Communicating Science and Technology Through Online Video

Researching a New Media Phenomenon

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9   Framing in Climate Change Videos

Bienvenido León, Maxwell Boykoff, Juhi Huda and Carmen Rodrigo

Climate change (CC) has become a defining symbol of our collective relationship with the environment in the 21st century. Increasingly, a high-stakes, high-profile and highly politicised issue, CC cuts to the heart of how we live, work, play and relax in modern life and thus critically shapes our everyday lives, lifestyles and livelihoods. CC is no longer considered as merely an environmental or scientific issue; rather, climate considerations pervade our individual as well as our shared, economic, political, cultural and social lives. As CC has increasingly dominated the contemporary science and policy landscapes, it has also more visibly inhabited public discourse through news and entertainment media representations and 'popular' cultures.

As such, CC is considered to be one of the most important issues of our time. Despite its relevance, public concern for CC and the response to mitigate its consequences have varied globally. Academic scholars and advocates alike have attempted to promote a better understanding and an increased public concern about climate change (CC). Research indicates that CC is often framed in the media in terms of potential damages or losses to ecosystems or human health. However, research indicates that an emphasis on gains from avoiding CC leads to more positive attitudes towards CC mitigation (Spence and Pidgeon, 2010), and a positive frame increases intentions to reduce environmental impacts (Morton et al., 2011).

In spite of its relevance and immediate impacts, it is often perceived as a remote issue not impacting daily life. Research investigating reasons behind this suggests that this may be due to perceptions of CC as uncertain, distant or irrelevant to daily life (Gifford, 2008; Lorenzoni et al., 2007; Ungar, 2007; Vlek, 2000).

Good-quality news coverage has been one of the most prominent modes of communicating the gravity of CC to the public (Bauer et al., 2007). This scientific literacy approach assumes that if citizens are informed about scientific facts, they will be more concerned (Nisbet, 2009). However, recent

research does not always support this assumption (Jang, 2013; Moser and Dilling, 2007). Instead, message framing is now gaining in prominence to convey the importance of CC (Moser and Dilling, 2007).

Message framing uses words, images and phrases to relay information (Chong and Druckman, 2007; Gifford and Comeau, 2011) and may provide problem definitions, attribute responsibility and provide solutions (Corbett, 2006; Cox, 2006; Gifford and Comeau, 2011; McComas et al., 2001; Shanahan and Good, 2000). Framing allows the audience to interpret the issue based upon problem definitions, causes and solutions. When it comes to environmental issues, framing can be an important tool to help gather attention, legitimise and provide a concrete understanding of abstract concepts (Doyle, 2007; Lakoff, 2010; Rebich-Hespanha et al., 2015).

In spite of the abundant literature about climate change framing in traditional media, no relevant study has been conducted yet about how this issue is framed in online video. Given the innovation capacity of online video to communicate science, this may provide a relevant new perspective on this topic, where limitations of traditional coverage may be overcome.

This chapter presents the results of the content analysis conducted for this project, focusing specifically on the framing of online videos about climate change. As mentioned in the introductory chapter, we conducted a content analysis of science-related online video, with a sample of 300 videos on climate change. Firstly, we analyse theme frames in order to understand the way representational practices of CC are shaped in context (Boykoff, 2011: 92). Secondly, we study the use of the gain and loss frames.

9.1.   Frames in Climate Change Representation

In the field of communication, studies over the past two decades have investigated how framed messages influence audience behaviour and attitudes. Research on framing has emerged 'as an analytical framework to unpack socially constructed schemas that give meaning to issues or events by presenting a "central organizing idea"' (Nisbet et al., 2013: 767). Framing allows the audience to interpret the issue based on problem definitions, causes and solutions. Frames can be constructed both at the institutional level as well as at individual levels of analysis. Studies on the effect of framing on attitude change over the past few years have (1) focused on identification of individual differences that influence effects of frame exposure and (2) examined framing effects within competitive and non-competitive framing environments (Nisbet et al., 2013).

