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Climate change in the British press: the role of the visual

N.W. Smith* and H. Joffe

Department of Psychology, University College London, London, UK

The present investigation identifies the key images that British newspapers use to represent climate change risks. In doing so, it widens the scope of the burgeoning literature analysing textual content of climate change media information. This is particularly important given visual information's ability to arouse emotion, and the risk perception literature's increasing focus on the importance of affect in shaping risk perception. From a thematic analysis of newspaper images, three broad themes emerged: the impact of climate change, personification of climate change and representation of climate change in graphical form. In particular, the depiction of climate change as an issue affecting domestic populations rather than just other areas of the world brings the threat closer to home. Challenging the perception that climate change is still a long-term and future-orientated threat, visual images concretise the risk by providing viewers with tangible examples of climate change's impact.

Keywords: British; newspaper; imagery; climate change; thematic analysis

Introduction

Global climate change is currently constructed as one of the biggest threats facing the world. Although gradual warming and cooling of the Earth's climate is a natural phenomenon, unprecedented temperature increases in recent years are causing widespread damage. The common consensus among climate change scientists states that continued production of greenhouse gas emissions at present levels is likely to have irreversible consequences (IPCC 2007). For individuals who are not engaged in climate science research, access to climate change information is typically through media reportage and interpersonal communication. Mass media communication is therefore hypothesised to play a key role in the public understanding of risk (Wahlberg and Sjoberg 2000). As a powerful influence on public engagement with risk issues, detailed analysis of this coverage is important.

The nature of this relationship has been the focus of considerable debate since the 1950s. Although a 'direct effects' model of information uptake has increasingly been rejected by researchers owing to individuals bringing an 'already known' component to their understanding of media information (Corner 1991), there has been little resolution in the field in part due to inherent complexities of discerning media influence. Audiences of media information are active processors rather than 'passive receptacles' who socially construct their understanding of risk information (Boholm 1998). Furthermore, the messages involved are multi-dimensional and many different channels of media disseminate risks. Those with a more visual bent may convey a set of messages that are absent from those where textual elements dominate, though of course, textual and visual portrayals are often combined. The

*Corresponding author. Email: nicholas.smith@ucl.ac.uk

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visual, in particular, has the ability to arouse emotion making it an effective medium for the social construction of risk messages (Joffe 2008).

Perlmutter (1998) argues that images, among other factors, arouse and stimulate affective responses from the viewer. In his typology outlining effects of visual images, manifest content is thought to foster an emotional connection between the viewer and what is viewed. Investigating responses to photographs of the Kenneth Bigley kidnapping in 2004, Iyer and Oldmeadow (2006) corroborate this theory identifying that individuals respond with greater feelings of fear when presented with visual images of the kidnapping compared to individuals presented with textual information only. 'Moving' the viewer along affective pathways, visual images elicit particular emotional responses due to the vividness of their content.

Exploring the iconic role of the visual, salient images can also serve as metonyms, exemplifying particular events or issues (Domke, Perlmutter, and Spratt 2002). Perlmutter and Wagner (2004), for example, explore the iconic status of a photograph, 'death in Genoa', depicting a protester moments before death at an anti-globalisation rally in July 2001. Taken by a Reuters photojournalist, the image shows the protester crouching behind a police jeep clutching an ominous object. Achieving a heightened level of fame, the photograph was published in numerous news periodicals the following week. Rather than simply capturing a snapshot of the natural world, the photograph was specifically chosen to represent the anti-globalisation movement. As symbols therefore, Perlmutter and Wagner (2004) argue that such images have the power to actively frame public interpretations of given events.

In recent years, there has been a considerable increase in the quantity of both textual and visual climate change information in the media. This rise has been particularly noticeable in the British press when compared to other forms of British media. Whereas numerous investigations have explored climate change content at a textual level, there is a surprising lack of empirical work on images accompanying newspaper articles. Given visual information's potential to concretise risk messages for members of the public, the current investigation will explore the content of this more recent coverage with particular focus on the types of images being depicted and the impact this might have on public engagement.

The rise and fall of climate change in textual press coverage

There have been several useful examinations investigating newspaper textual coverage of global climate change. Analysing a decade of coverage, Trumbo (1996) explores themes associated with climate change in five national American newspapers between 1985 and 1995. From detailed thematic and content analyses, cycles of attention were identified describing the relative rise and fall of the climate change problem. The first of these phases of attention, the pre-problem stage between 1985 and 1988, witnessed little coverage highlighting the lack of importance attributed to the issue. Phase 2, between 1989 and 1992, saw media coverage rise sharply and peak with the 1992 Rio Earth Summit, which recognised climate change as a serious global threat. Despite the political concern regarding the severity of climate change, media attention waned during the following few years: phase 3, between 1993 and 1995, is characterised by a considerable decline in newspaper coverage.

