



Utrecht University

(Science) Fiction Imaginaries and Policy

Master thesis

Student: Alissa Kerklingsh
Student number: 6744354
Program: Sustainable Development
Specialization: Earth system governance
Email: a.t.kerklingsh@students.uu.nl
Supervisor: Joost Vervoort
Second reader: Peter Pelzer
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Abstract

Modern-day democracies are investigating how to deal with long term problems that do not incentivize enough action in the present to prevent great problems in the future, like climate change. One possible solution could be that alternative, positive futures are to be collectively imagined, different from dystopian futures that can be painted by climate models or scientific predictions. Imagining these desirable futures has been proven to be difficult: some have argued that we are currently amid a crisis of the imagination. Intriguingly, cultural artefacts could aid in stimulating imaginaries of alternative futures. More specifically, science and climate fiction could be specifically suited for this purpose. The question that was therefore asked in this research is: to what extent can (science) fiction can stimulate policy makers to think of alternative futures? Ten policy makers participated in this study, who used science and climate fiction to create imaginaries of future worlds. Results revealed that most policymakers found that science and climate fiction stimulated them to think of alternative futures. However, most policymakers found that science fiction was not the most useful tool to create imaginaries for a policy setting. Recommendations are therefore made that future thinking in policy settings is stimulated, but that improvements are made for using methods to do this.

Key concepts: *Futuring, Foresight, Anticipatory Governance, Imaginaries, Science Fiction, Climate Fiction, Policy*

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“The secret of change is to focus all of your energy, not on fighting the old, but on building the new”

Socrates

“Art is not a mirror held up to reality but a hammer with which to shape it”

Bertolt Brecht

1. INTRODUCTION

A core question that is asked in governance for sustainability, is: how can modern democracies be reformed to better take into account long-term concerns? Should the structure of the state and the way it functions reform? Should there for instance be an ombudsperson for the future generation and sustainability (Beckmann & Ugglå, 2017)? Should councils or committees be created that represent these future generations? Or should there be constitutional reforms that embed these rights of future generations within the constitution? In this same debate, the question should be asked: what future are we aiming for? What futures do we want and what futures can we imagine we want? Often in sustainability discourses, dystopian pictures of future worlds we want to avoid are painted. So where are the positive images of worlds we are striving to achieve?

Some have argued that there is currently a crisis of the imagination (Ghosh, 2018). In this crisis of imagination, we fail to collectively think of a world in which we are more in balance with ecosystems (Rothe, 2014), where dependency of fossil fuels is diminished (Hajer & Versteeg, 2019) and where the transformation to these new systems is achieved in a just way (Moore & Milkoreit, 2020). Since images of the future can shape our behavior in the present (Granjou, Walker & Salazar, 2017), this lack of imagination is worrisome. Another challenge that is causing this lack of imagination, is the ability of people to mentally engage with an abstract concept like the future, especially with futures that are far away. Generally, 'the future' means 10 to 15 years from the present to people and the maximum time people are approximately able to think about the future is around 15 to 20 years (Tonn, Hemrick & Conrad, 2006). Next to that, people tend to psychologically distance themselves from the future ("I believe that bad things will only happen to people in the future in a place far away from mine") and do not take losses in the future as serious as losses in the present (Milkoreit, 2017). New research that reveals how the future can be imagined and governed is therefore now a new challenge for sustainability research and practice (Muiderman, Gupta, Vervoort & Biermann, 2020).

Cultural engagement

A cultural response to this lack of imagination might be one of the solutions, as has been proposed in Buckland (2012). Letting people engage with cultural artefacts that are portraying different futures might be stimulating for people to engage with these alternative futures. Schwarz (2015) for instance proposed that literature is used in decision making processes. He pleads for a 'Narrative Turn', where more use is made of storytelling in organizational settings. Cultural products have a special power to engage people into stories by letting them feel emotions of protagonists and

letting people become immersed in different worlds. And in turn, it could make people more reflective about decisions they make in the present. Cultural expressions have even been noted to move beyond merely engaging people with topics to contribute to co-creation of knowledge (Galafassi et al., 2018).

Science fiction and climate fiction

Science fiction is a specific cultural genre that is fitting for stimulation of alternative worlds. Historically used in the Soviet Union and in China after the Civil War as educational material (mostly for children) on the possibilities of science (Bould, Butler, Roberts & Vint, 2009), it has now grown out to be one of the most popular genres in contemporary media, with 22.1% of the American films being categorized as science fiction (The Numbers, 2021), the share of science fiction books rising (Milliot, 2018) and more women and people older than 30 being increasingly interested in this genre (Menadue & Jacups, 2018). The definition of science fiction that is most often used is the one defined by Darko Suvin (1972, p. 375):

“[Science fiction] is a literary genre whose necessary and sufficient conditions are the presence and interaction of estrangement and cognition, and whose main formal device is an imaginative framework alternative to the author's empirical environment”

Although science fiction cannot be categorized as merely a literary genre anymore, it's defamiliarizing component has certainly stayed inherent to the genre. Oziewicz (2017) describes science fiction as being a subcategory of speculative fiction, which embraces alternative realities. Science fiction is believed to have many effects on consumers of it. Effects on imagination have been described by Margaret Atwood in her book on science fiction and the human imagination (2011). She describes science fiction as a modern continuation of Renaissance (utopian) thinking. For her, science fiction can serve as therapy by providing a safe option to explore different worlds which might subconsciously already be present in our minds. Next to these emotional and personal influences that science fiction might have, instrumental values of science fiction in institutional settings have similarly been described. In science fiction, entire societies can be described and therefore films or books can provide a birds-eye over organizational processes (Walter-Jochum, 2016). Next to that, Carpenter (2016) describes how speculative fiction can help people to think beyond their political preferences: it can open their view to other standpoints by creating a space in which stakes from the real world don't have to be taken into account. Furthermore, the field of international relations has been examined in combination with science fiction. Carpenter (2016)

describes three categories in which this research can be divided: pedagogical research, in which culture serves as a mirror for society and from which people can learn, interpretative research, in which cultural products are believed to reflect society and examining these is thus an examination of society, and explanatory research, in which causal relationships are drawn between cultural products and political processes. Lastly, science fiction has been proposed to be useful in scenario planning exercises, with two specific functions: using it for domain-specific scenarios and for testing organizational strategies (Fergnani & Song, 2020).

Within speculative fiction, a specific subgenre has grown over the last decades: climate fiction. This genre explores alternative climates and therefore can portray consequences of climate change (Ullrich, 2015). This genre has also served as part of ecocritical (where literature is used for expressing environmental concerns) and anti-capitalist movements (Irr, 2017).

Science fiction and its influence

The influence of science fiction has had is apparent in society in many ways. For instance, when Ronald Reagan wanted to clear nuclear missiles from space, he referred to this mission as the “Star Wars campaign” (Gierzynski & Eddy, 2013). The Dutch Ministry of Infrastructure and Water Management made use of science fiction in 1994 to reflect on plans for their project on spatial development called ‘RUIMPAD’. Recently, more and more studies are using science fiction for worldbuilding (Harris, 2020; Zaidi, 2019; Hassler-Forest, 2016; von Stackelberg & McDowell, 2015). Worldbuilding is defined as creating imaginary worlds where details are worked out: there are coherent geographic, social, cultural, and other features present in these worlds (von Stackelberg & McDowell, 2015).

Soft and hard policy spaces

But where can these worldbuilding exercises take place? Certainly, not all official environments create room for discussions greater than the missions that are worked on in that environment. It is therefore that Hajer has created the distinction between ‘soft’ and ‘hard’ policy spaces. Soft policy spaces are environments where creative thinking is stimulated, and where there is an equal playing field to give input on collective problems. Hard policy spaces are environments where policy is formed (for instance, Parliament, Provincial States or Municipalities) (Stuive, 2020). The debate on how and where soft policy spaces should be formed is still ongoing.

Scientific background and previous studies

However great the theoretical promises of science fiction are, not much empirical research exists that shows the effects of reading or watching science fiction (Carpenter, 2016; Milkoreit, 2019). There is thus much opportunity for research to explore the role of art and culture in political and institutional processes. The few empirical studies which have conducted research in this area will be described here. The impact of science fiction on the discourse around 'killer robots', deadly autonomic weapons, was researched by conducting interviews with advocacy elites by Carpenter (2016). The main finding of this study was that although science fiction did not serve as a direct conversation starter for the subject at hand, it served to constitute a context in which the conversation was facilitated and could strategically be used as 'hooks' for advocacy targets. A major study by Gierzynski & Eddy (2013) researched the effect of the Harry Potter series on the political socialization of the generation of millennials. The effects of this study showed that fans of the series showed different political preferences and values than those that were not a fan of the series: fans showed more support for equality, were less authoritarian, showed lower levels of cynicism and higher levels of efficacy than non-fans. However, a clear causal relationship could not be drawn between watching or reading the series and all these characteristics. How sound are these claims of culture influencing political development? And what are differences in the way that cultural artefacts influence people? Another study that addressed popular culture artifacts, and simultaneously critically looked at the interpretive openness of cultural analyses, was a study done by Milkoreit (2019). In this study, the link that political commentators and activists made between Game of Thrones (GOT) and climate change was researched. It was found that commentators of the show used content from GOT to create parallels with climate change: for instance, 'Winter is coming', a famous phrase from the series, and the White Walkers were both described in these comments as analogies for climate change. The study showed that political commentators can have a crucial role in mobilizing people to view a cultural product in a certain way. An empirical study that investigated the effects of reading climate fiction on the attitudes of people on climate change showed differences between people who did and those who did not. Reading climate fiction caused people to regard climate change as more psychologically close, allowing people to investigate psychological and social aspects of climate change and better understand the scale at which climate change is unfolding (Schneider-Mayerson, 2018). Another study found that reading climate fiction books might increase readers' awareness of environmental injustices and help them sympathize with climate migrants (Schneider-Mayerson, 2020). A recent empirical study has looked at how reading climate fiction affected people's views and attitudes about climate change and discovered that it had

a modest but substantial effect on some beliefs and attitudes about climate change. One month following the intervention, these effects were no longer evident (Schneider-Mayerson et al., 2020).

Research aim

The aim of this research is to explore the usefulness of (science) fiction to create imaginaries for policy settings. This will be done by experimentally exploring how policymakers react to using (science) fiction for worldbuilding and consequently relate these future worlds to their work. Therefore, the following main research question and sub questions are asked in this research:

To what extent can (science) fiction stimulate policy makers to think of alternative futures?

1. What are the current mental models of policy makers of the future?

With this question, a mental model is obtained of how policymakers now see the future. This model is then later used to see if science fiction can open up and possibly change this mental model.

2. Does working with science fiction known to policy makers stimulate them to think of alternative futures?

With this question, policy makers will be asked to retrieve science fiction they know for worldbuilding. They will create a scenario based on two science fiction artefacts they know. Their reaction to this exercise is what will be used to answer this question.

3. Does working with a climate fiction podcast stimulate policy makers to think of alternative futures?

With this question, the short-term effects of exposure to climate fiction are researched. The same exercise as for question 2 will be done, and consequent reactions of policy makers will be used to answer this question.

4. How do policy makers indicate the influence that working with (science) fiction has had on them after 4 weeks?

With this question, the effects of the exercises after 4 weeks of conducting them will be researched. Policy makers will be asked to answer through e-mail what the effect of the study on them has been.

Scientific relevance

This study contributes to the field of sustainable development by filling an experimental research gap on the use of (science) fiction imaginaries for policy environments. In doing this, it contributes to creating methods for the stimulation of socio-economic imaginaries and adds knowledge to the field of empirical research on the influence of culture on policy. Theoretically, some concepts will be proposed in this research (the psychological description of 'open' or 'closed' views on the future), where previous literature has described these terms, but no definition has been created so far. Next to that, this study provides the reader with an overview of foresight methods and relates different concepts from sustainability research with this, such as the worldviews proposed by de Vries (2012) and Tukker and Butter (2007). Methodologically, an exercise for worldbuilding using (science) fiction imaginaries is proposed, which is easily conducted and can be used for policy settings.

Societal relevance

This research will contribute to a broader understanding of how cultural artefacts can be used in institutional settings. It is a starting point for discussion on how and why integration could and perhaps should take place between these two fields. Further research can draft more advice on how exactly integration can take place.

Conducting interdisciplinary research

For conducting this research, I have put myself in the role of interdisciplinary researcher. I have a bachelor's in Psychology and follow a master-degree in Sustainable Development. But in this thesis, I have also entered the arena of Cultural Analysis. These three disciplines have all influenced how I have conducted my research. I have used psychological model thinking to simplify reality and to draft hypotheses. After that, the richness from the qualitative interviews was used to contextualize the findings, which ultimately will lead to a conclusion that both tries to simplify the reality, but simultaneously shows how complicated researching these subjects is. Theory from cultural analysis has been used to answer the research question. Lastly, results from this research can contribute to sustainable development.