The way in which a message is emphasised or constructed has an effect on how a receiver interprets the message (Rebich-Hespanha et al., 2015; Shah et al., 2009). Frames allow for the selection and presentation of a particular

set of attributes to the audience (Hart, 2010). Framing theory more broadly provides an explanation of how media coverage influences public attitudes. Entman (1993) distinguished between two kinds of frames: media frames (construction and representation of content by the creator) and audience frames (mental maps or schemas of individuals that relate to audience exposure to the content). Framing thus enables one to develop a link between new information that an audience receives and the audience's prior knowledge on the issue.

When it comes to environmental issues, framing can be an important tool to help gather attention, legitimise and provide a concrete understanding of abstract concepts (Doyle, 2007; Lakoff, 2010; Rebich-Hespanha et al., 2015). Framings are inherent to cognition and effectively contextualise as well as 'fix' interpretive categories in order to help explain and describe the complex environmental processes of climate change. There is substantial existing literature on CC frames. Hulme (2009) identified 'economic, national and global security, and morality and social justice' CC metaframes (in Rebich-Hespanha et al., 2015: 494). Nisbet (2009) developed a typology of policy-related frames that included 'social progress, economic development and competitiveness, morality and ethics, scientific and technical uncertainty, runaway science, public accountability and governance, middle way/alternative path, and conflict and strategy' (quoted in Rebich-Hespanha et al., 2015: 494). Shanahan (2007) developed frames relevant to audience engagement with CC information that included 'scientific uncertainty, national security, polar bears, money, catastrophe, and justice and equity' (in Rebich-Hespanha et al., 2015: 494). Boykoff (2011) conducted a research project on climate change representation in UK tabloid newspapers and identified four theme frames: scientific, ecologic-meteorological, political-economic and sociocultural. This classification is therefore used in this study of online videos.

Several studies have analysed the use of the gain and loss frames. Within the field of health psychology, research has compared the effectiveness of information frames that focus on positive (gain frame) and negative consequences (loss frame) that arise from specific behaviours. The concept of loss aversion is relevant wherein individuals are seen to dislike losses as compared to equivalent gains (Kahneman and Tversky, 1979). Negative information may influence decision making more strongly than positive. Other factors may play a role when framing gain/loss outcomes such as the behaviour being studied or the relationship between the individual and the behaviour. For example, loss frames may be more effective in changing a behaviour that is risky, while gain frames are more effective with behaviours that may be considered safe. Relevant here is prospect theory, which proposes that 'people are less inclined to take risks when considering gains

because the perceived subjective value of gains is fairly low whilst people will take risks to avoid losses because the subjective value of losses are relatively high' (Spence and Pidgeon, 2010: 658).

Within climate change framing research, O'Neill and Nicholson-Cole (2009) conducted research in the UK context to examine the role of visual and iconic representations in influencing public engagement with CC. Their results indicate that negatively framed CC representations that are 'dramatic, sensational, fearful, shocking' can capture individual attention but disengage the individual through feelings of helplessness (p. 375). Their findings suggest that dramatic representations must be paired with positive framings establishing local relevance of impacts. Spence and Pidgeon (2010) examined psychology students in the UK to study how framing the same CC information in gain/loss terms and local/distant impact terms would influence perceptions. Their study focused on attribute frames (particular attributes of the target object) and outcome frames (frames the issue in terms of outcome). Results indicate that gain frames helped to increase positive attitudes towards mitigation and increased perceived severity of impacts.

Morton et al. (2011) focused on framing and uncertainty. They conducted two studies in the UK that showed that, when higher uncertainty is combined with a negative frame highlighting possible losses, then individual intentions to undertake pro-environmental behaviour tend to decrease. If higher uncertainty is combined with positive frames highlighting losses that may not occur, then intentions for pro-environmental behaviour tend to become stronger. So although uncertainty can cause confusion and disengagement, subtle variations in framing uncertainty can influence behavioural responses. When provided with a loss frame, then people become riskier in their preferences, while a gain frame leads to risk-averse behaviour. When CC impacts are framed positively, then people felt that the actions to avoid impacts may be more effective, and they were more willing to engage in actions.

