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Framing responsibilities for climate change in Chinese and American Newspapers: A corpus-assisted discourse study

Abstract

This study conducts a corpus-assisted discourse study of framing responsibilities for climate change in *China Daily* (CD) and *The New York Times* (NYT). Based on the distinction between causal and treatment responsibilities, it focuses on the framing of human and non-human causal responsibilities as well as developed and developing countries' causal and treatment responsibilities for climate change in the two newspapers. The findings suggest that CD tends to show consensus on the human causes of climate change while NYT is inclined to problematize human causes for climate change. While both newspapers favor treatment over causal responsibilities, CD prefers to underline developed countries' historical causal responsibilities for climate change and urges developed countries to take more treatment responsibilities for climate change, whereas NYT prefers to underscore developing countries' current causal responsibilities for climate change and their shared treatment responsibilities for climate change.

Keywords: climate change, causal responsibility, treatment responsibility, corpus-assisted discourse study, framing

1. Introduction

Responsibility attributions have drawn growing attention in academia due to their important role in shaping public understandings and opinions towards a certain issue (Iyengar, 1996). Previous studies have made a distinction between two categories of responsibilities, namely "causal" and "treatment" responsibilities (Iyengar, 1991). Causal responsibility refers to the causes of a problem, whereas treatment responsibility highlights the alleviation/solution of a problem. The former underlines the past, while the latter points to future solutions (Iyengar, 1990). These concepts are especially important in controversial issues because they are concerned with the parties responsible for the causes and solutions of the issues (Kim et al., 2010) and public understanding of the issues (Schlesinger and Lau, 2000). Numerous studies have been conducted on the discursive constructions of responsibilities in media discourse (e.g., Holton et al., 2012).

Previous studies argue that media are central sites of blame games (Anderson et al., 2018). Social actors are likely to blame others so that they can protect themselves against criticism. This can be witnessed in media's preference for attributing social issues to individual deficiencies rather than governmental policies (e.g., Koteyko et al., 2008; Peng and Tang, 2010), because it can help to shift the blame on the government (see Kim et al., 2017). Particular ways of framing responsibilities in news media are subject to political orientations and professional routines (Kim et al., 2010). This has

been evidenced in cross-national studies related to conflicts and international concerns (e.g., Chen and Wang, 2020; Kim and Lee, 2008; Li, 2010; Liu and Li, 2017).

Despite the controversial nature of climate change (Liu and Huang, 2022; Villar and Krosnick, 2011), media representations of climate change responsibilities in different countries have been extensively examined, such as the US (Kuha, 2009; Liang et al., 2014), the UK (Nerlich et al., 2012) and India (Billett, 2010). Nonetheless, few studies have given a critical examination of the particular ways of framing climate change responsibilities by news media from the US and China, two main contributors to climate change (Boykoff, 2012). Therefore, this study combines the methods and theories of corpus linguistics (CL) and critical discourse analysis (CDA) to give a corpus-assisted discourse study (CADS) of the framing of causal and treatment responsibilities for climate change in two international newspapers in China and the US, namely *China Daily* (CD) and *The New York Times* (NYT). It has two primary objectives: (1) to reveal their preferential ways of framing responsibilities for climate change in the two newspapers; and (2) to examine whether the two newspapers align with their national interests in framing climate change responsibilities.

2. Framing responsibilities for climate change

News media can frame an issue in a particular way (Gitlin, 1983). The framing process involves selecting certain aspects of reality and making them more salient (Entman, 1993). Therefore, it has the potential to shape people's interpretations of a certain issue by defining what the problem is, what/who causes it and how to deal with it (Entman, 1993). News framing of responsibilities for climate change can potentially lead the audience to identify the causes of and solutions to climate problems (Billett, 2010; Olausson, 2009). For example, acknowledgment of human impacts on climate change will contribute to people's active involvement in addressing climate change (Boykoff and Boykoff, 2004). Recent studies have investigated media framing of responsibilities and found that media coverage may pay less attention to causal responsibilities than treatment responsibilities (e.g., Freeman, 2017). The discussion of causes is mainly concerned with debates on human interference in climate change. For instance, the US newspapers are largely found to be skeptical about human contributions to climate change and are likely to attribute causes to natural fluctuations (Kuha, 2009). This can potentially deflect the responsibility of the government and lead to ineffective actions. The doubtful voice may be attributed to the need for balanced reporting (Boykoff and Boykoff, 2004) or Republicans' denial of human-caused climate change (Carvalho, 2007). By contrast, media in other countries like the UK are found to preferably present consensus on human impacts on climate change (see Freeman, 2017; Grundmann and Krishnamurthy, 2010).

Some other studies also focus on the debates about the causal and treatment responsibilities of both developed and developing countries. In most cases, news reports follow the in-group-protecting mechanism and tend to put less blame on in-group

members (Post et al., 2019). For example, Indian media seldom attribute causal responsibilities to other developing countries (Billett, 2010). However, some studies also discover that media in developed countries prefer to blame their own countries or other developed countries for contributing to climate change (Liang et al., 2014; Post et al., 2019). This can be attributed to the global consensus on developed countries' historical responsibilities for climate change (Post et al., 2019). As regards treatment responsibilities, studies have found that if the countries are framed as the main contributors to climate change, they are inclined to have obligations to solve the problem (Billett, 2010; Liang et al., 2014; Pan et al., 2021). Billett (2010) shows that a negative image of developed countries is overwhelmingly presented in Indian mass media through an emphasis on their lack of actions in global efforts. In some cases, media are also found to present a positive national image by attributing treatment responsibilities to their own countries. For instance, Liang et al. (2014) argue that the US TV news stories tend to frame the US as having more capabilities to solve climate change. Post et al. (2019) discover that media in developing countries are likely to depict their own countries as actively involved in the global issue partly because they tend to avoid attributing too much power to developed countries (see also Pan et al., 2021). These studies have demonstrated that the framing of climate change responsibilities tends to be shaped by national interests. As Lee et al. (2002) suggest, media representations of international news events tend to be filtered by the prism of national interests. However, there is little information about whether news media from China and the US frame climate change responsibilities in a way that is consistent with their national interests.

