

Synergizing Topic Modeling in Analyzing Media Discourse on China's Dual-Carbon Commitment and Actions

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Abstract

The media discourse surrounding climate change has evolved beyond issues of science and public health, becoming increasingly politicized and intertwined with broader ideological and geopolitical dynamics. While existing research has examined how Chinese state-run media constructs climate narratives, few studies have explored such discourse across national and ideological borders to understand how China's dual-carbon commitment is discursively represented. To bridge this gap, this study examines news reports between September 22, 2020 and December 31, 2023 from three globally influential newspapers: *People's Daily* (PD), *the Guardian* (TG), and *the New York Times* (NYT). Combining topic modeling and discourse-historical analysis, this study investigates both recurring themes and the discursive strategies employed to portray China's dual-carbon commitment. Findings reveal that while all three newspapers highlighted multilateral cooperation, they differed significantly in framing China, its climate actions and responsibilities: PD emphasized China's low-carbon achievements primarily through top-down narratives and framed its practice as aligned with global well-being, whereas TG and NYT underscored inconsistencies between China's pledge and actions mainly through selective statistics and anecdotal critiques, reflecting distinct ideological and geopolitical standpoints. In addition to explicit strategies such as nomination and predication, this study has also identified patterns of "concealment" across the corpora, where certain issues were downplayed or omitted to influence public attitudes and perceptions in directions that support each outlet's particular agenda and strategic interests. This study contributes to the field of environmental communication by illustrating how media discourse reflects and reinforces broader power relations, ideological divides, and national interests.

Keywords

China's dual-carbon commitment, climate change, media discourse, topic modeling, discourse-historical analysis

Introduction

In the global fight against climate change, China plays an important role due to its large carbon emissions and rapid economic development. Since surpassing the United States (US) as the world's largest carbon emitter in 2006 (Yu et al., 2023), China's role has become increasingly significant. Zhang and Orbie (2021) divided China's climate strategic narratives into three distinct stages, which were marked by three international climate conferences: the 2009 Copenhagen, the 2011 Durban, and the 2015 Paris Climate Conferences. Among the three phases, the post-Paris stage signifies China's transition from a passive participant to a "torchbearer" in global climate governance (p. 11), particularly after the US withdrawal from the Paris Agreement. At the 75th

United Nations (UN) General Assembly on September 22, 2020, China made an ambitious dual-carbon commitment to peak its carbon emissions by 2030 and achieve carbon neutrality by 2060. Embedded in China's national development blueprint, this pledge has since

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influenced a wide range of environmental policies and international collaborations. Carbon peak means that China's carbon emissions will peak, stabilize and then begin to decline. Carbon neutrality refers to achieving a balance between carbon emissions and absorption from the atmosphere, ultimately establishing a green, low-carbon economy. This environmental initiative represents China's proactive steps toward moving beyond an economy-driven model to embrace sustainable development and its commitment to addressing climate challenges. This dual-carbon commitment is significant not only for its ambitious goals but also for its potential impact on the global warming mitigation process. Consequently, it has drawn considerable attention and great international scrutiny, leading to consistent coverage in mainstream media worldwide. How this commitment was reported, interpreted, and framed in different media outlets reflects broader geopolitical and ideological dynamics. Investigating how Chinese and Western media discursively construct China's dual-carbon commitment helps to understand different perceptions of China's environmental policies and actions and their particular ways of representing this issue.

News media are widely recognized as an essential channel in arousing the public's awareness of contemporary environmental issues. Given that climate change is a gradual and accumulative process, the way news media portray it can largely influence the public's understanding (Xie, 2015). Nonetheless, climate change in media discourse is not merely a matter-of-factness, but socially constructed and politically motivated (Demeritt, 2002), and the climate discourse has transformed from a scientific perspective to a political one (Su & Hu, 2021). When ordinary citizens lack specific knowledge and are unable to identify the media's real intentions, they may be misinformed and subsequently become the "victims of manipulation" (Van Dijk, 2006, p. 361). Therefore, examining media discourse on China's dual-carbon goals not only contributes to research on environmental communication, but also reveals the ways in which ideology, geopolitical positioning, and power relations shape media language.

China's transitional role in global climate governance has sparked scholars' interests in examining China-related media discourse. For instance, Pan et al. (2021) conducted discourse analysis based on reports from *People's Daily*, China's party newspaper, whose mission is to provide moral guidance and convey the government viewpoints to the public in China (Zhao, 2012). Their diachronic analysis of news data reveals China's underlying development concepts and framings of climate change. Developing from this, Yu et al. (2023) explored how Chinese English-language news media, targeting a different readership (e.g., international readers), construct discourses of resistance in climate change

mitigation. This study sheds light on how state-owned news outlets employ language to build China's national image and illuminate the geopolitical and sociocultural complexities. There are also studies comparing portrayals of climate change across media in different countries. For example, Xie (2015) employed both generic and issue-specific frames to examine how the two "big chimneys" represent climate change. The study reveals the commonalities and differences in the two countries' discursive constructions as well as the underlying socio-political reasons.

Examining studies regarding climate change within the context of China reveals that most previous research has centered on: (1) how China presents climate-related issues, such as China's climate strategic narratives (Zhou & Qin, 2020), trending topics in China's public discourses (Liu & Wallace, 2023), and government-released policy discourse analysis (Jiang & Raza, 2023). (2) How other countries perceive China's climate issues, such as portrayal of air pollution in China (Liu & Li, 2017), and framing of China's national image (Yang & Wang, 2023). (3) How China and other countries narrate climate change respectively, examining underlying sociopolitical factors (Xie, 2015), framing responsibility (Liu & Huang, 2023), as well as values and voices conveyed in different media discourses (Huan, 2024). However, few studies have explored China's recent development of post-Paris climate discourse, particularly the historic dual-carbon initiatives and actions, or compare how this issue is represented across different socio-political contexts. To address this issue, the current study investigates the media discourses on China's dual-carbon commitment and actions. By comparing how this issue is represented in China and Western countries, this study helps to reveal discursive features that might otherwise go unnoticed and sheds light on how different ideological, geopolitical, and sociocultural standpoints shape media representations of China's environmental policies. It contributes to theoretical discussions in environmental communication such as the framing of climate responsibilities and the interplay between climate-related media discourse and underlying geopolitical and ideological dynamics. Given that public and political reactions to China's pledge vary considerably among domestic and international audiences, this comparative study is especially significant. It specifically addresses the following research questions:

- (1) What are the themes conveyed by different newspapers regarding China's dual-carbon commitment and actions?
- (2) What discursive strategies are employed in their theme articulation, and how do these strategies reflect different ideological and geopolitical standpoints in environmental communication?

