
| RESEARCH ARTICLE

An Ecological Discourse Analysis of *Silent Spring* from the Perspective of Corpus-based Attitude System: Human Image as an Example

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| ABSTRACT

The book *Silent Spring* by Rachel Carson, a famous contemporary American marine biologist, has prompted environmental issues to become the biggest theme of our time and triggered the rise of the modern environmental movement. In this paper, Two corpus tools are used to analyze the attitude resources related to the human characters in *Silent Spring* from an ecological linguistic perspective of the attitude system. The study finds that the farmers and workers portrayed in the book are both destroyers and victims of ecology, while the scientists and ecologists play the role of protectors and managers of ecology. The article rejects the previous notion of "an thropocentrism" and reveals that the author advocates an ecological view of nature in which "all things are equal and interdependent", with a view to awakening the ecological consciousness of human beings and then taking the initiative to care for nature and protect the earth.

| KEYWORDS

"Ecological Discourse Analysis"; "Attitude System"; "*Silent Spring*"; "Human Image"

| ARTICLE INFORMATION

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1. Introduction

In recent years, as global ecological problems such as climate change, ecological destruction and resource shortage become more and more prominent, people's ecological awareness is gradually strengthened. As a result, people have begun to analyze and consider problems from an ecological perspective, and ecological linguistics has come into being. As a major hot spot of ecological linguistics research, ecological discourse analysis focuses on the role of language in the ecosystem and focuses on ecological issues, aiming to explain how discourse constructs the relationship between humans and the ecosystem and reveal the ecological concepts and ideologies behind the discourse through discourse analysis (Miao & Lei, 2019). At present, domestic ecological discourse analysis has taken shape, but these studies related to ecological discourse still suffer from the lack of microscopic and quantitative studies based on corpus analysis.

Silent Spring is the most influential work of Rachel Carson, a famous American contemporary ecological writer, and is a masterpiece of ecology, which is regarded as "the bible of the green ecological movement". The book exposes the damage to the ecological environment caused by the misuse of pesticides and other chemicals and advocates the use of ecologically safer methods to control agricultural pests.

Taking the factors into account, the paper adopts a quantitative analysis to explore the attitude resources related to human characters in *Silent Spring* from the perspective of ecological linguistics, using corpus tools such as Sketch Engine and UAM Corpus Tool. While parsing the discourse ecological orientation, this paper focuses on two research questions: (1) What attitude resources do the authors use in portraying different human character images? What is the specific distribution? (2) How does the author

portray different images of human characters through language, and what kind of ecological view of nature does the author hide behind the language?

2. Theoretical Framework

2.1 Ecological Discourse Analysis

Ecological linguistics emerged in the context of intensifying global ecological problems, and there are two main research models: the "Haugen Model", which focuses on the interrelationship between language and its environment, and the "Halliday Model", which focuses on the impact of language on the ecological environment (He & Zhang, 2017). The latter model emphasizes the important role of language in solving various ecological problems and advocates studying ecological issues from language, arguing that the use of language can influence the ecological concepts of human society (Halliday, 1990). In Halliday's model, ecological discourse analysis serves as the main research path in ecological linguistics, which focuses not only on ecological discourse, i.e., discourse about the environment and ecology, but analyzes any discourse that has a potential impact on the ecosystem (Alexander & Stibbe, 2014). Ecological discourse analysis focuses on the role of language in the ecosystem and focuses on ecological issues, aiming to explain through discourse analysis how discourse constructs the relationship between humans and the ecosystem and reveal the ecological concepts and ideologies behind the discourse so as to raise people's awareness of ecological conservation and construct a harmonious ecological relationship between humans and nature (Miao & Lei, 2019).

