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Three twenty-first-century disaster films, the ideology of science and the future of democratic debateⁱ

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Abstract

While news media representations of science and technology have received ample attention in academic research, there is a lack of comparable research into disaster films. Drawing on a qualitative in-depth content analysis, this article aims to explore the representation of science in three recent disaster films: *The Day After Tomorrow* (Emmerich, 2004), *Contagion* (Soderbergh, 2011) and *Rise of the Planet of the Apes* (Wyatt, 2011). We find these films' representation of science contributing to a reification of science and the promotion of the 'ideology of science'. We conclude by discussing how this representation potentially shapes the context in which late modern risks are approached in social and political debates, and to what extent this might contribute to facilitating or impeding democratic debate and citizenship.

Keywords

disaster film

ideology of science

representation of science

science in the media

late modern risks

democratic debate

Introduction

Contemporary societies are confronted with an increasing number of techno-environmental risks and controversies, since science and technology have not only pervaded our daily lives through the many technological products and services whose comfort we enjoy but have also taken centre-stage in many of today's social and political debates. Climate change, nuclear energy, genetically manipulated (GM) crops and food, fracking, etc. confront us with tremendous democratic challenges. Indeed, scientific and technological developments not only offer many potential benefits to health, quality of life or economic development, but simultaneously introduce known and unknown risks to health, the environment and social justice (Beck 1992).

Not only have these risks and controversies become increasingly salient on the social agenda, but also on the academic agenda, and particularly in the field of media and communication studies. Their representation in news media discourses (and newspapers more specifically) have received quite some attention in these last few decades (e.g. Gaskell and Bauer 2001; Väliaverronen 2004; Van Dijck 1998). These discourses have been shown to serve as a key source of information, making access to scientific arguments and political options as well as understandings of risks and responsibilities largely dependable on the media discourses that people consume (Carvalho 2010; Corbett and Durfee 2004). Moreover, since science (and social reality in general) is constructed, and not mirrored, in media coverage, this construction is the result of (professional, economic, ideological, political, etc.) choices that call for detailed empirical research, revealing who succeeds in influencing these representations and with what potential implications (e.g. Carvalho 2007; Doyle 2011; Maesele 2011). Furthermore, in their simultaneous role as an 'agent' (in the (re)production

and (re)configuration of meanings) and ‘arena’ (where diverse points of view are contested, negotiated as well as ignored), media representations construct an image of what is *legitimate* science, scientific practice and scientific knowledge, who are science’s *legitimate* spokespersons, and what is the *legitimate* position of science in society, with corresponding implications for shaping public and political options regarding specific controversies (Beck 1992).

However, while news media representations of science and technology have received ample attention in academic research, there is a lack of comparable research into fiction media and especially into fiction genres that reflect on matters of science and technology, such as science fiction. Nonetheless, products of popular culture are as important as news media in mediating the ‘relations of definition’ between science, the public and other social spheres, such as politics, the economy and activism (Beck 1992). This article aims to explore the representation of science in three recent disaster films based on a qualitative in-depth content analysis: *The Day After Tomorrow* (Emmerich, 2004), *Contagion* (Soderbergh, 2011) and *Rise of the Planet of the Apes* (Wyatt, 2011). Furthermore, we discuss how this representation potentially shapes the context in which late modern risks are approached in social and political debates, and to what extent it might contribute to facilitating or impeding democratic debate and citizenship. However, we commence by reviewing the existing literature on science in the media and disaster films.

Science in the media

In the literature on science in the media, two broad approaches have previously been identified (Maesele et al. 2013). Traditionally, the field of media and science has been heavily informed by early communication theory and early sociology of science. As a result, an overarching idea promulgated: scientific knowledge is produced by scientists in a sphere

that is separate from the sphere(s) of non-scientists to whom it must subsequently be transmitted. Putting 'science' outside of 'society', this traditional approach characterizes the relationship between media and science as a matter, and primarily as a problem, of communication and information (e.g. Farago 1976; Kriegbaum 1967). Research from this approach concerns the efficiency, quantity and rigour of this transmission process between science and society, focusing on the evaluation of media coverage in terms of its scientific accuracy (e.g. Basu and Hogard 2008; Carsten and Illman 2002; Dunwoody 1982). These studies have generally concluded the scientists' dissatisfaction with science in the media, not only in terms of its factual errors, incompleteness or lack of essential details, but also in terms of style (sensationalization, misleading headlines, etc.). The common diagnosis made by research starting from this approach is that media either ignore, misunderstand or misrepresent science, and the proposed remedy commonly comes down to a combination of a more enhanced (i.e. in which journalistic interference is minimized) and increased representation of science in the media.

