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REVIEW AND SYNTHESIS

Nature on screen: The implications of visual media for human–nature relationships

The full story: Understanding how films affect environmental change through the lens of narrative persuasion

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Email: chris.mccormack@rememberthewild.org.au**Handling Editor:** Sarah Crowley**Abstract**

1. Researchers in conservation fields have recently highlighted the potential for visual storytelling to convey environmental messages to large audiences. However, an effective model for how such narratives can produce environmental outcomes, such as human–nature connection and pro-environmental behaviour (PEB), has not yet been developed.
2. Substantial evidence now suggests that narrative is an effective means of changing beliefs, attitudes and behaviours. This effect is demonstrated in diverse disciplines and understood within the theoretical frameworks of narrative persuasion.
3. We propose a conceptual framework for understanding the impacts of environmental films on environmental behaviours, and connection with nature. Linking insights from the narrative persuasion field with those of conservation psychology, we identify three promising pathways through which environmental films might influence their audiences: (a) reduced resistance to environmental messages, (b) interactions with audience identity and (c) meaningful media experiences.
4. This analysis raises key questions and illuminates priority areas for future research, with an aim to complement and extend existing calls to better appreciate the role of film in addressing environmental problems. Research moving forward should focus on understanding the role environmental films can play in connecting people with nature, promoting PEB and the relationship between the two. Specifically, more attention should be paid to the role of deictic shift in encouraging environmental outcomes, the relation between audiences and characters and the power for film to support self-expansion.

KEYWORDS

environmental communication, environmental films, extinction of experience, narrative persuasion, nature connection, nature documentary

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1 | INTRODUCTION

Many parts of the world have experienced a pattern of estrangement from nature, resulting in attitudes and behaviours implicated in the current environmental crisis (Pyle, 2003; Soga & Gaston, 2016). This 'cycle of loss and disaffection' has been dubbed the extinction of experience and, while not uniform across cultures, has been proposed as a fundamental driver of humanity's increasingly destructive effect on global environments (Miller, 2005; Pyle, 1993, 2003; Soga & Gaston, 2016). Key to this phenomenon is a loss of orientation towards the natural world (Soga & Gaston, 2016), something environmental psychologists have conceptualised as 'connection to (or with) nature' (Cartwright & Mitten, 2018; Tam, 2013a). Here, we use the term human–nature connection (HNC) as proposed by Ives et al. (2017), to refer to a broad range of terms and operationalisations regarding people's relationship towards the natural world, such as connectedness with nature (Mayer & Frantz, 2004), love and care for nature (Perkins, 2010) and nature relatedness (Nisbet et al., 2009). Mounting evidence demonstrates a link between HNC and the likelihood that people will engage in behaviours perceived to be beneficial to the environment, termed pro-environmental behaviour (PEB; Mackay & Schmitt, 2019; Whitburn et al., 2019), revealing an urgent need to understand what mechanisms might inspire deeper connections with nature and catalyse necessary cultural change.

Researchers in conservation are increasingly recognising the potential of film as a pathway for achieving widespread environmental outcomes (Jones et al., 2019; Silk et al., 2018). Films with strong environmental themes or subjects may help to raise awareness of conservation issues (Fernández-Bellon & Kane, 2019; Hofman & Hughes, 2018), trigger empathy and concern for threatened species (O'Bryhim & Parsons, 2015; Pearson et al., 2011) and motivate behaviour change (Shreedhar & Mourato, 2019). This potential, combined with the growth of streaming platforms, proliferation of short films on social media, and the democratisation of film-making, makes visual storytelling a promising candidate for encouraging HNC and PEB. However, while this potential has been acknowledged (Jones et al., 2019), an effective model for understanding *how* such films might persuade audiences to feel and act for the environment has not yet been developed. Furthermore, the vast majority of existing research has overlooked a valuable body of knowledge in the narrative persuasion field. The aim of this review is therefore to identify promising pathways through which environmental films may influence audience HNC and PEB, and thus provide direction for future research in this field along with preliminary guidance on how films might be designed to generate such change.