There are also a lot of academic discussions about the linguistic theoretical basis of ecological discourse analysis, mainly involving systemic functional linguistics (Alexander & Stibbe, 2014; Stibbe, 2014, 2015; He&Wei, 2017a, 2017b; He & Zhang, 2017; Zhang & He, 2018). In the process of its development, it has further integrated with systemic functional linguistics, forming a unique model of linguistic analysis. Xin and Huang (2013) interpreted natural ecological issues and linguistic ecological issues through linguistics and argued that systemic functional grammar could provide a powerful analytical tool for ecological discourse analysis. He and Zhang (2017) constructed an analytical model of ecological discourse from three levels of systemic functional linguistics: interpersonal meaning, ideational meaning and textual meaning; Miao and Lei (2019) supplemented the analysis models such as ergative analysis and causative analysis to further improve the systemic functional linguistic analysis framework of ecological discourse. With the continuous development of the analysis framework of ecological discourse, many scholars have practiced the analysis of ecological discourse on the basis of systemic functional linguistics and produced more research results. For example, some scholars have interpreted nature poetry from the perspectives of three major metafunctions, appraisal theory, and transitivity, to reveal the ecological view of nature conveyed by language (Pan & Yuan, 2022; Sun & Yang, 2022; Chen & Liang 2022; Huang & Chen, 2017); other scholars have analyzed novels from appraisal theory and ideational functions to examine the relationship between humans, nature, and animals (Ge, 2022; Wang & Dai, 2019; Yang, 2018; Yang, 2019); there is also ecological discourse analysis of news discourse in the new era from the dimensions of register, transitivity system, and attitude system (He, 2022; Yu, 2022; Yuan, 2018; Zhang, 2021); as well as exploring the ecological relationship between human and nature embodied in educational discourse from appraisal theory (Wang & Shi, 2022) and analyzing the ecological situation and ideology conveyed in discourse based on the corpus (Wang & Tong, 2022).

Comprehensive analysis shows that most studies about the theoretical basis of systemic functional linguistics perspective focus on the theories of transitivity, mood, modality, grammatical metaphor, and context, and some studies focus on appraisal theory (Stibbe, 2015; Zhang & He, 2018), though mainly on the basic application of appraisal theory, or on one of the subsystems for ecological perspective extension, with few studies combining corpus for in-depth analysis.

Many of the studies are limited to focusing on the ontological meaning of evaluation resources within the language system, i.e., defining positive and negative attitudes in terms of the pure meaning of lexical grammar. However, the ontological meaning expressed by the lexicon itself cannot be simply divided into positive and negative categories in the actual context; the lexicon itself expresses positive, while in the context, it may express either positive, negative, or ambiguous attitudes and vice versa (He & Ma, 2020). Therefore, it is not enough to consider only the ontological meaning of lexical expressions in the discourse analysis of appraisal theory (Li, 2004; Hu, 2009) but also other evaluation elements, such as evaluation subject-object and value subject-object, should be considered (Liu, 2007). Therefore, He and Ma (2020) suggest that when the appraisal theory is applied to ecological discourse analysis, the three subsystems under the evaluation system should be expanded and extended under the ecological philosophical view of "pluralism and harmony, interaction and symbiosis", so that they can jointly constitute the evaluation system from the perspective of ecological linguistics. In view of this, this paper expands and extends the evaluation system proposed and developed by Martin (2000) and others from the perspective of ecological linguistics, with the aim of providing an operable theoretical model of an evaluation system for ecological discourse analysis.

2.2 Appraisal Theory in an Ecological Linguistic Perspective

In the 1990s, linguist James R. Martin developed the theory of evaluative systems, which provides some additions to the interpersonal function in systemic functional linguistics (Martin, 2000). Appraisal theory is about evaluation, i.e., the various attitudes negotiated in discourse, the intensity of the emotions involved, and the various ways of indicating values and forming

alliances with readers (Martin & Rose, 2003). It consists of three subsystems: attitude, engagement and graduation. Attitude relates to affect, judgment, and appreciation; engagement relates to the source of attitude and is divided into monogloss and heterogloss; and graduation reflects the degree of attitude (He & Ma, 2020).

