



What Adaptation Stories are UK Newspapers Telling? A Narrative Analysis

Rachel Harcourt, Wändi Bruine de Bruin, Suraje Dessai & Andrea Taylor

To cite this article: Rachel Harcourt, Wändi Bruine de Bruin, Suraje Dessai & Andrea Taylor (2020) What Adaptation Stories are UK Newspapers Telling? A Narrative Analysis, Environmental Communication, 14:8, 1061-1078, DOI: [10.1080/17524032.2020.1767672](https://doi.org/10.1080/17524032.2020.1767672)

To link to this article: <https://doi.org/10.1080/17524032.2020.1767672>



© 2020 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group



[View supplementary material](#)



Published online: 19 Jun 2020.



[Submit your article to this journal](#)



Article views: 3107



[View related articles](#)



[View Crossmark data](#)



Citing articles: 4 [View citing articles](#)

What Adaptation Stories are UK Newspapers Telling? A Narrative Analysis

Rachel Harcourt ^{a,b,c}, Wändi Bruine de Bruin ^d, Suraje Dessai ^{b,c} and Andrea Taylor ^{a,b,c}

^aCentre for Decision Research, Leeds University Business School, University of Leeds, Leeds, UK; ^bSustainability Research Institute and ESRC Centre for Climate Change Economics and Policy, School of Earth and Environment, University of Leeds, Leeds, UK; ^cPriestley International Centre for Climate, University of Leeds, Leeds, UK; ^dSol Price School of Public Policy, Dornsife Department of Psychology, Schaeffer Center for Health Policy and Economics, and Center for Economic and Social Research, University of Southern California, Los Angeles, CA, USA

ABSTRACT

Media coverage of climate change impacts and adaptation will likely influence how citizens think society can and should adapt. Here, we undertook the first analysis of UK newspaper adaptation coverage. We identified five prominent adaptation narratives: (1) the government should build more flood defences, (2) home owners should buy flood insurance, (3) individuals should become more informed, (4) the farming industry should innovate, (5) and the natural environment should fight for its survival. We find that only some of the more immediate climate change impacts likely to affect the UK are presented as necessitating a response. The government is considered primarily responsible while UK citizens are given few and narrow responsibilities. The range of adaptive actions under consideration is limited and unchallenging to the status quo. In summary, newspaper coverage presents a restricted view as to when the UK should adapt and how it could adapt.

ARTICLE HISTORY

Received 5 November 2019
Accepted 1 May 2020

KEYWORDS

Climate change; adaptation; newspapers; narratives; responsibility; UK

1. Introduction

1.1. Adaptation choices

Climate impacts and extreme weather in the UK are expected to increase in severity and frequency (CCC, 2017; Met Office, 2018). “Adaptation” refers to actions that reduce the harm caused by impacts and take advantage of any opportunities that arise (IPCC, 2014). However, this is a broad definition and adaptation research has started to consider issues of what, who, when and intended outcome. A review of adaptation in several UK sectors, for instance, grouped the actions into categories so as to better understand where progress was being made (Tompkins et al., 2010). In terms of who should adapt, some have argued that adequately responding to climate change threats should incorporate as many stakeholders as possible (Fazey et al., 2016). The UK government promotes multi-stakeholder engagement in its National Adaptation Programme (DEFRA, 2018), although recent research found that in practice public bodies still dominate government-initiated adaptation (Lorenz et al., 2019). UK residents have differing opinions as to whether adaptation is the responsibility of the government or society at large, and there is some evidence that this

CONTACT Rachel Harcourt  ee15rh@leeds.ac.uk  CDR, LUBS, University of Leeds, Leeds LS2 9LT, UK; Sustainability Research Institute and ESRC Centre for Climate Change Economics and Policy, School of Earth and Environment, University of Leeds, Leeds LS2 9JT, UK

 Supplemental data for this article can be accessed at <https://doi.org/10.1080/17524032.2020.1767672>.

© 2020 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group
This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

uncertainty is a barrier to citizens adapting (Bichard & Kazmierczak, 2012; Cotton & Stevens, 2019). Adaptation choices can also be categorized as anticipatory or reactionary (Ford & King, 2015) and as offering short-term relief or long-term preparation (Moser & Ekstrom, 2010). Additionally, there might be different intended outcomes of adaptation. Pelling et al. (2015) identify three broad types of adaptation which they summarize as resistant, incremental and transformative which are defined by varying levels of disruption to socio-economic norms. Insurance to protect existing financial interests, for example, would be classed as resistant, while the development of new social contracts of power would count as transformational adaptation (Pelling et al., 2015). Adaptation is also context specific and the decision to adapt or not will differ by time and place (Adger, 2016). For instance, one determining factor might be the extent to which the proposed adaptation strategy is perceived as aligned with social values (Adger et al., 2009; O'Brien & Wolf, 2010). Therefore, choosing to adapt necessitates a series of decisions based on what and who should adapt, when, and for what intended outcome, as well as consideration of how these factors interact with the time and place in which adaptation is being considered. Decision and policy makers need to be aware of these choices if they are to develop adaptation strategies which are generally accepted by the necessary stakeholders and thus successfully implemented (e.g. Adger et al., 2013).

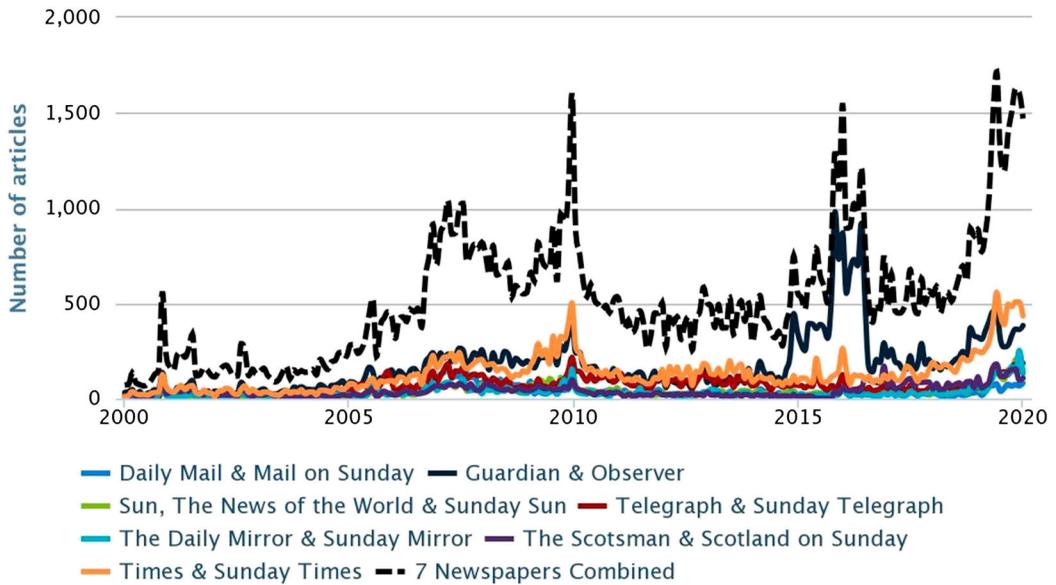
1.2. Narrative theory

Narrative theory offers a means of illuminating and exploring these choices. Narrative theory argues that societies use storytelling to debate, evaluate and make decisions about how they should respond to difficult and complex social issues (Fisher, 1984). The process of storytelling provides a safe space in which to try out possible outcomes, and their ramifications, ahead of time (Smith et al., 2017). As such, it can be used to push the boundaries of the debate and to explore a wider range of options before decisions are made (Veland et al., 2018). However, eventually a narrative emerges as seeming the most probable and the most truthful to how society views itself (Fisher, 1984). In time and through reiteration, this way of framing the topic comes to be seen as the social norm and the preferable way forward on the issue (Bruner, 1991).

How to best adapt to climate impacts is a relatively new topic within the climate change conversation (Cotton & Stevens, 2019; Pielke et al., 2007). Here, we will use narrative theory to analyze the range of narratives currently being told by UK newspapers. Specifically, we will use the archetypal narrative model of problem resolution in which the narrative arc is formed by the initial identification of a problem, followed by a description of individuals or groups responding in some way, and a resolution at the end (Rotmann, 2017; Ryan, 2007). This type of narrative model is particularly relevant to the study of adaptation which, at its most basic, is the identification of climate related impacts causing disruption to people or systems, followed by someone taking a response in an attempt to resolve or at least minimize the effects (Paschen & Ison, 2014). Using this analytical approach will allow us to examine newspaper coverage to understand how it's interacting with the adaptation choices of what, who, when and intended outcome outlined in Section 1.1.