This study employs a different methodological approach. Most current studies rely on pure qualitative analyses or corpus-based methods such as word frequency, collocates, and concordances (e.g., Liu & Huang, 2023; Yu et al., 2023). While corpus-assisted methods facilitate the extraction of focal and distinctive information, they primarily focus on lexical relationships and may lead to simplification (Murakami et al., 2017). Another concern for discourse analysts is how to avoid cherry-picking examples that fit assumptions (Baker, 2006). In recent years, topic modeling, which can automatically identify topics in a corpus without pre-set hypotheses (Blei, 2012), has gained traction in operationalizing discourse analysis (Jacobs & Tschötschel, 2019) as a relatively efficient and objective method (Murakami et al., 2017).

The present study starts with exploring the aboutness of each corpus through the extraction of the most frequent bigrams and latent topics, and then proceeds to analyze the specific discursive strategies employed by mainstream newspapers in China, the UK, and the US, along with their underlying ideological and geopolitical factors.

Methodology

Data Source

The comparative analysis is based on English-language news reports from three news outlets: *People's Daily* (PD) in China, *The Guardian* (TG) in the UK, and *The New York Times* (NYT) in the US. These three newspapers were selected for the following reasons. The English version of PD, positioned as China's propaganda missionary to outsiders, serves the primary function of shaping perceptions about China among international readers (Brady, 2015). It offers firsthand information on China's policies and practices and is widely read by those who seek a deeper understanding of Chinese politics (Velker, 2011); *The Guardian* is known for its left-leaning and critical journalism, with its readers primarily comprising the elite and middle class (Akpojivi & Aiseng, 2022); *The New York Times* is also renowned for its liberal viewpoint and impacts on shaping global news agendas (Liu & Huang, 2023), ranking among the most widely read newspapers in the country (Chen & Li, 2023). A more important consideration is that these outlets provide extensive coverage of China's dual-carbon commitment and related actions. In contrast, upon conducting keyword searches within certain timeframes on the official websites, it was observed that right-leaning or conservative news resources, such as *The Washington Times* and *New York Post* in the US, and *The Daily Telegraph* and *The Times* in the UK, have provided very limited coverage of this topic, making them less suitable for

Table 1. Details of the Two Corpora.

Corpus	PD corpus <i>People's Daily</i>	TG-NYT corpus	
		<i>The Guardian</i>	<i>The New York Times</i>
Text	277	57	44
Token	149,887	44,450	51,302
Total	149,887	95,752	

comparative analysis in the present study. While the dataset is relatively small, the selected newspapers represent highly influential media outlets in their respective national and ideological contexts. This design enables a focused cross-national comparison, complemented by topic modeling to enhance the objectivity and transparency of theme identification.

Data Collection

News articles containing the keywords “China,” “carbon peak,” and “carbon neutral(ity)” were extracted from the electronic database *Factiva*. The articles spanned from September 22, 2020, the day China initially pledged its dual-carbon goals at the UN conference, to the end of the 2023 when the data collection ended. This time frame was chosen to capture media coverage from China's initial announcement of the dual-carbon commitment through over 3 years of subsequent responses to China's climate policies and related actions. Such a range ensures sufficient data for topic modeling (see Section “Topic Modeling”), which aims to identify dominant themes in a large volume of media discourse. It also supports the application of critical discourse analysis, particularly discourse historical analysis (see Section “Analytical Framework”), by providing rich contextual data for analyzing themes, discursive strategies, and their linguistic realizations, thereby helping to uncover the ideologies behind the particular ways of representations in media discourse.

These articles underwent thorough examination to remove irrelevant and oversimplified content, video-based content, and duplicates. After this process, there were 277 articles (149,887 tokens) in PD, 57 articles (44,450 tokens) in TG, and 44 articles (51,302 tokens) in NYT, where tokens refer to individual word units. These data sources were subsequently compiled into two corpora, the PD corpus and the TG-NYT corpus (Table 1).

TG and NYT were combined because both are left-leaning broadsheet newspapers with similar media markets (Hallin & Mancini, 2004). This grouping is also supported by empirical evidence obtained from the word embedding analysis, which is a type of machine learning technique. Using algorithms such as Word2Vec, the

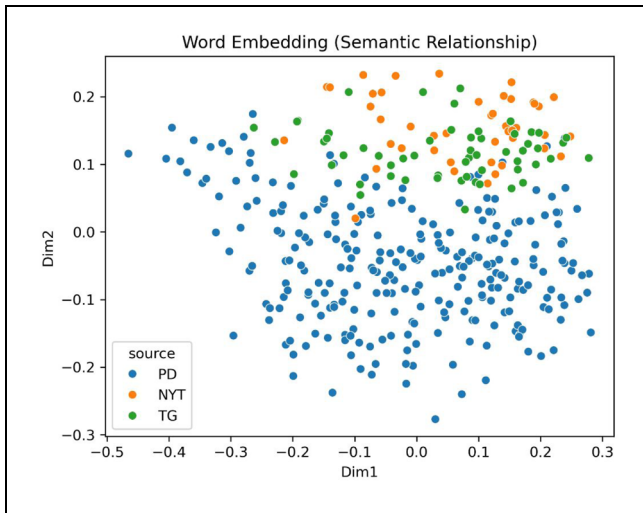


Figure 1. Word embedding result (semantic relationship).

word embedding analysis captures semantic relationships between words by analyzing their context in a corpus (Mikolov et al., 2013), allowing for the detection of semantic similarities and differences between corpora. In Figure 1, the dots represent news articles in the two corpora (PD in blue, TG in green, and NYT in orange). The considerable semantic overlap between TG and NYT supports their combination.

Topic Modeling

Topic modeling is based on unsupervised algorithm which enables the automatic identification of recurring co-occurrences in a document without any predetermined hypotheses (Törnberg & Törnberg, 2016). The most commonly-used algorithm in topic modeling is Latent Dirichlet Allocation (LDA; Jacobs & Tschötschel, 2019), which is a powerful technique for uncovering hidden topics throughout documents (Blei, 2012). LDA regards documents as a mixture of topics, which are represented as distributions over fixed terms. Each document exhibits these topics with varying proportions, reflecting the heterogeneous nature of a corpus (Blei & Lafferty, 2009). Topic modeling can help identify latent topics in a collection of documents, assign words to topics, and provide a comprehensive overview of a given corpus.

It should be noted that topic modeling is merely a tool for initially exploring topic distributions, and the analyst needs to determine the meaning of a topic by considering the context and the way discourses are constructed through language (Jacobs & Tschötschel, 2019). Using the corpus analytic tool *AntConc* (Anthony, 2024), this article centers on the analysis of keywords in each LDA topic, with the assumption that these keywords inform the representations of the issue being discussed and

provide insights into the nature of the corpora (Murakami et al., 2017). The concordances of these keywords are further examined to explore their potential contributions to the discursive constructions of China's dual-carbon commitment and actions.

