Fictional Narratives for Environmental Sustainability Communication

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Abstract

An increasing amount of fictional films, books or television series address themes of sustainability. This chapter defines fictional sustainability narratives and provides an overview about existing research. First, studies analyzing the content of fictional sustainable books and films are summarized. Second, we shed light on existing audience effects research about fictional sustainability narratives. Third, we give an overview of existing models that explain narrative persuasion effects of sustainability narratives. Given that models of narrative persuasion are hardly integrated in empirical research on sustainability narratives yet, we argue that a deeper understanding of narrative engagement processes may provide a useful background to specify effects of sustainability narratives in future.

Many fields of sustainable development are hardly tangible for citizens in industrialized, Western countries: Climate change is somewhere else or in the future; energy, food and water are abundant; biodiversity is seemingly intact; toxins in water and air are invisible. Consequences of non-sustainable behavior are not immediate nor are they individual – they are remote, collective and at times need close scrutiny or scientific inquiry to be detected. Thus, a chronic problem of

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sustainability communication is to illustrate issues in a way that makes them concrete, tangible and relevant for everyday life. Narratives have been discussed as a communication mode that is able to create this relevance (e.g., Seelig 2019). In particular, fictional narratives such as films, books, or shorter and amateur fiction have the potential to touch and move audiences. Based on the intense viewing experience they also may have a positive effect on real world beliefs, attitudes, intentions, and behaviors (Bilandzic and Busselle 2013; Braddock and Dillard 2016). This chapter intends to explore the role of fictional narratives in sustainability communication. Therefore, we will define fictional sustainability narratives and look at the depiction of sustainability topics in fictional media from a content perspective. Based on that, we will review existing audience effects research on sustainability narratives. Finally, we discuss models that explain narrative impact from the perspective of narrative persuasion research. These theoretical approaches have the potential to explain how sustainability narratives unfold their effects but are yet hardly considered in existing empirical research.

1 Fictional Narratives About Environmental Sustainability

When discussing the function of narratives, it is important to precisely distinguish between narratives and fiction. Narratives are generally defined as representations of events that are arranged in temporal and causal order (Abbott 2008) as well as representations of people with their inner world, emotions, ideas, motivations and intentions (Fludernik 2010). "Fiction" refers to the pragmatic status of a story and, in a common definition, means that events and characters do not have a corresponding referent in the actual world or at least do not claim to have one (Schaeffer 2013). Audiences are well aware that fictional events and characters are invented; nonetheless, research demonstrates that the label fact or fiction does not change a story's impact (e.g., Green and Brock 2000). On the contrary, fictional films or books can have greater potential to change individuals' views, as they are expected to entertain and not educate or influence. In addition, fictional stories, compared to reality, condense long periods of time into plots with a beginning and an end; the plot guides the audience's interpretations and emotions, and unobtrusively conveys messages about the environment in a pointed, vivid and, above all, emotional way.

Compared to the large amount of research on factual media content about sustainability, studies investigating fictional media content are relatively rare (McGreavy and Lindenfeld 2014). Nonetheless, environmental and sustainability

narratives have become increasingly popular in literature, film and television in the last decades (Christensen et al. 2018; Seelig 2019). While in the past sustainability messages were often used as a "backdrop to the story being told" (Seelig 2019, p. 45), environment in fictional media content is more and more being used as the main topic. Today, there are numerous examples of environmental topics in fiction, such as climate change (Trexler and Johns-Putra 2011; Svoboda 2016), the Anthropocene (Milner et al. 2015), nature and landscape (Moore 2017; Lefebvre 2007) or eco-disasters (Murray and Heumann 2014). Sustainability is no longer a niche-topic in fictional entertainment.

In literature, modern environmental writing is often associated with the publication of *Silent Spring* (1962) by Rachel Carson (Christensen et al. 2018). While most parts of the book are non-fiction, the first chapter is a fictional dystopian short story about the loss of biodiversity and extinction of species due to toxins. Such apocalyptic and post-apocalyptic settings are the main topic in fictional environmental literature (Christensen et al. 2018).

Post-apocalyptic future worlds and extreme nature events are also often used in popular "cli-fi" films (climate change fiction, Milner et al. 2015; Svoboda 2016) like *The Day after Tomorrow* (2004), *Waterworld* (1995) or *Snowpiercer* (2013) (see Bulfin 2017; McGreavy and Lindenfeld 2014; Svoboda 2016). Despite the popularity of these films, rhetoric analyses criticize examples from this genre for their lack of human agency (Hammond and Ortega Breton 2014; Salvador and Norton 2011) and reduced awareness for positive sustainability values, such as shared responsibility for collective action (McGreavy and Lindenfeld 2014).

Apart from climate-change disaster narratives, biodiversity and wildlife are also popular topics in fictional movies, in particular family films, e.g. *The Jungle Book* (2016). Silk et al. (2019) attribute some effectiveness to these films to increase awareness about species and featured areas, but also risks, emphasizing that robust evidence is lacking.

To sum up, research on fictional media content is relatively rare. Most of the existing studies are qualitative discourse or rhetoric analyses (e.g. McGreavy and Lindenfeld, 2014; Hammond and Ortega Breton 2014) that often analyze single sources or authors (for an overview on climate change see Trexler and Johns-Putra 2011). In order to identify overall trends and structures how sustainability, human responsibility and pro-environmental behavior are discussed, future research conducting systematic comparisons is needed.