McComas and Shanahan's (1999) content analysis of *New York Times* and *Washington Post* articles examines the narrative structure of this variable coverage. Sampling articles whose primary theme was global climate change between 1980 and 1995, revealed three periods of attention: a waxing phase (1986–1989) where the issue gained media attention, a maintenance phase (1990) with sustained media coverage and a waning phase (1991–1993) where interest declined. Using a pre-specified coding frame, story themes running through the data were analysed to examine differences across time. Although these results corroborate Trumbo's findings regarding the relative rise and fall of climate change information in American newspapers, results from this investigation revealed other themes dominating different phases of attention. Dangers and consequences of warming were significantly more prominent during the initial waxing phase, while scientific controversy sustained interest in the maintenance phase and the economics of solving the issue became evident in the waning phase.

The framing of climate change as a dangerous risk becomes salient in more contemporary investigations. Carvalho and Burgess (2005) present a critical discourse analysis of British broadsheet press coverage of global climate change. Covering a period between 1985 and 2003, articles analysed revealed three distinct circuits of change characterised by different framings of risks. The first 'circuit' from 1985 to 1990 witnessed a steady rise in the quantity of climate change reportage, with politicians first recognising the risk climate change posed to society. With the science openly uncertain, the climate change debate receded from public attention between 1991 and 1996. Editorial fatigue became commonplace within British newspapers. They were quick to lose interest in an as yet unrealised phenomenon. When the dangers were brought closer to home with a rise in extreme weather events, press coverage increased. This third phase between 1997 and 2003 provided the media with dramatic images and stories amplifying a new cultural understanding of the causes and impacts of climate change. Extreme weather events, for example, provided news organisations with concrete evidence strengthening the argument that climate change is caused by human activity.

In an examination of more recent coverage, Boykoff (2007) compares British and American newspaper coverage of climate change between 2003 and 2006. Recording a quadrupling of coverage in UK newspapers in the four years sampled, Boykoff (2007) identifies a series of important 'discursive moments' accounting for this increase. Key events include a G8 summit firmly consolidating climate change issues on the political agenda, the release of the Al Gore film *An Inconvenient Truth* and the 'Stern Review' cataloguing potential economic costs climate change incurs. Whereas older newspaper coverage was characterised by an equal and balanced consideration of both human and natural causes of climate change (Boykoff and Boykoff 2004), this trend is no longer observable. More recent coverage focuses almost exclusively on human causes.

Climate change is represented in newspapers as an issue falling in and out of public consciousness. Although a burgeoning literature exists, studies have a tendency to focus on textual information only. Due, in part, to the pragmatic and logistical challenges of obtaining visual material from online newspaper databases, images accompanying newspaper reports are typically not included in media analyses. This dearth is important to address given both the emotive salience of visual information and the importance of affective components of the risk perception process.

Imagery in the printed press

Examining media visualisations of the Gulf War, Griffin and Lee (1995) present an analysis of images published in three widely circulated American news magazines. Images were categorised in terms of content, genre and context, with visuals of military hardware, allied troops and political leaders dominating over half of all pictures published. Furthermore, this focus on American military and technological superiority dominates over images of casualties and the other human costs more commonly associated with war. Presenting images of military machinery instead of images of soldiers in combat therefore convolutes the messages a public receives about the nature of the war.

Boholm's (1998) examination of visual images of the Chernobyl disaster explores the content of pictures in five European newspapers commemorating the tenth anniversary of the event. Content analysing over 200 photographs and accompanying newspaper headlines, the most prominent category of images concentrated on the fate of human victims abroad. Presenting the suffering and dying victims of the disaster as 'persons rather than personnel' helped to personalise the messages reported and thereby concretise the risks communicated. Although desolated landscapes are apparent in the images sampled, the newspapers chose to focus on the personification of the Chernobyl disaster. Vivid images of suffering and dying individuals portray the devastating effects of nuclear radiation (Boholm 1998).

Visual information's ability to concretise risks is further illustrated via a study of media constructions of the Ebola virus in British newspapers (Joffe and Haarhoff 2002). The researchers identified a number of key themes resonating through the images collected. Individuals reading predominately tabloid and broadsheet newspapers, for example, were more likely to have seen teams of western scientists suited in hermetically sealed outfits and medical depictions of a virus respectively, rather than images of dying bodies. Although no mention of science fiction was discernible in accompanying textual articles, attention to these images might have influenced participant representations of Ebola subsequently gleaned through semistructured interviews (Joffe and Haarhoff 2002).