Analytical Framework

The discourse-historical approach (DHA) is one of the significant analytical frameworks in critical discourse analysis (CDA), which explores the relationships between social structure, power, ideology, and language (Catalano & Waugh, 2020). It is characterized by its emphasis on historical context, triangulation of theories and methods, and the availability of results for the public (Catalano & Waugh, 2020). According to Reisigl and Wodak (2016), the DHA is three-dimensional: (1) the identification of specific topics or themes; (2) the analysis of discursive strategies; (3) the examination of contextual linguistic realizations. This means that text analysis begins with detecting overarching themes and related subtopics. Then, it proceeds to examine the discursive strategies employed, which reflect the communicative and ideological intentions of the text producers. The discursive strategies include nomination, predication, argumentation, perspectivization, intensification/ mitigation. Finally, the analysis focuses on linguistic, pragmatic, and rhetorical devices that realize these strategies in context. The DHA is employed in this study because it draws upon textual and text-external factors (Yu et al., 2023), aligning with this articles' exploration of dominant political and sociocultural factors for various discursive constructions. Since the discursive strategies simultaneously occur with specific linguistic realizations, this study explicates their respective discursive strategies and primary socio-political variables while decoding their linguistic realizations.

To implement the DHA analytical framework in light of the empirical data, this study identifies the five discursive strategies proposed by Reisigl and Wodak (2016) as follows: (1) Nomination: this study captures how social actors (e.g., countries, governments, institutions) are labeled or referred to, such as "climate leader," "participant," or "largest emitter." (2) Predication: this study focuses on the attributes and actions ascribed to those actors, including adjectives and verbs that convey evaluation, such as "ambitious," "irresponsible," or "undermined." (3) Argumentation: this study identifies the reasoning mechanisms, or *topoi*, which are used to support or oppose claims (e.g., *topos* of comparison or *topos* of numbers). (4) Perspectivization: this study traces stances using modal verbs, quotation sources, or markers of certainty/uncertainty. (5) Intensification/ Mitigation: this study analyzes how language strengthens or

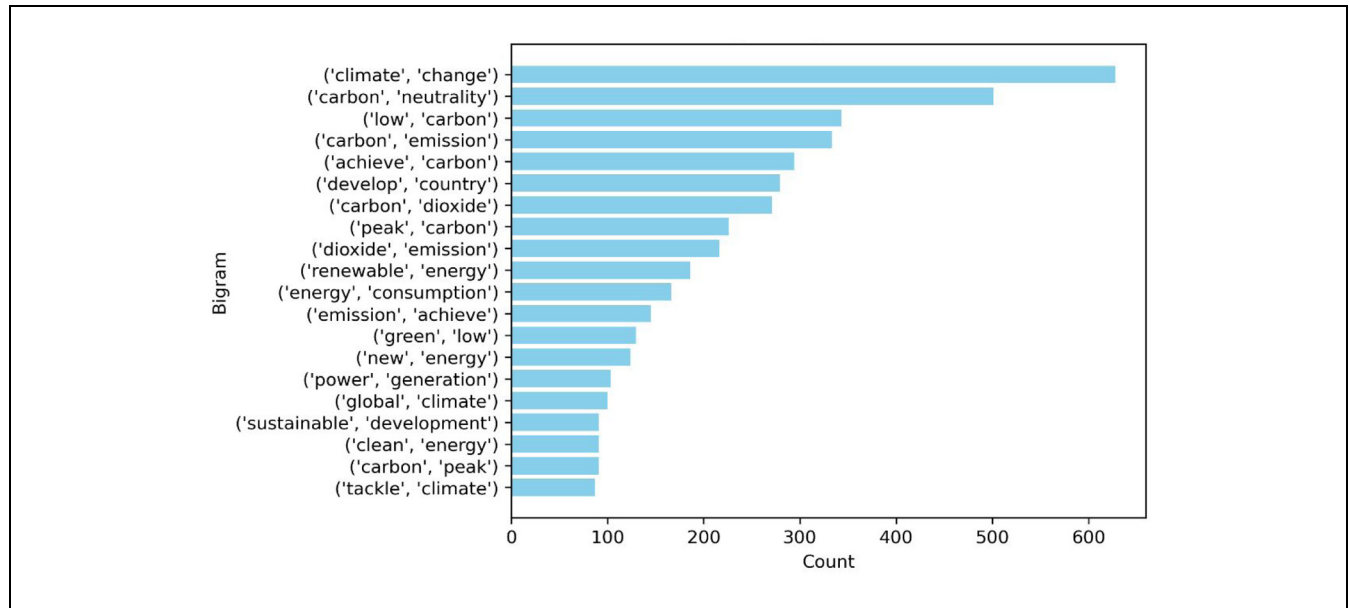


Figure 2. Top 20 bigrams in PD.

downplays claims, often through the use of evaluative adverbs, repetition, or contrastive framing. The identification of discursive strategies was operationalized through a triangulation of topic modeling results and close textual reading, which helped to reveal recurring themes and their linguistic realizations.

There are multiple advantages in synergizing topic modeling and CDA. CDA has been criticized for its inherent methodological shortcomings and limited generalizability (Breeze, 2011), partly due to the potential cherry-picking to fit assumptions (Baker, 2006). Leveraging topic modeling enables this study to explore the corpora without pre-determined assumptions, enhancing the saliency of discursive patterns which may go unnoticed or be taken for granted during manual analysis. Topic modeling can also statistically demonstrate the data's representativeness, ensuring replicability and validating subsequent qualitative interpretations (Jacobs & Tschötschel, 2019). Conversely, while topic modeling offers a macro-level identification of prominent topics, CDA complements it by enabling micro-level interpretation of discursive strategies and ideological positioning embedded in media language.

Findings and Analysis

Analysis of Top Frequent Bigrams and Latent Topics

Top 20 Bigrams. All the natural language processing was conducted in Python. As there are many two-word collocations and technical terms such as “climate change” and

“carbon emission” in both corpora, the most frequent bigrams, rather than single words, were extracted. Figures 2 and 3 present the top 20 frequent bigrams in each corpus, providing an initial exploration of their lexical foci.

The initial exploration of the top bigrams reveals interesting findings. News articles in PD prefer to emphasize China's low-carbon developments and achievements, as evidenced by the frequency of terms such as “low carbon” (343), “achieve carbon” (294), “emission achieve” (145), “green low[carbon]” (130). Contrastingly, news reports in TG-NYT focus more on China's dependence on dirty energy, with terms such as “coal fire” (114), “power plant” (104), and “fire power” (95). TG-NYT also emphasizes the severity of climate change by using terms such as “global warming” (60), and “climate crisis” (54), and repeatedly reminds readers of China's role as the largest carbon emitter in the world, as evidenced by the collocate “world large[st]” (45). Despite their different lexical foci, both corpora emphasize the distinction between developing and developed countries, as evidenced by the phrase “develop[ing/ed] country,” but it is more apparent in PD (279) than TG-NYT (63).

The above findings indicate that the two corpora differ significantly in their reporting foci. To further explore the aboutness of the corpora and uncover latent thematic structure (Blei, 2012), LDA topic modeling was implemented. This approach offers a more comprehensive understanding of each corpus by identifying hidden topics that may go unnoticed when examining only the top bigrams.

