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Article Title: Storylistening: How narrative evidence can improve public reasoning about climate change

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No conflicts of interest.

Abstract

Stories have cognitive value - listened to carefully and expertly, they provide knowledge. That knowledge is captured and presented in narrative evidence – the product of the expert act of critical engagement with stories, and with others' engagement with stories. *Storylistening* is the theory and practice of gathering narrative evidence to inform decision-making, especially in relation to public reasoning, as part of a pluralistic evidence base. Storylistening is necessary to counter the political deployment of partial, selective, or misinterpreted narrative evidence. There are four ways in which stories can contribute to public reasoning about climate change. Stories play a role in reframing the 'idea' of climate change, as well as being integral to many of the new disciplines, perspectives and knowledges drawn in as relevant by that reframing. Stories create and cohere collective identities and climate change beliefs and behaviour. Narrative models complement and supplement computational models, creating an ensemble of models that more adequately covers the gaps that result from only deploying big, global, generalised models. Stories play a crucial role in enabling better anticipation for decision-making, and storylistening can enable the use of narrative evidence from narrative futures methods, as well as perhaps improve the ways scientific evidence about the future is also listened to. Incorporating storylistening into public reasoning about climate change requires the evolution of advisory systems and of the academic humanities, and can play a role in the urgent need to democratise public reasoning about climate change.

Graphical/Visual Abstract and Caption



Public reasoning about climate change would benefit from the inclusion of narrative evidence derived from storylistening, and advisory systems need to evolve to include it.

1. INTRODUCTION

It is now widely accepted that climate change is a wicked problem (Rayner, 2017; Hulme 2022), that multiple perspectives – including, for example, those from the Global South, from Indigenous peoples, and from the academic humanities – are needed in order for humankind to address it, and that narratives have a crucial role to play here, beyond merely serving as communicative handmaidens to science. In this Perspective we map the various roles that stories are already playing in climate-change science and climate-change policy (beyond science communication), in order to embed our provocation that stories have cognitive value and that they can therefore provide narrative evidence that, when incorporated into a pluralistic evidence base, can support better public reasoning about climate change and better policymaking, for climate-change mitigation and climate-change adaptation. The aim is to provide a strong case for why stories should be taken seriously, albeit not always literally (exactly the argument currently made with regard to climate-change models [Rodrigues and Shepherd, 2022: 4]), and to indicate where that can be done.

In order to make our case, we are using words in ways that might be unfamiliar to interdisciplinary readers, as well as having already introduced a host of new words and terms necessary to name the new concepts being presented. So, some definition of terms is required. We understand ‘story’ and ‘narrative’ to be synonymous – we usually adopt ‘story’ as the operative noun and use ‘narrative’ as the adjective. We define story as a causal account of something happening that includes entities with agency and can be distributed and shared. Our capacious definition of story includes non-textual stories that are transient and malleable such as accounts of floods and fires on the news or social media, or memories of severe winters in the North of England (Hall and Endfield, 2016), as well as textual stories that are embedded, embodied and curated, such as climate-change novels and films, IPCC reports, business reports and NGO papers.

Our claim is that such stories have cognitive value. That is, listened to carefully and expertly, they provide knowledge. That knowledge is captured and presented in narrative evidence – the product of the expert act of both direct critical engagement with stories, and critical engagement with others’ storyimbibing. Such evidence is gathered by what we call *storylistening* (important to distinguish from *storytelling*). Storylistening is the theory and practice of gathering narrative evidence to inform decision-making, especially in relation to public reasoning, as part of a pluralistic evidence base. We take our definition of public reasoning directly from Sheila

Jasanoff, who defines it as ‘the institutional practices, discourses, techniques and instruments through which modern governments claim legitimacy in an era of limitless risks – physical, political and moral’ (Jasanoff, 2012: 5).

The cognitive value of stories might derive from the storycontent, or it may derive from the relationship between the storycontent and the storyteller(s), storyimbiber(s), or narrative networks associated with the story (we address the definition of narrative networks, a term already in circulation in the climate-change literature, in Section 3). In the latter cases, the content of the story may be irrelevant (it may even be false), but understanding how that story is functioning, and with what effects, can still provide useful evidence. This is a crucial point, and addresses head on what might be called ‘the post-truth objection’. That objection goes something like: ‘stories are slippery, emotionally manipulative, they can be used to deceive and to misinform in their own right, or be used to obfuscate other forms of evidence, so they are not to be trusted and cannot form part of a rigorous and legitimate evidence base. Stay away from stories’.

