

Framing Climate Change: A Content Analysis of Chinese Mainstream Newspapers From 2005 to 2015

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This study investigates the Chinese media coverage on climate change over the period 2005 to 2015. By analyzing 1,248 news articles from five mainstream Chinese newspapers, we identify six frames in climate change reporting: conflict, collaboration, human interest, attribution of responsibility, environmental and human impact, and leadership. The environmental and human impact frame is used the most, followed by the frames of attribution of responsibility, collaboration, and conflict. Results also reveal that the use of certain frames is associated with the use of certain information sources. This study suggests the overlooked fact that Chinese party-sponsored newspapers have been framing climate change from the perspective of global collective efforts.

Keywords: climate change, media framing, Chinese media

Climate change is a serious problem in the 21st century. The consequences and impacts of climate change, such as extreme weather and energy crises, are widespread and far-reaching. According to the United Nations Framework Convention on Climate Change (UNFCCC, 2009), billions of people face water shortage and health risks due to climate change. Furthermore, the UNFCCC calls for urgent adaptation to climate change, particularly in developing countries.

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While scientists have observed ample evidence on the environmental risk, public perceptions of climate change remain fragmented. For example, climate change is still a controversial topic in the United States, with 25% of Americans skeptical about the evidence of climate change (Saad, 2014). Such skeptical attitudes slow the global effort to mitigate climate change (Jang & Hart, 2015). Compared with people from the United States (41%) and other Asia/Pacific regions (48%), more Chinese people (49%) believe climate change is harming people now (Stokes, Wike, & Carle, 2015). Because the public perception of climate change relies heavily on mass media (Xie, 2015), it is important to examine the ways media frame and present the topic. Such an exploration is particularly meaningful in China, which is the largest greenhouse gas emitter and the second-largest economy in the world (Buckley, 2010; "China overtakes," 2010).

Over the past decades, a growing body of social scientific research has investigated climate change with respect to developed countries (e.g., Leiserowitz, Maibach, Roser-Renouf, & Hmielowski, 2012; Stamm, Clark, & Eblacas, 2000). Meanwhile, research on developing countries has been increasing, too (e.g., Billett, 2010; Gordon, Deines, & Havice, 2010; Mercado, 2012; Semujju, 2013; Shanahan, 2009; Takahashi, 2011), though Chinese media coverage of climate change is still underexplored (e.g., Xie, 2015). By applying framing theory, the present study fills this gap by investigating generic frames of climate change in Chinese newspaper coverage.

Literature Review

Media Communication and Climate Change

Research indicates that media framing of climate change has shifted from a scientific perspective to a political one (Bødker & Neverla, 2012; Carvalho, 2007). Climate change has become an important issue on the media's political agenda (Sonnett, 2010; Weingart, Engels, & Pansegrau, 2000). For example, climate change is frequently framed from the perspective of political conflict by the news media in several developed countries, such as the United States and France (Brossard, Shanahan, & McComas, 2004; Dirikx & Gelders, 2010). Furthermore, government officials have become the most frequently cited information sources in the media coverage of climate change in both developed and developing countries (Shehata & Hopmann, 2012; Takahashi, 2011), implying the politicalizing tendency in reporting on climate change.

The perspective shift may lead to media bias in communicating about climate change. Semujju (2013) found that news coverage on climate change in Uganda is biased toward the domestic and international stakeholders who control the media. Among developed countries, the French media are excessively dependent on subjective viewpoints rather than objective facts in reporting climate change (Gordon et al., 2010). In the U.S. news media, the journalistic norms of balanced reporting ironically result in biased coverage of climate change because journalists often give equal space to scientific findings and opposing views (Boykoff & Boykoff, 2004; Boykoff & Boykoff, 2007). As such, there is an urgent call for adopting science-related and health-related frames to better inform the public about the severe consequences of climate change (Meyer, 2007; Semujju, 2013).

Chinese Media and Climate Change

Characteristics of the Chinese Media System

Chinese media have been perceived as "entities of control of censorship" (Sun, 2010, p. 69). The Chinese Communist Party controls the financial and personnel resources of mass media organizations through ownership and political power (Han, 2007). As a result, the mass media in China often reflect the ideology of the party and provide the public with information needed for the party's leadership (Chang, Wang, & Chen, 1994; Tang & Iyengar, 2011).

However, economic reforms since the late 1970s have brought about a gradual introduction of commercialization and decentralization in the Chinese media industry (Sukosd & Wang, 2013). Since 2003, the Chinese government has launched a cultural system reform. As a result, a few media organizations obtained economic autonomy (Sukosd & Wang, 2013). Specifically, the organizations can run their own businesses and manage commercial operations such as pricing, distribution, and advertising. Those economic appeals have led to dramatic changes in the news production process (Anderson, 2009). To maximize revenue, commercial media tend to cater to audiences by adopting Western news values and norms to produce news (Han, 2007; Pan & Chan, 2003). For example, both Chinese and U.S. media were found to employ the same frames to cover the SARS epidemic, despite varying degrees of frame usage (Luther & Zhou, 2005). Contrasted with party-sponsored media, commercial news organizations are characteristic of more freedom in content production and economic operation. Such changes in the media industry have led to a "selectively diversified media environment" (Sukosd & Wang, 2013, p. 100) in China.