2 | ENVIRONMENTAL FILMS AND PERSUASION

Identifying effective ways of promoting PEB has become a central issue of the environmental social sciences. The various models

put forward to try and address this issue, for example the theory of planned behaviour (Ajzen, 1991) and norm-activation theory (Harland et al., 2007), speak to the complexity of human attitudes and behaviour. Acknowledging the role of drivers such as social norms, self-efficacy and direct experiences, we argue that vicarious experiences in the form of environmental films may be key to influencing PEB, particularly through the cultivation of various dimensions of HNC. The increasing prevalence of technological experiences of nature raises important questions for environmental conservation, as people come to understand the natural world more and more through mediated interactions (Truong & Clayton, 2020). Some scholars consider this rise in the use of electronic media as a key contributor to the extinction of experience (Imai et al., 2019; Miller, 2005), which may one reason for the lack of research into the beneficial potential of environmental films. For example, Pergams and Zaradic (2006) correlated a 16-year decline in the use of US national parks with an increased use in video games, home movies, theatre attendance and the internet. Notably, this research was carried out before the emergence of social media and the so-called 'web 2.0'. A more recent study by Larson et al. (2018) found screen time to be generally higher for rural youth than time spent outdoors, with the two pursuits inversely related.

Yet, work by Soga et al. (2018) found no such relationship between screen time and time spent in nature for children in Japan. Indeed, some scholars have suggested that electronic media may present an opportunity to improve human–nature relationships through its greater propensity for pro-environmental communication (Klein & Hilbig, 2018; Mayer & Bruehlman-senecal, 2009). Clayton et al. (2017) claim that while some experiences of nature may be going extinct, others are 'being transformed along with a changing society'. People now have access to live streams of wildlife, virtual reality experiences and—notably—more stories of the natural world, than ever before. 'Rather than dismissing these forms as inauthentic', Clayton et al. (2017) argue that we need to understand how they influence the way people think, feel and act towards nature. We agree this is an important area of study and contend that narratives—with their capacity for generating and sharing meaning—should not be treated as one with the mediums in which they are published. Conflating all uses and experiences of modern media as a problem risks neglecting the unique power of stories to remedy contemporary issues. We argue that environmental films provide for various dimensions of experiences of nature. For example, in accordance with Clayton et al. (2017), environmental films can be understood to allow for self-directed experiences of nature that promote appreciation and are integrated more easily into daily life. Thus, we see merit in examining the ways in which environmental films influence modern audiences and their attitudes and behaviours towards the natural world.

Here, we refer to *environmental films* as those which have the natural world among their primary subjects or themes: be it in relation to plants, animals, landscapes or other natural phenomena (e.g. climate). Such films may be fiction or non-fiction, involve human or non-human protagonists and need not be set on planet earth. They

may include major motion pictures, natural history documentaries and short-form content produced for online audiences. Generally, they move beyond the world of humans and provide audiences access to environments and life-forms they might not otherwise encounter as, for example, in the BBC's *Planet Earth* (2006) series. We argue that all environmental films, regardless of format, have in common a degree of narrativity. That is to say, they are all stories (or contain story elements) and so comprise a 'cohesive, causally linked sequence of events that takes place in a dynamic world subject to conflict, transformation and resolution through non-habitual, purposeful actions performed by characters' (Braddock & Dillard, 2016, p. 447). Finally, while the motives behind the production of environmental films can vary, many appear intended to persuade audiences to think or act differently with regard to some aspect of the environment. This appears particularly true for those in the documentary genre, though commercial drivers can still be strong in these ventures (Horak, 2006).

Research into the efficacy of environmental films to affect change is surprisingly scant; however, those studies that do exist have demonstrated some promising—if mixed—results. Much existing research is dedicated to films on climate change, with researchers investigating knowledge (Nolan, 2010), concern (Franzen & Mader, 2020; Howell, 2011), efficacy beliefs (Bieniek-Tobasco et al., 2019) and behaviour (Jacobsen, 2011). For example, Nolan (2010) found that watching Al Gore's *An Inconvenient Truth* increased audience knowledge about climate change as well as concern for its impact. More recently, Franzen and Mader (2020) found that films can increase environmental concern even in climate sceptics. Dunn et al. (2020) tested the effects of *Blue Planet II* (2017) on plastic use behaviour but, despite anecdotal reports that the film had influenced the public's plastic consumption and informed government policy, found no effect on the behaviour of study participants. In contrast, Hofman and Hughes (2018) found that study participants who watched a film on the Great Barrier Reef were more likely to engage in target behaviours if provided with ongoing support such as prompts and links provided through a dedicated Facebook page. Research into the impact of films on HNC is far more limited in scope. We could find only two studies which have investigated the important potential for environmental films to influence audience HNC (Arendt & Matthes, 2016; Janpol & Dilts, 2016). Both measured implicit connectedness with nature using the implicit associations test as adapted by Schultz et al. (2004), as well as PEB in the form of donations, but found conflicting results. Thus, while it appears that environmental films may influence audience knowledge, attitudes and beliefs, it remains to be seen if and how environmental films can influence HNC and motivate behaviour change.