3. Methodology

The present study is based on two large corpora: the CD corpus and the NYT corpus. The CD corpus collects news reports concerning climate change from the newspaper *China Daily* (CD). The NYT corpus collects news reports concerning climate change from the newspaper *The New York Times* (NYT). CD is selected because it is the most important official English-language newspaper of China and serves the important function of communicating the voice of the Chinese government. As a "newspaper of record" in the US, NYT is known for its liberal stance and influences on shaping international news agendas (Lee et al., 2002; Liu et al., 2022). The two corpora were built by collecting news reports with *climate change* in their headlines. All news texts were extracted from the electronic database LexisNexis and the time span set for data collection is from 2001 to 2020. Previous studies have shown that climate change started to receive much media attention after 2000 and has received growing attention in the media since the mid-2000 (Schmidt et al., 2013). To make sure that all news texts collected are topic-related, these news reports were further manually checked. The CD corpus consists of 438 news reports with 281,958 tokens, and the NYT corpus consists of 1071 news reports with 1,106,660 tokens. The number of news reports suggests that climate change receives less attention in CD than in NYT. This can be attributed to the lack of attention to climate change by the Chinese government before 2007 (Heggelund

and Nadin, 2017).

A corpus-assisted discourse study approach (CADS) is adopted in this study by combining the theories and methods of corpus linguistics (CL) and the discourse-historical approach (DHA) in CDA (Reisigl and Wodak, 2016). CDA views discourse as a social practice and underlines the examination of discourse in its socio-political contexts (Fairclough, 1995). One of its primary concerns is to expose the dynamic relations between language use and the wider socio-political contexts (Catalano and Waugh, 2020; Wodak and Meyer, 2016). Viewing climate change as not only a social phenomenon but also a discursive phenomenon, this study considers news discourse as an important site for discursive struggle (Fairclough, 1995) and examines the particular ways of framing responsibilities for climate change in different news media. It is "critical" in that it aims to "make contradictions apparent" and demystify the dynamic relations between news discourse and society (Wodak and Ludwig, 1999: 12).

The DHA is known for its emphasis on the importance of socio-historical context in the explication of the findings of textual analysis as well as the three-dimensional analysis of texts at the macro (e.g., topics/themes/frames), meso (e.g., discursive strategies) and micro (i.e., linguistic means and linguistic realizations) levels (Kijratanakoson, 2022; Reisigl and Wodak, 2016). With this framework, the study starts with the macro analysis of the particular ways of framing responsibilities and then moves to analyze the specific strategies and linguistic realizations in the constructions of causal and treatment responsibilities of different parties. Discursive strategies refer to "a more or less intentional plan of practice" to "achieve a particular social, political, psychological or linguistics goal" (Reisigl and Wodak, 2016: 33) and this study pays particular attention to the use of four prominent discursive strategies: (1) **nomination**; (2) **predication**; (3) **intensification/mitigation**; and (4) **argumentation**. Nomination strategies concern the ways of referring to social actors or phenomena; predication strategies refer to the ways of attributing features to social actors/phenomena; intensification/mitigation strategies address the ways of intensifying/mitigating the force of the utterances; and argumentation strategies concern the use of different **topoi** to justify the points (Reisigl and Wodak, 2016).

CL features the use of computer-assisted corpus analytic tools for the automatic identification and analysis of language patterns (Cheng, 2013). It can benefit CDA by providing an automatic analysis of large data efficiently, identifying the language patterns which cannot be acquired through mere manual analysis and providing entry points for the close analysis of some language patterns in their specific contexts of use (Baker, 2006; Liu and Zhong, 2020). CDA can benefit CL by providing proper interpretations and explanations of the findings generated by computer-assisted corpus analytic tools. Therefore, CADS underlines the "balanced" combination or "synergy" of the methods and theories of (C)DA and CL (Baker et al., 2008; Partington et al., 2004). It makes no distinction between "corpus-based" and "corpus-driven" approaches (Tognini-Bonelli, 2001). An analyst may approach a corpus with or without prior

assumptions, but the analyst has to move constantly between the findings generated by computer-assisted corpus analytic tools and the examination of some linguistic features in their specific contexts of use to identify the most proper and ingenious route in analyzing the data and answering the concerned research questions. In this sense, it is "data-driven" rather than "corpus-based" or "corpus-driven" (Partington, 2010).

Following DHA, this study starts from an overall analysis of responsibility framing by identifying whether those words related to causal and treatment responsibilities stand out in the two corpora in view of the fact that framing can be "manifested by the presence and absence of certain keywords" (Entman, 1993: 52). It starts from the automatic semantic processing of two corpora with the online corpus-analytic tool Wmatrix 4.0. The UCREL Semantic Analysis System (USAS) Wmatrix 4.0 incorporates can categorize the vocabulary of English into 21 semantic fields, which can be further classified into 232 semantic categories (SMCs) (Rayson, 2008). It can also help to generate a key SMC list by comparing the SMCs of one corpus with the SMCs of a reference corpus. Key SMCs refer to those SMCs which show statistically significant differences in a subject corpus when compared with their use in a comparable specialized corpus or a general reference corpus. Key SMC lists can rank the key SMCs by their log-likelihood (LL) values. The higher their LL values, the more key these SMCs. To generate their respective key SMC lists, the two corpora were compared in turn with a general reference corpus incorporated in Wmatrix 4.0, i.e., the American English 2006 Corpus (AmE06) (Liu, 2017; Liu and Ma, 2021). The top 30 key SMCs of each corpus are examined to see whether they have key SMCs related to responsibility framing in the two corpora. It is followed by a close examination of the key SMC "Cause & Effect and Connection" (A2.2) in both corpora to examine how they contribute to the constructions of causal responsibilities of climate change in two newspapers. The most frequently used tokens in this SMC (i.e., *cause**) are closely examined to reveal the strategies of constructing causal responsibilities in the two newspapers.