Feinberg and Willer (2011) conducted research on undergraduate students in the United States to examine whether less dire messaging (negative frame) could be more effective in communicating CC. They found that dire messages increased scepticism and that positive messages decreased scepticism. Research has emerged to challenge the frequent use of sacrifice-oriented message frames for CC communication (Nordhaus and Shellenberger, 2007). A shift of discourse towards a motivation-oriented approach involving 'solutions, values, and visions' may be more effective (Gifford and Comeau, 2011: 1302). Gifford and Comeau (2011) examined the effect of motivational and sacrifice message framing on perceptions of CC engagement and competence behavioural intentions for mitigation in a Canadian community and found that motivation-oriented frames were more valuable to promote climate engagement.

Meanwhile, Bain et al. (2012) examined whether CC deniers may undertake behaviour supporting mitigation efforts if they believed that these efforts will have positive societal effects. This Australian study investigated whether 'environmental citizenship intentions' were greater where deniers believed action on CC would have a positive effect on the character of people and on society as a whole (p. 601). Results indicate that a substantial proportion of deniers believed that mitigation would lead to positive effects and those who made positive projections 'intended to act more pro-environmentally' (p. 601).

Jang (2013) explores how individual perceptions and policy attitudes would differ based upon group cues in the United States. They draw from attribution theory and focus on how the perceived cause of climate change mediates 'the effects of exposure to information about in- or out-group's excessive energy use on concerns and policy attitudes about climate change' (p. 28). Their results indicate that American participants tended to believe that CC was caused by natural causes when they perceived that their own country was mainly responsible for these causes. This supports the view that certain risk information can lead to counterproductive effects and trigger defence mechanisms. This also supports studies that discussion of the dire consequences of CC can lead to dismissal of the severity of the problem and reduce the willingness to act. Wiest et al. (2015) find that a discussion of potential benefits of CC may make individuals less likely to perceive a threat from CC. However, it does not have a measurable effect on behavioural intention and weakens support for policy action among Democrats (p. 197).

From a psychological research perspective, highlighting the tangible gains associated with immediate action and appealing to long-term motivators of pro-environmental behaviour and decision making are some practices suggested for policymakers in order to improve public engagement with CC (van der Linden et al., 2015: 761).

Entman has commented that "framing essentially involves selection and salience. To frame is to select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition" (1993: 52). Certainly, media representations serve to assemble and privilege certain interpretations and understandings over others (Goffman, 1974). This has been the case with the highly charged discourses surrounding climate change. Moreover, there are dangers that the power behind these terms can be harnessed and manipulated via mass media in order to elicit more (or less) alarmed responses in civil society. Framing, then, effectively has the potential to produce powerful entry points to engagement and action, as well as dangerous diversions, affected by processes and inputs that produce and influence content.

Framing issues, in general, and the loss and gain frames, in particular, remain largely unexplored within the specific area of climate change online videos. This could be related, firstly, to the fact that this is a relatively new phenomenon and, secondly, to the difficulty derived from a multimodal text, where the frame is constructed by means of images, sounds and words. Multimodal texts are indeed more difficult to analyse, since any of the elements that are included can have an effect in the public's perception. In the next sections, we present the main findings of our content analysis.

9.2.   Main Themes

The ecologic-meteorological frame is prevalent (54.66%), followed by the scientific frame (38%). The political-economic frame is much less frequent (7.33%).[1]

The ecologic-meteorological frame typically includes stories on weather events and biodiversity (Boykoff, 2011). In our study, this frame is used in a wide range of topics and styles that were published by a varied range of authors: for example, 'The Reality of Climate Change' (a lecture by British film producer David Puttnam, that is part of the TED series) or 'Obama: No Greater Threat Than Climate Change' (a news report published by Sky News). The scientific frame was used in videos like 'NASA: Sea Levels Rising as a Result of Human-Caused Climate Change' (a news report by *The Guardian*) or 'Climate Change Basics' (a video produced by the US Environmental Protection Agency). Some examples of the political-economic frame are the videos 'Bill Nye Debates Climate Change with Economists' (an excerpt of a CNN programme); and 'Climate Change: Economics and Governance' (a promotional video of a course taught at the London School of Economics).