2. THEORETICAL FRAMEWORK

2.1 SUSTAINABILITY AND FUTURES

A new research area for earth system governance research is anticipatory governance (Burch et al., 2019). Anticipatory governance has been defined as ‘governing (or steering) in the present to engage with, adapt to or shape uncertain futures’ (Muiderman et al., 2020, p.1). As such, two processes related to these steering mechanisms have been defined: anticipation and imagination. While anticipation processes deal with creating futures and what assumptions underlie these (desired) futures, imagination processes deal with imagining futures, including ones that divert from linear continuations of our present. These two processes are not exclusive but do focus on different aspects of futures: imagination research investigates how humans perceive futures and how this mental model of the future can be altered, while anticipation mainly investigates scenario work and questions how planning of these futures will unfold. While these processes exist parallel to each other and are used in different settings, I would argue that imagination processes feed into anticipation processes. Challenging and altering imaginations of the future could create different anticipation processes. It is therefore important to research these processes, as has increasingly been recognized by the academic community (Muiderman et al., 2020). Collective imagination of new and alternative futures is seen by some as a first step to realize and achieve alternative futures (Hajer & Pelzer, 2018; Hajer & Versteeg, 2019).

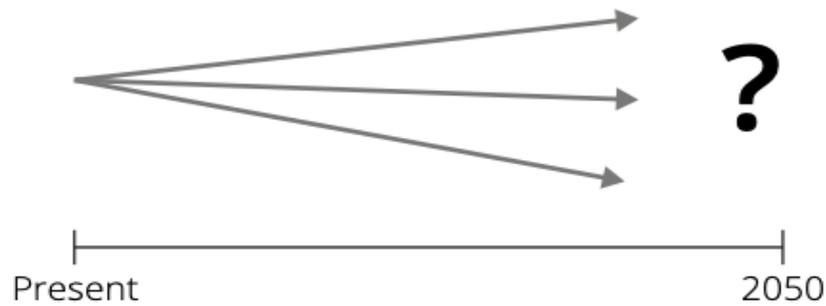
Foresight is an academic research area that encompasses a wide range of strategies for dealing with the future (Evely, Reed, Scott & Hardman, 2013). The scientific field has historically moved from a focus on systems and cybernetics after World War II to a focus on complexity and emergence in the late twentieth and twenty-first century, where human systems are understood through social and cultural systems (Conway, 2021).

An analytical distinction has been made in three different foresight methods: exploratory, visioning and pathways of action (van den Ende, Wardekker, Mees, Hegger & Vervoort, 2021). For the completeness of the theoretical background on foresight methods, a short overview of different methods will be given here.

First, *exploratory foresight methods* describe how plausible futures may unfold and what drivers lie at the basis of this change, see Figure 1. These scenarios start with the assumption that there are multiple futures and consequently scenarios possible. This is the method that will be researched in the current thesis. Exploratory foresight methods are particularly suited for policy development. Scenarios derived by using this method can explore the question what might happen if

certain scenarios become a reality. Completely different scenarios of the future can be derived using this method, where different assumptions about for instance population development, climate change and urban development can lead to radical different scenarios.

Figure 1
Exploratory scenarios of plausible futures



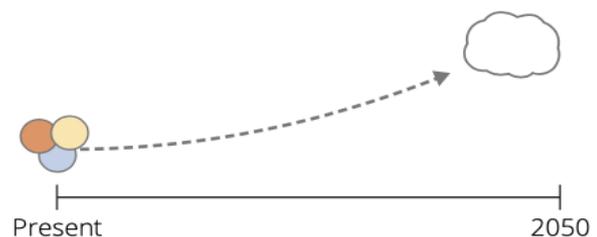
Note. Adapted from van den Ende et al. (2021)

Secondly, *visioning methods* stimulate people to think of desirable futures. Using this methodology, people are stimulated to think about what a desired environment, for instance your city or neighborhood, might look like in the future. Within this practice, a distinction can be made between two practices: visioning futures from scratch and based on (personal) values (Figure 2), or visioning futures based on existing practices (Figure 3).

Figure 2
Visioning futures from scratch



Figure 3
Visioning futures based on existing practices



Note. Both are adapted from van den Ende et al. (2021)

Thirdly, creating *pathways of action* provide people with concrete actions that will lead to a certain vision of the future. Here, concrete steps are considered that will take you to a certain

future. In Figure 4, *regular backcasting* is shown, which calculates the steps that are necessary for the desired future. However, change rarely happens linearly. Throughout history, there have always been (semi-) unexpected economic crises, climate disasters or pandemics. Therefore, *incremental backcasting* is a method that assumes there will be unexpected events along the way to a future. See figure 5 for a visualization of this method.

Figure 4
Regular backcasting

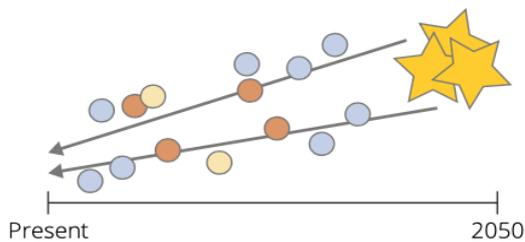
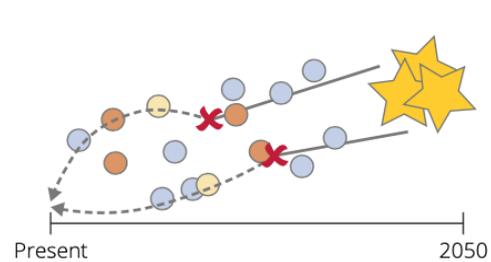


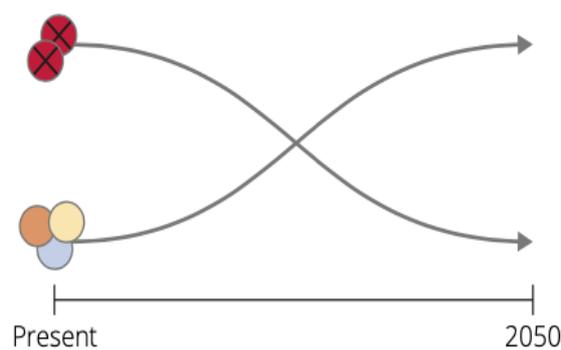
Figure 5
Incremental backcasting



Note. Both are adapted from van den Ende et al. (2021)

Lastly, *seed-based pathways* take local initiatives that already exist as a starting point for thinking about the future: how will these seeds develop and what is needed to stimulate their growth? See Figure 6 for a visualization of this method.

Figure 6
Seed based pathways

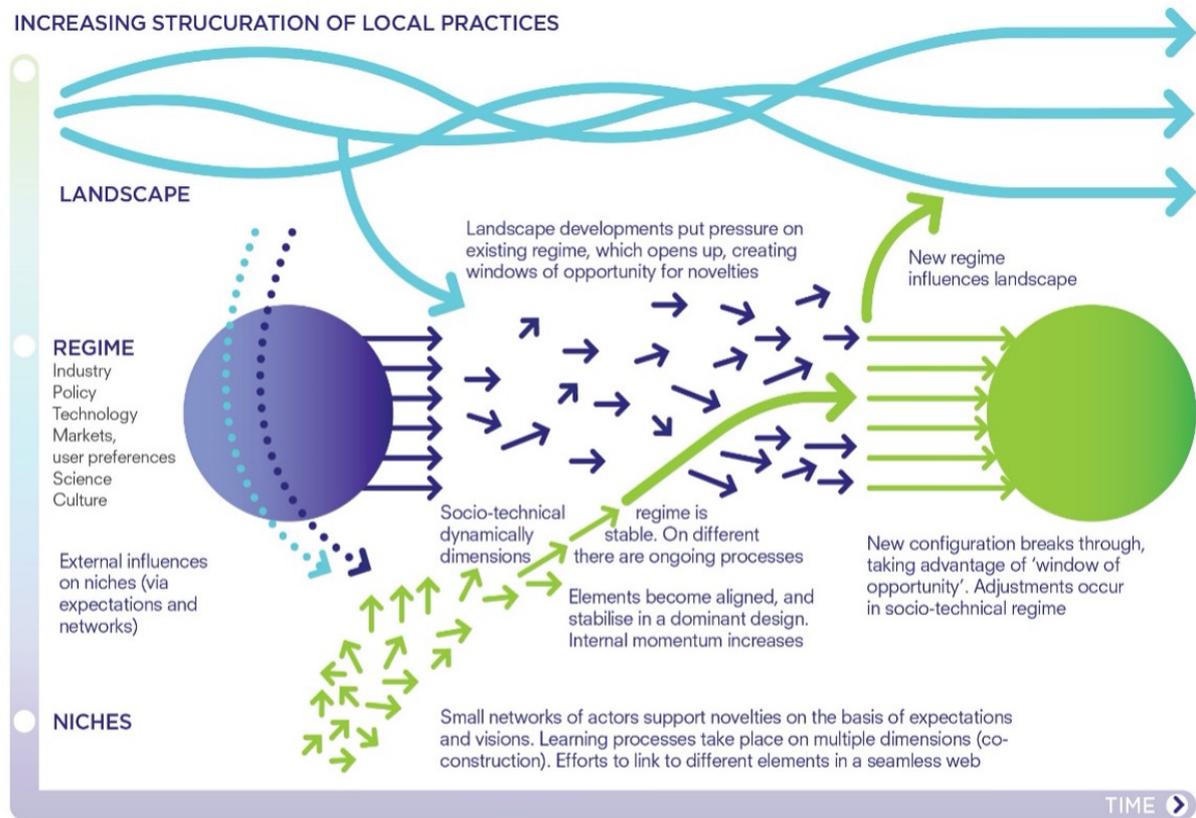


Note. Adapted from van den Ende et al. (2021)

In this last category of foresight methods, much research is being done. For instance, research on transformations and how niches (comparative to seeds) can be upscaled is being conducted (Geels &

Schot, 2007; Ghosh, Kivimaa, Ramírez, Schot & Torrens, 2020). See Figure 7 for a depiction of this work, which has explanatory text in the figure itself.

Figure 7
Multi-level perspective of the socio-technical transition framework



Note. Adapted from Geels and Schot (2007)

The current study tries to discover whether creating (science) fiction imaginaries have a potential to become an exploratory foresight method. Due to its experimental nature, science fiction or climate fiction are found to be not fitting for the other two categories, visualizing and pathways of action.

There is a call from practitioners within corporate and policy-making settings to make future studies more utilitarian (Ahlqvist & Rhisiart, 2015). Three pathways are suggested where future oriented research could develop towards: socio-technical practices, future-oriented dialectics, and socio-economic imaginaries. The current research will add knowledge to the last category of research, socio-economic imaginaries. The strength of this field is believed to lie in the possibility for people to imagine alternative futures, which could consequently mean they will act upon these futures (Ahlqvist & Rhisiart, 2015). Imaginaries could feed into the scripts that direct everyday life.

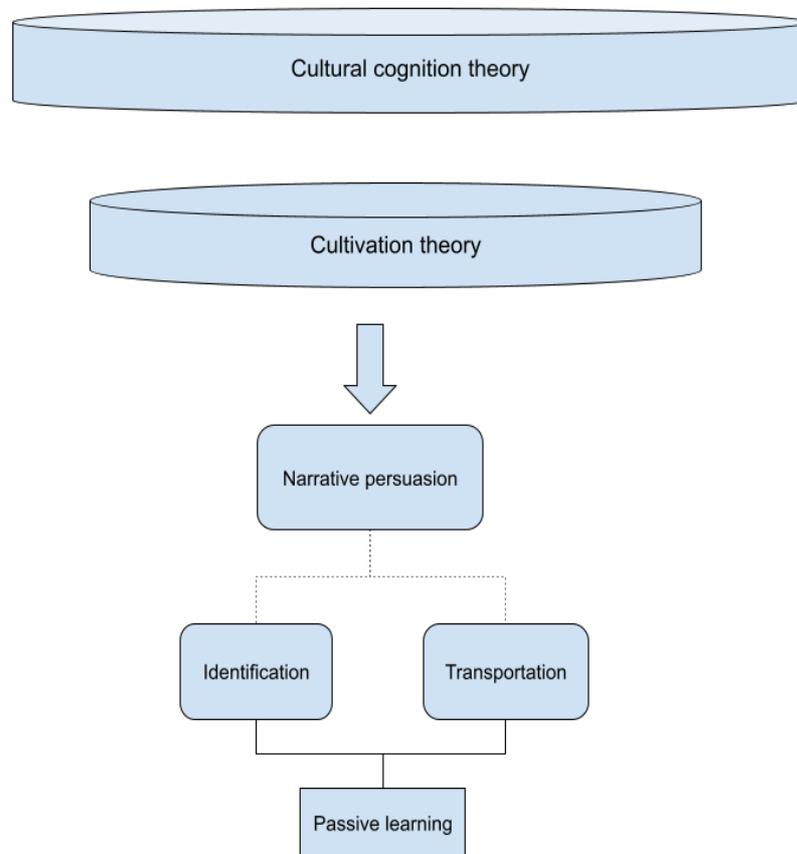
What exactly are imaginaries? Yusoff and Gabrys (2011, p. 516) define imagination as “a way of seeing, sensing, thinking, and dreaming the formation of knowledge, which creates the conditions for material interventions in and political sensibilities of the world”. Climate change is often described in imaginaries. The climate is present in the lives of every human living on this planet. However, the imaginary of what climate is and how it can change is based on the formation of knowledge. In this sense, imaginaries are at the interplay between material and perceptual worlds (Yusoff & Gabrys, 2011). A strength but simultaneously a weakness of imaginaries is that they can be self-fulfilling prophecies (Pelzer & Versteeg, 2019). This idea concurs with what Beckert (2013, p. 221) has noted: “It is the images of the future that shape present decisions”. Scholars have therefore been arguing that positive examples (‘good seeds’) of what a sustainable future could look like are needed to actually create sustainable futures (Bennett et al., 2016; Pelzer & Versteeg, 2019).