These studies illustrate the ability images have to depict risk information. A key question to address, therefore, is how visuals in the media have represented climate change and the potential impact this might have on individuals' construction of the risks presented. In order to ascertain such a relationship, it is important to first identify the content of visual images accompanying climate change newspaper articles. The present investigation will address the following research questions:

- What is the visual content of recent climate change coverage in British newspaper press?
- How do broadsheet and tabloid newspapers differ in their inclusion of climate change images?

Method

Sample

Three Sunday broadsheet newspapers (*Sunday Times*, *Sunday Telegraph* and *Observer*) and three Sunday tabloid newspapers (*News of the World*, *Mail on Sunday* and *Sunday Mirror*) were chosen based on being the most read according to

the Newspaper Marketing Agency (NMAUK 2006). The broadsheet and tabloid newspapers chosen not only enable comparison between 'highbrow' and 'lowbrow' viewpoints, but also represent a broad spectrum of political editorial style (Washer 2004). Sunday newspapers are considered to contain longer and more analytical articles than those in daily newspapers and also offer a feel for how coverage has shifted over the preceding week (Washer 2004).

As there are no online databases cataloguing visual images in newspapers, Lexis-Nexis was used to initially identify articles about climate change. Using key words 'global warming' OR 'climate change' OR 'greenhouse effect' appearing in the headline or with a 'major mention', all articles from the six Sunday newspapers sampled were selected between 1 January 2000 and 31 December 2006. Duplicates, letters and other articles not specifically about global warming, climate change or the greenhouse effect were removed leaving a workable sample of 300 articles included in the media analysis (208 broadsheets, 92 tabloids). As the focus of this investigation is to examine content of visual images accompanying these articles, microfilm copies of all newspapers sampled were obtained. Of the 300 newspaper articles sampled, 188 (approximately 60%) had one or more accompanying image.

Coding frame

Once the sampling unit had been selected, it was necessary to operationalise what to code, according to the purpose of the study, which was to identify key themes emerging from British newspaper images of climate change. The coding framework contained predefined high level categories and subcategories for deductive coding, as well as inductive codes based on distinctions identified in the data (Joffe and Yardley 2004). The predefined categories mapped onto the areas in which the United Nations Inter-Governmental Panel on Climate Change (IPCC) has identified the climate change agenda: 'the scientific basis' (investigating the causes of climate change), 'impacts, adaptation and vulnerability' and 'mitigation'. As a starting point therefore, newspaper images were coded Cause, Impact and/or Solution.

Upon closer inspection it became apparent that numerous images could be subdivided into more specific categories. A more inductive coding scheme was therefore devised staying truer to the data allowing counter intuitive themes to develop. An image of a flooded village in Britain, for example, rather than simply coded as 'impact', was also coded as 'local' reflecting the location of the impact being depicted. Further inductive distinctions for this and other themes were made as the coding process developed. This more fine grained level of analysis stays truer to the data obtained while encouraging unexpected themes to emerge. More bottom-up than deductive coding, theoretical constraints are minimised as themes are derived from the raw data itself. This therefore makes it easier to identify how images are related. Incorporating both deductive and inductive elements, the overall framework was finalised before coding began.

Analysis

In order to capture the essence of the visual images presented in the current investigation, analysis was two-fold. A content analysis of images was initially conducted concentrating on salient higher level codes using chi square statistics to assess important trends. Often considered 'trite' (Silverman 1993) establishing code

frequencies gives the data quantitative rigor but ignores the context within which information is constructed. Each category is counted without reference to its relationship to other content. Thus the paths of stories or linkages between ideas in images are lost. A thematic analysis was therefore also conducted to explore patterns found within the data. This more sophisticated level of qualitative analysis facilitates a more detailed exploration of image content by emphasising symbolic meanings embedded within the British newspapers sampled. In the following section, a content analysis and exploration of themes will be presented, observable from images accompanying British newspaper articles on climate change.

Results

Immediate impacts: bringing the threat closer to home

The tangible and immediate effect climate change has around the world is a prominent theme, with over 50% of images illustrating one or more climate change impacts. Significant differences are evident between newspaper types with broadsheet images more frequently depicting impacts than tabloid images ($\chi^2(1)=4.17$, $p<0.05$). Exploring the content of these images further, impacts relating to 'melting ice' are the most dominant. Photographs of retreating glaciers and melting polar ice caps capture both the scale and speed of the climate change problem. Two reports in the *Observer* (30 January 2005; 26 June 2005), for example, use images of melting ice caps to capture the ferocity of these impacts. In both images, clumps of jagged ice are shown breaking away from the ice shelves dramatically crashing into the seas below. These images (as depicted in Figure 1) are often wide angled, panoramic shots capturing not only the crumbling ice sheets but also the encroachment of the ice by surrounding seas.

