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Climate Fiction: A Promising Way of Communicating Climate Change with the General Public

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Abstract

Since anthropogenic climate change was first noticed in the late 1980s, despite scientists' consensus on its urgency and seriousness with strong evidence, climate risk is still a tough issue for the public to engage with due to its ambiguity, invisibility and uncertainty. This article reviews the emotive and empathetic role of climate fiction (cli-fi) in climate change communication, using the precautionary principle of relevance to sustainable development to discuss how cli-fi has influenced the way people feel and think about climate change and further foster pro-environmental attitudes and opinions. Through discussing the effectiveness of cli-fi as a communication tool, I argue that cli-fi allows readers to visualise the implications of climate change on themselves and triggers their empathetic and emotional responses, especially negative emotions. Those emotions, on the one hand, could arouse a wider and deeper climate consciousness by inspiring audiences to consider previously unnoticed subjects; on the other hand, could facilitate affective engagement and the perceived need for action.

Keywords: climate change communication, climate-fiction (cli-fi), risk perception, narrative, the precautionary principle, sustainable development

1. Introduction

Climate change and sustainable development are inseparable. In line with the Sustainable Development Goal (SDG) 13 – to 'take urgent action to combat climate change and its impacts' (UNDP, 2015) – a focus on mitigating and adapting climate change is one of the key arenas that would contribute to sustainable development. However, since anthropogenic climate change was first noticed in the late 1980s, despite scientists' consensus on its urgency and seriousness with strong evidence (Anderegg et al., 2010; Cook et al., 2013), climate risk is still a tough issue for the public to engage with due to its ambiguity, invisibility and uncertainty (Brace & Geoghegan, 2010; Moser, 2010). Given the value of narratives laid in providing deeper understanding, interest and engagement (Bruner, 1991; Dahlstrom, 2014), I suggest climate fiction can act as a solution to embed climate information in emotive and empathetic narrative communication, thereby contributing to communicating climate impacts to the general public.

The purpose of this essay is to use the precautionary principle of relevance to sustainable development (Beder, 2006) to discuss how climate fiction has influenced the way people feel and think about climate change, further fostering pro-environmental attitudes and opinions. The essay begins with the salience of climate communication and an analysis of its challenges, then introduces the emergence of climate fiction, and finally discusses the effectiveness of climate fiction as a tool for climate communication.

2. The Challenges of Climate Change Communication

2.1 The Significance of Climate Communication and Its Overall Challenges

Public communication of climate change is an indispensable part in alleviating climate change issue given that (1) most climate action requires individuals' changes in lifestyles and consumption habits that are determined by the public's personal willingness to adjust living standards (Gifford, 2011); (2) public advocating or objection can affect the enactment and implementation of climate-related policy (Shwom et al., 2010). Hence, it is essential to raise non-experts' climate concern and increase public engagement by effective climate change communication (Moser, 2010; Shi et al., 2019).

However, an argument has burgeoned since the early 21st century that individuals only pay attention to and value what is temporally, socially and geographically close to their everyday experience (Devine-Wright, 2013; McDonald, Chai & Newell, 2015). This echoes research on the psychological distance of climate change as a crucial barrier to climate engagement (Lorenzoni et al., 2007; Milfont, 2010; Weber, 2010). Today, it is generally acknowledged that climate change is occurring, but what is less certain about is the extent of climate impacts (McDonald, Chai & Newell, 2015). A growing body of empirical research shows that people are more likely to observe mild climate impacts (e.g., warmer summer and a decrease in rainfall) at a local level but perceive the more severe impacts as relatively temporally and geographically distant (ibid.; see also Lee et al., 2015). There are a number of challenging traits making climate risk a tough issue to engage with.

2.2 Invisible Causes and Distant Impacts

Primarily, the lack of visibility and immediacy makes global climate change a 'hyperobject', a phenomenon that cannot be intuitively and conspicuously seen and felt (Morton, 2013). To set an example, the main cause of global warming – greenhouse gases – is invisible and intangible, and no specific ailments and serious health problems are brought about to individuals instantly (Kirkman, 2007). In this case, greenhouse gases emissions from any single person seem rather small, and only their long-term cumulative effects will lead to an increasing temperature of the earth's surface (i.e., global warming) and then change the climate of the globe (IPCC, 1990). Additionally, many of the changes that are observed need long-term monitoring and they are small average changes numerically (Zwiers & Hegerl, 2008). In this sense, disconnection and the temporal distance in particular have made climate change a grand narrative that can only be observed locally through specific disasters.

