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A Corpus-Based Study on Metaphor in Ecological Discourses

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Abstract: *In response to environmental issues around the world, the United Nation and the Chinese NGO have launched various proposals and policies focusing on the relationships between humans and nature. From the perspective of conceptual metaphor, this study analyses the UN Protected Planet Report 2020, and China Environment Yearbook, edited by the first Chinese environmental NGO, Under the theory of Conceptual Metaphor by Lakoff and Johnson, a corpus-based methodology combining qualitative and quantitative approaches was applied to demonstrate traits of metaphors used in the reports to illustrate the conceptual models in ecological discourses in Chinese and English. This article figured out that conflict, journey, and living organism metaphor can best reflect different ideologies between parallel discourses in the two cultures. It helps to identify characteristics of language use of metaphor in Chinese and English ecological discourses.*

Keywords: *Conceptual Metaphor, Corpus Linguistics, Wmatrix*

1. Introduction

Nowadays, in the face of a series of ecological issues, there are increasing calls for environment-friendly development around the globe. As influential roles in ecological construction, both the Chinese government and the United Nation launched documents aiming to promote environmental protection and sustainable development. The ecological discourse of the two languages serves not merely as a tool to demonstrate plans literally but also as a window to their ideologies, which are believed by many linguists as a social construct (Richards 1936, Chaeteris-Black 2004). Therefore, linguistic analysis is significant in investigating present notions about human-nature relationships, especially in a cognitive approach of metaphor studies.

To explore the ecological ideology behind lines, this study first identified conceptual metaphors in bilingual files according to conceptual metaphor theory. The next procedure is to analyze the metaphors in the text by comparison and evaluating to work out a contrastive study about language use and ideology. This research aims to answer two questions:

(1) What metaphors can be categorized in the selected ecological discourse?

(2) Why are the metaphors used? What cultural message is conveyed?

2. Literature Review

2.1. Metaphor

Metaphor as a branch of rhetoric in traditional western disciplines experiences a revolutionary turn pointed out by Lakoff and Johnson: human thought processes are largely metaphorical. In a conceptual sense, it is regarded as a nature shared by human cognitive systems by establishing mappings from the source domain to the target domain. Source domain is often concrete, tangible, or familiar concepts used to understand or describe relatively abstract ones, namely the target domain. It is based on the assumption that metaphorical concepts might have arisen from our experiences. In this sense, Lakoff illustrates the role of metaphor in understanding the human conceptual system. However, besides common physical experience, there are a host of socioeconomic differences that tend to result in different metaphorical concepts, which further ushers in vast space for research about cultural discrepancies. Both similarities and differences are shared in the cross-cultural mode of metaphors. As Richards (1936) notes: The process of metaphor in language, the exchange between the meanings of words which we study in explicit

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verbal metaphors, are superimposed upon a perceived world which is itself a product of earlier or unwitting metaphor, and we shall not deal with them justly if we forget that this is so.

2.2. Metaphorical Studies in Ecological Discourse

Regarding the ecological turn that appeared in linguistics in the 1970s, scholars began to focus on the role of language in the field of ecology. International studies are abundant, with the approach of systemic functional linguistics as mainstream (Fill & Mühlhäusler 2001, Stibbe 2013, Huang 2018). According to Stibbe (2015), ecolinguistics as an interdisciplinary view can be integrated with other theoretical perspectives like discourse analysis, pragmatics, sociolinguistics, etc., according to the specific academic purpose.

Charteris-Black (2004) explained a new paradigm of metaphorical research in his book *Corpus Approaches to Critical Metaphor Analysis*, which is combined with corpus linguistics to explain the relationship between metaphor, ideology, and human thoughts. He adopted both cognitive semantic approach and pragmatics to investigate what metaphors are used and why they are used. The genre he mentioned included political speech, press reporting, and religious discourse, ushering in a new perspective to study a wide range of discourse at the same time. This thesis uses his Critical Metaphor Analysis (CMA) as a guide to combining qualitative and quantitative studies.

2.3. Corpus Linguistics

The qualitative method is the introspective method. Before the common use of corpus, metaphor researchers mainly applied introspection based on intuition to analyze metaphor phenomena. Several researchers began to improve this situation by laying the methodological foundations for a strong emphasis on authentic data and the empirical evidence of many of the fascinating theoretical claims in the field. In this way, the empirical studies turned to a more data-driven method and thus enhanced reliability and validity.