It is complemented by a close examination of the discursive construction of the causal and treatment responsibilities of two key parties: developed and developing countries (Reisigl and Wodak, 2016). This is achieved through a close examination of the token *countries* and their concordance lines to identify **the prominent themes** associated with developed and developing countries as well as the distinct and consistent **discursive strategies** and **linguistic features** used for constructing their causal and treatment responsibilities in the two newspapers. Only those themes and discursive strategies that occur repeatedly can be considered as prominent and consistent. Since discursive strategies are realized through specific linguistic features, the analysis of discursive strategies and linguistic features usually occurs at the same time. Finally, their respective ways of framing responsibilities for climate change are further discussed and explained in terms of the ideologies and journalistic routines of the two newspapers as well as the national interests of the two countries (Reisigl and Wodak, 2016).

Therefore, this study is mutually informed by the methods and theories of CDA and CL. CDA, DHA in particular, provides not only the theoretical framework for this study but also the proper interpretations and explanations of the findings generated by corpus-analytic tools, whereas CL can contribute to the efficient processing of the data, the identification of the most prominent language patterns for further detailed linguistic analysis (Baker et al., 2008).

4. Findings

4.1 Analysis of key SMCs

With Wmatrix 4.0, this section gives an overall analysis of the preferential ways of framing responsibilities in the two corpora. Table 1 demonstrates the top 30 key SMCs in CD and NYT. The LL scores of all these key SMCs are above 6.63 (p<0.01), suggesting that they are all statistically significant. Some key SMCs can be identified in both corpora, including **W4** ("Weather"), **A2.1+** ("Change"), **Z2** ("Geographical names"), **M7** ("Places"), **W3** ("Geographical terms"), **W5** ("Green issues"), **O1.3** ("substances and material: Gases"), **F4** ("Farming & Horticulture"), **G1.1** ("Government"), **W1** ("The Universe"), **A9-** ("Giving"), **O4.6** ("Temperature"), **Y1** ("Science and technology in general"), **O4.6+** ("Temperature: Hot/ on fire"), **T1.1.3** ("Time: Future"), **Q2.1** ("Speech: Communicative"), **A2.2** ("Cause/Effect and Connection"), **I1.1** ("Money and pay"), **A5.1---** ("Evaluation: Bad"), and **N5.1+++** ("Entire; maximum").

Table 1. Top 30 key SMCs in the two corpora

Rank	CD			NYT		
	Tagset	**LL**	**Semantic Category**	**Tagset**	**LL**	**Semantic Category**
1	W4	12073.67	Weather	W4	15656.57	Weather
2	A2.1+	5949.18	Change	A2.1+	4297.55	Change
3	Z2	2846.42	Geographical names	W3	4190.4	Geographical terms
4	M7	2395.37	Places	O4.6+	2806.79	Temperature: Hot/ on fire
5	W3	2374.6	Geographical terms	W5	2404.68	Green issues
6	W5	2015.56	Green issues	O1.3	2196.29	Substances and material: Gas
7	O1.3	1268.77	Substances and material: Gas	Y1	1602.91	Science and technology in general
8	F4	1230.96	Farming & Horticulture	G1.1	1566.27	Government
9	S1.1.3+	1151.88	Participating	Z2	1280.6	Geographical names
10	G1.1	1027.06	Government	Q2.1	1215.38	Speech: Communicative
11	W1	969	The Universe	W1	1123.63	The Universe
12	X5.2+	967.18	Interested/excited/energetic	Z99	1104.61	Unmatched
13	A9-	910.25	Giving	G1.2	997.58	Politics
14	S8+	754.02	Helping	O4.6	988.68	Temperature
15	O4.6	733.46	Temperature	F4	774.55	Farming & Horticulture
16	Y1	713.93	Science and technology in general	N5+	580.17	Quantities: many/much
17	O4.6+	667.94	Temperature: Hot/ on fire	O1.2	530.51	Substances and materials: Liquid

18	T1.1.3	654.85	Time: Future	A15-	490.13	Danger
19	S6+	511.86	Strong obligation or necessity	Z3	477.69	Other proper names
20	I1.3-	499.64	Cheap	O1.1	465.24	Substances and materials: Solid
21	Q2.1	476.96	Speech: Communicative	A9-	463.94	Giving
22	N5-	452.13	Quantities: Little	I2.1	459.01	Business: Generally
23	T1.3	427.17	Time: Period	I1.1	438.18	Money and pay
24	A11.1+	408.09	Important	N5.1+++	415.52	Entire; maximum
25	Z3	380.23	Other proper names	A12-	376.26	Difficult
26	N5++	310.67	Quantities: many/much	M7	357.74	Places
27	A2.2	309.55	**Cause & Effect/Connection**	A5.1---	343.44	Evaluation: Bad
28	I1.1	294.86	Money and pay	X7+	332.34	Wanted
29	A5.1---	291.47	Evaluation: Bad	T1.1.3	323.57	Time: Future
30	N5.1+++	272.98	Entire; maximum	A2.2	289.56	**Cause & Effect/Connection**

A close examination of the tokens in each shared key SMC finds that they foreground three topics: (1) environmental problems; (2) ways of tackling the problems; and (3) their causes and consequences. The first topic can be revealed in such key SMCs as **W4** (e.g., *climate*, *weather*, *flooding*), **A2.1+** (e.g., *change*, *changing*, *changes*), **W3** (e.g., *global*, *earth*, *atmosphere*), **W5** (e.g., *environmental*, *nature*, *environment*), **W1** (e.g., *world, planet, globe*), **O4.6+** (e.g., *warming*, *heat*, *fires*), and **O4.6** (e.g., *temperature*, *temperatures*, *melted*). The prominence of this topic can be attributed to the focus of the data, i.e., climate change. The second topic can be revealed by **Y1** (e.g., *technology*, *scientists*, *technologies*) and **G1.1** (e.g., *president*, *government*, *state*). They suggest the main parties involved in solving the problem of climate change, i.e., scientists and the government. The last topic can be revealed in such key SMCs as **O1.3** (e.g., *gas*, *carbon dioxide*, *gases*), **F4** (e.g., *greenhouse*, *agriculture*, *crops*), **A9-** (e.g., *emissions*, *emission*), and **A5.1---** (e.g., *disasters*, *worst*, *catastrophic*). They suggest that both corpora foreground the causes (i.e., greenhouse gases and carbon emissions) and consequences (i.e., agriculture and environmental disasters).

