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The usefulness of climate change films

“Although it seems counter-intuitive, the public’s difficulty in distinguishing fact from fiction has rendered cinema a useful tool within conventional pedagogical situations and for informal science education (ISE)” (Kirby 2014, p.105).

One of the surest ways to misunderstand images would be to read them as if they could be real or true...The assumption that films can show audiences the ‘truth’ is deeply ideological” (Mboti 2010, p.318).

1 Introduction

Film analysis is a point of connection between the physical sciences and the social sciences and humanities, as the quotes above show. Beyond academia, proliferation of film festivals, video competitions and global campaigns suggest that interest in climate change films has never been greater. Recent festivals include the 2009 Indigenous Voices on Climate Change Film Festival held in Denmark; the Clima Film Festival 2014 held in India; and the 2015 Handle Climate Change Film Festival in China. The 30th Guadalajara International Film Festival (2015) hosted the launch of Film4Climate, a global campaign spearheaded by the World Bank Group’s Connect4Climate initiative. As part of its mission to raise awareness about climate change through cinema, Film4Climate introduced its Global Video Competition (for filmmakers aged 14-35) in 2016.

In this context, a comprehensive review of all climate change films is clearly not possible. The paper’s chosen sample is a handful of English-language films with global reach through viewing platforms, such as cinema, television and the internet. Some of the most widely distributed films in the sample have already inspired much analysis and debate within two complementary fields of research. One is science communication, which includes studies of film consultancy (the role played by science advisers in film production), film content and audience reception of scientific images and messages. Therein so-called Hollywood Science or science fiction blockbusters is a genre of particular interest due to its audience reach (Perkowitz 2007). Concerns have been raised about the scientific accuracy or ‘verisimilitude’ (i.e. appearance of truth, or believability) of some of these films (Kirby 2014). The extent to which these should be the determining criteria for usefulness remains contested, however. As Perkowitz (2007, p.213) notes in his book *Hollywood Science*:

Movies, Science and the End of the World, “although getting the science right matters a great deal...that isn’t always the only consideration – even sometimes for the scientists themselves.”

The other main field is climate change communication, especially work on visual communication and public engagement. Sengupta (2013) distinguishes between films that address climate change directly and those that reference it indirectly or implicitly. Published papers focus largely on the former category and on three films within it in particular. These are: the Hollywood film *The Day after Tomorrow* (2004, hereafter TDAT); *An Inconvenient Truth* (2006, hereafter AIT) starring politician turned climate activist Al Gore; and *The Great Global Warming Swindle* (2007, hereafter TGGWS). The paper therefore reviews academic debates about the production, content and audience reception of these much-discussed feature-length films. In order to contribute to those debates and not simply appraise them, the sample also includes two more recent, largely unstudied but equally relevant examples of climate change films. These are: *Cowspiracy* (2014) and *Climate Change by Numbers* (2015, hereafter CCBN).

If climate change films cannot offer a complete view of climate change due to the nature of the subject matter and the nature of film ((Hulme 2009, Perkowitz 2007), then climate change films are necessarily imperfect. Nonetheless, readings in philosophy of science and in science communication suggest these films do have the potential to be useful – even those that don’t present science all that accurately. For Thomas Kuhn, accuracy was only one of five characteristics of a good scientific theory, the others being consistency, scope, simplicity, and fruitfulness (cited in Thompson 2012). There is also more to science (including science in cinema) than theory and factual information. So-called systems of science include scientific methods and norms, interactions among scientists, science policy, and research funding (Kirby 2014).

The question for this paper then, is not whether climate change films are useful or not. The issue is how the usefulness of such films is to be determined if not by sole reference to the accuracy or truthfulness of factual information. A possible answer for science education is the criterion of authenticity, which arguably “serves as a better lens [than accuracy] through which to see science in cinema” (Kirby 2014, 99).

The paper focuses on the educative dimension of climate change films because this is important in human as well as physical geography. For example, Simon Dalby has called

for a geographic pedagogy that includes values, such as justice, and a demonstration of how different modes of production and consumption are responsible for climate change in the current Anthropocene era (Dalby 2014). As in other writings in climate change communication, pedagogy here is about purposeful education and not only public understanding; it is about moving people to take action on climate change by (among other things) consuming less energy and otherwise changing their own behaviour.

With these points in mind, the paper begins with an overview of types of climate change film and a review of some notable debates and critiques. Part two shows that all climate change films are limited in some way and therefore imperfect. However, the same could be said of most branches of science, including climate science and its models. The film CCBN makes exactly that point; it argues for the trustworthiness of climate science despite its inevitable imperfections. So despite some innate limitations and flaws, climate change films can be useful in raising awareness, encouraging understanding and motivating behavioural change.