However, creating these seeds might not be such an easy task. Previous psychological work has shown that imagining the future is challenging for people. The future is an abstract concept, which requires cognitive effort to engage with. Next to that, the future is not as emotionally engaging as the present or near present. People often think linearly and see the future as a continuation of the present. Next to that, incentives often lack for people to imagine qualitatively different futures (Milkoreit, 2017).

An answer to relieve people from this locked-in mindset comes from a different field of science: cultural studies. Engaging with cultural artefacts might increase engagement with the future. The promise that cultural artefacts hold on increasing engagement with the future are manifold. Most importantly, they could create meaning-making and learning (for instance about science), stimulate the creation of mental models of the future, help to explore values and ethical dimensions of change, stimulate complex-systems thinking and humanize environmental problems (Milkoreit, 2016). The way in which these cultural artefacts do that is by stimulating worldbuilding (Hassler-Forest, 2016; Zaidi, 2017). How these worlds are perceived by an audience, will influence the impact they will have. Therefore, the cultural lenses as can be seen in Figure 8 were developed for the results of this thesis to be analyzed. Cultural cognition theory can be seen as a separate lens to look at the impact of media than cultivation theory. Cultivation theory is elaborated on by using the following constructs: narrative persuasion, identification, transportation, and passive learning.

Figure 8

The theoretical lenses used in this research.



2.2 CULTURAL COGNITION THEORY

The results from this research will be looked at through the lens of cultural cognition. This is a psychological theory, which states that people tend to fit information into a pre-existing scheme of beliefs and worldviews (Milkoreit, 2019; Kahan, Jenkins-Smith & Braman, 2011; Kahan & Braman, 2006). This theory has been tested on individuals with different views on climate change and scientific consensus on this topic. This research has shown that cultural cognition is indeed an explanatory factor for the differences found between people on their belief in the scientific consensus on climate change facts. Namely, people from different cultural backgrounds were shown to have opposing perceptions of expert statements on climate change (Kahan, Jenkins-Smith & Braman, 2011). Specifically, they found that people's worldviews had an impact on the way people adjusted their opinion around this scientific consensus. People with hierarchical and individualistic outlooks were shown to fit their perceptions of scientific consensus more towards their own values (thus sometimes not acknowledging widespread academic consensus around anthropogenic climate change), while people

with egalitarian and communitarian outlooks adopted views on scientific consensus more, even if they clashed with their values.

This lens of cultural cognition can be used in this research to explain how people consume (science) fiction, consistent with their pre-existing scheme of beliefs and worldviews. Namely, if people perceive the world to be linear and do not expect that the future will be radically different from the present, science fiction will likely not be perceived as fitting into their existing scheme of the future and will therefore not stimulate them to think of alternative futures. On the other hand, if people have a pre-existing belief that the future is open and that multiple alternative futures are possible, they will likely perceive science fiction as a possible future, and it will stimulate them to think of alternative futures. Using this lens, hypothesis 1 will follow. A confounding factor in drawing hypotheses based on this theory, is that works of fiction might have multiple meanings to different audiences. This phenomenon has been coined as 'interpretative openness' (Milkoreit, 2019). Thus, the results from this hypothesis will have to be contextualized.

2.3 CULTIVATION THEORY

Secondly, the results from this research will be looked at through the lens of cultivation theory. Cultivation theory can be classified as a grand theory (Potter, 2014; Roskos-Ewoldsen, Davies & Roskos-Ewoldsen, 2004). Morgan and Shanahan (2010) even state that cultivation analysis has gained some distinct paradigmatic characteristics. This theory captures how people perceive (mass) media and are consequently influenced by it. The literature has moved from the study of the macrosystem effects of media towards researching short-term reactions to specific messages in media and the effects of watching specific genres (Potter, 2014; Roskos-Ewoldsen et al., 2004).

Broadly speaking, cultivation theory proposes that frequent exposure to a media source causes viewers to internalize the perspectives in that source and to perceive the world in a similar light to that which is shown in that media (Sestir & Green, 2010). Supporting this theory, research has shown that people who frequently watch television see the world similar to what is presented on TV (Gerbner, Gross, Morgan, Signorielli & Shanahan, 2002; Shanahan, Shanahan, James & Morgan, 1999). Images of the world can be formed on misrepresentation of the real state of the world. For instance, material abundance and wealth are portrayed disproportionately to the real world on television (O'Guinn & Shrum, 1997). Next to that, risk perceptions can be influenced by the media. An example comes from violence portrayed on television. A discrepancy exists between 'real-world crime', experienced by less than 1% of the American population, and 'television crime', which is present in 70% of broadcast network television. This discrepancy has led people to seeing the world as a more

dangerous place than it actually is (Gerbner & Gross, 2017). Cultivation research has shown that watching media that match people's day-to-day environments will generate a greater cultivation effect than media that stand far from people's realities (Roskos-Ewoldsen et al., 2004).

Narrative persuasion is a mechanism that can be placed centrally in cultivation theory (Sestir & Green, 2010). This has been described as the process of perceiving messages in a story which has a plot and identifiable characters (Kreuter et al., 2007 in Schneider-Mayerson et al., 2020). Audiences tend to accept normative evaluations from narratives faster than scientific logically constructed arguments (Green & Brock, 2000; Slater & Rouner, 2002). Within narrative persuasion, two key mechanisms have been identified which enhance the persuasive effect of the messages: identification and transportation (Morgan & Shanahan, 2010; Schneider-Mayerson et al., 2020). These two psychological constructs have been labelled as the two major moderators for the impact that media can have (Sestir & Green, 2010).

Identification

An experimental study found that identification can be a mechanism of narrative persuasion (de Graaf, Hoeken, Sanders & Beentjes, 2012). A proposed definition of identification by Sestir & Green (2010, p. 3) is "a process whereby viewers vicariously take the place of a media character and react to his or her experiences as if they were happening to the viewer". Another study operationalized this as "perceived similarity between the reader and the character, the reader's understanding of the character, and their shared emotional experience" (Schneider-Mayerson et al., 2020, p. 2). Identification is usually a temporary feeling and does not maintain stable throughout the whole consuming process of media. When identifying with a character, one is more likely to engage and mentally elaborate on messages this character is receiving. Identification is expected to lead to a stronger influence of the rewards that character in the media is receiving (Sestir & Green, 2010). Furthermore, by reducing the psychological barrier between the narrative character and the receiver, identification is likely to heighten risk perceptions (Schneider-Mayerson et al., 2020).

Transportation

Another mechanism by which narrative persuasion is believed to operate is transportation. When consumers of media are transported into a story, all their mental capacities become focused on events happening in the story (Green & Brock, 2000). This state of mind has been shown to affect emotions, beliefs, attitudes and behavioral intentions (Schneider-Mayerson et al., 2020). A direct link with beliefs and values has been laid out by studies pointing towards an enhanced persuasion effect

when transportation occurs (Moyer-Gusé, 2008; So & Nabi, 2013). Thus, it seems that learning of messages is increased when transportation into a narrative is present.

Passive learning

For both identification and transportation, passive learning of messages in the story is increased. Passive learning assumes that when people enjoy media, passive learning occurs. This is learning that happens as a byproduct of another activity, such as watching television or reading a book. While focusing on the enjoyment of consuming media, people can be exposed to political or sociological messages, which can consequently be passively learned. Notably when people are enjoying themselves, subliminal messages might be learned faster (Gierzynski & Eddy, 2013). Counterarguments to the narrative are then formed less (McComas & Shanahan, 1999).

Choosing psychological lenses

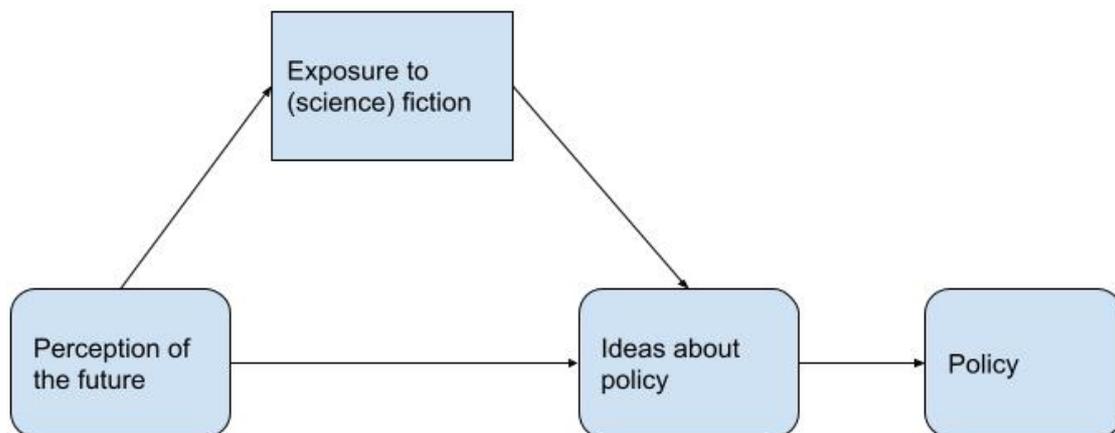
Many psychological lenses can be laid on the effects of media on people's perception of reality. Another perspective of cultivation theory on the effects of media comes from the mental model approach (Roskos-Ewoldsen et al., 2004). This approach looks at how memories are stored and retrieved from memory and predicts that the more accessible a model is from memory, the more likely it will be used to comprehend a specific situation. Mental models are dynamic representations of a situation, event or object. They can thus be cognitive maps, real or imagined situations, blueprints of system operations and deductive reasoning. Many psychological theories describe how this processing of information might work, such as the accessibility model of cultivation effects, the online processing model of cultivation effects or the weighing and balancing model of cultivation effects. Since the exact mechanisms of processing information are beyond the scope of this study, they will not be further elaborated upon.

2.4 CONCEPTUAL MODEL

The following simplified conceptual model was created for the current study, as can be seen in Figure 9.

Figure 9

Conceptual mode. Exposure to (science) fiction is seen as a mediator.



2.5 HYPOTHESES

Based on the studies described earlier, the following hypotheses were formed:

Hypothesis I

People fit information about science fiction into their existing worldviews and therefore people with a closed view of the future don't perceive science fiction as realistic and it will not stimulate them to think of alternative futures. People for whom the future is open perceive science fiction as a possible future, and it will stimulate them to think of alternative futures.

Hypothesis II

If narrative persuasion into a fiction artefact is 'high'¹, then it is believed that the impact of the media has a greater effect on letting policymakers think of alternative futures than if narrative persuasion is 'low', since this narrative transportation leads to a greater cultivation effect which in turn leads to the consumer of the media to internalize messages from this artefact.

Hypothesis III:

Since known science fiction might not be readily available from memory and new climate fiction is only offered to participants once and not repeatedly, the effects of working with this are not long lasting.

3. METHODS

For this research, a mixed-method design was used, known as triangulation of data (Graham, 2015). First, a literature review was conducted that was used for theoretical foundations of this study. Next to that, qualitative and quantitative research methods were used to answers the research questions.

3.1 MATERIALS AND PROCEDURE

Participants

In this study, 10 policymakers from different employees were interviewed. For a full overview of all the function of the policymakers, see Appendix A. Participants were recruited either through the network of the supervisor, my own network or through LinkedIn. One participant was recruited through another potential participant of the study, who could not participate.

Research design

To obtain data on how participants perceive the future and the impact that science fiction can have on thinking about this construct, a mixed method research design was used. First, interviews were held of one hour, which were subsequently analyzed with coding tools. Analyses were done based on meaning, thus open and exploratory question could be researched. Two interventions were done in the interview: creating imaginaries based on known science fiction and creating imaginaries

¹ What 'high' and 'low' means will be elaborated upon in the method section.

based on a climate fiction podcast. The effect this podcast had on the narrative persuasion of the participant was consequently quantitatively measured using a questionnaire. Lastly, a questionnaire was sent out one month after the interview had taken place. This again provided qualitative data.