Chinese Media Coverage of Climate Change

Previous research has consistently demonstrated substantial differences in reporting styles between party-sponsored media and market-oriented media in China (Luther & Zhou, 2005; Pan & Chan, 2003; Yang, 2009). This suggests media ownership may interact with news production processes in determining journalism values and reporting styles. Because climate change is a topic rife with contested discourses involving governments, scientific communities, industries, and nongovernmental organizations, the interaction between ownership and the production process might result in more diversity in climate change reporting and further complicate public perception of climate change. In China, climate change is also related to political tensions in Tibet (Lewis, 2009) and the bilateral relationship with the United States (Scherer, 2016). Such an emphasis on politics may give Chinese people an impression that climate change is essentially a topic about politics rather than about science, environment, and health (Lewis, 2009; Scherer, 2016).

Research on Chinese media coverage of climate change has mainly focused on Westerners' perceived image of China and comparisons between Chinese and Western media discourses (e.g., Guo, 2010; Jiang & Lei, 2010; Xie, 2015; Yang, 2009; Zheng & Li, 2010). Contrary to the skeptical attitudes exhibited in U.S. news media, Chinese news media emphasize China's great responsibility and advocate for global collaboration to mitigate climate change (Jiang & Lei, 2010; Xie, 2015). It should be noted,

however, that these arguments about the Chinese news media were made from a critical approach, with little empirical support.

Chinese news media are well known for their long-standing role as a mouthpiece for the Chinese Communist Party (Luther & Zhou, 2005), which may affect the media coverage of climate change. As Tolan (2007) observed, Chinese media coverage on climate change has become more intensive following extreme weather events or the release of national policies pertaining to climate change. Specifically, 2007, when China's first national climate change program was launched (National Development and Reform Commission, 2007), was a turning point marking the rapid growth of Chinese media coverage of climate change (Wu, 2009). Q. Zhao (2009) explicitly argued that Chinese news media typically bear the responsibility of facilitating political stability and economic development. Taken together, Chinese news media may be more likely to frame climate change as an issue involving conflict among stakeholders and collaboration among countries.

Framing Analysis

Media Framing

Framing refers to selecting certain aspects of a perceived reality and making them more noticeable, meaningful, and memorable in a communication text (Entman, 1993). Gitlin (1980) introduced the concept framing to the news production context by arguing that frames enable journalists to process and disseminate information to audiences efficiently and routinely. Media framing reflects the intent of journalists, though the motives may be unconscious (Gamson, 1989). The main five factors affecting journalists are social norms and values, organizational pressures and constraints, pressures of interest groups, journalistic routines, and ideological or political orientations of journalists (Scheufele, 1999).

Through framing, news media play an important role in deciding how people think and talk about public issues such as climate change (Gamson, 1988; Pan & Kosicki, 1993; Spence & Pidgeon, 2010). For example, when news stories cover public affairs with a thematic frame, readers attribute significantly more responsibility to the society than to individuals (Major, 2009). Furthermore, people often rely on news frames to decide whether to support or oppose legislation (Gamson, 1988; Iyengar, 1991; Lane, 1962). In short, media frames "promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation" (Entman, 1993, p. 52).

These four functions of frames build a foundation for social scientists to extract specific frames from news articles (Xie, 2015). However, researchers have criticized the body of framing research for its lack of systematic structuring and theory building (Scheufele, 1999). In this regard, research on generic frames, as opposed to issue-specific frames, has been recommended for making intercultural comparisons (de Vreese, 2005).

Framing Climate Change

Researchers have identified several news frames on climate change in different countries, including the United States (Boykoff, 2008; Boykoff & Boykoff, 2004; Shehata & Hopmann, 2012; Trumbo, 1996), France (Brossard et al., 2004), Sweden (Olausson, 2009; Shehata & Hopmann, 2012), and Australia (Jang & Hart, 2015). The most common frames used in these countries are frames of solutions, responsibilities, consequences/effects, science, and international relations/conflicts. Another consistent result in the literature is the frequent use of the scientific-uncertainty frame in U.S. media. Specifically, research has found that U.S. media presented skeptical attitudes toward the reality of climate change and exhibited substantial debates about the cause (Boykoff, 2007a, 2007b; Brossard et al., 2004; Liang, Tsai, Mattis, Konieczna, & Dunwoody, 2014; Shehata & Hopmann, 2012; Wilson, 2000; Xie, 2015; Zehr, 2000). Media coverage in European countries (e.g., the United Kingdom, Germany, and France) also displayed skepticism about climate change, but to a lesser extent than the U.S. media (Gavin & Marshall, 2011; Olausson, 2009).

In view of the large body of framing studies in developed countries, scholars (e.g., Shanahan, 2009) have called for more research on developing countries, especially the most vulnerable districts and countries with huge greenhouse gas emissions. The news frames adopted in developed countries have also been used in developing countries, but to varying degrees (Billett, 2010; Gordon et al., 2010; Mercado, 2012; Semujju, 2013; Shanahan, 2009; Takahashi, 2011). Research suggests that the media in developing countries tend to focus on environmental impacts (e.g., in Brazil, South Africa, and Swaziland) and on mitigations (e.g., in Brazil and Peru; Shanahan, 2009; Takahashi, 2011). Of great interest is the nationalistic position in the North-South frame depicted by media in developing countries such as India and Malaysia. Discourse analysis indicates that the nationalism frame, or the North-South frame, creates conflict between developed and developing countries (Billett, 2010; Manzo & Padfield, 2016).

