An ecolinguistic analysis of German textbooks used in Chinese universities: Environmental content and ecological view

MOU, YIWU
Tongji University / Lanzhou Jiaotong University
WU, YUN[1]
Tongji University

ABSTRACT: German is offered to students as one of the leading foreign languages in Chinese universities, and German language textbooks are an important resource to influence these students' environmental awareness. Taking transitivity as a theoretical framework, the present research was conducted to explore the transitivity features and ecological view of the environmental content in German language textbooks used in Chinese universities. The results show that transitivity patterns were significantly unbalanced in the environmental content, and an eco-beneficial view dominated to actively encourage students to protect nature. However, the political and cultural values underlying humanity's destruction of the natural environment were not much touched upon. Corresponding suggestions are made for textbook compilers and classroom teachers.
Keywords: Ecolinguistic analysis, environmental education, German language textbook, transitivity, ecological view.

Análisis de los manuales de alemán en las universidades chinas: Contenido medioambiental y perspectivas ecológicas.

RESUMEN: El alemán es una lengua extranjera clave que estudian los universitarios chinos, y los manuales de alemán se han convertido en un importante recurso que influye en la conciencia medioambiental de estos alumnos. Este estudio utiliza la transitividad como marco teórico para explorar las características de transitividad y las perspectivas ecológicas del contenido medioambiental de los manuales de alemán de las universidades chinas. Los resultados muestran que el uso del modelo de transitividad para los contenidos medioambientales es muy desigual; predominan las perspectivas ecológicamente beneficiosas para animar a los alumnos a proteger la naturaleza. Sin embargo, no se abordan suficientemente los valores políticos y culturales que subyacen a la destrucción de la naturaleza por los seres humanos. Este documento ofrece sugerencias al respecto para los autores de manuales y los profesores de la asignatura.

1. INTRODUCTION

In recent years globally important issues have been incorporated into a variety of core subjects, including language courses. Zahoor and Janjua (2019) note that language teaching should focus not only on developing students' language skills, but also on cultivating students who know about global issues and can respond properly. Among various global issues, environmental issues are of particular concern (Yakovchuk, 2004) since they affect the sustainability of the planet. In the field of language teaching environmental issues have become a hot topic, and have been the focus of a good deal of attention from researchers (e.g. Al-Jamal & Al-Omari, 2014; Brown, 2017; Hauschild *et al.*, 2012; Jacobs & Goatly, 2000; Mliless & Larouz, 2018; Zahoor & Janjua, 2019).

Textbooks offer direct linguistic input to learners in language classroom teaching (Razmjoo, 2012) and they can play a strategic role when teachers wish to incorporate environmental education into their language teaching (Zahoor & Janjua, 2019). In this regard, the linguistic choices and ecological views of the environmental content in language textbooks is very important, greatly impacting the development of learners' ecological literacy and our world's sustainability (Brown, 2017; Mliless & Larouz, 2018; Zahoor & Janjua, 2019).

Some research (Al-Jamal & Al-Omari, 2014; Jacobs & Goatly, 2000) has already been conducted to examine the ecological topics that are included in the environmental content of language textbooks. It has been shown that ecological issues have been integrated in language textbooks, although the topics are limited. In 27 sampled ELT textbooks from the South Asia Ministers of Education Organization, Jacobs and Goatly (2000) found that ecological topics accounted for only 2% of the total activities. In Al-Jamal and Al-Omari's (2014) research only 12.35% of the content in the analysed EFL textbooks was found to reflect ecological themes.

The linguistic choices in the environmental content of language textbooks have also attracted researchers' attention. Brown's (2017) research examined the use of the relative pronoun "who" with non-human animal antecedents, with results showing that although such constructions were unacceptable in the learners' dictionaries (distancing humans from animals), they were found in the graded readers. Mliless and Larouz's (2018) study explored the use of euphemism, agency and the passive voice in ELT textbooks in Moroccan high schools, showing that the distribution of these linguistic features didn't support environmental goals since prevalence of euphemism and the passive voice kept learners from recognising the hazardous reality of environmental issues and humanity's responsibility for environmental deterioration.