To determine usefulness, the next sections consider the work that climate change films do and the methods they use. I argue that the two key criteria for determining usefulness are *teachability* and *integrity*. Whereas the former term attaches principally to the educative and affective aspects of climate change communication, the latter is about ensuring the credibility of images and messages through truthfulness, openness and honesty in communication. Teachability and integrity relate directly to climate change films. They also link to significant broader themes in science communication and climate change communication, namely public understanding *of* science and public trust *in* science.

In conclusion, I reinforce calls to detach the issue of usefulness from accurate science while broadening the scope beyond the concept of authenticity per se. Useful films are educative, truthful and trustworthy, in ways not always intended by film-makers.

2 Types of climate change films

“Both entertainment and factual forms play with repetition and difference, and with realism in conjunction with melodrama...For many, the contemporary ultra-high-budget blockbuster is the most unpromising media form of all to evoke in relation to environmentalism” (Branston 2007, p.215).

Films can be defined in various ways. The special effects, big-budget film TDAT has been labelled as: a blockbuster (Hammond and Breton 2014; Hobbs-Morgan 2015); a “spectacular, fictional film” (Von Burg 2012, p.8); science fiction or Hollywood Science (Perkowitz 2007); an “issue event movie” (Branston 2007, p.220); and “cli-fi” (O Heigeartaigh 2014, p.1). These distinctions reflect a number of considerations, i.e. size of budget, commercial appeal, audience reach and issue salience. Last but not least is the question of scientific accuracy.

The award-winning film TDAT mingles scientific information and scenarios of abrupt climate change with invented characters, a fictional plot and a debatable timeline. Its central protagonist is a paleo-climatologist whose warnings of impending catastrophe fall on deaf political ears. The spectacular consequence is a sudden slowdown of the Gulf Stream ocean current, which produces apocalyptic global effects. Critics argue that the film’s temporality is not scientifically accurate (Hobbs-Morgan 2015; Von Burg 2012). The unrealistic rate of global warming and special effects mean that the film as a whole is ‘science fiction’ in a dual sense; it is fictional science as well as fiction + science.

And yet, the film has been viewed as a positive contributor to both public engagement and science education (Von Burg 2012). Alongside detractors and sceptics are a number of scientists who applaud the filmmakers’ efforts to publicise an urgent problem and need for political action (Von Burg 2012). In terms of science education, TDAT has been defended on the grounds that, like all good science fiction, it is premised on “scientific reality” (Von Burg 2012, p.16). Despite its inaccuracies it “can be used to teach real science” and “contribute to science education” (Perkowitz 2007, pp.220 and 225). In sum, the debate is not about whether or not TDAT is scientifically accurate. The issue is whether such a film can still educate, affect and motivate behavioural change.

The quote at the beginning of this section suggests that a possible response is to dismiss all films oriented toward public entertainment and melodrama as ‘fiction’ in favour of more ‘factual’ forms, such as “medium budget ‘issue’ films” and “theatrical documentaries” (Branston 2007, p.226). In describing TGGWS as “a much more conventional science documentary” than AIT, Mellor (2009, p.137) suggests that both are a factual form in some way. In terms of a simple fact/fiction dichotomy, TGGWS and AIT would then belong in the same category and automatically out rank any blockbusters. Instead of flattening the differences between those two films in that way, Greitemeyer

(2013) distinguishes between 'climate change affirming' films, such as AIT, and 'climate change sceptic' films, such as TGGWS. For Greitemeyer (2013), the key difference is their aims. Whereas Al Gore uses AIT to raise awareness of global warming and promote behavioural change, TGGWS aims to show that such change is not warranted because climate change is driven by solar rather than human activity.

A *less* conventional science documentary is CCBN, which was aired on television in the UK by the British Broadcasting Corporation (BBC) in 2015. Although climate change affirming in its insistence on Earth's temperature rise, the film's central claim is that understanding climate change requires a basic explanation of some relevant statistics. CCBN focuses on how three key numbers have been derived by climate scientists. These are: 0.85 degrees, the amount of warming the planet has undergone since 1880; 95%, the degree of certainty in climate science that at least half of the warming since 1950 is anthropogenic; and one trillion tonnes, the cumulative amount of carbon that can be burnt before the planet reaches dangerous levels of climate change. According to one of its three co-presenters Norman Fenton – a Professor of Risk and Information Management at the University of London – “the idea was to get mathematicians/statisticians who had not been involved in the climate change debate to explain in lay terms how and why climate scientists had arrived at these three numbers” (Fenton 2015, p.2).