The generic frames created by Semetko and Valkenburg (2000) have been widely identified in various cultures and in different news contexts (e.g., d'Haenens & Lange, 2001; Dirikx & Gelders, 2010). Dirikx and Gelders (2010) identified four generic frames frequently appearing in the context of climate change in Dutch and French newspapers: conflict, economic consequences, human interest, and attribution of responsibility. Research indicates that the four generic frames also appear in Chinese news media coverage of environmental issues (Tong, 2014). For example, Jiang and Lei (2010) located these frames in Chinese media reporting of the Copenhagen Climate Change Conference. Similarly, Xie (2015) examined two Chinese newspapers (i.e., *People's Daily* and *China Daily*) from 2005 to 2008 and found that attribution of responsibility, human interest, and non-human interest were the dominant frames. Premised on the sophisticated role of political systems and power in news production, Luther and Zhou (2005) identified leadership as a prevalent frame in the coverage of health issues in China. The authors argued that the leadership frame might be prevalent in the international news context because of the pivotal role of leadership in international interactions. This discussion leads to the first research question:

RQ1: Which frames are salient in Chinese media coverage of climate change?

Sources of Information

The dominance of certain sources may influence how media frame social issues (Liebler & Bendix, 1996). Examining information sources is a way to understand the competition among stakeholders such as policy makers and scientists. In other words, the use of certain information sources in news coverage may reveal the power relationship between interest groups in defining issues pertaining to climate change. Empirical research has found that certain information sources (e.g., officials, scientists, citizens) are more powerful in shaping public perceptions of climate change than other sources, such as actors in nongovernmental and industry organizations (Mormont & Dasnoy, 1995; Shehata & Hopmann, 2012; Takahashi, 2011).

Furthermore, Anderson (2009) pointed out that political institutions, the scientific community, nongovernmental organizations, and industry have established different perspectives on climate change. For example, in Peru, government officials tend to use the "solution" frame, whereas researchers are more likely to use the "effects" frame (Takahashi, 2011). Given the important role of sources in media coverage, we propose the following research questions:

RQ2: Which information source is dominant in Chinese media coverage of climate change?

RQ3: How do different information sources correlate with news frames of climate change?

Media Types and Frames

The frequency and pattern of frame usage may not be uniform across different types of media, considering the evolving Chinese media system over the past decade. Chinese news media today are less centralized and more diverse than in the Mao era (Sukosd & Wang, 2013). On one hand, deep-seated party journalism requires that all news should serve the Chinese Communist Party. On the other hand, professional journalism as a new paradigm has been increasingly adopted among Chinese correspondents (Pan & Chan, 2003; Y. Zhao, 2011). The new paradigm prioritizes the needs of audiences and promotes a higher degree of professional autonomy (Pan & Chan, 2003). The coexistence of traditional and new journalistic paradigms may affect how a medium covers climate change. For instance, *People's Daily*, as an official newspaper of the Chinese Communist Party, is more likely to support the stand of the official party (Pan & Chan, 2003). In contrast, a quite different style emerges from market-oriented media such as *Southern Weekly* and *Southern Metropolis Daily* (Yang, 2009). These newspapers are more likely to support professional journalism and practice Western news values and norms (Luther & Zhou, 2005; Yang, 2009). Moreover, according to the Chinese Club of Climate Change Reporting (2008), limited access to official authorities is one of the main barriers that Chinese correspondents encounter in reporting on climate change. Journalists affiliated with *People's Daily* and the National Xinhua News Agency typically have the privilege of interviewing high-ranked officials, which makes the media coverage more likely to reflect the government's opinions. Unequal access to various types of sources may further widen the discrepancy between party-sponsored and market-oriented media. In this case, it is reasonable to propose that:

H1: *Party-sponsored and market-oriented media differ in their use of news frames in coverage of climate change.*

Method

Sample and Procedure

To address the research questions and hypothesis, we conducted a content analysis of newspaper articles from 2005 to 2015. The five chosen Chinese daily newspapers were *People's Daily*, *Xinhua Daily Telegraph*, *Science and Technology Daily*, *Southern Metropolis Daily*, and *Xinmin Evening News*. In selecting the five newspapers, we considered the following criteria. First, these newspapers are important information purveyors for Internet news portals and mobile apps, which are the main channels for the public to learn about climate change (Center for China Climate Change Communication, 2012). Correspondents for commercial news websites in China have limited privilege to produce their own news stories, but they do have full rights to relay news from other traditional media such as newspapers and television programs. Second, circulation sizes of these newspapers are top ranked in China. Third, the selected newspapers are representative of a wide spectrum of Chinese media, across party-sponsored and market-oriented, national and local, general and specialized media outlets. *People's Daily* is known worldwide as a mouthpiece for the Chinese Communist Party. *Xinhua Daily Telegraph*, published by the National Xinhua News Agency, is typically viewed as an official, national, and general daily newspaper. Given the link between climate change and science, *Science and Technology Daily* was chosen as an example of national and specialized scientific newspapers. In contrast to these three national news outlets, *Southern Metropolis Daily* and *Xinmin Evening News* are local and market-oriented newspapers that have good reputations nationally. In this study, party-sponsored newspapers are represented by *People's Daily* and *Xinhua Daily Telegraph*. Although *Science and Technology Daily* is also party-sponsored, as a specialized newspaper, it might have different patterns of frame usage from the other two party-sponsored general media because of its emphasis on scientific coverage. Therefore, we categorized it as representative of specialized newspapers in climate change reporting. Market-oriented newspapers are exemplified by *Southern Metropolis Daily* and *Xinmin Evening News*. Table 1 presents basic information about each newspaper.