While a growing number of researchers are interested in understanding if environmental films can persuade, the majority of research has neglected the key mechanisms of persuasion. Often, research has compared the effects of environmental films to other films or media, rather than investigated the persuasive mechanisms of the films themselves (e.g. Arendt & Matthes, 2016; Pearson et al., 2011). A particularly relevant explanatory framework is

provided by the field of narrative persuasion which seeks to understand the uniquely influential elements of storytelling. For several decades, the focus of persuasion research has been on rhetoric; however, researchers have been increasingly attending to the persuasive role of poetics. Thanks in part to the earlier work of Fisher (1984), the so-called 'narrative-turn' in psychology and communications research has developed several theories and evidence for how and why stories influence people. Examples of this approach include the transportation-imagery model (Green & Brock, 2002; van Laer et al., 2014), extended elaboration likelihood model (Slater & Rouner, 2002) and model of narrative comprehension and engagement (Busselle & Bilandzic, 2008). However, as Moyer-Gusé et al. (2019, p. 424) point out: 'while there is a large body of research on environmental/science communication ... relatively little of this research has been done through the lens of narrative persuasion'. Supporting this conclusion, recent meta-analyses have revealed a dearth of studies focusing on the environment in the narrative persuasion field, as well as a bias towards textual narratives over video (Dahlstrom et al., 2017; Ratcliff & Sun, 2020). Thus, environmental films represent an understudied area of persuasion. Similar to Dahlstrom et al. (2017) who focused on health-related narratives, we argue that research must move beyond simple comparisons between narrative and non-narrative communications to examine the internal and external mechanisms that implicate the persuasiveness of environmental films. We offer a conceptual model and synthesis of existing theory in order to illuminate several priority areas for future research. Based on this, we draw out preliminary guidance for those seeking to better understand *how* environmental films can lead to positive environmental outcomes.

3 | CONCEPTUAL MODEL/THEORETICAL FRAMEWORK

Environmental films are more than just sequences of images, explanations of ecological phenomena or arguments for change. Central to this review is the fact that environmental films are—or in the least, contain aspects of—narratives. We put forward a conceptual framework for understanding how environmental films might arrest the extinction of experience in societies where contact with nature is lacking and digital media is easily accessed. Specifically, we propose three broad pathways through which environmental films may influence HNC and PEB (Figure 1). These pathways lean on existing theories in the narrative persuasion literature (Green & Brock, 2002) as well as current thinking in conservation psychology. First, we discuss the pathway of reduced resistance to environmental messaging resulting, in part, from immersion in a narrative. Second, we discuss how environmental films may interact with, and influence, audience identity to change behaviours and induce empathetic responses towards the natural world. Finally, we address the potential for environmental films to provide viewers with meaningful experiences that fundamentally alter their perceived relationship with nature.

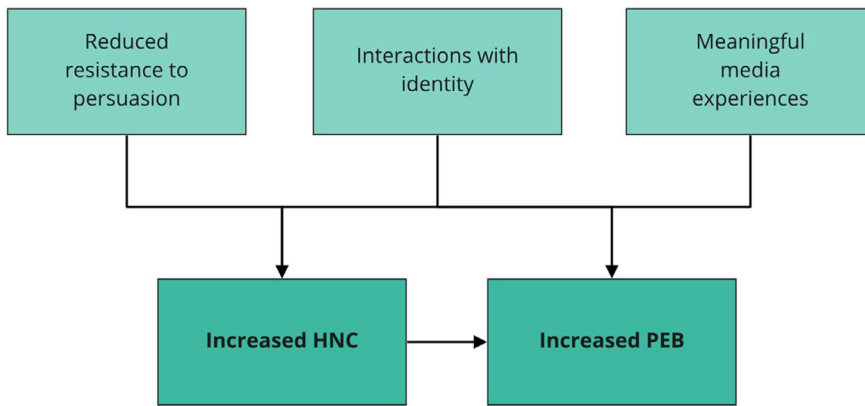


FIGURE 1 Three pathways through which environmental films enhance human–nature connection (HNC) and pro-environmental behaviour (PEB)

