

# Uncovering Meaning When Imagining a Preferred Personal Life in Climate Futures

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## Abstract

Climate change is a socially relevant topic that causes current and future distress. To deal with this distress, one promising avenue is meaning-making. It is thought that meaning-making can lessen distress or enable a pathway to successful adjustment. One way to uncover future meaning is through narrative futuring. Narrative futuring asks individuals to mental transport into the future and narrate a desired future. Extending Park's meaning-making model (2010), this research aims to investigate anticipatory meaning-making by asking participants to narrate a desired future in 2042 whereby climate change has progressed. This imagined future is called a climate future. The research aimed to investigate how young adults in the Netherlands uncovered meaning in climate futures using the meaning-making model. This research relied on qualitative data and had two parts. In part one, 32 young adults living in the Netherlands were shown one of two videos depicting a Transhumanism (TH) or Deep Ecology (DE) narrative. They then wrote a *Letter from the Future* (Sools, 2020). Letters were then analysed using the elements of the model. For part two, 5 participants took part in a focus group. This aimed to obtain a better picture of meaning-making and focused on the appraised meaning, distress and successful adjustment, and meaning-making processes. The results showed commonalities between how meaning-making was expressed in both conditions (TH and DE). Generally speaking, participants suggested that successful adjustment could be obtained in 2042, however, this was usually after a period of distress. The narratives were commonly expressed and seemingly helped obtain successful adjustment. The research indicated that Park's (2010) model can be extended to anticipatory meaning-making and that it can also be applied to climate futures. Further revisions of the model for anticipatory meaning-making are recommended.

*Keywords: Meaning-making, meaning-making model, climate futures*

## **Constructing Meaning When Imagining a Preferred Personal Life in Climate Futures**

Climate change is a socially relevant topic that can cause extreme distress both in the present and in the future. It can already be observed that climate change related distress has detrimental impacts on mental health and well-being and it is likely that these impacts become more pronounced or escalate as climate change progresses (Doherty & Clayton, 2011; McBride et al., 2021). This research suggested that meaning-making can lessen climate change related distress or even facilitate successful adjustment. In this research, meaning was defined by Baumeister (1991 p. 15), as a “mental representation of possible relationships among things, events, and relationships”. Meaning-making is the process of uncovering these representations. This research used narrative futuring, a method in which people envision a desired future (Sools & Mooren, 2012) to investigate meaning-making and the anticipation of climate change. More specifically, participants were required to imagine a desired future in 20 years whereby climate change has further progressed. This future was referred to as a climate future. This thesis followed Park’s (2010) meaning-making model and attempted to extend this towards anticipatory settings such as the anticipation of climate change. Reviewing recent literature hints that the model had not been applied in anticipatory settings yet. The anticipation of climate change and meaning-making is an emerging topic within the literature and is one that still is not widely understood. Therefore, this research the goal of this research is to further understand the relationship between the anticipation of climate change and meaning.

### ***Narrative Futuring***

Narratives can be expressed via stories and these stories can be used to uncover meaning (van de Goor et al., 2019). In this thesis, I follow Frankl’s reasoning as meaning is present in all situations and can always be uncovered (Frankl, 1979/1959 as translated in Auhagen, 2000). This means meaning is not found or created but rather revealed. Narrative

futuring can be a way to uncover this meaning in the future. Therefore, this can be a way to uncover anticipatory meaning-making. Narrative futuring asks people to mentally transport into the future and narrate what the future is like. Imagining the future may highlight perceived future needs, fears and desires (Prince, 2014). Therefore, narrative futuring may have a preparatory function, where individuals consider the future and alter or continue their present-day lives accordingly. This then may influence responses such as adaptive functioning which includes planning, evaluating outcomes and action (Maccallum & Bryant, 2011). Other benefits of narrative futuring may include improved emotional regulation and more effective coping mechanisms (Wahle, 2012). Overall, narrative futuring uses thoughts about the future and asks people to embody the future. In doing this, narrative futuring is a way to uncover meaning in the future and consequentially there may be various positive benefits both in the present and future.

### ***Meaning-making***

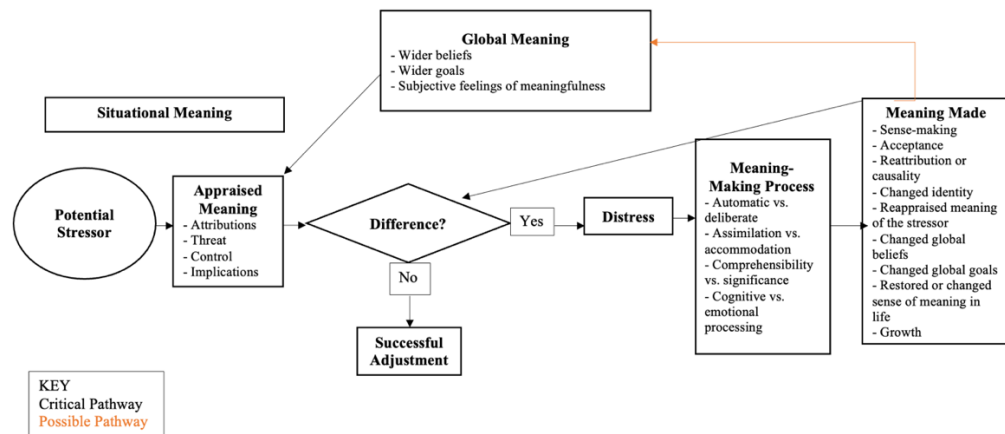
Park summarised the literature on meaning and defined meaning using Baumeister's (1991) definition of meaning as a "mental representation of possible relationships among things, events, and relationships" (p.15). Consequentially, Park (2010) formulated a meaning-making model (Figure 1). In the meaning-making model, there are two outcomes of meaning-making either distress or successful adjustment. Park suggests that successful adjustment and distress are largely influenced by situational and global meaning. Success is the one final conclusion of meaning-making, whereas distress stimulates further processes. Global meaning refers to wider meanings that are often encompassed within society and culture. This includes facets such as beliefs, goals, views and core schemas to name a few. Whereas situational meaning refers to meaning within a specific context. The meaning-making model is discrepancy based. This means that it is people's *perceptions* of the discrepancy between global and situational meaning that matter and not actuality. Successful adjustment is the

alignment of global and situational meaning whereas distress is a discrepancy in the two meanings. The bigger the discrepancy the bigger the distress (Park, 2010).