2 Research on Audience Effects of Fictional Stories and Environmental Sustainability

Studies investigating the actual effect of environmental fiction on the audience are remarkably rare and mainly concentrate on three topics, (1) climate change disaster movies, (2) nature preservation stories, and (3) entertainment-education narratives for sustainability behavior.

2.1 Audience Effects of Climate Change Disaster Narratives

The vast majority of research on audience effects of sustainability fiction deals with two climate change disaster films (Dudo et al. 2017; Sakellari, 2015), *The Day After Tomorrow* (2004) and *The Age of Stupid* (2009). Immediately upon its release, the Hollywood blockbuster *The Day After Tomorrow* was discussed as a potential source for climate change knowledge and engagement (Sakellari 2015). While the film was criticized for the liberties it took from scientific accuracy, the suspenseful plot and the visual effects made it a blockbuster (Leiserowitz 2004). Three weeks after the film was released, a quantitative survey (US-American representative sample) comparing viewers and non-viewers of the film was conducted (Leiserowitz, 2004). Leiserowitz (2004) found that film viewers expressed more concern and worry about global warming; they thought that phenomena due to global warming (e.g., floods, storm, food shortage) are more likely and had higher intentions to act against climate change (e.g., buy a fuel-efficient car, donate money). Two quantitative surveys (also conducted in the UK) studied the impact of *The Day After Tomorrow* on movie goers' attitudes about climate change (Balmford et al. 2004; Lowe et al. 2006). Balmford et al. (2004) asked movie goers in four English cinemas about their climate-related attitudes and concerns either before or after watching the film. Viewers asked after watching the film were more likely to invest hypothetical money in climate mitigation efforts than those asked before exposure. Other intentions, such as using public transport or employing low-energy bulbs, however, did not differ among the two groups. Interestingly, while expectations of temperature changes in the twenty-first century were not different between the groups, those who saw the film had more unrealistic expectations about the changes to be expected in the UK. The authors conclude that the film raised "public concern – but at the price of reducing public understanding" (Balmford et al., 2004, p. 1713). Lowe et al. (2006) conducted a quantitative survey (panel design, participants were asked twice: before and after

watching the film) of British cinema goers. Again, seeing the film slightly increased concern about climate change but also motivations to act against climate change. Remarkably, a generalization effect seems to have occurred, as concern about other environmental risks was also increased after exposure. In a similar quantitative panel-study in six German cinemas, no differences were found in the perception of climate change related danger for humanity before or after film exposure (Reusswig et al. 2004). However, after exposure, participants evaluated consequences of climate change presented in the film as more dangerous (sea level rise, storms and cold waves), while aspects like heat, drought or losses in biodiversity were not rated more dangerous after exposure. Interestingly, the perceived likelihood of climate change dropped after exposure. It seems that the very extreme setting of the film was perceived as less likely than the more abstract notion people had in mind when going into the film. A similar result was found in a quantitative experiment in the UK, in which participants (undergraduate students) were assigned to either watch the movie, read scientific materials or, in the control group, received no stimulus (Lowe 2006). People in the control group indicated that storms were more likely than people who saw the film or read the scientific materials. No differences were found between the groups with regard to the willingness to change behavior as well as the perception of threat to oneself, the local community and the UK; however, film goers had an increased perception of threat to "other countries" and "non-human nature". While these studies focus on immediate audience effects after exposure to *The Day after Tomorrow*, Hart and Leiserowitz (2009) investigated web traffic on six leading climate change websites as an indicator for climate change related information behavior. The study was combined with an analysis of the media coverage about *The Day After Tomorrow* (which served as a search term in the Lexis-Nexis Database). Around the release date of the film, media coverage of the film as well as web traffic on climate change sites increased. However, the study does not allow to distinguish effects of media coverage from effects of the film itself.

In conclusion, almost all of the studies about *The Day After Tomorrow* employed either correlational designs (comparing viewers and non-viewers in surveys) or surveys of a self-selected sample of movie goers before and after exposure. Lowe (2006) is an exception here, as participants were experimentally assigned to the conditions so that prior dispositions were irrelevant. Reusswig also confirms a "rather strong self-recruitment of better-educated and more engaged visitors of the film" (Reusswig 2005, p. 41/42). Under these circumstances, causal inferences are hard to make.

The second climate change movie that attracted a good deal of scholarly attention is the British drama-documentary *The Age of Stupid* (2009), which combines

a fictional narrative set in the year 2055 with documentary clips from the contemporary world about phenomena and consequences of climate change. In order to investigate its effects, Howell (2011) conducted a quantitative panel survey. UK movie goers were asked about their sustainability attitudes before watching the film, immediately after and 10 weeks after exposure. On the short term, the film increased concern about climate change, motivation to act, and the belief that individuals can do something about climate change. However, the effects dissolved after 10 weeks (and remained absent in an additional follow-up survey 15 months after the initial film exposure, Howell 2014a). Again, Howell (2011) used a self-selected sample, which reduces the participants to those who were interested in the film.

While *The Day After Tomorrow* and *The Age of Stupid* assume an explicitly partisan position about humans causing climate change through their behavior, a study by Bilandzic and Sukalla (2019) used the German film *Hell* (2011) that is set in a world devoid of resources because of excessive heat, while not disclosing the cause of this situation. In an experimental study varying narrative engagement (high versus low) and frame (non, temperature-rise, human responsibility) students of a German university watched the film in a classroom setting. In the low narrative engagement condition, math tasks were added to the film in order to reduce narrative engagement. The frame manipulation was implemented at the beginning of the film by presenting either additional textual information about the negative effects of human lifestyle on climate change or about temperature rise as a natural process or no additional information. The authors found that watching the film (compared to a no exposure group) raised the personal norm (the sense of personal obligation to act), and indirectly increased behavioral intentions to act against climate change. An introduction at the beginning of the film that claimed human responsibility for the hot and barren world had no additional effect; however, in the high narrative engagement condition, participants reported an increased feeling of guilt, which in turn raised intentions to act.