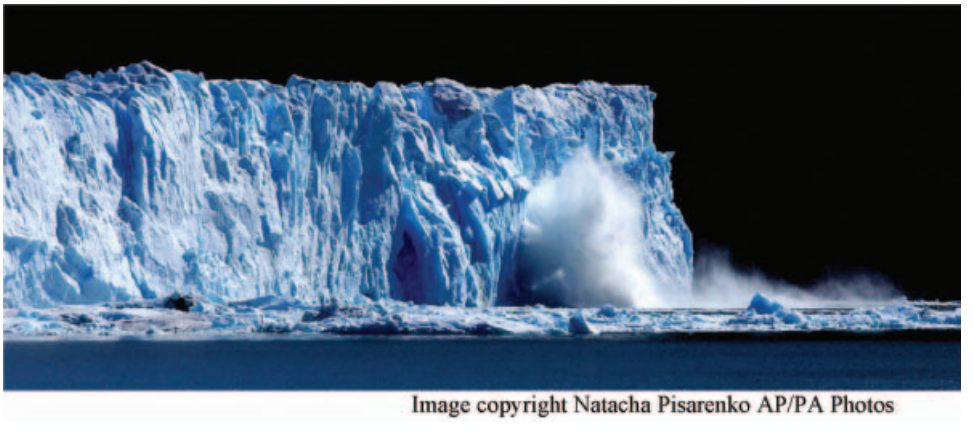

Figure 1. Impact of climate change (from *Observer* 30 January 2005): image copyright Natacha Pisarenko AP/PA Photos.

The retreating glacier provides a potent symbol of the scale of the problem, made salient by 'before' and 'after' photographs which give the viewer a baseline upon which to form their representation. An article in *The News of the World* (3 September 2006a) discussing climate change impacts presents two photographs, one taken in

1980 showing a glacier in full health, and one of the same landscape taken 26 years later showing the glacier in retreat. Disambiguating the images further, the accompanying caption reads 'Total meltdown: how a spectacular glacier in Peru has slipped into oblivion in the last 26 years'. Although glaciers are known to advance and retreat naturally, such 'before' and 'after' images help construct the disastrous consequences climate change is having on the world.

Associated with images of 'melting ice', newspapers also include numerous photographs of polar bears in articles about climate change. As inhabitants of Arctic environments, their plight is made increasingly salient as a result of melting polar ice caps. Depicted in several images as struggling to swim to safety, a sense of futility and desperation is apparent. Polar bears' struggle for survival is made even more poignant since they are symbols of power and fearlessness; a photograph of two lonely looking animals (*Mail on Sunday* 24 September 2006) is accompanied by the caption: 'Global meltdown…polar bears, such as these two on the Arctic island of Spitsbergen face death as the ice disappears'.

Beyond 'melting ice', flooding also dominates the content of the photographs that the newspapers use to illustrate climate change. With increasing extreme weather events reported in recent years, flooding is a particularly salient and disastrous consequence newspapers are keen to visually represent. On the front cover of a special environmental report in the *Observer* (7 November 2004), a flooded landscape is the first image seen. It could easily be a lake were it not for the top of a pedestrian walkway sign poking precariously out of the water. In another image, with the headline 'Monsoon Britain', cars are shown stranded on flooded streets (*Observer* 11 August 2002). A solitary figure, half submerged walks ironically with umbrella in hand. Such 'out of the ordinary' visual landscapes are used to emphasise the severity of the climate change challenge.

The climate change problem is brought closer to home in more recent coverage. Dividing the six years sampled into two groups (2000–2003 and 2004–2006), the percentage of 'local' impact images has increased from 30 to 40%, whereas the percentage of 'other' impact images has decreased from 48 to 42%. While neither of these differences are statistically significant, the direction of the trend is important. Elaborating on what these labels refer to, 'local' and 'other' impacts often share common ground depicting flooded landscapes, biodiversity loss or summer heat waves, but the key distinguishing feature is location. Both images might therefore show a flooded landscape but the 'local' would be British whereas the 'other' would be abroad. Visually bringing the threat closer to home climate change is represented as a problem no longer affecting just populations abroad.

Personification of the climate change problem

A considerable quantity of images collected do not feature landscapes as the central focus but people. This trend is particularly noticeable in tabloid newspapers reporting significantly more images of people than broadsheet newspapers ($\chi^2(1)=4.68$, $p<0.05$). Members of an affected public, key political figures and celebrities feature prominently in many of the images sampled and help personalise the messages conveyed.