In the model, situational meaning refers the rest of the elements of the model bar global meaning. Potential stressors are factors that supposedly can cause distress. All potential stressors have an appraised meaning. This refers to the potential stressors' initial meaning appraisals which include the level of threat, controllability, implications and initial attributions. Situational and global meanings are then perceptually compared and the outcome is either successful adjustment or distress. If successful adjustment occurs then the process concludes. If distress occurs, meaning-making processes are stimulated to attempt to reduce this distress. Park (2010) suggests there are four spectrums of meaning-making processes, namely automatic vs deliberate, accommodation vs assimilation, comprehensibly vs significance and emotional vs cognitive processing. These spectrums relate to intrapsychic attempts to change the perception of the difference between global and situational meaning. The result of meaning-making processes is "meaning-made". This includes sense-making, acceptance, reattributions, changed identity, the reappraised meaning of the stressor, changed global beliefs or goals, perception of positive changes or growth, and restored or changed meaning in life. If a discrepancy is still found then the process repeats. The overall goal of meaning-making is to obtain successful adjustment.

### **Figure 1**

*Park's meaning-making model (2010)*



The positive effects of meaning-making have been well-documented. Park (2010) suggested that *all* meaning-making attempts should result in a better later adjustment. Park (2013) later suggested that meaning-making attempts can be a way to cope with distress as they can create a pathway towards successful adjustment, which may later positively influence well-being. It is supposed the positive benefits of meaning-making can also apply to anticipatory meaning-making. Meaning-making has been positively associated with well-being with some even suggesting that meaning-making could be a means to cope, sustain or even enhance well-being (García-Alandete, 2015; Moomal, 1999). Although the path linking meaning-making and well-being may be hazy, it is suspected that adjustment has a key role (Heintzelman & King, 2014, Park, 2010).

It is important to point out that meaning-making without successful adjustment can lead to malfunctioning practices such as extreme rumination. Park and Blake (2020) highlighted this and suggested that malfunction practices are driven by distress and occur when meaning-making processes do not result in meaning-made. Rather, they are in a cycle of meaning-making processes driven by distress. Thus, the benefits of meaning-making may only occur with successful adjustment. To conclude, any efforts to uncover meaning, whether anticipatory or not, are likely to lessen distress and successful efforts may have a knock-on effect on positive coping mechanisms or well-being.

### ***Application to Climate Change***

Meaning-making can be the most valuable in the face of major events, particularly negative ones (King & Hicks, 2009) like climate change. Climate change includes many highly stressful events both the present and future (Adger et al., 2003, Caracciolo, 2022). Climate scientists claim the future of the climate will be bleak and to the most extreme, some scientists claim humanity may cease to exist (Wuebbles & Jain, 2001). Climate change and its associated stressors are thought to have detrimental effects on mental health and well-being (McBride et al., 2021). With this extreme adversity in mind, anticipatory meaning-making may be a way to cope or psychologically/mentally prepare for climate change and reduce the psychological severity of its future implications. In their research on children, Burke et al (2018) found that meaning-focused coping helped children cope with climate change. The researchers suggest that relying on beliefs, values and existential goals may lead to positive feelings that buffer some of the threats of climate change without minimising the urgency or severity of the issue (Burke et al, 2018). Burke et al, (2018) also suggested meaning-making increased positive affect, life satisfaction and environmental engagement. Hence, uncovering anticipatory meaning in the future whereby climate change has progressed may lessen the severity of its psychological implications and may also facilitate ways to successfully cope.

**Climate change narratives – Transhumanism and Deep Ecology.** Narrative psychology suggests that stories should be placed in the context of social and cultural narratives (Java, 2014; Murray & Sools, 2014). In this case, it is important to highlight current cultural narratives of climate change. In Park's (2010) research these narratives may make up global meaning. Climate narratives have already been used in research and as Nikoleris et al (2016) highlighted these can help participants situate themselves in the future. Two popular or emerging climate change narratives are transhumanism and deep ecology. Transhumanists see human nature as inept and a work in progress, and using technology can

enable us to go beyond biology (Verdoux, 2009). Therefore, transhumanism advocates for the use and development of technology. In terms of climate change, this could mean implementing technology to reduce the impact of climate change (Ferreira et al., 2019). Deep ecology is more social-ecologically oriented and suggests vast societal changes toward a more minimalist way of life using sustainable communities (Capra, 2013). Deep ecology also prides itself on going beyond environmentalism (Naess, 1984) and promotes restoration and protection of the planet and its resources. Conclusively, climate change narratives such as transhumanism and deep ecology, have the benefit of helping future imagination as well as being realistic narratives that are used and implemented in wider social spheres.

### ***This Study***

This research has two central aims. First, see if Park's (2010) meaning-making model can be extended to anticipatory meaning-making and second to better understand meaning-making in climate futures. The research uses narrative futuring to uncover anticipatory meaning for young adults living in the Netherlands. Young adults are thought to be one of the most vulnerable demographics affected by climate change (Doherty & Clayton, 2011; McBride et al., 2021). It is important to highlight that some of the implications of climate change are already distressing and highly observable. However, for people in the global north, like citizens of the Netherlands, buffers, such as dykes and technologies, have buffered or delay some of the worst consequences of climate change (Adger et al., 2003). Saying this, as the Netherlands is largely at or below sea level, they are likely to be even more heavily impacted by the melting icecaps and mass migration in the future. Thus, as some of these implications are still to come, this makes these escalations of climate change anticipatory in the Netherlands. This research is exploratory and by better understanding anticipatory meaning-making, this be a way to cope by lessening the burden of actual future adjustment to



future climate change. Thus, this research question: How do young adults uncover meaning when asked to narrate climate futures?

### **Materials and Methods**

This research has two parts and relies on qualitative data. In part one of the research participants watched one of two self-made videos either on deep ecology or transhumanism. These cultural narratives were used in the operationalisation of global meaning. Two conditions were formulated based on the video participants watched namely deep ecology (DE) and transhumanism (TH). Part one used a method called *Letters from the Future* which required participants to write a letter from 20 years in the future when climate change has progressed. Part two used a focus group to obtain a more accurate picture of meaning-making by focusing on the lesser clear elements of the model to better understand their role in anticipatory meaning-making. This research was approved by the University of Twente (Approval Code 221299).

#### ***Participants***

The study used young adults between the ages of 18 and 28 living in the Netherlands. All participants needed sufficient English language skills. For part one, participants were recruited through convenience sampling via a shared QR code or through a pool of Psychology students from the University of Twente. At the end of part one, participants indicated a willingness to take part in a focus group. Those who were interested were then emailed and invited to part two. The entirety of the research was online. Therefore, participants were required to have access to a computer or mobile device with a stable internet connection. Psychology students from the University of Twente were rewarded with SONA credits.