Similarly, Griffin (2017) also investigated the effects of natural disaster films that do not reference human impact on climate change (*NYC: Tornado Terror*, 2008; *F6 Twister*, 2012; *Lightning: Bolts of Destruction*, 2003). In contrast to the quantitative surveys and experiments discussed above, Griffin (2017) conducted qualitative focus groups. The participants watched one of the three experimental films at the beginning of the sessions. Overall, participants were skeptical about the extreme weather events shown in the movies due to unrealistic fictional elements and criticized the lack of possible mitigation or adaption behaviors. This lack of efficacy messages is also in line with the results from Brereton and Hong (2013) who asked 60 students about their expectations of environmental fiction

and non-fiction. While fiction and non-fiction movies were perceived as relatively similar, respondents emphasized that eco-fiction, in contrast to non-fictional films, often clearly describes environmental problems but misses distinct suggestions of how people should behave.

Not only films but also fictional books on climate change attracted scholarly attention.

Schneider-Mayerson (2018) conducted a qualitative survey about readers of climate change fiction and their attitudes. Individuals were included in the study if they had read one out of 19 works of environmental fiction about climate change and apocalyptic or post-apocalyptic scenarios. Similarly to viewers of climate-disaster films, readers of these books were more concerned about climate change. However, the study did not investigate whether increased concern had consequences for intentions or behaviors.

2.2 Audience Effects of Environmental Preservation Narratives

The second strand of research about audience effects of sustainability narratives concerns the protection of biodiversity and nature. A very successful genre in this category are animated family films, such as *Frozen 2* (2019), *Moana* (2016), *Finding Dory* (2016), *Rio* (2011), *Rio 2* (2014), *Madagascar* (2005) or *Madagascar 2* (2008). A Google trend analysis matching searches for the species featured in *Finding Dory*, *Rio* and *Madagascar* and their release dates shows that the films have the potential to increase interest in these species (Silk et al. 2019). However, since the study is limited to search results, it is not yet clear "whether this is positive or negative for the species or the ecosystem concerned" and how attitudes or behavior are influenced (Silk et al. 2019, p. 604).

Chen and Lin (2014) analyzed the persuasive effects of the animated family drama *Fly Away Home* (1996). In an experimental study conducted in Taiwan (contrasting college students who watched the film to non-viewers) transportation and identification emerged as relevant processes mediating the effect of the film on attitudes and intentions for nature conservation behavior. Attitudes towards nature preservation were also improved in an experimental study by Bahk (2010). Viewers who saw a slightly shortened version of the adventure drama *Medicine Man* were more favorable towards rainforest preservation measures than viewers who watched a thematically unrelated movie.

Attitudes towards animal protection were shown to be influenced by fictional movies as well: In a qualitative focus-group study, Newman (2015) showed that

awareness about animal mistreatment was slightly increased by the fictional movie *Bold Native* (2010) as well as the documentary *The Cove* (2009). The study used a pre-post design, discussing animal rights and protection directly before and after watching one of the two movies. However, only participants that already had preexisting positive attitudes and intentions towards animal protection intended to change their behavior after watching the movie. The author concludes that the film is "not enough to significantly change people's beliefs or behaviors towards animal use industries" (Newman, 2015, p. 78).

Nature protection for human well-being was also depicted in two episodes of *CSI: Crime Scene Investigation* (*CSI: Fracked* and *CSI: Miami, Bad Seed*), which were used as experimental stimulus by Cooper and Nisbet (2016). Both episodes emphasize the destructive potential of two current industrial developments (fracking and genetically modified organisms) for nature and human health. Participants were either assigned to one of the two CSI-episodes, news, or a documentary about one of the two topics. The series were able to evoke involvement, which increased negative affect as well as risk perceptions and, as a consequence, heightened supportive attitudes about governmental regulations.

Rather than using audiovisual fictional narratives placed in a real-world setting, Zwarun and Hall (2012) investigated the effects of the digital short film *Delivery* (2005) that emphasizes options of individuals to protect biodiversity in a fantasy world dominated by technology and destroyed by industrial pollution. In the experimental study, viewers (undergraduate students) of a control film on privacy protection perceived environmental problems as less serious than viewers of *Delivery*. However, no effects were visible for behavioral intentions to protect the environment.

Effects of fictional narratives about sustainable behavior are not only investigated in audiovisual media content but also in fictional literature about nature conservation. A study by Mobley, Vagias, and DeWard (2010) is concerned with the audience effects of three classic environmental books, Rachel Carson's *Silent Spring* (1962), Henry David Thoreau's *Walden* (1854) and Aldo Leopold's *A Sand County Almanac* (1949). In a quantitative web survey, reading these environmental books was a stronger predictor for environmentally responsible behavior than sociodemographic characteristics of the respondents, but not as strong as general environmental attitudes. While the correlation of reading environmental fiction and showing environmentally responsible behavior is plausible, it does not inform about the causal relationships: Interest in and concern about the environment may drive both reading and behavior.