Table 1. Basic Information on the Five Newspapers.

	<i>People's Daily</i>	<i>Xinhua Daily Telegraph</i>	<i>Science and Technology</i>	<i>Xinmin Evening News</i>	<i>Southern Metropolis Daily</i>
Daily circulation	2,400,000	200,000	100,000	1,280,000	1,845,000
Distribution area	National	National	National	Local	Local
News coverage	General	General	General	General	General
Profit model	Party-sponsored	Party-sponsored	Party-sponsored	Market-oriented	Market-oriented
Rank of status	Ranked first among all Chinese newspapers	—	—	Ranked first among local newspapers in Shanghai	Ranked first among local newspapers in Guangzhou

Note. All information is from <http://www.meihua.info/>.

News articles on climate change in these five newspapers were collected during the annual session of the Conference of the Parties by the UNFCCC and for one week before and one week after the conference annually from 2005 to 2015. This period was chosen for several reasons. The conference is the most formal meeting of the UNFCCC to assess global progress about climate change mitigation. It has been said to be the most important human activity in global climate change mitigation (Bruce, Lee, & Haites, 1996). Additionally, as indicated by the Baidu Index, a Chinese equivalent of the Google search engine, Chinese media pay close attention to climate change during the annual session of the Conference of the Parties. More importantly to the present study, research suggests that the social construction of climate change, such as reporting values and ideologies of journalism practice, is most clearly reflected during this period (Carvalho & Burgess, 2005).

The year 2005 was designated as the starting point of the sampling time window because it was in February 2005 that the Kyoto Protocol came into effect. The Kyoto Protocol is a landmark for worldwide efforts on combating climate change. To safeguard against potential bias in reporting on the days of the conference, articles published one week before and one week after the annual conference were also collected. We used keywords including *climate change* and *global warming* as well as names of conference locations to search for relevant news articles. After removing irrelevant pieces, such as advertisements, a total of 1,248 articles from 2005 to 2015 were retained for the final sample. Specifically, 255 articles came from *People's Daily*, 146 from *Xinhua Daily Telegraph*, 433 from *Science and Technology Daily*, 230 from *Southern Metropolis Daily*, and 184 from *Xinmin Evening News*. All articles were downloaded from the WiseSearch (*Huik*) database and the *People's Daily* database.²

Three trained graduate students coded all the articles. We randomly chose 135 articles (10.8% of the final sample) to assess coding reliability. Discrepancies were resolved via discussion among the coders. The final intercoder reliabilities ranged from .76 to 1.00 (Krippendorff's alpha). Based on the revised coding scheme, we recoded the pilot subsample articles and included them in further analyses (Neuendorf, 2017).

Measurement

Climate Change Frames

In light of past literature and Chinese media practices, we used a deductive approach to select and assess six popular generic news frames: conflict, attribution of responsibility, human interest, economic consequence, and leadership. The present study also applied an inductive method based on empirical data to explore media frames. Entman (1993) suggested that the presence or absence of certain keywords is an important sign that assists researchers in locating frames in news articles. Having carefully read 200 sampled articles, the researchers and research assistants agreed on establishing a new

² WiseSearch (<http://wiseneews.wisers.net/wiseneews>) provides access to hundreds of newspapers published in the Greater China area. Wiser (<http://www.wisers.com/en/>) is the largest database of Chinese news media. It was established in Hong Kong in 1998, supported by the Chinese University of Hong Kong. Most Chinese universities purchase access to the database.

"collaboration frame" featuring "community of interest," "joint efforts," and "agreement" in conference-related coverage. The collaboration frame conveys a certain shared meaning that may not be explained by previously identified frames.

The frames of conflict, attribution of responsibility, human interest, and economic consequence were assessed with the scale developed by Semetko and Valkenburg (2000). To better tap into the Chinese cultural and political context, the scale was slightly adapted. New items were designed to measure the frames of collaboration, environmental and human impact, and leadership in the climate change context. Specific measurement items are presented in Table 2, with each being coded as 1 (*yes*) if it appears in a news article and coded as 0 (*no*) otherwise. For each coded article, the calculated average score of items under each frame category was used to denote the frame score. As a result, the calculated frame index was a continuous variable, with scores ranging from .00 (*absence*) to 1.00 (*presence*). The frame score captures the degree to which a certain frame characterizes a news article. For instance, a conflict frame score of .6 in combination with a collaboration frame score of .3 indicates that the article emphasizes conflict twice as much as collaboration. Simply speaking, the higher the score of a frame, the more the frame is incorporated into the article.