Nevertheless, their preferential ways of framing causes and consequences can also be revealed in **A2.2** ("Cause & effect/connection") which consists of tokens suggesting the causes and impacts of climate change. Table 2 shows the top 20 tokens in **A2.2** in CD and NYT. Since this study is concerned with causal and treatment responsibilities, we focus on those tokens which express causes in the key SMC. Tokens expressing causes are marked in bold letters. The frequencies of those tokens communicating the meaning of causes and impacts suggest that both newspapers show preferences for impacts over causes. Among them, the different forms of *cause** are the most frequently used, with *caused* and *cause* used in CD (132), and *cause*, *caused*, *causes,* and *causing* used in NYT (806). A close analysis of the lemma *cause** can suggest their preferential ways of framing causal responsibilities in CD and NYT.

Table 2. The top 20 tokens in A2.2 in CD and NYT

Corpus	**Tokens**

CD	*impact* (213), *effects* (123), *impacts* (91), **caused** (88), *result* (83), **because of** (81), **due to** (79), **related** (70), **responsible** (64), *results* (64), *effect* (60), **cause** (54), **based on** (54), **produce** (50), *consequences* (47), **why** (47), **relations** (40), **lead to** (34), **factors** (31), **basis** (30)
NYT	*effects* (560), *impact* (415), **because of** (374), **why** (356), **cause** (301), *effect* (256), *result* (241), **caused** (240), *consequences* (220), **produce** (198), *impacts* (189), **reason** (170), **responsible** (166), **lead to** (147), **causes** (139), *results* (136), **based on** (135), **produced** (133), **factors** (126), **causing** (126)

This study focuses on the different forms of *cause** in CD and NYT to see whether they are used to express the causal responsibilities for climate change. They are *caused* (88) and *cause* (54) in CD, and *cause* (301), *caused* (240), *causes* (139), and *causing* (126) in NYT. An examination of their concordance lines finds that *cause** can be used to express either the causes or the impacts of climate change in both corpora (see Examples 1 and 2).

(1) **Impact**: Our climate is fragile. Small changes in surface temperatures will **cause** big problems.

(CD, 2019/11/22)

(2) **Cause**: Su said during the past two centuries, developed countries have made unbridled emissions of greenhouse gas, a major **cause** of global climate change, and developing countries are major victims of climate change.

(CD, 2009/04/01)

Overall, 29% (41) of *cause** (142) in CD and 36% of *cause** (805) in NYT are used to express the causes of climate change. It suggests that *cause** is less likely to be used for the causes than for the impacts of climate change in both corpora. Nevertheless, *cause** is more likely to be used in NYT than in CD to express the causes of climate change. Besides, a distinction can be made between human and non-human causes of climate change, as in the following:

(3) **Human**: The IPCC report reiterates global warming is a reality and **caused** by *humans*.

(CD, 2014/09/20)

(4) **Non-human**: Experts predict that the phenomenon could show up with greater frequency as a result of climate change, **caused** by *a rise in emissions of greenhouse gases*.

(CD, 2017/11/17)

Table 3 shows the frequencies of human and non-human causes of climate change. Among those occurrences of *cause** which highlight the cause(s) of climate change, although they are used much more frequently to underline human than non-human causes of climate change in both newspapers, they are more likely to be used to express human causes in NYT (78%) than in CD (63%).

Table 3. The frequencies of human and non-human causes of climate change

CD			NYT		
Tokens	**human**	**nonhuman**	**Tokens**	**human**	**nonhuman**
caused	17	7	*cause*	38	21
cause	9	8	*caused*	157	19
			causes	11	12
			causing	20	13
TOTAL	26 (63%)	15 (37%)		226 (78%)	65 (22%)

This can also be revealed in the **predication** strategy of climate change in both newspapers. Among all the occurrences of *caused* (88), only one occurrence occurs with *human* to form the compound *human-caused* to pre-modify climate change in CD. However, among the total occurrences of *caused* (346) in NYT, 101 (29%) occur with *human* to describe climate change, as in the following:

> (5) The Heartland Institute is a conservative think tank that disputes the established science of *human-**caused*** climate change.
>
> (NYT, 2018/05/08)

The occurrence of *human-caused* immediately before *climate change* makes *human-caused climate change* a nominal group that can be discussed and debated (Fairclough, 1995). Although CD also underlines climate change as caused by human beings, it tends to express it in a clause, as in the following:

> (6) Nowadays, the view that *human activities* have **caused** climate change has dominated the scientific community, public opinion and political discussions.
>
> (CD, 2010/01/28)

Therefore, CD tends to align with the statement that climate change is caused by humans. It represents a unified voice over this issue. By contrast, NYT tends to foreground the dispute over human-caused climate change in the US, as in the following:

> (7) It is widely believed that most Republicans *are skeptical about* *human-**caused*** climate change.
>
> (NYT, 2018/07/28)

To sum up, *cause** is used less frequently to emphasize causes over impacts but more frequently to emphasize human- over non-human causes in both newspapers. Nevertheless, while CD shows consensus on human causes for climate change, NYT suggests the dispute over human-caused climate change. This is consistent with the increasing polarization of political parties over human-caused climate change in the US (Boykoff, 2007). Especially after Donald Trump became the US president, he and the Republican party showed growing distrust of human-caused climate change. The following sections give a close analysis of the token *countries* to examine the framing of developed and developing countries' responsibilities for climate change.