This traditional approach is a science-centred approach, not only for its establishment of scientists as hierarchically dominant in (and extraneous to) the process of science communication, but also for its problematization of media and society, instead of science itself. Furthermore, it is both a descriptive and a prescriptive approach, based on what has been referred to as the 'ideology of science', elevating science and scientific practice into an infallible and impartial source of authority (Edmond and Mercer 1999; Nelkin 1995) – in other words, as the guardian of truth (Carvalho 2007).

Resulting from a turn in the sociology of science in the 1970s, historians and sociologists from the fields of the sociology of scientific knowledge (SSK) and science and technology studies (STS) have criticized this idea of two separate spheres for science and society, questioning (1) the assumption that public discourse only begins where scientific

discourse ends, (2) the linearity of the communication process (Bucchi 1996), and (3) the neglect of either feedback on core scientific practice or interactivity between different forms of media, scientists and citizens (Lewenstein 1995).

In these last two decades, however, a more sociological approach has increasingly made its way into the academic field. This approach focuses on the meaning-making practices underlying definitions of scientific, technological and environmental developments in public discourse, and media(ted) discourses more specifically (Anderson et al. 2005; Carvalho 2007; Nisbet and Hume 2006; Maesele 2011). Here, the popularization of scientific knowledge is characterized as a multilayered process with public discourse functioning as a site of contestation over different representations put forward by various social actors (heterogeneous and unequal in power), such as science organizations, industry, consultants, policy-makers, independent scientists, citizen groups and political and social movements/NGOs. When science is no longer approached as a detached from, but as something culturally defined within society, then science and scientific legitimacy are not assumed to be predefined, but to be achieved within the communication process itself. This approach allows a much broader range of research questions, focusing either on understanding: how scientific claims are represented in public discourse and by whom; how this relates to issues of access to media and social debate in general; and how these discourses are interpreted and used by various audiences. Furthermore, the mediatization of science itself – i.e. the professionalization of marketing practices, public relations, and image management within science organizations – also becomes an object of critical concern (Hilgartner 1990).

Much of the existing research literature from this sociological approach shows that the institution of science has successfully adapted to the mediatization of society, in terms of a relatively effective control of its public image in media(ted) discourses: for instance, in this past decade, science reporting has been found to be characterized by a largely affirmative,

sometimes even hyperbolic, nature, which is often the result of the success of science PR (Caulfield 2005). Coverage has also been found to largely rely on uncontested scientific expertise by drawing from only one institutional source (Bucchi and Mazzolini 2003). Furthermore, a high degree of satisfaction is found among scientists regarding their media contacts and media reporting in general (Peters et al. 2008). And last but not the least, specific culturally dominant discourses such as technological progressivism, scientism and neo-liberalism are found to contribute to preventing critical sources to be accredited with legitimacy or critical stories to gain prominence (Carvalho 2007; Maesele 2011). Correspondingly, seminal figures such as Bauer and Bucchi (2007) have recently concluded that currently there is a new regime of science communication, in which a logic of public relations, marketing and corporate communication has displaced a logic of journalistic reportage. Thus in the end, while research from this sociological approach, in contrast to the traditional approach, is not based on the assumptions of the ideology of science, it shows how media representations contribute nonetheless to the reification of science and therefore to promoting this ideology of science.

However, comparable research into fiction stories in media is lacking, especially into fiction genres that focus on science and technology, such as science fiction. Disaster films, for instance, often contain narratives of technological risk, but their role in serving as both an arena and an agent for making sense of science and risk remains unstudied.