Sources of Information

Sources were classified into three general categories (domestic officials, international officials, and nonofficials), which were divided into 11 subcategories for coding (adapted from Shehata & Hopmann, 2012). Specifically, the domestic officials source was defined as officials from either the central government or local government in China; the international officials source was confined to officials from the United Nations or foreign countries; and nonofficials consist of Chinese scholars/scientists, foreign scholars/scientists, members of nongovernment organizations, businesspeople, Chinese citizens, foreign citizens, and others. Similar to the calculation of the frame index score, the index of information source was coded as 1 (*presence*) and 0 (*absence*), with a higher score referring to more use of that specific source in the article.

Results

Exploratory factor analysis with promax rotation was conducted with Mplus v.7.0 and yielded a six-factor solution, $\chi^2(253, N = 1,248) = 16,133.12; p < .0001$; root mean square error of approximation = 0.032; comparative fit index = 0.99; Tucker-Lewis index = 0.98; standardized root mean residual = 0.065. Overall, the 21 framing items were clustered into six dimensions, which account for 71.25% of variance of the original items (see Table 2).

Table 2. Factor Loadings.

Framing Items	Frame					
	A	B	C	D	E	F
A. Conflict frame						
Does it reflect disagreements between individuals/groups/parties/countries?	0.66	0.15	0.02	-0.32	-0.16	0.18
Does one individual/group/party/country reproach another?	0.80	-0.28	0.08	-0.08	0.08	0.27
Does it refer to two sides or more of the issue?	0.63	0.14	0.08	-0.38	-0.15	0.18
Does it refer to dissatisfaction of one side to another?	0.86	-0.27	0.07	-0.06	0.02	0.34
B. Collaboration frame						
Does it reflect willingness of collaboration between individuals/groups/parties/countries?	0.28	0.88	0.15	-0.26	0.55	-0.17
Does it refer to common positions/ goals between individuals/groups/ parties/countries?	0.32	0.88	0.18	-0.16	0.43	-0.10
Does it emphasize that two or more sides are positively working together on protocols?	0.48	0.84	0.20	-0.17	0.21	-0.04
C. Attribution of responsibility frame						
Does it suggest that some level of government has the ability to alleviate climate change?	0.03	-0.15	0.61	-0.07	0.10	-0.17
Does it suggest that some level of government is responsible for climate change?	0.35	0.17	0.70	-0.15	0.18	0.03
Does it suggest solutions to climate change?	0.05	0.11	0.79	-0.09	0.07	-0.21
Does it suggest that an individual/group is responsible for climate change?	-0.02	-0.09	0.64	0.22	-0.06	-0.11
D. Human interest frame						
Does it provide a human example on the issue?	-0.29	-0.22	-0.16	0.98	-0.39	-0.14
Does it employ adjectives/personal vignettes that generate feelings?	-0.11	-0.08	-0.08	0.99	-0.23	0.06
Does it emphasize how individuals/groups are affected?	-0.22	-0.27	-0.20	0.94	-0.29	0.04
Does it go into the private/personal lives of the actors?	-0.26	-0.26	-0.09	0.96	-0.21	-0.08
Does it contain visual information that might generate feelings?	-0.11	-0.16	-0.07	0.98	-0.23	0.04
E. Leadership frame						
Does it refer to related activities of leaders?	0.11	0.28	0.16	-0.14	0.81	-0.27
Does it refer to related comments of leaders?	0.22	0.21	0.17	-0.27	1.01	-0.19
Does it refer to related attitudes of leaders?	0.19	0.26	0.17	-0.25	0.82	-0.30
F. Environmental and human impact frame						
Does it refer to impact of climate change on nature?	-0.49	-0.33	-0.24	0.01	-0.30	0.64
Does it refer to impact of climate change on human beings?	-0.59	-0.36	-0.35	0.17	-0.39	0.66

Note. "It" refers to the story. The scale was adapted from Semetko and Valkenburg (2000).

Specifically, the *conflict frame* connotes that the article emphasizes disagreements or arguments among individuals, groups, parties, or countries. In contrast, the *collaboration frame* suggests the opposite of the conflict frame, indicating that the story highlights agreements, willingness to collaborate, or joint efforts among individuals, groups, parties, or countries. The *human interest frame* implies that the article employs a personal narrative to describe the impact of climate change on individuals, and hence is more likely to evoke emotions such as outrage, empathy, caring, sympathy, or compassion. The *attribution of responsibility frame* means that certain organizations or individuals should be held accountable for causing or worsening the problem. The *environmental and human impact frame* is characterized by an emphasis on fact-based outcomes with respect to the environment and human life because of climate change. The *leadership frame* depicts the pivotal role of leaders and focuses on their attitudes or everyday actions with regard to climate change mitigation (see Table 3 for examples of each frame). The *economics frame* was deleted from the analysis because less than 0.5% of articles applied this particular frame.³

RQ1 asks which frames are salient in the Chinese news media. We found that the environment and human impact frame (22.43%) appeared the most, followed by the frames of attribution of responsibility (21.92%), collaboration (20.22%), and conflict (19.02%). The frames of leadership and human interest were used the least, accounting for 13.05% and 3.36%, respectively. Figure 1 shows the average frequencies of frames in five Chinese newspapers. *People's Daily* used the frames of collaboration leadership more than the other newspapers. *Science and Technology Daily* used the environment frame more than the other newspapers. The human interest frame appeared less frequently than the other frames.