Causal effects of reading environmental fiction on sustainability attitudes were investigated in an experimental study by Malecki et al. (2016). The authors

showed that reading a fictional story fragment about mistreatment of animals increased the concern about animal welfare compared to reading a control text. In a series of follow-up experiments, attitudes towards animals were more positive a week after participants read a fictional story about animal welfare (Malecki et al. 2018). This effect could not be sustained on the long term and no effects on actual behavior were visible (Malecki et al. 2018). Malecki et al. (2019) also demonstrated that a positive effect of fictional narratives about animals on attitudes is mediated by empathy for animals elicited by the narrative.

While the studies described so far contrast fictional stories to non-fictional media, control content or no content, Sangalang and Bloomfield (2018) analyzed effects of different *story types* advocating climate change protection behavior. The authors developed five short audiovisual narratives varying the dimensions time (past or present), reality (realistic or bizarre), emotion (happy or sad) and morality (moral or amoral). After viewing one of the five narratives, participants (US-American eligible voting adults) answered an online questionnaire. Perceived effectiveness of the story was rated highest for a story situated in the past, in a realistic setting and with clear moral values. However, the stories created do not only differ in story type, but also in content since they refer to various types of environmental dangers, protection behaviors, and efficacy perceptions, which confounds story characteristics and content.

2.3 Audience Effects of Entertainment-Education Sustainability Narratives

A third line of research refers to sustainable media content in the field of entertainment-education that strategically integrates educational and entertaining content (Lubjuhn and Pratt 2009). Various radio series worldwide cover topics such as air pollution, waste reduction, organic farming, conservation of biodiversity or water management (Reinermann et al. 2014). One of the most often cited examples is *Yeh Kahan Aa Gaye Hum* (*Where have we arrived?*), an Indian radio serial that addressed environmental problems in 52 episodes. Observations and focus group discussions showed that the series engaged members of the local radio listeners' club to organize discussion rounds, social campaigns and environmental activities, such as planting trees (Singhal, Pant, and Rogers 2000).

Behavioral effects of an entertainment-education radio series were also investigated in Vietnam. In a quantitative pre-post-test-experimental design, farmers that listened to a radio soap opera about the use of toxins and rice pest management

used less biocides and toxins on their fields and also showed more critical attitudes regarding pesticides compared to farmers that did not listen to the radio soap (Heong et al. 2008).

These two examples show that fictional narratives adressing regional needs of a specific audience and explaining possibilities for human action may be effective tools for increasing sustainable behavior.

2.4   Summary: Audience Effects of Sustainability Narratives

Existing studies on audience effects show that fictional narratives about specific sustainability topics have the potential to influence readers or viewers attitudes or behavior. However, this research is very heterogeneous regarding the (1) narratives used, (2) the methodology of the studies as well as (3) the type of effects investigated.

(1) Regarding the narratives used, most of the studies investigated blockbuster movies while others used feature films or short films. Apart from this broad category, the narratives differ in various dimensions as well, e.g. in quality, specific theme, genre, integration of human responsibility and human action, values and norms addressed, or primary intention (e.g. entertainment versus education). These dimensions are the key to understand what elements of sustainability stories are effective in changing existing attitudes, knowledge and behavior and to distinguish between good and bad stories. In addition, using several stories to compare effects along predefined content dimensions promises to increase stability of results and will enable researchers to make recommendations for sustainability communication on firmer empirical grounds.

2) Regarding methodology, most of the studies are quantitative surveys or experiments. While some of the surveys directly integrated reading or viewing a story, others included general reading or viewing situations in the past. For surveys in particular, causal inferences are limited, given the self-selected samples and potential influences of third variables, such as pre-existing attitudes or ideological worldviews. Such causal relationships are investigated in experimental studies. However, existing experiments mostly compare viewers or readers of a sustainability-related narrative to a non-exposure control group or a topic-unrelated control group. Again, it is not yet clear what characteristics of a movie, series or book are responsible for the persuasive effects. In future studies, experimental designs are needed that allow deeper insight into persuasive elements and structures of sustainability narratives. Furthermore, studies should integrate replications across different narratives to be able to generalize effects.

3) In terms of effect types, most studies investigated direct effects of exposure to sustainability narratives. While climate change disaster narratives mainly showed effects on the concern about climate change, nature-protection narratives mostly had effects on attitudes and behavioral intentions. Less is known about mechanisms that are responsible for these effects, conditioning and limiting them. For example, only a few studies have looked at the role of narrative engagement, identification with characters, or empathy (e.g., Bilandzic and Sukalla 2019; Chen and Lin 2014; Malecki et al. 2019). However, such mechanisms ultimately inform what type of narrative will be influential and how audiences need to engage in order to change sustainability behavior. We will explore the role of these processes in narrative persuasion by reviewing existing models of narrative persuasion in the following section.

3 Models and Mechanisms of Narrative Effects of Sustainability Stories

For a deeper understanding of the effects of fictional narratives on environmental issues it is important to consider the processes responsible for an effect on knowledge, attitudes and behavior. Several models of narrative impact exist (Green et al. 2019; Bilandzic and Busselle 2013) that, however, have hardly been integrated in the research on environmental narratives.

