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Comparative Analysis of the Metaphorical Frames of the Covid-19 Reports in the Pandemic and the Post-Pandemic Eras

Xinyue Li[1,a,*]

[1]*School of Foreign Languages, Northeast Normal University, Changchun, China*
[a]*15383766934@163.com*
**Corresponding author*

Abstract: *This study aims to conduct a comparative analysis of the metaphorical frames of the Covid-19 reports in the pandemic and the post-pandemic eras.This study adopts Python3.7 software to retrieve the relevant data of the official website of People's Daily, and uses TF-IDF algorithm to segment the text. We find that war metaphor and architecture metaphor are the most frequently used metaphors in People's Daily in the pandemic era and the post-pandemic era respectively. The word frequency of these two metaphors has a positive relationship with the word frequency of epidemic words during the pandemic era, while it has a significant negative relationship in the post-pandemic era. After that, we make a further analysis of the total trend of monthly word ratio of various metaphors, and find that architecture metaphor shows a significant upward trend in the post-pandemic era.*

Keywords: *Critical Metaphor Analysis, Discourse Strategies, War Metaphor, Architecture Metaphor, Covid-19*

1. Introduction

At present, the Critical Metaphor Analysis (CMA) theory at home and abroad is mostly applied to political texts, but it rarely involves the analysis of health reports. The difference is that foreign studies of CMA also study economic news and legal discourse[1]. In addition, there are multimodal critical metaphor studies on Characters[2] and magazine cover[3], which show the diversification of research objects; while studies on other genres and multimodal critical metaphor are relatively rare in China. From the perspective of languages in the corpus, studies on other languages (such as Spanish) have appeared abroad. However, at present, most of the corpus selected for critical metaphor studies in China are English texts, while the research on Chinese texts is relatively insufficient[4]. In view of this, this paper has made innovations in the selection of materials, selecting health reports to expand the diversity of text types in critical metaphor analysis, and selecting Chinese texts to make up for the deficiency of single English text research.

In early 2020, the global outbreak of New Coronavirus not only threatened the physical and mental health of the public, but also disrupted social order. Facing the complex epidemic situation, the media in various countries have played an important role in timely transmitting epidemic information to the public, strengthening prevention and control propaganda and guiding public opinion through discourse strategies. As the largest newspaper in China and one of the top ten most authoritative newspapers in the world by UNESCO, People's Daily has a far-reaching influence.Therefore, taking the epidemic reports of People's Daily as the corpus and CMA as the framework, this paper collected 13,655 reports on COVID-19 from January 1, 2020 to May 30, 2021, and then divided them into two news corpora, namely, the pandemic era and the post-pandemic era. In order to ensure the objectivity of the research, this paper is based on TF-IDF algorithm and Python language, and carries out manual screening to identify conceptual metaphors and extract data. This paper attempts to answer the following questions:

1) What are the main metaphors used in the news discourse of People's Daily in the COVID-19 pandemic and post-pandemic era?

2) What changes have taken place in metaphor in the two eras, and what are the reasons for this change?

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2. Literature Review

Metaphor is defined in *Longman Dictionary of Contemporary English* as "a way of describing something by referring to it as something different and suggesting that it has similar qualities to that thing". Starting from Aristotle's "substitution theory of metaphor " [5], the development of metaphor has experienced the "interaction theory" put forward by Richards[6] and the conceptual metaphor theory put forward by Lakoff &Johnson[7,8]. In the early 1980s, Lakoff and Johnson first put forward the conceptual metaphor theory, that is, metaphor is language use based on the cross-domain mapping of context and conceptual system [7]. They believe that metaphor is not only a rhetorical device, but also a common way of thinking and a basic cognitive tool. Metaphor is essentially a conceptual structure rather than a language structure. The working mechanism of metaphor, that is, the formation of metaphorical meaning is based on the similarity between source domain and target domain. In fact, the cross-domain mapping between these two domains is a process of understanding metaphorical meaning.