1.3. Climate change and adaptation in UK newspapers

In the UK, newspapers continue to be a main source of climate change information for many people (Barkemeyer et al., 2016 O'Neill et al., 2015; Reis & Ballinger, 2020;). Newspapers are not an objective reiteration of all available topics and facts. Instead, newspapers first select which topics to include and then point the reader's attention towards specific elements of the story and not others (Entman, 1993). This framing process can influence the public's awareness and perception of social issues (Kasperson et al., 1988). Indeed, people's perceptions of risks are correlated with how often they are mentioned in newspapers (Combs & Slovic, 1979). Additionally, newspaper discourse is perceived as influential in setting the political agenda (Devitt & O'Neill, 2017 Escobar & Demeritt,



CIRES Center for Science and Technology Policy Research, University of Colorado Boulder, http://sciencepolicy.colorado.edu/media_coverage

Figure 1. 2000–2019 United Kingdom Newspaper Coverage of Climate Change or Global Warming. Source: Boykoff et al. (2019).

2014); Newspaper coverage therefore will influence society’s decisions to adapt or not and if so how (Ford & King, 2015).

Figure 1 shows the volume of coverage about “climate change” or “global warming” in UK national newspapers over the last 20 years (Boykoff et al., 2019). Peaks in coverage reflect real-world events, with the 2009 spike driven by COP 15 and the “Climategate” email scandal (Boykoff & Yulsman, 2013), and the late 2015 peak likely driven by the signing of the Paris Agreement and major UK flooding. Key themes emerging from discourse analyses are that climate change coverage can be alarmist in tone (Boykoff, 2008; Ereaut & Segnit, 2006; Hulme, 2007) despite risks and impacts often being presented as abstract and distanced (O’Neill, 2013). Political figures and messages have a prominent presence (Carvalho, 2005; O’Neill, 2013), while scientific discourse has become increasingly politicized (Carvalho, 2007).

One real-world event that attracts newspaper coverage is the publication of IPCC reports, with coverage tending to be more pessimistic and employ more dramatic and emotive language than the source material (Barkemeyer et al., 2016). Media coverage of the most recent IPCC impacts and adaptation report was dominated by disaster framing (O’Neill et al., 2015). Similarly, images accompanying coverage of the IPCC’s special report on extreme weather most often expressed negative emotions such as fear and guilt, as well as passive responses such as helplessness and vulnerability (Nerlich & Jaspal, 2014).

In terms of adaptation coverage specifically, one North American study has examined whether newspapers present adaptation as anticipatory or reactive; something that should happen or is already happening; and whether the coverage focused more on “hard” approaches, such as built infrastructure, or “soft” approaches, such as changes in policy or behaviors (Ford & King, 2015). The intention in selecting these categories was to better understand what the coverage might contribute to people’s understanding of “good adaptation” (Ford & King, 2015, p. 139). They found that coverage was most often anticipatory until the later years of the period studied when there was greater reaction to extreme weather events; that there were more arguments for adaptation than there were descriptions of adaptation actions happening; and greater coverage of hard approaches.

Despite a lack of research on the UK adaptation discourse per se, there are existing studies of UK flooding coverage. They find that while flood events are increasingly being linked to climate change, it is not yet a principle frame with coverage instead focusing on reporting the events as they unfold and the human interest of the story (Escobar & Demeritt, 2014; Gavin et al., 2011). Homeowners are increasingly presented as responsible for safeguarding their own home, with financial protection provided by the private insurance industry (Escobar & Demeritt, 2014). There is also growing discussion of the policy response, particularly in regards to flood defences and flood management, but also in regards to acting as part of the global community to mitigate climate change (Escobar & Demeritt, 2014).

1.4. Adaptation newspaper narratives

The 2008 Climate Change Act requires the UK national government to publish regular climate change risk assessments, so far issued in 2012 and 2017; to develop national adaptation programmes published in 2013 and 2018; and to undertake progress reviews by the independent Committee on Climate Change. The UK is regarded as having some of the world's most developed adaptation policies (Lesnikowski et al., 2015; Massey & Huitema, 2013). UK newspapers might therefore present a well-developed and insightful discussion of the adaptation choices being made in the UK. They could, additionally, provide a useful case study for other countries as they develop their own adaptation programs and accompanying public discourse.

In this study we will analyze UK newspapers to address the following research question: What are the most prominent narratives in UK newspapers about how the UK is, could and should adapt to a changing climate?

2. Methods

2.1. Publications and time period

We searched UK national and regional newspapers (see Table 1 for full list). National newspapers included broadsheets which are considered influential on the political agenda (Escobar & Demeritt, 2014), as well as tabloids which generally have higher print circulation (Statista, 2018). We also included the 5 most circulated English regional newspapers (Mayhew, 2017)¹

Table 1. Number of selected articles by publication, category and year^a.

Publication	Category	2013	2015	2017	Total	Percentage
<i>The Guardian</i>	National Broadsheet	39	51	21	111	39
<i>Yorkshire Post</i>	Regional	22	16	18	56	20
<i>The Times</i>	National Broadsheet	11	11	9	31	11
<i>Eastern Daily Press</i>	Regional	11	8	6	25	9
<i>The Observer</i>	National Broadsheet	5	2	5	12	4
<i>Daily Mail</i>	National Tabloid	1	8	1	10	4
<i>Daily Mirror</i>	National Tabloid	3	3	2	8	3
<i>The Sunday Times</i>	National Broadsheet	6	1	0	7	2
<i>Leicester Mercury</i>	Regional	3	0	1	4	1
<i>Mail on Sunday</i>	National Tabloid	2	1	1	4	1
<i>The Sun</i>	National Tabloid	2	2	0	4	1
<i>London Evening Standard</i>	Regional	1	0	2	3	1
<i>Manchester Evening News</i>	Regional	1	1	0	2	1
<i>Metro</i>	National Tabloid	2	0	0	2	1
<i>The Sun on Sunday</i>	National Tabloid	0	2	0	2	1
<i>Liverpool Echo</i>	Regional	0	0	1	1	<1
Total		109	106	67	282	

^a*Express & Star*, serving the Birmingham area, was not available on Nexis so the 6th highest was included instead and the *Yorkshire Post* was also included due to its relevance to the 2015 flooding.

because climate change coverage in the UK can vary between the regional and national press (Brown et al., 2011).

We searched for articles published during 2013, 2015 and 2017. Selecting from every other year provided an overview of 5 years while managing data volume. These years had different weather events, with 2013 experiencing an unusually long, cold winter, a hot summer and winter flooding; 2015 having major flooding; and 2017 having no major weather events (Met Office, 2017).

2.2. Criteria for inclusion

To search for relevant articles published in the selected UK newspapers (Table 1) between 2013 and 2017, we used the Nexis (Nexis, 2018) online newspaper database. We combined search terms referring to climate change and weather events (such as climate, weather, flood, heat, drought) with words referring to making changes (such as adapt, manage, prepare, change, plan for). Please see the Supplementary Table S1 for the full set of search terms. The original search returned nearly 18k articles. These were reviewed for adherence to four criteria: (1) relevance to the UK; (2) mention of climate change, global warming, or disruptive events such as flooding or heatwaves; (3) inclusion of at least one individual or group that was or could act in response to those events; and (4) inclusion of at least one action that was or could be taken in response to the events.

Due to extensive coverage of the December 2015 flooding we randomly selected 25% of the 109 relevant articles ($N = 28$), stratified by adaptive response and publication. The final dataset included 282 articles.

2.3. Overview of the collected data

Of the 282 articles, 68% came from national newspapers and 32% from local newspapers. *The Guardian* contributed the most articles (39%), followed by the *Yorkshire Post* (20%), *The Times* (11%) and the *Eastern Daily Press* (9%).

2.4. Coding and analysis

Using pre-defined narrative components to determine the coding structure has precedence in the Narrative Policy Framework (Shanahan et al., 2018), which has been applied to climate change related texts (Fløttum & Gjerstad, 2017; Lazarevic & Valve, 2017). Our coding categories were based on the required elements of the problem resolution narrative as applied to the topic of adaptation: the impacts or disruptive events which initiate the story; the individuals or groups who respond; and the actions they take

Table 2. Sub-codes appearing in 10% or more of the articles.