These results differ from those obtained by Boykoff (2011) in his study of frames in UK tabloid newspapers, from 2000 to 2006, where the political-economic frame was prevalent (p. 93). Other studies on the themes of climate change representation have also produced results that differ from those of our own research, although the use of different classifications make comparison difficult. For example, a content analysis of online media coverage of the COP21 summit, held in Paris in 2015, shows that stories about 'disaster and catastrophe' (often connected to ecology and meteorological events) are more frequent than those about 'scientific background', a result that may be regarded as a corroboration of ours. However, this research indicates a relatively high representation of political-economic and social issues related to climate change that is not perceived in our study (Painter et al., 2016). In summary, this confirms that climate change is represented and contextualised differently in

different media (Nisbet, 2009) and that online videos seem to follow a different pattern from that of other media.

9.3.   Gain vs. Loss

In our content analysis, we coded the gain and loss frames, according to the following criteria:

1.   *Gain Frame:* When possible benefits of adaptation or mitigation measures are stressed.
2.   *Loss Frame:* When possible negative consequences are stressed.
3.   *Gain and Loss:* When both are similarly underlined.
4.   *None:* When none of them is represented.

Some examples of the loss frame are the videos 'Weather versus Climate Change' (National Geographic) and 'Science for a Hungry World: Agriculture and Climate Change' (NASA). The gain frame is used in videos like 'Do You Have to Be a Vegan to Help to Fix Climate Change?' (*The Guardian*) or 'Last Ditch Remedies for Climate Change' (Bloomberg).

In the overall account, the loss frame prevails (47.33%) over the gain frame (19.0%) and the gain and loss frame (14.66%). This result seems to match the often criticised media representation of CC, where potential damages and dangers are more frequently represented than potential benefits from adaptation and mitigation.

The correlation between the gain and loss frames with the theme frames is displayed in Table 9.1. These data show that the loss frame prevails across all theme frames, although it is even more frequent in videos with a scientific frame. This can be explained considering that, in most cases, scientific research is based on empirical evidence of CC effects and those are often the base for a prediction of the negative consequences of this process. For example, the video 'NASA: Sea Levels Rising as a Result of Human-Caused

Table 9.1 Gain vs. Loss Frames per Theme Frame

Frame	Gain	Loss	Gain + Loss	None	Total
Scientific	11 (9.65%)	72 (63.16%)	17 (14.91%)	14 (12.28%)	114 (100%)
Ecologic-meteorological	45 (27.43%)	59 (35.98%)	26 (15.86%)	34 (20.73%)	164 (100%)
Political-economic	1 (4.55%)	11 (50.00%)	1 (4.55%)	9 (40.91%)	22 (100%)

Source: Authors

Table 9.2 Gain vs. Loss per Main Objective

	Gain	Loss	Gain and loss	None	Total.
Information	29 (20.28%)	78 (54.55%)	13 (9.09%)	23 (16.08%)	143 (100%)
Engagement/ persuasion	23 (24.47%)	35 (37.23%)	26 (27.66%)	10 (10.64%)	94 (100%)
Entertainment	0 (0%)	4 (40.00%)	0 (0%)	6 (60.00%)	10 (100%)
Infotainment	2 (8.70%)	12 (52.17%)	3 13.04%)	6 (26.09%)	23 (100%)
Education/training	0 (0%)	7 (41.18%)	0 (0%)	10 (58.82%)	17 (100%)
Commercial	2 (12.5%)	5 (31.25%)	2 (12.5%)	7 (43.75%)	16 (100%)
Other	1 (16.66%)	1 (16.66%)	0 (0%)	4 (25.00%)	6 (100%)

Source: Authors

Climate Change' summarises the results of the measures taken by this institution and predicts the 'devastating effects' of sea level rise in the future.

Table 9.2 shows the frequency of the gain and loss frames, according to the main objective of the videos. Interestingly, the loss frame prevails over the gain frame in all the objectives (except the marginal category of 'other'). The loss frame is more frequent among informational videos (54.55%), which are often produced by news media. For example, 'Scientists: Climate Change Is Happening' (CNN) and '"No One Will Be Untouched": Climate Change Will Lead to War, Famine and Extreme Weather, Claims IPCC Report' (Mail Online).

The higher percentage of the gain frame corresponds to the 'engagement/ persuasion' objective (24.47%). For example, in the TED Talk 'Al Gore: Averting the Climate Crisis', the former US vice-president suggests several individual actions that can help to mitigate CC. The use of the gain frame in this kind of videos seems appropriate, considering research has shown that audience engagement is better achieved by stressing the potential benefits of addressing CC (van der Linden et al., 2015: 761).