Adoption of the approach of corpus linguistics means combining quantitative and qualitative approaches which concern the frequency and typicality as well as specific interpretation about the use of the word. Among international corpus-based metaphor studies, researchers conducted surveys in various genres across cultures. Moghadam and Samar (2020) investigated metaphor use in second language academic writings; Gong (2019) analyzed the annual environmental report of China Three Gorges Corporation, using Story Theory put forward by Stibble (2015); Yu (2020) analyzed environmental reporting of corporate social responsibility reports in Chinese, English, and Italian.

Previous studies have provided interesting insights into the positive or negative influences of ecological discourse, but bilingual ecological discourse analysis based on empirical verification is still limited. In this thesis, an online corpus tool of Wmatrix is adopted to tag semantic domains in order to provide more accurate data than manual means. In hope of enhancing awareness about the current heated global issue of ecology, this research will focus on a corpus-based study on bilingual ecological discourse through the lens of conceptual metaphors.

3. Research Methodology

In order to describe and interpret linguistic phenomena in an appropriate manner in research, this study firstly adopted Wmatrix as an online corpus tool to analyze materials and then followed the framework of Critical Metaphor Analysis (CMA) construed by Charteris-Black (2004). Both qualitative and quantitative methods are used to provide a reliable and credible analysis of conceptual metaphors in ecological discourses. The research procedures are divided into four parts: data collection, metaphor identification, metaphor interpretation, and metaphor explanation.

3.1. Wmatrix

Wmatrix (http://ucrel.lancs.ac.uk/Wmatrix/) is a web-based natural language corpus analysis tool developed by the Ray Paulson team at the Computer Language Research Center of the University of UCLE (Rayson, 2008). According to Rayson (2008), this corpus tool enjoys an accuracy of 91% to 92%, which is relatively higher in this field than other corpus tools. Its characteristic is that it is no longer limited to the default corpus. The researcher can build a corpus according to the specific needs and upload it to the online platform. This tool is more open, which is a bright spot compared to earlier tools. Similar

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to other corpus analysis tools, Wmatrix can generate concordance, collocation, keyword list, and frequency word list (Li 2019). In addition, one of the prominent advantages of Wmatrix is that it can provide a web interface for USAS (UCREL Semantic Annotation System) and then automatically generates semantic tags for the entire self-built corpus. That is to say, USAS can automatically assign a semantic domain, represented by a specific semantic tag, to each word, compound word, and even multi-word expression in the corpus (Sun, 2012; Sun, 2013).

This thesis will employ its semantic tagging to illustrate metaphor use. Wmatrix has its reference corpora like BNC (British National Corpus) Sampler Spoken and BNC Sample Written, as it is shown in Figure 1.

Figure 1: User's interface in Wmatrix

3.1.1. Metaphor Identification

Although Wmatrix helps a lot in identifying semantic domains, which is essential in judging source domains or target domains, manual verification is still in demand to ensure accuracy. By referring to the Master Metaphor List (Lakoff et. al., 1989/1991), online etymology dictionary (www.etymonline.com), and Macmillan dictionary (www.macmillandictionary.com), the words are categorized into different semantic domains and categorized on account of source domains. When selecting the source domain, this study adopts all types of expressions without setting a semantic field, and this is an approach investigating all types of metaphorical expressions in ecological discourse instead of just ecological metaphors. In this way, an intact view of human-nature relations and cognitive patterns in the material were shown.

Pragglejaz Group (2007) proposed the Metaphor Identification Procedure (MIP), which in this research was adopted and divided into 4 steps:

(1) Read the discourse and establish an overall understanding of the discourse.

(2) Determine the lexical units in the discourse.

(3) (a) Analyze the meaning of each lexical unit in the context of discourse, namely, how the lexical units in the discourse are applied to the entities, relationships, or attributes induced by the discourse context. The context before and after the lexical unit should also be considered in the discriminating process.

(b) Determine whether each lexical unit has a more fundamental meaning in other contexts than in a given context. For research, the basic meaning of lexical units is usually more specific, clearer, and more historical, and most of them are related to their own behavior (bodily action). In addition, the basic meaning of lexical units is not necessarily the most commonly used meaning.

(c) If the lexical unit has a more basic meaning in other contexts than in the current context, then the researcher should determine whether the contextual meaning is in contrast to the basic meaning and can be understood through the comparison with

basic meaning.

(4) If yes, mark this lexical unit as metaphorical.