3.1 | Resistance to environmental messages

One of the key barriers to persuasion is the notion of *resistance* (Knowles & Linn, 2003), an individual's response to attempts at persuading them, aimed at disregarding the content of such persuasion (Ratcliff & Sun, 2020). The power of narratives lies in their unique ability to reduce resistance and thus overcome one of the major obstacles to persuasion (Dal Cin et al., 2004; Moyer-Gusé & Nabi, 2010; Ratcliff & Sun, 2020). Key to this overcoming of resistance is the immersive quality of good stories (Hamby et al., 2018; Ratcliff & Sun, 2020). Absorption, or immersion, into a narrative, known as *deictic shift*, entails adopting the perspective from which story events are described, shifting from one deictic centre (i.e. perceptual vantage; Duchan et al., 1995) to another as events unfold. This process requires a willing suspension of disbelief, freeing cognitive resources to generate mental models of the story and reducing audience capacity to scrutinise the information they are presented with (Dal Cin et al., 2004). As such, deictic shift is likely to result in less resistance, such as in the form of counterarguing. In addition to reducing the cognitive capacity of audiences to critique a story's messages, the immersive and entertaining nature of narratives may mask their *persuasive intent* (Moyer-Gusé & Nabi, 2010). As a result, story-receivers may be less likely to feel they are being manipulated and therefore less likely to exhibit forms of resistance—such as reactance or anger—in response to the story (Ratcliff & Sun, 2020).

One way the audience of environmental films may experience deictic shift is through the phenomenon of *transportation* (Green & Brock, 2000, 2002). van Laer et al. (2014, p. 798) describe transportation as occurring 'whenever the consumer [story-receiver] experiences a feeling of entering a world evoked by the narrative because of empathy for the story characters and imagination of the story plot'. In their series of four studies, Green and Brock (2000) found convincing evidence that transportation can alter the attitudes and beliefs of story-receivers. More recent work has verified the influential power of transportation on attitudes and beliefs (Appel & Richter, 2007; Escalas et al., 2004), empathy (Bal & Veltkamp, 2013; Johnson, 2012) and behaviour (Farace et al., 2017; Johnson, 2012; van Laer et al., 2014). With regard to environmental films, to the best of our knowledge, Morris et al. (2019) is the only study to have tested the influence of transportation. They studied participant responses

to short videos communicating climate change which they scored for their degree of narrativity, that is whether they contained story elements like identifiable characters and a clear plot. While they found self-reported transportation to correlate with the strength of narrative structure in their study materials, they found no effect on PEB. However, they also attempted to measure transportation using indicators such as heart rate variability as evidence of emotional arousal and cognitive processing and found this to be more indicative of subsequent PEB. How closely such physiological measures correspond to the concept of transportation is not yet clear. Hence, while transportation is a prominent theory in the narrative persuasion literature, its implications regarding environmental films and their intended outcomes remain uncertain.

In addition to the phenomenon of deictic shift, many other factors may affect the capacity of environmental films to overcome audience resistance, such as through influencing perceived persuasive intent. For example, viewers of *An Inconvenient Truth* (2006) will likely expect that the documentary film will attempt to convince them of something (Nichols, 2001; Renov, 1993). This expectation will likely be heightened by the film's focus on the polarising subject of climate change, the use of a lecture format and the explicit argumentation. The film's presenter, Al Gore, is a former politician and so likely to provoke mistrust and negative emotions, particularly in right-leaning audiences (Yeo et al., 2018). These and other factors combine to make *An Inconvenient Truth*, an overtly persuasive environmental film. In contrast, consider the recent Netflix film *My Octopus Teacher* (2020). Although also an environmental documentary, *My Octopus Teacher* has a strong narrative format that immerses the audience in the life of its non-human protagonist and her kelp-forest home. There is little overtly controversial about the film's subject or its presenter Craig Foster, and its only explicit attempt at persuasion is a brief mention of Foster's environmental organisation at the film's conclusion. Thus, even within the confines of non-fiction, environmental films can differ markedly in their apparent intention to persuade.

A quality that possesses particular promise in reducing the perceived persuasive intent of environmental films is *humour*. Humour has been shown to increase attention to a message and enhance memory of its contents (Weinberger & Gulas, 1992), as well as increase the attractiveness and perceived credibility of the message's

source. Importantly, however, humour also appears to act as a discounting cue that reduces the urge for audiences to counterargue with the message being received (Nabi et al., 2007). Given the often-controversial nature of environmental stories, humour may be an effective tool for getting people to 'let their guard down', thus overcoming audience resistance to environmental messages. It is for these reasons that humour may hold promise for environmental film-makers, including those creating short-format content for social media where competition for audience attention and the tendency towards confirmation bias are both high. However, scholars have also cautioned that humour might act to trivialise issues presented in a narrative (Nabi et al., 2007). Hence, there is a risk that humour may undermine the seriousness of environmental problems conveyed through film, or perhaps lessen the emotional depth required to facilitate legitimate connection with nature. There are clearly opportunities to evaluate the contexts in which humour is and is not effective in promoting HNC and PEB through environmental films.