Disaster films

Disasters have always occupied a central place in science fiction, with a specific subgenre called ‘camp film’ being quite popular in the 1970s (Feil 2005; Keane 2006). Furthermore, ‘the proper, or humane, use of science, versus the mad, obsessional use of science’ (Sontag [1965] 2009) has always been a core element of science fiction. Nonetheless, research from

media and communication studies, and from science communication scholars more specifically, is limited to recent audience research. Scholars have studied either to what extent (media coverage on) the release of *The Day After Tomorrow* elevated information-seeking activity on global warming-related websites (Hart and Leisorowitz 2009; Leisorowitz 2004), or to what extent people's perception of climate change was influenced after watching the film (Lowe et al. 2006). Scholars from other fields have focused on the discourses of authority, security and terrorism in *The Day After Tomorrow* (e.g. Methmann and Rothe 2012), the role of psychoanalytical processes working through the represented destruction in specific recent disaster films (Žižek 2010), and the role of utopia/dystopia in the genre as a whole (Suvin 1979; Jameson 2005). However, it is still unclear which image of science, its spokespersons and its desired socio-political role is constructed in disaster films. It could be argued that this is a less relevant or significant domain, since science fiction films, in contrast to news media, do not play a comparable social role in day-to-day public discourse on techno-environmental risks and controversies. Kirby, however, argues the following:

The public makes sense of science – constructs a 'science citizenship' [...] – in the context of their everyday lives, pre-existing knowledge, experience and belief structures. Popular films influence people's belief structures significantly by shaping, cultivating or reinforcing the 'cultural meanings' of science. (2008: 41)

Therefore, this article aims to gain insights into which cultural meanings of science are shaped, cultivated or reinforced in recent disaster films. And most importantly, do we find these representations also contributing to a reification of science and the promotion of the ideology of science and, if yes, how?

Research design

For this exploratory case study regarding the representation of science and scientists in disaster films, our sample consisted of three recent paradigmatic examples: *The Day After Tomorrow* (2004), *Rise of the Planet of the Apes* (2011) and *Contagion* (2011). These were chosen on the basis of three criteria: (1) sharing representations of techno-environmental risks and controversies, (2) having important filmic and narrative divergences on these themes, and (3), being successful as disaster films in terms of box-office and home media-performance in the period between the year 2004 and 2014. Furthermore, these films were characterized by an interesting variety in terms of techno-environmental risk: climate change (*The Day After Tomorrow*), genetic manipulation (*Rise of the Planet of the Apes*), and a global pandemic (*Contagion*).

The Day After Tomorrow depicts how a series of disasters caused by climate change ravishes the United States. Its analytical relevancy lies in the representation of the relationship of the protagonist-scientist (a paleoclimatologist) with his employers and the government, his scientific efforts to understand the nature of the coming disaster and its potential mitigation, and the film's focus on the response of the American people to the disaster(s). Typical for this film is the emphasis on special effects and destruction scenes, which have been the object of study in the psychoanalytic tradition (e.g. Žižek 2010). *Rise of the Planet of the Apes* recounts a family drama in which the father of the protagonist-scientist is slowly slipping away from consciousness due to Alzheimer. The genetically modified cure that the main character is developing turns out to be also a dangerous virus, with the potential of massive deaths in the case of spreading. We do not see the virus actually infecting people on a global scale, but this is suggested at the end of the film. The film's analytical relevancy lies in the representation of the illicit development of the cure/virus by the protagonist-scientist for personal interests as well as its portrayal of science/scientists within the (commercial) confinements of the

pharmaceutical industry. The third selected film, *Contagion*, which was promoted by both its makers and traditional media as a ‘realistic’ portrayal of how a virus spreads and is successfully challenged (Ellis 2011), portrays the global spreading of a deadly viral brain infection. Its analytical relevancy lies in how *Contagion*, in contrast to the other two films, follows multiple scientific characters and, more specifically, how their relationships with other social actors (such as politicians and journalists) are represented and how their struggle to create a vaccine for the virus is criticized for various reasons. Furthermore, it is important to emphasize that the film attempts to represent the outbreak of the virus as scientifically faithful as possible, using, among others, multiple scientific terms and the names of existing scientific institutes.

As a first step, the selected films were transcribed, focusing in particular on the dialogues between the characters, the choice of topics and their narrative development (i.e. what is depicted in scenes and between scenes), the camera perspectives (long shot, point-of-view shot, soft focus, hard focus, etc.), and music and sound effects. The transcriptions were then systematically analysed using an in-depth qualitative content analysis, in combination with repeated viewings of the films, with the aim of inductively constructing relevant empirical categories. The coding process was characterized by the principles of the grounded-theory approach (Strauss and Corbin 1998): in a simultaneous process of collecting, coding, and analysing textual information, new ideas were constantly developed and tested through the analysis of data that could confirm or contradict (e.g. ‘critical cases’) preliminary findings. The eventual empirical categories were derived from approaching the filmic characters as stereotypes: i.e. elementary representations in popular culture of specific social groups, which stand for the broader group of social actors they belong to, such as scientists, politicians, businessmen, journalists, etc. (see also During 2007; O’Sullivan 1994: 299–301). The diegetic

ⁱⁱ position(s) of these social actors in relation to each other, and particularly in relation to the protagonist-scientist of each selected film, allowed us to draw conclusions on the constructed image of science, its spokespersons and its desired socio-political role most substantively. The eventual identified categories are the following: the representation of citizens as vulnerable undifferentiated crowds; politicians, businessmen and journalists as failing social actors; protagonist-scientists as superior social actors; and the desirable future society as being governed through science-led technocratic decision-making.