On one reading, CCBN is an attempt to restore public trust in climate science in the wake of two discrediting narratives. One was TGGWS, in which various academics question prevailing systems of science as well as the “current consensus on the causes of global warming” (Ofcom 2008, p.6; see also Jones et al 2007). The so-called Climategate scandal – a web-based debate sparked by unauthorised publication on the internet of climate scientists' private emails – was another such attack. The aim of publication “was to question the central results of climate science and the policies that rely on its results” (Nerlich 2010, p.421).

In this context, CCBN can be further read as a contributor to public understanding of systems of science and thus as a form of science education. This is despite (or indeed because of) the film's highlighting of scientific errors, uncertainty, complicated models and incomplete data. Unlike in TGGWS, these imperfections and limitations are presented as inherent in scientific inquiry and not as a scandalous aberration. CCBN's linkage of science to uncertainty recalls geographer Mike Hulme's argument that climate science “is most useful

to society when it finds good ways of recognising, managing and communicating uncertainty” (Hulme 2009, p.82). This is no easy task, for if “the public generally expects science to deliver certainty” (Thompson 2012, p.117), then communication of *uncertainty* risks undermining public trust in all aspects of science. Effective science communication is therefore about managing popular expectations and not just about dissemination of findings.

CCBN attempts to reassure the viewer that climate science is trustworthy on the grounds that: a) its models are subject to peer assessment and intense critical scrutiny; and b) they are based on the physical science disciplines of Physics and Maths. The former has been called “the most fundamental science of all” in a reading of philosophy of science (Okasha 2002, p.55).

Not all were convinced nonetheless by CCBN and its claims; the day after broadcast, the film was dismissed online as “the latest piece of climate change propaganda” by the BBC (Homewood P 2015, p.2). The blogger’s authority to speak on climate change had already been questioned on the basis of lack of identifiable credentials (Canning 2015), a point I return to in section four. Nonetheless, the charge that CCBN fails to address all pertinent issues is not in dispute. For Homewood (2015) the film’s omissions are “remarkable” (an adjective used more than once) and enough to undermine the credibility of the film and its broadcaster. An alternative view is that the programme was not negligent; it simply “did not have the time or scope” to address all relevant aspects of the climate debate (Fenton 2015, p.3).

CCBN is only the latest climate change documentary to raise critical questions about science. Both AIT and TGGWS were award winning commercial successes. The former won two Academy Awards and was one of the highest-earning documentaries of all time. The latter “received several awards and was broadcast on public television worldwide” (Greitemeyer 2013, p.109). And yet, both films have been criticised by scientists.

The more damning critiques are of TGGWS. When first shown on Channel 4 television in the UK, the film sparked a Group Complaint to the broadcasting regulator Ofcom. Citing inaccuracy and misrepresentation, complainants described the documentary as scientifically unsound, flawed and “very misleading” (Jones et al 2007, p.64; see also Ofcom 2008).

In finding for the broadcaster (that TGGWS was *not* scientifically misleading) Ofcom cited extensive media coverage of climate change in the UK and, on that basis, argued that viewers of TGGWS should be sufficiently informed to be able to judge the programme's arguments for themselves. Ofcom further stated that since the programme was clearly representing a minority viewpoint, its own "rules relating to the preservation of due impartiality" in matters of political dispute "did not apply" to this particular film (Ofcom 2008, p.21).

Charges of inaccuracy and misleading the public have dogged AIT as well. In its defence, supporters have described acknowledged errors as "inconsequential" because "the general points Gore is trying to make...are not in dispute" (Steig 2007, p.6). This echoes the Channel 4 response to charges of factual error in TGGWS: "For Channel 4...the factual errors were to be considered in isolation from each other and as such were deemed to be insignificant" (Mellor 2009, p.141). Steig (2007, p.8) concludes that although AIT "rests on a solid scientific foundation...its chief role is not a scientific one", its role is to raise an alarm – about global warming – and to link this alarm to ethical choices and suggestions for behavioural change. The question then is not *whether* viewers should be alarmed about global warming but *how* alarmed they should be. For Steig (2007, p.9), "this is no longer a scientific question so much as it is a question of values."

An identical defence has been made of *Cowspiracy*, a film co-produced and co-directed by Kip Andersen and Keegan Kuhn. An edited version of the film subtitled *The Sustainability Secret* has been available to view via the streaming website *Netflix* since 2015.

Cowspiracy answers the call for climate change films that engage directly with values of sustainability and social justice (Branston 2007). Like AIT, *Cowspiracy* aims to raise awareness of the anthropogenic drivers of global warming and promote behavioural change (in this case, embrace of a vegan lifestyle). However, like TGGWS, the film departs from the scientific consensus on climate change and suggests a conspiracy of silence around alternative viewpoints. The film argues that the major contributor to climate change is neither solar activity (as TGGWS claims) nor fossil fuel production and consumption. The main culprit is identified as animal agriculture (especially the dairy industry), which supposedly contributes 51% of all greenhouse gases. A critique of the film on the website of the Union of Concerned Scientists disputes that figure, pointing out that the scientific

consensus on animal emissions is that “livestock are currently responsible for about 15% of global greenhouse gases” (Boucher 2016, p.2).

