Effectance's influence on positive behavioral intentions in cli-fi narratives. A comparison of interactive and traditional narratives

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Contents

Abstract

Climate change is one of the most discussed topics nowadays. Still, the communication of the problem is quite complex, and it is hard to gain people's attention and change their current behavior (Auger, 2013; Boykoff, 2019). The present study investigates whether the inclusion of effectance in climate fiction (cli-fi) digital narratives positively impacts an individual's behavioral intentions. Furthermore, the study investigates how this relationship can be explained regarding transportation into the storyworld and whether the relationship is influenced by guilt and type of topia. The current research was inspired by Uildriks's (2020) work, and a between-subjects design was conducted (N=135). Two climate fiction narratives (dystopian/utopian) written by Mommers (2020) were adapted into an interactive digital format. Participants were given three decisions concerning an environmental dilemma resulting in either a utopian or dystopian story. The study further investigated participants' guilt, type of topia, and finally, the influence of effectance on participants' positive behavioral intentions for climate change. The results indicate successful manipulation of effectance; however, there was no significant effect on behavioral intentions towards climate mitigation or transportation into the storyworld. The traditional narrative mirrored the chosen path of the interactive narrative. Furthermore, the study results demonstrated that participants tend to make utopian decisions that exclude the opportunity to investigate the outcomes of a dystopian narrative. Consequently, the missing effect of transportation into the storyworld did not affect guilt, which the absence of a dystopian narrative could also explain.

Keywords: climate change, interactive digital narratives, IDN, cli-fi, traditional narratives, effectance, behavioral intentions, transportation, guilt

Effectance's influence on positive behavioral intentions in cli-fi narratives. A comparison of interactive and traditional narratives

Climate change is becoming more widely acknowledged as a worldwide threat, and many organizations have taken steps to address the issue. Finding an effective means to communicate the urgency and the impact of climate change to the general public remains a challenge (Auger, 2013; Boykoff, 2019). One approach that has received attention is *climate fiction narratives* (cli-fi), defined as a possible future scenario caused by climate change (Irr, 2017). These narratives can be classified as utopian (i.e., a possible optimistic future) or dystopian (i.e., a possible pessimistic future) scenarios (Schneider-Mayerson, 2017). Literary writers create narratives concerning environmental changes for various goals, such as increased audience comprehension and climate change mitigation behavior regarding the climate threat (Schneider-Mayerson, 2018). Even though cli-fi is a relatively new concept, its essence can be found in the traditional narrative.

Traditional narratives are often used as a communicational tool when aiming for social and behavioral change (Obregón & Tufte, 2017). The narrative format contributes to creating mental images of the narrative, which assists the information processing and the storage of the received information (Green & Brock, 2002). While readers are immersed in the narrative and use their cognitive resources to process the information, they lose track of reality and are transported into the storyworld. Thus, when information is better comprehended, the levels of transportation and engagement increase (Bilandzic & Busselle, 2017). Furthermore, the feeling of being present in the narrative has a persuasive impact, as explained in the Transportation Imagery Model (TIM) of the authors Green and Brock (2000). They further explain that transportation is a mental process that combines three components: attention, working capacity,

and emotional reactions. This effect can be explained by the ability of the narrative to make the reader ‘perfink’ (i.e., perceive, feel, and think simultaneously; Weinstein, 1987). Thus, transportation is linked to uncritical and intense processing while limiting counterarguing (Green et al., 2004). Green et al. (2019) further elaborate that the nature of the narrative (i.e., factual or fictional) does not influence the transportation of the reader. Although the comprehension of the narrative influences the reader's transportation into the storyworld, other elements play a factor regarding engagement, one of which is interactivity.

Interactivity within a narrative allows the interactor to have a sense of control over the storyworld by allowing them to influence the plot. Interactivity in narratives can take different forms, such as a ‘choosing your adventure format’ - where interactors can choose which storyline to follow in the interactive digital narrative (IDN; Neitzel, 2014). The result of their choice can become observable immediately after their choice or at the very end of the story (Roth & Koenitz, 2016). Interactivity provides interactors with choices that have a meaningful impact on the storyline and give information about the outcome of their actions: effectance (Smed et al., 2021). Effectance can be seen as an interactive element in a digital narrative that answers the intrinsic human need for competence and personal development (Roth & Koenitz, 2016). The need for *competence* is one of three psychological needs mentioned in Self-Determination Theory (SDT) and *autonomy* and *relatedness*. Actions satisfying these needs are intrinsically motivating and enhance the feeling of engagement and, possibly, transportation into the storyworld (Roth & Koenitz, 2016). Moreover, SDT explains the interactor’s choices when given an interactive narrative and their eudaimonic appreciation (Roth & Koenitz, 2016). Additionally, studies have shown that presenting the instant outcome of individuals’ actions (i.e., local effectance) can lead to positive behavioral changes mitigating climate change (Maddux et

al., 1982; Klimmt & Hartmann, 2006).

The current study is inspired by Uildriks's (2020) work, which focused on behavioral intentions mitigating climate change, the type of presented traditional cli-fi narratives (i.e., utopian or dystopian), and the perception of fear and concern. Considering that Uildriks (2020) did not find significant effects for fear and concern, it is suggested that guilt could be of importance instead. Several studies demonstrated that participants' behavioral intentions changed after reading a narrative describing environmental problems and eliciting guilt (Bamberg & Möser, 2007; Rees et al., 2014). When including effectance in the current study, the participants become the narrative's protagonist and thus also the decision-makers. The interactive choices concerning the narrative might give them the perception of being responsible for the story's outcome. Hence, the participants might experience guilt when interacting with the narrative seeing the outcome of their decisions.

Climate change has been a topic of global concern and has been communicated to the public through different approaches, one of which is through traditional narratives. With the increased global digitalization, IDNs can trigger positive behavioral changes toward environmental issues**.** Moreover, when looking at the diverse purposes of IDNs, the medium offers benefits, such as topic persuasion of the interactor (Figueiredo & Paiva, 2010). However, little is currently known about implementing narrativity and interactivity elements within cli-fi narratives. Therefore, the study aims to investigate the influence of effectance on the interactors' behavioral intentions towards climate change mitigation by comparing traditional and interactive cli-fi narratives. Furthermore, examining the transportation impact on the relationship and the possible effect of guilt and type of topia. The study addresses the following question:

RQ: *To what extent does effectance within traditional and interactive climate fiction narratives affect positive behavioral intentions towards climate change mitigation, and to what extent is this effect mediated by transportation into the storyworld?*

Theoretical Framework

2.1 Narratives

Climate change has been one of the most discussed topics due to the complexity of its nature and the environmental changes it brings with it (Schäfer & Painter, 2020). Effectively communicating the climate issue has proven challenging (Moser, 2009). However, Schäfer & Painter (2020) have proposed a communication tool to raise awareness regarding the climate's urgency and change an individual's behavioral intentions. One such approach is through narrative, as individuals can better comprehend the problem.

2.1.1 Narratives as a communicational tool

Narratives can represent past, present experiences, or future scenarios and promote healthy behavior in various domains such as mental recovery, sex education, and climate change (Collins et al., 2003; Gwozdziewycs, 2013; Fløttum & Gjerstad, 2016). Numerous scholars and researchers have attempted to explain and generate one standard definition of a *narrative* (Rudrum, 2005). For example, Prince (1984) refers to narratives as "... the representation of at least two real or fictive events in a time sequence, neither of which presupposes or entails the other." Meanwhile, Hinyard and Kreuter (2007) propose the following statement based on previous scientific explanations and core ideas: "a narrative is any cohesive and coherent story with an identifiable beginning, middle, and end that provides information about a scene,

characters, and conflict; raises unanswered questions or unresolved conflict, and provides resolution.”.

According to van Eschot (2021), narratives consist of two layers: the story and the discourse (i.e., the telling of the story). The story layer contains the sequence of events that could be presented in chronological order within the storyworld or are linked unintentionally (Kinnebrock & Bilandzic, 2006). Furthermore, narrativity factors are essential for storytelling efficacy, for example, the characters the story evolves with, the events that take place, and the location (Kinnebrock & Bilandzic, 2006; Smed et al., 2021). Incorporating these elements assists the reader in creating a mental representation of the story, which makes the information more accessible, and ultimately aids in the storyworld transportation (Hinyard & Kreuter, 2007; Kinnebrock & Bilandzic, 2006).

The discourse layer illustrates how the story is narrated by presenting the story through a particular perspective (i.e., focalization). Niederhoff (2014, p.115) defines *focalization* as the “restriction of narrative information in relation to the experience and knowledge of the narrator, the characters or other, more hypothetical entities in the storyworld.” Moreover, at the discourse level, the order of events being presented can be manipulated, triggering different emotional reactions such as suspense, curiosity, and surprise (Hoeken & van Vliet, 2000). Though the majority of the studies focus on non-fictional narratives, the definitions overlap in non-fictional and fictional narratives (Ryan, 2007).

2.1.2 Climate fiction and narratives

Climate change narratives are a factor in shaping society's perceptions of climate issues (Fløttum & Jerstad, 2016). These narratives communicate environmental changes and concerns, ease comprehension, and broaden the audience's knowledge of environmental changes (Bravo,

2009; Fløttum & Jerstad, 2016). The further development of climate narratives led to increased popularity and utilization of specific genres (Johns-Putra, 2016). One such genre is 'climate fiction′ (cli-fi). The term was invented to gather science fiction (sci-fi) narratives focused on environmental changes and possible prospective consequences (Evans, 2017). Cli-fi has a futuristic essence, and its narrative provides alternative realities. Due to its futuristic framing (i.e., assuring the readers that the scenario is an assumption), individuals are more likely to explore and consider the possibility of the scenario described as compared to climate change being reported as a present problem (Bainbridge, 1986; Hambrick, 2012; Whiteley et al., 2016).