2.3 Uncertainty

Another key characteristic of climate change is the immense uncertainty. Climate change is never entirely predictable due to the dearth of data, the incapability of adequately understanding environmental system mechanism, the inevitable insufficiency of representing nature and simulating complex scenarios in models, and many other elements (Funtowicz & Ravetz, 1992; Shackley, 1998). Communicating climate change to non-expert audiences, uncertainties in this global, imperceptible and complex issue has to compete for attention with the certainty of instantly felt challenges involved in how to maintain current quality and standard of living (Moser, 2010). Earning a living, receive a quality education, and keeping employment are all instances that are people's everyday challenges and immediate needs (ibid.). Compared with uncertain and distant climate change, those personally significant issues can motivate more individuals to seek and process relevant information when they feel they lack sufficient information and knowledge about those situations (Dunwoody, 2007).

2.4 Less Resonance

In the context of climate science, scientists generally 'hold a privileged position as knowledge holders, messengers, and interpreters' of this issue (Moser, 2010, p. 37). Thus professional scientific reports with complex charts and graphs are one of the most common ways of communicating climate change. Admittedly, data can seem convincing and cogent, however, complicated graphs might fail to resonate with lay audiences since they hardly bring about strong sensual shock, much less than that there still needs further education in scientific literacy (Mahony & Hulme, 2012). Apart from that, science routinely examines occurrence and procedures far beyond human scale (Dahlstrom, 2014), yet climate change is too large to be provided with a direct and intuitive sense by precise values and explanations. Attempting to understand this idea, audiences tend to draw on their pre-existing experience and knowledge, generalise a new perception under consideration and ultimately make following decisions based on this perception (Morris et al., 2019). Under this circumstance, a more emotive and emphatic communicating tool is needed, since unfortunately pure science communication seems not fully competent for the communication of phenomena beyond human scale.

To reiterate, causes and effects of climate change are different from many other environmental pollution problems (i.e., water or air pollution) in light of their invisibility, uncertainty and the resulting less resonance. As such, clear communication especially to non-experts is required, demanding 'clearer, simpler metaphors, imagery, and mental models as well as compelling framing' (Moser, 2010, p. 36). Weber's (2006) study shows that the statistical and abstract nature of climate change can hardly evoke strong visceral sympathy and reactions

of people outsides of the places where disasters take place. Narratives, in contrast to logical-scientific communication, are recently advocated as a more efficient, engaging and persuasive way on account of its structure of 'causality, temporality and character' (Bruner, 1986; Dahlstrom, 2014, p. 13614). It then becomes the focus how to embed climate change information in emotive and empathetic narrative communication. Against this backdrop, climate fiction as a subset in narrative format, as I would suggest, is an emerging way of communicating climate change.

3. The Emergence of Climate Fiction

3.1 An Introduction to Climate Fiction

Climate fiction (cli-fi) refers to literature focused on climate change (Schneider-Mayerson, 2018, p. 473). It is a term coined by the American journalist and Taiwan-based blogger Daniel Bloom in 2007 (Merchant, 2013 cited in Milner and Burgmann, 2018, p. 1). Cli-fi was regarded as a subgenre of sci-fi at the beginning, but nowadays most scholars in this field suggest considering cli-fi as a distinct and separate genre (i.e., LeMenager, 2017; Tuhus-Dubrow, 2013).

Cli-fi emerged and has flourished after 2010, when the potential value of compelling narratives drew attention from many public intellectuals (i.e., Macfarlane, 2005; McKibben, 2005). Over the next decade, with a growing awareness and consensus of the catastrophic and irreversible effects of climate change, readers within the period have started to accept this new fiction genre, which is a type of narrative 'set not in the distant future but the all-too-familiar present' (Schneider-Mayerson, 2017, p. 314).

3.2 Climate Fiction as a Communication Tool

The rise of cli-fi represents an arrival of narrative communication to the ongoing struggle to tackle the climate crisis in the early 21st century. Above all, cli-fi may provide an achievable remedy for the challenges of disseminating distant topics on the grounds that essential story elements – such as characters, plots and setting – could impact risk perception in an infectious and compelling 'situation-based' way (Dahlstrom, 2014, p. 13615).