3.2 | Identity, the self and environmental films

Another potential pathway for persuasion is via an individual's identity. Media such as environmental films may influence and interact with viewer identity in several ways. For example, depictions of characters in a film or documentary may allow viewers to draw *social comparisons* between themselves and those presented in said media. This can serve to reinforce an individual's understanding of who they are in relation to important attributes such as values, beliefs and goals (Cohen et al., 2020). Such comparisons may act to motivate people to become a more 'ideal' version of themselves (Cohen et al., 2020). In addition to drawing comparisons with characters, viewers may also engage in *social learning* whereby they model or imitate the behaviours exhibited on screen (Cohen et al., 2020). Importantly from a persuasion perspective, the greater the perceived similarity between the model (character) and observer, the greater will be the observer's belief that they are capable of engaging in the same behaviour (Cohen et al., 2020). This may be particularly important for environmental films where self-efficacy beliefs have proven a consistent barrier to behaviour change (Howell, 2011). On a deeper level, viewers may develop *parasocial relationships* with those characters and personalities with whom they have repeated exposure (Cohen et al., 2020). Such relationships are defined as involving a sense of intimacy not unlike friendship (Cohen et al., 2020) and, like 'real-life' relationships, help people come to terms with their own identity. For example, many natural history enthusiasts may have varying parasocial relationships with David Attenborough, whom they may feel they know and relate to. If such audiences perceive Attenborough as deeply connected with the natural world, this may serve to reinforce their own connection with nature.

Arguably, the most powerful way in which environmental films might influence viewer identity is through the narrative construct of *identification* (Cohen, 2001). Understood as a merging of the self and a character, unlike mere spectatorship, 'identification is a

mechanism through which audience members experience reception and interpretation of the text from the inside, as if the events were happening to them' (Cohen, 2001). Therefore, like transportation, it is a form of deictic shift connected to intense narrative engagement and should result in reduced resistance to persuasion (Hamby et al., 2018). However, identification may result in cognitive, affective and behavioural changes through two additional means. First, identifying with a character may lead to the assimilation of certain character traits into the self (Cohen et al., 2020). Second, identification may allow audiences to vicariously experiment with alternative selves without the social repercussions of doing so in the real world (Cohen et al., 2020). In this way, audiences effectively 'try on' different identities and may choose to incorporate aspects of these themselves. The role of identification in the persuasiveness of environmental films is largely unknown. As a starting point, we need to know if identification with pro-environmental characters actually results in a desired impact. Could such identification lead to the adoption of pro-environmental traits and behaviours? Along these lines, could identification with pro-environmental characters be used to overcome audience bias against certain environmental topics (e.g. climate change)? Likewise, could identification with anti-environmental characters have the opposite effect? Perhaps one of the most intriguing questions is *if—and how—*identification with non-human species can be achieved. At a broader level, we also wonder if identification with entire landscapes or ecosystems might be possible through using the appropriate narrative techniques—whatever they may be.

An important concept related to identity, and who we identify with, is *empathy*—the ability to 'perceive, understand and care about the experiences or perspectives of another person or animal' (Young et al., 2018). Empathy has both cognitive and affective dimensions and may be state like or trait like (Young et al., 2018). The relationship between empathy and the related construct of identification is not entirely clear; however, one distinction is that while identification involves a merging of the self and other, empathy requires self-other differentiation: to empathise with someone it is necessary to understand them as a separate persona (Håkansson Eklund & Summer Meranius, 2020). Empathy has proven to be a powerful motivator for attitude and behaviour change (Batson et al., 1997), including in the realm of human–nature relationships (Berenguer, 2007; Maguire et al., 2020; Tam, 2013b). It is feasible that empathy for human characters may act as pathway for eliciting empathetic responses for nature. For example, viewers of the film *The Refuge* (2016), might empathise with the plight of First Nations woman, Bernadette, who is campaigning to protect her ancestral homeland and the Caribou who live there from oil drilling, and change their attitudes accordingly.