Schneider-Mayerson (2018) suggests that cli-fi narratives are likely to raise general awareness of possible future scenarios of environmental concerns. However, De Meyer et al. (2020) argue that there is a problem with the way climate narratives are being written. Their study further elaborates that the emphasis on the narratives presented in news reports, media articles, and entertainment projects does raise individuals' awareness and concern; however, it does not offer a proper reaction to cope with environmental changes. The lack of reaction limits the 'action-based approach,' the ability of individuals, and their option to act accordingly to the communicated information. De Meyer et al. (2020) additionally explain that the lack of reaction leads to changes in individuals' surroundings and their acts towards mitigating the environmental changes. In addition, it elicits uncertainty in individuals concerning the meaningfulness of their actions. Overall, these studies highlight the need for the narrative (i.e., climate change narrative or cli-fi) to provide individuals with an option to act upon the presented information.

2.1.3 Topias

The dystopian narrative highlights the negative aspects and the possible outcomes of the absence of timely actions (Claeys, 2013). The negative characteristics of the narrative are

highlighted (e.g., i*t has become difficult to exercise outdoors as the summers are too hot these days;* Mommers, 2020). Such dystopian narratives aim to raise awareness and call for action toward the addressed problem (Hughes & Wheeler, 2013). The dystopian narrative concludes by indicating that a call to action should have been instigated. However, a utopian narrative consists of positive statements (e.g., *we are now producing green energy and eating sustainably cultivated food; Mommers, 2020)* and focuses on concluding a narrative with a positive message. The utopian vision represents a desirable future, a favorable scenario based on people's recent experiences and psychological views, suggesting health, wealth, and happiness (Hjerpe & Linnér, 2009; More et al., 2018).

In summary, by offering a narrative that is either dystopian or utopian, individuals will be given the possibility to become more aware of the topic presented or presented with a desirable future if specific actions were to be taken. Furthermore, by applying these topias to a cli-fi narrative, individuals could be made more aware of the (current) climate change crisis and about how to react in response to cope with the environmental change.

2.2 Interactivity in narratives

Interactive narratives are traditional narratives with additional affordances that allow interactors “to make real-time changes to the content of the medium.” (Murray, 2007). For example, by making the interactor choose and determine the story’s direction. The concept of interacting and altering the storyworld is referred to as “agency” (Smed et al., 2021).

Janet Murray (1997, pp. 97 - 182) defines *agency* as the feeling of satisfaction derived from the ability to take meaningful actions and witness the consequence of these actions. Roth and Koenitz (2016) take it a step further to define the dimensions of agency (i.e., usability,

autonomy, and effectance). *Usability* entails the speed and ease of interaction with the system, contributing to the convenience and effortless comprehension of the narrative (Roth & Koenitz, 2016.) *Autonomy* concerns the freedom of choice without a perceived pressure in a specific direction. Finally, *effectance* represents the meaningful effect of the individual's actions.

2.2.1 Effectance

Effectance can be local (i.e., seeing the result immediately after the action) or global (i.e., seeing the outcome of all the activities taken at the very end of the narrative; Roth & Koenitz, 2016). Effectance can be examined through the prism of SDT, which focuses on readers' choices and intrinsic motivations behind their actions with the need for "autonomy, competence and relatedness" (Ryan & Deci, 2000). *Autonomy* refers to the need for freedom and making one's own decisions. *Relatedness* is the meaningfulness of social connection and the feeling of being valued and respected. Lastly, *competence* is related to effectance in an interactive narrative, which can be seen as a way to answer the need for competence - personal progress and success (Roth & Koenitz, 2016).

The interactive narrative may fulfill an intrinsic need by eliciting the feeling of autonomy. By presenting an interactor with *free choices* and the consequence of the determined choices, effectance is implied, and the need for competence could be answered (Roth & Koenitz, 2016). According to the SDT, fulfilling these human psychological needs enhances narrative enjoyment (Deci & Ryan, 2012). Moreover, the feeling of effectance in the interactive narrative increases the interactor's enjoyment (Roth et al., 2012). The constant encouragement of interaction (i.e., the individual with the digital narratives) can trigger storyworld transportation (Bilandzic & Busselle, 2011; Oh et al., 2020).

2.2.2 Transportation

In the Transportation Imagery Model (TIM), Green and Brock (2000) define *narrative transportation* as the process of complete attention and mental capacity of the individual on the narrative by evoking mental images. By putting oneself 'in the shoes' of the fictional character,' the interactor constructs a story representation in his mind. This reconstruction leads to an emotional response triggered by the decision-making done on behalf of the character. This experience detaches the interactor mentally from reality (Green et al., 2012; Green & Brock, 2000). Furthermore, the transportation into the narrative is arguably reinforced with the inclusion of narrativity factors that might trigger uncritical and intense processing (Kinnebrock & Bilandzic, 2006). Moreover, when the need for competence is met, motivation to process the given information increases, thus processing the narrative more intensely and triggering higher transportation in the storyworld (Green & Brock, 2000).

It was established that traditional narratives (e.g., cli-fi) with futuristic characteristics focused on climate change play a pivotal role in communicating climate change issues. However, futuristic scenarios could become more influential by being modified into an interactive digital narrative (IDN) with the built-in effectance addressing the need for competence, thus improving people's motivation and aiding in the narrative's comprehension (Green & Jenkins, 2014; Winskell et al., 2019;). Research has further shown that presenting the immediate effect of individuals' actions can mitigate climate change by leading to positive behavioral intentions (Maddux et al., 1982; Klimmt & Hartmann, 2006).

Furthermore, including effectance, particularly in an IDN, could satisfy an individual's intrinsic needs, potentially affecting their level of transportation into the storyworld. Consequently, combining the mentioned factors could enhance individuals' transportation levels

in the storyworld (Bilandzic & Busselle, 2017). Therefore, the following hypothesis is suggested:

H1: ***Effectance in an interactive digital narrative will trigger higher levels of transportation into the storyworld than in a traditional narrative.***

2.3 Behavioral intentions

By implementing effectance in an IDN, the individual's engagement with the storyworld is encouraged, eliciting a cognitive response that helps the transportation and persuasion of the individual. Furthermore, IDNs could satisfy the basic psychological needs of the individual, leading to more engagement and transportation of the individual into the storyworld (Aitken et al., 2016; Bilandzic & Busselle, 2011; Deci & Ryan, 2012). Successful narrative transportation can prove beneficial by triggering the transformation of the individuals' opinions (Green & Brock, 2000), which Kinnebrock and Bilandzic (2006) define as *narrative persuasion*. Similarly, being transported into the narrative leads to an individual's engagement with the narrative.

The Extended Elaboration Likelihood Model (E-ELM) by Slater and Rouner (2002) suggests that a coherent narrative evoking transportation will enable narrative persuasion, which eventually results in behavioral intention and attitude change (Green et al., 2019). The E-ELM further proposes that when viewers are engaged in the content, they are in a state of being less critical. Their cognitive resources are engaged in accumulating what they experience, resulting in the interactor not having the mental capacity to counterargue and notice they are being persuaded (Slater & Rouner, 2002). This effect could be explained by the absence of resistance toward message absorption and behavior adoption (Moyer-Gusé, 2008). However, Täuber and Van Zomeren (2013) state that this is not enough to change the individual's attitude towards the problem.

The current study supports and enriches the idea of implementing agency in storytelling as a possibly effective way of influencing people's behavioral intentions. Simply reading the story (Schneider-Mayerson et al., 2020) or watching the film (Howell, 2012) has a short-term effect on people's actions and behavioral changes (de Meyer et al., 2020). De Meyer et al. (2020) suggest including agency as an 'action-based' perspective, allowing interactors to make a move based on perceived information while learning 'correct' behavior simultaneously. Therefore, by implementing the agency's subconstruct effectance in cli-fi narratives, individuals are expected to be transported into the storyworld. Their level of engagement with transportation will lead to positive changes in their behavioral intentions toward mitigating climate change. Based on this, the following two hypotheses were formulated:

H2: ***A higher level of transportation leads to a higher score on behavioral intentions.***

H3: ***Interactive narratives will lead to higher behavioral intentions towards climate change mitigation than traditional narratives.***

2.4 Guilt

As indicated, possible interaction and the prospect of meaningful choices can support the transportation of the individuals into the storyworld and trigger emotions. We focus on *guilt*, as this emotion is closely connected to climate change behavior and mitigation. Guilt is seen as an outcome of a violation of individuals' moral norms (Brosch, 2021). Baumeister et al. (1994) define it as "an individual's unpleasant emotional state associated with possible objections to their actions, inaction, circumstances, or intentions."

A study conducted by Rees et al. (2014) demonstrates that individuals respond emotionally when exposed to "human-caused damages." The study further elaborates on the moral emotions of guilt and shame and classifies them as "guilty conscience." Furthermore, the perceived feeling of guilty conscience mediates the influence on a participant's behavioral intention. However, Rees et al. (2014) point out that only shame motivated the participant's actions towards the problem. Ferguson and Branscombe (2010) examined the concept of guilt in a different setting, namely through group behavior and intentions. They point out that guilt based on one's conduct and guilt based on a group's conduct can foster pro-environmental behavior. Moreover, when individuals of a group feel responsible for harming the natural world, and their damage can be repaired, the collective guilt is likely to elicit behaviors to repair the caused damage (Ferguson & Branscombe, 2010).