In addition, several research studies (Stibbe, 2004; Xiong, 2014; Zahoor & Janjua, 2019) have tentatively explored the ecological views contained in the environmental content of language textbooks. By analysing the environmental content of EFL textbooks in Japan, Stibbe (2004) found that the materials concentrated on technical solutions to environmental problems while the underlying causes were ignored, suggesting that the environmental content was little more than shallow environmentalism. Xiong (2014) also found that shallow

environmentalism dominated in the EFL textbooks used in Chinese primary schools, in which the encouragement of positive and real participation in solving environmental problems was rare. Likewise, in Zahoor and Janjua's (2019) research an anthropocentric worldview was found to be propagated in the environmental content of English textbooks used in Pakistani primary schools.

It can be concluded from the above review that the topic of environmental issues has been integrated into language textbooks, and the linguistic choices as well as the ecological views of this content have been explored, shedding some light on language coursebook compilation and classroom teaching aiming to raise learners' environmental awareness. However, the language textbooks investigated in these research studies are mainly ELT or EFL textbooks, while textbooks for languages other than English, such as German, have been neglected.

As one of the major languages in the world, German is a native language in Germany, Austria, Belgium, Luxembourg, Switzerland and Liechtenstein. German is also widely taught as a foreign language, with approximately 15.4 million German language students worldwide. In China the German language is increasingly popular, with the number of learners doubling in 2015 compared to 2010 (Gardner, 2015), with most Chinese universities offering German courses. Despite high levels of learners' interest in German in Chinese universities, however, the environmental content of the German language textbooks used in Chinese universities has received little attention, and the linguistic constructions and ecological views of the environmental content in these textbooks remain unknown. Against this backdrop, the present research was conducted to investigate the environmental content in the German language textbooks used in Chinese universities, in terms of the linguistic constructions used and the ecological views underlying them.

2. Theoretical Framework

Ecolinguistics provides a sound theoretical framework for the present research, since an ecolinguistic analysis of environmental content can yield insight into the linguistic choices made, as well as the ecological views underlying them (Mliless & Larouz, 2018; Stibbe, 2004; Zahoor & Janjua, 2019). As an interdisciplinary area of study, ecolinguistics takes the relationship between the environment and language as its core topic of interest (Zhdanava *et al.*, 2021). Fill and Muhlhausler (2006) suggest that there are two types of approaches to ecolinguistics: Haugen's (1971) approach, and Halliday's (2001) approach. Haugen's approach focuses on language ecology; that is, language has its own ecological environment, and we cannot neglect the living condition of a language. Meanwhile, Halliday's approach focuses on the role that language plays in ecological issues. As Halliday (2001, p. 199) has argued, "destruction of species, pollution and the like [...] are not just problems for the biologists and physicists", but "problems for the applied linguistic community as well". Ecolinguistic analysis reveals the ecological ideology underlying linguistic data, which shapes people's concern for the environment.

In terms of ecolinguistic analysis, the transitivity framework from the systemic functional grammar approach is widely used. Systemic functional grammar holds the view that language is used functionally. The metafunctions of language are divided into three categories: the

ideational function (expressing our outer and inner experience), the interpersonal function (establishing interpersonal relationships), and the textual function (organising coherent text). According to Halliday (1994), ideational function at the clause level is realised by transitivity, which consists of the participant, process and circumstance. In traditional grammar, transitivity is a criterion used to judge whether a verb can be followed by an object. However, Halliday (1994) extends transitivity to the level of the clause, regarding it as "not only a feature of the verbal group but … of the entire clause" (Opara, 2012, p. 110). Transitivity is seen as "a system for describing the whole clause, rather than just the verb and its object" (Thompson, 2000, p. 78).

As a clause system, transitivity "construes the world of experience into a manageable set of process types" (Halliday, 1994, p. 106). Therefore, in the transitivity system "process" is the nucleus and the most important component, which is typically realised by a verbal group. Generally there are six types of transitivity process patterns (See **Table 1**): material process, mental process, relational process, behavioural process, verbal process, and existential process (Thompson, 2000). The material process is the process of "doing"; the mental process is the process of "sensing", which indicates perception, cognition, emotion and desire; the relational process is the process of "being", which characterises or identifies; the behavioural process is the process of "behaving"; the verbal process is the process of "saying"; and the existential process is the process of "existing" and "happening". The following examples (See Examples 1 to 7) are taken from Thompson (2000), and represent illustrations of these transitivity processes. The transitivity framework has been used to analyse not only texts in the English language, but also texts in other languages including German (See Examples 8 to 13, taken from Putri, Maknum, & Lukman, 2020).