Critical Discourse Analysis (CDA) was first proposed by Fowler[9], which aims to reveal the relationship between ideology and discourse through language forms, and how they originate from and serve the social structure and power relations [10]. CDA is mainly based on the Framing Theory proposed by Lakoff [11], that is, frames can be classified into surface frames and deep frames, the psychological structure activated by words is the surface frame, while the values activated by the surface frame are the deep frame, which influences human reasoning and action[12].

In view of this, Charteris-Black put forward the theory of CMA in 2004 by combining CDA, pragmatics, cognitive linguistics, database linguistics and corpus analysis, aiming at "revealing the intention and attitude of language users" through metaphor analysis. Among them, CDA mainly discusses the relationship between metaphor and social background, and reveals the social ideology embodied in metaphor in a specific environment; pragmatics mainly discusses the function of metaphor; database linguistics shows the advantage of dealing with a large amount of data; cognitive linguistics mainly analyzes the mapping of metaphor from the perspective of cognition. On this basis, Charteris-Black further proposed three steps of CMA, namely metaphor recognition, metaphor interpretation and metaphor explanation[13], thus making CMA more scientific. It can be seen that CMA is a pioneering metaphor analysis method, and its main purpose is to use various methods to analyze metaphor and reveal the ideology, attitude and belief implied in metaphor [14].

Recent years, with the development of cognitive linguistics, scholars pay more and more attention to the study of metaphor. Shu Dingfang pointed out that "metaphor is not only a linguistic phenomenon, but also a tool for human beings to perceive and form concepts when they understand the world around them."[15]. According to Hu Zhuanglin, metaphor is a comparison between two related factors, which "allows people to communicate in a holistic way, let people perceive the overall relationship between symbols through the stimulation of tension emotions, and provide the exact meaning to these dynamic relationships instead of the symbols themselves"[16].

3. Research Methods and Findings

3.1 Research Methods

According to the CMA model, combining quantitative and qualitative methods, this paper uses Python3.7 software to retrieve the relevant data of official website, People's Daily, with "Covid-19", "Covid-19 epidemic" and "Novel Coronavirus" as keywords. The date is set from January 1, 2020 to May 30, 2021. The retrieved 13,655 news items are used as the corpus samples for metaphorical analysis of COVID-19 epidemic. Referring to the five stages divided by www.Chinanews.com, this paper divides the Covid-19 epidemic into two eras, namely, the pandemic era and the post-pandemic era, so as to compare the metaphorical changes in the texts of the two eras. Among them, there are 4,516 reports in the pandemic era (from January 1 to April 28, 2020) and 9,139 reports in the post-pandemic era (from April 29, 2020 to May 30, 2021).

For text processing, this paper uses TF-IDF algorithm to segment the text and eliminate some redundant words. TF-IDF algorithm can evaluate the importance of a phrase to a file set or a file in a corpus. The importance of words increases in proportion to the number of times they appear in the file, but decreases in inverse proportion to the frequency they appear in the corpus. Various forms of TF-IDF weighting are often used by search engines as a measure or rating of the correlation between files and user queries. The expression is as follows:

$$TF_{i,j} = \frac{n_{i,j}}{\sum_k n_{k,j}} \quad (1)$$

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$n_{i,j}$ indicates the frequency of a word in the text, while $\sum_k n_{k,j}$ represents the total vocabulary of all texts.

$$\mathrm{IDF} = \log_2 \frac{|\mathrm{D}|}{|\omega \in \mathrm{d}|} \tag{2}$$

In the above formula, $|D|$indicates the number of all news inquired and$|\omega \in d|$represents the number of concerned words in the document. Finally, multiplying the word frequency by the inverse document frequency is the importance of the concerned words:

$$\mathrm{TF} - \mathrm{IDF} = \mathrm{TF_{i,j}} \times \mathrm{IDF} \tag{3}$$

The above formula mainly indicates the frequency of a word in the text, that is, the higher the TF-IDF value, the more important the word is in the document.