Higher level codes	Sub-codes	No. of articles coded
Impacts	Heavy rain and flooding	169
	Rising temperatures and heatwaves	50
	Climate change (impacts not specified)	37
	Drought	34
Active Agents	National government	119
	Individuals	35
	Local government and authorities	34
	Scientists, experts, technology	29
Adaptive Actions	Built flood defences	66
	Alternative types of flood management	37
	Nature adapting	36
	Flood insurance	34
	Reviews, reports, consultations	30
	Changes to food production	28

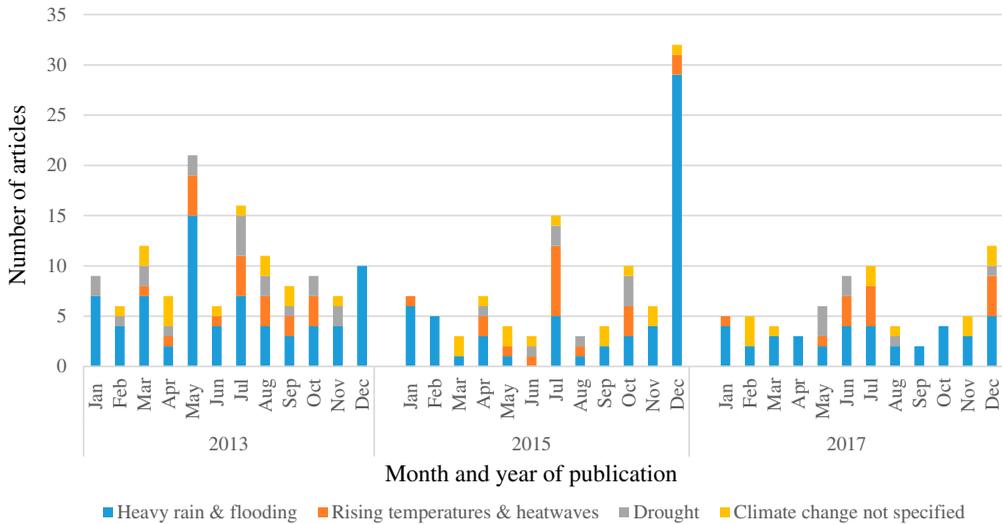


Figure 2. No. of articles per month for most frequently covered impacts.

to resolve the situation (see Section 1.2). We didn't code systematically for resolutions, despite this being part of the narrative model, as an initial reading of the articles had indicated that most articles were not written as complete narratives and didn't include a defined resolution. Within each coding category we inductively developed sets of sub-codes determined by the content of the articles. An article could receive multiple codes if, for example, it covered flooding and heatwaves. Table 2 lists all the sub-codes that were applied to 10% or more of the articles. The full set of codes can be found in Supplementary Table S2. The coding was done by the first author in Nvivo11.

Figure 2 shows coverage over time for the four Impacts mentioned in 10% or more of the articles. "Heavy rain and flooding" articles appeared in all months bar June 2015, and coverage spiked in May 2013 during negotiations between the national government and the insurance industry, and in December 2013 and 2015 when there was flooding in the UK. The UK Met Office recorded unusually warm weather in July 2013, July 2015 and June 2017 which is reflected in increased coverage of "Rising temperatures & heatwaves" (Met Office, 2017). There were no major extreme weather events in 2017 which may explain why this year had fewer articles overall (67 compared to 109 in 2013 and 106 in 2015). Thus, as in previous studies, coverage appears to be driven by real-world events (Boykoff & Yulsman, 2013).

Rather than focusing on individual articles, narrative analysis aims to read across texts to "weave together" storylines and their sub-plots from the topics mentioned (Bergman, 2017, p. 189; see also Hampton, 2004). Narrative analysis prioritizes identifying how texts act as social meaning makers rather than as simple conveyers of facts and, therefore, focuses not just on content but also the tone and emphasis of the storytelling (Paschen & Ison, 2014). Once all articles had been coded and the prominent topics had been identified we then read across the articles more closely to identify the adaptation stories being told about those topics.

3. Results

Next, we will describe the five problem resolution adaptation narratives we identified as most prominent in our dataset of newspaper articles. Our description of each narrative will outline the initiating events, and who responds and how (i.e. the beginning and middle of each story). A summary is provided in Table 3. As mentioned above, the narratives do not include definitive resolutions as climate change adaptation is a developing story with as yet unknown endings. However, the narratives do suggest intended or preferred outcomes which we will discuss in Section 4. In the

Table 3. Summary of the five narratives and the principle elements of each story.

Narrative	Initiating event	Principle active agents	Principle adaptive actions
A. Defences against flooding	Flooding	National government	Built flood defences
B. Insuring the home	Flooding	Individuals, aided by national government & insurance industry	Buying home insurance; making affordable insurance available
C. More informed decision making	Flooding; hotter weather; health risks	Individuals, aided by information providers	Using information to become more informed; making more informed decisions
D. Innovation in food and farming	All types of extreme weather; seasonal change; climate change	Farmers, aided by science & technology experts.	New crops; new technologies
E. Winners and losers in the natural environment	All types of extreme weather; seasonal change; climate change; plus other stressors	Nature, aided by Non-Governmental Organizations and concerned individuals	Fighting to survive, supportive actions

following text the numbers in brackets refer to supporting quotes taken from newspaper articles (see Supplementary Table S3).

3.1. Narrative A: defences against flooding

The collected articles were dominated by coverage of flooding. Flooding was described as happening with unprecedented frequency and severity (1–3) thus bringing unprecedented disruption to the UK. The coverage emphasized the growing risk to “hundreds of thousands of homeowners” (4) and local communities (5–7), and the “revolting, traumatising and economically ruinous experience” (8) of being flooded (9–10). Newspapers made it clear that this was an issue that needed to be addressed comprehensively and urgently (11).

The single most discussed adaptation action throughout the coverage studied was more and bigger flood barriers (12–13). According to newspapers, the relationship between flood defences and reduced risk to homeowners was clear and quantifiable. Reports stated that new schemes announced in February 2013 would protect 64,000 homes (5, 12); while other recently built defences would protect 800,000 on the East Coast (14); 16,000 in Nottingham (15); 7800 in Carlisle (16) and 8000 in Hull (17). Conversely, during real-world flood events stories about those suffering were accompanied by criticisms of insufficient defences such as the “repeatedly postponed” defences for the currently “submerged” town of Kendal (18, see also 19). Building flood defences was described as the responsibility of the government (20), in part because flood defences are large infrastructure investments that only the government has the means to deliver (21). There was also an assumption that the government was responsible for building flood defences so as to “make adequate provisions to protect its own people” from natural hazards (22) and to prepare for “the biggest threat the UK faces from climate change” (23, see also 24–25). However, newspapers strongly criticized the UK government for the “simple, shameful fact” (26) that it was not making enough money available and had even “slashed” the flood defence budget (27, see also 28–29). The broader government policy of austerity was also criticized for its role in limiting the UK’s preparedness for flooding (30). The opposition party made disparaging comparisons with their own record on flood defences (23, 31), while certain members of government were singled out for criticism, including the Prime Minister (10, 32) and the Environment Secretary (33). The relationship between government inaction and flooded homes was made explicit, as in the headline “Tory cuts leave towns to drown” (29, see also 10, 34).

Other ways to manage flood risk were also discussed, in part due to the perceived limitations of flood defences (35). These included the widening and improved management of water ways (36–37), better land drainage (38), more land turned to flood plains (39), and planting more trees (40–41), as well as building residential areas designed to flood (42) and large-scale reintroduction of the beaver

to the UK's waterways so as to create more natural dams (43). Nevertheless, the narrative for built flood defences remained dominant, particularly during moments of high pressure. When covering the December 2015 floods, newspapers engaged in an extensive and often emotional discussion of the “heartbreaking” events (44) and how the UK could better manage flood risk, including revising “idiotic fiscal policy decisions” (45) and no longer “disregarding climate change” (46, see also 47). There were some attempts to move the conversation beyond built flood defences, particularly by *The Guardian* which called for a more holistic approach and “a leap of the imagination, not just a bit more money” (48). However, the more pervasive mood was summed up by the *Daily Mail* in its headline “Britain Needs Bigger Barriers” (13).

3.2. Narrative B: insuring the home

Narrative B also responded only to the flood threat to people's homes and similarly emphasized the serious and negative impacts of the growing risk (7, 49), particularly focusing on the “millions of pounds worth of damage” homeowners could face (50, see also 51–52). In this narrative, however, the responsibility was with homeowners to manage their own exposure by buying home insurance (53–54). That homeowners could and should do this was emphasized: articles provided advice on how people could secure the best insurance for them (53, 55) and how to contact their insurance company after being flooded (54). Home insurance was championed as providing a financial safety net to homeowners should they be flooded (56). Further, because home insurance is a requirement of a mortgage agreement (57), the insurance narrative also mentioned the benefit of preventing a growing percentage of UK properties from becoming “uninsurable, unmortgageable and unsellable” (52) as this would negatively affect the personal financial assets of those affected (58–59), and the total value of the UK property market (60–61).

