protectors, reinforcing ecological awareness and the need for conservation.

**Physical participant.** Physical participants refer to physical factors such as geographical locations, mountains, and rivers. As shown in Table 3, they appear most frequently in relational processes (136 times), followed by material processes (78 times), with only eight occurrences in mental processes and three in behavioral processes, and none in verbal processes. This reflects the textbook’s emphasis on depicting relationships between physical factors. Examples include:

(18) The Amazon Rainforest has more different animals and plants than any other place in the world. (Grade 8, Book 1, p. 87)

(19) The Wolong Panda Reserve allows people to get closer to pandas. (Grade 8, Book 1, p. 42)

(20) If the rivers are polluted, farmers can't use the water for their crops. (Grade 9, Book 1, p. 96)

Example (18) is a relational process, defining the Amazon Rainforest's biodiversity as an intrinsic characteristic. Examples (19) and (20) are material processes, depicting physical participants in various roles: the Wolong Reserve as an enabler of human-panda interaction and river pollution as a threat to agriculture. These examples show that physical participants are portrayed through two main lenses: as resources serving human needs (the reserve) and as environmental problems requiring human intervention (pollution). This representation reinforces a pragmatic, human-centered view of nature, where the value of physical participants is often defined by their utility to or impact on human society.

**Social participant.** Social participants mainly refer to social factors such as politics, economy, and culture. As shown in Table 3, social participants appear most frequently in material processes (29 occurrences) and relational processes (20 occurrences), with fewer occurrences in verbal (5), existential (5), and mental processes (4). No social participants appear in behavioral processes. For example:

(21) So the WWF is working hard to save them (animals) all. (Grade 8, Book 1, p. 44)

(22) Earth Hour is held toward the end of March each year. (Grade 9, Book 1, p. 103)

Example (21) is a material process, while Example (22) is a relational process. Example (21) adopts a political perspective, describing the WWF's efforts in ecological protection. Example (22) adopts a cultural perspective, illustrating the contributions of education and various activities to ecological protection. The statistics on participant roles reveal that the textbook places great emphasis on the severe survival challenges faced by animals and plants, including habitat destruction, environmental pollution, climate change, and ecosystem disturbances caused by human activities. Through various cases and scenarios, the textbook highlights biodiversity decline and its potential impact on ecosystem balance. In addition, it demonstrates how different sectors of society work together to address these crises, presenting perspectives such as individual contributions, environmental organization actions, and government initiatives.

### Ecological Values Embedded in Junior High School English Textbooks

Table 4

*Ecological Value Types in FLTRP Junior High School English Textbook*

Type of Ecological Value	Core Orientation	Transitivity Representation	Educational Significance & Limitation
Responsible Ethics of Anthropocentrism	Humans as protectors of nature	Human actor + material process ( <i>protect/save/help</i> ) Relational process	Cultivates environmental responsibility; but nature is in a passive position
Pragmatist Value of Nature as a Tool	Nature serves human needs	(importance), existential process (resource measurement)	Recognizes nature's practical value; may reinforce instrumental thinking
Implicit Value of Ecological Symbiosis	Nature has subjectivity and internal connections	Non-human living being as actor, relational network of physical participants	Provides linguistic resources beyond anthropocentrism; not yet a dominant discourse

Based on the above transitivity analysis of process types and participant roles, the ecological values embedded in the FLTRP junior high school English textbooks can be summarized into the following three types (see Table 4).

### **The Responsible Ethics of Anthropocentrism**

This is the most dominant ecological value in the textbooks. In material processes, humans frequently appear as actors, while nature and animals mainly appear as goals or protected targets. High-frequency verbs such as “protect”, “save”, and “help” all construct humans as the active and responsible party in ecological protection. This value emphasizes human responsibility for protecting nature, reflecting a positive environmental ethical awareness. However, its grammatical structure still places nature in a passive, protected position, essentially continuing the cognitive framework of anthropocentrism. It contributes to the cultivation of students’ sense of environmental responsibility, while it fails to fully represent nature’s subjectivity and agency.

### **The Pragmatist Value of Nature as a Tool**

This value anchors the value of nature primarily in its usefulness to humans. In the transitivity system, this value is mainly reflected through two types of grammatical configurations: In material processes, natural objects appear as utilized goals to meet human survival or development needs; in relational processes, the value of natural objects is explicitly defined in terms of their function for humans. For instance, “If the rivers are polluted, farmers can’t use the water for their crops”. In this example, “water” as a natural element has its value directly defined as “used for irrigating crops”, serving the human need of agricultural production. In relational processes, the value of natural objects is often defined through their connection to human needs. For example: “Education is important and can help children and young people change their habits”. Although the subject of this sentence is the social participant “education”, within the context of the textbook’s ecological discourse, similar relational structures are often used for nature-related topics, attributing nature’s value to its function of solving human social problems. Furthermore, the high frequency of “acquisition” verbs in material processes also reflects the instrumental positioning of nature. Such verbs appear frequently in the textbook’s ecological discourses, with human participants mostly as subjects and natural objects such as water, food, and resources as objects, collectively constructing a discourse model of nature as a resource pool to meet human needs. This type of value helps students understand the fundamental supporting role of ecosystems for human survival, but it tends to simplify nature to a resource pool or service provider, weakening nature’s intrinsic value and non-instrumental significance.

### **The Implicit Value of Ecological Symbiosis**

In a small number of discourses in the textbook, grammatical configurations that transcend anthropocentrism appear. For example, non-human living beings appear as actors in material processes, demonstrating animals’ own survival behaviors (e.g., “The panda eats”); in mental processes, animals are also endowed with emotional tendencies (e.g., “They [pandas] love bamboo”). In addition, the high frequency of physical participants in relational processes presents the interconnections among various elements within the ecosystem. These grammatical choices provide students with linguistic resources for understanding nature’s subjectivity and the intrinsic relationships within ecosystems. Although they have not yet formed a systematic dominant discourse, they contain the potential for developing toward ecological symbiosis values.

## Conclusion

This study conducts an ecological discourse analysis of nature-related texts in the FLTRP junior high school English textbooks based on the transitivity system within systemic functional linguistics. The findings show that material processes, relational processes, and mental processes account for the highest proportions, indicating that the textbooks contain extensive descriptions of human ecological activities, psychological responses, and relationships between entities. Furthermore, living and physical participants account for relatively high proportions, reflecting the great importance humans attach to the ecological environment and their efforts toward ecological protection. This analysis can help teachers better cultivate students' ecological awareness and provide specific content and data for textbook compilation, revision, and improvement. As this study only explores the ecological nature of the textbooks from the perspective of transitivity, further research at the levels of interpersonal and textual meaning is needed to achieve a more comprehensive understanding.

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