The opportunity of repairing the damage is observable in utopian climate narratives. Moreover, utopian narratives may evoke positive emotions due to their optimistic content (Claeys, 2013) and potentially encourage readers to behave similarly to individuals in the story's intended society (Schneider-Mayerson, 2017). Contrastingly, dystopian narratives may trigger negative emotions such as fear, concern, and guilt (Uildriks, 2020). According to Harth et al. (2013), guilt leads to behavioral intentions in climate change mitigation. Therefore, it can be assumed that a dystopian narrative could trigger higher levels of guilt in the individuals and influence their behavioral intentions significantly. Including effectance or global agency to the cli-fi IDN and showing the consequences of an individual's choices in the narrative might influence participants' future behavioral intentions towards climate change. Rouse et al. (2018) highlight that witnessing the negative consequences of the protagonist's decisions can cause the interactor (i.e., the causative agent of the events) to feel an unpleasant emotion, namely guilt.

This unpleasant emotion is due to the interactor possibly feeling responsible for the negative outcome of their choices.

Based on the IDNs capability to address the participant's need for competence, it could be assumed that the moral feelings elicited by an individual's actions (i.e., while being transported into the narrative) could influence their intentions towards climate change mitigation. Furthermore, being successfully transported into the narrative could positively influence perceived guilt in the individuals (Mahood & Hanus, 2017). The current study includes an IDN that offers individuals the opportunity to make decisions according to the provided information. The IDN includes the two possible directions (i.e., utopian and dystopian) determined by interactors' actions. The dystopian IDN could elicit more guilt than a narrative with a utopian ending. As there is scarce research on the topic, the following subquestion was proposed:

Sub-RQ: ***To what extent do guilt and type of topia influence the impact of effectance on behavioral intentions to mitigate climate change?***

It is paramount to note that answering this research question depends entirely on participants having a utopian or dystopian outcome.

2.5 Original study

The current study examines the influence of effectance within traditional and interactive digital cli-fi narratives and is inspired by Uildriks's (2020) study. The original work investigated the perceived emotions of concern and fear and their effect on behavioral intentions to mitigate climate change. The goal was to find how effectance affects positive behavioral changes towards

climate mitigation and to what extent this effect is influenced by transportation and perceived moral guilt. Moreover, an object of interest was whether temporal distance and type of topia (utopian or dystopia) affect this relationship.

A similarity between the study done by Uildriks (2020) and this study is the use of the same dystopian (i.e., "Future scenario 1: The walls) and utopian (i.e., "Future scenario 2: Forests") cli-fi narratives written by Mommers (2020). In the current study, the narratives are combined, and choices are incorporated to embed effectance. Furthermore, characters are added to enhance transportation to the storyworld (Appendix D).

However, there are discrepancies between the two studies. For instance, the year 2050 is used in the current, as intended according to Mommers (2020). That is not the case in Uildriks's (2020) study, as the year (i.e., 2040 and 2100) was a variable in testing temporal distance. Temporal distance is not measured in the current study; however, it does set out to measure 'transportation' and 'effectance.' Furthermore, the attention check questions differ. Uildriks (2020) specified "Nederland" as an event place, while the current study opts for a vague location, namely "somewhere in Europe." The decision for a location change ensures that the narrative is more applicable to a diverse sample of participants. Another distinction between the two studies is the conduct language, as the current study is conducted in English. Finally, participants will be asked about their attachment to a specific country, as this helps filter participants who spend most of their lives outside of Europe as a possible explanation for outcome differences.

Uldriks' (2020) study demonstrates that *fear* and *concern* did not indicate a significant effect. *Guilt* is added as a variable to the current study due to the emotional component of the narratives included in both studies. Furthermore, Uldriks' (2020) study concluded that 99.5 % of

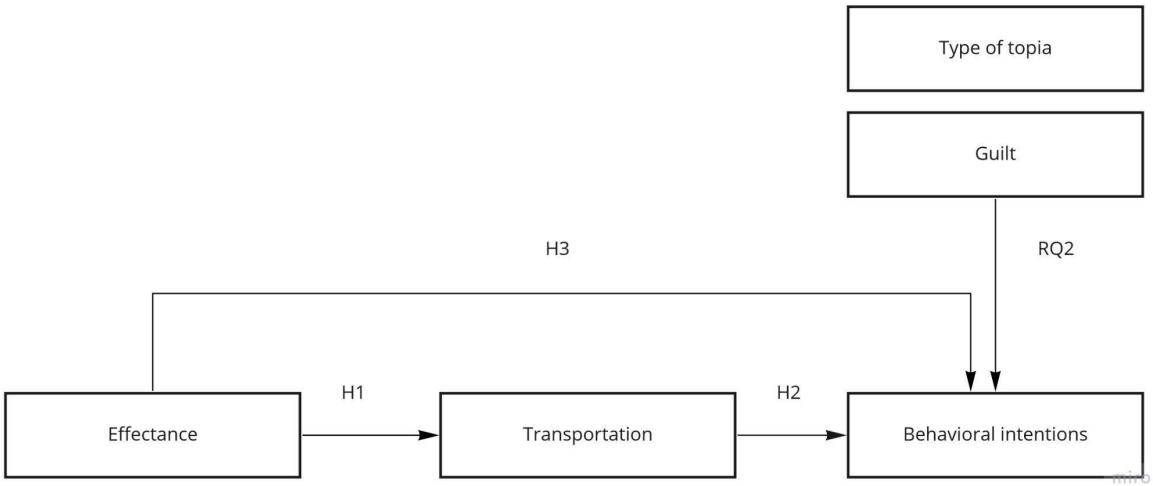
the participants were not skeptical regarding climate change, and one of the reasons for its causation was people.

Finally, the present study includes Uildriks's behavioral intentions scale towards climate change. The study replicates the method of use by evaluating participants before and after the narrative exposure and comparing the outcome. A manipulation check is added to check whether the story is perceived as utopian or dystopian.

The following conceptual model is proposed based on the principles addressed and linked in the theoretical framework (Figure 1).

Figure 1

The Conceptual model



Method

A between-subjects design was used to test the influence of effectance in a cli-fi narrative on transportation into the storyworld and behavioral intention to mitigate climate change, taking guilt and type of topia into account.

3.1 Participants

For the recruitment of participants, convenience sampling was done by using the personal network of the researcher. The questionnaire was distributed on the researcher's social media accounts (Instagram, Facebook, WhatsApp, LinkedIn, and Viber). According to a power analysis (G*power3, Faul et al., 2007), the statistical power of 0.95, with a medium-sized effect ($d = 0.3$) and an alpha of 0.05, requires a sample size of 134 participants. In total, 255 participants responded to the study. The majority of the participants (54%) spent most of their lives in Bulgaria, 15% in the Netherlands, and the rest came from other European countries (e.g., United Kingdom, Spain, Portugal, Romania). The inclusion criteria for participating in the study were sufficient English proficiency (<A2) and a completed attention check. Four of the participants did not give their consent, 55 did not finish the study, 19 stated they had spent most of their life in a country outside of Europe, and 40 failed the attention check and therefore were excluded. The final sample consisted of 135 participants (interactive narrative: $N = 65$ | traditional narrative: ($N = 70$). Most participants were female (n = 80, 57.6%), 51 were male (36.7%), and four (2.8%) preferred not to say, identified as non-binary or else. Most of the respondents had an educational level of a Master's degree (47.4%) or a Bachelor's (37%). Participants aged 25 to 34 years old (45.2%) and between 18 and 24 years old (40%).

3.2 Stimulus material

The central part of the study is a text-based IDN that addresses the topic of climate change and the potential future of climate change. The IDN is based on two futuristic scenarios written by Mommers (2020) merged and transformed into one narrative. Next, they were divided into 'small topics': 'up-growing temperatures, farm production, and climate refugees.' After, the topics were divided into paragraphs with interactive questions in between. For this purpose, three

conflict points were added, with choices for either utopian or dystopian solutions and their following outcomes (Appendix B). The added elements (questions and possible solutions) were based on Mommers' (2020) statements and assumptions.

Moreover, based on the literature suggestions of Riedl and Bulitko (2012), the main character - the prime minister and his advisors (scientists/congressmen) - were added, aiming to increase the narrativity of the story and make the interaction possible, giving the chance of the interactor to make choices on his behalf. He was introduced: "*As the prime minister of the country, your people need you. Now, more than ever*." Also, the place of events was changed to 'Somewhere in Europe" instead of "Northern America" as it was initially. That has been done by aiming for individuals' perceived personal similarity with the narrative, remaining convenient for the study's sample size.

Additionally, Uildriks (2020) suggested changes emphasizing human behavior, and consequences were included. For the utopian narrative, the final sentence was: '*Fortunately, we helped with that in time*,' and the dystopian narrative had the following sentence: "*If only we had done something about this earlier."* The structure of the IDN can be seen in Appendix C.

The traditional narratives were determined based on the decision paths participants' chose while interacting with the first narrative. Participants preferred two paths, both ending up with a utopian outcome. The difference between the two paths was the number of utopian decisions leading to it, meaning 58.46% of participants made 3 out of 3 utopian decisions, and 38.46% with 2 out of 3. The percentage of participants ending with dystopian outcomes was only 3.07%. The specific differences in the structure of the narratives can be seen in Appendix E.