4.2 Analysis of the collocates of the token *countries*

This section gives a close analysis of the particular ways of framing causal and treatment responsibilities of developed and developing countries in the two corpora. Table 4 demonstrates strong adjective collocates of *countries* based on their LL scores. The higher the value, the stronger the collocation (Baker, 2006). The LL scores are above 6.63 (p<0.01), reflecting that they are all statistically significant. These collocates show that different **nomination** strategies have been used for different countries, such as the stages of development (*developed* and *developing*), the wealthy status (*rich*, *poor*, *richer*, *poorer*, *poorest*, and *wealthy*), industrialization (*industrialized*), and vulnerability (*vulnerable*). As Table 4 shows, NYT makes a subtler distinction of different countries than CD. Besides, the different rankings of these collocates also suggest their preferences for different countries. CD tends to foreground developed/rich/industrialized countries, as can be seen from the top four adjective collocates *developed*, *developing*, *industrialized* and *rich*. NYT prefers to foreground poor/developing countries in its representations of climate change, as can be seen from the top two collocates *developing* and *poor*. While CD prefers to use the nominal group of *developed countries* over the nominal group of *industrialized countries*, NYT shows similar preferences for the two nominal groups. Therefore, CD shows similar preferences for *developed* and *developing* countries, but NYT tends to put more emphasis on *developing*/*poor* countries than on *developed* countries.

Table 4. Collocates of countries at L1 position

CD			NYT		
Collocates	**LL**	**Freq.**	**Collocates**	**LL**	**Freq.**
developed	1,721.90	354	*developing*	542.36	89
developing	1,629.38	383	*poor*	323.71	60
industrialized	171.42	41	*rich*	214.69	39
rich	162.02	42	*industrialized*	160.91	24
poor	81.69	31	*poorer*	112.57	17
poorest	42.27	13	*developed*	108.44	26
vulnerable	37.18	20	*poorest*	63.99	11
small	22.41	14	*richer*	49.7	8
richer	13.76	4	*wealthy*	29.11	7
poorer	11.58	4	*vulnerable*	22.58	11
			richest	14.2	3
			wealthier	14.2	3

Since we are concerned about the framing of responsibilities of developed and developing countries, this study focuses on the strongest three collocates of CD (i.e., *developing*, *developed* and *industrialized*) to examine how causal and treatment responsibilities are framed in CD and NYT. Table 5 presents the number of occurrences of these tokens in their representations of causal and treatment responsibilities of

developed and developing countries. The total frequencies of these tokens suggest that CD, compared with NYT, prefers to foreground the distinction between developed and developing countries in its framing of causal and treatment responsibilities for climate change. This can be attributed to the fact that the US is shirking the responsibilities of combating climate change. Besides, both newspapers put more emphasis on treatment responsibilities than causal responsibilities, as can be seen from the total frequencies of causal and treatment responsibilities in Table 5. Finally, CD puts more emphasis on the responsibilities of developed countries (444) than the responsibilities of developing countries (206). This can be attributed to CD's motivation to push the developed countries, the US in particular, to take the lead in combating climate change. By contrast, NYT shows similar preferences for developed and developing countries. This can be attributed to fact that the US tends to assign an equal responsibility to developed and developing countries in climate change. The following sections give a close examination of the framing of causal and treatment responsibilities of developed and developing countries.

Table 5. Causal and treatment responsibilities of developed and developing countries in two corpora

Types	CD		NYT	
	Developed	Developing	Developed	Developing
Causal responsibility	56	6	8	7
Treatment responsibility	388	200	44	41

4.2.1 Causal Responsibility

CD highlights the causal responsibilities of developed countries and downplays the causal responsibilities of developing countries. An examination of the concordance lines (56) of causal responsibilities for developed countries finds that CD tends to resort to different strategies in the construction of the causal responsibilities of developed and developing countries. First, CD prefers to refer to the **topos** of "history" by highlighting the accumulative contributions to climate change by developed countries during their process of industrialization in the last 200-odd years, as in the following:

> (8) *Developed **countries** should be responsible for their <u>accumulative</u> emissions <u>during their 200-odd years of industrialization</u>, which is the main reason for the current global warming, and they should naturally take the lead in shouldering the <u>historical responsibilities</u> to substantially reduce emissions.*
>
> (CD, 2011/11/23)

Besides, CD also uses **predication** strategies to underline the large emission of greenhouse gases by developed countries, as can be seen from the use of these adjectives *unrestricted* and *unbridled*. For instance:

> (9) The almost <u>*unrestricted*</u> emission of greenhouse gases by *developed **countries*** during their industrialization is partly to blame for the high concentration of greenhouse gases, he said.

Intensification strategies are often used in CD to underline the dominant role of developed countries, as can be seen from these adjectives (e.g., *biggest*, *most*, *main*), adverbs (e.g., *mostly*, *largely*), and phrases (e.g., *more than 80 percent*).

By contrast, CD also downplays developing countries' contribution to climate change by resorting to the **topos** of "per capita", as in the following:

> (10) The United Nations Framework Convention on Climate Change (UNFCCC) 1992 pointed out clearly that developed countries have contributed the biggest proportion of greenhouse gas emission historically and at present, the *per capita emission* of *developing* **countries** is *still relatively low*…
>
> (CD, 2007/10/31)

In the meantime, they also refer to the **topos** of "victim" by highlighting developing countries as the major victims of developed countries' industrialization process and underlining the fact that developed countries have shifted most of the manufacturing to developing countries, as in the following:

> (11) This is because *the globalization process* has shifted most of the manufacturing from *developed* **countries** to the *developing* ones.
>
> (CD, 2009/12/07)

Causal responsibilities of developing countries are rarely mentioned in CD (6), and **mitigated** by attributing them to some external factors like producing industrial products for developed countries or the necessity for economic development, as in the following:

> (12) Increased demand has led to high oil prices and *developing* **countries** *have to depend* more on coal, which leads to even bigger greenhouse gas emission.
>
> (CD, 2007/10/31)

By contrast, NYT not only **downplays** causal responsibilities but also gives an equal emphasis on the causal responsibilities of developed (8) and developing (7) countries. This can be attributed to the journalistic practice of balanced reporting. Besides, although causal responsibilities of developed countries are acknowledged in the NYT, no consistent discursive strategies can be identified. However, the causal responsibilities of developing countries are underlined through the **topos** of "now". NYT tends to highlight developing countries' current contributions to climate change (see Example 13). Developing countries are constructed as desperate for economic development at the expense of the environment. They blame developing countries, China and India in particular, by highlighting their current contributions to the world's emissions and the growing fossil fuel consumption (see Example 14).