An affected public

Members of an affected public are a key group of people that relay the immediacy of the climate change problem through the situations in which they are depicted. Often

shown in a variety of dangerous and life threatening scenarios, these photographs seem to aim to evoke a heightened emotional response. This is neatly illustrated from a photograph in the *Observer* (5 January 2003a) in which two fire fighters rescue a grandfather and his six-year-old granddaughter from an episode of flooding (Figure 2). This content, disambiguated by an accompanying caption, conveys an 'it-could-be-you' sentiment enabling individuals to vicariously experience the first hand effects of climate change through the lives of others. Although the picture also depicts a flooded landscape, it is the focus on the individuals being carried to safety that dominates its content.

Figure 2. Personification of climate change (from *Observer* 5 January 2003): image copyright Gretel Ensignia, National Pictures.

Another set of images that use an affected public to represent consequences of climate change focus on the inconvenience and disruption warming has upon lifestyles. The scenario faced by two holiday makers in the Swiss Alps, for example, is depicted in one photograph by the lack of snow seen upon arrival (*Sunday Times* 17 December 2006). Standing on barren ground with snowboards clutched underarm, readers seem to be called to empathise with the sense of frustration etched on their faces. In another image, a cyclist is pictured carrying his bike along a road closed due to flooding (*Sunday Telegraph* 26 September 2004). A sign standing behind reads 'unsuitable for heavy goods vehicles'. There appears to be an intention to convey irony in this. Such examples illustrate the direct impact climate change has on the general public but in a manner that makes the message more personal.

Given the negative connotations mention of climate change evokes, an interesting set of photographs depict members of an affected public, particularly children, enjoying unseasonal weather changes. In one photograph, for example, two small children enjoy being pulled on a sledge after waking up to a blanket of unexpected snowfall (*Observer* 5 January 2003b). In another, children at Kew Gardens play in unseasonal Autumnal

sunshine (*Observer* 15 October 2006). If visual information plays an important role in helping individuals foster representations of climate change, the contradictory impact of such images may require future investigation.

Political leaders

An abundance of images depicting global political leaders illustrate the visual politicisation of the climate change problem. As an issue dominating the international stage, climate change has become an inherently political topic. It is unsurprising, therefore, that photographs of key political leaders are routinely included in newspaper articles on climate change. Of these, former American President George Bush receives the most attention. Given the lack of international cooperation America has offered in relation to climate change treaties in recent years, President Bush is an obvious choice and images reflect this.

In one image, for example, the Sun is targeted by a series of heat-seeking missiles. President Bush is depicted in the bottom right hand corner smiling and giving thumbs up to the situation (*Observer* 5 November 2006). A caption reads 'Look out, sun. You've been warned'. Via this photomontage, the viewer is provided with the insinuation that climate change is not only caused by the Sun but is also controllable through the use of military force. This links to Bush's reputation as a war-mongering President as well as focusing on the non-anthropogenic argument for the cause of climate change.

Other images depicting President Bush are not as easily interpreted owing to the lack of relevant context. Whereas it is often easy to discern the messages contained in an image of a melting polar ice cap or retreating glacier, there is often an inherent ambiguity surrounding the interpretation of images depicting people. Disambiguation of these images is reliant on captions. In two similar photographs of President Bush superimposed against an image of a melting glacier, for example, accompanying captions read 'The ice melts…but Bush could not care less' (*Sunday Mirror* 12 June 2005) and 'As polar glaciers melt, Bush disputes that global warming is man-made and insists US technology could solve any climate problem' (*Observer* 19 May 2005). The link connecting President Bush and the climate change issue is made through the visual, but the negative connotation attached is only made salient via the caption.

Following popularisation of his climate change documentary *An Inconvenient Truth*, former American Vice-President Al Gore is also regularly depicted in photographs accompanying newspaper articles. Al Gore is presented as a climate change ambassador. Whether it is his academic stance or the intellectual facial signs expressed, a sense of authority is gained from viewing these images, which often depict him delivering his lecture. Al Gore also personifies the international effort being made to solve the climate change problem. This is further emphasised in the captions accompanying these images: 'We've got ten years to save the planet' (*News of the World* 3 September 2006b) and 'At stake is nothing less than the survival of human civilisation' (*Sunday Telegraph* 19 November 2006).

Although Bush and Gore are the main international political figures accompanying climate change articles, former British Prime Minister Tony Blair and former Deputy Prime Minister John Prescott attract their fair share of domestic coverage. In a notable example, three real time photographs depict John Prescott dramatically storming out of a recent climate change convention (*Observer* 26

November 2000). Providing three successive images, taken just seconds apart, gives the viewer a sense of action only usually gained by viewing video footage. After attempting to broker a proposal that would subsidise American greenhouse gas emissions, the photographs depict Prescott leaving at the precise moment that talks collapsed. A similar set of photographs also appear in *The Mail on Sunday* (26 November 2000) with a caption reading 'Downcast: John Prescott quits the talks…his grim expression betraying the anger inside…and he struggles to hold back a furious tirade…before heading back to Britain without a deal'. In addition to capturing the volatility of international climate change negotiations, the real time footage gives the viewer a vicarious sense of being there, amidst the turmoil.