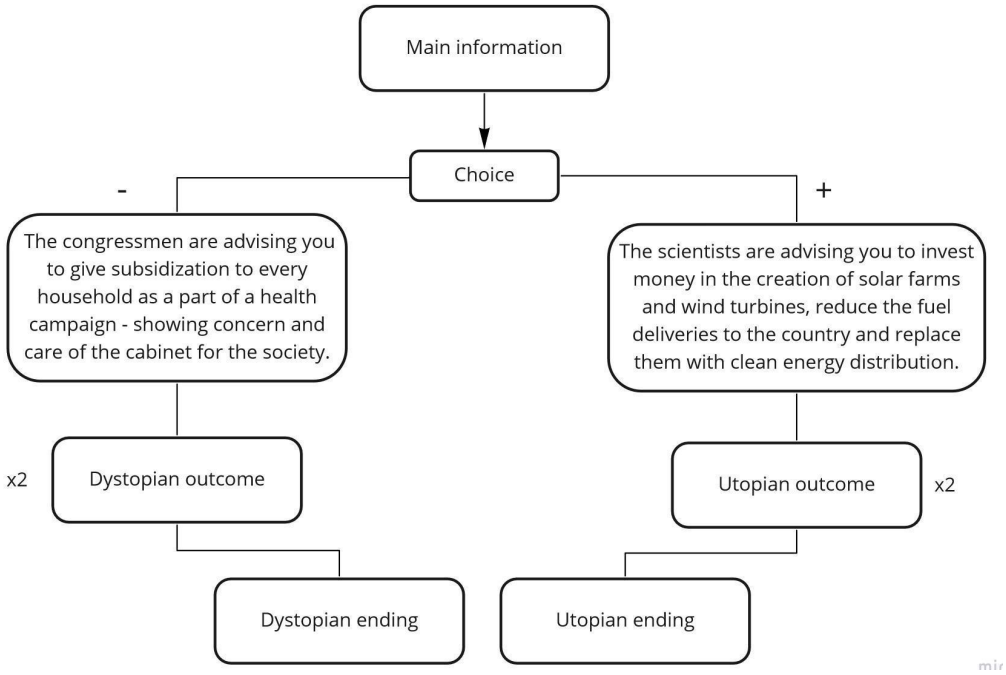
Effectance is this study's independent variable, which was manipulated by creating three main points of conflict. The participants were able to see the consequences of their actions

immediately (local effectance) and at the end of the interactive narrative (global effectance). Concerning global effectance, the participants could reach two possible endings (dystopian or utopian) based on the amount of positive and negative decisions they made (Figure 1 depicts a simplified diagram of the mechanism.). For example, a positive decision is: "*Scientists are suggesting the creation of a massive campaign for protecting the forests and planting more trees. The benefits will have a long-term effect - the forest will enrich the soil and prevent floods."* A negative: *"The congressmen suggest you create climate-proof housing as a safe option. People will be able to live there in case of floods or high temperatures caused by climate catastrophe."*

Furthermore, an attention check was included to test whether the interactors became distracted trying to skip the textual content. Therefore, statements concerning the narrative were added for the participants to indicate whether it was truthful or not. For example, *'Who were your advisers?' 'What was the second given topic of discussion?'* and *'What was the working position of the main character?'* The attention check was considered positive if at least three out of the five questions were answered correctly. The results of the participants who failed the attention check were filtered out of the analysis.

Figure 2

A short version of the interactive narrative structure



3.3 Measures

3.3.1 Behavioral intentions

The dependent variable of the study is behavioral intentions which were measured with a scale adapted from Lorenzoni et al. (2007) and O'Neill & Nicholson-Cole (2009) and adapted by Uildriks (2020). Behavioral intentions were measured with four items (e.g., '*I am willing to adopt an eco-friendly lifestyle*') on a 7-point Likert scale (1 = completely disagree, 7 = completely agree). The items imply the four defined behaviors in which individuals could help the environment, such as sustainable consummation, environmental-friendly policies, lifestyle, and reducing polluting behavior. Moreover, the used items were derived from the defined behaviors, and they were structured to start with '*I am willing to.*' for example: '*I am willing to adopt an eco-friendly lifestyle*.' Behavioral intentions were measured twice in the survey, once before the (interactive) narrative and once after. That has been done to consider interactors' initial behavioral intentions towards climate mitigation (see Appendix D). A new variable was

computed, representing the difference in scores between the two tests. The reliability of both scales was good, for the pre-test α = .83 and the post-test α = .86.

3.3.2 Transportation

Appel et al. (2015) used the short form of transportation scale to measure transportation. The scale consisted of five statements such as '*I could picture myself in the scene of the events described in the narrative'* and the extent to which the interactor agrees with the statement on a 7-point Likert scale (see Appendix D). The scale had good reliability, α = .88. The scale is a reliable and valid short version of Green and Brock's (2000).

3.3.3 Guilt

The Modified Differential Emotion Scale by Renaud and Unz (2006), adopted by Bilandzic and Sukalla (2019), was included to measure perceived guilt. The scale consisted of three items - remorseful, guilty, conscience-stricken (e.g., '*To what extent do you feel remorseful?*') on a 5-point Likert scale ('1'= completely disagree, '5' = completely agree). The reliability of the scale was good, α = .78.

3.3.4 Manipulation check

The manipulation of effectance was checked by adopting the scale from Roth (2015) by using two items. The questions asked participants to rate how strongly they agreed with each statement.: '*My actions had a considerable impact on the events in the story'* and '*My decisions clearly influenced how the story went on.*' The answers were measured on a 7-point Likert scale.

Also, a question obtaining information about the country the participants feel close to was added. The inclusion of the question was aimed at the collection of exploratory data. That could explain differences in behavioral intentions towards climate mitigation based on cultural or economic background.

Additionally, a manipulation check question was added to check whether the presented narrative is perceived as utopian or dystopian. After reading it, the evaluation measured respondents' beliefs in the story's positive and negative implications, gains, and losses (Uildriks 2020; Spence & Pidgeon, 2010). The four items were measured in a 5-point Likert scale varying from 'Strongly agree' to 'Strongly disagree.' The scale's reliability was uncertain, $\alpha = .63$, and should be taken with consciousness.

3.4 Procedure

A questionnaire (Appendix F) was set up in Qualtrics and was shared with the participants. Before the study, participants received a consent form (see Appendix A). After the end of the study, they were debriefed (see Appendix G), and the intentions of the survey were further explained. Data collection was divided into two parts. First, the first half of the participants were presented with the interactive narrative. After giving their consent and beginning with the study, participants answered questions concerning their demographics. In particular, their sex, age, and education were then asked for the country they identify with. After that, they were presented with questions measuring their behavioral intentions toward climate change mitigation. Next, they continued with the narrative. The participants answered the questions concerning behavioral intentions again, followed by transportation, effectance, and guilt. After that, participants answered attention check and manipulation check questions (see Appendix F). Finally, they were debriefed and informed of the study's goals (see Appendix G).

The second part of the survey included the other half of the participants. They were exposed to the same procedure and questions. The discrepancy was that they had to read a traditional linear narrative instead of interacting with an IDN. Most participants ended with a utopian outcome of 98.5% ($N = 63$) and 1.5% ($N=2$) with a dystopian ending. Since the utopian

ending was by far the most frequent one, the traditional narrative contained a utopian ending. The only difference between them was in the third decision-making stage. In Traditional Narrative 1 (see Appendix D), the scientists' advice (*The scientists are advising you to finance the scientific experiments and the creation of ecological projects aiming to increase sustainable opportunities and create technologies optimizing the harvesting and collection of clean energy.'*) was chosen by 60.3% of the participants in the IDN. The advice of the congressmen ('*The congressmen are suggesting to you to create climate-proof housing as a safe option*') and its outcome was chosen by 35.3% of the respondents of the interactive narrative (see Appendix E).

3.5 Data Analysis

For the data analysis, an independent *t*-test was used to investigate the influence of effectance in cli-fi narratives (traditional vs. interactive) on participants' transportation into the storyworld and behavioral intentions regarding climate change mitigation. Additionally, the sub-RQ was examined by performing correlation analyses, investigating the correlations between transportation, guilt, and behavioral intentions. IBM SPSS Statistics version 26 was used to conduct all of the analyses.

Results

4.1 Comparing the traditional narratives

As mentioned, two traditional narratives had been created. The effect of both narratives on transportation and guilt and behavioral intentions was examined using three independent *t*-tests. The first independent *t*-test was performed with *transportation* as a dependent variable ($Mdif = .03$, $t(68) = -.65$, $p = .992$, bootstrapped 95% CI [-0.55, 0.55]. As the confidence interval crosses zero, the results were found not significant. That can also be seen from the *p*-value,

which is higher than .05. The second independent *t*-test was performed using *behavioral intentions* as a dependent variable (*Mdif* = -0.84, *t* (68) = -,65, *p* = .52, bootstrapped 95% CI [-.4, 0.21], showing that there was no significant difference between the variables. The independent *t*-test was performed with *guilt* as dependent variable (*Mdif* = -0.1, *t*(68) = -,46, *p* = .65) showing that there is no significant difference between the variables. Since the obtained results show no significant difference between the two traditional narratives with transportation, behavioral intentions, and guilt they were combined into a new variable and used for the main analysis. The results of the comparison are presented in Table 1.

Table 1

Comparison of the Two Traditional Narratives and their Effect on Transportation, Behavioral Intentions and Guilt

Variable	**Traditional narrative (*N* = 53)**	**Traditional narrative 2 (*N* = 17)**	
	M (SD)	*M (SD)*	*p*
Behavioral intentions (sub.)	0.15 (0.43)	0.24 (0.57)	0.52
Transportation	4.73 (1.38)	4.72 (0.79)	0.99
Guilt	2.7 (0.8)	2.8 (0.73)	0.65

4.2 Manipulation check

To ascertain whether the effectance of the IDN was perceived as higher, an independent *t*-test was performed. The data was not normally distributed for the interactive narrative ($z_{skewness}$ = -2.05; $z_{kurtosis}$ = -0.35). On average, the score of participants who experienced interactive narratives (*M* = 4.09, *SD* = .85) was higher than the score of participants experiencing the traditional narratives (*M* = 3.49, *SD* = 1.10). This difference was significant (*Mdif* = .61, *t*(133) =

3.56, p = .001) and generalizes to the population (95% CI [.27, .94]. The difference represents a medium-sized effect d = .62. Therefore, the results indicate a clear difference between the two narratives, showing that the perceived effectance was higher for the interactive narrative than for the traditional narratives.