RQ2 asks which information source is used most in Chinese media. Results show that international officials (37.73%) were used the most, followed by nonofficial sources (36.59%) and domestic officials (25.68%). We also conducted a one-way analysis of variance to compare source usage across the party-sponsored newspapers (*People's Daily* and *Xinhua Telecom Daily*), the market-oriented newspapers (*Southern Metropolis Daily* and *Xinmin Evening News*), and the specialized newspaper (*Science and Technology Daily*). We found that the three types of newspapers had significantly different usage of domestic official sources, $F(2, 1,247) = 36.82, p < .0001$. Domestic officials in party-sponsored newspapers consisted of 12.27% of all sources used in the five newspapers, followed by 8.32% in market-oriented newspapers and 5.09% in the specialized newspaper. The three types of newspapers also had significantly different usage of international official sources, $F(2, 1,247) = 7.55, p = .001$. Post hoc analysis revealed a significant difference between the specialized newspaper (10.76%) and the market-oriented newspapers (14.84%), but not between the specialized newspaper and the market-oriented newspapers or between the market-oriented newspapers and the party-sponsored newspapers. Results also indicated significant use of nonofficial sources, $F(2, 1,247) = 9.86, p < .0001$. Specifically, the

³ The measurement for the economic consequence frame was obtained from Semetko and Valkenburg (2000, p. 100). The frame was measured with three items: "Is there a mention of (financial) losses or gains now or in the future?"; "Is there a mention of the costs/degree of expense involved?"; "Is there a reference to (economic) consequences of pursuing or not pursuing a course of action?"

specialized newspaper (15.84%) used nonofficial sources more than both the party-sponsored newspapers (9.47%) and the market-oriented newspapers (11.29%).

Table 3. Examples of Each Frame.

Conflict frame

Example 1: The United States declined to reduce greenhouse gas emissions and to collaborate with other countries on the climate change issue. The United States did not accept the conclusion drawn by scientists that the global warming phenomenon is the result of human activities.

Example 2: The United States agreed only on participating in "unconstrained" negotiation about long-term strategies of climate change mitigation.

Collaboration frame

Example 1: Parties to the Kyoto Protocol agreed to negotiate a new goal of reduction of greenhouse gas emissions.

Example 2: About 40 developed countries attending the conference agreed to finance the \$100 billion global environmental protection projects.

Attribution of responsibility frame

Example 1: Developed countries should make more efforts for technology innovation and promotion.

Example 2: An official from the United Nations hoped that each country could actively take part in climate change mitigation and put in effort to resolve challenges.

Human interest frame

Example 1: "When I was young, there was rain in spring and snow in winter. Now we have a drought every year," a local farmer said when watching his land.

Example 2: A group of villagers had to move farther down their mountain, becoming "climate refugees" (a story of a village's 50-year migration due to climate change).

Leadership frame

Example 1: Vice Premier Hui Liangyu said that China has been creating an increasingly well-off society that will benefit 1.3 billion Chinese. China will enact more efficient strategies to cope with climate change to prevent and reduce the occurrence of natural disasters.

Example 2: Wan Gang, China's minister of science and technology, met Halonen, president of Finland. They shared their opinions on topics such as the relationship between China and Finland, climate change mitigation, and sustainable development.

Environmental and human impact frame

Example 1: The trend toward a warmer and drier climate in the past five decades will have a negative impact on the ecology of the local area.

Example 2: The Antarctic ozone hole has reached 10 million square miles.

Note. All examples were selected and translated from the original Chinese newspaper articles.