3.1.2. Data Collection

The selected English text was the UN Protected Planet Reports, which are biennial landmark publications that assess the state of protected and conserved areas around the world. The Protected Planet Report 2020 edition (https://livereport.protectedplanet.net) provides the final report on the status of Aichi Biodiversity Target 11 and looks to the future as the world prepares to adopt a new global target for nature under the post-2020 global biodiversity framework. The main topics in the report include status quo, coverage of protected and conserved areas, ecological representatives in various ecoregions, Key Biodiversity Areas (KBAs), management effectiveness assessments, the quality of governance in protected and conserved areas, global connectivity, sustainable use across the wider landscape and seascape, a summary of Aichi Target 11 and plans. Tokens analyzed are 8061, belonging to 106 key semantic domains in Wmatrix as is shown in Table 1.

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Table 1: Key semantic domains of English texts

			Item	O1	%1	O2	%2	LL	LogRatio	
1	List1	Concordance	S8+	330	4.20	4225	0.44 +	882.64	3.27	Helping
2	List1	Concordance	M7	321	4.08	5888	0.61 +	663.75	2.75	Places
3	List1	Concordance	W5	105	1.34	225	0.02 +	603.34	5.84	Green issues
4	List1	Concordance	L1	77	0.98	594	0.06 +	273.92	4.00	Life and living things
5	List1	Concordance	W1	72	0.92	912	0.09 +	193.90	3.28	The universe
6	List1	Concordance	Q4	57	0.73	740	0.08 +	151.09	3.25	The Media
7	List1	Concordance	Z99	366	4.66	22165	2.29 +	146.00	1.02	Unmatched
8	List1	Concordance	X2.2	25	0.32	87	0.01 +	123.55	5.15	Knowledge
9	List1	Concordance	A1.8+	66	0.84	1624	0.17 +	105.27	2.32	Inclusion
10	List1	Concordance	X9.2+	58	0.74	1382	0.14 +	95.43	2.37	Success

The Chinese text was passages from the China Environment Yearbook, edited by Friends of Nature, China's first environmental NGO, containing articles describing and commenting upon the environment and protection measures in China. The series has been published since 2005. This research excerpts passages of Ecological Recovery: Believing in Nature (Volume 1), Saving Energy (Volume 1), Land Resource Protection and Management (Volume1), Conservation Agreements: Incorporating Government-led and Community-based Initiatives (Volume 5), Effects of Climate Change on China (Volume 5), A Fragile Balance: Observations on Protecting Biodiversity (Volume 1). Tokens analyzed are 7987, belonging to 144 key semantic domains as is shown in Table 2.

Table 2: Key semantic domains of Chinese texts

			Item	O1	%1	O2	%2	LL	LogRatio	
1	List1	Concordance	W5	193	2.56	225	0.02 +	1303.40	6.78	Green issues
2	List1	Concordance	W3	141	1.87	3466	0.36 +	234.41	2.38	Geographical terms
3	List1	Concordance	A2.1+	149	1.98	3939	0.41 +	230.73	2.28	Change
4	List1	Concordance	W4	60	0.80	770	0.08 +	164.65	3.32	Weather
5	List1	Concordance	M7	145	1.92	5888	0.61 +	133.84	1.66	Places
6	List1	Concordance	S8+	116	1.54	4225	0.44 +	124.45	1.82	Helping
7	List1	Concordance	O4.6	20	0.27	110	0.01 +	84.58	4.54	Temperature
8	List1	Concordance	A11.1+	74	0.98	2803	0.29 +	75.34	1.76	Important
9	List1	Concordance	F4	41	0.54	912	0.09 +	74.70	2.53	Farming & Horticulture
10	List1	Concordance	N3.6	16	0.21	93	0.01 +	66.12	4.46	Measurement: Area

4. Data Analysis

In this study, for the sake of clarity, all grammatical forms of one word are classified into a single form as Table 3 and Table 4. In the process, all inflections are considered except the phrases that involve metaphorically related words. For example, "saving" and "save" are classified as the type of "saving", and the type contains several occurrences of grammatical forms of "saving". Below represents the types and tokens of metaphorical expressions after the manual examination. The total numbers of metaphorical expressions are similar between the two languages, among which Chinese occupies slightly more tokens with nearly double types. Nine kinds of systematic metaphors are sorted.