Although Anderson did draw on findings “from recent scientific reports” (Homewood A 2015, p.2), critics of *Cowspiracy* dismiss it as merely another conspiracy oeuvre. As in CCBN, critical questions speak to scientific credibility; where is the 51% figure drawn from?; Are the sources peer-reviewed?; and methods - how was the figure derived?; Are the measurements valid? (Boucher 2016). However for co-director Keegan Kuhn (2015), the film’s numbers (although defensible) are neither consequential nor significant because “regardless of whether animal agriculture is responsible for 14.5% of GHS or 51%, it is still a primary driver of climate change” (2015: p.1). The filmmakers’ objectives were to raise awareness and promote the “true sustainability” of plant-based foods, so if audiences embrace a vegan lifestyle after viewing then those objectives have been met (2015, p.2).

A review of comments from around the world on the *Cowspiracy* Facebook page suggest that “the film has been triggering major behavioural change among young adults, an age group often labelled as apolitical and apathetic” (Homewood 2015, p.1). Sample comments about feelings of terror and shock demonstrate the affective power and emotional engagement called for in films by a number of authors. Good films arguably offer “both facts and feelings” (Perkowitz 2007, p.225), and pull climate change “into an affective human-interest frame” (Hammond and Breton 2014, 312). *Cowspiracy* does this through a combination of information, interviews, “jolly animation sequences” and a “thriller-like” narration from the self-professed environmentalist Andersen (Homewood 2015, p.2).

In sum, climate change films can be classified in a variety of ways. The analysis above suggests breaking from simple fact/fiction or factual/entertainment dichotomies. The films discussed all contain some degree of science as well as notable errors or contestable claims. Different genres of film have their detractors and defenders, so no one type of film should be dismissed out of hand (Branston 2007). Usefulness therefore cannot be determined by type. Equally, scientific accuracy cannot be the determining factor because facts are not the only issue, even in debates about the accuracy of science in film. Critical questions are about significance and consequence as well. These are not simply a matter of scientific knowledge; they are also about aims and objectives (e.g. raising awareness), about social values, such as sustainability, and about the different functions of climate change communication, notably

affect and behavioural change. It is therefore necessary to explore what climate change films *do* and *how* they do it; it is to those two issues that the paper now turns.

3 The work of climate change films: visualisation and communication

Climate change films are a form of climate change communication and a potential boost to public engagement, about which concerns have been raised in a number of studies. An influential paper on limited public engagement with climate change in the UK, for example, argues that “it is not enough for people to know about climate change in order to be engaged, they also need to care about it, be motivated and able to take action” (Lorenzoni, Nicholson-Cole and Whitmarsh 2007, p.446). The authors’ contention that *engagement* has three defining aspects – the cognitive, affective and behavioural – and is not a function of scientific knowledge or information alone subsequently informed a special issue of the journal *Science Communication*, which aimed to enhance public engagement through effective strategies for communicating climate change (see Maibach and Priest 2009).

Those studies suggest that climate change communication has three basic functions or aspects - the *educative*, the *affective*, and the *motivational* (see also O’Neill and Hulme 2009; O’Neill et al 2013; Spoel et al 2008). A growing sub-field of literature devoted to visual communication explores the use of graphs in science documentaries, discussed further below, as well as other types of still images, such as paintings (Doyle 2011; Miles 2010; Thornes 2008), photographs (Manzo 2010a and 2010b; O’Neill 2013; Schmidt and Wolfe 2008), and cartoons (Klein and Bauman 2014; Manzo 2012). Another related aspect of film research is audience analysis, which addresses reception of moving images by viewers (see for example Greitemeyer 2013; Howell 2011; Lin 2013; Jacobsen 2011; Lowe et al 2006; O’Neill and Nicholson-Cole 2009). Taken together, these studies demonstrate that the purpose of climate change communication is to share information and promote understanding; to foster affective engagement and show people why they should care; and last but not least to motivate (or move) people to act.

Concerning education in particular, several studies mention the limits of a traditional ‘deficit model’ of communication. This model envisages a one-way knowledge flow and “assumes that the provision of scientifically sound information can change public behaviour and increase support for new policy measures” (Hulme 2009, p.217; see also Howell 2011;

Lowe et al 2006). One reaction against this is the idea of “science-citizen dialogues” that welcome debate. Despite their potential, these “will always only ever touch a small proportion of the public” (Hulme 2009, p.221); greater emphasis on emotions (pathos) is another mooted alternative. As noted by Howell (2011, p.178), “not all emotions are helpful in this context.” Fear-based campaigns and appeals “are problematic because fear can trigger denial, apathy, repression, anger and counterproductive defensive behaviours” (see also O’Neill and Nicholson-Cole 2009).