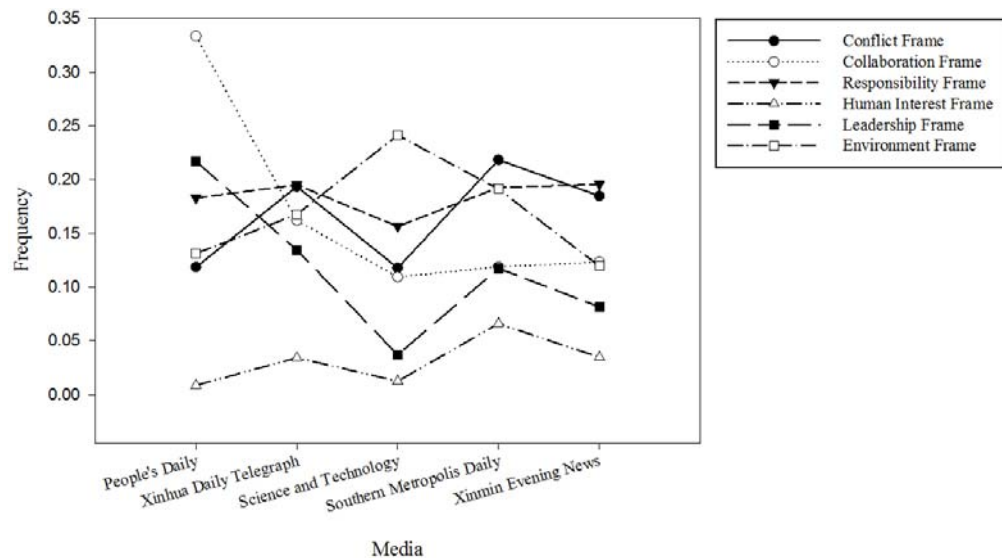


Figure 1. Average use of frames in five Chinese newspapers. The frequency scale ranges from 0 (absence) to 1 (presence). From left to right along the x axis, the newspapers are less likely to practice party journalism and more likely to be market-oriented. Southern Metropolis Daily and Xinmin Evening News are considered market-oriented newspapers.

RQ3 asks about the relationship between information sources and frames appearing in Chinese media coverage of climate change. Table 4 presents the correlations (Spearman's rho) between the frames and sources. We found that the use of domestic officials and international officials exhibited a similar pattern with respect to frame use. Specifically, the use of domestic officials and international officials was positively related to using the conflict, collaboration, responsibility, and leadership frames, but negatively correlated with use of the human interest frame. However, the environmental and human impact frames were negatively correlated with the use of domestic officials, but not with the use of international officials. In contrast to the pattern of official source usage, the use of nonofficial sources was positively related to the use of the environmental, human impact, and human interest frames, but negatively related to the use of the conflict, collaboration, and leadership frames.

Table 4. Correlation Coefficients of the Use of Frames and Sources (Spearman's rho).

Sources	Frames					
	Conflict	Collaboration	Responsibility	Human interest	Leadership	Environment
Domestic official	.11**	.17**	.08**	-.06*	.26**	-.21**
International official	.21**	.20**	.13**	-.06*	.08**	-.05
Nonofficial	-.06*	-.12**	-.03	.15**	-.17**	.19**

* Correlation is significant at the .05 level (two-tailed).

** Correlation is significant at the .01 level (two-tailed).

H1 predicts significant differences of frame usage across media type. Results of multiple one-way analyses of variance support the hypothesis (see Table 5). Specifically, post hoc tests using the Sidak criterion show that the party-sponsored newspapers employed the collaboration frame ($M = .27$, $SD = .36$) more than the market-oriented newspapers ($M = .12$, $SD = .26$) and the specialized newspaper ($M = .11$, $SD = .26$). Similarly, the party-sponsored newspapers employed the leadership frame ($M = .18$, $SD = .31$) more than the market-oriented newspapers ($M = .10$, $SD = .24$) and the specialized newspaper ($M = .04$, $SD = .16$). The market-oriented newspapers applied the conflict frame ($M = .20$, $SD = .30$) more than the party-sponsored newspapers ($M = .15$, $SD = .27$) and the specialized newspaper ($M = .12$, $SD = .25$). The market-oriented newspapers also employed the human interest frame ($M = .05$, $SD = .19$) more than the party-sponsored newspapers ($M = .02$, $SD = .11$) and the specialized newspaper ($M = .01$, $SD = .09$). The specialized newspaper used the environmental and human impact frame ($M = .24$, $SD = .40$) more than the party-sponsored newspapers ($M = .15$, $SD = .32$) and the market-oriented newspapers ($M = .16$, $SD = .33$).

Table 5. Post Hoc Test of the Differences in Frame Use Between Different Types of Media.

Frame	F	p	η^2	Post hoc	Cohen's d
Conflict	10.61	.000	.02	Market-oriented—Party-sponsored***	-.20
				Market-oriented—Specialized***	-.31
Collaboration	37.75	.000	.06	Party-sponsored—Market-oriented***	-.48
				Party-sponsored—Specialized***	-.51
Responsibility	3.97	.019	.01	Market-oriented—Specialized*	-.18
Human interest	10.19	.000	.02	Market-oriented—Party-sponsored**	-.22
				Market-oriented—Specialized***	-.27
Leadership	40.24	.000	.06	Party-sponsored—Market-oriented***	-.31
				Party-sponsored—Specialized***	-.61
				Market-oriented—Specialized***	-.32
Environment	9.27	.000	.01	Specialized—Party-sponsored***	-.26
				Specialized—Market-oriented**	-.23

* The mean difference is significant at the .05 level (two-tailed).

** The mean difference is significant at the .01 level (two-tailed).

*** The mean difference is significant at the .001 level (two-tailed).

Discussion

Politicizing Climate Change

Governmental efforts and international collaborations are fundamental for tackling climate change in any country or region (Luterbacher & Sprinz, 2001; Qi, Ma, Zhang, & Li, 2008). Accordingly, our research, consistent with earlier findings, shows that media organizations tend to use official sources and thus politicize climate change (Dotson, Jacobson, Kaid, & Carlton, 2012; Shehata & Hopmann, 2012; Takahashi, 2011). This tendency can be also observed in frame usage. For example, our research shows that about 50% of the sampled articles applied frames of conflict, collaboration, and leadership.