Analysis

First we will focus on the films' representation of the non-scientist social actors, such as citizens, politicians, businessmen and journalists. Subsequently, we will discuss the representation of scientists and the position of science in a desirable future society.

Citizens: Vulnerable crowds

In both *Contagion* and *Rise of the Planet of the Apes*, disaster comes in the form of a deadly virus, in *The Day After Tomorrow*, however, citizens suffer from destruction due to natural forces. The disaster's object of destruction functions as a mirror-image of contemporary society. Both society and the destruction of society are inevitably 'suggested': they cannot be shown 'in full', therefore, they are suggested and developed through the use of specific representations of destruction, such as the demolition of cultural and historic buildings (the Statue of Liberty in *The Day After Tomorrow* and the Golden Gate Bridge in *Rise of the Planet of the Apes*), and, in each film, the dying and suffering of citizens. Citizens, however, hardly play a role as individuals. Quite to the contrary, they are represented as large groups of undifferentiated individuals, in other words, as 'crowds', 'masses' or even 'mobs'. These aggregations constitute a key part of the storyline of each film: in discussions between

officials and scientists we repeatedly find that the question of how to solve or prevent any negative consequences of the disaster equals indirectly discussing the fate of citizens.

The continuously suggested key characteristic of these citizens is their vulnerability, physically as well as psychologically. They are represented as defenseless, fragile and oblivious in relation to the disaster. For instance, the virus in *Contagion* is a 'silent killer': while its earlier phase resembles an innocent flu, it turns deadly within a matter of days. Similarly, the virus in *Rise of the Planet of the Apes* appears as an innocent saviour from mental disease, yet it turns out to slowly kill its patients. *The Day After Tomorrow* has numerous scenes in which citizens are being pursued by tsunamis or tornadoes that have the size of buildings. Interestingly, these natural disasters mostly seem to strike when citizens are either stuck in traffic congestion or in another context in which they are unable to dodge or avoid the destruction. This fundamental vulnerability continuously puts forward citizens as in need of the protection of others if they are to survive the disaster.

However, citizens not only need protection from the sheer force of the disaster, but also from themselves. They are presented as stubborn, mistaken, easily manipulated, and/or malevolent when the disaster strikes, and therefore, pose a threat to others and themselves. For example, in *The Day After Tomorrow*, a group of citizens struggles to survive in an ice-ridden New York. Their plan matures that they should leave the safety of their heated building and try to leave New York. The protagonist-scientist, however, advises his son to warn the group about an approaching ice storm, which will freeze anyone outside within a couple of minutes. Without actual reasoning, the group stubbornly disregards these scientific warnings and leaves the safety of the building for the cold open streets, only to freeze later on, as was predicted by the protagonist-scientist. *Contagion* depicts similar actions by citizens: as the virus ravages the nation, some citizens become sceptical about the claims of the (diegetic) Center for Disease Control and Prevention (CDC) and turn to a journalist and his theories

about the virus instead. As the CDC ardently tries to quarantine the disease, this journalist instructs people to get a homeopathic ‘cure’ (Forsythia). However, the ensuing queues in front of the pharmacies spread the virus even faster than it could have otherwise. Furthermore, the idea of an approaching disaster leads to a complete loss of social order, attributable to the emergence of plundering, theft and overall malevolence for the sake of individual survival. While some citizens are robbed of the first working vaccines, others are kidnapped to ensure the kidnappers are first in line to receive the vaccine. Supermarkets are plundered and streets have high heaps of trash that due to unknown mechanisms seem to combust due to the loss of social order. *Contagion* takes this image of ‘war of all against all’ as a fundamental given, as an official in the film points out that this degeneration takes place as soon as people learn about the proportions of the disaster. He argues that the best possible policy is to conceal the proportion of the disaster from citizens at all times for their own good. Therefore, the more derogatory ‘mob’ appears a suitable label for the representation of citizens in this case.