3.1 The Transportation Imagery Model

The Transportation Imagery Model by Green and Brock (2000) assumes that the intensive emotional and cognitive experience of a narrative – a phenomenon called transportation – is responsible for changes in attitudes and beliefs. Focusing one's mental resources on the narrative while being transported into the narrative leaves little capacity to be critical about the story's assertions and engage in counterarguing. The reduction in counterarguing in turn entails higher levels of persuasion. Research shows that transportation indeed facilitates persuasion (van Laer et al. 2014; Tukachinsky and Tokunaga 2012). In addition, narratives are able to evoke vivid mental images in a reader – of the events, the characters and the story world. This imagined picture is quite similar to real-life experiences, rendering the narrative into a powerful impression. The role of imagery is less well researched; the theoretical idea seems better equipped for texts: in texts, imagery needs to be actively created in the reader's mind, while in audio-visual

narratives the images are provided by the narrative itself and "only" need to be processed, not generated. Considering the powerful images used in many climate change films, there is clearly need to delineate the role of imagery. For example, seeing familiar buildings and landmarks of New York destroyed and covered by ice in *The Day After Tomorrow* (2004) offers powerful images of what climate change in its extremes may entail – not in other places and the future, but *at home* and *now*.

3.2   The Model of Narrative Comprehension and Engagement

The Model of Narrative Comprehension and Engagement by Busselle and Bilandzic (2008) suggests a close connection between the way in which a reader or viewer processes a narrative and how they are influenced by it. In order to understand a narrative, readers or viewers extract mental representations from the narrative: 1) the situation model that contains the events and causal connections between them, 2) character models that retain all important features about characters (such as appearance, motivations, feelings) and 3) the story world model which contains the setting in time and space of the narrative world, its specific rules and logic. Narrative engagement, in this model, emerges when the process of constructing mental models of the story proceeds smoothly and without disruption. In this case, processing the story is easy and effortless, and the result is a flow experience, expressed as narrative engagement with its intense focus on the story and masking out the actual world. Audience members are generally not disturbed by deviations of the story from the real world, as long as the story world model explains the deviation and acknowledges it as a legitimate feature of the story world. For example, the story worlds in post-apocalyptic films such as *The Day After Tomorrow* (2004) or *Snowpiercer* (2013) explain the deviation in the climate with a catastrophic event (melting polar ice caps and a geoengineering experiment to counteract climate change, respectively); other films such as *Hell* (2011) or *The Book of Eli* (2010) do not give a concrete reason for the hot and barren world, but present the changed climate as the status quo in the narrative, thus giving a plausible frame for the breakdown of civilization and the scarcity of resources. Busselle and Bilandzic (2008) argue that consistency within the narrative ("narrative realism") is more important than correspondence with the actual world ("external realism"). This also explains why powerful and influential fictional films may have a setting that is radically different from the actual world and still allow for narrative engagement. One of the striking results from

research about the *The Day After Tomorrow* (2004) may be explained using this model: viewing the film lowers how likely viewers estimate drastic climate changes. What was shown in the film was perfectly in line with the story presented (narrative realism); but if asked how likely such events are for our actual world, people may have judged the events to be too far removed from the actual world (external realism). The Model of Narrative Comprehension and Engagement also explains how people deal with fictionality: It suggests that viewers know that a narrative is fictional, but that this knowledge is tacit and does not disturb processing nor the effects of the story, but can be activated when needed (Busselle and Bilandzic 2008).

3.3 Extended Elaboration Likelihood Model (E-ELM)

The Extended Elaboration Likelihood Model (E-ELM) was put forward by Slater and Rouner (2002) in an entertainment-education context and builds on the Elaboration Likelihood Model (ELM) by Petty and Cacioppo (1986). For the application in a narrative context, the E-ELM uses the reader/viewer experience of absorption (corresponding to transportation or narrative engagement) rather than involvement (as in the ELM) to explain how intensive processing of the narrative leads to better elaboration and retention of the message. Importantly, one of the drivers of effects in the model is how visible the persuasive intent is for the audience, as the perception of persuasive intent may trigger reactance (i.e. resistance to persuasion). This is particularly important for theorizing effects of fictional narratives, as they usually do not have or do not show persuasive intent.

3.4 Vicarious Experience and Simulation

The models presented so far explain why fictionality and unrealism do not represent obstacles to persuasion (Busselle and Bilandzic 2008). Additionally, a reduction in counterarguing, an intensive narrative experience (Green and Brock 2000), an elaboration of the message as well as an unobtrusive persuasive intent in the message facilitate persuasion (Slater and Rouner 2002). The persuasion process envisaged in these models however is rather attuned to rhetoric arguments (such as accepting information delivered by the story). However, many fictional narratives on environmental issues do not contain arguments nor do they have an explicit persuasive intent. In such formats, it is the "exploration of the future subjectivities and societies that may result from radical ecological changes" (Weik

von Mossner [2012], p. 42) that is *shown* and not *argued*. Simply putting on screen what might be expected in the future, showing how humans struggle in a possible world lacking of resources, suffering a changed climate or extreme pollution, as well as the emotional reactions this elicits in the audience, is what makes such formats powerful (Weik von Mossner [2017]). Bilandzic and Sukalla ([2019]) argue that "(c)ounterarguing fails as a mechanism precisely because one cannot argue against claims that are not made in the film" (p. 1074). Bilandzic and Sukalla ([2019]) go on to suggest that the relevant mechanism is 'vicarious experience': By living in the fictional narrative world for a period of time, people experience an alternative reality which is much harder and harsher to live in. When audiences are engaged with the narrative and identify with characters, the fictional experience becomes even more vivid and similar to real-life experience. Vicarious experience may lead viewers to make their own conclusions about right and wrong behavior. Weik von Mossner ([2012]) employs the fitting metaphor of viewers "visceraliz[ing] speculative future worlds" (p. 42), which goes beyond vicarious experiences by stressing the overall appropriation of an experience which is not (yet) possible in the actual world. De Roo ([2019]) also emphasizes the importance of the immersed experience of the narrative world: The cinematic imagination of the natural elements ("elemental imagination") can "resensitize the spectator, reorient and broaden her or his awareness so as to include the elemental world's vulnerable qualities and constitution" (p. 59/60). Mar and Oatley ([2008]) describe a similar process for experiencing social situations and interactions in narratives: They assume that consuming narratives is simulating the plot and the implicated emotions on the consumers' mental systems, with the results that the experience is life-like and feels real and relevant.