Intervention and the research question

In this research, science fiction was used as an intervention to stimulate alternative ideas of the future. As such, the interview itself was used to have an interactive conversation with participants after which the effect of this conversation on the use of science fiction was established. Most of the content of the interviews in this research can therefore rather be seen as means to an end than as the primary data source. By the end of the interview, 15 min were used for reflecting on what science fiction had done in stimulating alternative ideas of the future for participants. For describing the content of the interviews, a thematic distinction will be made between the empirical intervention (talking about science fiction) and the reflection (answering the main research question).

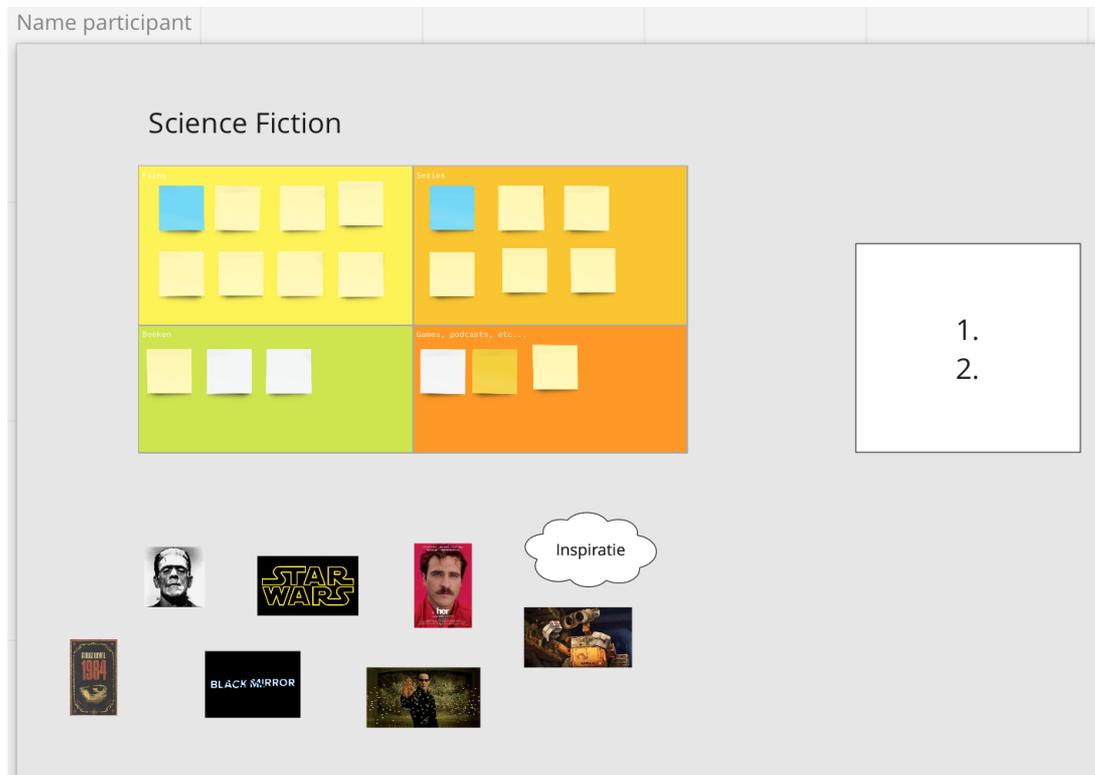
Empirical intervention

In the first part of the interview, which took around 10 minutes, participants were asked to describe their work activities. Subsequently, they were asked if they had a project in their work in which future thinking was central or an important part of that project. This project was used in the second and third part of the study. After answering these questions, they were asked how they see the future. Since this is a very broad question, participants were told that they could answer this question in whichever way they wanted.

In the second part of the interviews, which took roughly 20 minutes, participants were asked to use the Miro board to describe what science fiction they knew, and to write these down in the provided categories on the Miro board: 'Films', 'Series', 'Books', 'Games, podcasts, etc.'. To help some participants who might have trouble thinking of science fiction films, an email was sent to participants one day before, asking them to already think of science fiction they knew to refresh their memory. For an example of the Miro board as it was presented to the participants, see Figure 10 below. Each color block represents a different category, where yellow stands for 'films', light-orange for 'series', green for 'books' and dark-orange for 'games, podcasts, etc.'. On the bottom, inspiration was given for each participant to help them think of science fiction media they have consumed. On the right there is a white square, which was used to write down the two media that the participant selected as having had the most impact on them.

Figure 10

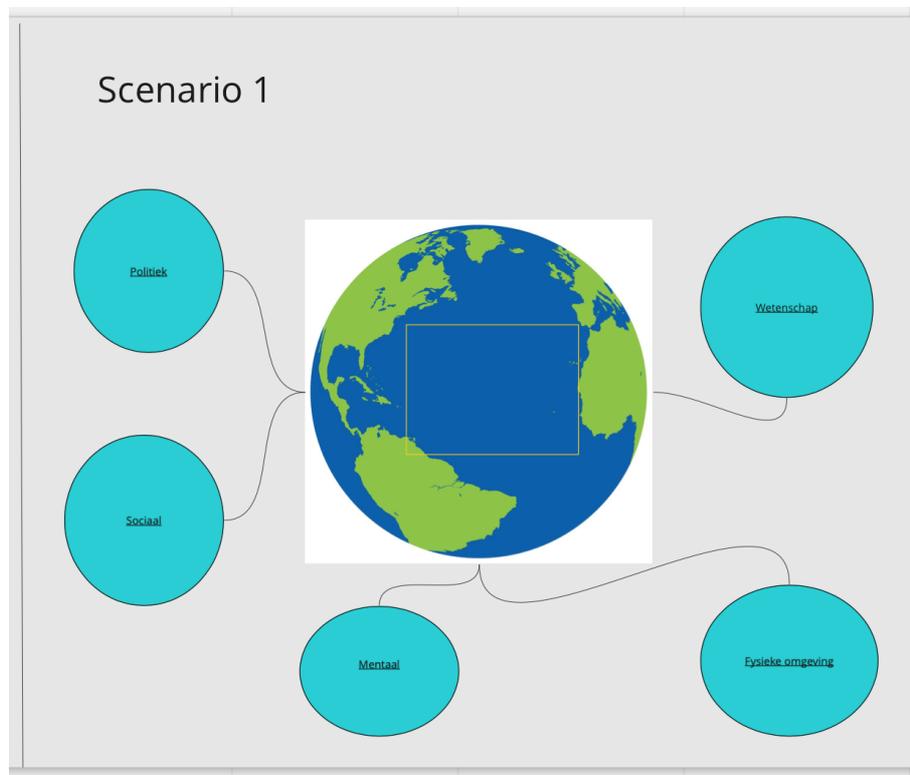
The Miro board which was used to support each interview.



The science fiction that participants indicated had had the most impact on them were believed to operate according to the 'narrative persuasion' mechanism, and thus these two science fiction artefacts were assumed to have scored highly on the two construct identifications and transportation. Participants were asked to imagine that the two science fiction artefacts they chose were to become reality in 10 years. This time span was chosen since previous research has found that people's imagination of the future goes dark after 15 to 20 years into the future (Tonn et al., 2006). Consequently, they were asked to describe what this world would look like by making use of the Miro board. On the board, different themes related to worldviews were provided: 'political', 'social', 'mental', 'physical environment' and 'science'. Participants were asked to describe what each theme would be like in this mentally created science-fiction world. After this exercise, participants were asked to integrate this world into their work project: what would their work project and role in it look like if this world were to become a reality? For an example of the Miro board that was used for this exercise, see Figure 11.

Figure 11

Miro board which was used for the first scenario exercise. For the second scenario exercise, an identical Miro board was used, with the only difference being the title which read 'Scenario 2'.



In the third part of the interview, participants were asked to listen to a fragment of a climate fiction podcast from the podcast series *'Dit is de Toekomst'*, specifically the episode called *'Mevrouw de president'*. In this podcast, a world was described in which three female leaders of the EU, the U.S.A. and China together formed a block against the oil industry. The story was situated in the year 2030 and was told by Jan Terlouw, the author of the story. This podcast series was developed by the Dutch newspaper *De Volkskrant* to provide people with an idea of what the future could look like. As a preparation, expert scientists were paired with writers, who subsequently wrote a story on how the world would develop based on the conversation with this expert scientist. To take the time limit of the interviews into account, the participants were provided with a summary of the story and situational setting of the podcast and were asked to listen to a fragment of 7 minutes taken from the podcast. After that, they were asked to fill in a questionnaire consisting of five questions. These were made to measure narrative persuasion, and concretely the two constructs 'identification' and 'transportation'. To measure this, a validated questionnaire taken from the study by Schneider-Mayerson et al. (2020) was used. This questionnaire was translated into Dutch and a document was drafted which contained the questions and a four-point scale for each question. This questionnaire

contained two questions measuring identification and three questions measuring transportation. Questions like ‘Did you become fully absorbed in the story?’ (measuring transportation) and ‘Could you imagine what it would be like to be in the position of the characters?’ (measuring imagination) were asked. For the guiding document that was provided to each participant containing all five questions, see Appendix C. After listening to the podcast and completion of the summary, participants were asked to do the same worldbuilding and scenario exercise as they did with their known science fiction.

Reflection

By the end of each interview, the participants were asked to reflect on what they had done. For this, question like ‘What was it like to engage with futuring in this way?’ and ‘Do you see a potential role for science fiction in your work?’ were asked. For a full overview of the guiding questions that were used, see Appendix B. In this part of the interview there was also room to provide additional remarks, as this was an open conversation about the effects that the study had had on the participant’s thinking.

Post test

After one month of conducting the interview, participants were asked to indicate what the impact had been of the interview on them. For this, 4 questions were asked that could be answered openly, like ‘In the past month, to what extent have you thought about the conversation we had?’ and ‘Has the conversation we had changed your vision of the future in any way?’. For an overview of all four questions, see appendix D.

3.2 DATA COLLECTION

The data was collected through online interviews through Microsoft Teams. Interviews were recorded and these recordings were used to create transcriptions for each interview. Next to that, a Miro board was made for each participant, which is an interactive tool that can be used for online collaborative work. A Miro board was made for each interview, which could be filled in by each participant during the interview. For the second measurement, participants were asked to fill in five questions about the podcast in a Word document, which was consequently sent back to the researcher after completion. The third measurement was collected through an email which was sent back to the researcher, which contained questions that were answered by the participant.

Data analysis

Qualitative interpretative analysis was conducted to analyze the results. Since there is no pre-existing framework to research how policymakers look towards the use of science fiction in their work, grounded theory was used to analyze the data. This can particularly be used to closely examine data and break them into components (Charmaz, 2014).

For the coding of the interviews, the program NVivo was used. A coding scheme was developed through bottom-up coding, based on the research questions, hypotheses and the themes that were found in the interviews. First, line-by-line coding was done for the first interview to develop mother-codes and daughter-codes. Bottom-up adjustments were made by looking at a second and third interview, leading to addition and deletion of codes. After this, the coding scheme was established that can be found in Appendix F. Additionally, notes were made for each interview, allowing me to write down observations.

To answer the first sub question, a distinction was made between open and closed views of the future. An *open view* of the future was for this study defined as a view that the future is ridden with uncertainty and that there is not one future. An example of an open view of the future is for example the answer of one participant to the question how she sees the future:

“As I always say, we are very bad at predicting the future. Nobody can do that. We all would not have foreseen 10 years ago how much influence the smartphone would have. I have no idea, but I do work towards a social, sustainable future where we live more in community.”

A *closed view* of the future was defined for this study as a view that the future can be predicted to a certain level and that predictions can be made based on the present situation. An example of a participant who has a closed view of the future is the following answer to the same question:

“I think climate change is going to have a big impact on life on the planet. I think we're going to have a lot of refugees because of climate change, that some areas in the world that are livable now will no longer be livable, because of huge droughts, because of challenges in that regard.”

For the analysis of the quantitative measurement that was taken after participants listened to the podcast, an average was taken over their scores. If a participant scored higher than 3 (on a 4-point scale), they were assumed to have scored ‘high’ on narrative persuasion. If a participant scores

between 2 and 3, their score was evaluated to be 'average'. And lastly, if a participant scored below 2, their scores was evaluated as 'low'.

An analysis of the Miro boards was not done, these were merely used to guide the conversations. For an overview of all Miro boards, see Appendix E.

Reliability and validity of the data

To ensure validity of the data, themes in the codes were linked to the research question and to the hypotheses. Next to that, examples were provided to illustrate the themes (as proposed by Bryman, 2016; Mason, 2017). For the measurement of narrative transportation and identification, the methods used in the study by Schneider-Mayerson et al. (2020) were copied. This short questionnaire was found to be internally consistent and unidimensional: all items on the questionnaire measured the construct it intended to. The questionnaire to measure identification was likewise found to be internally consistent. Findings from the main study by Schneider-Mayerson et al. (2020) corroborated this.