To evaluate whether the narratives are perceived as utopian or dystopian, another independent *t*-test was performed. The average score of *Type of topia* was M= 3.46 (SD = .63). The data was not normally distributed for the interactive narratives because the $z_{skewness}$= 2.17, $z_{kurtosis}$ = - 0.82. On average, traditional narrative scores (M = 3.47, SD = .66) were higher than interactive narrative (M = 3.44, SD = .6). Thus, there was no significant difference ($Mdif$ = -.03, t(133) = -. 24, p = .814) in participants' perception of narratives perceived as dystopian or utopian. In particular, individuals did not see positive or negative implications discussed in the narratives.

The score of participants' behavioral intentions towards climate change mitigation was obtained twice in the survey. First, before the (interactive) narrative and once after. The difference in results between the two tests was represented by a new variable - *behavioral intentions subtracted.* Table 2 presents the scores of the pre-test, post-tes,t and the subtraction.

Table 2

Behavioral Intentions Scores Including Pre-test, Post-test, and Subtraction scores

Variable	**Interactive narrative (N = 65)**	**Traditional narrative (N = 70)**
	M (SD)	*M (SD)*
Behavioral intentions (pre-test)	5.9 (0.97)	5.62 (0.96)
Behavioral intentions (post-test)	6.07 (0.89)	5.8 (0.92)
Behavioral intentions (sub.)	0.18 (0.63)	0.17 0.46)

4.3 Effectance and transportation

To assess whether the level of transportation differs between the interactive and traditional narrative, an independent *t*-test was performed. The data was not normally distributed for the interactive narrative ($z_{skewness}$ = -2.05; $z_{kurtosis}$ = -0.35). On average, *transportation* was higher for the interactive narrative (*M* = 5.05, *SD* = 1.16) than for the traditional narrative (*M* = 4.73, *SD* = 1.26). This difference was not significant (*Mdif* = .32, *t* (133) = 1.55, *p* = .123), and does not generalize to the population 95% CI [-27, .94]. Therefore, hypothesis 1 was not supported.

4.4 Behavioral intentions and effectance

To examine whether the interactive narratives will lead to higher *behavioral intentions* towards climate change mitigation than traditional narratives (H3), an independent *t*-test was performed. The average score of *behavioral intentions* was 0.17 (*SD* = .55). The data was not normally distributed for the interactive narratives ($z_{skewness}$ = 17.99, $z_{kurtosis}$ = 61.31) nor for the traditional narratives ($z_{skewness}$ = 4.54, $z_{kurtosis}$ = 7.72). Equal variances between groups were assumed as the variance ratio was 1.85. On average, participants who experienced the interactive narrative ($M_{subtracted}$ = 0.18, *SD* = 0.63) reported a higher level of *behavioral intentions* than participants experiencing the traditional narratives ($M_{subtracted}$ = 0.17, *SD* = 0.46). However, this difference between the interactive narrative and traditional narrative was not significant (*Mdif* = 0.01, *t* (133) = 0.06, *p* =.96, bootstrapped 95% CI [-.16, 0.21]. As the confidence interval does cross zero, the difference between the two groups is not significant and cannot be generalized to the population.

4.5 Behavioral intentions and transportation

To test whether *transportation* is correlated to a higher level of *behavioral intentions* (H2), a bivariate correlation analysis was performed. The mean score of Transportation was 4.89 (*SD* = 1.21). A Pearson's correlation test was used to examine the relationship. Since the assumption of normality was not met for *transportation* $z_{skewness}$= -2.95, nor *behavioral intentions,* $z_{skewness}$ = 20.21, $z_{kurtosis}$ = 72.80), the bootstrapped confidence intervals were also reported to provide a more robust estimate of the effect. There is a positive correlation between *transportation* and *behavioral intentions*: *r* = .08, *p* = .345, bootstrapped 95% CI [-.02, .22]. As the confidence interval does cross zero, the results were not significant.

4.6 Exploratory analysis

In order to answer the sub-RQ - '*To what extent do guilt and type of topia influence the effect of effectance on behavior intentions?*' an independent *t*-test was performed to check whether the feeling of guilt differed between the interactive and traditional narrative. The average score of *guilt* was *M*= 2.82 (*SD* = .78). The data was normally distributed for the interactive narratives ($z_{skewness}$ = 0.33, $z_{kurtosis}$ = 1.06) and for the traditional narratives ($z_{skewness}$ = -0.05, $z_{kurtosis}$ = 0.31). Equal variances between groups were assumed as the variance ratio was 1.04. On average, the participants who experienced the *interactive narrative* (*M* = 2.92, *SD* = .76) reported a higher level of guilt than the participants who read the *traditional narrative* (*M* = 2.72, *SD* = .78). This difference was not significant (*Mdif* = 0.19, *t* (133) = 1.46, *p* = .15). Therefore, there was no significant difference in perceived *guilt* between the narratives.

The overall results of the performed *t*-tests are presented in Table 3.

Table 3

Results of Behavioral Intentions, Guilt, Transportation and Effectance

Variable	Interactive narrative (N = 65)	Traditional narrative (N = 70)	
	M (SD)	*M (SD)*	t-test
Behavioral intentions (sub.)	0.18 (0.63)	0.17 (0.46)	0.06
Moral emotion: Guilt	2.92 (0.76)	2.72 (0.78)	1.46
Transportation	5.05 (1.16)	4.73 (1.26)	1.55
Effectance	4.09 (0.85)	3.49 (1.10)	3.56*

* $p < 0.05$ (2-tailed) N = 135

In order to examine the relation between the variables *guilt* and *behavioral intentions,* a Pearson's correlation test was performed. Since the normality assumption was not met for the variable *behavioral intentions* ($z_{skewness} = 17.99$, $z_{kurtosis} = 61.31$), the bootstrapped confidence intervals are also reported to provide a more robust estimate of the effect. A significant positive correlation between the variables was not found $r = .09$, $p = .278$, bootstrapped 95% *CI* [-.06, .27]. Therefore, there seems to be no relation between perceived guilt and behavioral intentions towards climate change mitigation. Furthermore, Pearson's correlation analysis between guilt and transportation was performed: $r = .56$, $p = .000$, bootstrapped 95% *CI* [.43, .67], the correlation is significant. The correlations within the variables are presented in Table 4.

Table 4

Correlations between Behavioral Intentions, Guilt, and Transportation

Variable correlation	Behavioral intentions (sub.)	Transportation	Guilt
1. Behavioral intentions (sub.)	1.00	.35	.28
2. Transportation	.35	1.00	.56
3. Guilt	.28	.56	1.00

The second element in the sub-RQ, type of topia, was included as an exploratory variable in the study because the possibility for its examination depends on participants' decisions. In particular, obtaining data for both utopian and dystopian cli-fi narratives depends on whether there will be enough participants for each direction (utopian/dystopian). The data stated that most participants finished the interaction with the utopian ending (98.5%, $N = 63$) and only 1.5% (N=2) with the dystopian ending. Therefore, a traditional narrative only with a utopian ending was made.

Discussion

The current study was inspired by Uildriks's (2020) work and aimed to investigate how effectance influences transportation and behavioral intentions of participants towards climate change mitigation after they were exposed to either a traditional or interactive cli-fi narrative. Guilt and type of topia were variables that were considered as well. The current section explains the findings and offers interpretations of the results. Additionally, the current study's limitations and suggestions for future research and practical implications are included in this section.

5.1 Effectance and Transportation

The study set out to test the first hypothesis on whether effectance in an interactive digital narrative would trigger higher levels of transportation than a traditional narrative. The results suggest that the scores for transportation were slightly higher for the interactive narrative than the traditional narrative; however, the results were not statistically significant. These findings contradict previous outcomes, which suggested that IDNs could fulfill individuals' psychological needs by providing the feeling of consistency and freedom over the narrative. That in turn, would increase engagement and transportation into the storyworld (Green & Jenkins, 2014; Oh et al., 2020; Sundar et al., 2014). A possible explanation for this outcome is that no prior information is provided for the prime minister's personality, despite the participant interacting on behalf of the character. This lack of information prevents the construction of vivid imagery in the readers' minds, which is essential in identifying the character. Bilandzic and Busselle (2017) highlight that this is necessary for the interactor, as it aids in the transportation into the storyworld. Participants presumably could not identify with the main character due to the missing characteristics, ultimately lowering the transportation into the storyworld.

5.2 Transportation and Behavioral Intentions

Previous studies show that transportation into the narrative is an essential factor influencing behavioral intentions (Green et al., 2019; Green & Brock, 2000; Kinnebrock & Bilandzic, 2006). The second hypothesis focused on whether a higher level of transportation would lead to a higher score on behavioral intentions. Despite a positive correlation between the two variables, the statistical data was not significant. Thus, these results do not support the H2. A possible explanation for this might be the lack of transportation, an essential factor for the

participants' enjoyment and persuasion, as its presence could trigger a behavioral change (Green et al., 2019; Slater & Rouner, 2002).

According to Green and Brock (2000), when participants perceive the protagonist as sympathetic, they think of them as genuine and develop an affinity. However, Kuzmičová and Bálint (2019) state that readers tend to use themselves to reference the protagonist's characteristics and perceived relatedness. Factors such as gender are not enough for perceived similarity or wishful identification with the character. Thus, the prime minister, the main character in the current study's narratives, might not have enough similar qualities to the readers, causing the absence of identification and thus transportation into the storyworld. Additionally, the main character's working position and characteristics could have influenced the correlation transportation and behavioral intentions.

Another explanation for the findings could be the individual's home country, assuming they had spent most of their lives there. According to Mayerl and Best (2019), people living within countries with higher national wealth (e.g., the Netherlands) are more likely to engage in positive behavioral intentions towards climate change than people living in countries with lower national wealth, like Bulgaria. Since most of the participants of the study were Bulgarians, their routine life and country's economic situation could be an explanation for the outcome on behavioral intentions toward climate change mitigation.