Environmental films may facilitate empathy for non-humans. This can occur through cognitive empathy, for example supporting the audiences' capacity to understand what it is like to be, for example, a capuchin monkey living in the Amazon (*Amazonia*, 2013), as well as through affective empathy by allowing audiences to perceive the emotional lives of their non-human subjects, sharing their pain as well as their triumphs. While environmental films present potential

for developing empathy with nature and the non-human, the specific means to achieving this are not well-understood and many questions remain open. For example, how does the language of a film influence the likelihood of an empathetic response? Young et al. (2018) point out that something as simple as the choice of pronouns (e.g. 'he/she' vs. 'it') may drastically alter how another species is perceived, either inferring that they are an individual with agency or relegating them to the state of an inanimate object. As with identification, we might also ask how empathy is influenced by the focal species in question, and how such biases may be overcome. Importantly, Young et al. (2018) also warn of the dangers of evoking *too much* empathy, leading audiences to disengage in order to preserve their own emotional well-being. This raises important questions about how environmental films might strike an effective balance when eliciting empathetic responses to the natural world.

When discussing identity, empathy and the non-human, one must also consider the potential for *anthropomorphism* and how this may interact with, and influence, audience reactions to story characters/subjects. Projecting human qualities—such as emotions, morals and agency—onto other species is commonplace in many environmental films. Such projections are arguably inevitable in any form of storytelling and are inherent to how humans comprehend the world around us (Elliot, 2001). However, the degree of anthropomorphism in environmental films can differ markedly. Consider, for example, the overt anthropomorphism of fictional, animated characters such as those in the film *Finding Nemo* (2003), compared to the more subtle anthropomorphisms that may be found in natural history films, as when David Attenborough suggests a bird of paradise feels 'deflated' (*Planet Earth*, 2006), or a praying mantis is demonstrating 'kung-fu' (*Life Story*, 2014). While the anthropomorphic approach in film (particularly in the documentary genre) has been heavily criticised for a variety of reasons (e.g. see Bousé, 2011; Somerville et al., 2021), it can also be a valuable tool for making the non-human more relatable to an audience, thus making it easier to identify and/or empathise with them (Tam, 2015; Tam et al., 2013). Indeed, Tam et al. (2013) found that anthropomorphism resulted in greater connectedness to nature and subsequent PEB. Hence, while it is vital film-makers consider the potential pitfalls of anthropomorphism, it may be a valuable pathway through which environmental films combat the extinction of experience. In particular, we believe investigations of anthropomorphism may yield important understandings of how to increase identification and empathy with non-human characters and should constitute a priority for future research.

3.3 | Meaningful media experiences

Broadly speaking, experiences of media have been divided into two main typologies of audience response. *Hedonic* experiences have been the primary focus of research and refer to gratifications based on pleasure and enjoyment (Raney et al., 2020). On the other hand, increasing scholarship has turned its attention to those experiences that are characterised by meaningfulness, connectedness

and well-being. These *eudaimonic*—or *meaningful*—experiences can contain various cognitive and affective components (Raney et al., 2020). For example, one might feel empathy or hopefulness as part of a meaningful media experience, or someone might engage in reflective moments as they try to make sense of the experience. Environmental films may be particularly suited to providing such eudaimonic experiences as they are not often considered 'light fare', and many deal with subjects related to human agency, our place in the universe and the interconnectivity of nature. There is evidence meaningful media experiences can result in greater motivations to engage in pro-social behaviour (Raney et al., 2018), greater political engagement (Bartsch & Schneider, 2014) and greater feelings of connectedness in general (Oliver et al., 2018).

Oliver et al. (2018) have gone even further in proposing a 'higher level' of such eudaimonic experiences—*self-transcendent media experiences*—which relate to thoughts and feelings directed beyond the self. That is, they 'give rise to an increased appreciation for the potential, values and needs of others, for the natural world and powers beyond ourselves, and for moral virtue' (Oliver et al., 2018, p. 384) and pertain to 'universality and connectedness, moral virtue and spirituality' (Oliver et al., 2018, p. 381). These experiences may be considered more intense than other eudaimonic responses, involving sensations such as awe and elevation, and resembling other self-transcendent phenomena such as flow (the state of being completely immersed in an activity (Csikszentmihalyi, 1990)), peak experiences ('moments of highest happiness and fulfilment' (Maslow, 1964)) and mystical experiences (a religious experience described by James (1985) involving loss of the self and a sense of oneness with the universe). In the context of environmental films, such experiences seem likely to overlap with various operationalisations of HNC, many of which define HNC using related terms such as 'oneness' (Mayer & Frantz, 2004), 'spirituality' (Nisbet et al., 2009) and 'interconnectedness' (Perkins, 2010) aligning well with Oliver et al.'s (2018, p. 384) description of a 'heightened awareness and appreciation of the interconnectedness among humans, nature and the universe'. Indeed, the inclusion-of-other-in-self scale (Aron et al., 1992), suggested as one way of measuring responses to self-transcendent experiences (Yaden et al., 2017), has also been adjusted for the purposes of measuring connection with nature (Schultz, 2002). However, it is important to note that these experiences are just that: *experiences*. They are therefore state-like and transitory, and do not refer to an individual's values or worldview. Nevertheless, they may well be a catalyst for change in such traits, and so present a means through which environmental films might foster HNC and PEB.