Ethical issues related to data collection

All participants gave their consent for recordings of the interviews. The recordings were not shared with others and merely used to create transcriptions of the interviews. The transcriptions of the interviews were only shared with the supervisor of the master's thesis. For each Miro board, a separate link was made to ensure that participants could not see other Miro boards. These links were shared in the Microsoft Teams meeting chat and were only shared with the participant with which the interview was held. Two participants could not or did not want to log into Miro, and therefore had no access to the board. For these two participants, I filled in the Miro board based on the conversation, next to providing screenshots of what the Miro board looked like.

4. RESULTS

First, each sub question will be answered, after which an answer to the main question will be given. Throughout answering the questions, some statements were analyzed with literature on worldviews and sustainability mindsets.

1. WHAT IS THE CURRENT MENTAL MODEL OF POLICYMAKERS OF THE FUTURE?

An answer to the question ‘What do you think the future will look like?’ made most of the participants think for a minute. Some of them asked for further clarification, like ‘In what time span do I have to think?’ or ‘Do you want to hear one scenario, or multiple?’. Since no specific answer was needed from the participants in asking this question, they were spurred on to answer in whatever way they wanted. Firstly, many participants answered that predicting the future is a precarious activity. One participant answered that we could never have predicted the impact of the smartphone ten years ago, let alone oversee what changes we are making in the present that will impact our future. Another participant stated that there is in fact no future and that how we picture the future comes from how we feel in the present. The ungraspable nature of the mental concept of the ‘future’ was acknowledged in most of the conversations with the participants.

Secondly, many participants expressed worries about the future. Climate change was a theme that came back in many conversations, with predictions that this will impact our lives in a substantial way. Next to that, many participants expressed that they thought that digitalization will play an increasing role in the future lives of people. One participant expected many crises to unfold, over raw materials, over water and eventually a migration crisis which was caused by this shortage of water. She also expected that differences between rich and poor would increase globally, and that changes in the systems we have would only come after big, disruptive events. This mindset has been conceptualized as ‘fatalist’ (Tukker & Butter, 2007; de Vries, 2012). This participant believed that since we live in a consuming and digitally driven environment, people are seeking for satisfaction in the short term, which consequently causes them to be less able to think of the future and organize themselves collectively as a force. Another participant said that he is scared by the future images that he reads abouts in books and he fears that the world is getting darker and darker.

However, some participants stated that they were optimistic about the future (sometimes these were the same participants that were also pessimistic about the future). Two participants expressed that they felt they had an obligation to be optimistic about the future. One of these

participants stated she noticed that 'being green' has slowly become the new normal over the last decade and she was therefore hopeful of this trend causing projects to consider planetary boundaries and ecosystems. The other participant stated that he noticed that there are many projects that work towards a more sustainable future, which made him optimistic about this future. This mindset of many projects working together towards a more sustainable future has been conceptualized as 'egalitarian' (Tukker & Butter, 2007; de Vries, 2012). A different participant, who expected water to become a topic over which many future crises will unfold, stated that she thought we were 'at a turning point in history', since the court case of Friends of the Earth against Dutch Royal Shell had just been won². This bottom-up approach, in which groups of actors try to change the system, can be classified as a hierarchical approach, where dominant actor coalitions (like Friends of the Earth) steer change (Tukker & Butter, 2007). Lastly, some participants expressed wishes for the future. Almost all expressed the wish that our current systems get back into balance with ecosystems and that we collectively do our best to limit climate change as much as possible. Next to that, one participant stated that she hoped that humans would get more satisfaction out of little things, such as interpersonal contact, and that the consuming lifestyle would become less dominant. This change in thinking was mentioned by a few participants, who all expressed the hope that new ways of thinking will become dominant. Lastly, one participant hoped that in the future, we will all live in sustainable houses and lead sustainable lifestyles.

A categorization was made between an 'open' and 'closed' view of the future. This categorization was made based on the definition as was discussed in the method section. Five participants were found to have a 'closed' view on the future and three participants were found to have an 'open' view. Two participants were not asked this question in the interview, and thus no categorization was made based on their view.

2. DOES WORKING WITH KNOWN SCIENCE FICTION STIMULATE POLICYMAKERS TO THINK OF ALTERNATIVE FUTURES?

When starting the exercise, most participants had some trouble remembering the science fiction that they had previously watched. Some participants therefore made use of the science fiction examples that were given on the Miro board. Some stated that they had watched much more than they could remember at that moment. Thinking out loud and talking with me to remember what science fiction they knew seemed to help many participants. Two participants stated that they read more history than science fiction books. Two other participants stated that they consumed a lot of science fiction

² For a news article on this case, see <https://www.bbc.com/news/world-europe-57257982>

and one of these participants stated that he could name things he read or watched for hours. Summing up, a great variety was found among the participants in terms of the amount and sort of science fiction that was consumed.

The impact that science fiction had had on participants differed greatly. Some reported that science fiction artefacts had left a great impression on them, others reported that since they did not enjoy science fiction its impact on them was low. This effect could be explained by the difference in transportation and identification (and consequently narrative persuasion) into science fiction that participants described. One participant stated that the movie 'Avatar' made him reflect on the societies that undergo transformations and that this side of transitions that are currently being undertaken (such as the energy transition) are underexposed. This participant here describes the feeling of transportation into a narrative and possibly even identification with characters from the story. Another participant described that he watched the series 'Years and Years' and that it made him feel like this world was not far from his own as he was transported into this world. He mentioned that he could feel how awful it felt to have a world like that: he described here a feeling of identification into the narrative. He mentioned that he could draw parallels with processes that he already saw happening in the world, which for him increased the impact of the series. One participant noted that her fantasy was more stimulated by reading books, thus for her it seemed like narrative persuasion is more triggered by reading than by watching media. Another participant, who already early on indicated that he did not seek out science fiction for pleasure, had trouble remembering what had taken place in the movies he watched. He reported being particularly thrown-off by the non-realistic nature of science fiction, pointing towards the fact that this genre creates a low narrative persuasion for him. Other participants who reported not enjoying science fiction gave the same reason for not enjoying this genre.

Certainly, differences were found in the kind of science fiction that was consumed. One participant stated that she does not think movies like Star Wars can become a reality, but movies like Her or a series like Black Mirror had a greater impact on her. Although this did not come back in the interview, this can arguably be described to the fact that Her and Black Mirror depict a reality that is closer to ours. For a full list of science fiction that was identified by policymakers, see Table 1. In this table, in brackets are the number of times an artefact was mentioned. Note that some artefacts have been categorized as how the participants listed them (some movies are also books for instance).

Table 1

List of science fiction that was brought forward by the participants.

Movies	Movies	Series	Books	Games, podcasts etc.
2001: A Space Odyssey	Mad Max	Back Mirror (4)	1984 (6)	De Chromonauten
Avatar (3)	Men in Black	Catweazle	Frankenstein	Shadowrun
Back to the future	Metropolis	Handmaid's Tale (3)	The Circle	
Blade runner	Minority Report	Star Trek (5)	White Noise ³	
Divergent	Never Let Me Go	Snowpiercer		
E.T. (2)	Star Wars (6)	The Mandalorian		
Frankenstein	Starship Troopers			
Her (3)	Tenet (2)			
I, Robot	The Hitchhiker's Guide to the Galaxy (2)			
Independence Day	The Martian			
Interstellar	The Matrix (7)			
Jurassic Parc (2)	Transformers			
	Waterworld			

³ Opinions divert if this could be considered as science fiction, see for instance this blog: <https://rapidtransmission.blogspot.com/2019/12/white-noise-don-delillo.html>

The reaction to the exercise of creating the scenarios was that some participants needed clarification whether they were doing the exercise right. I therefore reflected on the exercise and its outcome while in the data collection phase, and therefore made some changes to it after the first two interviews. I updated the Miro board after the third interview, where I replaced the theme 'physical' with 'physical environment'. But most importantly, I grew in confidence with every interview I conducted, probably resulting in higher quality interviews by the end of my data collection period. In general, participants sometimes asked whether they were doing the exercise right and one participant asked whether her Miro board looked like that of other participants. Some of them asked for clarifications on how big they could think: could the world that was created using these two science fiction artefacts be completely different from our world now, or was still some realistic thinking wanted for the scenarios? The openness of the exercise seemed to be unfamiliar for many participants. Reflections on the scenarios that were created showed that participants approached this exercise differently. Some had made scenarios completely based on the science fiction imaginaries that they had mentally created, while others had created scenarios that were more based on realities they would like to see. In the interviews, I tried to let participants use the material from their chosen science fiction as much as possible. I would start with asking what the material they chose was about, gently guiding them to think in themes already. The combination of these two science fiction artefacts was difficult for some since worlds derived from them were not always complementary and sometimes even contradictory. But however difficult it sometimes was to converge worlds, the exercise was always completed, and all Miro boards were filled in.

When reflecting on these scenarios, many participants noted that science fiction imaginaries made them create scenarios that were extreme. In the scenarios, extreme developments in digitalization, in climate change or in societal development were shown. One participant stated that she thought science fiction is suited for 'wild futures', where completely different worlds are to be imagined. Another participant stated that science fiction can be suited for painting a picture of a world you do not want, since extreme and dystopian futures are often present in science fiction material. These extreme scenarios, as one participant noted, made her look to her own work with a different perspective. Three participants said that the implications of developments in society are often not overseable; the extreme scenarios that are created by science fiction can help you in thinking what implication of actions in the present will mean. Another participant, who created a world in which different planets had to relate to each other, noted that these extreme scenarios made his work even more complicated. He found it difficult to imagine living in such a world. He ended by saying that he thought we should find ways to relate to these extremes in everyday life. Another participant, who created a world in which bottom-up sustainable living was the norm, reflected on her scenario by

means of feasibility. She did not think that the scenario she created could be imposed by the government, where in her scenario the role of the government was merely to advise on projects. She therefore saw her scenario as wishful thinking rather than a possibility. Even though many scenarios were not seen as realistic, almost all participants answered that they did one thing: they created food for thought.

By the end of each interview, reflections were made together with me on the effect the exercise had had on the participant and what role science fiction could play in the work of the policymakers. Many participants stated that the exercise made them think of science fiction they had seen already, but that the influence of these films was a bit tucked away. Not all themes that were discussed in the exercise came back in the movies or books that were used for the scenarios, and thus sometimes some extra imagination and mental effort was required to create images for the themes described on the Miro board. Three participants noted this in their reflection upon the exercise. One participant stated:

“In a series or movie, you know what the world looked like because you saw it, but when you conceptually go further and think what the political system would look like in this world, this requires some extra mental effort.”

For many participants, the science fiction imaginaries and consequent scenarios that were created were not seen as realistic. For one participant, the fact that he could not relate science fiction to his work made him not take his scenario and the exercise seriously. In fact, when asked what he thought of his work scenario that he created, he stated that he could not remember what he had created himself and that he did not take this scenario seriously. Another participant also stated that she did not take science fiction imaginaries seriously, although she found the exercise interesting. She said that she would rather leave dreaming of completely different worlds up to others and create realistic scenarios.

Integration in work

When discussing the topic of integration into the work of the policymakers, a few themes came back, which will be discussed in the following sections.

‘Mental stretching’

One of these was the mental exercise that creating science fiction imaginaries had been. In the interviews, it came back that science fiction can help to think in possibilities instead of limitations.

One participant noted that she was used to thinking on a local scale and that creating this bigger scale on which she could think was a great mental exercise for her (or, as she called it: mental stretching). One policymaker interestingly voiced what science fiction can add to create new ways of thinking:

“You notice that you build different paths in your brain that are not so often activated”

This remark nicely illustrates the idea of neuroplasticity, where different neurological pathways are built. The idea of neuroplasticity is that when you build new connections in your brain, by for instance getting into contact with new ways of thinking and the more reinforced these pathways are, the stronger they will become and the faster they get activated. Thus, a possible effect of consuming science fiction could be that ideas about alternative worlds are activated faster.

Interestingly, three participants noted that science fiction imaginaries could help with short-term thinking. Although the length of the interviews prevented me from deepening the conversation on this topic, possibly the participants meant here that using big-scale imaginaries can help to see how your work relates to bigger developments that are happening. In this sense, science fiction imaginaries can help to reflect on where we are collectively going. Two participants mentioned this use of science fiction: to prevent unwanted situations by using imaginaries. One policymaker noted that science fiction helps her to reflect on ethical dilemmas. To illustrate this effect, she used an example of ethnic profiling at schools, where she noticed 15 years ago in her work that algorithms were used to predict school absence. Her conversations with her daughters after watching shows such as *Black Mirror* helps her to reflect on dilemmas like this. The same policymaker noted that the ‘toeslagenaffaire’, which was a big scandal in the Netherlands where many parents were unjustly accused of sabotaging their tax-forms, could have been prevented if science fiction had been shown that deals with these dilemmas together with a conversation on procedural management in the *Belastingdienst*. Of course, this was mere speculation on the side of this participant, but her belief that this effect could be so strong was interesting.