5.3 Effectance and Behavioral Intentions

To further investigate the influence of effectance on individuals, their behavioral intentions were assessed before and after exposure to interactive or traditional narrative. The third hypothesis sought to determine whether an interactive narrative would lead to higher behavioral intentions toward climate change mitigation. Prior studies (Green & Jenkins, 2014;

Bilandzic & Busselle, 2011; Deci & Ryan, 2012; Oh et al., 2020; Roth et al., 2012) highlighted that the inclusion of effectance would satisfy individuals' intrinsic need for personal growth and progress and would have a persuasion effect. Contrary to earlier findings, traditional narratives are not likely to trigger a positive change in the individuals' behavior (Täuber & Van Zomeren, 2013; Schneider-Mayerson et al., 2020; Howell, 2012), thus effectance was proposed as a factor. Despite perceived effectance scoring slightly higher in the interactive narrative condition, the data indicates no significant difference. This result was due to the individuals seeing the outcome of their decisions, which could trigger a positive change in their behavioral intentions towards climate change mitigation.

Another potential explanation for the produced results could be the content of the narratives, as this element influences the level of transportation of an individual. The effects of the participant's choices were shown immediately, and the outcome of the narrative was presented at the very end. However, a lack of information did not lead to an informed choice. For example, the reader was exposed to brief introductory information regarding the role of the main character and a brief explanation of the current situation (e.g., *'Experts worldwide keep alarming for the climate change effects'* and *'Your goal is to construct an emergency plan, take care of the economy, society, and reduce climate change effects.'*). No further information is provided regarding the country's current situation, social dispositions, or undertaken measures; instead, the protagonist is invited to act straightaway - *'The meeting begins, and the first topic is the up-growing temperatures.'* Therefore, the interactor might not have sufficient information to identify as the main character and perceive enjoyment and transportation in the storyworld. Preceding studies (Pandrea, 2021; Winskell et al., 2019) highlighted the importance of additional information in the content, resulting in a higher perceived competence level. These studies

offered compelling interactive narratives that altered the perception and intention of the participant. Additionally, the included effectance in the narrative would help the participants learn and adopt the desired behavior while interacting (de Meyer et al., 2020), resulting in a change in their behavioral intentions. Contrary to previous studies, the present study was unable to confirm that effectance within a cli-fi narrative influences peoples' positive behavioral changes.

5.4 Guilt and Topia

5.4.1 Guilt

The study aimed to address the sub question regarding how guilt and type of topia influence the impact of effectance on behavioral intentions to mitigate climate change. The emotional response of guilt was proposed to affect behavioral intentions toward positive climate change (Bilandzic & Sukalla, 2019; Ferguson & Branscombe, 2010). Despite the participants experiencing a slightly higher level of guilt in the interactive narrative, the difference was not statistically significant. Furthermore, there was no relation between perceived guilt and behavioral intentions towards climate change mitigation. One explanation for these results could be the strong correlation between guilt and transportation, as the median for transportation was low. This low score could have influenced the emotional reactions toward the protagonist's journey throughout the story. This explanation is in line with the study done by Rickard et al. (2021), which demonstrates that transportation is essential for emotional responses, particularly guilt. An alternative explanation of the outcome could be that the majority of the participants reached a utopian ending. It is essential to emphasize that they were not exposed to a dystopian outcome, which presumably triggers negative emotions (Harth et al., 2013; Rickard et al., 2021). Therefore, by making positive decisions and reaching the utopian ending, participants might

experience positive emotions, potentially triggering change based on parallels with the storyworld characters (Claeys, 2013; Schneider-Mayerson, 2017).

5.4.2 Topia

The results suggest that participants did not perceive the narrative as dystopian or utopian. According to the results of the manipulation check, participants exposed to one of either narratives (i.e., interactive or traditional) did not perceive the story as utopian or dystopian. Respondents exposed to the interactive narrative preferred the utopian advice of the scientists more (i.e., *'Scientists are suggesting the creation of a massive campaign for protecting the forests and planting more trees.')* which eventually resulted in a utopian ending. This preference could be because the proposed solution (i.e., to the presented dilemma) did not possess enough information. The lack of information made participants unaware of whether their decision would have a positive (utopian) or negative (dystopian) impact. Another possible explanation is that participants picked the options they believed they should, not reflecting their natural behavior. Instead, they expressed a perception of what a morally correct behavior should be like (i.e., a wishful behavior). This assumption aligns with the study by FeldmanHall et al. (2012), which states that people's moral actions in real life tend to be 'more negative and self-centered' than the individuals' decisions in a hypothetical scenario.

Several participants expressed their impressions regarding the study. A biology teacher stated that the interactive narrative was a great way to communicate the futuristic environment with her students and that she will use it in her teaching. "*This seems like a way to solve the aftermath of a different problem which I think is the human way of thinking; as long as people keep using the same instruments to solve that which has been created, lasting change is futile*," another participant mentioned. These examples exemplify the inspiration for future research on

cli-fi IDNs with active learning content. However, some participants expressed dissatisfaction, of which one mentioned that he had never considered the climate crisis or its ramifications before the study. However, another participant had an unfavorable opinion toward the narrative content: "*It is, after all, a "fiction" life, and economics doesn't work this way. It is a very imaginary story indeed, and I feel like a lot of details were not considered in the story and what they led to.*" This comment gives food for thought concerning the length of the narratives and the nature of the provided information in future research. These comments highlight the potential of narratives regarding climate change communication if properly executed.

5.5 Implication and Future Research

A natural progression of this thesis could usefully explore more in-depth an "action-based" perspective (De Meyer et al., (2020) by accounting more for how interactors make a move based on observed information while simultaneously learning 'proper' behavior. Researchers state that educating and informing individuals about their contribution is essential in adopting a positive behavioral attitude towards climate change (Lester et al., 2006; Rudd et al., 2019). The current study could not explore in detail how people should respond to environmental change. Therefore, future research should focus on including educational content in a futuristic interactive narrative before elaborating more on climate change and attempting to simulate correct behavior. This inclusion could provide an extended interactive experience that could positively affect peoples' knowledge, perception, and attitude toward the topic.

Furthermore, considerably more work will need to be done to develop the character's inner world throughout the story. Specifically, future research should focus on the main character's characteristics, conflicts, and personal growth through internal focalization (van Krieken et al., 2017). As a result, this might act as an enabler of participants' transportation into

the storyworld, and thus the digital interaction, allowing them to act on behalf of the prime minister while giving them the responsibility for the outcome could lead to a more significant effect (Brock et al., 2002). Additionally, identification with the fictional character should be included as a variable mediating the transportation effect.

Moreover, further research needs to examine the links between people's behavioral intentions and the different economic and cultural factors of their specific country. Perceived skepticism towards ecological changes and their impact differs among countries. The variety comes from cultural background, political environment, the extent of the danger, and the media news stream (Capstick et al., 2014; Pidgeon, 2012). Thus, as this study location of events was set as 'Somewhere in Europe,' possible future research is required to determine a narrative content for specific geographical areas in the construction of the futuristic scenario concerning climate change. One of the underlying reasons for setting a specific geographical location is that, according to Mayerl and Best (2019), people living within countries with higher national wealth (e.g., the Netherlands) are more likely to engage in positive behavioral intentions toward climate change. The future study could examine the question by including participants' level of concern, skepticism, individual income, and relationship status. That could be a way to understand an individual's world better and find a more satisfactory explanation for his behavior and intentions towards climate change.

This study was based on Uildriks's (2020) study; thus, future research could be conducted by combining the variables of this study and Uildriks' study to obtain additional knowledge on the subject matter. Particularly, both studies engaged in Mommers' (2020) narratives, which for future research should be adjusted so that the events could be narrated using the internal focalization of a character, presenting his thoughts and motivations behind his actions. Moreover,

based on the original study, more focus should be placed on the year of events, assuring quality control in studying the effect of topia and temporal distance (Uildriks, 2020), while additionally studying identification variables assessing the transportation into the storyworld.

In terms of directions for future research, another potential area of further work could investigate the negative emotional reactions of fear, concern, and guilt, together with positive emotional reactions such as hope. On top of this, it might be required to explore their effect on positive behavioral intentions toward climate change mitigation to understand the focus area better. Lastly, the future study should compare interactive and traditional narratives once more with a more significant number of descriptive words estimating the narrative's directions in a way that clarifies the dystopian or utopian character of the story.

5.6 Limitations of the study

The thesis was limited in several ways. First, the study did not examine the dystopian narrative, and thus, the type of topia could not be included as a factor. As a result, the types of topia could not be compared. Another limitation is the online distribution of the survey, reducing the control over its conduction, so factors distracting respondents' attention might be occurring during the participation. However, an attention check measure was included right after the narrative to control for it. It resulted in the exclusion of 40 people from the study. Furthermore, the survey participants were diverse in terms of age, of which the elderly age group could have experienced difficulties due to the linguistic limitation and the narrative's digital format. Finally, a potential source of bias for the study is the sample choice, consisting of mainly Bulgarian participants. Therefore, the lack of diverse nationalities in the sample adds further caution regarding the generalizability of these findings.

Conclusion

The present study investigated the impact of effectance within traditional and interactive cli-fi narratives. The research question was: *To what extent does effectance within traditional and interactive climate fiction narratives affect positive behavioral intentions towards climate change mitigation, and to what extent is this effect mediated by transportation into the storyworld?* This study indicates that people tend to primarily make positive choices (i.e., utopian) in the narrative presented. Moreover, it seems like the inclusion of effectance is not enough to satisfy a participants' intrinsic needs. Thus, more attention should be placed on the influence of narrativity factors on individuals. The lack of satisfaction did not lead to narrative transportation, and the missing narrative elements (e.g., providing additional information) could explain the lack of storyworld transportation. The lack of transportation and the absence of a dystopian narrative can explain the missing effect of guilt in the participants regarding their behavioral intentions concerning climate change mitigation.