This narrative was purportedly supportive of using home insurance as a means of managing an individual's exposure to flood risk. However, sub-stories within the narrative simultaneously questioned the supposed agency of individuals. While covering the 2013 insurance policy renegotiations between the government and insurance industry, newspapers presented access to available and affordable insurance as a standard right for homeowners (62). However, the negotiations over-ran and threatened to collapse with the “Government under fire over failure to help flood victims ... unless someone blinks soon” (63). According to newspapers, UK residents were to imminently lose their access to affordable insurance, leaving homeowners at higher flood risk on their own (64–65). Although the negotiations ultimately produced the Flood Re scheme, the helplessness of homeowners during this process was emphasized, such as a report that “insurance fears drive rise in calls for advice” (66). Additionally, articles from all years told of homeowners who were no longer able to secure affordable insurance due to being considered too high risk (67–69).

The coverage also exposed the limitations of insurance as a flood management strategy. It was noted that, while insurance provides a level of financial protection, “no insurance product or scheme can prevent floods or the widespread devastation and destruction they cause” (70). Indeed, there were reports of homes and communities that had experienced multiple floods in recent years (71–72). The long-term financial viability of the insurance industry was also questioned. During the 2013 renegotiations, the insurance industry argued that a “lack of flood defence spending by the government meant that covering high-risk homes was no longer viable for the industry” (73, see also 74). Therefore, while this narrative promoted home insurance as a beneficial response to flooding, it also revealed that, if flooding in the UK increased as expected, more and more people would find themselves at risk and without insurance.

3.3. Narrative C: more informed decision making

Narrative C also responded to homeowners' flood risk (75), as well as other emerging risks, such as hotter weather (76), health hazards including Lyme disease (77–78) and changing financial markets

(79). As such, it was a less straightforward narrative than those promoting either built flood defences or home insurance, but was notable for the range of different risk topics it included.

The emphasis was on the individual to become more informed about these risks so as to make better decisions about managing them. In regards to flooding, there was a variety of ways that individuals could do this. Over the 5-year study period, higher resolution flood maps became available (80–81), as did maps showing surface water flood risk for the first time (82). This meant that house buyers could check risk of flooding much more accurately than before (82–83), although there were further calls for flood risk to become standardised in the information packs given to potential house buyers (84). Existing homeowners were also urged to make use of the “vital service” provided by flood maps (85) and to join the “more than a million households [who] have signed up to the Government’s flood warning service” (86), the benefits of which had been proven during previous flood events when early action had “saved lives and properties” (87). Newspapers also suggested changes that residents could make to their own homes to increase resilience to flooding (88–89). In summary, “educat[ing] people to help themselves” (90) was advocated as part of an effective, holistic flood management strategy (91–92).

Occasionally newspapers provided information about other risks, such as how extreme weather might affect health “and what you can do about it” (77) and “10 tips on how to prepare for an apocalyptic future” (93). For financial investments, readers were encouraged to access the available specialist information (94). However, often the lack of available information about risks other than flooding was noted and criticized. According to newspapers, “Heatwaves are national emergencies and the public need to know [but] Lethal risks of extreme weather are under-reported and government must stop cutting public awareness funds” (95). Heatwave warning systems (96) and clearer guidelines on maximum working temperatures (97) were suggested. Similarly, it was noted that information about increased risks of skin cancer (98) and Lyme disease (99) was not yet available. While the focus of this narrative was the empowerment of individuals to manage their own exposure, the information first needed to be provided by other agents, including the national government, local government, the Met Office, the Environment Agency, health authorities and estate agents. When that wasn’t done then an individual’s ability to make good decisions was impeded “causing preventable deaths” (95).

Within this narrative, therefore, the possibility of informed decision making was presented as limited. For flooding, there were a number of ways individuals could learn to manage their own exposure; for other risks, options were presented as minimal. There was an underlying assumption of the benefits of having all sectors of society working together to become better prepared for climate change, for instance, more informed home buyers would be less likely to buy in flood risk areas thus reducing the costs of flooding in that area. However, according to the coverage, often these opportunities were, thus far, under-utilized.

3.4. Narrative D: innovation in food and farming

Narrative D described the susceptibility of food production to more extreme weather, seasonal shifts and a warming climate (100–103). The unpredictability of recent weather patterns was presented as particularly difficult for farmers to manage, with commentators noting that “Under one scenario, Yorkshire will be the new Tuscany, under the other, it will be the new Tomsk” (104, see also 105–106), while extreme weather events caused losses in revenue (107) and livestock (108). Concerns were expressed about popular fish dishes being threatened by warming and acidifying oceans (109–110). Weather and climate events in other regions were also mentioned as risking UK food imports (111–112). Increased risks of poor harvests in the UK and elsewhere, were seen as “the biggest threat to UK farming and its ability to feed the nation’s growing population” (100, see also 113).

The adaptive actions in this narrative were based on accepting change and innovating. It was noted that some current foods might no longer be suitable to UK farming and fishing conditions

(109, 114), so forcing a change. But there was also an argument made for capitalizing on new opportunities, such as growing crops “farmers only ever dreamed about” (115) including wine (116), grains (103) and fruit (115–117), as well as types of seafood now in UK waters (118). Additionally, there was coverage of technological innovations that might make UK farming more resilient, including new seed varieties (119, 120). Newspapers debated whether the UK should farm genetically modified crops which are currently banned under EU law but, some argued, might be more resilient to weather extremes and new pests (121–123).

Farmers were the main characters in this narrative. The President of the National Farmers Union, Peter Kendall, was frequently quoted (121, 124–125) and individual farmers were also interviewed about their extreme weather experiences (126–127). The farming industry used its coverage to present itself as proactive in responding to changing conditions, saying “We’re a resilient lot, we’ll work it out” (128). The most celebrated example of this were those who had pursued wine making in the UK, drawing on “deep pockets, a vision, and nerve,” and were now reaping the benefits (129, see also 130–131). This narrative also suggested that farmers would not be able to do it on their own but would need help from science and technology (119–120, 132–133) as well as financial (107, 132) and legislative (134–135) support from the national government. Additionally, they might need to manage resistance from environmental groups (136–37) and to secure consumer support for changing how their food was produced (138–139).

Of all the narratives presented in this paper, this one was most engaged with planning for the future. Indeed, there was explicit mention of the need to plan now for food demands in 20 years’ time (125), as well as reports of industry strategizing “for a climate where ‘abnormal’ weather becomes ‘normal’” (140). There were also arguments made for pre-emptively preparing for developments in adaptation strategies, such as policies to support the use of anticipated technological breakthroughs in seed production and pesticides (122, 134).

3.5. Narrative E: winners and losers in the natural environment

Narrative E described the UK’s wildlife as being impacted by extreme weather (141–142), warming on land and at sea (143–145), and additional stress factors, such as depleting habitats (144, 146). There was also discussion of perceived changes in the UK’s seasonal patterns (147–148). Further, the threats to nature were framed as risking losses of emotional and cultural importance to the UK. Nature impact stories often focused on familiar garden species such as birds, bees and butterflies (144, 146, 149–152), and those symbolic of the UK coasts, such as puffins and terns (153–156). An article about the barn owl, described it as “one of Britain’s most popular” birds and an “icon of the countryside,” but noted the “catastrophic fall in numbers” due to unusually cold and wet springs (157). According to the articles, events “Nature lovers” (158) could themselves participate in, including bird watching (155) and observing the first day of spring (158), might also be under-threat as the climate changes.

Nature was cast as the active agent making best possible adaptive actions so as to survive, with reports of some species adapting to warmer temperatures by moving further north (143, 145, 159). But there were also other reports of species struggling to survive (160), with some not having any available habitat to migrate to (146, 159) and others suffering from forced dietary changes (161). Consequently, nature’s position was summarized as “a list of winners and losers” (162, also 163–164). In this version of the narrative, the role for humans was to observe and record the changes happening, an action in which newspapers themselves played a role as they reported on “The Birds and the Bees Confused” (149, see also 165), “a freak year for nature” (150 & 166), “The highs and lows of British wildlife” (160), and “one of the most unusual [years] on record” (167). Readers were also encouraged to get involved with citizen science projects which could help experts achieve a better understanding of how the natural environment was adapting to climate change (168–169). This adaptation narrative was uniquely defeatist in terms of its acceptance of inevitable losses, and it was uniquely passive in its role for humans.