Risk is one of the key terms in taking 'precautionary measures to anticipate, precent, or minimise the causes of climate change' (UN, 1992, Article 3). In accordance with IPCC (2007), effectively dealing with the communication of risk and uncertainty is a significant target for assessment of long-lasting environmental policies. Therefore, risk perception could be a crucial indicator for appraising the outcome of climate communication. While the information deficit hypothesis[1] to communicating climate change attributes public's indifferent attitudes of scepticism or refusion towards climate change to a lack of science literacy, in fact, little evidence shows connections between public understanding of climate science and risk perception (Kahan, 2015; Morris et al., 2019). Narratives as a fiction-writing mode, on the contrary, offer mounting understanding, interest and participation (Dahlstrom, 2014). Specifically, cli-fi presents the future world affected by climate change through its particular accounts of agency and focalised perspectives. It simultaneously provides information and contexts, triggering a risk perception of climate change and its possible resolution, or most of the time promoting critical thinking (Leavenworth & Manni, 2021). Furthermore, vivid imagination and empathy evoked by narratives can contribute to transferring the feeling of the moment into long-term memory (Dahlstrom, 2014).

The main goal of communicating climate change is to persuade non-experts to understand the gravity and urgency of the issue and motivate them to take action. In this regard, cli-fi aims to raise lay audiences' awareness of climate change and initiate a shift of readers' attitudes, thereby addressing "Anthropocene disorder" (Clark, 2015). More importantly, different from rigorous science communication, the role of cli-fi is not to assert truth but provide a means of asking 'what if' questions (Berkhout et al., 2002) to help envision and picture future contexts.

4. Effectiveness of the Communication

In the context of climate communication's contribution to sustainable development, the effects of cli-fi as a communication tool could be analysed and interpreted within sustainable education, four components of the precautionary principle, and readers' affective responses.

4.1 Sustainability Education and Climate Fiction

Education for sustainable development has a role of vital importance in climate communication. One significant aspect arousing individual and societal transformation in reacting to climate change is to develop action and critical thinking through learning (Leavenworth & Manni, 2021; Lotz-Sisitka et al., 2015). Young learners' questions and their comprehensions towards climate change should be considered seriously in that they are the future generations crucial in the fight against climate emergency. It is similarly highlighted by UNESCO (2019) that education should be designed for enabling action-oriented and transformative learning. Consequently, evaluation criteria may include how to affect young citizens' understanding of climate change and further foster pro-environmental opinions and behaviours.

Contemporary speculative cli-fi provides readers with a safe space where new thoughts could be explored. As Webb (2018) suggests, possible futures can be envisioned unrestrictedly but still associated with actual circumstances, resonating with the notion of 'what if' question. Diverse settings in cli-fi, most often in the future, enable audiences to recognise their own world and meanwhile go through a 'cognitive estrangement' (Suvin, 1979, p. 3-15 quoted in Leavenworth and Manni, 2021). Readers' backgrounds including cultural, societal and political structures in reality can be examined at a visionary distance, and they can subsequently question the unsustainable aspects in current living way. The role of cli-fi, in this light, is to encourage and inspire readers to critically think of, reflect and introspect the status quo.

Cli-fi may overlap with eco-anxiety – e.g., worries about environmental limits and tipping points – but also hopes for the future, allowing for its affective and compassionate role to foster readers to think of changing climate. It aids in the transition from 'reading' the unsustainable present to 'writing' a more sustainable future.

4.2 Precautionary Principle and Climate Fiction

Narratives are 'intrinsically persuasive' and do not need justification to defend the accuracy of their claims, in that narratives focus on the description of specific experience instead of the demonstration of universal truth (Dahlstrom, 2014, p. 13616; Graesser & Ottati, 1995). Such characteristic of narrative persuasion – to offer values to the real world without necessary arguments – determines the difficulties to counter the conclusions of narratives. This persuasive side of narratives (specifically cli-fi) appears to fill the absence of significantly effective climate communication, as it to some extent dismantles or at least alleviate the uncertainty of scientific evidence in communicating climate emergency.

According to Beder's (2006) definition, the precautionary principle refers to 'when human activities may lead to morally unacceptable harm that is scientifically plausible but uncertain, actions shall be taken to avoid or diminish that harm' (p. 48). A review of four key components of this principle through specific case studies of cli-fi novels can help explore the role of cli-fi in promoting audiences' thinking of 'what if' question.

'Morally unacceptable harm' highlights the threats to human life and irreversible impacts. *Mother of Storms* (Barnes, 1994) depicts a giant hurricane spawned by the release of clathrate compounds being quelled by technology of using the ice from the comet. This story, although can bring convulsion to readers, may conversely lead to a reinforcement of their current lifestyles given that the morally unacceptable harm from the nuclear explosion seems to be solved by another new technology. Audiences might feel amazed at the advance of the emerging technology, thereafter considering the present consumerism lifestyles to be safe and acceptable.