Table 9.3 shows the relationship between the gain and loss frames and the types of producers of the videos. Data show that the loss frame prevails across all author categories. It is not surprising that this is the case in those videos produced by mass media, as it seems reasonable to think that these actors would tend to use the loss frame more frequently, as research in traditional media has indicated. However, it may be seen as unexpected that other actors, like scientific institutions and ordinary people (user-generated content, UGC), also give priority to the loss frame.

Table 9.3 Gain vs. Loss Frames by Type of Producers

	Gain	Loss	Gain + Loss + None	Total
Scientific institution	3 (8.57%)	17 (48.57%)	15 (42.86%)	35 (100%)
Company	2 (33.33%)	3 (50%)	1 (16.66%)	6 (100%)
Television	15 (27.27%)	25 (45.45%)	15 (27.27%)	55 (100%)
Other media	27 (22.69%)	51 (42,86)	41 (34.45%)	119 (100%)
Non-scientific NGO/association	10 (22.72%)	23 (52.27%)	11 (25.00%)	44 (100%)
UGC	0	18 (69.23%)	8 (30.77%)	26 (100%)
Other	0	5 (33.33%)	10 (66.66%)	15 (100%)

Source: Authors

9.4.   Conclusion

In principle, compared to traditional media, online video may be regarded as a new virginal field, where climate change could be framed in a different way. Online video is not constrained by the same limitations of the traditional media, like time, space or news values (the principles that decide which events are newsworthy). Therefore, producers in this field could take advantage of the experience of the past and represent CC in a way that contributes to promoting a positive approach towards CC mitigation and adaptation among citizens.

But the results of this study show that, to a great extent, online videos follow framing patterns that are similar to those used by traditional media, thus replicating the representation problems that researchers have underlined. To date, this evidence can be interpreted as a re-inscription of ongoing discourses in traditional media in online video communications. Framing influences how meaning is constructed and negotiated and involves not only the portrayals that gain traction in discourses but also those that are absent from them or silenced (Derrida, 1978). Framing processes have important effects on marginalising some discourses while contributing to the entrenchment of others (Castree, 2004). Tim Forsyth has stated that "assessments of frames should not just be limited to those that are labelled as important at present, but also seek to consider alternative framings that may not currently be considered important" (2003: 1). As such, media representational practices can confront power as they critically engage with pressing contemporary issues.

However, portrayals can also serve political and economic power. Dipensa and Brulle have cautioned, "The news media [can] serve as an important institution for the reproduction of hegemony" (2003: 79). Through complex, dynamic and messy processes, discourses are tethered to material realities, perspectives and social practices (Hall, 1997).

Significantly, the loss frame prevails over the gain frame across all types of producers. It may come as no surprise that those videos produced by television or other media companies will use the loss frame extensively, since this has been a consistent trend in the past. However, interestingly, other types of producers, like scientific institutions and even UGC, also frame climate change mainly through the loss frame. The dominance of these fear-inducing tropes can be partly attributed to the fact that many aspects of climate change—such as ecological forecasts and societal impacts—are inherently quite gloomy subjects. Climate threats also can drive systematic and scientific investigations of anecdotal or observational ways of knowing.

The loss frame is also prevalent among videos of all purposes, and it is even more frequent in those that intend to engage or persuade the audience. This suggests that those videos are subject to similar limitations to those of traditional media and could also benefit from the use of gain frames.

This may indicate that a negative view of climate change is deeply rooted in our society and that it is difficult to change, or else it could also point towards a possible continuity pattern from traditional to new audiovisual media. However, there exist some differences between old and new media, as far as theme frames are concerned: while the political/economic frame prevails in traditional media, the ecological/meteorological frame is most frequent in online videos. While these can be overlapping tropes, more research is needed in order to better understand this difference in framing across media.

In summary, to a great extent but not completely, online videos seem to be representing climate change rooted in the traditional framing models and therefore not taking advantage of the opportunities that this new field may provide.

Note

1. The 'culture and society' frame that was identified in Boykoff's study was not used in any of the videos in our sample.

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