However, some of the coverage focused on what homeowners and gardeners could do to help. Readers were “urged to help save” birds and animals by putting out food during extremely cold weather (170), and homeowners were “urged to create rooftop gardens” for insects (171). They were also encouraged to replace hard surfaces on their properties, such as paving, with grass or planted areas (172), and to choose plants that attract bees and insects (173). The “urging” was done by NGOs, usually Matthew Oates from The National Trust, who provided both the authoritative voice on the current state of nature (162, 174) and the call for greater citizen engagement with the natural environment (158, 168, 175). The Royal Horticultural Society backed the campaign to “green grey Britain” (1732, 176–177), while the Natural History Museum and the Royal Society for the Protection of Birds also encouraged people to do what they could to help (169–170). Nevertheless, the promoted actions tended to be short-term, with small-scale benefits.

3.6. Other narratives

As with previous newspaper studies, the corpus of articles contained more topics and ideas than we can discuss here (Brown et al., 2011). Some articles also responded to other disruptive events including drought, storms, cold weather, coastal erosion, warming and rising seas, shifting seasons, and wildfires. We also found at least some mention of the following adaptation actions: changes to infrastructure such as rail lines and housing, adapted business models, policy interventions, moving away from hazards, socio-economic system transformation, UK funding of overseas adaptation projects, water use and storage, as well as arguments that adaptation was not yet happening and alternatively that it wasn’t needed. However, these topics were mentioned less frequently and hadn’t yet developed into more established problem resolution narratives.

4. Discussion

This paper presents the first analysis of newspaper coverage of climate change adaptation in the UK drawing on 282 articles published in 14 national and regional newspapers during 2013, 2015 and 2017. We used narrative analysis based on the archetypal narrative model of problem resolution to identify which events initiate an adaptation story and who responds and how. We identified five prominent adaptation narratives: (1) due to flooding the government should build more flood defences and (2) homeowners should buy insurance. Due to flooding and other risks (3) individuals should make more informed decisions to limit their own exposure. And due to a combination of weather and climate impacts (4) the farming industry should innovate while (5) the natural environment should strive to adapt as best as possible.

The premise of this research was that the stories societies tell about disruptive events influence how they’re conceptualized and, ultimately, the response and resolution taken. Reading across these narratives we found that newspapers present adaptation as principally a response to flooding and much less so to other climate risks likely to affect the UK now and in the future; as still largely dependent on the actions and support of the national government; and as intending to maintain the current way of life while trying to protect those most at risk from acute weather impacts. We will now discuss each of these points in turn.

4.1. Adaptation to immediate threats

The single most pervasive message from across the coverage was that the UK should be better responding to growing flood risks. Two of the five narratives were initiated solely by flooding, one was initiated by emerging risks to individual wellbeing from flooding and other causes, and the remaining two involved a combination of weather and climate events including flooding. To some extent this was driven by newsworthy events which happened during the period studied. The major floods of December 2015 received so much coverage that we included only a 25% sample

of it in our analysis, plus there was significant commentary on the wet weather events of 2012 and the storm surge in 2013. Newspapers are more likely to cover stories which are dramatic, novel and have a strong human interest, a brief which flooding fits (Boykoff & Boykoff, 2007). There is also a long-running narrative of the UK as a flood prone nation which pre-dates climate change adaptation discussions (Escobar & Demeritt, 2014; Gavin et al., 2011). But flooding also fits well into the existing “disaster” narrative which earlier studies have found both dominates climate change coverage (Boykoff, 2008) and, more specifically, the impacts and adaptation discourse (O’Neill et al., 2015). We found evidence of this here through the use of dramatic and emotional language, as well as the references to “victimhood” of at-risk homeowners. Climate change framing which is strongly negative or fear inducing has been found to be disengaging (O’Neill & Nicholson-Cole, 2009). As such, while newspaper flooding stories might be providing useful risk communication about climate change impacts, the current approach to the coverage might be unlikely to encourage greater engagement with adaptation decision making.

Hot weather was the second most mentioned impact in the coverage, although in only 50 articles compared with the 169 of flooding. Further, none of the five adaptation narratives centered only on heat risks. Unlike flooding, heat risks are not yet a well-established topic in the UK. In fact, previous research into public perceptions of climate risks found that UK residents thought hot summers and heatwaves had become less common (Taylor et al., 2014). Further, they might consider hotter weather to be a positive thing to be enjoyed rather than a risk to be managed (Bruine de Bruin et al., 2016). The limited coverage of heat risks in newspapers did not challenge this perception. However, experts categorize rising temperatures in the UK as a risk of the same severity and immediacy as flooding (CCC, 2017). There are some initial findings that people will follow heat risk information (Lefevre et al., 2015), but that it’s not yet being sufficiently provided (Howarth et al., 2019). The decision making narrative referenced this as it criticized the lack of hot weather adaptation information available. Unlike for flooding, though, newspapers were also not yet providing this advice to readers.

According to the latest *UK Climate Change Risk Assessment*, in coming decades the UK is also likely to be effected by risks to the water supply, natural capital, and food production, and risks from new and invasive pests and diseases (CCC, 2017). We found at least some articles on all of these issues, although only some were sufficiently discussed to be included in the most prominent narratives.

Newspapers are influential in how people perceive what’s risky and what’s not (Combs & Slovic, 1979; Kasperson et al., 1988). In relation to climate change impacts, newspapers can influence which current or probable future events people are aware of, and the extent to which they perceive them as of concern. This will, therefore, influence which types of events are seen as deserving of adaptation investment. Adaptation coverage is so far focusing on familiar and dramatic current events and is not yet debating the full range of emerging risks likely to affect the UK. Linking adaptation so closely to mainly one event, i.e. flooding, also risks presenting a limited interpretation of when and for whom taking adaptive actions might be possible and beneficial. A recent critique of measuring adaptation argued that rather than focusing on adherence to specific actions it would be more useful to evaluate the capabilities of societies to live well under a range of possible futures (Dilling et al., 2019). It might therefore be useful for newspapers, and other sources of public information, to present adaptation as a long-term strategy to managing unavoidable change rather than as principally a set of flood response actions.

4.2. Adaptation dependent on government

The national government was the main active agent only in the narrative about building flood defences. However, it was also presented as playing indispensable supporting roles in regards to insurance, individual decision making and farming. It was not mentioned in the nature narrative which was also the most doubtful as to the success of adaptation. This presentation risks giving

the perception that adapting to climate change is principally the responsibility of the national government. Nevertheless, as with previous studies, we found that newspapers were often critical of the government, especially in regards to flood management (Escobar & Demeritt, 2014). Blame directed at the government and key political figures escalated during actual flood events, and newspapers also covered policy disputes between the two main political parties. As such, politicization of the issues became a central theme of the coverage. Further, because newspapers demanded a political response to managing the issues this in large part set the boundaries of the debate. For example, there was voluminous coverage of the flood defence budget, the spending policies of the two main political parties, and the publications' own stance on spending. In comparison, there was much less room given to debating non-government led solutions to flooding. This type of agenda setting is often cited as a principle influence of newspapers (Entman, 1993), although, as government messaging tends to be a primary source of climate change coverage, it can also influence the scope of policy ideas newspapers cover and critique (Carvalho, 2005). We find that this is likely a cyclical process with government figures dominating the coverage while also responding to the demands of the media. This creates a closed discourse with limited space available for other voices. It also fails to robustly interrogate government leadership and centralized governance as the best means of approaching adaptation. Perhaps most importantly, it gives a false impression that debate and decision making are taking place while obfuscating the need for greater social engagement in deciding how best the UK might adapt.