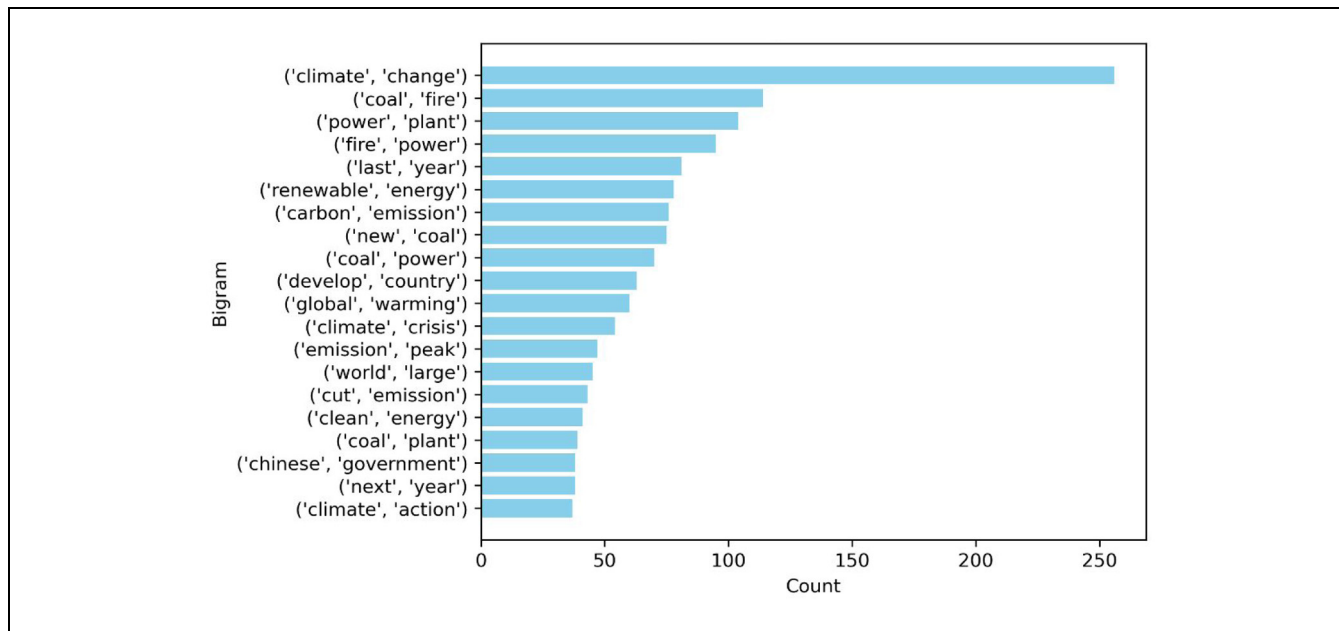


Figure 3. Top 20 bigrams in TG-NYT.

LDA Implementation. The raw texts in this study underwent careful preprocessing, including removing stop words (e.g., articles, pronouns, prepositions, conjunctions), non-word characters, punctuations, digits, and lemmatizing the remaining texts. This data-cleaning process aims to remove noises and elements that carry little meaningful information, thereby enhancing the algorithm performance. In determining the number of topics, this article follows the common practice of employing perplexity and coherence scores as metrics for evaluating the quality of a topic model (Brown et al., 2024; Korenčić et al., 2018). Perplexity measures the goodness of a fit by evaluating “the likelihood of held-out data to be generated from the underlying distributions of the model” (AlSumait et al., 2008, p. 6). A lower perplexity indicates that the model is better at predicting this held-out data. Coherence pertains to topic interpretability, measuring the degree of semantic similarity between words in a topic (Korenčić et al., 2018). A higher coherence score means that words in each topic are more semantically related and tend to co-occur in the same contexts. To enhance topic interpretability, the number of topics was set to 10 for PD, and 6 for TG-NYT. This decision was based on their relatively low perplexity scores (PD: .00088; TG-NYT: .00067) and the highest coherence scores (PD: .46; TG-NYT: .43). Using the pre-set optimal numbers of topics, the LDA algorithm generated topics and the ten most representative keywords, along with their weights indicating the probability of association with each topic (Table 2). A higher weight suggests a stronger association, meaning the word is

more characteristic of that topic. For example, the word “climate” appears in several topics but with varying weights, indicating its varying degrees of centrality across these topics.

Given the concern that interpreting topics based solely on keyword lists can be subjective (Bednarek, 2024), this study followed Brookes and McEnery’s (2019) procedures that involve inspecting topic keyword lists and conducting concordance searches of representative texts with high topic proportions. This process enables more contextually grounded manual labeling for each topic and facilitates the theme extraction.

The latent topics identified by the LDA model reveal that PD foregrounds various facets of China’s carbon-neutral endeavors and achievements, such as biodiversity/ecological protection, the development of renewable energy, and the popularization of electric vehicles. PD also tends to stress China’s status as a developing country. In contrast, TG-NYT focuses on China’s heavy dependence on coals, large coal-fired emissions, and climate protests in China. Despite their different focuses, both corpora highlight the importance of multilateral cooperation. The topic modeling results not only triangulate the findings of the previous section—as the top frequent bigrams revealed the emphasis on China’s low-carbon endeavors in PD and the large dependence on coals in TG-NYT—but also extend these findings. The LDA analysis makes salient additional information such as the emphasis on dynamic diplomatic relations in PD, China’s climate protests in TG-NYT, and their common advocacy for global cooperation.

Table 2. Topic Labels and Keywords in the Two Corpora.

PD corpus (149,887 tokens)			TG-NYT corpus (95,752 tokens)		
Topic	Label	Keywords (with weights)	Topic	Label	Keywords (with weights)
1	Biodiversity conservation	Biodiversity (.033), conservation (.025), protect (.023), nature (.019), park (.014), protection (.014), earth (.011), mountain (.010), lake (.009), river (.009)	1	Coal-powered energy	Energy (.086), coal (.062), power (.041), capacity (.016), demand (.015), official (.015), meet (.015), local (.015), electricity (.013), plant (.012)
2	Ecological protection	Carbon (.018), say (.016), water (.013), ecological (.013), forest (.010), environment (.010), pollution (.008), area (.008), year (.007), day (.007)	2	People's concern and coal-fired bitcoin mining	People (.004), environmental (.003), bitcoin (.003), mining (.003), many (.002), export (.002), coal (.002), concern (.002), trump (.002), region (.002)
3	Renewable energy	Energy (.057), power (.040), renewable (.016), percent (.015), solar (.015), year (.015), wind (.013), generation (.013), project (.012), carbon (.012)	3	Energy-price control	Say (.013), year (.008), government (.007), climate (.007), price (.006), change (.006), city (.005), oil (.005), make (.005), country (.004)
4	Green and low-carbon development	Carbon (.069), emission (.028), energy (.028), green (.018), percent (.014), year (.013), say (.013), low (.013), neutrality (.013), achieve (.012)	4	Coal-fired emission	Climate (.025), say (.020), emission (.016), country (.013), coal (.013), year (.012), world (.010), global (.009), change (.008), new (.007)
5	New energy vehicles	Oem (.020), nev (.015), consumer (.007), customer (.007), service (.005), user (.005), car (.004), powertrain (.003), subsidy (.003), software (.003)	5	Climate protest	Hotel (.003), parent (.003), protest (.002), school (.002), feel (.002), vigil (.002), fish (.002), police (.002), guilin (.002), plastic (.002)
6	Carbon-neutral achievements	Carbon (.041), say (.026), neutrality (.020), cooperation (.017), change (.015), climate (.015), achieve (.011), low (.009), green (.009), technology (.008)			
7	Global development and cooperation	Climate (.000), country (.000), say (.000), year (.000), world (.000), development (.000), change (.000), carbon (.000), cooperation (.000), global (.000)	6	Contradiction and cooperation	Comb (.002), transfer (.002), gw (.001), peaking (.001), giant (.001), rethink (.001), timing (.001), integrate (.001), contradict (.001), cooperation (.001)
8	Dynamic relations	Relation (.013), resume (.006), confrontation (.003), trip (.002), sister (.002), dismiss (.002), wise (.002), proliferation (.002), terrorism (.002), friction (.002)			
9	Multilateral relations	Merkel (.004), sheet (.003), attack (.003), livable (.003), visible (.003), Washington (.002), adhere (.002), ill (.001), facet (.001), superpower (.001)			
10	Developing status	Climate (.033), country (.026), say (.021), change (.020), global (.015), develop (.015), carbon (.011), world (.011), development (.010), make (.009)			