The other two components in the transitivity system are the "participant" in the process and the "circumstance" associated with the process (Halliday & Matthiessen, 2004). The participant is typically realised by a nominal group related to an entity or thing, and different processes involve different participants, such as "actor" and "goal" in the material process (See Examples 1 and 8), "senser" and "phenomenon" in the mental process (See Examples 2 and 9), "carrier" and "attribute" in the attributive relational process (See Examples 3 and 10), "identified" and "identifier" in the identifying relational process (See example 4), "behaver" in the behavioural process (See Examples 5 and 11), "sayer" and "target" in the verbal process (See Examples 6 and 12) and "existent" in the existential process (See Examples 7 and 13). The circumstance is typically realised by an adverbial group or prepositional phrase related to time, place, manner, cause, accompaniment, matter, role, angle and contingency (See **Table 1**), which essentially encodes "the background against which the process takes place" (Thompson, 2000, p. 104).

Table 1. *The transitivity system*

PROCESS	FUNCTION	PARTICIPANT	CIRCUMSTANCE
Material process	Describe the world in terms of "doing" and "happening".	Actor: the doer of the process. Goal: something that the process is directed at.	Extent: how long, how far, how often. Location: when, where. Manner: means, degree, comparison. Cause: reason, purpose. Accompaniment: who/what with. Matter: what about. Role: what as, what into. Angle: from what point of view. Contingency: despite, in spite of.
Behavioural process	Construe the physiological and psychological behaviour.	Behaver: the agent who is behaving.	
Mental process	Encode mental reactions such as perception, cognition and emotion.	Senser: the conscious being who can feel, think or see. Phenomenon: something that is sensed.	
Verbal process	Represent the action of saying.	Sayer: the producer of the speech. Target: the participant which is the object of the talk.	
Relational process	Establish an identity (X is the identity of Y) or assign a quality (X is an attribute of Y).	*Type 1: identifying process.* Identified: the entity which is identified. Identifier: the entity which is used to identify. *Type 2: attributive process.* Carrier: the entity, person or concept being described. Attribute: the quality ascribed to the carrier.	
Existential process	Express the existence of an entity.	Existent: the object or event which is being said to exist.	

Example 1: The fire (actor) had destroyed (process: material) everything (goal).
Example 2: She (senser) could hear (process: mental) his voice (phenomenon).
Example 3: This bread (carrier) is (process: attributive relational) stale (attribute).
Example 4: My name (identified) is (process: identifying relational) Edward (identifier).
Example 5: He (behaver) stared (process: behavioural) in amazement (circumstance).
Example 6: The report (sayer) sharply (circumstance) criticises (process: verbal) Lilly's quality-control procedures (target).
Example 7: Maybe there is (process: existential) some other darker pattern (existent).
Example 8: Hänschen klein (actor) ging (process: material) allein in die weite Welthinein (circumstance). (Little Hans went into the wide world alone.).
Example 9: Zeigt (process: mental) her (circumstance) eure Schuh (phenomenon). (Show me your shoes.).
Example 10: Nun (circumstance) ist (process: attributive relational) die Vogelhochzeit (attribute) aus (circumstance). (Now the bird wedding is over.).

Example 11: Alle meine Täubchen (behaver) gurren (process: behavioural) auf dem Dach (circumstance). (All my doves are cooing on the roof.).

Example 12: Schwester (sayer) spricht (process: verbal): "Welch' Gesicht" (verbage). (The sister says: "What a face.").

Example 13: Hänschen (existent) in der Fremde (circumstance) war (process: existential). (Little Hans was abroad.).

A large body of literature has explored the transitivity constructions in a variety of genres, such as presidential debates (Fadilah & Kuswoyo, 2020), bulletins (Lima-Lopes, 2014), novels (Zijiao, 2013) and lectures (Kuswoyo & Rido, 2019), and the linguistic framework of transitivity has also been used to understand the worldview (Zahoor & Janjua, 2019), the image (Tang, 2018), the identity (Rizwan, 2013) and the ideology (Bello, 2014) underlying transitivity constructions. As argued by Zahoor and Janjua (2019), language is a representation of both the physical world and the social world, which consequently shapes language users' attitudes towards the world.