Individuals were the main characters in the insurance and decision making narratives, and had supporting roles in the nature narrative and, to a lesser extent, food and farming narrative. Focusing on those narratives in which individuals were the main active agent, the principle drivers for individual adaptation were protection of personal wellbeing and of immediate self-interests. Most often individuals were reframed as homeowners responsible for protecting their financial assets. This consequently influenced the type of adaptive actions individuals were encouraged to take, namely, buying home insurance and becoming more informed about the flood risk to their house, themes which had already developed in earlier periods of flooding coverage (Escobar & Demeritt, 2014). However, the narratives also made clear the limitations to individual agency, such as homeowners being dependent on affordable insurance and risk information being made available to them. Additionally, individuals were very rarely presented in other less individualistic roles such as citizens, voters or community members. Media can be very influential in projecting ideas about appropriate social identities and responsibilities (Burr, 2003; Fairclough, 1995). As such, media and other climate change communications have been criticized for the extent to which they promote individual behavior change, rather than political engagement in the socio-economic practices driving climate change (Carvalho et al., 2017; Pepermans & Maesele, 2014). We draw comparable conclusions here, finding that so far newspaper coverage of adaptation includes discussion of actions individuals might take to protect their own interests, but that questions beyond this immediate sphere of personal interest are being framed as a political issue and the responsibility of the government. To the extent to which newspaper coverage is an influencing factor in shaping our understanding and response to an issue, this coverage might lead to perceptions of limited responsibility of non-government actors which might therefore limit their willingness to act. This, therefore, also risks undermining the announced adaptation strategy of the government which calls for all sectors of society to engage in managing their own risks (DEFRA, 2018).

4.3. Adaptation to maintain the status quo

Adaptive actions can be categorized by intended outcomes: some are resistant and reinforce existing pathways; some are incremental causing non-threatening adjustments; and some are transformational causing fundamental changes (Pelling et al., 2015). Newspaper coverage of flooding, the dominating topic, was principally resistant in tone. The two most discussed adaptive actions to flooding, flood defences and home insurance, can both be categorized as resistant as they encourage at risk

communities to stay in place. Focusing on government funded infrastructure further contradicts government strategy which emphasizes individual engagement in decreasing personal risk, and cross-sector collaborations to increase community resilience (DEFRA, 2018). A study of North American newspapers also found greater coverage of “hard” adaptation approaches, arguing that this might limit the scope of what is understood or valued as adaptation, and also fails to consider situations in which soft adaptation approaches which can build resilience might be more feasible and more beneficial (Ford & King, 2015). While several of our narratives might be described as soft approaches, including insurance and more informed decision making, from a volume perspective built flood defences dominated the coverage especially during periods of high interest. However, if flooding increases as expected then the UK will need to move beyond traditional hazard management strategies (HM Government, 2017; Howard Boyd, 2019)

The decision making and nature narratives suggested incremental changes to provide immediate benefits to people’s health and wellbeing or to that of nature. However, the food and farming narrative was more transformational in approach as it promoted the uptake of new opportunities and practices. This might have been influenced by the dominating voice of the National Farmers Union President, Peter Kendall, who explicitly positioned himself, and therefore the industry he represented, as willing to change. The wine story, the only good news story from across the coverage, also provided a positive example of embracing change. However, this narrative also highlighted the need to secure broad support if change is to be socially accepted and successfully implemented (Tschakert et al., 2016). This was shown in the debate about GM crops which was polarized towards those who viewed them as a necessary part of the future and those who saw them as “Frankenfood” (139).

Adaptive actions might be either reactive or proactive. Reviewing newspapers provides some view into real-world events and, here, there were reports on proactive developments in flood management and in the farming industry. However, our analysis focused on how newspapers were choosing to narrate adaptation and often their tone was much more reactive. A key example was the escalated demand for more flood barriers during December 2015 when many homes and communities were under-water. Additionally, newspapers tended to prioritize alleviating immediate concerns over preparation for the long-term. This emerged especially in the insurance narrative, in which newspaper demands for home insurance for all didn’t adequately engage with the long-term challenges of funding the rising cost of flood damage or providing long-term security to the most at risk communities. This is not unusual as newspapers tend to focus on the most newsworthy events and to emphasize the dramatic and human interest elements (Boykoff & Boykoff, 2007). However, newspaper framing can influence political priorities therefore shaping policies (Escobar & Demeritt, 2014). A study of flooding coverage in Irish newspapers supports this thesis, arguing that the newspapers response during times of flooding was influencing the short-termism of government flooding policy (Devitt & O’Neill, 2017). Therefore, we suggest that the focus on immediate relief for dramatic real life situations further supports an adaptation approach which focuses on current risks and prioritizes maintaining the current status quo but which risks failing to plan sufficiently for future developments.

4.4. Conclusion

The British government is promoting uptake of adaptation in all sectors of society so as to increase the UK’s resilience to the uncertain impacts of climate change (DEFRA, 2018). As such, it is important to reiterate the extent to which newspaper coverage is focusing on government leadership and hard adaptation approaches, which might undermine individuals’ agency. Earlier we noted that, in practice, adaptation is a series of choices and, at times, compromises. Society’s ability to best navigate this decision making process will be dependent on access to an informative and robust debate, in which newspapers will play a key part. As has been found in other studies regarding flooding in the UK (Escobar & Demeritt, 2014) and adaptation in other territories (Boykoff et al., 2013), so

far this is not yet happening in UK adaptation newspaper coverage despite the UK's relatively advanced adaptation planning. The coverage we studied presented a narrow view of when taking adaptive actions might be beneficial, and of how it might be done. Additionally, newspapers minimized discussion about the longer-term challenges and compromises adaptation will likely cause. The clear boundary setting as to what adaptation is and should be is likely to affect the range of policies under consideration (Entman, 1993). Additionally, it might be disengaging to those who don't consider themselves at imminent risk of climate change impacts, particularly flooding. There is a disconnect, therefore, between the announced ambitions of adaptation in the UK and newspaper discourse on the topic. This is a challenge that other contributors to the discourse, such as public communicators, need to be aware of.

4.5. Limitations and further research

Since the end of our data collection the UK had an unusually hot summer in 2018, the IPCC released a Special Report on Global Warming of 1.5°C, the School Strike and Extinction Rebellion movements emerged and, most recently, there was a series of major wildfires across the globe. Therefore, while we recognise that the UK adaptation discourse might already have developed beyond the newspaper narratives we described, this also further highlights the value in analyzing media discourse and how it might influence public perception. It is useful to study newspapers due to their continued wide readership (Statista, 2018), their influence on the political agenda (Escobar & Demeritt, 2014) and their continued influence on TV news content (Boykoff & Yulsman, 2013) as well as on newer forms of media such as twitter (Kirilenko & Stepchenkova, 2014). However, a newspaper analysis can only provide a partial view on the public discourse regarding a topic. Further, while newspaper coverage, as a main source of non-experts climate change information, might be an influencing factor on public opinion it by no means directly determines what people think (Carvalho & Burgess, 2005; Olausson, 2011). Therefore, fruitful further research would test people's responses to these narratives to see if they find them informing and engaging. Additionally, UK citizens might have their own ideas not yet being captured by the most prominent newspaper narratives. Working with citizens to develop their own adaptation stories could offer new and more engaging ways to talk about the UK's preparation for a changing climate.

Note

1. The *London Evening Standard* is not listed as a regional newspaper by Mayhew. However, it has a circulation of approx. 850,000 making it the most highly circulated regional newspaper in the UK so we included it.

Acknowledgements

Wändi Bruine de Bruin was partially supported by the Center for Climate and Energy Decision Making (CEDM) through a cooperative agreement between the National Science Foundation and Carnegie Mellon University (SES-0949710 and SES-1463492) as well as the Riksbankens Jubileumsfond (The Swedish foundation for Humanities and Social Sciences) Program on "Science and Proven Experience"

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

Suraje Dessai acknowledges the support of the UK Economic and Social Research Council (ESRC) for the Centre for Climate Change Economics and Policy (CCCEP; ES/R009708/1) and of the Strategic Priorities Fund (SPF) UK Climate Resilience Programme (NE/S017321/1).