Note. "Weight" refers to the word's probability in a topic distribution, with higher weights indicating stronger associations between the word and the topic.

Examining the concordances of the keywords in each topic from representative texts with high topic proportions reveals three recurring themes in PD: (1) China's efforts in fulfilling its dual-carbon goals (Topic 1–6); (2) the advocacy for multilateral cooperation (Topic 7–9); (3) emphasis on China's role as a developing country (Topic 10). In contrast, the most salient themes in TG-NYT are: (1) China's inconsistency between its climate commitment and actual actions (Topic 1–5); (2) the importance of global cooperation (Topic 6). While both corpora foreground global collaboration in climate change mitigation, they differ sharply when portraying China, its climate actions and its responsibilities (which relate to its developing status).

Discursive Strategies—A Critical Discourse Analysis

Based on the identified themes, this section reports the discursive strategies both corpora utilized for theme articulation, and links these discursive themes and strategies to a broader geopolitical and sociocultural context.

Common Advocacy in the Two Corpora. Both corpora highlight the necessity of multilateral cooperation, especially focusing on the US-China dialogue. Being the two largest economies and carbon emitters in the world, the US and China's willingness and capacity to strengthen collaborations exert an important impact on combating the global enemy of climate change (Jiang, 2021). The news reports in PD foreground China's willingness to cooperate with the US. For example:

Example 1: Maintaining China-U.S. dialogue and cooperation on climate change is of great significance to both countries and the whole world, ... China stands ready to strengthen communication, deepen cooperation with the US and jointly advance climate governance so as to make greater contribution to human development. (Topic 7)
(PD, 2023/09/20)

In a similar vein, TG-NYT also underscores the urgency of the US-China cooperation, especially during Joe Biden's administration, for example:

Example 2: "We need genuine cooperation," Mr. Kerry said in an interview. "China and the United States are the two largest economies in the world and we're also the two largest emitters. It's clear that we have a special responsibility to find common ground." (Topic 6)
(NYT, 2023/07/06)

Both corpora frame China and the US as key actors in global climate governance, utilizing both nomination and predication strategies. In NYT, nomination is evident in John Kerry's reference to the two nations as "the

two largest economies" and "the two largest emitters," emphasizing their global stature and shared responsibility. The excerpt underscores the two countries' "special responsibility," conveying a sense of urgency and mutual accountability, and framing them as major stakeholders in addressing global climate challenges. PD, on the other hand, primarily employs predication strategies, portraying China as a proactive collaborator. This is evidenced by verb phrases such as "stands ready to strengthen communication" and "jointly advance climate governance," which highlight China's willingness to cooperate and its constructive role in the potential US-China climate cooperation. While both advocate cooperation in addressing climate challenges, the term "cooperation" is discursively framed in distinct ways. In PD, "cooperation" is constructed as a moral obligation and a global responsibility, deeply rooted in the collectivist values and the concept of a shared future for all humanity (see Example 3). In contrast, in the TG-NYT corpus, particularly in NYT, "cooperation" is more often constructed as a conditional, strategic, and interest-driven choice, closely tied to geopolitical tensions (see Example 4).

Example 3: Facts have again proven that cooperation and dialogue between China and the United States beat friction and confrontation. Sound cooperation between the two countries would be the bedrock of world peace and the booster of global development. (Topic 8)
(PD, 2020/12/25)

Example 4: It [climate change] is a genuinely possible area of cooperation. The danger is, if the United States dithers and fails to get its house in order and China solidifies its market position in clean energy. Then we, the United States, lose the opportunity to benefit our economy and our workers from the clean energy economy. (Topic 6)
(NYT, 2020/11/13)

This discrepancy reveals that even when advocating for the same global goal, the media discourse may become an arena of ideological contestation, with both sides framing the concept of "cooperation" in ways that align with their respective political narratives and strategic positioning. Despite the shared call for global climate collaboration, the two corpora differ more distinctly regarding their prominent themes, as will be discussed in the next section.

Theme Differences in the Two Corpora

China and Its Climate Action. As the authoritative party paper, PD primarily serves to promulgate China's policies and ideologies (Song & Chang, 2012) and propagate its foreign propaganda (Brady, 2015). The competitive, dynamic international relations, such as the US-China strategic competition, necessitates each side's endeavors to gather its supporters (Kim, 2024). The media, which

could shape the public's attitudes and perceptions (Flottum, 2017), plays a significant role in this process. Since President Xi took office, a dominant Chinese diplomacy conveyed to the world is the concept of building a "community with a shared future" (Zhang, 2018). Aligning with this notion, news reports in PD construct China as a committed country which makes positive contributions to humanity. For example:

Example 5: Under such challenging global circumstances, as a participant and leader in the process of and contributor to enhancing global ecological conservation, China has always been committed to a path of green development, contributing to enhancing global climate governance through a wide range of pragmatic actions. (Topic 2)

(PD, 2022/11/16)

In the above example, PD describes China as a "participant," "leader," and "contributor" in climate change mitigation. These expressions can be seen as a nomination strategy, constructing China as a responsible country contributing to global sustainable development and the human living environment. By emphasizing "challenging global circumstances" and "pragmatic actions," China's climate efforts are framed as responses to a difficult international context, which helps to strengthen China's image of resilience and commitment. This concurs with previous research which regards the role of government-controlled newspapers as essential platforms for conveying China's geopolitical messages to international community (Yu et al., 2023).