Since citizens are unable to defend themselves against certain destruction, while constituting a clear danger to themselves and others, still others are needed to mitigate or prevent disaster. In this regard, four other groups of social actors, external to these undifferentiated crowds, masses, or mobs, feature in the selected films: politicians, businessmen, journalists and scientists.

Non-scientist social actors and their failings

In both *Contagion* and *The Day After Tomorrow* politicians are expected to devise and implement policies aimed at countering or preventing disaster. Yet in both films, politicians fail to act in this respect, since they are too ignorant. This is true both in the sense of failing to understand what exactly is at issue, although being told repeatedly what the disaster entails and what they should do to mitigate it, and in the sense of being too self-interested, since they

are found to be driven only by the pursuit of special interests and/or personal political gain. The former is illustrated both in *The Day After Tomorrow* and *Contagion* with a scene in which politicians during a meeting with scientists repeatedly fail to understand the nature and implications of the coming disaster. Both scenes eventually conclude with the respective scientists resorting to drawing on a blackboard, as if they are teaching students. The latter sense, being too self-interested, is illustrated in *The Day After Tomorrow* by the character of the vice-president: when he and his cabinet are explained by the protagonist-scientist the nature of the coming environmental disaster and its implications in terms of evacuation, and when scientific warnings from a United Nations-conference confirm the scientist's theories, this information is simply disregarded using the argument that the US economy is just as fragile as the environment. Here, it is implied that for the US government economic interests (which concern specific groups) take precedence over environmental interests (which concern all), and correspondingly, the social well-being of citizens. Similarly, in the meeting between scientists and local politicians during *Contagion*'s first phases of the virus about how to contain the infection by closing public spaces, the politicians react very sceptically to these data and argue that, even though the virus might be dangerous, Thanksgiving-sales must continue under all circumstances. In later phases of the spread of the virus, we find these politicians mainly interested in how to evade the potential costs of emergency treatment for the infected.

The protagonist-businessman in *Rise of the Planet of the Apes* plays a similar role. In a meeting with major stockholders, the protagonist-scientist explains how a new medicine is going to save the lives and sanity of thousands of patients. The manager of the pharmaceutical firm he works for, immediately interrupts him, with the intervention that potential profits are virtually unlimited and that this is what really matters. Later on in the film, the businessman needs to decide on the continuation of the production of this medicine. When the protagonist-

scientist warns him about the potential dangers, he lectures the scientist on the deal they had: profits for himself and fame for the scientist. After further discussion on the matter, he fires the scientist and approves the continuation of production even while being aware of the product's lethal dangers.

In these examples, we find a remarkable logic of priorities, which is quite self-defeating: the US economy cannot prosper in a frozen, destroyed environment, a deadly sick man can neither buy nor receive Thanksgiving gifts, and a lethally fatal product cannot be profitable. The priorities in these discourses are so remarkably ranked that their function is to highlight how these arguments pursue other interests than the public interest (i.e. the well-being of citizens), which subsequently serves as an explanation as to what prevents these social actors from acting on the coming disaster. The nature of these competing interests is revealed through the narrative contrast and the logic of frozen environments, dead people and lethally fatal products.

While it is repeatedly suggested that politicians and businessmen are too ignorant to provide the necessary preventative and mitigating measures, the question remains whether other (non-scientist) social actors, such as journalists, are able to pursue the public interest. This is addressed in *Contagion* in which a critical journalist in his blog on the disaster exposes the CDC and government as being controlled by private interests and not the public interest, while presenting himself as a man of and for the people. In so doing, he draws on existing discourses about the role of corporate interests of the pharmaceutical industry in biomedical research. However, at the same time, his discourses are mixed with doubtful and implausible statements, such as claiming the existence of a direct link between autism and vaccination or claiming that the government deliberately developed the virus to ensure victory in the next elections. This mixture suggests permeable boundaries between social criticism and pure speculation, leaving room for all his ideas, whether valid or invalid, to be labelled as the

babblings of a madman. The final blow to his credibility is the exposure of his stocks in the developer of the 'cure' Forsythia. So while we were first led to believe that this social actor is capable of addressing the public interest, this is eventually unmasked as an illusion, since self-interestedness, and above all hypocrisy, appear to be the main drivers of the journalist in question.