#### ***Procedure***

##### **Part One**

Participants clicked a link and were directed to the study on Qualtrics. After reading an information sheet (Appendix 1) and giving informed consent, participants either watched a self-made video on transhumanism or deep ecology. Which video participants watched was randomised. Afterwards, all participants watched another self-made video which instructed how to write a *Letter from the Future*. Participants then had to write a letter. Additional prompts from the instruction video were also provided. There was no word count but participants were advised the task takes 20 minutes. After letter writing, participants answered a short questionnaire (Appendix 2). At the end of the research, participants indicate interest in participating in part two by leaving their contact details. Participants were then debriefed and given the researchers' email addresses for further concerns.

## **Part Two**

Participants who indicated a willingness to participate in the focus group were emailed a second information sheet (Appendix 3) and had to email back if they were still interested. Before the focus group, participants were emailed a copy of their letter and were asked to watch both transhumanism and deep ecology videos. After obtaining online consent and rereading the information sheet, participants were then refreshed on the aims of the research. The focus group started with some short questions on the narratives. After a short discussion, participants then read out loud their *Letters from the Future*. Participants were then asked a series of questions about their imagined future, the appraised meaning, distress, and meaning-making processes. After each question, participants were invited to share their experiences and discuss these. The focus group was an hour long. All data from parts one and two were stored safely on the UT Network storage. See appendix 4 for more details on part two including the specific questions.

## ***Materials***

### **Global Meaning Videos – Transhumanism and Deep Ecology**

In this research, global meaning was operationalised using transhumanism and deep ecology narratives. These narratives were shown using two short self-made videos. These videos aimed to educate participants on the narratives. The videos were used to provide a 'mental scaffold' to help situate participants in the future. The two videos were illustrated and narrated by myself and another student. The illustrations were based on the narration and highlighted keywords or ideas of each movement (for example trees and plants represented ecosystems). The videos aimed to prompt the extreme, prototypical version of the chosen cultural narrative. The narratives also acted as an example of global future changes that could be implemented. This included increased implementation of technology or extreme reductionism. Links to the videos and their subsequent scripts can be found in Appendix 5.

**Transhumanism and Deep Ecology.** These short videos synthesised the literature on transhumanism and deep ecology. The transhumanism video used Verdox's (2009) ideas that technology should benefit and *enhance* human capabilities and allow humanity to go beyond nature's limitations. The deep ecology video centred around Naess's (1984) work suggests a harmonious equilibrium between humanity and the ecosystems. This means humans take vital resources from the ecosystem, such as food and water, and do not deplete the ecosystem's resources by taking non-vital resources. The deep ecology video also highlighted the role of reductionism (Sessions, 1987). These particular narratives were chosen because of their social and cultural opposition. Both narratives are future-focused and promote radical changes to society and humanity. For example, transhumanism promotes enhancement and deep ecology is more essentialist. However, attribute different roles to nature, humanity and technology. The link between the narratives and climate change was not expressed in the videos, but the application to climate change was not far-fetched. This meant participants could interpret and apply the narratives in their own way.

### **Letters from the Future**

Part one used *Letters from the Future* to obtain narratives. Originating and adapted from storytelling groups promoting mental health, *Letters from the Future* are letters written from a future time to the present where a specific problem has been solved (Sools & Mooren, 2012). The creative exercise relies on narrative futuring and requires participants to imagine being taken in a time machine to a desired future. Participants then have to describe what the future is like in a written letter. In this research, participants were shown a self-made video instructing them on how to write a *Letter from the Future*. This video was adapted from Sools et al.'s (2020) research. The video used illustrations alongside a soft-spoken voice and aimed to act as a thought provoker that helped participants imagine a desired future in 20 years whereby climate change has progressed.

Prior research suggested when imaging the future, younger people tend to benefit from a specific time reference (Lyon & Carabell, 2016). 20 years was chosen. This was so that participants could imagine a distant future whereby change could be somewhat easily imaginable, but not too far that the future feels highly ambiguous or too speculative. Participants were also prompted to describe the path to the future, actions that were taken to get to this future and to give a message to the present. This aimed to enhance reflective thought about how the future came to be and highlight the role, if any, of personal actions or narratives. Immediately after watching the video participants wrote the letter. The audience of this letter was open. Specific instructions are in appendix 5.

### **Questionnaire**

The questionnaire included 14 questions (Appendix 2). The first 5 questions were about sample demographics. The next 3 questions were about the letter-writing process. The following 4 questions were about the narratives and participants' identification with them. Finally, the last two questions asked for participants' willingness to participate in part two and if they would like to be sent the final thesis.

## **Focus group**

A focus group was conducted to gain a more in-depth understanding of meaning-making. Questions in the focus group were focused on appraised meaning, meaning-making processes and distress and successful adjustment. In the letters, the appraised meaning was often non-specific and tended to include vague statements of climate change progressing. Similarly, successful adjustment tended to be expressed using vague generalised improvements but lacked specification as to how or why these improvements arose. Finally, meaning-making processes were often overshadowed or inferred through meaning-made. This meant outcome was present but the actual mechanism to get to such was not widely documented. Participants were also asked about their understanding of the previous task and the narrative. This was primarily done to evaluate the research. The specific questions can be found in Appendix 4. Using a focus group allowed for deep exploration and discovery of ideas and perspectives, and allowed individuals to share and highlight what matters to them (Morgan, 1998). A group setting also aimed to expose participants to others' experiences. This may develop their own meaning-making as by hearing others' narratives, participants may alter, adapt or defend their own narrative.

## ***Selection Criteria***

Out of the 58 participants who started the research, 25 participants were excluded because they did not fully complete the research. Another participant was excluded as were not in the specified age demographic. This led to a sample of 32 participants in part one; 19 participants in the transhumanism condition ( $\bar{x}$  age = 21.9) and 13 in the deep ecology condition ( $\bar{x}$  age = 22.5). 9 individuals indicated a willingness to participate in the focus group, however, only 5 took part in the online focus group ( $\bar{x}$  age = 21.6). Table 1 and 2 shows the sample demographics for part one and two.