13

(13) *Developing **countries*** are <u>now</u> responsible for *<u>two-thirds</u>* of the world's emissions.

<div align="right">(NYT, 2014/09/21)</div>

(14) *Developing **countries***-China and India being only the most dramatic examples-*<u>want to burn</u> <u>whatever energy they need, in whatever form available</u>*, to grow their economies and raise the living standard of their people.

<div align="right">(NYT, 2015/12/07)</div>

Overall, CD gives a negative representation of developed countries by constructing them as the main contributors to climate change and underlining their historical contributions to the current climate crisis. Meanwhile, it gives a positive representation of developing countries by constructing them as victims of the problems caused by developed countries. By contrast, NYT not only downplays causal responsibilities by giving an equal emphasis on developed and developing countries but also underlines the current contributions of developing countries to climate change.

4.2.2 Treatment Responsibility

A close examination of the concordance lines of *developed* (388) countries in CD finds that two themes emerge: (1) developed countries must take the lead in cutting emissions and help developing countries (200, 76.6%); and (2) developed countries have not fulfilled their due treatment responsibilities (61, 23.4%). The first theme takes the dominant share (200, 76.6%) in CD's representations of treatment responsibilities, as in the following:

(15) The developing countries are insisting that the *industrialized **countries*** take the lead, as the latter are responsible for the atmosphere's accumulation of greenhouse gases (GHG) in the last 200 years.

<div align="right">(CD, 2009/06/15)</div>

Among them, deontic modal verbs *should* (82) and *must* (4) are often used to underline developed countries' treatment responsibilities. Besides, developed countries often occur as the "Target" of some verbs used to express the verbal process, as can be seen from the expressions *urged* (14) or *called on* (14) (Halliday, 1994: 141). They contribute to the construction of treatment responsibilities of developed countries. However, CD also gives a negative representation of developed countries by highlighting their failure or reluctance to fulfil their due treatment responsibilities (61, 23.4%). Developed countries are negatively **predicated** by such expressions as ***insufficient*** *sincerity*, ***inadequate*** *efforts*, *lagging **far behind***, ***falls well short*** *of their fair share*, and *talked much but did **very little***. Examples are as follows:

(16) It is a pity that *developed **countries*** have shown *<u>insufficient sincerity</u>* and made *<u>inadequate</u> <u>efforts</u>* to fulfill the above obligations.

<div align="right">(CD, 2007/10/31)</div>

(17) However, the *developed **countries*** are <u>*lagging far behind*</u> in providing effective financial and technological support to developing countries.

<div align="right">(CD, 2011/03/03)</div>

(18) A recent review of the INDCs by civil society groups shows that the ambition of all large *developed **countries*** <u>*falls well short of their fair share*</u>.

<div align="right">(CD, 2015/11/27)</div>

(19) However, in these 10 years, *developed **countries*** <u>*talked much but did very little*</u>.

<div align="right">(CD, 2009/08/12)</div>

Intensification strategies have also been used by CD to underline developed countries' consistent negative stance towards climate change, as can be seen from the adverbs like *even* and *too*. Examples are as follows:

(20) On top of the fact that rich countries are responsible for today's global warming, these countries <u>*are **even** reluctant to*</u> give the funds and technical support that *developing **countries*** need to tackle the problem.

<div align="right">(CD, 2007/05/24)</div>

(21) *Developed **countries*** have pledged $9.7 billion to the UN's Green Climate Fund, <u>*but the amount remains **too** small*</u> compared to their promise to mobilize $100 billion per year in climate finance by 2020, Zou says.

<div align="right">(CD, 2014/12/05)</div>

An examination of 228 concordance lines of *developing* in CD finds that four themes emerge: (1) developed countries' responsibilities to help developing countries (100, 44%); (2) developing countries' treatment responsibilities for climate change (69, 30%); (3) developing countries' differentiated responsibilities for climate change (41, 18%); and (4) developed countries' too high expectations of developing countries' treatment responsibilities for climate change (18, 8%). In other words, they underline the important role of developing countries to fulfil proper treatment responsibilities on the one hand, and highlight developed countries' contributions to developing countries on the other hand.

(22) **Theme 1**: "The transfer and application of existing technologies is <u>*a necessary precondition*</u> for *developing **countries*** to get on the road of low carbon emissions," he said.

<div align="right">(CD, 2008/04/24)</div>

(23) **Theme 2**: *Developing **countries*** <u>*should also*</u> make, implement, publicize and regularly update their national programs to address climate change.

<div align="right">(CD, 2007/10/31)</div>

(24) **Theme 3**: China said on Oct 4 that *developing **countries'*** <u>*right to development*</u> must be guaranteed in order to achieve a positive progress in tackling with climate change problems.

<div align="right">(CD, 2010/10/08)</div>

(25) **Theme 4**: But *developed **countries*** have been <u>*pushing the leading emerging economies*</u> - China, India, Brazil and South Africa - to shoulder more responsibility as their emissions have risen in step with their growing economic clout.

An examination of the 44 concordance lines that address the treatment responsibilities of developed countries in NYT finds that although some of them acknowledge developing countries' request for developed countries to fulfil their commitments (11) and developed countries' failure to fulfil their responsibilities (5), the majority of them (28) still give a positive representation of developed countries by underlining their agreement to help developing countries to cut climate change, as in the following:

(26) *Developed **nations** <u>agreed to</u>* give $100 billion a year by 2020, which will require coordination and planning on a large scale, and the United States may have a critical role in that planning.

(NYT, 2016/12/14)

Besides, it also justifies the US government's failure to fulfil its responsibilities by attributing it to the unfair commitments made by developing countries or other developed countries, as in the following:

(27) Until now, negotiations had followed a divide put in place by the 1997 Kyoto Protocol, which required that *developed **countries*** act *<u>but did not require anything</u>* of developing nations, including China and India, two of the largest greenhouse gas polluters.