The attitude system adopted in this paper is central to the appraisal theory. Attitude refers to the judgment and appreciation of human behavior, texts/processes, and phenomena. Thus, the system is subdivided into affect, judgment, and appreciation. Affect belongs to the psychological category and refers to the expression of human emotions, which clearly reveals the speaker's attitude toward a person or thing and can be refined into four aspects: happy/unhappy, safe/unsafe, satisfied/unsatisfied, and inclined/non-inclined. Judgment belongs to the ethical category, which is a moral judgment of the language user's behavior according to ethics and regulations, such as praise, criticism, condemnation, etc. Appreciation belongs to the aesthetic category, which refers to the evaluation of texts/processes and phenomena and consists of three aspects: reaction, composition, and value (Wang, 2001). Meanwhile, words about emotion, judgment, and appreciation can be divided into positive and negative meanings. For example, words expressing positive attitude meanings such as pleased and yearn for, and words expressing negative attitude meanings such as abhor and anxious (He & Ma, 2020).

Scholars exploring the interpersonal meaning of natural ecological discourse found that the original appraisal theory, which defined positive and negative attitudes in terms of the pure meaning of lexical grammar, was not fully applicable to the revelation of the ecological meaning of discourse. In view of this, they added three features of affect origins, judgment criteria, and appreciation objects in describing the attitude analysis model of nature ecological discourse and further distinguished between human-based and nature-based (human as part of nature) origins, criteria, and objects (Zhang & He, 2018). The adjusted attitude framework expands on the ecological orientation of discourse and further explains it to provide an operative appraisal system for the ecological discourse analysis paradigm.

Therefore, this paper presents a quantitative analysis of ecological discourse from the attitude system framework in the adjusted appraisal theory, taking *silent spring* as an example, to analyze the natural ecological view of the author hidden behind the language. This study aims to provide a new research method for ecological discourse analysis and use it to explore multiple ideologies in ecological discourse in order to promote green and sustainable development.

3. Analysis of Attitude Resources of Human Images in *Silent Spring*

In this paper, we use Sketch Engine to filter out four character images that appear most frequently in *silent spring*, which are farmers, workers, scientists and entomologists. Then the contexts in which the relevant characters appear are indexed, and their attitude resources are summarized and imported into UAM Corpus Tool for ecological annotation and statistics, and the following data are obtained.

3.1 Analysis of Attitude Resources of Farmers

Table 1 Statistics on the use of resources on positive/negative attitudes of farmers

| Attitude | Positive | Negative | Sum |
|--------------|----------|----------|-----------|
| Affect | 2 (4%) | 9 (18%) | 11 (22%) |
| Judgment | 4 (8%) | 19 (38%) | 23 (46%) |
| Appreciation | 4 (8%) | 12 (24%) | 16 (32%) |
| Sum | 10 (20%) | 40 (80%) | 50 (100%) |

From Table 1, judgment resources were the most frequent, appearing 23 times, accounting for 46% of all attitude resources; appreciation resources appeared 16 times, accounting for 32%; and affect resources were the least frequent, appearing 11 times, accounting for 22%. In terms of attitudinal orientation, negative-oriented attitude resources were more frequent, appearing 40 times or 80% in total; positive-oriented attitude resources were less frequent, appearing 10 times or 20% in total. Among them, judgment resources of negative orientation are the most frequent, appearing 19 times or 38%; affect resources of positive orientation are the least frequent, appearing 2 times or 4%. This shows that the authors mostly used relatively negative attitude resources in describing the image of farmers.

The authors used a large number of negative appreciation resources to evaluate the behavior of farmers before and after the excessive use of pesticides that led to changes in the natural environment, such as "prosperous farms" and "the roadsides were places of beauty" before the use of pesticides, but after the overuse of pesticides, the author turns to negative appreciation, such as "the streams were now lifeless" and "easily become a harsh reality" and so on. Through this contrast of positive and negative

appreciation of the same appreciation object, the author can undoubtedly stimulate his readers' awareness of ecological protection and convey his own criticism of human pesticide abuse and his concern about the serious consequences.