Since transitivity expresses "how meaning is represented in clauses" and "can reveal the certain worldview framed by the authorial ideology" (Setiawan, 2021, p. 314), the transitivity framework was adopted by the present research in order to explore the transitivity constructions in the environmental content of German language textbooks used in Chinese universities, as well as the ecological views underlying them. Specifically, the present research addressed the following two questions:

1. How is the environmental content in German language textbooks used in Chinese universities linguistically constructed in terms of transitivity?
2. What ecological view is further reflected in these transitivity constructions in environmental content?

3. METHODOLOGY

3.1. Source of data

The source of data for the present research was the reading texts in German language textbooks used in Chinese universities, since reading is "a fundamental denominator" (Arikan, 2008, p. 73) of language textbooks. The German language textbooks commonly used in Chinese universities can be purchased from the largest two e-shops in China, Taobao (*www.taobao.com*) and Jingdong (*www.jd.com*). Specifically, we focused on German language textbooks mainly designed for non-German majors, as the number of these students in China is much larger than the number of German majors.

There were not many German language textbooks designed for non-German majors; altogether, we obtained 15 such textbooks from the two e-shops. Each reading text in the textbooks was carefully checked for environmental themes including global warming, greenhouse gases, species extinction, deforestation and so on. We found that only 10 (See **Appendix 1**) of the textbooks contained environment-themed reading texts; the total number of texts was 24. These 24 reading texts were used as samples in the research.

3.2. Coding and data analysis

In systemic functional grammar, the "clause" is the unit of analysis (Bloor & Bloor, 1995). A clause is a group of words containing a finite verb, which communicates complete meaning. For example, "China allein produziere 82 Prozent aller Sonnenkollektoren der Welt" (China alone produces 82 percent of all solar panels in the world) consists of only one clause, while two clauses are contained in "Alles andere sei weder ökonomisch noch ökologisch vernünftig und es wäre sicherer als Atomenergie." (Everything else is neither economically nor ecologically reasonable and it would be safer than nuclear energy). In the present research, all 24 environmental reading texts were first segmented into clauses. According to the linguistic characteristics of "transitivity", all the clauses were then coded into transitivity components, namely "process", "participants", and "circumstance". For example, "China allein produziere 82 Prozent aller Sonnenkollektoren der Welt" was coded as "China <participant: actor> allein produziere <process: material> 82 Prozent aller Sonnenkollektoren <participant: goal> der Welt <circumstance: location>". After the transitivity coding was finished, each transitivity in the sampled environmental reading texts was judged as to whether it was eco-beneficial (encouraging students to protect ecosystems) (See Excerpts 9 to 13), eco-destructive (hindering students from protecting ecosystems) (See Excerpts 14 to 18) or eco-ambivalent (conveying a vague attitude towards the relationship between humans and nature) (See Excerpts 19 to 21), in order to clarify the ecological views of the environmental reading texts.

Since the authors were not German language majors, to ensure the reliability of coding two German language professionals who were also familiar with systemic functional grammar were invited to code the environmental reading texts independently. They were first given 10% of the reading texts for a pilot analysis. After they became very familiar with the coding criteria, they coded all the reading texts independently. The reliability between the two coders was 0.91, and any differences in their coding were negotiated until they were resolved.

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4.1. Transitivity constructions in the sampled German textbooks' environmental content

Regarding the transitivity constructions, the results of the present research show that all the transitivity patterns were used in the environmental content of the German language textbooks, but their distributions were unbalanced. Among the six transitivity patterns, the most commonly used patterns were material process, relational process and existential process, accounting for 53.12%, 26.96% and 10.66% respectively (See Table 2). The rest of the transitivity patterns, including mental process, verbal process and behavioural process, were less preferred, accounting for only 5.03%, 3.02% and 1.21% respectively.

Table 2. *Transitivity patterns in the sampled environmental content*

TRANSITIVITY PATTERN	NUMBER	PERCENTAGE
Material process	264	53.12%
Relational process	134	26.96%
Existential process	53	10.66%
Mental process	25	5.03%
Verbal process	15	3.02%
Behavioural process	6	1.21%
Total	497	100%

In most previous studies the material process pattern was found to be the dominant type in various genres, such as presidential debate (Fadilah & Kuswoyou, 2020), short stories (Rizwan, 2013), popular songs (Harbi *et al.*, 2019) and literary texts (Darani, 2014). The dominance of material process patterns was also evidenced in the present research. The material process is also called the physical action process; thus, verbs of doing something necessarily emerge in clauses involving a material process, basically encoding the message of a participant (the actor) physically doing something to another participant (the goal). For example, excerpt 1 encodes that "China" (the actor) produces (verb of doing) solar panels (goals). In the present research, a larger proportion of material processes was used in the sampled environmental content, indicating that the interaction between humans and nature was the focus of the environmental content.