Environmental films might be uniquely placed to offer viewers such transcendent experiences. First, many environmental films sit within the documentary genre which was recently shown to be one of the highest elicitors of self-transcendent media experiences, behind only drama (Raney et al., 2018). Second, the natural world is often cited as eliciting feelings of transcendence (Williams & Harvey, 2001; Yaden et al., 2017). The above experiences of self-transcendence are less likely to be experienced in non-narrative forms of environmental communication (Oliver et al., 2018). Indeed,

the temporarily expanded boundaries of the self-model (Slater et al., 2014) predicts that such transcendence of the self is a primary motivator for why people engage with stories in the first place. In addition to this, we suspect that the unique qualities of film as both a visual and auditory experience make it a particularly promising medium for providing such meaningful mediated experiences. Thus, we argue that environmental films are especially well-suited for facilitating self-transcendent media experiences that result in a sense of connectedness with the natural world, and that the potential of such meaningful media experiences should be a focus of future research.

4 | DISCUSSION

This paper aimed to identify promising pathways through which environmental films may persuade audiences to feel and act positively towards the natural world. Drawing together research from narrative persuasion and conservation psychology, we have identified three broad pathways through which environmental films may influence audiences. In this section, we clarify the implications of this analysis for future research and identify preliminary implications for effective environmental films.

4.1 | Research to understand the effects of environmental films

Our analysis identifies key areas for future research to understand how environmental films may enhance HNC and PEB (Table 1). Researchers should seek to understand what qualities of environmental films enhance transportation as well as those that limit or disrupt it (Table 1). We also identified the need to consider several other mechanisms for overcoming resistance to environmental films. The aspects of environmental films that might influence this salience (e.g. humour) are numerous and varied, and the field would benefit from a systematic approach to identifying and testing such factors in isolation from one another (Table 1).

Given the role of identity in mediating environmental attitude and behaviour change (Clayton, 2003), researchers should focus on understanding if and how these identity phenomena (e.g. identification and empathy) influence HNC and PEB, and—importantly—how they can be used effectively for different audiences (Table 1). Both identification and empathy raise interesting and important questions relating to the non-human. Can these phenomena be experienced in relation to the characters of environmental films when those characters are non-human? If so, what qualities of such characters might

TABLE 1 Summary of possible research questions for understanding the influence of environmental films on human–nature connection (HNC) and pro-environmental behaviour (PEB)

Pathway	Research questions
Reduced resistance to persuasion	How does transportation into environmental films influence HNC and PEB? • What qualities of environmental films enhance audience transportation? What factors influence the perceived persuasive intent of environmental films? What influence does humour have on audience resistance to messages contained in environmental films, and how does this implicate their capacity to influence HNC and PEB? Specifically: • Does humour enhance persuasion? • Through increased immersion? • Through acting as a discounting cue? • Or, does humour cause audiences to discount the importance of a film's environmental messages?
Interactions with identity	What role do social comparisons play in enhancing or reducing the desired effects of environmental films? What role does social learning play in mediating the effects of environmental films? • Can behaviour models in environmental films help to overcome low self-efficacy? How does identification with characters in environmental films influence HNC and PEB? • What qualities of environmental films enhance audience identification? • What role for anthropomorphism? • Can identification with characters in environmental films help to overcome existing biases towards environmental issues? • How can identification with non-human characters and subjects be achieved? • How does this influence relevant measures of audience HNC and PEB? How does empathy with the characters of environmental films influence HNC and PEB? • What factors influence the evocation of empathy with non-human subjects? • How can film-makers avoid evoking unhelpful empathetic responses? • What role for anthropomorphism?
Meaningful media experiences	To what extent do environmental films provide meaningful media experiences? • What qualities of environmental films are important in eliciting eudaimonic responses? • How do such experiences influence HNC and PEB? What qualities of environmental films might allow for transcendent experiences? • How do such experiences influence HNC and PEB?

encourage or constrain audience potential for identification and empathy?