The politicizing tendency could be explained in reference to factors relating to the news production process and political economy (Anderson, 2009). First, Chinese news media have a tendency to follow political agendas (Wu, 2009) and policy-making processes (Boykoff & Boykoff, 2007). Officials typically possess privileged access to news media because of their rich cultural capital (Anderson, 2009). Second, party journalism has remained influential on the topic of climate change. Advocating for the Chinese Communist Party, Chinese news media in general hold the position that developed countries should take the primary responsibility for mitigating global climate change (Wu, 2009).

Frame Usage Across Media

Another interesting finding is the widespread use of the environmental and human impact frame, stressing the natural impact on humans. Such a finding runs counter to the argument that Chinese "reports had a heavy focus on climate change impacts in remote areas, such as polar bears in the Arctic, rather than people in China" (Shanahan, 2009, p. 148). In other words, Chinese media coverage in general does support the link between climate change and the interests of human life. Nevertheless, it should be noted that half of the articles using the environmental and human impact frame were in the specialized newspaper *Science and Technology Daily*. This indicates that the four general newspapers might still focus more on other issues involved in climate change than on environmental issues.

This study also examined the use of different frames across China's party-sponsored and market-oriented media. Party-sponsored newspapers tended to use the collaboration frame, which implies willingness and active cooperation of climate change mitigation among countries. The frequent use of the collaboration frame suggests that the official party newspapers attempt to paint a positive and constructive image of global efforts on climate change rather than pitting developing countries against developed ones. This finding is even more interesting in light of criticism of the Chinese government for its lack of cooperative efforts in the past (Kobayashi, 2003). Thus, although it remains true that Chinese news media advocate the position of the Chinese government—that developed countries should take more responsibility than developing nations—the new frame found in this study highlights the overlooked fact that party-sponsored newspapers such as *People's Daily* have been framing climate change from the perspective of global collective efforts. Another notable finding is the more frequent appearance of the collaboration frame and the leadership frame in the party-sponsored newspapers than in the market-

oriented newspapers (see Table 5). This discrepancy testifies to the complex roles of the Chinese Communist Party and the market in affecting news frames.

In recent years, a growing amount of media coverage has focused on the impact of climate change on individuals. Compared with the party-sponsored newspapers, the market-oriented newspapers, *Southern Metropolis Daily* in particular, are more likely to apply the human interest frame. *Southern Metropolis Daily* is known for its practice of Western journalistic norms (Luther & Zhou, 2005; Yang, 2009). By vividly depicting individual lives, correspondents of *Southern Metropolis Daily* attempt to elicit feelings among the audience and to call for public action on climate change in their daily lives. The adoption of the human interest frame in all five media outlets may lend support to the conclusion by Luther and Zhou (2005) that Western news values are penetrating Chinese journalism. However, *Xinmin Evening News* did not use the human interest frame as often as *Southern Metropolis Daily*. Even though they are both market-oriented, the two newspapers are still different. Similarly (and as shown in Figure 1), *People's Daily* and *Xinhua Daily Telegraph* exhibited different patterns of frame usage as well. Therefore, it would be valuable to investigate why newspapers in the same category, either market-oriented or party-sponsored, differ in their use of news frames and how party affiliations, market demands, and Western news values affect their journalism practices.

The Contested Nature of Framing

News frames, in essence, can be viewed as the outcomes of contested social constructions of reality (Gamson & Stuart, 1992). With climate change, the popularity of a particular frame reveals which stakeholder holds the upper hand among all the interest groups bearing on this global issue. Media in developing countries tend to focus on environmental impacts and mitigations, whereas media in developed countries such as the United States and France put more emphasis on conflicts between politicians and scientists or lean toward displaying the international relationships (Brossard et al., 2004; Shanahan, 2009; Takahashi, 2011). The difference among nations in reporting climate change speaks to the sophisticated process of social meaning construction involving social groups, institutions, and ideologies (Goffman, 1974). The contested nature of media frames features multiple, diverse, interactive, and dynamic media performances within, as well as across, countries. In this regard, it would be meaningful to interview Chinese journalists about their news production process and the dual impact from market and party interests. In addition, to explore the common and distinct interests of different countries, it would be promising to conduct comparative research to examine media coverage and related communication issues on climate change.

Limitations and Future Directions

This study has several limitations. The first limitation is that our reporting period was limited, occurring during the weeks surrounding the annual session of the Conference of the Parties. Therefore, the use of conference-related frames and sources such as international officials might be higher than normal. Another limitation of the sampling is the media we chose. Important news producers in the Chinese context include newspapers and television programs. The findings in this study might not apply to television. Furthermore, future research needs to assess the validity of our instruments. Although the

current study contributed a new frame (i.e., the collaboration frame) as well as a new measurement for frames of conflict, attribution of responsibility, leadership, and environmental and human impact in the context of climate change, the new designed measurements warrant further validation.

This content analysis serves as a descriptive foundation for media effects research (Slater, 2013). By identifying patterns of Chinese media frames, this study may provide future directions regarding media effects. For example, the human interest frame may be more likely to elicit strong emotional responses (Valkenburg, Semetko, & de Vreese, 1999). Therefore, it might be more effective than other frames in directing public perception of climate change toward environmental risk. In this regard, more studies are urgently needed to understand how different frames in climate change reporting affect public perceptions, attitudes, and behaviors.

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