> Excerpt 1: China allein produziere 82 Prozent aller Sonnenkollektoren der Welt. (China alone produces 82% of all solar panels in the world.) (taken from *Themen Aktuell*, book 2.

The most common physical action words in the environmental content (See Table 3) were geben (give), machen (make), sammeln (collect), produziern (produce), brigen (bring), kaufen (buy), brauchen (need), stellen (place), verbrauchen (consume), and abholen (collect). Using examples from the German textbooks, excerpt 2 encodes that clothing and shoes (goal) can be donated (physical action verb) by man (the actor), and excerpt 3 encodes that "items" (goal") should be collected (physical action verb) in special plastic bags or garbage cans (circumstance) by man (actor). These physical action words in the environmental content represent various specific actions by humans towards nature, which were helpful in helping students to understand humanity's physical actions towards the environment, thereby raising students' environmental awareness.

Table 3. *The most common "physical action words" in material processes*

RANK	WORDS	NUMBER	PERCENTAGE
1	geben	26	9.85%
2	machen	15	5.68%
3	sammeln	11	4.17%
4	produzieren	8	3.03%
5	bringen	7	2.65%
6	kaufen	7	2.65%
7	brauchen	5	1.89%
8	stellen	5	1.89%
9	verbrauchen	5	1.89%
10	abholen	5	1.89%

Excerpt 2: Kleidung und Schuhe kann man in Altkleidersammlungen geben, die von Hilfsorganisationen durchgeführt werden. (Clothing and shoes can be donated to used clothing collections run by aid organisations.) (taken from *Klick auf Deutsch*, book 3).

Excerpt 3: Sie sollen in speziellen Plastiksäcken oder Mülltonnen gesammelt werden. (They should be collected in special plastic bags or garbage cans.) (taken from *Themen Aktuell*, book 2).

According to Halliday (1994, p. 138), "...there are three principal types of process in the English clause: material, mental, relational". However, the findings in the present research show a slightly different picture. Beyond material and relational processes, it was the existential process pattern rather than the mental process pattern that was found to be an important process pattern. The reason for this is that the existential process is a process of encoding what happens in nature and how living beings and inanimate participants coexist. In excerpt 4 an existential process is used in which a "green dot" is placed on packaging, indicating human concerns related to the protection of the environment. In excerpt 5 an existential process is also used to highlight an existent "hundred examples", indicating that humans destroy the environment by producing a lot of garbage. In both excerpts the relationship between humans and nature is described, which could inspire a deep concern for human actions towards nature.

Excerpt 4: Es gibt auf vielen Verpackungen "den Grünen Punkt"... (There is a "green dot" on many packages.) (taken from *Universität Allgemeines Deutsch*, book 2).

Excerpt 5: Dabei gibt es hundert Beispiele, wo wir völlig sinnlos Müll produzieren. (There are a hundred examples that we produce completely useless garbage.) (taken from *Themen Aktuell*, book 2).

Only a comparatively small percentage of mental processes (5.03%) and verbal processes (3.02%) were found in the sampled environmental content in the present research. However, their particular roles cannot be neglected. The mental process, as a process of "feeling, thinking, and seeing" (Halliday, 1994, p. 117), is usually related to people's inner world behaviour. The mental process involves two participants: the senser (the conscious being who can feel, think or see), and a phenomenon (something that is sensed). For example, in excerpt 6 the sensing cognition was "to know", the "senser" was "you" and the "phenomenon" was "sorting garbage in Germany", conveying a discussion of protecting the environment in Germany. The verbal process, as a process of "saying" (Halliday, 1994, p. 140), involves the "sayer" (the producer of the speech) and a "target" (the object of the speech). For example, in excerpt 7 the "sayer" (everyone) is talking about (verbal action) "water scarcity and water saving" (the "target"). Since the mental process and the verbal process can be used metaphorically to include "sensing" and "saying" by other living beings and even inanimate participants in nature, more mental processes and verbal processes related to them need to be represented in environmental content to help learners to better understand the relationship between humans and nature.