To answer this objection: storylistening is not aligned with post-truth. It is not aligned with the eradication of the importance of scientific evidence. Rather, it is an honest recognition that such evidence is not the only type of evidence available to public reasoning about climate change. Pretending otherwise does not make stories and their power disappear. Rather, it renders them vulnerable to abuse by those storytellers who recognise and wish to wield their power in ways that do indeed position stories as oppositional to scientific and other forms of essential climate-change evidence. In the context of significant concerns about post-truth, deceit, and misinformation in public reasoning, which might otherwise lead to the neglect of some valid forms of evidence, it is in fact essential to have a rigorous framework through which institutions can properly understand stories’ functions and effects.

Before we move on to elaborate this framework in detail, and briefly address how it needs to be operationalised in practice, a practical example of our answer to the post-truth objection might be helpful, indeed even more so because it is an example of narrative evidence being *misused* in public reasoning about climate change, a misuse that might have been addressed with the tools of storylistening. In an example of partisan selective deployment of narrative evidence, Republican Senator James M. Inhofe (who had described global warming as ‘the greatest hoax ever perpetrated on the American people’ [quoted in Kluger, 2015: n.p.]) made Michael Crichton’s novel *State of Fear* (2004) required reading for the members of the Senate Committee on Environment and Public Works, at a hearing of which Inhofe called Crichton to testify. Attention to the story by decision-makers was not informed by expert scientific advice regarding the novel’s mimetic illegitimacy with regard to the science (Union of Concerned Scientists, 2008), nor by expert humanistic advice regarding its cognitive value in relation to its actual target system – namely the politics of knowledge, facts and truth that it in fact highly effectively models (Trexler, 2016: 35–46; Radin, 2019) (on narrative models, see Section 4). Nor was the novel attended to as part of a synthesis of narrative evidence on climate change.

This is an example of the kind of mislistening that discourages public reasoning from taking stories seriously, but which in fact demonstrates the need to use narrative evidence properly through the storylistening framework. For the partisan selective deployment of scientific evidence is equally a danger, but the solution there is not to dispense with scientific evidence altogether. Rather, it is to ensure that there are systems in place that ensure (as far as is possible)

the robustness of both the evidence and its use in decision-making. The same applies to narrative evidence – storylistening provides the necessary framework to ensure that robustness. The incorporation of storylistening into public reasoning would therefore help to prevent or debunk the political deployment of partial, selective, or misinterpreted narrative evidence.

In the sections that follow we present four ways in which stories can play a role in public reasoning about climate change - reframing the problem, understanding collective identities, expanding the range of models available, and extending the range of futures for debate. In each section, we emphasise how storylistening is essential to gathering narrative evidence from such stories and conveying it into public reasoning. In conclusion, we address what is needed in order for storylistening to be incorporated into public reasoning about climate change.

2. FRAMING: SEEING THE PROBLEM FROM DIFFERENT PERSPECTIVES AND ACCESSING NEW FORMS OF KNOWLEDGE

Significant work has already been undertaken to reframe discussion of climate change away from the story that it is solely a matter for the physical sciences (Meckling and Allan 2020; Patterson 2022; Hulme, 2022). Such work is telling new stories about how climate change needs to be understood, stories which, if listened to, can inform better public reasoning, decision-making and action. Further narrative analysis of the way in which climate-change is and has been framed can contribute to the exposure of the limitations of framing it only as a physical problem and add further robustness to the case for different framings. Such work could be historical (e.g. challenging the story that the application of the advanced physical sciences to climate knowledge in the later twentieth century was sudden [Making Climate History, n.d.]), sociological (e.g. creating new narrative evidence through recording the oral histories of climate scientists and science administrators [Making Climate History, n.d.]), and literary. Narrative evidence could be gathered from attending to textual stories that model the stories told about climate change and the different points of view presented or empowered in such stories – just one example would be Arthur Herzog’s 1977 novel *Heat* which presents the perspectives and framings of physical scientists, policymakers, social scientists, and publics affected by an extreme weather event, and models the risks of ignoring or overly-prioritising some perspectives over others. If narrative evidence from *Heat* had been taken seriously in the late 1970s, there might have been earlier recognition that the physical science evidence was not going to be sufficient to generate the types of action needed, and there might have been greater investment in other types of knowledge that might have led to earlier action.