Scientists: prophets and saviours

Citizens are at risk of destruction through their vulnerability, while other social actors are too flawed to assist. Nevertheless, all would be destroyed if they were not saved from someone/something external and radically different from themselves. This saviour from disaster, lack of knowledge, private interests and 'human nature', is the diegetic 'science community' that appears in the form of one or multiple scientific personae. This science community is characterized by its superior knowledge on the one hand, and its sacrifices for the survival of society on the other. The main assumption that runs through all diegetic scientists is that the essence of a 'true' scientist lies in putting everything on the line for the life of others, directly or indirectly. These sacrifices range from risking their individual careers to risking their lives, each time concerning the loss of personal comfort or gain for the survival of others. In other words, scientists, contrary to non-scientists, (are able to) act in the public interest. These almost religious characteristics are manifested especially in *The Day After Tomorrow* and *Rise of the Planet of the Apes*, in which the respective protagonist-scientist, like a classic Biblical prophet, faces a recalcitrant and unsubmitive audience in light of imminent disaster. But even more than prophets, they feature as saviours.

As mentioned before, the vice-president in *The Day After Tomorrow* doubts the claims made by the protagonist-scientist about the dangers of climate change. Relevant in this illustration is the sequence of scenes, as the previous scene has the protagonist-scientist

risking his life to preserve his research data from slipping away in an ice canyon. The dismissal by the vice-president of the implied findings from these data for the sake of the US economy firmly contrasts the interests both groups of social actors represent. In the following scene the protagonist-scientist is told by his superior to stop spreading his theories about the coming disaster, as they pose a danger to his career as a scientist. Nevertheless, he continues to hold on to his theories, even when his colleagues openly mock him. We are led to believe that nothing can stand in the scientist's way of striving for the common good.

Similarly, the main narrative in *Rise of the Planet of the Apes* is the return of a scientist to his 'real essence' of pursuing the public interest. While the virus is initially developed by the protagonist-scientist illegally and for private reasons only (to counter the mental degeneration of his father), the film subsequently focuses on the problems this causes, first in his personal environment and second in the approaching disaster. Eventually, he comes face to face with the manager of the biomedical company he works for, since the latter only has his eyes set on the potential profits of the virus as a cure for mental degeneration, while neglecting its potential risks. At a certain moment both have to make a decision based on the exact same information regarding the lethality of the cure/virus. The businessman is unable to make a choice in the public interest, while the protagonist-scientist is. When the businessman decides to continue the production of the (lethal) medicine the scientist helped to develop, the 'reconverted' scientist decides to intervene. This narrative sequence suggests that although these different identities may deviate from their essence for a short period of time, this can only be a temporary deviation (see also the journalist in *Contagion*).

While the self-sacrifice of the protagonist-scientists in *The Day After Tomorrow* and *Rise of the Planet of the Apes* concerns mainly their careers as scientists, *Contagion* goes further with the sacrifice the female protagonist-scientist is willing to make in developing the first working vaccine for the virus. Knowing that testing the virus will take months and that

those months will increase the number of infected and dead, she tests the vaccine on herself with the risk of infecting herself. In a following conversation, she recalls her actions and explains her behaviour. She implicitly refers to the example of Nobel Prize laureate and microbiologist Barry Marshall, who showed his scientific colleagues the correctness of his theory that peptic ulcers are caused by bacterial infection by infecting himself. The female scientist refers to this as an example of how a 'true' scientist is supposed to act.

The celebration of science and technocratic decision-making

Since scientists are the only social actors able to orientate themselves towards the common good, they are necessarily assumed, or predestined, to come into conflict with the other (non-scientist) social actors. Contrary to the scientists, these other social actors are part of the respective existing power frameworks and consequently have decision-making power (the politicians in *The Day After Tomorrow* and *Contagion*, the businessman in *Rise of the Planet of the Apes*). On the other hand, it is continuously suggested that without taking decisions based on science, disaster will ensue. Since this is what happens in *Rise of the Planet of the Apes*, the virus eventually conquers the world. While *Contagion* shows the continuous struggle with political officials, the situation is only found to improve when the quarantine and treatment of patients is done according to the instructions of science. Similarly, *The Day After Tomorrow* shows how the vice-president is in constant conflict with the protagonist-scientist, even though at one point he admits to being wrong. It is not until he (reluctantly) accepts the instructions of the protagonist-scientist to evacuate the northern part of the country that the film shows some improvements for citizens.