> Excerpt 6: Weißt Du, dass man den Müll in Deutschland sortieren muss? (Do you know that people have to sort the garbage in Germany?) (taken from *Klick auf Deutsch*, book 3).
> Excerpt 7: Aber warum reden dann alle von Wasserknappheit und Wassersparen? (However, why is everyone talking about water scarcity and water saving?) (taken from *Klick auf Deutsch*, book 3).

Halliday and Matthiessen (2004) hold that behavioural processes are usually the least salient among the six process patterns. Accordingly, a very limited number of behavioural processes were found in the present research, with only two occurrences. Although behavioural processes mainly describe typical human physiological and psychological behaviours like breathing, coughing, smiling and so on, such as in excerpt 8 describing the physiological behaviour of sleeping, they could also be used to personify other living beings and inanimate participants in nature. In this way, they could be used to show more care about other living beings and inanimate participants. Thus, future textbook compilers need to take more behavioural processes into consideration while selecting and editing environmental content.

> Excerpt 8: Ich habe sogar ein paar Stunden geschlafen. (I even slept for a few hours.) (taken from *Themen Aktuell*, book 2).

4.2. Ecological view in the sampled German textbooks' environmental content

In terms of the ecological view, each transitivity process in the environmental content was categorised as eco-beneficial, eco-ambivalent or eco-destructive (Stibbe, 2015). Specifically, if a transitivity process helps people protect ecosystems, it was categorised as eco-beneficial; if it conveys a vague attitude towards the relationship between humans and nature, it was eco-ambivalent; and if it hinders people from protecting ecosystems, it was categorised as eco-destructive. The results of the present study (See **Table 4**) show that the

eco-beneficial view dominated the sampled environmental content, accounting for 56.94%, followed by the eco-destructive view with 31.83%, while the eco-ambivalent view ranked third with 11.87%. More details are illustrated in the following.

Table 4. *Ecological view in the sampled environmental content*

TRANSITIVITY PROCESS	ECO-BENEFICIAL		ECO-AMBIVALENT		ECO-DESTRUCTIVE	
	N	%	N	%	N	%
Material process	172	60.78%	14	23.73%	78	50.32%
Mental process	12	4.24%	3	5.08%	10	6.45%
Verbal process	6	2.12%	7	11.86%	2	1.29%
Relational process	71	25.09%	23	38.98%	40	25.81%
Behavioural process	2	0.71%	2	3.39%	2	1.29%
Existential process	20	7.07%	10	16.95%	23	14.84%
Total	283	56.94%	59	11.87%	155	31.83%

4.2.1. Eco-beneficial view

Most of the transitivity processes in the environmental content in the sampled German textbooks were eco-beneficial. Ecologically, humans are part of nature and cannot be separated from it. Only when humans actively protect nature can they coexist with it in a harmonious way. Thus, humans should attach great importance to nature and, more importantly, take effective action to protect it. In the present research the majority of the material processes –up to 60.78%– were found to be eco-beneficial.

As mentioned in the earlier part in this paper, within the transitivity system the nucleus is a process realised by verbs. In the sampled German textbooks' environmental content we found a great number of dynamic verbs involved in material processes, such as "benutzen" (use) in excerpt 9 and "entwickeln" (develop) in excerpt 10. These dynamic action words were used to illustrate human behaviour related to protecting nature.

Excerpt 9: Benutzen Sie wiederaufladbare Batterien. (Use rechargeable batteries.) (taken from *Klick auf Deutsch*, book 3).

Excerpt 10: Gegen die Luftverschmutzung wurde ein umfassendes Programm entwickelt. (A comprehensive programme against air pollution has been developed.) (taken from *Neues Konzept für Deutsch*, book 2).

Many relational processes in the sampled German textbooks' environmental content were also found to take an eco-beneficial view. As shown in Table 4, eco-beneficial relational processes accounted for 25.09% of the total. Relational processes can be further divided into two types: identifying processes, and attributive processes. Excerpts 11 and 12 were categorised as identifying processes involving two participants, namely the identified (the

entity that is identified) and the identifier (the entity that is used to identify), while excerpt 13 is an attributive process involving two participants, namely the carrier (the entity, person or concept being described) and the attribute (the quality ascribed to the carrier).