Regarding 'plausibility', Paolo Bacigalupi's (2009) *The Windup Girl* envisions how humans live without fossil fuels in the 23rd century. It refers to 2 important themes: life after oil and climate injustice (Schneider-Mayerson, 2017). Along the line of 'business as usual' presented by dystopian cli-fi, Bacigalupi's imagination certainly cannot replace scientific output, yet the fiction concentrates more on the analysis and critique of the philosophical and ideological roots of anthropogenic climate change. Aligned with hard science, cli-fi can encourage readers to use information from stories as well as pre-existing knowledge to answer questions about the world (Appel & Richter, 2007; Marsh, Meade & Roediger, 2003).

'Uncertainty' may apply to causality or possible harm. In Jacques Lob and Jean-Marc Rochette's (1982) *Snowpiercer* (*Le Transperceneige)*, humans attempt to address global warming by applying geoengineering techniques, but unexpectedly lead to a sudden drop in air temperature. It could be seen that cli-fi overall holds a sceptical view towards technology, doubting if innovative technology is able to solve problems in a timely and safe way (Li & Wei, 2019).

As to 'action', Kim Stanley Robinson published *Science in the Capital Trilogy* (2004, 2005 and 2007), where he not only portrays vivid images of extreme weather but discusses 'how socially and politically engaged scientists… in alliance with political leaders, might devise and implement multi-levelled solutions to address the climate crisis' (Pak, 2018, p. 103). Such realistic narratives set in the present and near future are more likely to bring empathic feelings to audiences and further foster action.

4.3 Reader Response

The role of cli-fi in climate change communication is to arouse a more pervasive and profound climate consciousness, thereby conducing to progressive action individually and societally. To evaluate the potential impacts of cli-fi on environmental beliefs and pro-environmental opinions and attitudes, it is essential to investigate responses of readers.

Construal level theory contends that different levels of psychological distance affect 'how people represent objects mentally and what information they consider when making judgments and decisions' (Brugger, Morton & Dessai, 2016, p. 125; see also Trope & Liberman, 2010). From this perspective, cli-fi allows lay audiences to visualise the implications of climate change on themselves during which what was once obscure has become

more specific. Schneider-Mayerson's (2018) empirical survey shows that even for those who have already concerned with climate change, cli-fi can reinforce their thoughts and deepen their imagination, which thereafter has an extended depth compared with the previous shallow and superficial sense. All of this supports the claim of cognitive psychologists that vivid representation brings about more narrative engagement and recall (Starr, 2015). Other participants indicate that cli-fi has focalised them on previously unnoticed subjects (see Schneider-Mayerson, 2018). This is because cli-fi novels set remotely can still draw great connections to actions at the moment by reconfiguring readers' perception of environmental processes or inspiring them to firstly realise the 'slow violence' (Nixon, 2013) of climate change. These works have promoted audiences to ponder some of the possible consequences of changing climate that tend to be reported weakly or unrepresentatively.

Empathetic and emotional responses from readers should also be paid attention to. 'Vivid use of setting' and skills enabling 'character identification' (Keen, 2007, p. 93) are significant traits of narratives that contribute to audiences' empathetic responses. Through those features, many readers regard those narratives realistic when they can empathise with particular texts. Nevertheless, recognition of the 'reality' of these climate futures does not mean achieving the goal of heightening climate consciousness. Many cli-fi readers have dramatic emotional responses, the majority of which are negative (Schneider-Mayerson, 2018). This is mainly attributed to the dominant disaster frame employed by most cli-fi works. A sense of hopelessness and helplessness grows when readers consider climate change as not only real but such a big issue and humans can hardly tackle it. Although pessimistic feelings generally linked to audiences' avoidance of the subject, however, Morris et al.'s (2019) experiments show that 'negative end valence plays a key role in facilitating affective engagement and the perceived need for action' (p. 32). In that case, further research on negative emotions elicited by cli-fi may be placed on situating the appropriate point where pro-environmental behaviour could be promoted while audiences would not be entirely discouraged.

5. Conclusion

Overall, I hold the view that cli-fi is an effective way of communicating climate change in contributing to sustainable development. Based on the SDG 13 and the precautionary principle, I review the emotive and empathetic role of cli-fi in climate change communication. Features of narrative persuasion enable cli-fi to fill the absence of clear communication, since narratives are not required to justify and defend the accuracy of their claims, which helps alleviate the uncertainty of scientific analysis in communicating climate change. To achieve the primary goal of climate communication, cli-fi allows readers to visualise the implications of climate change on themselves, and also triggers empathetic and emotional responses of readers, especially negative emotions. Those (negative) emotions, on the one hand, could arouse a wider and deeper climate consciousness by inspiring audiences to consider previously unnoticed subjects; on the other hand, could facilitate 'affective engagement and the perceived need for action' (Morris et al., 2019, p. 32).

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