In PD, the recurrent theme is China's consistent efforts in pursuing green and low-carbon development, which are often constructed as collaborative endeavors involving the whole society and multiple institutions, as demonstrated in the following example:

Example 6: As China's green shift gathers pace, Xi has called for concrete and constant efforts across the society to make greater contributions to jointly build a clean and beautiful world. (Topic 4)

(PD, 2023/08/16)

PD has consistently emphasized China's top-down approach to carbon reduction, underscoring not only the leadership of President Xi but also his calls for nationwide participation. This dual emphasis constructs a centralized model of environmental governance, in which the strategic direction stems from the highest level of leadership and is then extended to the whole society. The quotations from Xi reflect the perspectivization strategy, a discursive tactic by which the media outlets express

their viewpoints, involvement, or detachment toward a particular social event (Reisigl & Wodak, 2016). In this case, the media reporting adopts a leadership-centered stance, constructing a narrative where the legitimacy, authority, and ideological foundation of green development originate from top-level leadership.

To further enhance the credibility of the self-constructed, positive image of China, PD also employs the perspectivization strategy by quoting many compliments and praises from the international community, making its positive national image more consensus-based. For example:

Example 7: Cambodian government's chief spokesman Phay Siphon said China's low-carbon strategy was laudable, reflecting its top priority to the improvement of people's well-being around the world. "It truly demonstrates China's commitment to promoting global carbon emission reduction and green development," he told Xinhua. (Topic 4)

(PD, 2022/12/16)

By quoting Phay Siphon's comments, PD foregrounds that China's dual-carbon pledge adheres to the global trend on sustainability. Phay Siphon's position as the chief spokesman of Cambodian lends authority and trustworthiness to his statements, exerting a positive impact on the public's perception, particularly international readers. The emphasis on improving people's well-being "around the world" not only reflects and reinforces China's discursive framing of moral responsibility and its vision of a shared future for mankind, but also legitimizes China's climate narrative by indicating alignment between its stated commitments and global recognition of its actions. Through strategic use of language that resonates with national interest, such as leveraging the international community's extolment, the public's perceptions and beliefs are shaped in a way that is beneficial to China's international reputation. This accords with Van Dijk's (2015) observation that words can be used to influence recipients' minds such as their knowledge and attitudes, serving as a form of legitimate persuasion, or ideological manipulation. This emphasis on external trust and appreciation is also entrenched in Chinese traditional culture, particularly in Confucian morality of *Xin* (Tan, 2023). This notion advocates that a country, a society, or even an individual cannot thrive without trustworthiness (in Chinese: 无信不立 *Wu Xin Bu Li*). Confucianism's strong emphasis on credibility and reputation explains PD's use of external praises as a propaganda tool to bolster China's national reputation. This may also help to explain the increasing openness and transparency in climate reporting (Tong, 2014), but only when politically and culturally aligned.

In contrast, TG-NYT, particularly TG, frames China as a primary contributor to global environmental degradation and constructs a negative image through predication strategies. For example:

Example 8: Despite growing demand for energy, China still has far more coal power capacity than it needs. Last year the average utilization rate for coal power plants was just over 50%. Experts say that the way to ensure China's energy security is to improve the technological infrastructure of the grid to make it more stable and efficient, not build new dirty generators. (Topic 1)

(TG, 2023/11/27)

In the above example, China is described as having “far more coal power capacity than it needs” and building “new dirty generators.” Lexical choices such as “still has far more” and “dirty” predicate China's energy practice as excessive, polluting, and misaligned with sustainable development. China's coal reliance is further portrayed as contradictory and inconsistent with its dual-carbon pledge, as seen in the following instance:

Example 9: About 40% of China's bitcoin mines are powered with coal, while the rest use renewables, the study said. However, the coal plants are so large they could end up undermining Beijing's pledge to peak carbon emissions before 2030 and become carbon neutral by 2060. (Topic 2)

(TG, 2021/04/07)

China's climate action is condemned due to its large coal dependence and expansion, which are seen as problematic and contradictory with its commitment and global climate goals. Expressions like “could end up undermining Beijing's pledge” predicates China's climate action as insufficient and unreliable, framing the country as failing to meet its dual-carbon goals and impeding global climate mitigation progress. Similarly, unlike PD which emphasizes top-down directives and external laudatory comments on China and its climate action, TG-NYT tells the story from a different perspective. The voices of the ordinary Chinese public, rather than the authoritative officials are paid attention to, for example:

Example 10: Warning of coal shortages, officials are trying to curb energy usage by telling residents not to use electric stoves and extinguishing lights on building facades and billboards. ...“They don't discuss this policy with you. They just notify you,” he [a shop owner in Yiwu] said. “If you don't comply, they'll cut off your electricity.” (Topic 1)

(NYT, 2020/12/21)

Emphasizing China's coal-dependent energy and the top-down carbon-curbing policies, NYT employs

perspectivization by foregrounding ordinary citizens' voices, indicating the asymmetry between the authority and the public in climate-related decision-making. This contrasts with PD's framing of carbon reduction as a morally driven, unified national mission.

Example 11: Yet within the country [China], the positive half of the picture is more likely to be heard ... Howey [a 16-year-old Chinese girl] does not think this is enough. She conducted a public climate strike in front of government offices in Guilin in southern China ... before the authorities said she had to stop because she did not have a permit. ...“People in China don't know the situation and think the Chinese government is doing a lot and is great,” she said. “The point is that people here can't petition to protest and do something about the climate. Even if people want to change things they think activism in China will fail and the cost is too high.” (Topic 6)

(TG, 2021/8/26)

Similarly, TG also reveals ordinary Chinese people's criticisms on Chinese government, highlighting a lack of transparency in China's climate governance. The narrative about Howey, a Chinese young environmental activist, serves to reveal the sharp discrepancy between the rosy pictures presented in China's official media discourse and the reality experienced by some individuals. Howey's words underscore the limited transparency and public awareness of the actual state of climate action in the country. By highlighting Howey's climate strike and the authorities' subsequent efforts to silence her, the news article draws readers' attention to the lack of freedom of expression in China. It also raises questions about the extent to which the Chinese official narratives represent its citizens' voices, particularly those who seek to challenge the status quo.

This attention to individuals' perspectives aligns with the Western's emphasis on individual rights and freedoms. The human rights framework, which underscores fundamental rights such as individuals' well-being and dignity, is deemed as the most notable achievement of the Western political philosophy (Spahn, 2018). On the contrary, Chinese culture traditionally emphasizes collectivism, deeming that individuals should restrain their behavior to align with the collective and national interests (in Chinese: 克己 奉公 *Ke Ji Feng Gong*). Another explanation can be found in Confucius' philosophical teachings of propriety (*Li*, in Chinese: 礼), which accentuates the public's conformity and loyalty for the central government's authority and leadership (Hwang, 2001). This is evident in PD's emphasis on the top-down decisions made by governments and authorities, whereas TG-NYT highlights individuals' opinions and

experiences. This sharp discrepancy in ideologies leads to distinct focuses when reporting the same issue regarding China's climate actions across different newspapers.