ORCID

Rachel Harcourt  <http://orcid.org/0000-0001-7085-5192>
 Wändi Bruine de Bruin  <http://orcid.org/0000-0002-1601-789X>
 Suraje Dessai  <http://orcid.org/0000-0002-7879-9364>
 Andrea Taylor  <http://orcid.org/0000-0002-8949-1234>

References

- Adger, W. N. (2016). Place, well-being, and fairness shape priorities for adaptation to climate change. *Global Environmental Change-Human and Policy Dimensions*, 38, A1–A3. <https://doi.org/10.1016/j.gloenvcha.2016.03.009>
- Adger, W. N., Dessai, S., Goulden, M., Hulme, M., Lorenzoni, I., Nelson, D. R., Naess, L. O., Wolf, J., & Wreford, A. (2009). Are there social limits to adaptation to climate change? *Climatic Change*, 93(3–4), 335–354. <https://doi.org/10.1007/s10584-008-9520-z>
- Adger, W. N., Quinn, T., Lorenzoni, I., Murphy, C., & Sweeney, J. (2013). Changing social contracts in climate-change adaptation. *Nature Climate Change*, 3(4), 330–333. <https://doi.org/10.1038/nclimate1751>
- Barkemeyer, R., Dessai, S., Monge-Sanz, B., Gabriella Renzi, B., & Napolitano, G. (2016). Linguistic analysis of IPCC summaries for policymakers and associated coverage. *Nature Climate Change*, 6(3), 311–316. <https://doi.org/10.1038/nclimate2824>
- Bergman, N. (2017). Stories of the future: Personal mobility innovation in the United Kingdom. *Energy Research & Social Science*, 31, 184–193. <https://doi.org/10.1016/j.erss.2017.06.028>
- Bichard, E., & Kazmierczak, A. (2012). Are homeowners willing to adapt to and mitigate the effects of climate change? *Climatic Change*, 112(3–4), 633–654. <https://doi.org/10.1007/s10584-011-0257-8>
- Boykoff, M., Chandler, P., Daly, M., Mcallister, L., McNatt, M. A., Oonk, D., & Pearman, O. (2019). 2000–2019 United Kingdom Newspaper coverage of climate change on global warming. Retrieved January 31, 2020, from https://sciencepolicy.colorado.edu/icecaps/research/media_coverage/uk/index.html
- Boykoff, M. T. (2008). The cultural politics of climate change discourse in UK tabloids. *Political Geography*, 27(5), 549–569. <https://doi.org/10.1016/j.polgeo.2008.05.002>
- Boykoff, M. T., & Boykoff, J. M. (2007). Climate change and journalistic norms: A case-study of US mass-media coverage. *Geoforum*, 38(6), 1190–1204. <https://doi.org/10.1016/j.geoforum.2007.01.008>
- Boykoff, M. T., Ghosh, A., & Venkateswaran, K. (2013). Media coverage of discourse on adaptation: Competing visions of “success” in the Indian context. In S. C. Moser & M. T. Boykoff (Eds.), *Successful adaptation to climate change* (pp. 261–276). Routledge.
- Boykoff, M. T., & Yulsman, T. (2013). Political economy, media, and climate change: Sinews of modern life. *WIREs Climate Change*, 4(5), 359–371. <https://doi.org/10.1002/wcc.233>
- Brown, T., Budd, L., Bell, M., & Rendell, H. (2011). The local impact of global climate change: Reporting on landscape transformation and threatened identity in the English regional newspaper press. *Public Understanding of Science*, 20(5), 658–673. <https://doi.org/10.1177/0963662510361416>
- Bruine de Bruin, W., Lefevre, C. E., Taylor, A. L., Dessai, S., Fischhoff, B., & Kovats, S. (2016). Promoting protection against a threat that evokes positive affect: The case of heat waves in the United Kingdom. *Journal of Experimental Psychology: Applied*, 22(3), 261–271. <https://doi.org/10.1037/xap0000083>
- Bruner, J. (1991). The narrative construction of reality. *Critical Inquiry*, 18(1), 1–21. <https://doi.org/10.1086/448619>
- Burr, V. (2003). *Social constructionism*. Routledge.
- Carvalho, A. (2005). Representing the politics of the greenhouse effect: Discursive strategies in the British media. *Critical Discourse Studies*, 2(1), 1–29. <https://doi.org/10.1080/17405900500052143>
- Carvalho, A. (2007). Ideological cultures and media discourses on scientific knowledge: Re-reading news on climate change. *Public Understanding of Science*, 16(2), 223–243. <https://doi.org/10.1177/0963662506066775>
- Carvalho, A., & Burgess, J. (2005). Cultural circuits of climate change in U.K. broadsheet newspapers, 1985–2003. *Risk Analysis*, 25(6), 1457–1469. <https://doi.org/10.1111/j.1539-6924.2005.00692.x>
- Carvalho, A., Van Wessel, M., & Maesele, P. (2017). Communication practices and political engagement with climate change: A research agenda. *Journal of Environmental Communication*, 11(1), 122–135. <https://doi.org/10.1080/17524032.2016.1241815>
- CCC. (2017). *UK climate change risk assessment 2017 evidence report key messages from the synthesis report*. Retrieved February 6, 2017, from <https://www.theccc.org.uk/wp-content/uploads/2016/07/CCRA-Synthesis-Report-Key-Messages-fact-sheet-1.pdf>
- Combs, B., & Slovic, P. (1979). Newspaper coverage of causes of death. *Journalism Quarterly*, 56(4), 837–843. <https://doi.org/10.1177/107769907905600420>
- Cotton, M., & Stevens, E. (2019). Mapping discourses of climate change adaptation in the United Kingdom. *Weather, Climate, and Society*, 11(1), 17–32. <https://doi.org/10.1175/WCAS-D-18-0024.1>

- DEFRA. (2018). *The national adaptation programme and the third strategy for climate adaptation reporting: Making the country resilient to a changing climate*. Retrieved July 23, 2018, from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/727252/national-adaptation-programme-2018.pdf.
- Devitt, C., & O'Neill, E. (2017). The framing of two major flood episodes in the Irish print news media: Implications for societal adaptation to living with flood risk. *Public Understanding of Science*, 26(7), 872–888. <https://doi.org/10.1177/0963662516636041>
- Dilling, L., Prakash, A., Zommers, Z., Ahmad, F., Singh, N., De Wit, S., Nalau, J., Daly, M., & Bowman, K. (2019). Is adaptation success a flawed concept? *Nature Climate Change*, 9(8), 572–574. <https://doi.org/10.1038/s41558-019-0539-0>
- Entman, R. M. (1993). Framing: Toward clarification of a fractured paradigm. *Journal of Communication*, 43(4), 51–58. <https://doi.org/10.1111/j.1460-2466.1993.tb01304.x>
- Ereaut, G., & Segnit, N. (2006). *Warm words: How are we telling the climate story and can we tell it better?* Institute for Public Policy Research. Retrieved November 26, 2016, from <http://www.ippr.org/publications/warm-wordshow-are-we-telling-the-climate-story-and-can-we-tell-it-better>
- Escobar, M. P., & Demeritt, D. (2014). Flooding and the framing of risk in British broadsheets, 1985–2010. *Public Understanding of Science*, 23(4), 454–471. <https://doi.org/10.1177/0963662512457613>
- Fairclough, N. (1995). *Media discourse*. E. Arnold.
- Fazey, I., Moug, P., Allen, S., Beckmann, K., Blackwood, D., Bonaventura, M., Burnett, K., Danson, M., Falconer, R., & Gagnon, A. (2016). Transformation in a changing climate: A research agenda. *Climate and Development*, 39, 351–362. <https://doi.org/10.1080/17565529.2017.1301864>
- Fisher, W. R. (1984). Narration as a human communication paradigm: The case of public moral argument. *Communication Monographs*, 51(1), 1–22. <https://doi.org/10.1080/03637758409390180>
- Fløttum, K., & Gjerstad, Ø. (2017). Narratives in climate change discourse. *Wiley Interdisciplinary Reviews: Climate Change*, 8(1), 1–15. <https://doi.org/10.1002/wcc.429>
- Ford, J. D., & King, D. (2015). Coverage and framing of climate change adaptation in the media: A review of influential North American newspapers during 1993–2013. *Environmental Science and Policy*, 48, 137–146. <https://doi.org/10.1016/j.envsci.2014.12.003>
- Gavin, N. T., Leonard-Milsom, L., & Montgomery, J. (2011). Climate change, flooding and the media in Britain. *Public Understanding of Science*, 20(3), 422–438. <https://doi.org/10.1177/0963662509353377>
- Hampton, G. (2004). Enhancing public participation through narrative analysis. *Policy Sciences*, 37(3–4), 261–276. <https://doi.org/10.1007/s11077-005-1763-1>
- HM Government. (2017). *UK climate change risk assessment 2017 government report*. Retrieved July 11, 2018, from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/584281/uk-climate-change-risk-assess-2017.pdf
- Howard Boyd, E. (2019). *A different philosophy: Why our thinking on flooding needs to change faster than the climate*. gov.uk. Retrieved September 12, 2019, from <https://www.gov.uk/government/speeches/a-different-philosophy-why-our-thinking-on-flooding-needs-to-change-faster-than-the-climate>
- Howarth, C., Kantanbacher, J., Guida, K., Roberts, T., & Rohse, M. (2019). Improving resilience to hot weather in the UK: The role of communication, behaviour and social insights in policy interventions. *Journal of Environmental Science Policy*, 94, 258–261. <https://doi.org/10.1016/j.envsci.2019.01.008>
- Hulme, M. (2007). Newspaper scare headlines can be counter-productive. *Nature*, 445(7130), 818. <https://doi.org/10.1038/445818b>
- IPCC. (2014). *IPCC fifth assessment report working group II contribution: Glossary*. Retrieved September 11, 2017, from <http://www.ipcc.ch/report/ar5/wg2/>
- Kasperson, R. E., Renn, O., Slovic, P., Brown, H. S., Emel, J., Goble, R., Kasperson, J. X., & Ratick, S. (1988). The social amplification of risk: A conceptual framework. *Risk Analysis*, 8(2), 177–187. <https://doi.org/10.1111/j.1539-6924.1988.tb01168.x>
- Kirilenko, A. P., & Stepchenkova, S. O. (2014). Public microblogging on climate change: One year of twitter worldwide. *Global Environmental Change-Human and Policy Dimensions*, 26, 171–182. <https://doi.org/10.1016/j.gloenvcha.2014.02.008>
- Lazarevic, D., & Valve, H. (2017). Narrating expectations for the circular economy: Towards a common and contested European transition. *Energy Research & Social Science*, 60–69. <https://doi.org/10.1016/j.erss.2017.05.006>
- Lefevre, C. E., Bruine de Bruin, W., Taylor, A. L., Dessai, S., Kovats, S., & Fischhoff, B. (2015). Heat protection behaviors and positive affect about heat during the 2013 heat wave in the United Kingdom. *Social Science & Medicine*, 128, 282–289. <https://doi.org/10.1016/j.socscimed.2015.01.029>
- Lesnikowski, A., Ford, J., Biesbroek, R., Berrang-Ford, L., & Heymann, S. J. (2015). National-level progress on adaptation. *Nature Climate Change*, 6(3), 261–265. <https://doi.org/10.1038/nclimate2863>
- Lorenz, S., Porter, J., & Dessai, S. (2019). Identifying and tracking key climate adaptation actors in the United Kingdom. *Regional Environmental Change*, 19(7), 2125–2138. <https://doi.org/10.1007/s10113-019-01551-2>
- Massey, E., & Huitema, D. (2013). The emergence of climate change adaptation as a policy field: The case of England. *Regional Environmental Change*, 13(2), 341–352. <https://doi.org/10.1007/s10113-012-0341-2>