3.5 Summary: Models and Mechanisms of Narrative Effects of Sustainability Stories

Overall, models of narrative persuasion help to explain how narratives about climate change, environmental protection or animal welfare shape our understanding of these complex environmental processes and influence readers' and viewers' attitudes, beliefs and behaviors. The few existing studies which integrate narrative engagement processes still show their empirical relevance for sustainability research. Future research should pay more attention to these mediating processes in order to answer the question what elements of a story influence specific engagement processes and in consequence affect audiences' attitudes and behaviors.

Apart from the limited integration of narrative persuasion processes, another caveat in researching the effects of sustainability narratives is that most research does not integrate existing models of the environmental decision process. Environmental decision and behavioral models (for an overview see Klöckner 2013) suggest that intermediary steps such as perceptions of responsibility or norms are important for forming the actual behavior. After all, it is not clear whether narratives really directly impact attitudes and behaviors, or rather one of the earlier (and easier-to-change) steps. For example, Bilandzic and Sukalla (2019) only found an indirect effect of a cli-fi film on behavioral intentions through the personal norm. Howell (2014b), in a similar vein, argues that fictional films build on cognitive-affective processes of change and should affect early stages rather than behavior. Mechanisms of narrative engagement and environmental decision processes should not be viewed as separate types of processes and effects but rather be integrated to explain how readers and viewers process sustainability narratives.

4   Conclusions

Fictional narratives about sustainability topics have become more popular in the last decade. Considering their increasing amount and popularity, they have garnered relatively little scholarly attention. This is surprising, since existing results already show that fictional sustainability narratives are a promising way to increase concern about environmental problems, pro-environmental attitudes as well as environmentally friendly behavior.

Empirical studies often only analyze direct effects on sustainability attitudes and behaviors. Studies investigating specific narrative elements across different films or books, the mediating processes from narrative persuasion research as well as environmental behavior research are scarce. Apart from these limitations, the boundaries of fictional effects are unclear. While various studies were able to show that climate change disaster films increased concern about climate change, results on behavioral consequences are rare and heterogeneous (Balmford et al., 2004; Lowe, 2006; Lowe et al. 2006). Possibly, films may have less opportunities to clearly convey options for individual action (Hammond & Ortega Breton, 2014; Salvador & Norton, 2011). Fictional narratives that focus on individuals' responsibility and behavioral actions may be more effective in increasing environmental behavior than narratives only showing the severe consequences of climate change.

In this vein, stories may also not be suitable for all types of audiences or all types of topics. Some audience members may have stronger preferences for stories

in general or have greater ease in engaging in stories (Bilandzic et al. 2019). Some story topics may be suitable for narrative presentation (e.g., climate change) but others may not (e.g., bee extinction). In a similar way, some narratives may foster individual action, while others strengthen policy support and activism.

Finally, it needs to be noted that fictional stories may support climate action and in that sense work for the greater good, but stories may also support anti-environmental, or skeptical positions, such as Michael Crichton's bestselling thriller *State of Fear* (2004), which openly promotes climate-skeptical positions, albeit in the usual well-written, gripping way. The same power that promotes positive, pro-environmental views, will promote negative, anti-environmental positions as well.

Existing research on fictional sustainability narratives shows the potential of this format to reach audiences. They may have particular potential for accessing audiences with contrarian pre-existing attitudes or little interest in the topic. Possibly, different audiences may "need" different stories at different points in time. Climate skeptics may need a story that debunks the climate conspiracy; unconcerned teens may need a story to create environmental awareness; already concerned citizens may need positive role models in a story to engage in activism. Specifying the interactions between narrative characteristics, audience engagement and decision processes seems to be a promising endeavor for future research and may represent an important complement for research on factual media content.

5   Reflective Questions

1. What is the difference between fiction and narrative?
2. Under what circumstances will audiences accept information and assertions from fictional sustainability narratives?
3. What is the potential of fictional narratives to engage people for sustainability behavior?
4. What are the ethical limitations of using fictional sustainability narratives for environmental communication?
5. Do producers of fiction have the responsibility to keep their facts in line with scientific evidence?
6. What are the differences of narrative effects for different sustainability topics?
7. Why are persuasive effects of sustainability narratives often limited?

References

Abbott HP (2008) The Cambridge introduction to narrative, 2nd edn. Cambridge University Press, Cambridge

Bahk CM (2010) Environmental education through narrative films: impact of medicine man on attitudes toward forest preservation. The Journal of Environmental Education 42(1):1–13. https://doi.org/10.1080/00958960903479811

Balmford A, Manica A, Airey L, Birkin L, Oliver A, Schleicher J (2004) Hollywood, climate change, and the public. Science 305(September):1713b–1713b. https://doi.org/10.1126/science.305.5691.1713b

Bilandzic H, Busselle RW (2013) Narrative persuasion. In: Dillard JP, Shen L (eds) The Sage handbook of persuasion. Developments in theory and practice. Sage, Los Angeles, pp 200–219

Bilandzic H, Sukalla F (2019) The role of fictional film exposure and narrative engagement for personal norms, guilt and intentions to protect the climate. Environmental Communication 13:1069–1086. https://doi.org/10.1080/17524032.2019.1575259