(NYT, 2014/12/14)

On the contrary, developing countries are generally represented as passive in solving the climate issue. Their inactive attitude is highlighted by using **mitigation** strategies, e.g., negation. Negation (17) is largely employed to not only highlight the exemption of developing countries from taking up responsibilities but also presuppose their obligations to accept emissions caps. They are expected to shoulder responsibilities but they are treated with softer rules. It thus shows NYT's negative attitudes towards their inaction to limit carbon emissions. The unsatisfactory emotions are also revealed by highlighting developing countries' refusal to take steps against greenhouse gases, as evidenced by such expressions as *rejected any mandatory limit* and *simply walk away*. They contribute to the construction of an irresponsible and willful image of developing countries, as in the following:

(28) But in the years after the protocol was announced, *developing **countries***, including the fast-growing giants China and India, have held firm on their insistence that they *<u>would accept no emissions cuts</u>*, even though they are likely to be the world's dominant source of greenhouse gases in coming years.

(NYT, 2005/12/04)

5. Discussion and Conclusion

To sum up, a corpus-assisted discourse study of the framing of responsibilities in CD

and NYT finds that they show explicit differences in their representations of causal and treatment responsibilities for climate change. An overall analysis of the two corpora finds that while human causes of climate change have been addressed in both corpora, it is more emphasized in NYT than in CD. Besides, although CD shows consensus on human causes of climate change, NYT tends to highlight the dispute over human causes of climate change. A further analysis of the token *countries* finds that both corpora favour the distinction between developed and developing countries in framing responsibilities for climate change, but it is more apparent in CD than in NYT. Furthermore, both corpora prefer to highlight treatment responsibilities over causal responsibilities. CD prefers to foreground historical causal responsibilities of developed countries for climate change and urges developed countries to take the lead in fulfilling their treatment responsibilities for cutting emissions and helping developing countries deal with climate change. It is consistent with the emphasis of the Chinese government on "differentiated responsibilities" for climate change (Pan et al., 2021). NYT prefers to highlight current causal responsibilities of developing countries for climate change and argues for the shared treatment responsibilities of developing and developed countries for climate change. This is consistent with the US government's wish to shirk treatment responsibilities for climate change and shift them to developing countries (e.g., Liang et al., 2014; Post et al., 2019).

Therefore, media representations of international issues tend to be filtered by prisms of national interests (Lee et al., 2002). Be it CD or NYT, the ideological square of "positive self-presentation and negative other-presentation" (van Dijk, 1998) is still at work in the framing of developed and developing countries' causal and treatment responsibilities for climate change, even though NYT is known for its liberal stance. Both newspapers align with their national interests in framing the causal and treatment responsibilities for climate change. This can be revealed by not only their choice of topics/themes but also their choice of some discursive strategies and the linguistic means and realizations. Even though the responsibilities for climate change have been widely recognized and acknowledged in scientific and academic circles, their representations in news media are still full of discrepancies and controversies. This further suggests that climate problems are not only a scientific issue but also a discursive issue, and that news media always serve as an important site of discursive struggles (Boykoff, 2007; Liang et al., 2014; Post et al., 2019).

The particular ways of framing responsibilities should merit our further attention and necessitate a critical examination given news media's significant role in shaping public understanding of certain global issues. The main contributions of this research lie in not only revealing their different ways of framing responsibilities at different levels of discourse but also the CADS approach adopted. A combination of the methods and theories in CDA and CL can present not only a holistic picture of the representations of the issue over a long period but also the detailed discursive and linguistic strategies used for manipulating public perceptions of a contentious issue. It is hoped that it can contribute to the growing literature towards this endeavor.

References

Anderson D, Philip C and Monika D (2018) Fanning the blame: Media accountability, climate and crisis on the Australian "fire continent". *Environmental Communication* 12(7): 928-941.

Baker P (2006) *Using Corpora in Discourse Analysis*. London and New York: Continuum.

Baker P, Costas G, Majid K, Michał K, Tony M and Ruth W (2008) A useful methodological synergy? combining critical discourse analysis and corpus linguistics to examine discourses of refugees and asylum seekers in the UK press. *Discourse & Society* 19(3): 273-306.

Billett S (2010) Dividing climate change: Global warming in the Indian mass media. *Climatic Change* 99(1): 1-16.

Boykoff J (2012) US media coverage of the Cancun Climate Change Conference. *PS: Political Science and Politics* 45(2): 251-258.

Boykoff MT (2007) Flogging a dead norm? Newspaper coverage of anthropogenic climate change in the United States and United Kingdom from 2003 to 2006. *Area* 39(4): 470-481.

Boykoff MT and Boykoff JM (2004) Balance as bias: Global warming and the US prestige press. *Global Environmental Change* 14(2): 125-136.

Carvalho A (2007) Ideological cultures and media discourses on scientific knowledge: Re-reading news on climate change. *Public Understanding of Science* 16(2): 223-243.

Catalano T and Linda RW (2020) *Critical Discourse Analysis, Critical Discourse Studies and Beyond*. Cham: Springer.

Chen F and Wang G (2020) A war or merely friction? Examining news reports on the current Sino-US trade dispute in The New York Times and China Daily. *Critical Discourse Studies* 19(1): 1-18.

Cheng W (2013) Corpus-based linguistic approaches to critical discourse analysis. In: Chapelle C (ed) *The Encyclopedia of Applied Linguistics*. West Sussex: Wiley-Blackwell, pp.1353-1360.

Entman RM (1993) Framing: Toward clarification of a fractured paradigm. *Journal of Communication* 43(4): 51-58.

Fairclough N (1995) *Media Discourse*. London: Arnold.

Freeman BC (2017) Claims, frames, and blame: Coverage of climate change in ASEAN's English-language Newspapers, 2002-2012. *Sage Open* 7(1): 1-12.

Gitlin T (1983) *Inside Prime Time*. New York: Pantheon Books.

Grundmann R and Krishnamurthy R (2010) The discourse of climate change: A corpus-based approach. *Critical Approaches to Discourse Analysis across Disciplines* 4(2): 125-146.