> Excerpt 11: Wir sind Gäste, der Boss ist und bleibt die Natur. (We are guests, and the boss is nature.) (taken from *Mittelpunkt*, book 1).
> Excerpt 12: Die Produktion wäre dann sowohl energiesparender als auch kostengünstiger. (Production would then be both more energetically efficient and cost effective.) (taken from *Berliner Platz*, book 3).
> Excerpt 13: In der südwestchinesischen Stadt Kunming zum Beispiel habe jedes Haus Sonnenkollektoren. (In the southwest Chinese city of Kunming, for example, every house has solar panels.) (taken from *Studienweg Deutsch*, book 4).

4.2.2. Eco-destructive view

In the sampled environmental content from the German language textbooks, approximately one third of the transitivity processes were found to express an eco-destructive view. Specifically, these eco-destructive transitivity processes describe destruction of the ecological environment and a notion of anthropocentrism.

> Excerpt 14: Der Mensch ist jedoch dabei, die seit einer Jahrmilliarde vorherrschende Sauerstofftendenz zu stoppen oder gar umzukehren. (However, humans are in the process of stopping or even reversing the oxygen trend that has prevailed for a billion years.) (taken from *Hochschuldeutsch*, book 4).
> Excerpt 15: Der Lärm erzeugt Herzleiden, erhöht den Blutdruck und erzeugt Magengeschwüre. (The noise causes heart disease, raises blood pressure and causes stomach ulcers.) (taken from *Neues Konzept für Deutsch*, book 2).

Within the transitivity system, "circumstance" is used to construct the background for the process. In excerpt 14 a relational process is used to reflect how terrible it is when nature is destroyed, and the use of the identifier "Der Mensch" (humans) explicitly shows that it is humanity who is causing such unbearable destruction to nature. In excerpt 15 a material process is presented in which the actor, "der Lärm" (the noise), causes many negative effects on humans, represented by the goals "Herzleiden" (heart attack), "Blutdruck" (blood pressure) and "Magengeschwüre" (gastric ulcer).

Although many transitivity processes in the sampled environmental content were eco-destructive, most of these eco-destructive processes were anthropocentric, supporting Stibbe (2004) who found human-centred environmentalism in Japan's EFL textbooks, and Zahoor and Janjua (2019) who found that nature was constructed as a commodity in Pakistan's ELT textbooks. In the German language textbooks in this study, eco-destructive processes were used to help learners recognise how a destroyed environment greatly influences human lives, such as by causing illness (See Excerpt 16) or even loss of life (See Excerpt 17), or in relation to human consumerism, such as utilising a large amount of water to make artificial snow (See Excerpt 18). However, the cultural and political reasons underlying humans' environmental destruction were rarely mentioned or analysed in the sampled German textbooks, which was

not helpful in raising learners' awareness of deep ecological values advocating "the equal intrinsic worth of all life in the universe" (Zahoor & Janjua, 2019, p. 8).

> Excerpt 16: Die Menschen werden krank. (People get sick.) (taken from *Neues Konzept für Deutsch*, book 2).
> Excerpt 17: 3,000 zusätzliche Tote pro Jahr als Folge der dadurch hervorgerufenen Luftverschmutzung. (There were 3,000 additional deaths per year as a result of the air pollution.) (taken from *Stichwort Deutsch*, book 2).
> Excerpt 18: 60% aller Skipisten sind künstlich beschneite Flächen. (60% of all ski slopes are covered with artificial snow.) (taken from *Berliner Platz*, book 3).

4.2.3. Eco-ambivalent view

As shown in **Table 4**, 59 of the transitivity processes in the sampled environmental content found to take an eco-ambivalent view. These transitivity processes neither encouraged nor discouraged people from protecting ecosystems. In other words, no clear ecological orientation was conveyed by these eco-ambivalent transitivity processes.

Excerpt 19 is a material process conveying a message that "Most of the water in the earth is salty and cannot be drunk". Excerpt 20 is an existential process, conveying a message that "Three million people live there". Excerpt 21 is a verbal process, conveying a message that "A reporter was very impressed with China's plan". Here, readers cannot discern a clear ecological view; for example, excerpt 21 only expresses that the reporter was very impressed with China's plan, but whether the reporter would take further specific actions to support China's green plan was not clear. Therefore, it is difficult to decide whether the process is eco-beneficial or eco-destructive.