## **Table 1**

*Demographics from Part One (N=32)*

Sample Characteristics	<i>Total N</i>	<i>Trans-humanism N</i>	<i>Deep Ecology N</i>	Total Freq.	Trans-humanism Freq.	Deep Ecology Freq.
<b>Total Participants</b>	32	19	13	100%	59.3%	40.6%
Gender						
Male	11	5	6	34.4%	45.5%	54.5%
Female	21	14	7	65.6%	66.7%	33.3%
Nationality						
Dutch	13	8	5	40.6%	61.5%	38.5%
German	11	7	4	34.3%	63.6%	36.3%
Other	6	2	4	18.8%	33.3%	66.7%
Dual Nationality	2	2	-	6.25%	100%	0.0%
Employment Status						
Student	29	16	13	90.6%	55.2%	44.8%
Student and working	3	3	-	9.4%	100%	0.0%
Highest Diploma Obtained						
High School	19	10	9	59.4%	52.6%	47.4%
Bachelor's Degree	13	9	4	40.6%	69.2%	30.8%

**Table 2**

*Demographics from Part Two (N = 5)*

Sample Characteristics	<i>Total N</i>	Group Freq.
<b>Total Participants</b>	5	100%
Gender		
Male	2	40%
Female	3	60%
Nationality		
Dutch	4	80%
Dual Nationality	1	20%
Employment Status		
Student	4	80%
Student and working	1	20%
Highest Diploma Obtained		
High School	3	60%
Bachelor's Degree	2	40%
Prior condition		
Transhumanism	4	80%
Deep Ecology	1	20%

**Data Analysis**

After data collection, letters were anonymised and de-identified. Letters were then referred to by a number e.g., Letter 1. Two conditions were formed based on the video participants watched namely Transhumanism (TH) and Deep Ecology (DE).

To analyse the letters, I first familiarised myself with them. After this, I referred back to Park's (2010) paper to better understand each element of the model. I then re-read the letters, highlighted, and coded text that fit with Park's definitions. For example, I highlighted and coded anything that fits Park's (2010) definition of a potential stressor, then on a new document highlighted anything that fits the definition of an appraised meaning and so on. After this, I further defined Park's (2010) definitions using my own definitions that were more specific and fit my data. For example, as this research is on anticipatory meaning-making, successful adjustment was *perceived in the future*. I then revised the primary codes based on Parks' (2010) definitions using my newly adapted definitions. I repeated this process based on Park's (2010) explanations for the sub-elements of the model such as threats, implications, controllability etc. I also separated potential stressors by time into implied past (2022-2041), past (2022-2041), and future (2042 and beyond). The implied past referred to changes in the past that were not explicitly mentioned by inferred from the positive changes that occurred. For example, "But, thanks to the flourishing of technologies, the rise of climate-aware politicians and climate change activists, we've managed to adapt relatively well". This inferred that at some point in the climate-aware politicians were not rising or in power and this was somewhat problematic. Thus, it could be implied that this was a potential stressor in the past. Separating by time in this was done to differentiate stressors between newly arising stressors from those which continue and those which ameliorate. All codes were displayed on individual mind maps showing each sub-element and extracts for participants in transhumanism and deep ecology condition. Using mind maps helped summarise the difference in the number of codes and the expression of sub-elements between

the two conditions. Overall, 33 mind maps were created. Appendix 6 shows all the definitions of the elements and sub-elements and provides an example with a very short explanation of how each of these was coded.

Letters were coded using a meaning-based unit of analysis (rather than a grammatical unit such as a sentence or word). These meant codes were formulated from extracts. Extracts could be whole sentences, fragments of a sentence, or multiple sentences constituting the same idea. See Appendix 6 for examples. Multiple codes could be found within the same letter or even the same sentence if different ideas were mentioned. It is important to highlight that all codes had to be related to climate change. This could be a primary implication of climate change such as increased temperatures or secondary or tertiary implications such as an inability to work due to relocation because of climate change.

In some instances, codes overlapped. For example, with implications and threats i.e., “only when by 2035 real problems started occurring, extreme weather became the norm” (Letter 6, DE). In this example, the threat of unspecified climate change is continuing (as indicated by the extreme weather), but the implications are that the threat has become a norm and that real problems have started as a consequence. In these cases, they were coded for both implications and threats.

For Part two, analysis was performed on the transcripts obtained from the video recording. Analysis was coded the same as Part one, however, analyses were only done for appraised meaning, distress, and meaning-making processes. Codes could be obtained from the entirety of the transcripts and not just the specific target questions. This meant that an appraised meaning code could be found when the targeted question was about meaning-making processes and vice versa. This was done so that I could better understand the relationship between elements of the model and adequately capture them.

## **Results**



I first present the code frequencies for the elements and sub-elements of the model. Then I give a brief overview of the findings for the relevant part of the research. I then detail the expression of elements and sub-elements of the model. Both parts used the same definitions. The definitions of the elements and sub-elements of the model including an example and a short explanation of why they were coded like this can be found in Appendix 6. Unless otherwise indicated, the expression or number of codes for transhumanism and deep ecology was comparable. Therefore, if one example is given this was typical of both conditions.

### ***Part 1 – Letters from the Future***

**Code Frequencies.** All elements and sub-elements of the model were found in the letters. However, some were more pronounced than others. To give an overall picture comparing the different elements of the model, global meaning was coded for the least (codes = 160), whereas potential stressors were coded the most (codes = 463). Meaning-making processes were also highly coded for (codes=387).

Global meaning was defined as the perceived meaning resulting from larger societal or cultural powers. In this research, global meaning used transhumanism and deep ecology. Further investigating global meaning, transhumanism components were most common in the TH condition (n = 9, codes = 45). Deep ecology components were most common in the DE condition (n = 8, codes = 46). 3 letters did not adhere to any narrative. 8 letters included a hybrid narrative (codes = 58).

Potential stressors were the supposed objective, physical or experienced factors that may cause stress. Potential stressors were separated by time (implied past, past, future). Most potential stressors were in the past (codes = 195) or implied past (codes = 165). This suggests perceived improvements in several present-day stressors. Some stressors were found in all time frames. See appendix 7 for the types of potential stressors split by time and condition.

As suggested, all potential stressors had an appraised meaning. The appraised meaning was defined as the perceived future or current potential consequences, initial appraisals, or meaning of these potential stressors. The most common forms of appraised meaning were implications (codes = 43) and controllability (codes = 66). Differences in the conditions were seen via threats (most common in the TH condition (DE = 4, TH = 20)) and attributions (most common in the DE condition (DE = 23, TH = 7)).