In addition to the ideological divergences, the broader context of the media outlet's political agenda cannot be overlooked. Western countries, especially those in a strategic competitive relationship with China, might have the incentive to present a critical narrative when reporting China-related issues. One possible reason is that China's rise in economic power legitimates its Communist Party's governance, which challenges the dominant ideology of capitalism and multi-party democracy (Tang, 2021). While this critical narrative does not necessarily invalidate Howey's experiences, it does raise questions about the report's positionality and neutrality. For example, news reports in TG-NYT tend to leverage individuals' stories to represent the majority's general experiences and broader societal issues in China. This aligns with Liu and Li's (2017) observation that Western newspapers are inclined to portray China negatively to pressure it into taking greater responsibility for combating climate change.

To understand how such negative portrayals are discursively constructed, it is important to examine the argumentation strategies employed in the reports. According to Reisigl and Wodak (2016), argumentation serves the function of justifying and questioning claims of truth and normative rightness (Reisigl & Wodak, 2016), making news reports more persuasive and contributive to newspapers' ideological manipulation. One key feature of this strategy is *topos*, a method to link the argument(s) and the claim. Among various *topoi*, the *topos* of numbers is rather prominent in climate-related coverage, where statistical data are used as rhetorical tools to lend credibility and promote specific ideological positions.

This discursive strategy is salient in NYT's reports on China-related climate issues, where the strategic framing of China as a geopolitical competitor is reinforced through selective numerical representation. As seen in the following example:

Example 12: Air pollution from Asia has been the cause at times of as much as 65% of the increase in ozone levels in some parts of America. A 2014 study of 2006 data for air pollution in China found that when strong winds blew across the Pacific Ocean, pollutants produced by China's export industries accounted for, at worst, 4% to 6% of the carbon monoxide recorded in the Western United States, up to 11% of the black carbon pollution and 12% to 24% of sulfate concentrations. These facts should be of great concern for the Trump administration—if only because they are of great concern for Americans. According to a survey by the Pew Research Center in April, China's impact on the

global environment topped American people's list of concerns about China. (Topic 2)

(NYT, 2020/10/12)

This excerpt utilized quantitative data, particularly peak values (e.g., “as much as,” “up to”) or worst-case estimates (e.g., “at worst”), to amplify the perceived environmental threat posed by China, thereby constructing China not only as a polluter but also a geopolitical competitor whose domestic environmental practices carry cross-border consequences. While the use of data appears objective and evidence-based, the selective emphasis on alarming figures reveals a strategic use of numbers to frame China as a threat. By highlighting the tangible impacts of China's emissions on American soil and invoking American public concern, the report justifies external pressure on China while aligning environmental discourse with geopolitical competition.

Similarly, PD also utilizes the *topos* of numbers in reporting climate issues, particularly to highlight China's achievements in afforestation, renewable energy, and electric vehicles, and international cooperation in carbon mitigation. For instance:

Example 13: As of June 2023, the country has signed 46 memorandums of understanding on climate change with 39 developing countries, launched over 70 climate change mitigation and adaptation projects, and helped train more than 2,300 officials and technicians from over 120 developing countries, according to the MEE [Ministry of Ecology and Environment] report. (Topic 7)

(PD, 2023/12/01)

While both NYT and PD employ the same discursive strategy of argumentation, particularly the *topos* of numbers, they differ significantly in terms of data sources and ideological orientations. Specifically, NYT uses statistics to magnify the potential risks that China's pollution may pose to the US and its people. By drawing on data from independent research and public surveys (e.g., “a 2014 study,” “a survey by the Pew Research Center”), NYT conveys a sense of grassroots legitimacy, allowing the narrative to appear grounded in public concern rather than driven by political agenda, thereby reinforcing its critical framing of China in a more persuasive and subtle manner. In contrast, PD cites authoritative statistics from the government white papers and official reports to highlight China's low-carbon achievements and frame China as a responsible actor globally. By emphasizing support to other developing countries (e.g., “helped train more than 2,300 officials and technicians from over 120 developing countries”), PD projects a constructive international image of China, reinforcing state-led narratives of global leadership and moral

commitment. This aligns with earlier findings that PD often adopts a top-down perspective, while TG-NYT emphasize more on bottom-up, critical perspectives rooted in geopolitical critique.

China and Its Climate Responsibility. The divergences in constructing China and its climate actions can be partially attributed to their varying beliefs about China's development status and its corresponding responsibilities. Both corpora are found to employ the argumentation strategy to legitimate their propositions. In PD, the topos of comparison is frequently employed to foreground the historical imbalance in carbon emission and to rationalize China's current development trajectory, for example:

Example 14: They [Western countries] always chide China for its carbon emissions, consumption of fossil fuels ... Developed countries have played the biggest role in causing climate change, ... It is simply unfair for developed countries, which have relied on coal to fuel economic development that was unrestrained for centuries, to ask developing countries, which just started an economic takeoff, to abandon coal completely. (Topic 10)

(PD, 2021/11/30)

The argument that developed countries are the primary cause of climate change underpins China's long-term advocacy of equity for developing countries. By emphasizing that countries with highest cumulative carbon emissions should take greater responsibility, the report intends to convey that developed countries should stop slandering China for emitting carbon. Instead, they should focus on addressing the negative consequences of their historically high carbon emissions, following the principle of common but differentiated responsibilities in addressing climate change (Pan et al., 2021). Such an argument helps to entrench readers' opinion that there should be a more equitable approach in combating climate change: developed countries should play a more important role in climate change mitigation and should allow developing countries such as China to pursue suitable pathways of development.

Along with the topos of comparison, PD also employs the intensification strategy to intensify the epistemic status of a proposition (Reisigl & Wodak, 2016). For example:

Example 15: China has earnestly fulfilled its obligations under the Basel Convention, and made positive contributions to global environmental governance. In contrast, the United States ... dissociated itself from the global system and arrangement of carbon emissions, seriously hindered the global process of emission reduction and green development ... It is clear who willfully disregards the global environment and the health of people around the world ... It

[unilateralism] is a dead end and leading nowhere. The U.S. provocation of confrontation at the United Nations for its own interests is unpopular and doomed to fail. (Topic 8)

(PD, 2020/09/23)

PD contrasts China's responsible climate actions, using phrases such as "earnestly fulfilled its obligation" and "make positive contributions," with the US' irresponsible inactions, using strong terms such as "seriously hindered," "willfully disregards," "dead end," and "doomed to fail." In this way, PD conveys to its readers that the US' dissociation from the global cooperation has impeded the process of mitigating climate change. Given the DHA's emphasis on the background information, it is necessary to contextualize PD's blaming of the US within a broader political and historical context, wherein the discursive framing is relevant to and embedded. In 2017, Donald Trump announced the US withdrawal from the Paris Agreement, a milestone representing the international community's consensus in tackling climate change (Urpelainen & Van de Graaf, 2018). China, due to its rapidly-developed economy and strategic emphasis on sustainable innovations, is widely believed to have the ability to assume a leading role in global climate governance (Geall & Ely, 2018). The world leadership void caused by the US retreatment has ushered in an opportunity for China to gain more influence in global climate negotiations, aligning with its pursuit of greater institutional discourse power (Zhang & Orbie, 2021) and its determination to transition from a participating role to a leading role in global issues.