Narrative evidence from such stories introduces new ways of framing debates and decision-making, cutting across or ignoring existing assumptions and practices about the nature of the system to be considered, the agents and stakeholders in that system, and the types of evidence that could or should be considered. Storylistening can support this reframing – paying attention to what stories have dominated (in this instance the hegemonic narrative of the physical sciences), and searching out and listening to different stories, that provide different perspectives on, and therefore new framings of, the problem of climate change. Storylistening also provides a rigorous framework through which the narrative evidence uncovered through such reframings can inform decision-making as part of a pluralistic evidence base, be that the narrative knowledge often integral to Indigenous perspectives (Kimmerer, 2013; Wright, 2013; Callison, 2020; Whyte, 2020), the creative engagements to which Hulme (2022) refers, or the

‘storyline’ approach integral to Shepherd et al’s (2018) contribution. The storylistening framework provides a robust way in which such narrative evidence can legitimately be incorporated into public reasoning alongside other forms of evidence.

3. COLLECTIVE IDENTITIES: USING STORIES TO MAP AND TO UNDERSTAND COLLECTIVE BEHAVIOURS

Stories play a fundamental role in individual and collective identity formation, and influence behaviour because they constitute the identities that are the preconditions for our actions (Somers, 1994; Bamberg, 2011). As a species we are, in Walter R. Fisher’s (1984: 6) terms, *homo narrans*. Attending to stories, and the collective identities they play a role in constituting, offers insight into why collectives of actors manifest at a particular moment, what their motivations are, what drives their strategic choices, and the social effects of collective action (Polletta and Jasper, 2001; Tilly, 2002; Chabay et al., 2019).

It is for this reason that it is increasingly recognised in climate change literature that understanding collective identities is essential to understanding collective behaviour (Patterson 2022), and that key to understanding that behaviour is understanding how stories function to constitute collective identities. But Patterson (2022) notes that although collective identity is studied across a range of different fields, its implications for climate-change action (and here we would include climate-change public reasoning more broadly) are not always clear. Routine practices of storylistening would enable the synthesis of narrative evidence regarding collective identities across disciplines, and enable such evidence to be considered in climate-change decision-making, enhancing its effectiveness through providing a more nuanced understanding of the relevant collective identities (existing and newly identified), their intersection, interaction, and the tensions between them.

Narrative networks are groups whose interactions and hence whose collective identities and behaviours are informed by storyimbibing – storytelling, storysharing, or storycreating. Collective identities can be identified and examined through study of these narrative networks in which the production, circulation, and reception of stories are in a constant process of defining, and being defined by, the collective identity. Extending Hayer’s work on discourse coalitions (1993; see, e.g., its application in Alvarado et al, 2021), existing narrative-network analysis (Lejano et al, 2013; Ingram et al, 2015) focuses on how narratives sustain marginalised environmental networks and enable them to exert influence and effect change, in particular in opposition or resistance to ‘hegemonic’ discourses. It focuses on the use value of such work to academics, and almost exclusively on non-textual stories. Storylistening invites an expansion of this narrative network analysis through analysing narrative networks in multiple contexts, including those of the ‘hegemonic’ discourses; by attending to the role of textual as well as non-textual stories in cohering such networks; and by focusing on the use of narrative evidence about such networks to inform climate-change policy, not just aid the understanding of academics.

For example, shared stories do not just constitute activist collectives, but also constitute researcher collectives, such as those that form and inform the IPCC (Dillon and Craig, 2021: 78-80). Where the collective identity is created and sustained by a strong shared story – for instance, that of climate change as a matter only for the physical sciences – that collective

identity risks embedding potentially unhelpful narrative norms and narrative lock-in. Storylistening can aid decision-makers in determining when stories are, or are essential to, safeguarding knowledge – Galafassi et al. (2018) indicate that one example of this is precisely in the area of science policy (see also Tengö et al., 2017) – and when stories (from a multitude of sources) might be essential to changing established norms or generating the new knowledge required to meet the challenges of climate change.

Textual stories can provide narrative models (see Section 4) of the operations of multiple and intersecting collective identity systems (Eggers, 2009; Kingsolver, 2012), extending the ways to reason about socio-political effects of climate change, which are felt very differently by different groups of people and where the most insightful forms of collective identity may not be the same as those, from age and sex to wealth, that are often used in debate, by default. The role that imbibing and sharing textual stories plays in people’s climate behaviour and collective identity is an embryonic field of study (Schneider-Mayerson, 2018) - further empirical research is needed to investigate the impacts of climate fiction (Svoboda, 2014; Małecki 2019) in order to better understand the ways, and to what extent, textual and non-textual stories play a role in collective identities, social knowledge, and views and behaviours around climate change.