Halliday MAK (1994) *An Introduction to Functional Grammar*. 2nd ed. London: Arnold.

Heggelund G and Nadin R (2017) Climate change policy and governance 1. In: Sternfeld E (ed) *Routledge Handbook of Environmental Policy in China*. London and New York: Routledge, pp.97-112.

Holton A, Weberling B, Christopher CE and Smith MJ (2012) The blame frame: Media attribution of culpability about the MMR-Autism vaccination scare. *Health Communication* 27(7): 690-701.

Iyengar S (1990) Framing responsibility for political issues: The case of poverty. *Political Behavior* 12(1): 19-40.

Iyengar S (1991) *Is anyone responsible?: How television frames political issues*. Chicago, IL: University

of Chicago Press.

Iyengar S (1996) Framing responsibility for political issues. *The Annals of the American Academy of Political and Social Science* 546(1): 59-70.

Kijratanakoson N (2022) The discursive representation of male sex workers in Thai newspapers. *Journalism* 0(0): 1-21.

Kim HS and Lee S (2008) National interest, selective sourcing and attribution in air disaster reporting. *The Journal of International Communication* 14(1): 85-103.

Kim SH, Carvalho JP and Davis AC (2010) Talking about poverty: News framing of who is responsible for causing and fixing the problem. *Journalism & Mass Communication Quarterly* 87(3-4): 563-581.

Kim YC, Shim M, Kim JH and Park K (2017) Factors affecting the "locus of responsibility" in cancer news: Focusing on the role of health journalists' medical expertise in South Korea. *Journalism & Mass Communication Quarterly* 94(2): 465-485.

Koteyko N, Nerlich B, Crawford P and Wright N (2008) Not rocket science or no silver bullet media and government discourses about MRSA and cleanliness. *Applied Linguistics* 29(2): 223-243.

Kuha M (2009) Uncertainty about causes and effects of global warming in US news coverage before and after Bali. *Language and Ecology* 2(4): 1-18.

Lee C-C, Chan JM, Pan Z and So CYK (2002) *Global Media Spectacle: News War over Hong Kong*. Hong Kong: Hong Kong University Press.

Li J (2010) Transitivity and lexical cohesion: Press representations of a political disaster and its actors. *Journal of Pragmatics* 42(12): 3444-3458.

Liang X, Tsai J-Y, Mattis K, Konieczna M and Dunwoody S (2014) Exploring attribution of responsibility in a cross-national study of TV news coverage of the 2009 United Nations Climate Change Conference in Copenhagen. *Journal of Broadcasting & Electronic Media* 58(2): 253-271.

Liu M (2017) "Contesting the Cynicism of Neoliberalism": A corpus-assisted discourse study of press representations of the Sino-US currency dispute. *Journal of Language and Politics* 16(2): 242-263.

Liu M and Huang J (2022) "Climate change" vs. "global warming": A corpus-assisted discourse analysis of two popular terms in The New York Times. *Journal of World Languages* 8(1): 34-55.

Liu M and Li C (2017) Competing discursive constructions of China's smog in Chinese and Anglo-American English-language newspapers: A corpus-assisted discourse study. *Discourse & Communication* 11(4): 386-403.

Liu M and Ma J (2021) The politics of fear in Hong Kong protest representations: A corpus-assisted discourse study. *Journal of Language and Politics* 31(1): 37-59.

Liu M, Zhao R and Ngai CSB (2022) Vaccines, media and politics: A corpus-assisted discourse study of press representations of the safety and efficacy of COVID-19 vaccines. *Plos One* 17(12): 1-18.

Liu M and Zhong J (2020) Between national and local: Identity representations of post-colonial Hong Kong in a local English newspaper. D*iscourse, Context & Media* 36: 1-9.

Nerlich B, Forsyth R and Clarke D (2012) Climate in the news: How differences in media discourse between the US and UK reflect national priorities. *Environmental Communication* 6(1): 44-63.

Olausson U (2009) Global warming—global responsibility? Media frames of collective action and scientific certainty. *Public Understanding of Science* 18(4): 421-436.

Pan Y, Opgenhaffen M and Van Gorp B (2021) China's pathway to climate sustainability: A diachronic

framing analysis of People's Daily's coverage of climate change (1995–2018). *Environmental Communication* 15(2): 1-14.

Partington A (2010) *Modern Diachronic Corpus-Assisted Discourse Studies*. Edinburgh: Edinburgh University Press.

Partington A, Morley J and Haarman L (2004) *Corpora and Discourse.* Bern: Peter Lang.

Peng W and Tang L (2010) Health content in Chinese newspapers. *Journal of Health Communication* 15(7): 695-711.

Post S, Königslöw KK and Schäfe MS (2019) Between guilt and obligation: Debating the responsibility for climate change and climate politics in the Media. *Environmental Communication* 13(6): 723-739.

Rayson P (2008) From key words to key semantic domains. *International Journal of Corpus Linguistics* 13(4): 519-549.

Reisigl M and Wodak R (2016) The discourse historical approach (DHA). In: Wodak R and Meyer M (eds) *Methods of Critical Discourse Studies*. London: Sage, pp.23-61.

Schlesinger M and Lau RR (2000) The meaning and measure of policy metaphors. *American Political Science Review* 94(3): 611-626.

Schmidt A, Ivanova A and Schäfer MS (2013) Media attention for climate change around the world: A comparative analysis of newspaper coverage in 27 countries. *Global Environmental Change* 23(5): 1233-1248.

Tognini-Bonelli E (2001) *Corpus Linguistics at Work.* Amsterdam and Philadelphia: John Benjamins.

van Dijk TA (1998) *Ideology: A Multidisciplinary Approach.* London: Sage.

Villar A and Krosnick JA (2011) Global warming vs. climate change, taxes vs. prices: Does word choice matter? *Climatic Change* 105(1-2): 1-12.

Wodak R and Ludwig C (1999) *Challenges in a Changing World*. Vien: Passagen Verlag.

Wodak R and Meyer M (2016) *Methods of Critical Discourse Analysis*. London: Sage.