At the same time, the author also uses negative affect resources that indicate "unhappiness" and "insecurity", such as: "complained of loss in farm ponds ", "have already suffered", "a deadlier one", etc., which show the passive and helpless image of farmers as victims of natural disasters. The author expresses his fear of this "inexplicable disaster" and his compassion for all the species suffering from it, as well as his dissatisfaction and criticism of mankind's random spraying of pesticides and other acts of ecological destruction, aiming to highlight that this "inexplicable disaster" is not a normal The aim is to highlight the fact that this "inexplicable disaster" is not a natural phenomenon, but the inevitable result of human misconduct.

3.2 Analysis of Attitude Resources of scientists

Table 2 Statistics on the use of resources on positive/negative attitudes of scientists

| Attitude | Positive | Negative | Sum |
|--------------|----------|----------|-----------|
| Affect | 2 (6%) | 2 (6%) | 4 (12%) |
| Judgment | 13 (36%) | 12 (33%) | 25 (69%) |
| Appreciation | 4 (11%) | 3 (8%) | 7 (19%) |
| Sum | 19 (53%) | 17 (47%) | 36 (100%) |

From Table 2, judgment resources were the most frequent, appearing 25 times, accounting for 69% of all attitude resources; appreciation resources appeared 7 times, accounting for 19%; and affect resources were the least frequent, appearing 4 times, accounting for 12%. In terms of attitudinal orientation, there were more attitude resources of positive orientation, with 19 occurrences or 53%, while those of negative orientation was also basically the same, with 17 occurrences or 47%. Among them, judgment resources of positive orientation were the most frequent, appearing 13 times, accounting for 36%; affect resources of positive and negative orientations were the least frequent, appearing 2 times each, accounting for 6%. This shows that the authors used relatively average attitude resources in describing the image of scientists.

Judgment is an affirmative or negative evaluation of human behavior. In the selected text, the authors use positive words to evaluate the scientists' invention of pesticides to curb pest damage, such as "raised their houses, sank their wells, and build their barns ", "man's inventive mind", "intelligent being", etc. This is because, in the process of man's battle with nature, when humans are at a disadvantage and are often infested by creatures other than humans, their hard work and wisdom to overcome these threats are praiseworthy and admirable. However, with the continuous advancement of human technology, at the stage of social development after the excessive use of pesticides, the threat and destruction of man to nature have become far greater than that of nature to man. Therefore, the author uses positive judgmental resources to affirm the role of scientists as dominators and stewards of nature, such as "not agree upon how much DDT can be stored" "invigorated the native diet of the Eskimos This is because only scientists can provide the right model for our development because science means long investigations, repeated experiments, careful reasoning and argumentation, and only scientists can carefully guide other beings on the path of human development.

3.3 Analysis of Attitude Resources of Entomologists

Table 3 Statistics on the use of resources on positive/negative attitudes of Entomologists

| Attitude | Positive | Negative | Sum |
|--------------|----------|----------|-----------|
| Affect | 3 (10%) | 0 (0%) | 3 (10%) |
| Judgment | 18 (58%) | 3 (10%) | 21 (68%) |
| Appreciation | 5 (16%) | 2 (6%) | 7 (22%) |
| Sum | 26 (84%) | 5 (16%) | 31 (100%) |

From Table 3, judgment resources were the most frequent, appearing 21 times, accounting for 68% of all attitude resources; appreciation resources appeared 7 times, accounting for 22%; and affect resources were the least frequent, appearing 3 times, accounting for 10%. In terms of attitudinal orientation, the positive-oriented attitude resources were more frequent, appearing 26 times or 84% in total; the negative-oriented attitude resources were less frequent, appearing 5 times or 16% in total. Among them, judgment resources of positive orientation were the most frequent, with 18 occurrences (58%), and affect resources of negative orientation were the least frequent, with 0 occurrences. This shows that the authors used more positive attitude resources in describing the image of entomologists.