4. MODELLING: RECOGNISING GAPS AND EXPANDING ENSEMBLES OF MODELS

Rodrigues and Shepherd (2022: 4) observe that ‘climate-change science is, without a doubt, big science’. They note the impressive technical and scientific efforts that have produced measurement systems and simulation models that provide a global perspective on planetary change. These tools are necessary, but not sufficient. Knowledge gaps remain (Hulme, 2018). Existing climate science, in particular in the form of computational models, seeks general explanations of the phenomena within its domain, but such models have limitations, in particular limitations of scale – uncertainty increases as the spatial scale decreases (Hargreaves and Annan, 2014) – and of data and access, a category of limitation particularly characteristic in the Global South (Rodrigues and Shepherd, 2022). Shepherd et al (2018)’s ‘storyline’ approach to regional climate information is designed to balance this focus on the general and the global in climate science. ‘Storyline’ approaches do not just communicate pre-existing climate information generated via other methods, but are a form of climate information in their own right (Shepherd and Lloyd, 2021). Narrative is here understood to be a way of *doing* science, not merely *communicating* it, a position that aligns with contemporary work on narrative science (Morgan et al, 2022) and with established work on the role of stories within models (Dillon and Craig, 2021). In our language, this means that the ‘storyline’ has cognitive value.

Shepherd et al (2018) emphasise that they are talking about *physical science* storyline approaches, but as a result of the same limitations of current climate science, especially climate models, that they identify, we propose that storylines, or stories, from elsewhere than the physical sciences also have cognitive value. In fact, we maintain that textual stories can be understood as narrative models. For models are simply abstractions of the world that perform useful functions (such as explanation and anticipation) and enable reasoning about it (Government Office for Science, 2018; Calder et al., 2018). It therefore follows that they take many forms, including narrative. Understanding textual stories as narrative models provides

another way of understanding their cognitive value and the role they can play in providing narrative evidence for public reasoning about climate change. Including narrative models in a pluralistic evidence base extends the range of models available to reason with, in particular redressing the issues of scale, data range and availability, access, and valuing and incorporating local knowledge, that present challenges to existing computational models.

There are a wealth of narrative models that incorporate social, political, and cultural factors and systems alongside the physical models. Literary studies can expand existing analysis of, and argument from, these narrative models (Trexler, 2015; Goodbody and Johns-Putra, 2018; Johns-Putra, 2019a, 2019b; Sperling, 2020b) to demonstrate their cognitive value to public reasoning. For example, late twentieth-century storylistening might usefully have attended to early anthropogenic climate change stories published as public consciousness of climate science and its findings began to rise (e.g. Pohl, 1959; Blish, 1969; Le Guin, 1971; Herzog, 1977). More recently, Kim Stanley Robinson's *Aurora* (2015) serves as a useful mimetic narrative model in relation to climate change. In recreating the closed system of Earth on an imagined interplanetary relocation ship, *Aurora* models the resource and governance challenges and options that Earth currently faces. Storylistening to *Aurora* might usefully be placed alongside planetary boundary arguments from other fields (Rockström et al., 2009; Steffen et al., 2015).

Embedding storylistening in climate change policy can help expand what is considered reliable and useful knowledge when it comes to climate-change decision making. Storyline approaches, collaborative storytelling games (Shenk and Gutowski 2022), narrative models, and incorporating local and Indigenous knowledge (often narrative in form) within a wider knowledge base (Bronen et al, 2020; Buzzard et al, 2021; Simonee et al, 2021; Wilson et al, 2021), can all enable the coproduction of useful climate information and enable a more democratic sense of wider participation.

5. ANTICIPATION: USING NARRATIVE FUTURES METHODS TO EXTEND THE RANGE OF FUTURES FOR DEBATE

Policymaking and decision-making depend upon anticipations of the future (Boulding, 1973; Bell, 1993) – this is as much the case for climate change as for any other policy issue. And stories play a crucial role in anticipation, both in creative imaginaries (Arizona State University, 2021; UN Climate Change Conference UK 2021, 2021; Hulme, 2022) and in formal futures practice. Informed by narrative evidence drawn from the role of stories across established futures techniques, as well as from stories themselves as anticipatory narrative models, storylistening can contribute to the work of anticipating the future, in order to enhance the quality of current climate-change decisions by bridging from scenarios (Bishop et al., 2007) to action.