Celebrity icons

Impassioned by the climate change cause, celebrities are increasingly represented as environmental spokespeople in newspaper images. Pictures of famous people are used to persuade individuals to take up the green agenda and change their unsustainable behaviours, reflecting the Hollywoodisation of environmental issues more generally. Celebrity protesters Rory Bremner and Bianca Jagger, for example, are depicted in one image promoting the boycott of Esso petrol stations (*Mail on Sunday* 6 May 2001). In another, British actress Thandie Newton is shown standing beside a sports car with the caption 'Thandie Newton…star of the Hollywood hit Crash, traded in her 4 × 4 after Greenpeace put stickers on it warning of its emissions' (*Observer* 29 October 2006). Depicting celebrities endorsing environmental consciousness is a mechanism for persuading the public to do the same.

Celebrities also capture visual newspaper attention by fostering climate change activism. Headlining at a recent Stop Climate Chaos rally in London, for example, British pop singers Johnny Borrell and KT Tunstall are depicted in two images aimed at raising public awareness (*Sunday Mirror* 5 November 2006). Pictured singing to crowds of fans, they are keen to show their commitment to environmental causes, as accompanying captions suggest. In another image, American pop group Scissor Sisters are shown performing to fans in London's Hyde Park (*Sunday Telegraph* 10 December 2006). Although taken during the recent Live8 concerts, the caption accompanying the image emphasises their involvement with 'Global Cool', a similar event encouraging people to reduce carbon emissions. Although such images are not as prominent in newspapers as an 'affected public' or 'political leaders', growing numbers of celebrities are keen to have their image associated with the climate change issue.

Graphical representation of climate change

A final group of images that feature prominently in newspaper articles represent the climate change problem in graphs with broadsheets more likely to have an image of a graph than tabloids ($\chi^2(1)=8.16$, $p<0.05$). Simplified bar charts and line graphs, in particular, are used to convey statistical information more conventionally found in scientific reports on climate change (IPCC 2007).

This trend, providing statistical information in readily digestible formats, is illustrated in three noteworthy sets of images (*Observer* 27 February 2000; 1 April 2001; 11 June 2006). All three images have prominent bar charts comparing the relative greenhouse emissions different countries contribute. In pole position,

America is depicted emitting up to three times as many emissions as other countries. Accompanied by graph titles including 'fumes that are choking the planet' and 'how America threatens the world's environment', such figures symbolise the impact carbon emissions have on the planet (Figure 3). The viewer is provided with a visual representation of America as the worst polluter. Furthermore, this trend is contrasted to the relatively small contributions made by other countries.

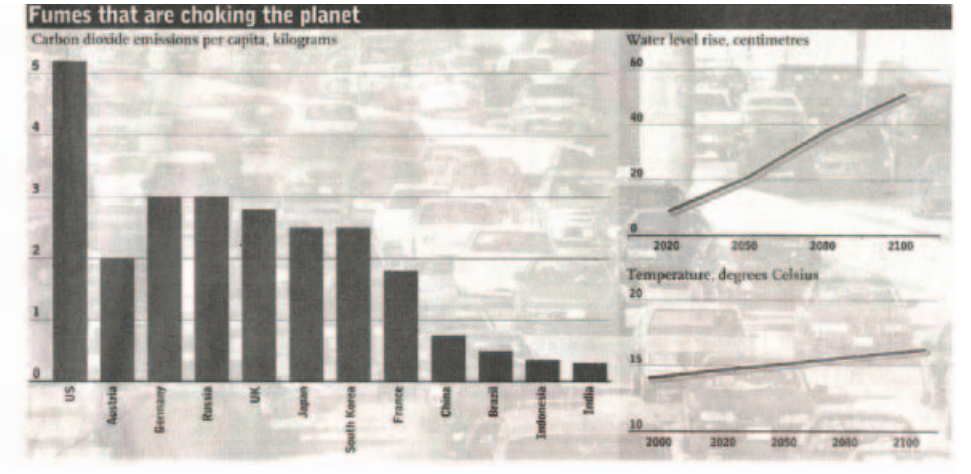

Figure 3. Graphical representation of climate change (from *Observer* 27 February 2000): image copyright Guardian News & Media Ltd 2000.