> Excerpt 19: Das meiste Wasser auf der Erde, nämlich 97.2 Prozent, ist salziges Meerwasser, das für den Menschen ungenießbar ist. (Most of the water on earth, namely 97.2 percent, is salty seawater, undrinkable for humans.) (taken from *Klich auf Deutsch*, book 3).
> Excerpt 20: Und dort wohnen drei Millionen Menschen. (And three million people live there.) (taken from *Studienweg Deutsch*, book 4).
> Excerpt 21: Der Fernsehjournalist Franz Alt, der an dem Forum teilnahm, zeigt sich in einem Interview mit Telepolis beeindruckt von Chinas Plänen. (TV journalist Franz Alt, who attended the forum, said he was impressed by China's plans in an interview with Telepolis.) (taken from *Studienweg Deutsch*, book 4).

The relatively small number of occurrences of eco-ambivalent processes in the sampled environmental content imply that the German textbooks commonly used in China's universities attempt to raise learners' environmental awareness in an explicit way, relying on discussion of eco-beneficial processes or eco-destructive processes. However, eco-ambivalent processes can still be pedagogical resources, acting as typical cases for teachers to design pedagogical activities to guide students to construct their own views on these ecologically vague discourses. Take excerpt 19 as an example; teachers could assign students to carry out a group project to analyse why industrialisation makes the sea increasingly salty and what sustainability measures could be taken.

5. CONCLUSION

Incorporating environmental education into language courses is necessary, since language can promote ecocentric and biocentric worldviews (Zhdanava *et al.*, 2021) while also cultivating learners' language skills. German is one of the main foreign languages offered to students in Chinese universities, and the environmental content in these courses is an important resource to influence students' environmental attitudes. Adopting Halliday's transitivity analysis model, the present research was conducted to examine the transitivity constructions and ecological views expressed in the environmental content in German language textbooks used in Chinese universities.

In terms of transitivity constructions, the present research found that the environmental content relied on material transitivity processes, relational transitivity processes and existential transitivity processes to raise students' environmental awareness, while processes of mental transitivity, verbal transitivity and behavioural transitivity were used less often. Nevertheless, these latter transitivity processes have their own particular function, and they should not be neglected when implementing environmental education. Our findings indicate that there is a need for a more balanced use of transitivity patterns in environmental content in German language textbooks; more verbal transitivity, behavior transitivity and mental transitivity could be added into the environmental content to personify nature. In this way, learners will be better able to think about, perceive and feel emotions towards nature, resulting in more empathy towards the environment, which will be helpful in explicitly raising learners' awareness of the importance of protecting the environment.

In terms of the ecological views displayed by the environmental content, the present research found that an eco-beneficial view dominated, followed by an eco-destructive view and an eco-ambivalent view. The dominance of an eco-beneficial view in German language textbooks is very helpful in developing students' positive attitudes about protecting the environment. Although some environmental content was of an eco-destructive nature, raising students' environmental awareness by discussing the destructive effects of environmental damage on human lives, the negative effects of human behaviour on other creatures such as animals were rarely mentioned in the environmental content. What is more, the political and cultural values underlying humanity's destruction of nature were not touched upon in the environmental content. We suggest that content of an eco-ambivalent view should be reduced, since it neither encourages nor discourages learners from protecting ecosystems. Also, content expressing an eco-destructive view should not only display the result of humanity's destructive behaviour on other creatures, but also reveal the political and cultural causes underlying human activities.

In addition to the pedagogical implications for textbook compilation, the present research also has some theoretical implications. In previous research (Brown, 2017; Mliless & Larouz, 2018) linguistic constructions such as antecedents, euphemism and the passive voice were analysed from the point of view of ecolinguistics. However, these constructions only concerned individual words or structures; the clause as a whole was not taken into consideration to reveal the underlying ecological view. In the present research the transitivity system, which focuses on the whole clause, was used to analyse environmental discourse in language textbooks, offering a new theoretical perspective for environmental discourse analysis.

There are several limitations in the present research. First, the research corpus was not large; future studies could analyse as many German language textbooks as possible to make the findings more objective. Second, only reading texts were analysed in the present research; future studies could include more text genres from German language textbooks, such as listening, writing, and speaking.

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7. Appendix 1

The Sampled German Language Textbooks

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