Table 3: English metaphorical words

Metaphor	English Metaphorical Words	Types	Tokens
War	realm (9), sector (4), cover (1), violate (1), devastate (1), exploitation (1), strategy (4), target (5), success (6), achievement (4)	10	36
Living organisms	prepare (1), generate (2), quality (11), take up (1), face (2), health (2), well-being (3), drivers (3), strong (5) weak (1) resilience (1)	11	32
Journey	lead to, reach (3), access (1), enter (2), deliver (1), withdrawal (1), bring (2), way (6), ways (5), landmark (1), further (13), guide (4), guidelines (2), pave the way (1), take forward (1), sustain (18), ongoing (3), look forward (1), focus (9)	18	75
wealth	poor (2), loss (16), contribution, value (4)	4	23
Building	support (14), framework (10), refine (1), base (15), basis (1)	5	41
Business	Roll out 1	1	1
Drama	scenarios (1), performance (2), dramatically (3)	3	6
Education	Lessons (1)	1	1
Sports	goal (14), baseline (2), surpassed (1)	3	17
SUM		56	232

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Table 4: Chinese metaphorical words

Metaphor	Chinese Metaphorical Words	Types	Tokens
War	Invasion (1), battleground (1), Campaign (16), explosion (1), standard (7), sectors (7), spur (1), strategy (5), tactic (4), target (2), campaigners (1), destruction (4), damage (5), destroy (2), ruin (1), disaster (1), catastrophe (1), achievement (2), loss (1), fail (4)	20	66
Living organisms	Survive (1), remedy (1), health (6), recovery (2), head (3), headwater (1), artery (1), stand (1), pace (1), grow (8), yield (1), vulnerable, (2), strong (5), weak (1), stregthen (4)	15	38
Journey	lead to(2), exploration(1), arrive(1), reach(4), pass, follow(5), deliver(2), withdrawal(1), place(3), approach, way(9), pave the way(1), bring(4), track(1), flagship(1), launch(1), pilot(1), left(1) , reverse (1), Proceed (1),Confront (2), director(1), lead(8), conduct(1),aid(1), obstacles (1), circumvent (1), catch up (1), come into (2), start(3), complete(1), continue(4), set(3), susatin(8), remian(3), focus (4)	35	85
wealth	In urgent need (1), rich (1), prosperity (1), poor (2), asset (3), save (6), value (4), loss (3), consume (2), own (1), ownership (3), property (2), reclaim (4)	13	26
Building	Base on/based (11), construct (1), rebuild (1), establish (5), support (3), strengthen (6), broaden (1), ground (1), framework (1)	10	30
Business	productivity (4), operation (2), roll out (1)	3	7
Drama	performance (2), play role/part (3)	2	5
Education	Lessons (1)	1	1
Sports	goal (15), exercise (1)	2	16
SUM		101	274

As Lakoff and his colleagues noted, metaphorical expressions are systematically originated from a potential conceptual metaphor, usually with the form of A is B (Lakoff 1987; Lakoff et. al., 1989/1991). For example, various linguistic forms and expressions (e.g., forward, guide, etc.) are able to be sorted out their correlated conceptual metaphors (e.g., Purposeful Action is Directed Motion to a Destination, Beliefs are Guides, etc.), while these metaphors share the same theme (e.g., journey). Many scholars, later on, summarize certain formulas through this cognitive semantic approach revealing human conceptual patterns, as journey, war, body parts, plants metaphor, and so on (Charteris-Black 2004, Cameron & Malsen 2014).

The following analysis is conducted focusing on differences. By exploring different distributions, collocations, and semantic prosody, the metaphor interpretations were conducted selecting war, living organism, and journey metaphor, for they bear the most evident features that suit the aim of this study.

4.1. Conflict Metaphor

Chaeteris-Black (2004) defines conflict metaphor as a shared script for a ritualized sequence of activities. Initially, there is a threat – leading to the identification of an enemy; then there is a call to action in which allies are summoned, a military struggle against an enemy – in which they may be sought 'dead or alive' – leading to victory, surrender and some form of punishment.

In the selected ecological discourse, Chinese and English showed great discrepancies in the amount of conflict metaphor. Although both languages shared the semantic domain of typical features of warfare, including G3: warfare, defense, and the army; weapons, X7+: wanted, A1.1.2: Damaging and destroying, and X9.2:success or failure, Chinese had a wider range of metaphorical words and, therefore, showed greater tense and urgency of environmental protection career, whereas English was more objective.

1) Nature reserves are the primary **battleground** of protection for biodiversity and the vital artery of ecological security.

2) Since the founding of the Peoples Republic of China, and especially in the last 20 years, predatory exploitation, deforestation, and low-efficiency utilization in violation of scientific principles as well as reclaiming land from the sea have all caused unprecedented **damage** to coastal mangrove resources.

Despite highly conventional expressions like "strategy" and "win/loss", Chinese highlighted the importance of nature reserves by rhetorically using "battleground". Afterward, words of negative prosody as "damage" and "disaster" depicted the mutual interest between the lives of humans and the healthy operation of the ecosystem. Both human deeds and the interaction of ecology were illustrated as a warning to push the environmental protection work.