‘Top-down versus bottom-up influence’

A few participants mentioned that across organizational levels, out-of-the-box thinking is useful. As one participant said:

“In order to create new realities, we need to give people space to think of these realities”

From an organizational point of view, there are problems with the short time span with which politics deal with problems. This short-term thinking could be stretched by using science fiction imaginaries that push people to think out of their comfort zone and beyond the political implications of scenarios. One participant was completely convinced of the necessity to have out-of-the-box conversations around certain societal topics, and proposed that meetings, seminars, webinars, trainings and much more should be organized, where people from all levels of decision making would come together to discuss these science fiction imaginaries.

Simultaneously, science fiction imaginaries could be used in the work of policymakers to start and stimulate conversations with citizens or people who normally would not have much impact on policy. Two participants said that they would want to integrate more awareness and engagement with citizens and saw a role for science fiction imaginaries here. An example of this engagement that could be created was discussed in one interview, where the participants mentioned that the show *Als de dijken breken* ('When the dikes break') was created to increase citizen awareness around water safety. He stated that since action perspectives of citizens are incredibly low in the Netherlands for water safety, the show was partially created by Rijkswaterstaat to create imaginaries of what would happen if the dikes would break. Another participant mentioned that movies, series or books can speak to people on a personal level, and can therefore get people involved in conversations around topics they would normally not engage in. Next to that, he stated, storytelling in these artefacts can create a collective imaginary in which people can find themselves, it can inspire people and create intrinsic motivation to work for a certain imaginary.

'Different way of talking about subjects'

Additionally, science fiction could be used by participants in their work to start a discussion. As one participant said:

"We are always so serious at the office. I use a lot of metaphors to tell my story. People love stories. Stories linger much longer than esoteric policy jargon. I think it's a strong method."

She points here to the fact that science fiction could be used to create a different conversation than is usually held at the office. Next to that, when something serious is in the form of something that can bring relaxation and fun, subjects can become easier to discuss. This participant therefore proposed that the creation of science fiction imaginaries could be used on an introduction day for new governmental workers, or for critically reflecting on broad societal concepts that are institutionalized in government structures, such as inclusion or transparency. Almost all participants

noted that they thought watching science fiction should be accompanied by creating a conversation around it.

'Need of realistic thinking'

In almost all conversations, the fact that science fiction stands far from reality came back. A few participants therefore pointed towards the downfall of using science fiction imaginaries in policy settings, as she said: "You have to be careful with crazy scenarios in order to avoid newspaper headlines like 'Officials are on a rampage with science fiction'." Since science fiction can stand far from reality, two participants stated that they saw no role for science fiction imaginaries in their work.

3. DOES WORKING WITH A CLIMATE FICTION PODCAST STIMULATE POLICYMAKERS TO THINK OF ALTERNATIVE FUTURES?

Primary response to the podcast

There was a great variety found in the responses to the podcast. While some really liked the author and reader of the story one participant found him irritating. Noticeable was that two participants responded very negatively to the podcast. They were both saying that the story told in the podcast is very outdated and that they hoped that the situation would be different in 2030. Both interviews were held after the climate case against the Dutch Royal Shell was won by the prosecutor Friends of the Earth. Both participants mentioned the case in their interview. Four participants were skeptical about the content of the podcast and saw the reality depicted as too simplistic. Two participants stated that they thought the story was outdated and hoped that things had changed by the time it would actually be 2030. One participant said that she became sad and cynical by listening to the podcast. On the other hand, some people were stimulated by the content of the podcast. One participant said that she interpreted the podcast as being 'super positive' and that the podcast inspired her to think this would be the future. After the interview was conducted, she listened to the rest of the podcast by herself. The fact that the protagonists in the story were female leaders instead of male, made some participants reflect on the effect of female leadership.

The reflection on the scenarios revealed that working with the podcast to create a worldview had been easier for many participants, compared to working with known science fiction. A few participants mentioned that this was also due to the fact that they listened to the podcast and immediately could use it: it was fresh in their memory. This points to a clearly established psychological mechanisms, the retrieval effect. It is easier to retrieve material you recently came into contact with, than it is to do that with material that you encountered some time ago (Baddeley,

Lewis, Eldridge & Thomson, 1984). Next to that, many participants found that their work would become easier or even redundant in this world. Three participants explicitly said that they wished this world would become a reality. Two other participants stated that again, this world is one where quite a drastic change in democratic decision making could be observed. This extreme could make them look towards their own work in a different light. Two participants noted that it is fascinating to look at trends that are happening now and think these through in scenarios; these scenarios help you reflect on your work in the present. One participant noted that probably everyone took something different from the podcast and reflecting together on the material that was heard could be fruitful for a discussion.

Creating the second scenario was easier for some than creating the first scenario. This is because the exercise is done twice, which makes it easier the second time it is done.

Results measurement narrative persuasion

The scores participants gave after listening to the podcast were analyzed by taking the average for transportation, identification, and consequently narrative persuasion. As can be seen in Table 2, found was that on average, transportation was high, identification was average and consequent narrative persuasion was average.

Table 2

Average scores for Transportation and Identification for all participants, on a scale from 1 (not at all) to 4 (a lot).

	Transportation	Identification	Narrative persuasion
Average score	3,33	2,4	2,96

4. ARE THESE EFFECTS NOTICEABLE AFTER A 4-WEEK INTERVAL?

In total, 7 participants responded to the email that was sent one month after the interview had taken place, thus conclusions can be drawn based on the answers of these participants. The results of this analysis will be shown using the questions that were sent to the participants.

To what extent have you thought of the conversation we have had in the last month?

To this question, most participants answered that they had enjoyed the conversation and thought back at it with pleasure. A few participants mentioned that they had brought up the

interview with colleagues. One participant said that she discussed with colleagues that she was surprised to notice the effect the exercise had on her; she had created worlds that she would not think of before the interview. Another participant stated the same thing: she had reflected more upon the importance of thinking 'outside-the-box' and came to the conclusion that a mix of 'inside-' and 'outside-the-box' thinking is important in policy settings. Another participant mentioned that he thought it is very important to have long horizon visions when talking about policy. He mentioned that with the challenges we are facing, we need to have leaders who can incorporate these long-term visions for the future. One participant said that he used the imaginaries of (science) fiction to obtain his goals in projects he is working on. The same participant even stated that he used the lessons he learned from the interview in a conversation with a colleague.

Two participants reported to not have found the conversation to have had a long-lasting impact on them. Possibly, the participants that did not respond to the email felt the same way. Overall, it seemed as though the conversation had sparked most participant's imagination and had left a lasting impression.

Did you look up more, less or the same as before in (science) fiction media after the interview?

All participants responded that they did not look up more (science) fiction after the interview. One participant mentioned that he reflected on the role of science fiction in creating imaginaries and proposed that instead mythology could be used⁴.

Has the conversation we had changed your vision of the future in any way?

Three participants mentioned that they did not change their vision after the interview. A few participants reported that the interview had caused them to create a bigger vision for the future. Specifically, a few participants mentioned the 'opening up' of future images; engaging with the (science) fiction had given them different ideas of what the future might be. One participant said that after the interview, his vision of the future was more radical than before. Two participants specifically mentioned that they thought policy environments could benefit from future thinking, where one participant mentioned that often in policy settings, a serious way of talking about things is adopted. Using storytelling and (science) fiction, this serious tone could be replaced by a more playful one, which could engage people more with the topic at hand. One participant said she thought that exercises like the ones done in the current study are best fitting in the beginning phases of projects. This is concurrent with the objective of this research, to make a contribution to the field of exploratory foresight methods.

⁴ He was possibly inspired by an article of the Chronauten, which can be found here: <https://dechrononauten.nl/0010-2/>

Would you be interested in further discussions on this topic?

Three participants answered that they were not interested in further discussions on (science) fiction and policy. Two participants stated that they were interested in staying up to date about the methods that are derived from this field of science. Two participants responded that they would gladly stay in contact about this subject.

MAIN RESEARCH QUESTION

To what extent can (science) fiction stimulate policymakers to think of alternative futures?

From the ten policymakers that participated in this study, it was found that six found science fiction stimulating to think of the future, and four did not. Thus, a tentative conclusion can be made that science fiction was found to be stimulating for policymakers to think of alternative futures.

Science fiction

Many participants had some trouble thinking of the science fiction they had seen or retrieving the content of the movies. There was a great variety in how much science fiction was consumed between the participants, with some almost never watching or reading science fiction, while others would regularly do this. Science fiction was found to have different mechanisms in helping participants imagine alternative futures. One was that science fiction can be used to lay connections between developments or events you see in your daily reality. For instance, one participant noted that she drew parallels between the movie *Never Let Me Go* and real life:

“When I see *Never Let Me Go*, it's like watching a normal movie for a long time. And only after a while you notice, 'oh, strange things are happening here'. And then I think of that one book that that refugee who wrote about what his journey was like from Ethiopia to the U.S. One of the stories in that book is that at one point he was taken to a kind of blood farm, where all kinds of young boys had to donate their blood for the soldiers in a civil war. That's almost the same story as *Never Let Me Go*. That's science fiction, which can sometimes be an exaggeration, just like the podcast, of what could possibly happen.”

As can be seen from this example, science fiction can be an enlargement of reality. The same function of this genre came back from another interview, where a participant emphasized how science fiction helps her reflect on ethical and moral issues:

“I like the ethical-moral dilemmas in Black Mirror and 1984. I hope these will become increasingly important in decision-making. And look, I'm quite rational myself. If the ratio really had 100% predominance, that isn't good either. Then we would not have decided to quarantine all in this corona time, for it would have been economically smarter to let old people die and prefer that the economy stays stable. But because we said emotionally: no, we are not going to suddenly let weak people die, we are all going to sit inside. Rational decision making without ethics, it would be terrible.”

In the same sense, science fiction was used to be a communication tool by one policymaker:

“I really enjoy reflecting on futures and I also do it regularly in discussion. I would for instance try to say: but look at Avatar, do we want a world like that? If you can't figure it out in terms, you paint that picture. It's funny, when you use such a film, everyone immediately knows a little bit what you are talking about. While at the same time if you try to do that in language, you would need much more time for that.”

Next to that, science fiction was found to be stimulating in the sense that it could paint worlds that you do not want; dystopian futures you would want to avoid. Overall, science fiction was found to show possible future worlds, which stimulated most participants to think of alternative futures. However, some participants were not stimulated by science fiction. Their common reaction to this genre was that it was not realistic enough, and therefore hard for them to integrate this into their worldview. One participant who did not find science fiction stimulating expressed herself by saying that science fiction is made by people, and therefore merely reflects the contemporary mindset with which people can make predictions about the future. She saw science fiction more as an artistic expression than a predicting artefact.

Climate fiction podcast

The climate fiction podcast had a different effect on policymakers. Many responded that they found the story in the podcast quite naive and/or outdated and therefore took the content less serious. However, receiving material with which you immediately work with was found to be pleasant for most participants. Next to that, the world which was painted in this podcast resembled reality much more than science fiction, which made many participants prefer to work with the podcast.

(Science) fiction in policy

Overall, the interviews revealed that 3 participants saw a role for science fiction in their work. But most participants (7) were in between, who saw the need for futuring and alternative ways of thinking about the future but did not find science fiction a fitting tool for this. Almost everyone recognized that science fiction stimulated them to think differently about the future, but since science fiction can paint very extreme images of a future, it can be less fitting to use in a policy setting. However, it can be a nice conversation starter. Especially in the first, explorative phase of designing projects, in which future worlds are created, (science) fiction could be stimulating. The climate fiction podcast was found to be more suited for policy environments by participants, mostly because of its realistic characteristics. The difference in working with known science fiction and the climate fiction podcast was nicely illustrated in the following quote by one of the participants:

“The podcast I got is close to reality and very concrete in its application in my work. When we talk about far-reaching digitization or, for example, when you think about Star Wars, the impact is... The podcast is much clearer. This is 8 years away, that is not a reality that is very far away. It's tangible. It is very conceivable. I can easily imagine that. How digitization will have a role, and what role, that is speculation. That's much more complicated. This doesn't take much effort to imagine.”

Thus, it can be concluded that overall, policymakers prefer to work with realistic fiction that is offered to them immediately. However, the alternative futures that were created using science fiction were more extreme, and therefore might be more fitting if radical different futures are to be imagined.

HYPOTHESES

Hypothesis I

People fit information about science fiction into their existing worldviews and therefore people with a closed view of the future don't perceive science fiction as realistic and it will not stimulate them to think of alternative futures. People for whom the future is open perceive science fiction as a possible future, and it will stimulate them to think of alternative futures.

After categorizing participants based on the definition in the method section and comparing their reaction to how science fiction stimulated them to think of alternative futures, no clear relationship was found. Possibly, this is due to the fact that the view of the future was not 'measured' as is often done in psychology, but merely categorized after the interview had taken place. Next to that, it was found that people who have a certain expectation of the future, or 'closed' views, find science fiction stimulating because it lets them create imaginaries beyond their current ones. Thus, this hypothesis could **not be confirmed**.