Debate about the deficit model does not presuppose that people already know everything they possibly can about climate change. Studies show that “people commonly exhibit misconceptions about the causes and consequences of climate change” (Lowe et al 2006, p.436). The aforementioned assumption by Ofcom (2008) that widespread media coverage translates into popular ability to assess the truth claims of films, such as TGGWS is therefore debatable. However, the argument that “viewers expect to be adequately informed about matters in the public interest, including of course *minority* views and opinions” is not unreasonable (Ofcom 2008, p.13, emphasis in the original). If clashing values and standpoints account for disagreements about climate change (Hulme 2009), then different messages are bound to appeal to different audiences.

For some, specific values are precisely what climate change films should be emphasising (Branston 2007). Others advocate films that offer particular ways of seeing, e.g. conceptualisations of climate change as a form of violence (Hobbs-Morgan 2015). In terms of motivation, more information (and clearer messages) about what people can do to mitigate climate change is another suggestion (Lowe et al 2006). There is also the argument that if “*lack of certainty is our natural lot*” (Hulme 2009, p.84), then more should be taught about how uncertainty in science is normal and how scientists manage it.

So one way to assess the educative usefulness of climate change films is in terms of particular stories, messages, perspectives and values. This is teachability as content. The success of a documentary, such as AIT, which has been described as “essentially a lecture on film” (Mellor 2009, p.136), demonstrates “the commercial power of factual fear pieces” (Bartlett 2009, p.34), if not that “science is a hot topic” in Hollywood and beyond (Perkowitz 2007, p.225). However, several reviewers suggest that topic alone does not explain the popular appeal of certain science-based films. AIT is a multi-faceted documentary that “also borrows from the tradition of the sermon” (Aaltonen 2014, p.73). Some sections of the film

are “emotionally charged” (Hammond and Breton 2014, p.310). Despite the differences both AIT and TGGWS “use powerful imagery, evocative music and loaded language” (Bartlett 2009, p.35). In sum, these films are popular because they work well as cinema, using filmic functions to engage their audience.

Another way to assess educative usefulness concerns the concept of “teachable moments” (Lowe et al 2006, p.454; Von Burg 2012, p.19). This is the idea that climate change films can stimulate public interest in formal science (Perkowitz 2007), and open up “new discursive landscapes” (Von Burg 2012, p.19). The fact that TDAT inspired some additional fact-finding on mitigation supports this position (Lowe et al 2006). ‘Teachable moments’ alludes to “the epistemic significance of cinema,” i.e. its thought provoking potential or capacity (Shapiro 2008, p.5). It also signals a famous aphorism widely attributed (apparently incorrectly) to William Butler Yeats, that ‘education is not the filling of a pail, but the lighting of a fire’ (Strong 2013). This is teachability as inspiration and stimulation – to engagement and critical thinking.

Documentaries apparently attract those with pre-existing concerns and high levels of awareness (Howell 2011; Jacobsen 2011), while blockbusters draw in a wider, less initially informed audience. In both cases, levels of awareness and concern can be boosted. However, evidence suggests that behavioural change doesn’t necessarily ensue. Follow-on surveys by audience researchers reveal lower levels of concern and motivation as time goes on. Explanation for this lies partly in message reception and the fact that few films are viewed very often. Advertising research “suggests that people need to see messages more than once in order to remember and respond to them” (Howell 2011, p.185); another factor is saliency. Climate change must compete for people’s attention along with other significant and pressing concerns. Finally, there is the issue of efficacy. Film viewers in one study told researchers they “do not feel they have access to information on what action they can take...to individually or collectively implement change” (Lowe et al 2006, p.453).

Motivation to act is thus dependent on a range of factors, both intrinsic and extrinsic. However, it is also worth differentiating between unintended consequences and intentional outcomes. Critical thinking and inquiry may be prompted by the public debate surrounding a film – i.e. by audience response – rather than by the film itself. This would suggest that public debate is as useful an outcome as private reflection and independent study – a point I return to in what follows.

4 The how of climate change films: methods of communication

This section begins with a seemingly irrelevant question: “who is Paul Homewood?” (Canning 2015). The question was prompted by approving references in a *Telegraph* newspaper article (Booker 2015), and a subsequent fruitless search for biographical details on Homewood’s own website. The point of the query was to heighten awareness “of the sort of people quoted as experts in the press” (Canning 2015).