The current study's findings can serve as a starting point for future research implicating educational content. Elements such as effectance and character transportation could influence the positive behavioral intentions of participants towards climate change mitigation.

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Appendix A

Consent form

Dear participant,

Welcome, and thank you for your time! The following experiment is a part of a Master's thesis study in Communication and Information Sciences at Tilburg University. The study is dedicated to the topic of interactive narratives. Below you will find the information you need to get familiar with before proceeding with the survey.

The questionnaire will take about 5-10 minutes to complete. At first, you will be asked for your demographic information. After, you will be asked to read the given information and make decisions according to it. Note that all of the story elements are based on futuristic assumptions by Mommers (2020). Afterward, you would need to answer questions clarifying your experience. The obtained data from the study will be anonymized, analyzed, and stored.

Your participation is entirely voluntary, and you are free to withdraw at any point.

By taking part in this survey, you confirm that you are at least 18 years old and agree to have read and understood the form. By clicking "Give consent," you confirm that you have read the information above and will participate in the study.

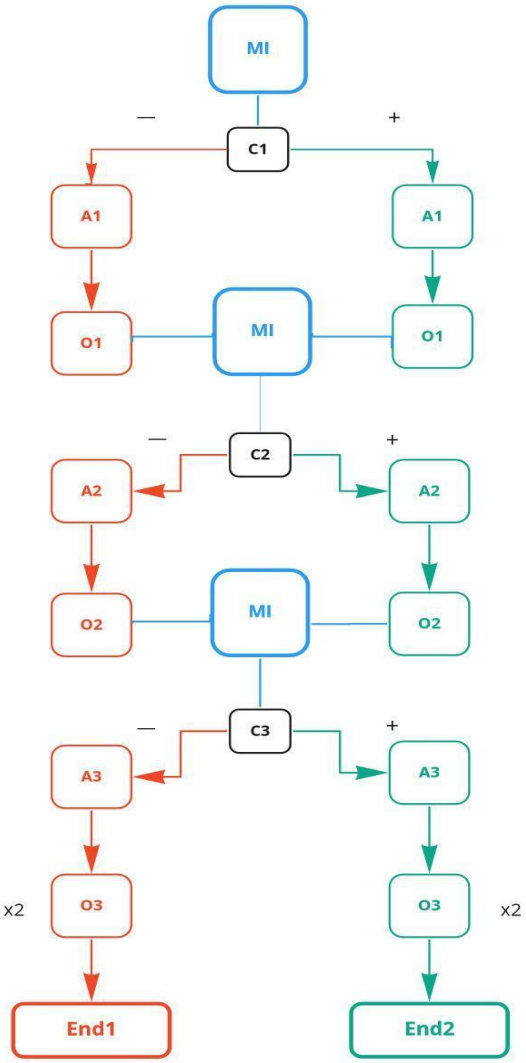
Thank you for your participation!

In case of further questions or additional information, please contact: Preslava Mihaylova (p.mihaylova@tilburguniversity.edu)

□ I hereby confirm my participation in this study, taking into account all terms mentioned above.

Appendix B

Interactive narrative structure



Introduction

C1 (Up-growing t°)

A1: Health campaign: AC & Subsidization

A1: Solar farms & Wind turbines

O1: Lack of Funding & High t °

O1: Green energy, new jobs and boosted economy

C2 (Food production)

A2: Fertilization and plantation of mono cultures

A2: Campaign for forests protection and trees planting

O2: Declined export, high prices and floods

O2: Low CO2 emissions, rich soils and enhanced food production

C3 (Climate refugees)

A3: Climate-proof housing

A3: Sustainability and clean energy

O3: Climate-proof houses only for the rich people

O3: Global warming has stopped, wind turbines

End 1: Safe and comfortable life is set to become the preserve of a wealthy minority.

End 2: Restoration and protection of nature, forests that absorb carbon and provide cooling it is a hopeful time to live in.

MI - Main Information	**C** - Choice (1/2/3)
A - Negative Advice (Dystopian)	**A** - Positive Advice (Utopian)
O - Negative Outcome (Dystopian)	**O** - Positive Outcome (Utopian)
End 1 - Dystopia	**End 2** - Utopia

Appendix C

Merged climate fiction narrative - Interactive narrative

MI - Main Information

C1 - Choice (1/2/3)

A1 - Negative Advice (Dystopian)

A1 - Positive Advice (Utopian)

O1 - Negative Outcome (Dystopian)

O1 - Positive Outcome (Utopian)

End1 - Dystopia

End2 - Utopia

Year: 2050

Somewhere in Europe

MI1: As the prime minister of the country, your people need you. Now, more than ever. Experts worldwide keep alarming for the climate change effects. As every leader, you are expected to be in a meeting with scientists, experts, and businessmen right now. Big changes need time, so you need to start as soon as possible. Your goal is to construct an emergency plan, take care of the economy, society, and reduce climate change effects. As you expected, the complexity of the problem is quite great.

The meeting begins, and the first topic is the up-growing temperatures.

C1: What would you decide?

A1: The congressmen are advising you to give subsidization to every household as a part of a health campaign - showing concern and care of the cabinet for the society. In the campaign, the cabinet will deliver an air conditioner to every household to enhance people's comfort.

A2: The scientists are advising you to invest money in the creation of solar farms and wind turbines. Also, to make a plan to reduce the fuel deliveries to the country and replace them with clean energy distribution.

O1: There's not enough money to realize this ambition. It has become difficult to exercise outdoors as the summers are too hot these days. For a while, it looked as if we were going to have the sort of weather that the Mediterranean used to enjoy, but we soon overshot those pleasant temperatures. This summer we had dozens of long, languid days with the kind of stifling heat that gives you headaches.

O2: After your decision more and more governments followed your example and levied taxes on CO2 emissions and invested the profits in renewable technology. The green industries that flourished under that policy created millions of new jobs and substantially boosted the economy. We're now producing green energy and eating sustainably cultivated food, and almost all everyday items are produced in a closed-loop.

MI2: A few years passed. Your decision spurred the change. You have been re-elected. It is time for you to take the next significant step. The plan must continue, and more things require

your attention. The next thing you need to take care of is to decide how you can help farmers and food production.

C2: What would be your decision?

A2.1: The congressmen support the idea of buying more machines, helping with the fertilization and plantation of monocultures. Although those cultures are not enriching the soil, they are great for export and trade.

A2.2: Scientists are suggesting the creation of a massive campaign for protecting the forests and planting more trees. The benefits will have a long-term effect - the forest will enrich the soil and prevent floods.

O2.1: The economy is struggling. The export of agricultural products has declined due to heat and drought, increased soil salinity, and torrential rainfall. Food prices have rocketed worldwide, while the costs of coastal protection are steadily mounting. Dike elevations are keeping the in lands dry for the time being, but the overriding concern now is that more and more land will flood anyway during the rainy season when lengthy downpours make rivers burst their banks.

O2.2: You can see the consequences of the Great Turn everywhere. The city is no longer a concrete jungle. Green roofs have been constructed on houses to absorb CO2 and rainwater and to cool the surroundings; parks are home to a wider variety of plants and animals than ever before. The protection of the trees and their plantation enriched the soils and enhanced food production drastically.

MI3: Only months after, the drastic changes in the environment have created a new kind of refugees. People are trying to reach countries with better ecological conditions. Hence, economic growth and prospective future. Following the steps of the emergency plan enhanced the movement.

C3: What would you do next?

A1: The congressmen are suggesting to you to create climate-proof housing as a safe option. People will be able to live there in case of floods or high temperatures caused by climate catastrophe.

A2: The scientists are asking you to finance the scientific experiments and the creation of ecological projects aiming to increase sustainable opportunities and create technologies optimizing the harvesting and collection of clean energy.

O3.1: Despite these drastic measures, the government can't guarantee that residents of major cities will keep their feet dry. Only the providers of climate-proof housing projects are in a position to offer such assurances, but you have to be a multimillionaire to live in one of those. Fortunately, we're shielded from the unrest elsewhere in the world as the Ministry of Defense has pledged to protect our border walls. But that doesn't stop us from seeing footage of people trying to climb over, in search of a better life.

O3.2: The turn came at a hefty ecological price: countries such as Bolivia and the Democratic Republic of the Congo expanded their polluting mining industries in recent decades to produce sufficient resources for wind turbines, batteries, and modern power networks. But now that we manage the recycling of our materials better, mine closures are on the increase. The

definitive end of the long era of plundering is finally in sight. Global warming has stopped, although in the past decades it has grown warmer part of the damage was unavoidable, thanks to the CO2 from previous generations still floating around.

End 1: Governments are doing all they can to manage the consequences because we have collectively failed to sufficiently mitigate global warming. A safe and comfortable life is set to become the preserve of a wealthy minority, even more so than today. In this scenario, society is in constant heightened tension, which could spiral even further out of control at any moment. If only we had done something about this earlier.

End 2: The climate fund to which all countries contribute a fair proportion of their GDP has mitigated the impact in the worst-affected areas, and the collaborative efforts of the national recovery ministries are bearing fruit: communal forestry projects deliver tangible benefits for everyone. A great deal of money that previously went into defense now goes to the restoration and protection of nature. The millions of new trees planted in the 2020s now form forests that absorb carbon and provide cooling during the warm summers. Despite everything, it is a hopeful time to live in. Fortunately, we helped with that on time.

Appendix D

Climate fiction narrative - Traditional narrative 1

Year: 2050

Somewhere in Europe

As the prime minister of the country, your people need you. Now, more than ever. Experts worldwide keep alarming for the climate change effects. As every leader, you are expected to be in a meeting with scientists, experts, and businessmen right now. The big changes need time, so you need to start as soon as possible. Your goal is to construct an emergency plan, take care of the economy, society, and reduce climate change effects. As you expected, the complexity of the problem is considerable.