- Mayhew, F. (2017). *Regional ABCs: Circulation growth for Scotsman and Irish News but many record double-digit decline*. Retrieved November 27, 2018, from <https://www.pressgazette.co.uk/regional-abcs-circulation-growth-for-scotsman-and-irish-news-as-many-record-double-digit-decline/>
- Met Office. (2017). *Past weather events*. Retrieved September 11, 2017, from <http://www.metoffice.gov.uk/climate/uk/interesting>
- Met Office. (2018). *UK climate projections*. Retrieved January 25, 2019, from <https://www.metoffice.gov.uk/research/collaboration/ukcp>
- Moser, S. C., & Ekstrom, J. A. (2010). A framework to diagnose barriers to climate change adaptation. *Proceedings of the National Academy of Sciences of the United States of America*, 107(51), 22026–22031. <https://doi.org/10.1073/pnas.1007887107>
- Nerlich, B., & Jaspal, R. (2014). Images of extreme weather: Symbolising human responses to climate change. *Science as Culture*, 23(2), 253–276. <https://doi.org/10.1080/09505431.2013.846311>
- Nexis. (2018). *Nexis newspaper database*. Retrieved February 12, 2019, from <https://www.nexis.com/home/home.do?randomNum=0.9708025118379766>
- O'Brien, K. L., & Wolf, J. (2010). A values-based approach to vulnerability and adaptation to climate change. *Wiley Interdisciplinary Reviews: Climate Change*, 1(2), 232–242. <https://doi.org/10.1002/wcc.30>
- O'Neill, S. J. (2013). Image matters: Climate change imagery in US, UK and Australian newspapers. *Geoforum*, 49, 10–19. <https://doi.org/10.1016/j.geoforum.2013.04.030>
- O'Neill, S., & Nicholson-Cole, S. (2009). “Fear won’t do it” promoting positive engagement with climate change through visual and iconic representations. *Science Communication*, 30(3), 355–379. <https://doi.org/10.1177/1075547008329201>
- O'Neill, S., Williams, H. T. P., Kurz, T., Wiersma, B., & Boykoff, M. (2015). Dominant frames in legacy and social media coverage of the IPCC fifth assessment report. *Nature Climate Change*, 5(4), 380–380. <https://doi.org/10.1038/nclimate2535>
- Olausson, U. (2011). We’re the ones to blame: Citizens’ representations of climate change and the role of the media. *Environmental Communication – A Journal of Nature and Culture*, 5(3), 281–299. <https://doi.org/10.1080/17524032.2011.585026>
- Paschen, J. A., & Ison, R. (2014). Narrative research in climate change adaptation-exploring a complementary paradigm for research and governance. *Research Policy*, 43(6), 1083–1092. <https://doi.org/10.1016/j.respol.2013.12.006>
- Pelling, M., O'Brien, K., & Matyas, D. (2015). Adaptation and transformation. *Climatic Change*, 133(1), 113–127. <https://doi.org/10.1007/s10584-014-1303-0>
- Pepermans, Y., & Maesele, P. (2014). Democratic debate and mediated discourses on climate change: From consensus to de/politicization. *Environmental Communication*, 8(2), 216–232. <https://doi.org/10.1080/17524032.2014.906482>
- Pielke, R., Prins, G., Rayner, S., & Sarewitz, D. (2007). Lifting the taboo on adaptation. *Nature*, 445(7128), 597–598. <https://doi.org/10.1038/445597a>
- Reis, J., & Ballinger, R. C. (2020). Creating a climate for learning-experiences of educating existing and future decision-makers about climate change. *Marine Policy*, 111. <https://doi.org/10.1016/j.marpol.2018.07.007>
- Rotmann, S. (2017). “Once upon a time ...” Eliciting energy and behaviour change stories using a fairy tale story spine. *Energy Research & Social Science*, 31, 303–310. <https://doi.org/10.1016/j.erss.2017.06.033>
- Ryan, M.-L. (2007). Toward a definition of narrative. In D. Herman (Ed.), *The Cambridge companion to narrative* (pp. 22–35). Cambridge University Press.
- Shanahan, E. A., Jones, M. D., & Mabeth, M. K. (2018). How to conduct a narrative policy framework study. *The Social Science Journal*, 332–345. <https://doi.org/10.1016/j.soscij.2017.12.002>
- Smith, J., Butler, R., Day, R. J., Goodbody, A. H., Llewellyn, D. H., Rohse, M. H., Smith, B. T., Tyszczyk, R. A., Udall, J., & Whyte, N. M. (2017). Gathering around stories: Interdisciplinary experiments in support of energy system transitions. *Energy Research & Social Science*, 31, 284–294. <https://doi.org/10.1016/j.erss.2017.06.026>
- Statista. (2018). *Circulation of newspapers in the United Kingdom (UK) as of June 2018 (in 1,000 copies)*. Retrieved November 27, 2018, from <https://www.statista.com/statistics/529060/uk-newspaper-market-by-circulation/>
- Taylor, A., Bruine de Bruin, W., & Dessai, S. (2014). Climate change beliefs and perceptions of weather-related changes in the United Kingdom. *Risk Analysis*, 34(11), 1995–2004. <https://doi.org/10.1111/risa.12234>
- Tompkins, E. L., Adger, W. N., Boyd, E., Nicholson-Cole, S., Weatherhead, K., & Arnell, N. (2010). Observed adaptation to climate change: UK evidence of transition to a well-adapting society. *Global Environmental Change*, 20(4), 627–635. <https://doi.org/10.1016/j.gloenvcha.2010.05.001>
- Tschakert, P., Tuana, N., Westskog, H., Koelle, B., & Afrika, A. (2016). T^{CHANGE}: The role of values and visioning in transformation science. *Current Opinion in Environmental Sustainability*, 20, 21–25. <https://doi.org/10.1016/j.cosust.2016.04.003>
- Veland, S., Scoville-Simonds, M., Gram-Hanssen, I., Schorre, A. K., El Khoury, A., Nordbø, M. J., Lynch, A. H., Hochachka, G., & Bjørkan, M. (2018). Narrative matters for sustainability: The transformative role of storytelling in realizing 1.5 C futures. *Current Opinion in Environmental Sustainability*, 31, 41–47. <https://doi.org/10.1016/j.cosust.2017.12.005>