Based on the text results processed by TF-IDF algorithm, this paper makes metaphor recognition, metaphor interpretation and metaphor explanation in People's Daily. 1.Metaphor recognition: firstly, this paper uses Python 3.7 (Jieba database) to segment the corpus, and it is found that there are 2,124,312 grouped words in the pandemic era and 7,030,706 grouped words in the post-pandemic era. Then, according to the definition of metaphor, this paper determines whether there is tension between the source domain and the target domain to determine the candidate metaphors, classifies the candidate metaphors with metaphorical meanings as metaphorical keywords, and extracts these metaphorical keywords with the analysis algorithm of Jieba database. After that, these metaphorical keywords are brought into the original text for screening and judging whether the meanings of these metaphorical keywords in the context have metaphorical meanings, and the keywords that do not have metaphorical meanings are eliminated. 2. Metaphor interpretation: in order to better analyze the use of various conceptual metaphors in the corpus, we refer to the concept of "resonance value", that is, a measurement standard of metaphor productivity. The calculation formula is as follows:$resonance = \sum type \times \sum token$. Metaphor interpretation is to further classify metaphors according to different source domains based on the resonance value of each metaphor obtained from the above formula. 3. Metaphor explanation, that is, according to the classification of metaphors in the text, combined with pragmatic environment, historical background and other factors to explain them.

3.2 Findings

Based on the above processing results, this paper uses Python to search the daily epidemic news to further count the word ratio (‰) of various metaphors. Table 1 shows the descriptive statistics of the word ratio of various metaphors.

Table 1: Descriptive statistics of the word ratio (‰) of various metaphors

	War Metaphor	Architecture Metaphor	Journey Metaphor	Machine Metaphor	Examination Metaphor	Up-down Metaphor
count	13655	13655	13655	13655	13655	13655
mean	9.807	11.742	3.104	3.699	0.489	3.257
std	14.222	12.689	4.070	5.171	2.014	4.940
min	0.000	0.000	0.000	0.000	0.000	0.000
25%	1.206	2.375	0.000	0.000	0.000	0.000
50%	6.064	8.197	1.859	1.890	0.000	1.401
75%	13.423	17.241	4.867	5.624	0.000	4.854
max	300.000	116.173	38.462	71.429	69.951	65.934

From the mean value, the mean values of war, architecture, journey, machine, examination and up-down metaphors in Table 1 are 9.80, 11.74, 3.10, 3.7, 0.49 and 3.26 respectively. We find that the mean value of architecture metaphor is the highest, followed by war metaphor, while examination metaphor is the lowest. From the max value, war metaphor is the highest, and the difference between the maximum and minimum value of its word ratio is as high as 300, which shows that its word ratio in various news fluctuates greatly. This may be related to the fact that the media will pay more attention to mobilization when the epidemic situation is serious, which leads to a significant increase in keywords of war metaphor. However, the examination metaphor has less word frequency, and it has no word frequency in the min, 25%, 50% and 75% quantiles, and the machine metaphor, up-down metaphor and journey metaphor have also no word frequency in the min and 25% quantiles. From the result, this paper concludes that war metaphor and architecture metaphor have great influence on epidemic reporting.

In order to further explore whether there are strong correlation between the above-mentioned metaphors, this paper makes a Pearson correlation analysis of the word ratio of these metaphors, and

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the results are shown in Table 2.

Table 2: Correlation analysis of various metaphors

Metaphor category	War	Architecture	Journey	Machine	Examination	Up-down
War	1.000	0.038	0.108	-0.003	0.043	-0.071
Architecture	0.038	1.000	0.252	0.308	0.029	0.183
Journey	0.108	0.252	1.000	0.255	0.045	0.129
Machine	-0.003	0.308	0.255	1.000	-0.012	0.127
Examination	0.043	0.029	0.045	-0.012	1.000	0.028
Up-down	-0.071	0.183	0.129	0.127	0.028	1.000

As can be seen from Table 2, architecture metaphor and machine metaphor have the highest correlation, with a correlation of 0.308 but no more than 0.5, while other metaphors have low correlation, among which machine metaphor, up-down metaphor and war metaphor are negatively correlated, thus showing that there is no strong correlation among these metaphors.