Apart from a barb about “what any proper mathematician should know” the aforementioned online critique of CCBN by Homewood (2015) did not question the co-presenters’ authority, duly referring to them by title as Dr Hannah Fry, Professor Norman Fenton and Professor David Spiegelhalter. The blog post confined itself to remarks about the BBC, the programme’s omissions, its “flashy graphics” and “impressive sounding words thrown around” (Homewood P 2015, p.2).

Those online comments encapsulate two significant issues associated with public trust and the nature of argument, i.e. the issue of authority and the issue of language (both visual and spoken). These are addressed in the sub-sections below.

4.1 Voices of epistemic authority

The book *Who Speaks for the Climate? Making Sense of Media Reporting on Climate Change* notes that “the boundaries between who constitutes an ‘authorised’ speaker (and who does not)” have shifted (Boykoff 2011, pp.13-14). Science organisations have used celebrities to raise awareness about climate change, film producers employ scientists (as already mentioned) and actors present documentaries – for example *The 11th Hour* (2007), a film produced and narrated by Hollywood star Leonardo DiCaprio.

These developments are explored in depth by Boykoff (2011), suffice it to say here that with regard to films, the criterion of authenticity mentioned in the introduction relates in part to questions about authority figures. One type is “experts” on the subject of climate change. If “science described by someone who lives the subject is more authentic than science described by someone who only writes about it” (Perkowitz 2007, p.227), then CCBN is no more authentic than AIT. The former features mathematicians/statisticians while the latter stars the erstwhile politician Al Gore. None of them are climate scientists. Most authentic of all then would be TGGWS, which contains interviews with “four climate

experts” in an effort to “lend credibility to the documentary” (Jones et al 2007, p.63). And yet, a complaint was lodged with Ofcom and academics hostile to the film pointedly dismiss the interviewees as “well known ‘climate sceptics’”, who have not published anything credible (Jones et al 2007, p.63).

Recognition of individual authority is therefore a matter of knowledge, about who the interlocutors are and what they do, and judgement - about the relevance and value of credentials. This point applies equally to the issue of celebrity as a form of authority. *Who Speaks for the Climate* classifies climate change celebrities into six main types: actors; politicians; athletes/sports figures; business people; musicians; and public intellectuals (Boykoff and Goodman 2009). Al Gore is an archetype of a celebrity politician, but whether his political status accounted in any way for the appeal of AIT is debatable; a more crucial contributor to the documentary’s success is arguably “Gore’s everyman charm” (Bartlett 2009, p.36). The appeal then is Gore the personality rather than Gore the politician. Similarly, *Cowspiracy’s* “unique selling point” has been described as “Anderson himself. An easy-going, regular guy in a baseball cap” (Homewood 2015, p.2).

The broader political context is also crucial when considering the usefulness of celebrity politicians. A diminution of public trust in politicians and bankers has been linked to “the financial meltdown that led to the global recession of the late 2000s” (Nunn and Biressi 2010, p. 60). Trust surveys in the UK “show politicians at the very bottom of the scale, less trusted to tell the truth than bankers, estate agents and even journalists” (Freedland 2015, p.1). The perception here is that politicians are not just greedy or inept, they are also dishonest – not in a criminal sense, but because “most are engaged in a very particular, narrowly defined kind of untruthfulness” that “rests more on euphemism and omission than the outright lie” (Freedland 2015, p.1). This is the issue of integrity that I address in the sub-section below.

Another consideration is the way that celebrity works in the public realm in terms of emotional labour. At a time when celebrity communication is highly affective, i.e. relies heavily on a “language of emotion,” those in the public eye “who best understand the emotional dimensions of the public realm and its communicative rules” will connect most effectively with audiences (Nunn and Biressi 2010, pp.49 and 62).

The “celebrity/climate change connection” has been critiqued for focusing excessively on individualism and distracting attention from calls for systemic and large-scale

responses to climate change (Boykoff and Goodman 2009, p.404). The best that can be said of that connection is that it links strongly to emotion and the affective dimension of climate change communication. The success of TGGWS and *Cowspiracy* (films with no famous faces) suggests however that celebrity may be less useful than controversy in attracting attention to a thesis or message. I consider this question in what follows.

Before doing so, it is worth noting that audience analysis reveals another type of authority figure. A survey of viewers of TDAT found they would have been more receptive to the same message from the BBC, which “appeared to have authority and legitimacy – in fact in some cases, it was the yardstick viewers used to refer back to and judge the ‘science’ of the film” (Lowe et al 2006, p.450). This reaction contrasts markedly to the aforementioned inscription of the BBC as a disreputable propaganda machine.