Hypothesis II

If narrative persuasion into a fiction artefact is 'high', then it is believed that the impact of the media has a greater effect on letting people think of alternative futures than if narrative persuasion is 'low'. This can be explained by the mechanism narrative transportation, which if this is activated leads to a greater cultivation effect, which in turn leads to the consumer of the media to internalize messages from this artefact.

Most participants responded that the podcast was easier to work with. However, no clear relationship was found between the scores participants had on narrative persuasion, and the impact the podcast had on participants. Participants mostly gave back that they found the ideas from the podcast outdated, and that they hoped the world would be different in 2030. However, an important note to make here is that even though participants mostly did not internalize messages from the podcast, it could still have stimulated them to think of alternative futures. Comparative to dystopian pictures painted by science fiction, the podcast could have served for painting a world which you do not want. Picturing yourself in a world you do not want can still motivate you to think of alternative futures. All in all, this hypothesis could **not be confirmed**.

Hypothesis III

Since known science fiction might not be readily available from memory and new climate fiction is only offered to participants once and not repeatedly, the effects of working with this are not long lasting.

When asking about the impact of the exercise one month after having conducted the research, most participants answered that the exercises had sparked their imagination and that the conversation had made an impact on them. Thus, based on the results from this research, this hypothesis must be **rejected**.

5. CONCLUSION

In this research I asked the question whether creating (science) fiction imaginaries have a potential to become an exploratory foresight method. It was found that for most policymakers, (science) fiction was stimulating to think of alternative futures. However, for science fiction imaginaries to be suited for policy environments, some work still needs to be done.

I will describe some extra conclusions based on the observation I made. I found that grossly, two types of thinkers can be discerned: self-declared realists and explorers. The self-declared realists did not see science fiction as plausible, and therefore did not think it would impact them. The explorers sought out science fiction and found it inspirational and important to talk about alternative futures. Since people fit information into existing worldviews (consistent with cultural cognition theory), self-declared realists will not seek out science fiction and explorers will. Probably both profiles are necessary in policy settings, and both can add different perspectives to policy processes.

In this study, I found that policymakers had different attitudes and perspectives of looking towards the future. In line with the classification of Tukker and Butter (2007) and de Vries (2012), views were found that can be described as fatalist, egalitarian and hierarchical.

To conclude, I will describe here the overall conclusion of my research. Firstly, the future was found to be hard to predict for policy makers. Many of them expressed worries about the future. Next to that, (forced) optimism was also found among the policy makers. Many policy makers hoped to get back into balance with ecosystems and felt the necessity to adjust our current systems to achieve this. Both open and closed views were categorized among policy makers. Secondly, conducting the worldbuilding exercises was unfamiliar for many policy makers and many asked for boundaries to be set. The scenarios that followed from working with known science fiction were extreme. They could be useful when wanting to create 'wild futures' and for reflecting on the consequences of your actions in the present. The effect this exercise had was that policy makers were nudged to 'mentally stretch' their ideas about the future. It could be that building these new pathways in the brain could indeed lead to a faster activation of alternative worlds when engaging with the future. Both a top-down and bottom-up influence of science fiction imaginaries was expressed by the policy makers: these imaginaries could push officials to think beyond political implications of scenarios, but they can also be used for engagement of citizens. Science fiction imaginaries can be a different way of talking about futures, away from policy jargon and serious tones: it can be a communicative tool. Next to that, science fiction was found to give policy makers an opportunity to reflect on what future they want and what future they would want to avoid. It also gave them a chance to reflect on moral and ethical dilemmas. The podcast was found to be more

directly applicable for the creation of scenarios, although the story told in it was found to be outdated by many. The creation of a second scenario was found to be easier for most policy makers. It was found that on most policy makers, the interview had made a lasting impact and that the conversation had indeed opened their view on the future. Creating a conversation around these imaginaries was found to be important: the soft spaces as proposed by Hajer are a possibility for this. Lastly, the need for realistic thinking in policy setting was emphasized. Science fiction imaginaries should be used together with scientific evidence and scenarios to be taken more seriously.

6. DISCUSSION

INTERPRETATION AND IMPLICATION OF RESULTS

The results from this study show that although (science) fiction was sometimes found to be not directly applicable in policy settings, it was stimulating to think of alternative futures. The question that arises is: is it important to have a direct application for this purpose? Why are we creating imaginaries that are out of the box? It appears the policymakers in this study found it difficult to find a direct application of creating imaginaries. Therefore, more effort should be made into explaining how imaginaries do not directly create a world which you want, especially when using exploratory foresight methods. Although these concepts are not scientifically well-developed yet, the proposal of Hajer's soft- and hard spaces could help in explaining the use of these exercises. (Science) fiction imaginaries should be used in 'soft spaces' and this should be made clear to policymakers up front. If this is not done clearly, there is a pitfall that policymakers find that the exercise is a mere escape of reality or an intellectual activity without practical use.

That is another point which came forward from this research: conversations should be held around consuming (science) fiction. Reflecting upon the meaning and consequences of imaginaries could be a very important step to truly let (science) fiction have an impact on (the work of) policymakers.

The results show that policymakers find futuring and opening up the future important in policy settings and would want to integrate this more into their work. This is the first study that researches if policymakers find (science) fiction fitting to create alternative imaginaries. Results are based on only ten interviews, and the researcher in question has never conducted research like this before. Therefore, the conclusions that are drawn in this study should be seen in this light and can be further improved on elaborated in further research.

LIMITATIONS

There were a few weaknesses in the design of this study that need to be addressed.

Mechanisms narrative persuasion

How can you measure whether something is stimulating? That is the core methodological challenge that had to be addressed in this research. Narrative persuasion was chosen as a concept, but weaknesses that accompany this choice must be addressed. The mechanism 'narrative

persuasion' was assumed to have caused the impact known science fiction had on participants, but this was not measured directly. Measuring this would have strengthened the research design and would provide a stronger theoretical backbone for the research. The cut-off line for measuring 'high' and 'low' narrative transportation after listening to the podcast was defined based on common knowledge: if something is above the average, that means it's high. Further research could provide more guidelines for improving these measurements.

Next to that, narrative persuasion does not directly measure stimulation or impact. Someone who is not persuaded by a narrative could still be stimulated by it, since pictures of a world which you do not want can still motivate you to think of alternative futures. The question then arises: what is the influence of thinking about these alternative futures? Is this measurable, or is that beyond the scope of methodological research methods? A more elaborate study design, in which better measurements were used that could assess the impact that the cultural artefacts had had, could have possibly improved this weakness of current study.

Empirical intervention

Asking policymakers to work with science fiction they had already seen created an unequal basis for making the scenarios: some policymakers had seen much more science fiction than others, which makes scenarios of those who consume a lot of science fiction much richer. Creating an empirical intervention where a science fiction movie had to be watched or where science fiction was to be read would have created a 'cleaner' intervention. In further research, science fiction movies or books can be introduced that are relevant for their work (such as the film *The Day After Tomorrow*, the book *Klifi* or the series *Als de dijken breken*). This would simultaneously answer to the preference of policymakers to work with media that was provided to them.

'Open' and 'closed' views

In this study, attempts were made to distinguish attitudes towards the future by creating a categorization of 'open' and 'closed' views. These definitions were self-defined and are therefore not theoretically strong. These views on the future are likely to correlate with other psychological constructs, such as believe in free will, internal or external locus of control (which is a feature of someone's character that states how much a person believes is in their control; do events merely happen to someone, or can you exert influence over them? (Lefcourt, 1991)) and previous life experiences. Further research could strengthen theoretical bases of psychological profiles and influence of (science) fiction by breaking down personal characteristics and consequent influence of media.

Selection bias

Although not all participants reported to have affinity with science fiction, a selection bias probably took place. A few participants had already come into contact with futuring by taking a Master class on this, causing these participants to have a conceptual background and interest in the subject. Attempts were made to increase the diversity of participants by recruiting through LinkedIn or by email, but it is likely that still only those with affinity with the subject chose to participate. Possibly, rewarding participants to participate in this kind of research setting would decrease this selection bias and improve representation of the research group.

RECOMMENDATIONS

More work should be done to find (science) fiction that is relevant for policy settings. Climate fiction might be especially relevant for policy makers who come into contact with climate change in their work, and within climate fiction more research could be done on which media works best: literature, movies, podcasts etc.... What could help for starting to research this topic, are the archetypes of science fiction made by Fergnani & Song (2020). They have created six archetypes in which science fiction could be divided, see Figure 12. Especially 'Growth & Decay', 'Threats & New Hopes', 'Wasteworlds' and 'The Powers that Be' might be fitting categories of science fiction for policy environments.

Figure 12

Six archetypes of science fiction



Note. Figure adapted from Fergnani and Song (2020)

The five imaginative logics created by Pelzer & Versteeg (2019) (see Table 3) might also give conceptual guidance for further research, if outcomes and use of specific logics is identified before conducting a workshop.

Table 3
The five imaginative logics

<i>Imaginative logic</i>	<i>Description</i>
<i>Doable</i>	The image of the future is closed. This logic's purpose is to make individuals feel linked to a (shared) goal. As a result, this reasoning has a defined direction and a rather closed storyline.
<i>Juxtaposing</i>	The image of the future is closed. This logic is meant to teach individuals about trade-offs and difficulties in decision-making through the utilization of extreme scenarios.
<i>Defamiliarizing</i>	The image of the future is relatively open. This logic's purpose is to portray to a new or under-considered topic. New concerns are addressed in familiar places, circumstances, or behaviors.
<i>Guerilla</i>	The image of the future is relatively open. This logic's purpose is to make people feel surprised or even perplexed. Recontextualizations are used to combine facts and values.
<i>Procedural</i>	The image of the future is open. The purpose of this reasoning is to stimulate one's own creativity. This is accomplished through the utilization of generative situations in which individuals can imagine situations.

Note. Adapted from Pelzer and Versteeg (2019, p. 19)

Studies which examine the discourse in and around movies, such as the study done by Salvador and Norton (2011), which analyzes the movie *The Day After Tomorrow*, could improve the use of policy relevant material. If more material relevant for policy environments is found and exercises are created that have a clear purpose, creating workshops for integration of science fiction in policy environments could be very fruitful. Important is that conversations are started that accompany these exercises and create room to reflect and discuss for participants of these workshops. What became clear from this study, is that it is best to provide material with which is worked during or before interviews. The effect of repeated exposure is worth integrating in future research, since previous research indicated that repeated exposure and reinforcement from media sources can lead to behavioral change (Schneider-Mayerson et al., 2020), as is similarly predicted by cultivation theory.

Other forms of fiction could be researched to open up the idea of the future for policymakers. As was found in previous research by Schneider-Mayerson et al. (2020), it might be that reading literature can change values and attitudes towards certain subjects. Next to that, the use of interactive games in policy settings might be another exciting way to stimulate policy makers in thinking about the future (one participant in this study mentioned by herself already that she would be thrilled to work more with serious games). Theatre, music, podcasts, ecopoetry, even dance... There are many cultural manifestations which might engage policy makers with the future.

Research on how storytelling works and what characteristics in stories are useful for engaging people can add recommendations to this field of study. For instance, Dahlstrom (2014) has studied how storytelling and narratives can be used to engage non-experts with climate change. Next to that, neurological impacts of stories have been identified, where dopamine, oxytocin and endorphin have been shown to engage people with stories (Philips, 2017). There are relatively simple mechanisms with which these neurotransmitters could be evoked, like telling a story in a way an expectancy effect of a punchline is evoked or by telling a story with which people can sympathize. Studies like the one conducted by O'Neill and Nicholson-Cole (2009), which show that fearful messages attract attention, but are often an ineffective tool for motivating people, should be considered. Next to that, more research could be done into thinking of different ways to let people engage with scientific material, which can sometimes be hard to read and understand, especially for laymen. Previous research has shown that constructing science fiction can engage scientific reasoning and imagination (Matuk, Hurwich & Amato, 2019), thus much promise lies here in how science communication can be improved. Can the creation of science fiction itself be a way to let policy makers engage with alternative futures? Galafassi et al. (2018) similarly have argued for co-creation of knowledge to combat the warming of this planet. Next to that, a topic that I find under

lighted and much needed, is the effect which humor can have on thinking about the future. It has been shown that laughing increases the neurotransmitter endorphin (Yim, 2016) which consequently improves memory. Might comedy to engage people with topics such as climate change be a way forward? Studies like the one conducted by Boykoff and Osnes (2019), which investigates how comedy and climate change could fuse and together form a strong communicative tool, should be given more attention when designing interventions to engage people with the future.