Newspapers also use a variety of line graphs to graphically represent salient climate change impacts. In line with findings from the most recent round of IPCC reports (IPCC 2007), levels of atmospheric carbon dioxide and global temperatures in particular are predicted to rise steadily over coming years. Using line graphs to represent this information, viewers are provided with a conceptually clear format through which to appreciate these rises. Most frequently, a single line is depicted, plotted on a graph where the x axis is time (calculated in years) and the y axis is impact measured (atmospheric carbon dioxide calculated in ppm, temperature calculated in °C, and so on). What is most notable from these graphs, however, is not the axes used or even the impact depicted but rather the rate at which they are rising. Indeed, to keep formats simple, minimal information is provided in the graphs. In one image (*Observer* 11 June 2006), carbon dioxide is shown rising sharply over recent centuries (from 280 ppm in 1800 to over 360 ppm in 2000) but no elaboration is given regarding what this means. Although the relative magnitude of this 200 year change is unknown, a dramatic increase is depicted.

Discussion

Visual information is clearly a dominant feature in British broadsheet and tabloid newspaper coverage of climate change, accompanying nearly two thirds of all articles sampled. The content of visual images can be classified within three broad themes.

Immediate impacts: bringing the threat closer to home, personification of climate change and graphical representation of climate change. The following section will highlight likely reasons for newspapers focusing on these three areas in their selection of climate change imagery and, in particular, focus on the role imagery might play in directing public engagement with climate change issues.

Over half of all articles had one or more image depicting a climate change impact. Ranging from melting ice caps to retreating glaciers, newspapers provide viewers with a visual catalogue of climate change's global influence. Bringing the problem closer to home, newspapers increasingly choose to represent the climate change threat more locally, depicting UK landscapes. At one level, this trend mirrors the textual content of newspaper articles. In reviews of this textual coverage, Carvalho and Burgess (2005) and more recently Boykoff (2007) highlight a variety of extreme events that have helped drive media interest in climate change over recent years. Ranging from the devastation caused by Hurricane Katrina to more recent summer flooding in British towns and cities, extreme weather events provide the mass media with an attractive hook with which to document tangible examples of alleged climate change impacts.

Images also diverge from textual analyses of newspaper coverage in important ways. Although balanced reporting (of both anthropogenic and natural causes of climate change) is no longer observable in either US or UK textual newspaper coverage (Boykoff 2007), dissenting views are still aired. Controversies are discussed, the immediacy of impacts is debated and an overall perspective is gained that there are still numerous 'unknowns' waiting to be resolved. This element of uncertainty is removed in visual depictions. Viewing an image of a melting iceberg or a retreating glacier, for example, is much more definitive. It says to the reader that climate change is happening and here is the evidence to prove it. Concretisation of impacts in newspaper images, therefore, speaks against the argument that climate change science is uncertain. Whether or not this trend influences public engagement with the risks presented will require future investigation.

Newsworthiness also helps account for the depiction of climate change issues. Investigating the rise and fall of risk reporting, Kitzinger and Reilly (1997) argue that future-orientated threats characterised by distant and unknown impacts do not attract widespread media attention. As newsworthiness of a story is ultimately dependent on how tangible its impact is, presenting climate change as an unknown quantity hinders the likelihood of its continued media interest. Visual images are therefore used to represent the climate change threat as real and no longer potential and future orientated. Although articles about retreating glaciers convey to the reader the realities of the climate change threat, an accompanying image visually solidifies the tangibility of this threat by providing the viewer with a concrete example of the impacts climate change can have.

This need for media to have concrete material to represent is illustrated by an investigation of media attention to BSE. While conducting their interviews, Kitzinger and Reilly (1997, 344) mention that in order for the crisis to justify intensive coverage, one news journalist commented 'we needed dead people, well, we've got them now'. Climate change has been a topic of concern for the past two decades but only recently have material events such as retreating glaciers, melting ice caps and summer flooding served as news hooks permitting a change in degree of newsworthiness. Although not icons as Perlmutter and Wagner (2004) would describe, this group of images can be considered symbols representing the climate change threat, with concrete examples exemplifying the immediacy of the impacts.

The second theme attracting visual media attention in British newspapers focuses on the personification of climate change. Particularly salient in tabloid newspapers, images of an affected public, key political figures and celebrities account for the majority of these visual images. In other media analyses of visual information, pictures of people are often found to accompany textual news articles. Boholm (1998), for example, in her investigation of media coverage of the Chernobyl disaster, identified that the vast majority of newspaper images depicted people rather than landscapes. Griffin and Lee (1995) in their exploration of Gulf War photography in popular American news magazines, also identified images of people depicted in numerous dominant picture genres. Attracted to the 'human face' of science and risk reporting (Kitzinger 1999), journalists actively seek out stories in which a human interest factor can bring the content alive. Including a photograph depicting a dramatic rescue alongside a newspaper article about flooding, for example, may be more likely to generate a sense of empathy in the viewer than simply presenting the text.