All kinds of metaphors play their respective roles in epidemic reporting, but what is the relationship between various metaphorical words and epidemic words? For further exploration, this paper will conduct modeling analysis. In this paper, OLS regression is carried out on the word ratio of epidemic words and various metaphors, and seven models of metaphors and epidemic words are established. The models are as follows and their regression results are shown in Table 3.

$$\text{Covid} = \alpha_i + \beta_i X_i + \varepsilon_i \quad (4)$$

Covid represents the word ratio of epidemic words, $\beta_i$is the estimated parameter of each model, and X_i is the word ratio of various metaphorical words.

Table 3: OLS regression between metaphor and epidemic words

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
War metaphor	0.434***						0.450***
	(46.664)						(50.548)
Architecture metaphor		-0.327***					-0.275***
		(-30.029)					(-25.731)
Journey metaphor			-0.494***				-0.338***
			(-14.196)				(-10.317)
Machine metaphor				-0.501***			-0.195***
				(-18.413)			(-7.483)
Examination metaphor					-0.365***		-0.410***
					(-5.154)		(-6.569)
Up-down metaphor						-0.532***	-0.245***
						(-18.683)	(-9.421)
Consts	12.259***	20.356***	18.051***	18.374***	16.697***	18.253***	18.096***
	(76.229)	(108.207)	(101.425)	(106.123)	(113.933)	(108.254)	(84.425)
R^2	0.138	0.062	0.015	0.024	0.02	0.025	0.228

Note: * * * means significant at 99%, * * means significant at 95%, and * means significant at 90%

As can be seen from Table 3,the regression coefficients of word ratio of various metaphorical words and epidemic words are significant at the level of 99%, while only the model coefficients of war metaphor are significantly positive, which indicates that there is a positive influence between war metaphor and epidemic words, that is, the more war metaphor appears, the more epidemic words will follow. However, metaphors such as architecture, journey, machine, examination and up-down have a negative relationship with the occurrence frequency of epidemic words, that is, the more metaphorical words mentioned above, the less epidemic words will be.

In view of the fact that this paper focuses on the changes of metaphors in pandemic and post-pandemic reports, and from the above descriptive statistical results, the mean values of word ratio of war and architecture metaphors are the highest, so the two metaphors have the greatest influence on epidemic reports. Therefore, this paper will focus on the analysis of the impact of the two metaphors in the pandemic and the post-pandemic reports. According to this, this paper constructs the Dummy

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variables and Interaction, firstly, it constructs a dummy variable of Dummy1 with 0 and 1, that is, set it to 1 before April 28th, 2020, and 0 after this date. Similarly, this paper constructs a dummy variable of 0 and 1 of Dummy2, that is, set it to 0 before April 28th, 2020, and 1 after this date. After that, we take Dummy1 and Dummy2 as Interactions with metaphors of war and architecture respectively, and obtain metaphorical variables of war and architecture in the pandemic and the post-pandemic eras. The results are as follows:

$$Covid = \alpha_i + \beta_i(X_i * Dummy_i) + Control\ Var_i + \varepsilon_i \quad (5)$$

Covid represents the word ratio of epidemic words, β_i is the estimated parameter of each model, X_i is the word ratio of war metaphor and architecture metaphor,$Dummy_i$ is the dummy variable of the pandemic and post-pandemic eras.