Eventually, the selected films share the underlying message that in the face of disaster, policy should be based exclusively on science-led decision-making. Since society is only able to prevent or mitigate disaster by having scientists decide policy in spite of what politicians,

businessmen, citizens or journalists believe, it is suggested that science-led technocratic decision-making is the preferred form of government for successful risk mitigation in specific and a desirable future society in general.

The eventual (and as continuously suggested: inevitable) response of society to the sacrifices of scientists and their successful takeover of control is illustrated by a typical scene demonstrating the celebration of science in both *Contagion* and *The Day After Tomorrow*. A genuine media event, in which society symbolically renews its allegiance to science by means of a public event, emphasizes its truly 'collective' dimension: fundamentally, these media events revolve around the reification of science for all to see its superiority. In both films the events are led by politicians, which is remarkable as politicians were originally science's main adversaries. This reversal suggests that politicians, in contrast to scientists, are unfit to lead when it really matters, in this case, when society is under threat by disaster.

Discussion

The three selected disaster films have in common that they presume a fundamental difference between the attitude and actions of scientists and non-scientists. While scientists are found to challenge the approaching disaster, non-scientists are only contributing to its eventual materialization. While scientists understand the nature and implications of the coming disaster, non-scientists have to be explained repeatedly, and even then, they remain too ignorant to act on the disaster. In the end, only when scientists succeed in overcoming the resistance of non-scientists and in directly informing policy-making, the disaster can be resolved or mitigated. In this process, a dichotomy between science as a superior sphere versus other ignorant inferior spheres, such as politics, business, media, and the public, is continuously reproduced and naturalized. This reproduction and naturalization is based on both a rational and moral assumption: only scientists are able to comprehend the true nature

of the disaster and its potential prevention and mitigation, and only scientists succeed in pursuing the public interest, respectively. While the journalist from *Contagion* and the protagonist-scientist from *Rise of the Planet of the Apes* appear to contradict these patterns in first instance, both characters are represented through a narrative of deviation, revelation and eventual return to their 'true' essential identity, restoring the narrative equilibrium: the journalist as too ignorant and the protagonist-scientist as pursuing the public interest. So it is fair to conclude that these representations of science are found to contribute to a reification of science and the promotion of the ideology of science, as also is demonstrated in previous literature on science in the media: science and scientific practice are elevated into an infallible and impartial source of authority (Edmond and Mercer 1999; Nelkin 1995). Furthermore, the ideology of science in the selected disaster films is characterized by essentialist identities, with the assumption of an infallible and impartial science community on the one hand and the general failing of other social actors on the other, with an unbridgeable gap in between.

The question now becomes how this representation of science could potentially shape the context in which late modern risks (such as GM food, nuclear power or climate change) are approached in social and political debates, and to what extent it might contribute to either facilitating or impeding democratic debate and citizenship.

First, this ideology of science which characterizes the representation of science in these films is based on the discourse of *scientism*, which refers to the science/society (ontologically) and fact/value (epistemologically) dichotomies (Goeminne 2010; Kleinman 2005; Maeseele 2015). This powerful discourse in western societies not only distinguishes between science and society on the one hand, and facts and values on the other, as inherently separate categories, but also puts forward science and facts as superior to society and values. In public discourse, these traditional dichotomies appear in various forms, such as science versus anti-science, ideology, politics or religion; reason versus belief; rationality versus

emotionality or fear, etc. Discourses based on these dichotomies are strategically deployed as a rhetorical tool to isolate unacknowledged (and unaccountable) value-laden assumptions and material interests in the introduction, development, promotion and safety regulation of new technological developments. Furthermore, based on the assumption of being value-free and politically neutral, this discourse grants scientists and experts superior cultural authority, and preferably, exclusive participation in decision-making on technical matters, i.e. technocratic decision-making.