Research should also focus on how environmental films can provide eudaimonic experiences, and what qualities of such films are influential in this process (Table 1). Researchers can bring clarity to this concept by developing appropriate tools for measuring different types of self-transcendence as experienced through environmental films, and subsequently identifying the qualities of such films that lead to these experiences. Lessons can be gained from existing knowledge of how people react to nature in the 'real world'. For example, Pearce et al. (2017) provide insights from nature-based tourism on how best to foster the related sensation of *awe*—a transcendent feeling associated with wonder and amazement. They find that charismatic fauna, environmental aesthetics, ecological phenomena, vast geological landscapes and reflective/perspective moments support awe-inspiring experiences in nature. All of these attributes are possible to convey or provide for in some manner through environmental films, and as such provide an initial scope for investigation.

4.2 | Preliminary guidance for designing effective environmental films

Our analysis offers tentative recommendations for film-makers and their collaborators who are seeking to influence audience HNC and PEB (Figure 2). While much remains unknown about resistance to environmental films, evidence suggests that the unique narrative phenomenon of deictic shift is vital to getting audiences to let down their guard (Hamby et al., 2018; van Laer et al., 2014). Hence, film-makers should aim to create immersive experiences that transport viewers into the world of their environmental film. A strong narrative structure (e.g. clear plot line, identifiable characters), immersive visuals and sound and the use of emotion may support such transportation (Morris et al., 2019; Ratcliff & Sun, 2020). Additionally, resistance may be overcome by masking the film's persuasive intent, such as by limiting explicit appeals or using humour (Moyer-Gusé et al., 2019; Nabi et al., 2007). Film-makers also need to be aware of the various identities that make up their audience and choose characters and subjects that are relatable and empathetic. Such



FIGURE 2 Recommended techniques and their associated pathways of influence for film-makers seeking to encourage human-nature connection and pro-environmental behaviour. References: Morris et al. (2019)¹; van Laer et al. (2014)²; Green et al. (2008)³; Ratcliff and Sun (2020)⁴; Moyer-Gusé et al. (2019)⁵; Moyer-Gusé and Nabi (2010)⁶; Gordon et al. (2018)⁷; Bandura (2009)⁸; Cohen et al. (2020)⁹; Batson et al. (1997)¹⁰; Tam et al. (2013)¹¹; Pearce et al. (2017)¹²; Oliver et al. (2018)¹³; Slater et al. (2014)¹⁴; Williams and Harvey (2001)¹⁵

characters should be well-defined and model the attitudes and behaviours desired in the audience. Film-makers should note that people more readily adopt the behaviour of those they feel are similar to themselves (Bandura, 2009), and that some degree of anthropomorphism may be required to achieve identification with, and empathy for, non-human subjects (Tam et al., 2013). Finally, film-makers should embrace the potential for environmental films to offer meaningful experiences to their audience, exploring profound concepts and showcasing the complexity and vastness of natural environments (Oliver et al., 2018; Raney et al., 2020). Film-makers should consider ways in which their stories might elicit self-transcendent feelings and thoughts within audiences, through a combination of narrative, visuals, sound and the information provided. These recommendations are focused on persuading film audiences to care and act for the environment. As such we acknowledge that their usefulness is contingent on the relative aims of different film-makers. However, we do not feel our suggestions conflict with the potential to produce engaging and compelling films, and so have no reason to believe they would undermine other goals, such as those relating to a film's commercial viability. Indeed, many of the narrative persuasion concepts we have drawn on are used to great effect in consumer marketing (Kim et al., 2017; Wang & Calder, 2006).

5 | CONCLUSION

The need to communicate about nature in ways that further pro-environmental outcomes has never been more urgent. In the face of myriad environmental issues and the compounding problem of the extinction of experience, scholars have argued film can play a role in connecting people with the natural world and influencing behaviour (Jones et al., 2019; Silk et al., 2018). We provide a model for testing this assumption and directing research towards a greater understanding of how environmental films can influence human-nature relationships. In doing so, we provide direction for ongoing research in the field, focusing efforts towards understanding resistance, identity and meaningful media experiences which might also be of value in the study of other narrative modes and electronic media, for example video games (see Truong et al., 2018). In a rapidly changing world where we worry about the loss of HNCs, environmental films offer promise that people may continue to experience and be influenced by the natural world. As Sir David Attenborough has said, 'No one will protect what they don't care about; and no one will care about what they have never experienced'.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHORS' CONTRIBUTIONS

C.M.M. conceived the idea for the framework which was revised through discussion with K.J.H.W. and J.K.M. All authors participated in writing the paper and sourcing appropriate references.

DATA AVAILABILITY STATEMENT

This manuscript does not use data.

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