Distress and successful adjustment was defined as the perceived alignment or difference between situational and global meaning. Successful adjustment was more common in the TH condition (DE = 22, TH = 48). Distress stimulated meaning-making processes. Meaning-making processes were defined as the attempts or efforts to uncover meaning to reduce the perceived distress. The most common types of meaning-making processes were deliberate processes (codes = 55), and assimilation (codes = 52) vs accommodation (codes = 37). Assimilation (DE = 18, TH = 34) and comprehensibility (DE = 7, TH = 19) were coded as more common in the TH condition. Emotional processing (DE = 2, TH = 10) and automatic meaning-making (DE = 0, TH = 2) were not coded frequently but when they were this was most common in the TH condition. Significance was the only variable whereby codes indicated it to be a bigger theme in the DE condition (DE = 20, TH = 18). Successful meaning-making processes then fed on to meaning-made. Meaning-made was defined as the outcome of meaning-making processes. The most common forms of meaning-made include acceptance (codes = 59) and changed global beliefs (codes = 61). Comparing the two conditions, differences were in sense-making (DE = 26, TH = 19) and changed global goals (DE = 18, TH = 27) as these were more central in the DE condition. Reattributions TH (DE = 11, TH = 24), changed identity (DE = 6, TH = 18), and changed global beliefs (DE = 24, TH = 37) were coded more in the TH condition.

### **Table 3**

*Global and situational meaning in the letters across conditions*

Elements of the model	Total (n = 32)		Deep Ecology Condition (n = 13)		Transhumanism Condition (n = 19)	
	N letters	N codes	N letters	N codes	N letters	N codes
Global Meaning		160		52		108
Deep ecology components only	11	55	8	46	3	9
Transhumanism components only	10	47	1	2	9	45
Both deep ecology and transhumanism components	8	58	1	4	7	54
Neither component	3	-	3	-	-	-
Potential stressors		463		200		163
Implied Present	29	165	12	76	17	88
Present	30	195	12	85	18	110
Future (2042)	23	103	7	39	16	64
Appraised meaning		167		78		89
Threat	16	24	3	4	13	10
Attribution	13	34	6	23	7	11
Controllability	24	43	9	18	15	25
Implications	16	66	6	33	10	33
Distress and successful adjustment		170		74		96
Emotional Distress	22	45	9	17	13	28
Cognitive distress	20	55	10	35	10	30
Successful adjustment	26	70	10	22	16	48
Meaning-making processes		229		93		136
Automatic	2	2	-	-	2	2
Deliberate	23	55	9	25	14	30
Assimilation	21	53	8	18	13	34
Accommodation	18	37	8	15	10	22
Comprehensibility	16	16	2	7	13	19
Significance	19	35	11	20	8	15
Cognitive processing	14	19	6	7	8	12
Emotional processing	7	12	2	2	5	10
Meaning-made		387		158		229
Sense-making	29	45	9	26	10	19
Acceptance	24	59	10	26	14	33
Reattribution	20	35	7	11	13	24

Changed identity	11	24	3	6	8	18
Reappraised meaning	20	39	7	14	13	25
Changed global beliefs	21	61	10	24	11	37
Changed global goals	20	45	6	18	14	27
Restored or changed meaning in life	25	38	10	14	15	23
Growth	20	41	8	19	12	22

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**Overview.** In line with the task, most letters narrated an improved future whereby climate change has progressed but is now better managed. However, a small handful of letters did not narrate an improved future. Participants tended to narrate a period of distress followed by successful adjustment in 2042. There were some differences in coding and expression between the conditions. However, the overall picture of meaning-making was comparable. Both conditions often concluded with successful adjustment in 2042 which was largely influenced by the narrative they watched.

**Expression.** The expression refers to the content of the letters. This is separated by element. Situational meaning includes potential stressors, appraised meaning, distress and successful adjustment, meaning-making processes, and meaning-made. These will be analysed individually.

**Global meaning.** Global meaning was defined as the perceived meaning resulting from larger societal or cultural powers. In this research, global meaning used transhumanism and deep ecology. The expression of global meaning differed for the TH and DE conditions. This tended to be in line with the narratives. For example, those in the TH condition tended to detail the implementation of technology and those in the DE condition tended to detail communities coming together. In the hybrid narrative, participants commonly suggested that technology helped deep ecology goals such as restoring the ecosystem. For example, “the world looks much greener, as we stay planting more green that are genetically mutated to be

able to handle weather changes” (letter 11, TH). In this example, it appears that technology helped restore the ecosystem by planting greenery and helping nature and the ecosystems flourish once more.

**Potential stressors.** Potential stressors were the supposed objective, physical or experienced factors that may cause stress. Potential stressors were separated by time (implied past, past, future). Despite the vast number of potential stressors, there was lots of agreement. Most potential stressors were a primary or secondary implication of temperature changes or extreme weather. Most potential stressors were thought to improve or ameliorate in the future, even if these events still occurred. This was usually after a period of acceleration of the stressors. Most stressors in the past or implied past included temperature or weather changes. These stressors often continued into the future as well, seemingly were less of a stressor. Another key category of potential stressors was a lack of ability to do something in the future. This included difficulties adjusting to a new future that has attempted to take control over climate change. This difficulty in adjustment was voiced in many ways one of which included missing the past or the way nature used to be. For example, Letter 25 suggests that the development of transhumanism resulted in less nature and that they “miss nature like..., not the perfectly planted trees we have now”. Later the writer suggests they “get really sick of the odourless perfect air we have here” (letter 25, TH).

**Appraised meaning.** Many appraised meanings in the past were highly negative and suggested climate change caused havoc. However, the appraised meaning was often referred to in retrospect using the past tense. This infers positive improvements in the appraised meanings in 2042.

It was typical of participants to mention unspecified threats escalating or becoming more prominent in the future. Unspecified threats were inferred to be related to climate change progressing and worsening. However, *what* was threatening was unclear. Letter 1

captured this best “climate change was starting to become more and more relevant over the years, we wanted to make sure we were out of harm’s way (or at least as much as possible)” (TH). In this example, it is thought that the threat or harm of climate change felt closer to home and became more of an issue. Like in this example, it was typical of participants to narrate an increasing threat that resulted in a vast change in lifestyles such as relocation.

The letters tended to attribute improvements to increase the narratives having more control over climate change. This combined two sub-elements. Generally, participants in the TH condition attributed this control to technology and in the DE condition to love or respect for nature. For example, letter 12 attributed the restoration of nature to a new found love for nature e.g., “this year nature loves us because we love her”. Later in the letter, the writer suggests that this love had positive effects on the climate by helping restore the ecosystem. Similarly, in the transhumanism condition, letter 9 attributes the improvements in energy consumption to technology e.g., “technology made it possible to save the energy that is not used at a certain moment, so nothing goes to waste”. This technology highlights the use of sustainable technologies implemented by transhumanism. The writer later infers that this had positive effect on climate change.