The power that images of people can have also highlights why personification of climate change risk is a key component of newspaper visuals. Images of affected populations, especially, are likely to evoke strong emotional reactions due to the personal nature of the contexts depicted. Validating recent research investigating the 'identified victim' effect, Small, Lowenstein, and Slovic (2007) discovered that people are significantly more willing to donate money to charity when presented with pictures of identified victims as opposed to statistical information alone. In an environment where statistics fatigue is becoming increasingly commonplace (Slovic 2006), pictures invite the viewer to become personally and emotionally involved with the events shown. In response, this arouses interest and facilitates an emotional reaction enhancing the desire to contribute. Whether or not personification of climate change risks in British newspaper imagery evokes a comparable emotional tone in readers will be important to investigate.

The final group of images made salient in British newspaper coverage use graphical representations to conceptualise climate change risks. Given the inherent conceptual limitations individuals have with interpreting complex statistical information (Kahneman and Tversky 1979), there are a surprising number of images depicting quantitative data. In particular, there is a general trend for newspapers to use line graphs to depict numerical information. Corroborating results from Zacks et al. (2002), in which graphs from four US newspapers were content analysed, line graphs accounted for half of all presentation formats. In particular, simple line graphs depicting straightforward relationships between two variables were the most common format identified. As contemporary societies rely heavily on graphics to communicate statistical data, simple graphical representations that have the power to make quantitative information 'perceptually salient and memorable', are an important component of print media communication (Zacks et al. 2002, 187).

While the types of images chosen to accompany articles have been identified in the present analysis, it is important to consider how these themes might influence public engagement with climate change risk. Given the complex link between mass media presentation and public uptake of risk information, it is important to explore the role visual imagery might play in mediating this relationship. The valence of visual images, in particular, has been highlighted as an important component in

understanding emotional reactions to vivid images (Iyer and Oldmeadow 2006). Photographs of Kenneth Bigley accompanying newspaper articles of his kidnapping appear to produce emotionally fearful responses due to the nature of the content presented. Incorporating vivid images of climate change impacts into media coverage, therefore, should capture attention and direct emotionally salient responses.

This line of enquiry is particularly important given the strong affective component researchers attribute to risk perception processes. Whereas traditional risk perception theories focus on the rational and probabilistic reasoning practices individuals are hypothesised to employ when making judgements about unfamiliar information (Slovic 1987), more recent research has emphasised the important role positive and negative affect plays in guiding judgement and decision making (Finucane et al. 2000). In their investigations of individual associations with climate change, Leiserowitz (2005) and Lorenzoni et al. (2006) highlight how affective images can drive public engagement with risk information. By expanding the traditional cognitivist model of risk perception, positive and negative affect are shown to be important predictors of public reaction to the climate change threat. More specifically, this elaboration helps develop a conceptual understanding of the crucial role emotion plays in engagement with risk.

Visual information is likely to play a powerful role in 'positioning' public conceptions of climate change. With their ability to arouse emotion, newspaper images are thought to imprint a particular way of thinking, inviting the viewer to become emotionally involved with the contexts depicted (Joffe 2008). Added to this is a sense of validity that visuals inject into public engagement of risk issues. A level of authenticity is gained that could make visuals easier to process than verbal or textual information. Using the visual to personally witness an event increases the likelihood of it leaving a salient trace in memory (Graber 1996). Given the emotive power of visual information, it will be important to explore the suggestion that newspaper imagery helps shape public engagement with climate change risk. This is particularly pertinent given that identification of visual themes does not automatically uncover how the public engages with them.

Conclusion

The present study has identified the salient images that newspapers choose to represent the climate change threat. In doing so, it builds upon previous media analysis research focused on the textual content of newspaper articles. In particular, visual content solidifies the climate change risk providing tangible examples of its impact. Scientific uncertainties are removed by visuals' concretisation function. How this tangibility influences public engagement with climate change risk is a key question for future research. Furthermore, given the power the visual has to evoke strong affective responses, newspaper imagery is also expected to play an important role in fostering emotional reactions to climate change information. The vividness of visual imagery, in particular, is expected to influence availability of salient information in memory. Leaving a powerful memory trace, vivid images may tap people's emotional engagement. While this has been investigated in laboratory experiments, it has not been examined in more naturalistic contexts. Without such explorations, it will be difficult to understand how individuals use visual information to engage with the climate change risk.

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