Unlike PD, which categorizes China as a developing country, TG-NYT contends that China should be classified as a developed country and should assume greater responsibility in addressing climate change. For example:

Example 16: It is looking increasingly inappropriate to define China as a developing nation, since emissions of carbon dioxide per capita already exceed that of the UK (7.0 vs. 5.8 tonnes per year). (Topic 4)

(TG, 2020/10/08)

Topos can be either reasonable or fallacious (Reisigl & Wodak, 2016). In the above example, the report employs a fallacious topos to emphasize the need to reassess China's development status. When the mass media provide partial or biased information about a specific issue, communicative manipulation emerges to mislead the public into supporting actions that benefit the manipulator behind the discourse (Van Dijk, 2006). In Example 16, by purposively presenting carbon emissions per capita as the sole criterion of a country's development status and downplaying other key determinants such as per capita income, economic structure, and social conditions (Sanford & Sandhu, 2003), the report attempts to

persuade readers that China should be recognized as a developed nation which should assume greater responsibility in mitigating climate change. This finding accords with Liu and Li's (2017) observation that Western newspapers tend to pressure China to take more radical actions, aiming to curb its rising power and international influence through media constructions.

Discussion

A preliminary exploration of the most frequent bigrams uncovers different discursive foci across the corpora. PD tends to focus on China's green and low-carbon fulfillment, whereas TG and NYT highlight China's continued reliance on coal-powered energy and resulting high levels of carbon emissions. These observations are corroborated and extended by the LDA topic modelling results, which uncover latent topics, such as the shared advocacy for multilateral cooperation and ongoing debates on China's developmental status. Further analysis of concordances for keywords in the extracted latent topics reveals recurring themes in both corpora, each employing different discursive strategies to legitimize their respective positions and fulfill their ideological interests.

While the overall patterns align with existing literature, namely, that China's official media outlets tend to construct a positive national image, while Western media is largely critical of China's climate actions, this study further reveals how these divergent portrayals are discursively constructed by identifying several nuanced discursive patterns. Specifically, PD frequently emphasizes the moral alignment of China's policies and actions with broader global goals, such as improving human well-being, and foregrounds narratives of top-down leadership and across-society collaboration. In contrast, this study finds that TG and NYT tend to frame China's dual-carbon efforts within the broader context of geopolitical rivalry by emphasizing contradictions between stated goals and actual practices, often through selective numerical representations or anecdotal critiques. These findings contribute to the literature by offering deeper insights into the political, societal, and cultural dimensions embedded in climate-related media discourse.

However, the analysis also suggests that the DHA analytical framework may not fully capture all discursive strategies present in the data. One additional discursive strategy that emerged inductively from the corpora is "concealment," which means the deliberate withholding or downplaying of certain information to achieve particular ideological effects. For example, PD tends to omit grassroots voices and experiences concerning the implementation of carbon-reduction policies, thereby reinforcing a centralized narrative. In contrast, TG and NYT often downplay China's actual achievements in reducing

carbon, thus reinforcing a critical framing of China's international image. Recognizing concealment as a discursive strategy would complement existing DHA categories and highlight the importance of analyzing media narratives not only through what is explicitly stated, but also through what is left unsaid.

As one-way communication tools, the media outlets in both corpora intend to inform recipients, shaping perceptions and values, guide behaviors, and produce environmental governance (Erbaugh et al., 2024). Within the context of dynamic multilateral relations, particularly the China-US contestation, the framing of China's dual-carbon commitment reflects a continuous contention over the construction of environmental realities. The discursive strategies adopted in both corpora are inherently ideological, demonstrating how environmental narratives are employed to serve geopolitical positioning and shape national branding.

Conclusion

Drawing on the synergy of topic modeling and DHA, this comparative study examined how mainstream newspapers from China (PD), the UK (TG), and the US (NYT) discursively constructed China's dual-carbon commitment and related climate actions. The analysis reveals contrasting thematic and ideological patterns. Specifically, PD highlights China's consistent efforts in carbon reduction and constructs a positive image of China as a responsible developing country, with an emphasis on top-down policies, nationwide collaboration, and an alignment of morality with its actions. In contrast, TG and NYT tend to problematize China's climate actions by highlighting inconsistencies between China's pledges and actions, framing them through the lens of geopolitical rivalry, and portraying China as a developed country which should assume greater responsibility in addressing climate change.

These representations are articulated through a range of discursive strategies such as nomination, predication, perspectivization, argumentation, intensification, and concealment. The study illustrates how language is deployed for ideological purposes, connecting these different representations to broader geopolitical and socio-cultural contexts. It also reveals that competing geopolitical narratives, such as the notion of "China threat" and national image campaigns, can shape the climate-related media discourse. In China, official English-language media function as diplomatic tools to project favorable narratives and enhance the country's image among international community. The positive framing of climate efforts following the dual-carbon pledge serves as a soft power strategy to deflect criticism of China as the largest emitter by positioning itself as a

global leader in environmental governance, thereby attracting more international allies and supporters. In contrast, China's rising influence on the world stage is often perceived by Western capitalist nations as a challenge to the status quo, and their media tend to cast China in a negative light across domains including environmental communication.

This study also reveals a nuanced pattern not previously discussed in the literature: media discourse in PD links China's climate policies to moral and top-down narratives, which are grounded in the long-standing Confusion collectivism. Meanwhile, TG tends to highlight the inconsistency of China's climate rhetoric and its actions, whereas NYT put more emphasis on geopolitical rivalry between China and the US. These discursive constructions of China resonate with framing theory in political communication, which conceptualizes media as an agent that mobilizes bias and exercises power in shaping public perceptions of reality (Roslyng & Dindler, 2023). These insights enrich our understanding of how climate-related discourse is shaped by both media's strategic goals and underlying ideological and geopolitical stances.

This study contributes to the literature in two important aspects. Methodologically, the incorporation of topic modeling into media discourse analysis facilitates the detection of the recurrence of nuances in a large dataset, enhancing the qualitative interpretation process. This mixed-method approach helps address some limitations of traditional discourse analyses, such as subjectivity and limited sample sizes. Theoretically, this study extends the analytic framework of discursive strategies by incorporating "concealment" as an additional discursive strategy, highlighting both what has been explicitly stated and what has been deliberately left unsaid.

One limitation of this study is that both TG and NYT are liberal (left-leaning) newspapers in Western countries. Further research can add a corpus of news reports from conservative (right-leaning) news outlets. This added corpus can allow for a more balanced and nuanced understanding of the international representation of China's climate policy and actions, and of how ideological and political positions may shape the media framing. Such an expanded dataset would also help meet the robust empirical standards expected of computational communication research. Another recommendation is to conduct a longitudinal analysis, employing the same methodology, to examine trending topics across different news outlets over time. This approach can help identify changes and continuities in the discourse (Sakki & Pettersson, 2018), shedding more light on the dynamic interplay between the media discourse and broader sociocultural and political contexts.

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