Second, from a perspective of democratic debate and citizenship, the reproduction and naturalization of these traditional dichotomies is problematic in a late modern context of *late modern risks* and the *commercialization of science* (Maesele 2015). Regarding the former, it has been demonstrated that science has become a necessary as well as insufficient condition for making sense of these risks, since the existence of incompatible epistemic cultures within science results into a variety of (hypothetical) scientific findings regarding the level of *unknown* and *unforeseeable* risks involved (Boschen et al. 2010). This implies not only that these (essentially epistemic) controversies cannot be resolved on the basis of matter of fact and therefore require a 'political' decision about the *unknown* and *unforeseeable* risks communities and societies are willing to undergo. It also implies that the often conflicting (and contested) claims to knowledge are found to be selectively adopted by various social actors as a material and discursive resource in pursuing broader social, economic or political agendas (Maesele 2009; McCormick 2007). Furthermore, not any notion of scientific credibility will determine which framing of the unknown will eventually be dominant, but the economic and cultural resources the various social actors involved in a controversy are able to draw from will. And this is where the commercialization of science kicks in: inspired by the broader political-economic context of *neo-liberalization*, since the late 1970s and early 1980s scientific research has shifted from public to private patronage, as western governments

framed the *privatization* of scientific research as another interesting condition for stimulating economic growth within a context of global economic competitiveness. As a result, universities, science organizations, and individual scientists have increasingly become players in the commercial arena during the past decades (Baskaran and Boden 2004; Bauer and Bucchi 2007). Consequently, the ideal of the independent scientist that serves the ‘public interest’ and provides disinterested knowledge has become less credible, further weakening the claim that science provides a universal authority (Levidow 1999; Maesele 2009).

Third, what is at stake then in current risk controversies is a democratic struggle between competing alternative (technological, sustainable, economic, etc.) futures (Maesele 2015). This has been well-documented with regards to the role of the American conservative movement in the climate change debate (McCright and Dunlap 2010) and the political dynamics in the GM food controversy (Boschen et al. 2010). However, this representation of science based on the ideology of science serves to eliminate or close the necessary discursive space needed for organizing a democratic debate about these competing alternative futures. This happens by drawing on processes of rationalization and moralization, which are deeply characterized by mechanisms of exclusion: based on an (assumed, predefined) moral or rational consensus, the (moral or rational) demands of responsible actors (i.e. scientists) are distinguished from the epistemically vacuous concerns of irresponsible actors (i.e. citizens, politicians, businessmen, journalists, etc.), thereby excluding the latter from democratic debate and citizenship (Maesele et al. 2013). In so doing, it stigmatizes those actors and demands that either disagree with the ‘scientific consensus’ or with approaching the issue in question as an epistemic matter or a humanitarian cause. These moral or rational imperatives effectively shift the *site of struggle* from a democratic struggle between alternative futures to a struggle between ‘good’ and ‘evil’ or ‘rational’ and ‘irrational’ (i.e. ‘scientific’ and ‘unscientific’), and in doing so, acts in the service of concealing what is stake. Consequently,

this representation, in which normativity is derived exclusively from the ‘sound scientific’ reasoning by scientists, clearly puts forward technocratic decision-making as superior to any form of democratic control or debate, which is presented as counterproductive. Common to the ‘folk epistemology of science’, the role of science for any form of social progress is discursively reconstructed by both a strategy of authorization, calling upon the (scientific) authority of specific individuals and institutions in positions of recognized importance to legitimate knowledge claims, and a strategy of ‘scientification’, putting forward the technical and scientific nature of late modern risks as the sole basis for policy decisions. In addition to impeding democratic debate, a discursive construction in terms of an exclusionary scientific framing also stifles democratic citizenship (Carvalho and Peterson 2012; Machin 2013; Maesele 2015): it encourages political apathy by alienating people from owning an issue and also polarization between acceptance and denial. Furthermore, it turns people into passive spectators and not active participants in the articulation and shaping of alternative futures. Hence, despite the inherent normativity in the selected films in terms of progressive positions (emphasizing the urgency of climate change and the potential dangers of genetic manipulation), this representation of science based on the ideology of science encourages discourses that impede democratic debate and citizenship (while promoting technocratic decision-making). And most importantly, this representation constitutes a significant barrier to challenging the intertwining of science with commercial objectives, especially when the scientific establishment supports the commercial objectives (GM food, nuclear power, etc.).

Finally, this study is characterized by a limited generalizability, since only three films have been analysed. More films need to be analysed to be able to draw conclusions on disaster films in general. In addition, to be able to validate the significance of this study, and the discussion regarding democratic debate and citizenship, qualitative reception research is essential to examine the autonomy of the viewer in his or her ‘sense making’ of these

messages and in cutting across these particular ideological mechanisms, since the ideological nature of mediated representations will become clear only when we understand how these representations are dealt with by the public (Verstraeten 1996). And here audience research kicks in again.

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ⁱⁱ That is filmic, within the narrative of the film.