Again it seems there is no general public with regard to climate change films. Instead there are different publics that respond to films in a variety of ways, not least because their conceptions of authority are different.

4.2 Languages of science and persuasion

Standard methods of documenting climate change are both visual and textual. A prime example is the collection of essays called *Climate Change: Picturing the Science*. In the Forward to the volume the editors - a climatologist and a photographer - describe the illustrated papers as “a tour de force of public education” and argue “powerful photographs help to illuminate a complex and compelling story” (Schmidt and Wolfe 2008, pp. vii-viii). The story told is that of human-induced climate change. The accompanying visuals are not only photographs but also graphs, charts, maps and satellite imagery (Schmidt and Wolfe 2009).

A short article in the journal *Nature* describes documentaries as “good for showing the subtleties of science” (Marris 2006, p.902). Films frequently do this in the same way as illustrated books; they use still images (and video) as evidence in support of an argument. If the argument is to convince then the visuals must be trustworthy, as Mellor (2009) explains. The “documentary form...asserts an indexical relationship with reality,” i.e. the recorder bears witness to events occurring in real time; it is “the indexical nature of documentary film [that] enables the audience to invest trust in it.” If audience trust is to be maintained

then visuals must be used “openly and honestly” and not falsified in any way (Mellor 2009, pp.143-45).

Seeing is not always believing. AIT was ruled an error-laden film by the British High Court in a judgement widely reported in the British press at the time (see for example Peck 2007). At issue were the conclusions drawn from some of the visuals, notably a couple of graphs and some images of glaciers. An aforementioned defender of AIT describes some of these images as “confusing” and ill-chosen examples of glacier melt due to temperature change. Nonetheless, for this reviewer “the general points Gore is trying to make in these examples are not in dispute” and the film’s overall message is accurate (Steig 2007, p.6).

The legal judgement of AIT raised questions about the use of visuals in the film. It did not question the indexicality of the images themselves. No one accused Gore of falsifying graphs in order to prove (or disprove) a theory. By contrast, the Group Complaint to Ofcom cited “falsification or serious misrepresentation of graphs or data” in TGGWS (Ofcom 2008, p.7). The finding noted Channel 4’s acknowledgement of such errors and agreed to consider these within the context of the programme as a whole. In its judgment, “Ofcom did not consider the inaccuracy to be of such significance as to have been materially misleading so as to cause harm and offence” to the public (Ofcom 2008, p.16).

Falsification is a matter of dishonesty as well as inaccuracy, and falsification of graphs is particularly problematic because they “are perhaps the most highly indexical of the representational techniques of science, tracing as they do data gathered from the material world” (Mellor 2009, p.144). Like Ofcom, Mellor (2009) argues for evaluating the text of a film as a whole. However instead of just accuracy, her frame of reference is “the overall integrity of the text, signifying its truthfulness, openness, and honesty” (Mellor 2009, p.148). This links to the aforementioned point about public trust (in the indexicality of visuals), as well as to a broader question about image manipulation, namely “how do we underwrite the credibility of images we want to function as documents and evidence?” (Campbell 2015, p.7).

Manipulated images submitted to major visual journalism competitions, such as World Press Photo (WPP), are disqualified from consideration. This is not only in order to ensure the credibility of the images themselves but also to safeguard public trust in professional practice at a time when digital image files are easily altered. As explained by David Campbell, the Secretary of WPP’s 2015 competition, lack of tolerance “for even

materially small changes” signals “a broader commitment to open photographic practices that allow images and stories to be verified” (Campbell 2015, pp.5-8).

Since no film can tell the whole truth, truthfulness is not about the absence of alternative stories that might have been told. It is about outright lies, manipulation of images and falsification of data. Public debates around Climategate and TGGWS show that integrity matters for public trust. The outcome in these cases was not just controversy but scandal.

If, as a popular saying goes, there is no such thing as bad publicity then scandalous films are useful as teachable moments. Research in marketing, however, suggests that the aphorism is open to question. Negative publicity has been shown to stimulate product awareness and increase sales – but only for “new entrants” that want “simply to get seen.” For all others the outcome is the opposite; sales are negatively affected by bad publicity (Stanford GSB Staff 2011, p.2). Even if scandalous new films actually do no harm to (even usefully profit) their producers, scandalous documentaries are arguably doubly damaging to viewers. Initial screening damages public understanding *of* science, while subsequent negative publicity damages public trust *in* science. Academics might still choose to show, debate and discuss a film, such as TGGWS in university classes, but this would need to be done in conjunction with rigorous critiques published in peer-reviewed journals. The aim would be to critically analyse the truth claims in the film and to question its communicative strategies, as well as to show what happens when integrity is violated.