Bilandzic H, Sukalla F, Schnell C, Hastall MR, Busselle RW (2019) The narrative engageability scale: A multidimensional trait measure for the propensity to become engaged in a story. International Journal of Communication 13:801–832

Braddock K, Dillard JP (2016) Meta-analytic evidence for the persuasive effect of narratives on beliefs, attitudes, intentions, and behaviors. Communication Monographs 83(4):446–467. https://doi.org/10.1080/03637751.2015.1128555

Brereton P, Hong C-P 2013 Audience responses to environmental fiction and non-fiction films. Interactions: Studies in Communication & Culture 4(2): 171–199. https://doi.org/10.1386/iscc.4.2.171_1

Bulfin A (2017) Popular culture and the 'new human condition': Catastrophe narratives and climate change. Global Planet Change 156(September):140–146. https://doi.org/10.1016/j.gloplacha.2017.03.002

Busselle R, Bilandzic H (2008) Fictionality and perceived realism in experiencing stories: A model of narrative comprehension and engagement. Communication Theory 18(May):255–280. https://doi.org/10.1111/j.1468-2885.2008.00322.x

Chen T, Lin J-S (2014) Entertainment-education of altruistic behaviors: An empirical study of the effects of the narrative persuasion of a nature conservation film. Chinese Journal of Communication 7(4):373–388. https://doi.org/10.1080/17544750.2014.946430

Christensen M, Aberg A, Lidström S, Larsen K (2018) Environmental themes in popular narratives. Environmental Communication 12(1):1–6. https://doi.org/10.1018/17524032.2018.1421802

Cooper KE, Nisbet EC (2016) Green narratives: how affective responses to media messages influence risk perceptions and policy preferences about environmental hazards. Science Communication 38(5):626–654. https://doi.org/10.1177/1075547016666843

de Roo L (2019) Elemental imagination and film experience climate change and the cinematic ethics of immersive filmworlds. Projections-The Journal for Movies and Mind 13(2):58–79. https://doi.org/10.3167/proj.2019.130204

Fludernik M (2010) Towards a 'natural' narratology, 2nd edn. Routledge, London

Green M, Bilandzic H, Fitzgerald K, Paravati E 2019 Narrative effects. In: Oliver MB, Raney AA, Bryant J, Fourth (ed.), Media effects. Advances in theory and research, pp 130–45. Routledge, New York

Green MC, Brock TC (2000) The role of transportation in the persuasiveness of public narratives. J Pers Soc Psychol 79(5):701–721. https://doi.org/10.1037/0022-3514.79.5.701

Griffin LN (2017) Audience reactions to climate change and science in disaster ci-fi films: A qualitative analysis. Journal of Public Interest Communications 1(2):133–152

Hammond P, Ortega Breton H (2014) Bridging the political deficit: Loss, mortality, and agency in films addressing climate change. Communication, Culture and Critique 7(3):303–319

Hart PS, Leiserowitz A (2009) Finding the teachable moment: an analysis of information-seeking behavior on global warming related websites during the release of the day after tomorrow. Environmental Communication-A Journal of Nature and Culture 3(3):355–366. https://doi.org/10.1080/17524030903265823

Heong KL, Escalada MM, Huan NH, Ky Ba VH, Quynh PV, Thiet LV, Chien HV (2008) Entertainment-education and rice pest management: a radio soap opera in Vietnam. Crop Protection 27(10):1392–1397. https://doi.org/10.1016/j.cropro.2008.05.010

Howell RA (2011) Lights, camera … action? Altered attitudes and behaviour in response to the climate change film The Age of Stupid. Global Environmental Change-Human and Policy Dimensions 21(1):177–187. https://doi.org/10.1016/j.gloenvcha.2010.09.004

Howell RA (2014a) Investigating the long-term impacts of climate change communication on individuals' attitutdes and behavior. Environment and Behavior 46(1):70–101

Howell RA (2014b) Using the transtheoretical model of behavioural change to understand the processes through which climate change films might encourage mitigation action. Int J Sustain Dev 17(2):137–159. https://doi.org/10.1504/IJSD.2014.061778

Klöckner CA (2013) A comprehensive model of the psychology of environmental behaviour - a meta-analysis. Global Environmental Change 23(5):1028–1038

Lefebvre M (2007) Landscape and film. Routledge. https://doi.org/10.4324/9780203959404

Leiserowitz A (2004) Before and after the day after tomorrow - a U.S. study of climate change risk perception. Environment 46:22–37

Lowe T 2006 Is this climate porn? How does climate change communication affect our perceptions and behaviour? Tyndall Centre for Climate Change Research, Working Paper 98. https://dcms2.lwec.ulcc.ac.uk/sites/default/files/wp98.pdf

Lowe T, Brown K, Dessai S, Franca Doria M, Haynes K, Vincent K (2006) Does tomorrow ever come? Disaster narrative and public perceptions of climate change. Public Understanding of Science, 4:435–457

Lubjuhn S, Pratt N 2009 Media communication strategies for climate-friendly lifestyles—addressing middle- and lower-class consumers for social-cultural change via entertainment-education. IOP Conference Series: Earth and Environmental Science 8. https://doi.org/10.1088/1755-1315/8/1/012009.