Most implications were highly detailed and predominantly addressed perceived implications of weather changes or increased frequency of potential stressors. For example, the implications of extreme weather, like plant and animal extinction, became normalised. Many of the implications detailed vast changes to personal lives to accommodate the weather events such as relocation. Letter 24 (DE) best exemplifies this when talking about increased frequencies of extreme weather events “people displaced from their homes and memories. And that was if they even got away because due to weather extremes and poverty, a lot of people lost their lives”. These drastic implications were generally narrated on a global scale.

***Distress and successful adjustment.*** Participants usually agreed on what was distressing. Most distress concerned difficulties adapting to the new changes implemented to get a hold of climate change. Successful adjustment tended to be a result of resolving this distress and be expressed at the start or end of the letters to either instil hope or to advise the audience.

Successful adjustment tended to include components of the narratives. There were differences in what successful adjustment looks like. For example, some suggested this was better management of potential stressors, whereas others suggested that successful adjustment includes coming to terms with a new utopia. Successful adjustment also tended to have a positive outlook this was in line with an improved future. For example, “I may miss many nature adventures I had in my childhood on earth, but it's not that bad, either. It is a change for sure, but I like it” (Letter 32, TH). It was typical of successful adjustment to mention changes that were a result of the narratives taking control over climate change. In each condition, the expression of this differed. In the TH condition, this tended to include the widespread adoption of technologies and transhumanism. Whereas in the DE condition, this tended to include social changes such as communities coming together and people being more helpful or kinder to one and other.

Participants expressed cognitive distress differently in each condition. In the DE condition, distress concerned a loss in nature. “Plants continue to grow luckily, but with less frequency, and also less colours and nice smells. They do not produce fruit and vegetables like before, but in a way smaller quantity” (letter 31, DE). In the TH condition cognitive distress commonly included generalised distress. “The future is not the utopia that some people want it to be” (letter 28, TH). Both examples suggest that despite the changes made to get a hold of climate change, distress is still present in 2042, however, the DE was more specific as to what this distress was.

It was typical for participants to narrate emotional distress via feelings of grief or anxiety about climate change. Climate anxiety in 2022 was often expected to perpetuate in future but resolve by 2042. It was inferred that emotional distress was dependent on the state of the climate and an improved climate bettered emotional distress. Letter 11 best examples this “I know you have been struggling with climate anxiety because it has become a more and more pronounced issue in your reality” (TH). The letter continues to suggest that there is no need to worry anymore and infers this is because the state of the climate has vastly improved.

***Meaning-making processes.*** Meaning-making processes were often ambiguous and were commonly inferred through the next step of the model which was the result of these processes i.e., meaning-made. When meaning-making processes were more obvious, participants tended to narrate accommodation and assimilation. Many meaning-making processes could be seen through advice to the audience of the letters.

Deliberate meaning-making was favoured over automatic. No generalisations for automatic processes could be found as they were not highly mentioned. However, one example referred to use of electric cars “as those only ones that get sold these days” (Letter 28, TH). This was determined as automatic as there was no further details as to why these are the only cars sold. Deliberate processes tended to narrate an elaborate path to the future. A common example of this was through supposed future policies or laws. “This was all made possible by new policies” (Letter 11, TH) and “a law: "For each square feet of nature you take up, you should plant an equal amount of plants and trees on top of the roof or somewhere that is suitable" (Letter 8, DE). Many ideas were mentioned, but it was common for participants to narrate specific roles of governments or society, such as laws or regulations, to control climate change.

Assimilation and accommodation often included solutions that decreased the appraised meaning, particularly the threat. Assimilation and accommodation were rarely



narrated together. Assimilation tended to include sustainable behaviours. This was expressed on a personal level in the DE condition and a group level in the TH condition. “I, you should start by walking, taking a bike or public transport more often to reduce emissions” (Letter 8, DE). “Most people eat plant-based, rely on bikes, or transport more sustainably powered, no longer use plastic packaging, etc” (Letter 7, TH). In the TH condition, the narrators suggested that *many people* opted into these changes but this was due to their own doing and not society. In the DE condition, it was inferred that *the writer and sometimes also their partner* opted into these changes. This suggests that assimilation was more of a personal choice and was not influenced by others such as the TH condition may suggest. Accommodation was narrated differently in each condition and this tended to be in line with the further adoption of the narratives. Letter 17 best exemplifies this, “when we embraced nature...Now, we lead the fast life in harmony with nature” (TH). This example referred to global meaning as the hybrid narrative. In the rest of the letter, living the fast life include taking ‘L-Vits’ which were inferred to be life vitamins, which were enhancers. Embracing nature was of course closely related to deep ecology. Thus, although this example detailed the hybrid narrative, it embodied both forms of accommodation in each condition through either enhancement technologies or reconnections to nature.

Comprehensibility commonly expressed attempts to understand the path to the future whereas significance tended to narrate important factors to get to this future. Significance and comprehensibility were commonly used together to advise the audiences. For example, “if I can offer one piece of advice, it is that this community is what is most important” (Letter 22, TH) and “maybe you can prepare your place that it will fit in the future world already” (Letter 4, DE). These examples were typical of significance and comprehensibility as they often instilled hope of an improved future by first detailing and elaborately describing the

path to this future in the rest of the letter (comprehensibility), then advising on what it important to get to this future.

Cognitive processing tended to detail the path in which humanity got to the future and tended to rationalise cognitive distress. A typical example of this was in letter 33, “As you can see, although it took us long enough and the road to a better future didn't start off quite as easy, everything changed for the better” (TH). Like many other letters, the writer tries to rationalise present-day distress by suggesting that the future is better because of this distress. In the few times emotional processing was expressed, it tended to concern grief about climate change progressing or worry about the future. This was more prominent in the DE condition but was expressed similarly in both conditions. For example, “you got close to giving up, I think lots of people did, no one can deal with the grief of climate change by themselves. People still aren't.” (Letter 2 DE).

***Meaning-made.*** Meaning-made tended to closely align with successful adjustment. Meaning-made tended to be positive and participants seemed to be content with this outcome. Much of the distress in the “past” was resolved using meaning-made. There was also less distress in 2042 seemingly due to meaning-made.

Sense-making and acceptance tended to overlap. For example, participants made sense to accept this new reality. This was generally expressed in two different ways, firstly, by stating that climate change is a reality “climate change happened. Big time” (Letter 1, TH) and secondly through acceptance of changes and the narrative “my living situation is not an acceptance but merely the norm” (letter 8, DE). Most sense making and acceptance was found when referring to the audience. This was usually done to comfort the audience that this new utopia was going to be difficult to get to and distressing at times, but the outcome is desired. Closely related to this, growth tended to refer to global changes and included ideas that some of the ideologies of today's world, such as meat consumption, are outdated. For

example, “it is funny to think about how we used to eat animals, polluted rivers and had non-degradable plastic lol” (Letter 4, TH) and “yes, the world has changed, but humans for the better” (Letter 24, DE). In these examples, the teller suggests acceptance to the changes that have been made and earlier in the letters described the path to the future (sense-making). Finally, they concluded by suggested that these changes helped them get to a better future.