Table 4: Regression comparison results of war metaphor and architecture metaphor

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
War*pandemic	0.587***						0.554***	
	(62.577)						(60.785)	
War*post-pandemic		-0.245***						-0.134***
		(-14.618)						(-7.905)
Architecture*pandemic			0.159***		0.125***			
			(9.171)		(7.957)			
Architecture*post-pandemic				-0.416***		-0.351***		
				(-37.847)		(-32.589)		
War					0.438***	0.438***		
					(48.031)	(49.805)		
Architecture							-0.216***	-0.243***
							(-20.877)	(-20.679)
Journey					-0.479***	-0.292***	-0.171***	-0.102***
					(-14.532)	(-9.033)	(-5.443)	(-2.843)
Machine					-0.365***	-0.156***	-0.151***	-0.225***
					(-14.173)	(-6.074)	(-5.999)	(-7.951)
Examination					-0.448***	-0.412***	-0.362***	-0.268***
					(-7.034)	(-6.692)	(-6.010)	(-3.946)
Up-down					-0.349***	-0.250***	-0.276***	-0.374***
					(-13.211)	(-9.753)	(-10.973)	(-13.241)
Consts	13.544***	17.682***	15.953***	19.924***	15.970***	17.599***	18.410***	22.506***
	(100.800)	(108.947)	(102.948)	(122.425)	(75.326)	(86.282)	(91.306)	(102.746)
R^2	0.223	0.015	0.006	0.095	0.194	0.249	0.278	0.087

Note: * * * means significant at 99%, * * means significant at 95%, and * means significant at 90%

It can be seen from Table 4 that war metaphor in pandemic era is significantly positively related to epidemic category, that is, for every 0.587 unit of word ratio of war metaphor, the epidemic category will also increase by one unit. However, in the post-pandemic era, war metaphor has a significant negative correlation with epidemic category, which may be due to the obvious control of the epidemic, so the increase of war metaphor vocabulary will no longer lead to the increase of epidemic words. On the contrary, the increase of war metaphor vocabulary will reduce epidemic words, and the same situation also appears in architecture metaphor vocabulary. When we control the words of journey, machine, examination and up-down metaphors, the results are still stable. It can be seen that the word frequency of war metaphor and architecture metaphor has a positive relationship with the word frequency of epidemic category in the pandemic era, while they have a significant negative relationship in the post-pandemic era. On this basis, this paper makes a further analysis of the total trend of monthly word ratio of metaphors in pandemic and post-pandemic reports, and the results are shown in Figure 1.

It can be seen from Figure 1 that journey metaphor, machine metaphor, examination metaphor and up-down metaphor account for less than 5 ‰. During the pandemic era, war metaphor decreased rapidly with the reduction of word ratio of words in epidemic reports, indicating that China had made remarkable achievements in fighting the epidemic, and its wartime state gradually eased. However, in the post-pandemic era, the word ratio of epidemic category and war metaphor showed a slow

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downward trend, but the word ratio of war metaphor increased slightly, which may be related to the local outbreak of the epidemic. War metaphor can call on all people to fight against the epidemic together, indicating that China has not slackened its epidemic prevention and control. However, the word ratio of architecture metaphor has been fluctuating and rising, which is closely related to construction work.