Malecki W, Pawlowski B, Cienski M, Sorokowski P 2018 Can fiction make us kinder to other species? The impact of fiction on pro-animal attitudes and behavior. Poetics 66(February):54–63. https://doi.org/10.10164/j.poetic.2018.02.004

Malecki W, Pawlowski B, Sorokowski P (2016) Literary fiction influences attitudes toward animal welfare. PLoS ONE 11(12):e0168695. https://doi.org/10.1371/journal.pone.0168695

Malecki W, Pawlowski B, Sorokowski P, Oleszkiewicz A (2019) Feeling for textual animals: Narrative empathy across species lines. Poetics 74(June):101334. https://doi.org/10.1016/j.poetic.2018.11.003

Mar RA, Oatley K (2008) The function of fiction is the abstraction and simulation of social experience. Perspectives on Psychological Science 3(3):173–192. https://doi.org/10.1111/j.1745-6924.2008.00073.x

McGreavy B, Lindenfeld L (2014) Entertaining our way to engagement? Climate change films and sustainable development values. Journal of Sustainable Development 17(2):123–136. https://doi.org/10.1504/IJSD.2014.061766

Milner A, Burgmann J, Davidson R, Cousin S (2015) Ice, fire and flood: Science fiction and the anthropocene. Thesis Eleven 131(December):12–27. https://doi.org/10.1177/0725513615592993

Mobley C, Vagias WM, DeWard SL (2010) Exploring additional determinants of environmentally responsible behavior: The influence of environmental literature and environmental attitudes. Environment and Behavior 42(4):420–447. https://doi.org/10.1177/0013916508325002

Moore EE 2017 Landscape and the environment in Hollywood film: The green machine. Palgrave Macmillan.

Murray RL, Heumann JK (2014) Film and everyday eco-disasters. University of Nebraska Press, Lincoln

Newman L (2015) The effect of the cove and bold native on audience attitudes towards animals. Animal Studies Journal 4(1):77–98

Petty RE, Cacioppo JT (1986) Communication and persuasion: Central and peripheral routes to attitude change. Springer-Verlag, New York

Reinermann J-L, Lubjuhn S, Bouman M, Singhal A (2014) Entertainment-education: Storytelling for the greater, greener good. Journal of Sustainable Development 17(2):176–191

Reusswig F (2005) The international impact of the day after tomorrow. Environment 47:41–43

Reusswig F, Schwarzkopf J, Pohlenz P 2004. The climate blockbuster 'The Day After Tomorrow' and its impact on the German cinema public. Nr 92. Potsdam Institute for Climate Impact Research (PIK). https://www.pik-potsdam.de/research/publications/pikreports/.files/pr92.pdf

Sakellari M (2015) Cinematic climate change, a promising perspective on climate change communication. Public Understanding of Science 24(October):827–841. https://doi.org/10.1177/0963662514537028

Salvador M, Norton T (2011) The flood myth in the age of global climate change. Environmental Communication 5(March):45–61. https://doi.org/10.1080/17524032.2010.544749

Sangalang A, Bloomfield EF (2018) Mother goose and mother nature: designing stories to communicate information about climate change. Communication Studies 69(5):583–604. https://doi.org/10.1080/10510974.2018.1489872

Schaeffer J-M 2013 Fictional vs. factual narration. In H Peter et al. (ed.) *The living handbook of narratology*. Hamburg University, Hamburg. https://www.lhn.uni-hamburg.de/article/fictional-vs-factual-narration. Accessed 12 Feb 2019

Schneider-Mayerson M (2018) The influence of climate fiction. An empirical survey of readers. Environmental Humanities 10(2):473–500. https://doi.org/10.1215/22011919-7156848

Seelig M (2019) Popularizing the environment in modern media. Communication Review 22(1):45–83. https://doi.org/10.1080/10714421.2019.1569449

Silk MJ, Crowley SL, Woodhead AJ, Nuno A (2019) Considering connections between Hollywood and biodiversity conservation. Conserv Biol 32(3):597–606. https://doi.org/10.1111/cobi.13030

Singhal A, Pant S, Rogers EM (2000) Environment activism through an entertainment-education radio soap opera in India. In: Oepen M, Hamacher W (eds) Communicating the environment: environmental communication for sustainable development. Peter Lang, Frankfurt, pp 176–183

Slater MD, Rouner D (2002) Entertainment-education and elaboration likelihood: Understanding the processing of narrative persuasion. Communication Theory 12(2):173–191

Svoboda M (2016) Cli-Fi on the screen(s): Patterns in the representations of climate change in fictional films. Wiley Interdisciplinary Reviews-Climate Change 7(1):43–64. https://doi.org/10.1002/wcc.381

Trexler A, Johns-Putra A (2011) Climate change in literature and literary criticism. Wiley Interdisciplinary Reviews: Climate Change 2(March):185–200. https://doi.org/10.1002/wcc.105

Tukachinsky R, Tokunaga RS (2012) The effects of engagement with entertainment. Communication Yearbook 37:287–321. https://doi.org/10.1080/23808985.2013.11679153

van Laer T, de Ruyter K, Visconti LM, Wetzels M (2014) The extended transportation-imagery model: A meta-analysis of the antecedents and consequences of consumers' narrative transportation. Journal of Consumer Research 40(5):797–817. https://doi.org/10.1086/673383

Weik von Mossner A 2012 Visceralizing ecocide in science fiction films: the road and hell. Ecozon@: Eur J Lit Cult Environ 3(2):42–56

Weik von Mossner A 2017 *Affective ecologies: empathy, emotion, and environmental narrative*. Ohio State University Press

Zwarun L, Hall A (2012) Narrative persuasion, transportation, and the role of need for cognition in online viewing of fantastical films. Media Psychology 15(3):327–355. https://doi.org/10.1080/15213269.2012.700592