Stories are essential to anticipation with regard to the products of futures methods: they function as narrative scenarios, as the ‘what if’ prompt for quantitative methods, and they function as the framing and use-facilitation of non-narrative scenarios. Stories also function as anticipatory techniques in their own right. Storytelling, storyimbining, and/or story analysis already define the processes of some known techniques such as incasting, backcasting, and future mapping. We propose that these known techniques should be classified as Narrative

Futures Methods (NFM), a category which should also include Science Fiction Prototyping (SFP) (Merrie et al., 2018), collaborative storytelling games (Shenk and Gutowski, 2022), and reasoning from existing stories (primarily, but not exclusively, SF stories) functioning as anticipatory narrative models (Dillon and Craig, 2021).

Climate change NFMs can be used to anticipate under conditions of uncertainty and contingency. For example, these methods can help model the slow violence (Nixon, 2011), latent futures in the making (Adam and Groves, 2007), and extended geological time and recurrent risks (Jemisin, 2015, 2016, 2017) of climate change. Extreme narrative models can motivate action but can also create narrative lock-in, re-enforcing boundary construction between different collective identities, inhibiting social action and interaction, and leading to narrative deficits (the failure to attend to, or the actual absence of, alternative stories). Narrative lock-in and narrative deficits restrict the range of anticipations and therefore limit decision-making. Storylistening can redress this by enabling the identification of such restrictions in the first place, and by drawing attention to – or encouraging the creation of – a fuller range of stories, for example the emphasis in recent climate change narrative futures initiatives (Fernández-Llamazares and Cabeza, 2018; Chabay et al., 2019; Shenk and Gutowski 2022) and narrative models (Robinson, 2020) on the necessity and empowerment of more positive visions of the future.

The question of what evidence is allowed to be suitable for public reasoning is potentially even more contested for evidence about the future than for that evidence acknowledged to be about the past (King and Thomas, 2007; Craig, 2019; van Dorsser et al., 2020). There may be a particular form of value for those whose primary concern is the role of climate science here, in that storylistening can bring with it a degree of comfort with multiple potential futures that help avoid the trap of scientists of having to ‘prove’ things about the future that are unprovable. Incorporating evidence from narrative futures methods into public reasoning may mean that climate-change scientific evidence about the future will be listened to in more sophisticated and robust ways too.

6.CONCLUSION: MAKING STORYLISTENING HAPPEN

We have made the case for the importance of stories – functioning with respect to framing, identities, modelling and anticipation – in understanding climate change, and the importance of storylistening for gathering narrative evidence from stories in order to inform public reasoning about climate change. In conclusion, we want to touch briefly on developments that are needed to put storylistening into practice.

Climate-change public reasoning requires plural forms of evidence including from the social sciences and the humanities (Shah, 2020; Dillon and Craig, 2022). For storylistening to be embedded in expert advisory systems and for valuable narrative evidence to inform decision-making, relevant communities (policymakers, science advisors, humanities advisors) need to be willing to consider discipline-specific forms of rigour and different types of evidence (Collins, 2014; Douglas 2012; SAPEA 2019; OECD 2020a), including within existing mechanisms for synthesising evidence for the purposes of decision-making (The Royal Society and the Academy of Medical Sciences, 2018). The humanities as an academic discipline needs to evolve to incorporate collaborative (not just oppositional) working (Brom, 2019; Dillon and

Craig, 2021), synthesis practices (Dillon, 2022; Dillon and Craig, 2022), and to develop long-term relationships with policymakers, which have been shown to contribute to good quality research, advice, and decision-making (Owens, 2015; Meckling and Allan, 2020).

Building on the growing body of experience and reflection on dialogue and deliberation in climate change policy (Ottinger, Barandiarán, and Kimura, 2017; OECD, 2020b; Ostfeld and Reiner, 2020; Pidgeon, 2020; also e.g. UK: Climate Assembly UK, 2020; France: *Convention Citoyenne pour le Climat*, 2021), storylistening can play a significant role in future arrangements for public dialogue and for deliberative democracy. Such arrangements can enable the intersection of evidence, anticipations and decision-making in public reasoning around climate change, where there are particularly hard and urgent challenges around democracies' capacity to engage with plural forms of evidence, systems thinking, complexity and uncertainty (Runciman, 2019) – challenges which storylistening is well-suited to help tackle.

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