Participants tended to narrate reattributions differently and this was in line with the narratives. In the TH conditions, reattributions were linked to technological changes. This included further adoption or infiltration of life changing or enhancing technologies For example, letter 32 suggests diseases like cancer no longer exist as “now there is a technology that allows people to replace their damaged organs and limbs with new robotics easily” (TH.) In the DE condition, reattributions include changes to be more community based. This included letter 26, “it all happened thanks to humanity finally realising that we have to respect nature and started first with small groups and then later whole cities joined” (DE). Other key themes in the DE condition included communities supplying food and desired goods to replace high consumerism.

The reappraised meaning often detailed personal actions to align with their global meaning and the majority of these concerned acting more sustainably. It could be suggested that personal actions may be linked to control, as these are the things within the writers’ influence or control for example “I bought everything I needed locally, ethically and sustainably” (letter 1, TH). Acting more sustainably was also a theme in changed meaning of life and changed identity. The meaning in life tended to include concern caring more about the state of the environment. Changed identity usually included making concern for the environment a bigger part of their identity.

Most changed beliefs are related to changed personal beliefs about consumption. Beliefs tended to highlight that we as a society should vastly decrease our usage of resources and accept our role in escalating climate change. Letter 30 best exemplifies this:

“I believe it was mainly because two decades ago we had a common belief where we thought that our individual actions would not affect the planet. Now I can say and confirm most people have come to the realization that this is our environment and we should treat it with love and respect” (TH).

Changed global goals were linked to the narratives and tended to narrate goals to be more minimalist in the DE condition. In the TH condition, changed goals mentioned rules methods to control climate change. “At this point, so in 2042, we all live together with strict rules (emissions, world population numbers, society, ...) and with limited space but we make the best out of it.” (Letter 5, TH) The latter example suggests that there are still problems with climate change however the situation was improved. Letter 8 best narrates this for the DE condition "So ultimately the goal is to only take from nature what you really need and if possible, always give back to it. The idea is to live peacefully in proximity to wildlife and nature”.

### ***Part 2 – Focus group***

The focus groups targeted the appraised meaning, distress and successful adjustment, and meaning-making process. The definitions of the elements and sub-elements remained the same as in part 1 (see appendix 6).

**Code frequencies.** All of the targeted elements and sub-elements were coded for (Table 4). Meaning-making processes had the greatest number of codes (codes = 78). This was followed by distress and successful adjustment (codes = 47). The appraised meaning had the least number of codes (codes = 29). Within each element, there were similarities and differences in code frequencies within the sub-elements. There were no drastic differences in

the code frequencies for the sub-elements of the appraised meaning, but controllability (codes = 10) and attributions (codes = 9) were the most coded for sub-elements. In the next element of the model, most codes were for successful adjustment (codes = 18) and cognitive distress (codes = 19). Emotional distress was coded much less frequently (codes = 10). Finally, there were clear differences in meaning-making processes. Cognitive processes (codes=23) and deliberate processes (codes=24) were coded the most.

**Table 4**

*Table showing the elements of the model found in the focus group (N=5)*

Elements of the model	Total number of codes
Appraised meaning	29
Threat	4
Attribution	9
Controllability	10
Implications	6
Distress and Successful Adjustment	47
Emotional Distress	10
Cognitive Distress	19
Successful Adjustment	18
Meaning-making processes	78
Automatic	5
Deliberate	24
Assimilation	10
Accommodation	9
Comprehensibility	7
Significance	14
Cognitive Processing	23
Emotional Processing	6

**Overview.** To briefly overview part 2, participants often compared the future and present and mentioned changes in the present day that seemingly affect the future. This infers participants felt 2022 actions largely influenced the 2042 future. It is important to mention that all participants aligned with a hybrid narrative of both deep ecology and transhumanism. However, there were differences in how much influence each narrative had. For example, person 1 largely suggested transhumanism should take a more central role, whereas person 2

took a stronger deep ecology stance. The remaining three participants took a more centralised position. The findings in the focus group should take this hybrid narrative. Again, like the letters, unless expressed otherwise, participants narrated comparably.

**Expression.** The following section only refers to the expression of the appraised meaning, distress and successful adjustment, and meaning-making processes.

**Appraised meaning.** All participants suggested that climate change progressing was a potential stressor. However, the most common potential stressor was extreme weather events. Most of the appraised meanings were intertwined for example participants often narrated threats and implications together.

Participants typically mentioned extreme weather events such as floods or dryness and often linked threats and implications by stating that the threat of these extreme weather events leads to further implications. Threats were climate change progressing and becoming more prominent in richer westernised countries like the USA and the Netherlands. Implications tended to include the normalisation of extreme weather events and the perception that climate change is only going to worsen. A typical example of this was narrated by Person 5. “I think for me the flooding in the South of the Netherlands was really intense a while ago. Because it was a really big thing that suddenly it was very close to home.” (Person 5). Later in their speech, Person 5 states that “the floods have been predicted, but not for 25 years from now”. This inferred that climate change is escalating faster than scientists' predictions and this is threatening.

Participants commonly attributed the current and future state of the climate to their own actions or lack thereof. Person 2 best narrates this by stating “I noticed the less I do and the more I hear, the more hopeless I feel”. In this example, the speaker attributes their lack of action to feeling worse about the whole situation. Person 2 stated at a different point that they wished to be more active. It was common for participants to attribute importance to action or

change behaviour and tended to attribute sustainable behaviours or changes such as veganism to an improved future.

Controllability was narrated differently by different participants. These differences aligned with how central deep ecology or transhumanism was in the hybrid narrative. For example, when talking about how to control climate change, Person 1 referred to their actions within the transhumanism narrative “I personally can achieve more working on the technology”. Contrarily, person 4, who took a more centralised stance, suggested that control is in the hands of climate scientists but they were still sceptic “but it’s still not enough as we see”. Despite this disagreement in *who* (technology and humans or climate scientists) should take control, Person 5 made an interesting point which the rest of the group seemingly agreed with. Person 5 expressed *how* the control should be, i.e., “if it’s not societal and systemic and we haven’t like made an actual framework that is durable, then people could slip back”. This suggests participants perceived control over climate change to require large-scale changes. Furthermore, these changes may only be temporary and without support from governments or society, the future of the climate could be vulnerable once more.