In the text, the authors used a lot of positive judgment and appreciation resources, such as "have learned by experience", "whose specialty is insects", "function as prosecutor, judge and jury", "among the leading advocates of chemical control" to create a positive image of entomologists as truth-seekers. The positive image of the entomologists is considered as a seeker of truth. At the same time, this corresponds to the author's eco-philosophical view that man should use a scientific approach to his relationship with nature. Nature is man's best teacher, and man should intervene in it as much as possible on the basis of understanding it.

3.4 Analysis of Attitude Resources of workers

Table 4 Statistics on the use of positive/negative attitudes resources of workers

| Attitude | Positive | Negative | Sum |
|--------------|----------|----------|-----------|
| Affect | 0 (0%) | 2 (8%) | 2 (8%) |
| Judgment | 3 (13%) | 13 (54%) | 23 (67%) |
| Appreciation | 1 (4%) | 5 (21%) | 6 (25%) |
| Sum | 4 (17%) | 20 (83%) | 24 (100%) |

From Table 4, judgment resources were the most frequent, appearing 23 times, accounting for 67% of all attitude resources; appreciation resources appeared 6 times, accounting for 25%; and affect resources were the least frequent, appearing 2 times, accounting for 8%. In terms of attitude orientation, the negative-oriented attitude resources were more frequent, appearing 20 times cumulatively, accounting for 83%; the positive-oriented attitude resources were less frequent, appearing 4 times cumulatively, accounting for 17%. Among them, the resources in the judgment category of negative orientation were the most frequent, appearing 13 times or 54%; the resources in the affect category of positive orientation were the least frequent, appearing 0 times. This shows that the authors used more negative attitude resources in describing the image of workers.

The author makes several judgments against the workers' behavior of destroying the environment by blindly spraying pesticides, such as "foraging ceaselessly" and "chromosome abnormalities". The author aims to expose the short-sightedness of human beings and the consequences of giving up long-term development for the sake of immediate benefits. The author refutes the view of human egocentrists by using a lot of negative resources and argues that man's supremacy in nature and his rude and reckless actions towards nature often cause irreparable damage.

4. Conclusion

To sum up, this paper combines corpus tools with the attitude system from the perspective of ecological linguistics to make an objective analysis of the human image in *Silent Spring*. From the relevant situation, it is clear that although the farmers and workers in the text are involved in ecological destruction, they are also the victims of ecology. As a vulnerable group, they are passively dependent on the ecological environment. *Silent Spring*, as a useful discourse, exposes, through numerous examples, a series of important hazards arising from the use of pesticides in the twentieth century and, to a certain extent, promote the protection of the ecological environment by human beings. At the same time, the scientists and ecologists who appear in the text play the role of ecological protectors and guides. Through the portrayal of scientists, the author explains the importance of a scientific approach to the relationship with nature. The article rejects the previous "anthropocentrism" concept and advocates the equality and interdependence of all things. Human beings should realize that nature is the best teacher for human beings, and they should intervene in nature as much as possible on the basis of understanding nature. Language expresses man's perception of the real world, and conversely, the world described by language affects man's language expression. The ecological harmony that author Carson constructs through *Silent Spring* is what all human beings should establish, especially today when the economy is developing at high speed, human material life is improving significantly, and ecological problems are becoming more and more serious. As an integral part of nature, we should work together to protect the common home of all species, take the initiative to care for nature, and coexist peacefully with other creatures instead of opposing or overriding nature. Only by abandoning the "anthropocentrism" concept of conquering nature can we finally achieve the healthy development and harmonious coexistence of human beings and nature.

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