The meeting begins, on the agenda for today are the rising temperatures. The scientists are advising you to invest money in the creation of solar farms and wind turbines. Furthermore, they advise you to make an emergency plan to reduce the fuel deliveries to the country and replace them with clean energy distribution.

After you took their advice, more and more governments followed your example and levied taxes on CO2 emissions and invested the profits in renewable technology. The green industries that flourished under that policy created millions of new jobs and substantially boosted

the economy. We're now producing green energy and eating sustainably cultivated food, and almost all everyday items are produced in a closed-loop.

Your decision spurred the change. Now it is time for you to take the next significant step. The emergency plan must continue, and more things require your attention. The next thing you need to take care of is to help farmers and food production. Now, the scientists are suggesting the creation of a "Green Turn' - a massive campaign for protecting the forests and plantation of more trees. The benefits will have a long-term effect - the forest will enrich the soil and prevent floods.

They were right. After taking their advice, you can see the consequences of the Great Turn everywhere. The city is no longer a concrete jungle. Green roofs have been constructed on houses to absorb CO2 and rainwater and to cool the surroundings; parks are home to a wider variety of plants and animals than ever before. The protection of the trees and their plantation enriched the soils and enhanced food production drastically. Only months after, the changes in the environment have created a new kind of refugees. The people are trying to reach countries with better ecological conditions. Hence, economic growth and prospective future. The scientists are advising you to finance the scientific experiments and the creation of ecological projects aiming to increase sustainable opportunities and create technologies optimizing the harvesting and collection of clean energy.

The turn came at a hefty ecological price: countries such as Bolivia and the Democratic Republic of the Congo expanded their polluting mining industries in recent decades to produce sufficient resources for wind turbines, batteries, and modern power networks. But now that we

manage the recycling of our materials better, mine closures are on the increase. The definitive end of the long era of plundering is finally in sight. Global warming has stopped, although in the past decades it has grown warmer part of the damage was unavoidable, thanks to the CO2 from previous generations still floating around.

Overall…the climate fund to which all countries contribute a fair proportion of their GDP (Gross Domestic Product) has mitigated the impact in the worst-affected areas, and the collaborative efforts of the national recovery ministries are bearing fruit: communal forestry projects deliver tangible benefits for everyone. A great deal of money that previously went into defense now goes to the restoration and protection of nature. The millions of new trees planted in the 2020s now form forests that absorb carbon and provide cooling during the warm summers. In spite of everything, it is a hopeful time to live in. Fortunately, we helped with that on time.

Appendix E

Climate fiction narrative - Traditional narrative 2

*The part that differs from Traditional narrative 1 is presented in *Italic*.

Year: 2050

Somewhere in Europe

As the prime minister of the country, your people need you. Now, more than ever. Experts worldwide keep alarming for the climate change effects. As every leader, you are expected to be in a meeting with scientists, experts, and businessmen right now. The big changes need time, so you need to start as soon as possible. Your goal is to construct an emergency plan, take care of the economy, society, and reduce climate change effects. As you expected, the complexity of the problem is considerable.

The meeting begins, on the agenda for today are the rising temperatures. The scientists are advising you to invest money in the creation of solar farms and wind turbines. Furthermore, they advise you to make an emergency plan to reduce the fuel deliveries to the country and replace them with clean energy distribution.

After you took their advice, more and more governments followed your example and levied taxes on CO2 emissions and invested the profits in renewable technology. The green

industries that flourished under that policy created millions of new jobs and substantially boosted the economy. We're now producing green energy and eating sustainably cultivated food, and almost all everyday items are produced in a closed-loop.

Your decision spurred the change. Now it is time for you to take the next significant step. The emergency plan must continue, and more things require your attention. The next thing you need to take care of is to help farmers and food production. Now, the scientists are suggesting the creation of a "Green Turn' - a massive campaign for protecting the forests and plantation of more trees. The benefits will have a long-term effect - the forest will enrich the soil and prevent floods.

They were right. After taking their advice, you can see the consequences of the Great Turn everywhere. The city is no longer a concrete jungle. Green roofs have been constructed on houses to absorb CO2 and rainwater and to cool the surroundings; parks are home to a wider variety of plants and animals than ever before. The protection of the trees and their plantation enriched the soils and enhanced food production drastically.

Only months after, the changes in the environment have created a new kind of refugees. The people are trying to reach countries with better ecological conditions. Hence, economic growth and prospective future. *The congressmen are suggesting to you to create climate-proof housing as a safe option. People will be able to live there in case of floods or high temperatures caused by climate catastrophe.*

Despite these drastic measures, the government can't guarantee that residents of major cities will keep their feet dry. Only the providers of climate-proof housing projects are in a position to offer such assurances, but you have to be a multimillionaire to live in one of those. Fortunately, we're shielded from the unrest elsewhere in the world as the Ministry of Defense has pledged to protect our border walls. But that doesn't stop us from seeing footage of people trying to climb over, in search of a better life.

Overall…the climate fund to which all countries contribute a fair proportion of their GDP (Gross Domestic Product) has mitigated the impact in the worst-affected areas, and the collaborative efforts of the national recovery ministries are bearing fruit: communal forestry projects deliver tangible benefits for everyone. A great deal of money that previously went into defense now goes to the restoration and protection of nature. The millions of new trees planted in the 2020s now form forests that absorb carbon and provide cooling during the warm summers. In spite of everything, it is a hopeful time to live in. Fortunately, we helped with that on time.

Appendix F

Survey items

Demographic questions

1. **What is your gender?**

    a. Male

    b. Female

    c. Non - binary/ Third gender

    d. Other: ____

    e. Prefer not to say

2. **What is your age?**

    a. 18-24 years old

    b. 25-34 years old

    c. 35-44 years old

    d. 45-54 years old

    e. 55-64 years old

3. **What is the highest level of education you have completed?**

    a. No formal education

    b. High school diploma

    c. Bachelor's degree

    d. Master's degree

    e. Doctorate degree

4. **In which country have you lived the longest?**

Behavioral intentions:
Please, indicate to what extent you agree with the statements below after reading the story.

1. I am willing to adopt an eco-friendly lifestyle. (7-point scale: “Strongly disagree” to “Strongly agree”)
2. I am willing to be more sustainable in my consumption. (7-point scale: “Strongly disagree” to “Strongly agree”)
3. I am willing to vote for a more environmentally friendly policy in the future. (7-point scale: “Strongly disagree” to “Strongly agree”)
4. I am willing to avoid environmentally polluting behavior. (7-point scale: “Strongly disagree” to “Strongly agree”)

Transportation:

Please indicate below the extent to which you agree with these statements about the story.

While reading the story...

1. I could picture myself in the scene of events described in the story. (7-point scale: “Strongly disagree” to “Strongly agree”)
2. I was mentally involved in the story while reading it. (7-point scale: “Strongly disagree” to “Strongly agree”)
3. I wanted to learn how the story ended. (7-point scale: “Strongly disagree” to “Strongly agree”)
4. The story affected me emotionally. (7-point scale: “Strongly disagree” to “Strongly agree”)

5. While reading the story I had a vivid image of the main character. (7-point scale: “Strongly disagree” to “Strongly agree”)

Moral emotion: Guilt

1. To what extent do you feel remorseful? (5-point scale: “Not at all” to “Very much”)
2. To what extent do you feel guilty? (5-point scale: “Not at all” to “Very much”)
3. To what extent do you feel conscience-stricken? (5-point scale: “Not at all” to “Very much”)

Effectance:

To what extent do you agree with the given statement:

1. My actions had a considerable impact on the events in the story. (5-point scale: “Strongly disagree” to “Strongly agree”)
2. 'My decisions clearly influenced how the story went on.' (5-point scale: “Strongly disagree” to “Strongly agree”)

Attention check:

Correct answers are presented in **bold.**

1. **Who were your advisers?**
    a) **Congressmen and scientists**
    b) Scientists and businessmen
    c) Congressmen and Farmers

2. What was the second given topic of discussion?

a) Diversity of animal species

b) Clean water resources

c) Farms and food production

3. What was the working position of the main character?

a) President

b) Prime minister

c) Ecologist

Manipulation check:

The story you have just read mentioned ways in which society will deal with climate change in the future and what effects these ways will have on the future.

To what extent do you agree that the following aspects of this were discussed in the story?

1. Positive implications (5-point scale: “Strongly disagree” to “Strongly agree”)
2. Negative implications (5-point scale: “Strongly disagree” to “Strongly agree”)
3. Gains (5-point scale: “Strongly disagree” to “Strongly agree”)
4. Losses (5-point scale: “Strongly disagree” to “Strongly agree”)

Appendix G

Debrief

Thank you for participating in this survey!

You have been exposed to a so-called climate fiction (cli-fi) story. The story you were presented to is based on two futuristic scenarios written by Jelmer Mommers (2020) and published in his book 'How are we going to explain this: Our future on a hot Earth.' Your participation was part of a study aiming to investigate the effect of seeing the outcome of your decisions on your behavioral intentions comparing interactive stories and traditional stories. Transportation to the storyworld and whether the moral feeling of guilt impacts the effect as mentioned above were also measured. The results of this research will provide more insight into the effectiveness of interactive stories about climate change.

If, after completing the survey, you still have your doubts and want to withdraw, you can do so via email (p.mihaylova@tilburguniversity.edu). You do not need to provide a reason for your decision. Your data will be deleted. In case of any further questions or additional information needed do not hesitate to contact me.

Please, do not share any information about the purpose of the study or the survey itself with other people. A possible future participant should not be familiar with this information before conducting the survey.

Thank you for your time and your participation!

Best regards,

Preslava Mihaylova (p.mihaylova@tilburguniversity.edu)