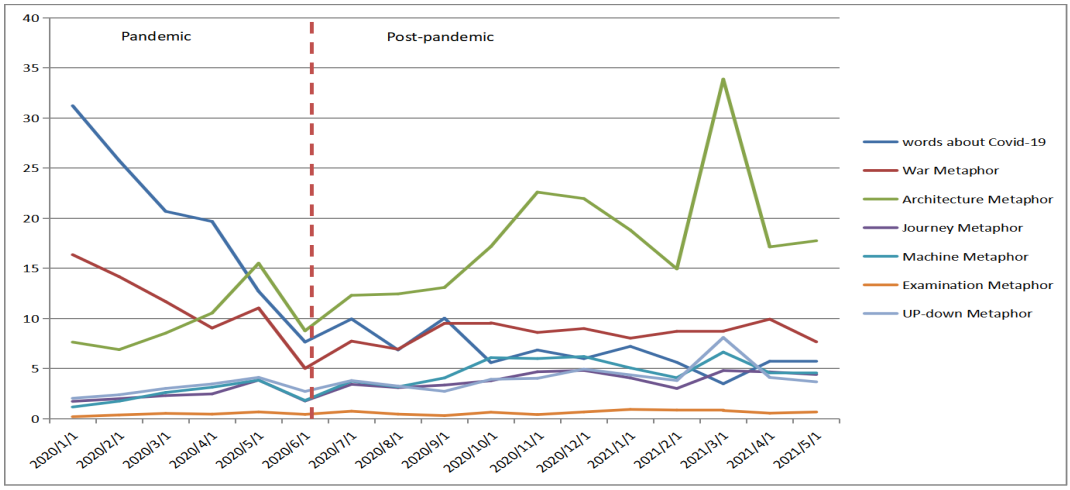

Figure 1: Monthly word ratio of metaphors

4. Conclusion

Under the CMA mode, this paper builds a corpus based on TF-IDF algorithm and Python3.7 software, and makes a corresponding model analysis on the relationship between epidemic words and metaphors in People's Daily. Through descriptive statistical analysis of the frequency of related metaphorical words in epidemic reports, this paper concludes that war metaphor and architecture metaphor account for a large proportion in epidemic reports, which means these two subjects are the most concern in China during the epidemic. According to the regression results of war metaphor and architecture metaphor in pandemic and post-pandemic reports, the word frequency of these two metaphors has a positive relationship with the word frequency of epidemic vocabulary during the pandemic era, while it has a significant negative relationship in the post-pandemic era. From the above results, it can be seen that in the pandemic era, the Chinese government focused on fighting the epidemic, while in the post-pandemic era, it turned to economic development. After that, this paper makes a further analysis of the total trend of monthly word ratio of various metaphors, and finds that architecture metaphor shows a significant upward trend in the post-pandemic era.

References

[1] Ana, O., K. Waitkuweit & M. Hernandez. (2017) Blood, soil, and tears: conceptual metaphor-based critical discourse analysis of the legal debate on US citizenship[J]. Journal of Language and Politics, 2, 149-175.
[2] Poppi, F. & E. Urios-Aparisi. (2018) De corporibus humanis: metaphor and ideology in the representation of the human body in cinema[J]. Metaphor and Symbol, 4,295-314.
[3] Silaski, N. & T. Durovic. (2017) Saving the euro-a multimodal analysis of metaphors depicting the Eurozone crisis [J]. Iberica, 33,125-146.
[4] Xia SZ, Lin ZJ. (2020) Studies of Critical Metaphor in China: Present State and Future Prospect[J]. Foreign Languages Research, 1,36.
[5] Aristotle. Rhetoric and Poetics[M]. New York: The Modern Library, 1954.
[6] Richards, I.A. The Philosophy of Rhetoric[M]. New York: Oxford University Press, 1936.
[7] Lakoff, G. & Johnson, M. Metaphor We Live by[M]. Chicago: The University Chicago Press, 1980.
[8] Wu JG, Gong C, Song Y. (2020) Investigating Political Discourse from the Perspective of CMA: A Case Study on Trump's Speeches[J]. Journal of Foreign Languages, 3,81.
[9] Fowler. R., Hodge, R., Kress, G., & Trew, T., Language and Control [M]. London: Routledge & Kegan Paul, 1979.
[10] Ding JX, Liao YQ. (2001) A Review of Critical Discourse Analysis[J]. Contemporary Linguistics, 4,305-310.

ISSN 2706-6827 Vol. 4, Issue 9: 71-77, DOI: 10.25236/IJFS.2022.040910

[11] Lakoff, G. Whose Freedom: The Battle over America's Most Important Idea[M]. New York: Farrar, Straus and Giroux, 2006.
[12] Wang SH, Zhang W. (2017) A Study of Constructing Metaphorical Framing Model of American Political Discourses: The Cases of Bush's and Obama's Speeches on Environmental Protection[J]. Foreign Languages in China,2, 54-59.
[13] Charteris-Black J. Corpus Approaches to Critical Metaphor Analysis [M]. New York: Palgrave Macmillan, 2004.
[14] Ji YH, Chen Y. (2007) Critical Metaphor Analysis: A New Method of Critical Discourse Analysis[J]. Journal of Xiamen University (Arts &Social Sciences), 6,42-48.
[15] Shu DF. Studies in Metaphor[M]. Shanghai: Shanghai Foreign Language Education Press, 2000.
[16] Hu ZL. Metaphor and Cognition[M]. Beijing: Peking University Press, 2004:11.