1) There remains a need to increase coverage through the designation of new protected and conserved

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areas, including in the terrestrial **realm** where protected area growth has stalled in comparison to the marine **realm**.

On the contrary, English material tended to be milder, and the use of "realm" represented a role with its own character within the entire ecosystem.

4.2. Living Organisms Metaphor

This systematic metaphor includes metaphors related to the human body, plants and agriculture, and the evaluation of strength and quality. The common semantic domains include B2: health and disease, S1.2.5: strong/weak and B1: Anatomy and physiology, while English metaphorical words have more personifications about nature like A1.1.1: general actions and M3: Vehicles and transport on land, and Chinese have more expressions about existence like A3: being.

As one of the most familiar concepts of the body in the human cognitive system, it is natural to map some familiar relations of correspondence of particular parts of the body with particular actions. English metaphorical expressions contained words like "face", "health" to assess the current status of the environment, but its Chinese counterpart adopted more verbs of change like "remedy", "recovery", "pace", and "grow".

1) The functioning area of the reserve needs to be adjusted. It should be expanded so as to **remedy** the defect of a core area of

2) From 2000 to 2005 the Botanical Institute of the Chinese Academy of Sciences carried out eco-rehabilitation experiments in Bayinhushu Village in Zhenglan Banner, Inner Mongolia in order to aid in the **recovery** of the sandlands in Otindag.

Corresponding to the sentence in conflict metaphor, "nature reserves are… the vital artery of ecological security." which mapped the vital organs of humans to important aspects of environmental protection, Chinese materials paid more attention to the importance of human's role in advancing the well-being of ecosystem, and the introspection of current protection work, and explored feature strategy on behalf of nature as life in its healing process, proceeding its crisis narrative in conflict metaphor.

The personifications in English discourse discussed more policies, factors, and the evaluation of nature, which was from the perspective of human activities.

3) The Protected Planet Report 2020 provides a **strong** starting point from which to begin working towards this ambitious goal.

4) In the context of governance, **quality** is in part linked to diversity.

4.3. Journey Metaphor

A journey includes a complete process from start to the destination and contains notions of orientation, leadership, obstacles, landmark, motion when dealing with challenges. According to Wmatrix, both the two languages shared a wide range of semantic domains including A2.2: Cause & Effect / Connection, M1: Moving, coming and going, M2: Putting, pulling, pushing, transporting, M3: Vehicles and transport on land, S8: helping/hindering, T2: time, and X5.1: attention.

Although both discourses highlighted the importance of guidance, each reflected distinct attribution of responsibilities. Chinese outnumbered in the semantic domains of S7.1, stressing the role of government. Given its political system, the Chinese government is vital for the domestic environmental protection blueprint and organizing different aspects of the society to exert great influence.

It is suggested that an investigation group should make a comprehensive assessment of the current situation and the predicted future trends of national-grade nature reserves so as to promote a working mechanism with the government as the **director**, the society as the supervisor, and the public as the participants in Chinas nature reserves and **lead** them onto a **track** of healthy development.

"Director" and "lead" revealed that there is a need for a right orientation in the forward motion, implying and strengthening the responsibilities of the Chinese government. "Track" provided a sense of order for safe progressing, boosting the confidence of the public.

On the other hand, the UN report pointed out the guiding principles would lay a solid foundation for future global cooperation.

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a Green List standard to support the effective management and governance of protected and conserved areas (including through advancing gender equity) (IUCN and WCPA, 2017), an MPA **Guide** supporting a shared understanding of conservation in the marine realm (Oregon State University et al., 2019), and a definition to **guide** the identification of OECMs (CBD, 2018).

5. Conclusion

In sum, the domains of conflict, journey, living organism, wealth, building, business, drama, and education occur in the bilingual corpus, in which metaphorical expressions are equally distributed except conflict metaphors. Both languages pay attention to balance the interest of human beings and the environmental protection career. Protecting nature is and certainly will still be the major concern in human societies around the globe, but at the same time, human initiatives should be valued and the need of humans should also be faced with, because the interest of the two is not contradictory essentially (Liu & Li, 2019).

From the perspective of comparison, conflict, journey, and living organism metaphor better show the ideological differences in ecological discourse between English and Chinese. Chinese text highlights the importance of environmental protection and the leadership of the Chinese government, which can be derived from the urgent environmental problems owing to the Chinese rapid economic advances since the 20th century, and its political system is suitable for concentrating various efforts under a unified leadership. English, as represented by the UN report, lay more stress on work summary and planning as well as the consensus of stakeholders.

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