Next to a focus on how to create the best stories, research could shed light on psychological traits and engagement with stories. Why do certain people enjoy science fiction and others do not? This could be researched in combination with the worldviews classification, to provide a fast classification of who can be approached with what technique to stimulate ideas about the future. There will always be individual differences between people's preferences for culture, but can workshops for engagement with the future be attuned to meet the preferences of most participants? Perhaps differences in how material is presented could change people's engagement with topics around the future? Next to that, the psychological construct of 'open' and 'closed' views on the future are often used in future literacy, but no psychological research exists, to my knowledge, on this topic so far. Another interesting area of research could be into the *constructive episodic simulation hypothesis*. This hypothesis states that we use prior episodic memories (memories of specific events that are stored in long-term memory) of experiences we have had to guide images of the future (Szpunar & McDermott, 2008). The more experiences we have had conform to thoughts about the future, the easier images of the future are to construct (Szpunar & Schacter, 2013). Research in this area investigates what areas of the brain are involved in activation of these future images, which could lead to very interesting research when combining research question on policy and future with activation of brain areas. For instance, could we predict on the basis of stimulation of brain areas (measured in an MRI scanner) which people have stronger activation of brain areas involved with future thinking? Could we then draw conclusions about which people are better at creating images of the future? Psychologically unravelling these concepts could be interesting for further research.

This study has indeed showed that almost all policy makers saw a need for more future thinking in their work and enjoyed conversation on this topic. Thus, research into how cultural products can be used in policy settings is a valuable addition to the research area of foresight and futuring. I would be thrilled to pursue research in this area.

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Zaidi, L. (2019). Worldbuilding in science fiction, foresight and design. *Journal of Futures Studies*, 23(4), 15-26.

Functions of interviewees

Program manager Energy transition and Circular economy at the province of Utrecht
Participation advisor for natural gas free neighborhoods at the municipality of Amsterdam
Strategy and Public Affairs at the municipality of Utrecht
Policy advisor sustainability at the municipality of The Hague
Water safety policy officer at the Ministry of Infrastructure and Water Management
Program manager for 'Weerbaar Rotterdam', a climate adaptation program at the municipality of Rotterdam
Dealmaker and regional advisor at the Ministry of Internal Affairs
Project leader Utrecht4GlobalGoals at the municipality of Utrecht
Team leader for natural gas free neighborhoods at the municipality of Amsterdam
Strategic advisor at the water board De Stichtse Rijnlanden

Interview guidelines

Scheme

Part 1	Introduction (10 min)
Part 2	Known science fiction (20 min)
Part 3	Podcast (15 min)
Part 4	Reflection (15 min)

Opening interview

I follow a master Sustainable Development with a specialization in governance. This research falls into the quickly developing scientific area of ‘futuring’, which tries to capture how people think about the future.

Are you okay with this interview being recorded?

Data will only be used for this study.

Introduction

Work

1. What is your job description?
2. Do you have a project in which future thinking is present?

Future

3. How do you see the future?

Known science fiction

4. Which science fiction films, series, books, games or podcast have you seen, read or heard?
5. Which two have made the most impact on you?

Worldbuilding exercise I

6. If you were to combine these two science fiction artefacts and imagine that this is the world we are heading for, what do you think that world would look like? Please use the different themes as are described on the Miro board in the blue circles to guide your answer.
7. What would your work project and your role in it look like if this world were to become a reality in 10 years? Please use the yellow box in the middle of the Earth to describe this.

Podcast

8. Please read the summary of the podcast I've sent you and subsequently listen to the podcast.
9. Fill in the questions attached in the document (you can make additional comments if you want) and send it back to me.

Worldbuilding exercise II

10. Now, imagine that this world becomes a reality in 10 years. Can you describe what that world would look like? Please use the different themes in the blue circles to guide your answer.
11. What would your work project and your role in it look like if this world were to become a reality in 10 years? Please use the yellow box in the middle of the Earth to describe this.

Reflection

12. What is it like to engage in futuring in this way?
13. What is the difference between working with science fiction you already knew and the podcast you listened to?
14. How do you look back at the scenarios you have created?
15. How do you look at the influence that science fiction has on you?
16. Do you see a potential role for science fiction in your work?
17. What would you need to possibly integrate science fiction into your work?

Guiding document podcast

The whole podcast can be found on

<https://www.volkskrant.nl/kijkverder/t/podcasts/serie/dit-is-de-toekomst/jan-terlouw-mevrouw-de-president/>

In this study, only the fragment between 20:08 and 27:08 was provided to the participants.

Introducing podcast episode 'Mevrouw de president'

You are now going to listen to a podcast episode of 'Dit is de Toekomst', a podcast series made by de Volkskrant. For this series, scientists were paired up with writers, who then wrote a story about a development in the future. For this study we listen to part of the episode 'Mevrouw de president', written and narrated by Jan Terlouw. In his story, he describes how three female leaders, Elisabeth (President of the US), Wei Wei Lin (President of China) and Helga (President of the European Commission) together form a block against the oil industry and thus make a big step towards solving the climate problem. Discussed in the next 7 minutes you hear are the three leaders who are meeting in Iceland with oil producers to discuss the strategy for 2030 to 2040.

After listening to the podcast, could you please fill in the questions below? If you want, you can type an explanation with it.

On a scale from 1 to 4 (1 = not at all, 2 = a little, 3 = moderately, 4 = a lot), to what degree did you:

1. Have a vivid image of the events in the story?
2. Become fully absorbed in the story?
3. Feel as if you were present in the world that the story created?
4. Feel the emotions the characters were feeling?
5. Imagine what it would be like to be in the position of the characters?

Post test questions

1. In the past month, to what extent have you thought about the conversation we had?
2. Did you consume more, less or the same as before in science fiction media after your participation in this study?
3. Has the conversation we had changed your vision of the future in any way?
4. Would you be interested in further discussions on this subject?

Science Fiction

1.
2.

Scenario 1

- Politiek** Samenwerking / regimine
- Sociaal** Veranderheid in de samenleving / polarisatie
- Wetenschap** Geen vinynd in onderzoek gestuurd.
- Mediaal** Hoge druk op de mens
- Psychiek** Achteruitgang van het menselijk bewustzijn

Scenario 2

- Wetenschap** Sharing & open access, openbaar domein, openbaar domein
- Sociaal** Inequality, social inequality, social inequality
- Mediaal** Mental health, mental health, mental health
- Politiek** Political, political, political
- Psychiek** Psychological, psychological, psychological

Science Fiction

1. Star Wars
2. Waterworld/ Mad Max

Scenario 1

- Sociaal** Inequality, social inequality, social inequality
- Wetenschap** Wetenschap is niet meer algemeen beschikbaar
- Mediaal** Mediaal, mediaal, mediaal
- Psychiek** Psychiek, psychiek, psychiek

Scenario 2

- Wetenschap** Wetenschap is niet meer algemeen beschikbaar
- Sociaal** Inequality, social inequality, social inequality
- Mediaal** Mediaal, mediaal, mediaal
- Psychiek** Psychiek, psychiek, psychiek

Science Fiction

1. Space ship
Odyssee
2. 1984

Inspire

BLADE RUNNER
STAR WARS
1984

Scenario 1

Digital
Een van de belangrijkste ontwikkelingen van de toekomst. Het is de manier waarop we met elkaar communiceren en samenwerken. Het is de manier waarop we ons leven organiseren en de manier waarop we de wereld zien.

Sociaal
De manier waarop we met elkaar omgaan. Het is de manier waarop we samenleven en de manier waarop we de wereld zien.

Technisch
De manier waarop we de wereld zien. Het is de manier waarop we de wereld zien.

Mediaal
De manier waarop we de wereld zien. Het is de manier waarop we de wereld zien.

Wetenschappelijk
De manier waarop we de wereld zien. Het is de manier waarop we de wereld zien.

Business
De manier waarop we de wereld zien. Het is de manier waarop we de wereld zien.

Scenario 2

Digital
Een van de belangrijkste ontwikkelingen van de toekomst. Het is de manier waarop we met elkaar communiceren en samenwerken. Het is de manier waarop we ons leven organiseren en de manier waarop we de wereld zien.

Sociaal
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Technisch
De manier waarop we de wereld zien. Het is de manier waarop we de wereld zien.

Mediaal
De manier waarop we de wereld zien. Het is de manier waarop we de wereld zien.

Wetenschappelijk
De manier waarop we de wereld zien. Het is de manier waarop we de wereld zien.

Science Fiction

1.
2. AI

Inspire

BLADE RUNNER
STAR WARS
1984

Scenario 1

Digital
Een van de belangrijkste ontwikkelingen van de toekomst. Het is de manier waarop we met elkaar communiceren en samenwerken. Het is de manier waarop we ons leven organiseren en de manier waarop we de wereld zien.

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Wetenschappelijk
De manier waarop we de wereld zien. Het is de manier waarop we de wereld zien.

Business
De manier waarop we de wereld zien. Het is de manier waarop we de wereld zien.

Scenario 2

Digital
Een van de belangrijkste ontwikkelingen van de toekomst. Het is de manier waarop we met elkaar communiceren en samenwerken. Het is de manier waarop we ons leven organiseren en de manier waarop we de wereld zien.

Sociaal
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Technisch
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Mediaal
De manier waarop we de wereld zien. Het is de manier waarop we de wereld zien.

Wetenschappelijk
De manier waarop we de wereld zien. Het is de manier waarop we de wereld zien.

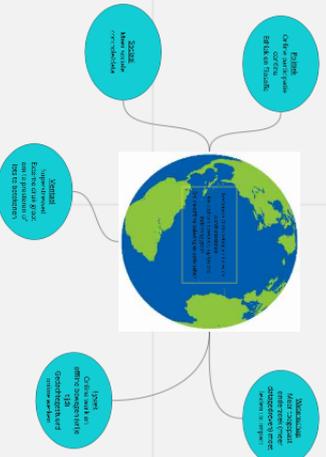
Science Fiction

Films	Series
Star Wars Blade Runner The Matrix Blade Runner Blade Runner	Star Trek Blade Runner Blade Runner
Boeken	Games, podcasts, etc.
1984	

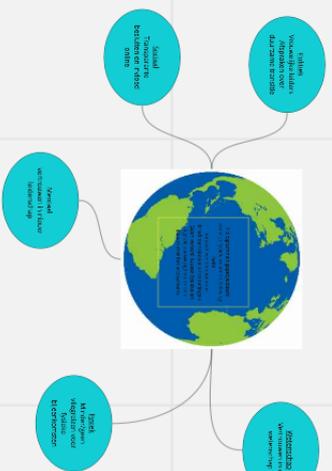


- 1. 1984
- 2. Black Mirror

Scenario 1



Scenario 2



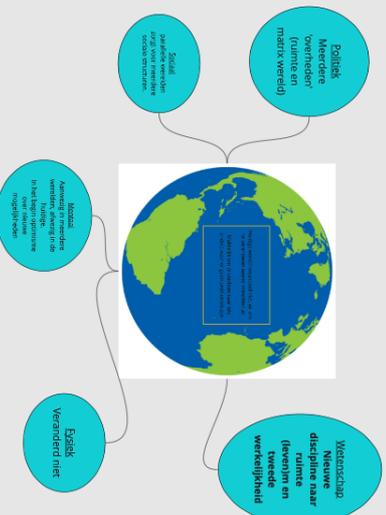
Science fiction

Films	Series
Star Wars Blade Runner The Matrix Blade Runner Blade Runner	Star Trek Blade Runner Blade Runner
Boeken	Games, podcasts, etc.
1984	

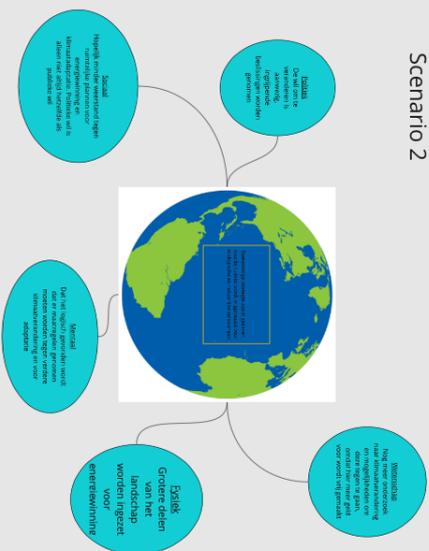


- 1. The Matrix
- 2. Star Trek

Scenario 1



Scenario 2



Coding terms and Hierarchy

5 'mother' codes were created, each with 'daughter' codes. They were based on the transcriptions of the first 3 interviews. For the post test, another mother code with daughter codes was developed.

- Work description
 - Description work project with futuring
- Vision future
 - Closed
 - Open
- First scenario exercise
 - Known science fiction
 - Reaction to exercise
 - Work scenario integration
- Second scenario exercise
 - Reaction to exercise
 - Work scenario integration
- Reflection
 - Effect of exercises and future thinking
 - Difference between exercise 1 and 2
 - Reflection on scenarios made
 - Influence (science) fiction
 - Policy integration
- Post test
 - Thinking about conversation
 - More or less (science) fiction
 - Impact conversation
 - Interest in further discussions