The aforementioned Ofcom judgement was confined to matters of accuracy and therefore limited in scope. Like the blog post on manipulation, however, the finding did consider what images “can *do* rather than what they *are*” (Campbell 2015, p.6, emphasis in the original). The judgement notes that “the purpose of the various graphs” in TGGWS is to provide visual illustration of the programme’s thesis about solar activity (Ofcom 2008, p.16). The text of a film is thus not simply a series of images (both moving and still). It is also a thesis or series of statements. Like other types of visuals, film images “can be powerful documents and evidence, but they require other statements, other information, to be truly effective” (Campbell 2015, p.7). It is therefore necessary to briefly address speech and language in climate change films.

Aaltonen (2014) does this for three climate change documentaries, namely AIT, *Recipes for Disaster* (a 2008 Finnish documentary) and *Not Evil, Just Wrong* (a 2009 climate

change sceptic film). While noting that “the ontology of documentary films has rested on the indexical features of photography,” the author focuses on rhetoric - a term that “usually refers to the art of speech, to skill or theory and to the oral means of influencing an audience” (Aaltonen 2014, p.62). Rhetoric, in other words, is a form of persuasion.

The three basic elements of classic rhetoric are rational argument (logos), emotion (pathos) and matters related to credibility (ethos). Taking the last first, ethos is about “who is claiming what for whom?” and concerns an issue already addressed, namely the use of expert interviewees and authority figures (Aaltonen 2014, p.64). Concerning logos, these films all rely on visual indicators of science, such as graphs, to suggest objectivity. In keeping with rhetorical convention, each film also introduces the main argument before counter-arguments are addressed and rebutted.

Pathos is a combination of “affective persuasion” and “emotive images”, such as images of children, which are in all three films. Analysis by Aaltonen (2014) shows that these three films are effective because they use different means to communicate and connect effectively with their audience. The conclusion suggests a useful point with which to end this discussion, which is that versatility of this sort is not a property of these particular films or of documentaries per se. It is a property of cinema, an “art form that uses visual, audio and cinematic expression to affect the viewer both on a cognitive and on an emotional level” (Aaltonen 2014, p.73).

5 Conclusion

This paper was motivated by academic writings on science communication and climate change communication, especially analyses of visualisation and climate change films. The question about usefulness was prompted by numerous critiques of the major climate change films (notably TDAT, AIT and TGGWS), as well as by public debates about their scientific veracity and image integrity. If even the most influential, award-winning and popular movies are open to debate then how useful are climate change films as vehicles of climate change communication?

To address this question, I considered the nature of cinema as an art form as well as the content of particular films. I also reviewed ongoing debates about science in film, climate change communication and image manipulation. The basic conclusions to draw from the analysis are as follows. Firstly, just as scientific endeavour can never produce “absolute

truth or reality” (Thompson 2012, p.79), so no film of any length can produce the whole story of something. Climate change films therefore can, and should be open to ongoing debate. Debate is as normal for films as it is for science – whether film makers intend it or not. It is also desirable when it takes place in the public realm, providing a ‘teachable moment’ or opportunity for collective engagement and critical thinking.

Secondly, if science is defined by experimentation, evidence gathering and peer review then climate change films are not actually science however well they portray it. Films are stories and constructs that “represent things in a certain way, thus compelling audiences...to see certain things and to miss others” (Mboti 2010, p.320). This is true of all films, for behind every one is a film-maker (or production team) involved in framing, composing and recording.

This means that choices about *what* to show and *how* to show it are inherent in “the usual editing through which the documentary filmmaker constructs a particular point of view” (Mellor 2009, p.146). Editing however is not the same as manipulation or falsification. Editing is not inconsistent with integrity and it is this – rather than absolute truth or reality – that should be demanded of any climate change film.

Thirdly, the usefulness of climate change films attaches principally to the educative and affective aspects of climate change communication. Their capacity to convey particular stories, messages, perspectives and values through a combination of rhetorical and visual strategies is well-documented. Their capacity to effect behavioural change, on the other hand, is demonstrably more limited. This is due to the nature of audiences and not just to the nature of films. The question of how to bridge the gap between motivation and actual change is an on-going challenge for climate change policy more generally.

In sum, particular types of film – notably science fiction films and science documentaries - engage in some way with climate science. In doing so, they should not be held to higher standards than science itself, which is not expected to tell the whole truth and be perfect. Debates about data interpretation, logos and so on are therefore inevitable. However such films can, and should be held to photographic standards of truthfulness, openness and honesty. The indexical nature of documentary film is a matter of both accuracy and trust, which is why revelations about manipulated or falsified images are doubly damaging to audiences. They undermine public understanding of science and public

trust *in* science. Guarding against harm is surely a priority for educators, if not for film-makers as well.

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