***Distress and successful adjustment.*** Participants usually agreed on what was distressing in the future. Most distress concerned about what the future will hold if nothing changes. The participants all perceived this future to be bleak and distressing. Like in many of the letters, successful adjustment was after a period of distress. Successful adjustment tended to include changes in global or situational meaning to become more sustainable.

Emotional distress included worry or stress about the future. This could also indicate a level of climate anxiety. Participants emotional distress voiced fears if drastic action or change does not occur, which they perceived to be somewhat likely. Person 5 suggested that the management of climate change was worrisome, “I am worried that we are so divided at this point that no one’s going to agree”. Cognitive distress showed the same pattern of present

concerns escalating or perpetuating in the future. Like emotional distress, most of the cognitive distress mentioned regarded the future. Person 4 best voiced this i.e., “how will it be over another 10 years?”. In these examples, the speakers suggest that they perceive distress in 2022 due to the current state of the climate and the way it is handled. Furthermore, the speakers suggest this fear will extend into 2042. Thus, distress included concerns for the future and this was expressed through cognitive and emotive language.

Successful adjustment commonly appeared after distress. Successful adjustment also often occurred with changes in global or situational meaning. When asked about successful adjustment, person 2 voiced “I have to kill my darlings basically or my darlings are getting killed by everything that's happening. So, I have to find peace with a reduced life.” This infers that successful adjustment coincides with peace and reductionism. Peace could also be linked to meaning-made, specifically acceptance. By suggesting that their darlings are being killed, person 2 suggests a period of distress whereby climate change or its implications disable them from having the same opportunities that they would in 2022.

***Meaning-making processes.*** Meaning-making processes commonly included changes towards an improved future. This can be seen from comparisons of the present and future. It was unclear if meaning-making processes were triggered by emotional or cognitive distress.

Again, no real conclusions could be found from automatic processes. Deliberate meaning-making tended to evaluate how the hybrid narrative could be used to reduce distress. This included narrating the path to the future. Person 1 exemplified this “I think we need the deep ecology point of view and the deeper ecology mindsets to drive the transhuman technological developments to enhance the deep ecology point of view.” Person 1 then detailed this further using veganism as an example “the industry of producing of food and the efficiency of harvesting plant-based products also has to be driven and accelerated by



technology”. Thoughts, like these, on the utilisation of the movements, were typical of deliberate processes.

Accommodation and assimilation were often narrated together and most often narrated the story of change. In all cases, change was in line with the participants desired future and included changes in global and situational meaning. Yet, it was unclear which came first. Two participants highlighted that these changes included changes in diet. Person 4 suggested a more obscure dietary change. “I am not a fan of insect-based meat because of the idea, but you will have to change your mindset for it and I think that also comes with like the society.” (Person 4). The speaker suggests personal dietary changes to eat insect meat and suggests a level of autonomy with this as they suggest they will have to change their mind or personal position on this (assimilation). Similarly, the speaker highlighted that changes in diets need to be done by society (accommodation).

Significance tended to tell the importance of change. All the participants suggested that change was needed to reduce distress and narrated the importance of this. *What* was important for change, however, differed for different participants. One view was more pragmatic and suggested it was important to get concrete evidence to know action or change is worthwhile. “You have to know that you're walking in the right directions, actually be motivated to make those steps, because if you know you're working to something that will work in the end” (Person 1). Another view suggested that hope was important to reduce distress “as long as I have that feeling, I think I can go through a lot of dark times” (Person 2). The general stance agreed with the latter view. Like in the letters, comprehensibility and significance were sometimes narrated together. The best example of this was by person 3. Person 3 highlighted that hope was important (significance) and explained what they perceived the role of hope to be and where it comes from (comprehensibility):

“The people surrounding me, if they already give me a lot of hope and love and just. Yeah, I think that will already work as a coping mechanism. And then if that gives me hope to do better, I do hope to have children someday. So, if I can already give them something. For the future, I think that will already give me hope.”

In this example, the speaker seems to be trying to understand the role of hope in the future and speaks in indefinite terms which indicates understanding. Person 3 infers that hope is something that motivates them to keep working towards this future and that doing such decreases distress. Most participants agreed that hope was a way to cope with distress.

Cognitive and emotional processing also was often mentioned together. The main emotions mentioned and processed were stress, worry, and numbness. Cognitive processing tended to narrate participants' role in climate change and the consequent problems that are occurring. Emotional and cognitive processing was commonly narrated in the present day and usually, this did not result in meaning-made. This suggests a cycle of emotional and cognitive processing. Person 5 best exemplifies this when talking about the floods in the south of the Netherlands. “And that's when I went uh, what are we doing? And then I had to, I think a solid week where I was really stressed and panicked about everything”. The speaker later stated “I felt kind of numb to everything as well because I didn't know enough to do anything.” (Person 5). In this example, Person 5 appears to be processing their role in climate change (cognitive) while also acknowledging and trying to manage their emotions. To better manage their emotions, it was inferred that knowledge would help (cognitive).

### **Discussion**

This research used Park's (2010) meaning-making model and aimed to extend this to anticipatory meaning-making. The research aimed to capture anticipatory meaning-making in climate futures whereby climate change has progressed. This research aimed to better understand how young adults in the Netherlands make meaning when facing or when

constructing meaning in climate futures. Comparing the two conditions, climate futures were narrated similarly and most letters reached a state of successful adjustment. When narrating climate futures, participants tended to suggest a period of distress whereby potential stressors and their appraised meaning escalate. After this, participants suggested that the narratives controllability increased and this commonly resulted in successful adjustment. Conclusively, the research can be applied to anticipatory meaning-making in climate future.

### ***Main findings***

**Global meaning.** Arguably, the biggest insight was a hybrid narrative in global meaning. This hybrid narrative is consistent with the eco-social perspective (Noyle, 2021). Furthermore, this eco-social perspective uses technology to counteract the damage to the planet to restore the ecosystems while still promoting growth and enhancement. However, transhumanism supposedly played a more central and clearer role in the path to the future. Transhumanism also had a much clearer role in controlling climate change. This could be seen via the vast number of detailed technologies that were implemented to reduce the impact of climate change. Seemingly, these technologies were closely related to successful adjustment. Even in the present, technologies can provide a means to control, reduce threats, and lessen the implications of potential climate stressors (Ferreira et al., 2019, Wennersten et al., 2015). Therefore, further technological projections may aid the alignment between global and situational meaning and therefore help reduce distress or facilitate successful adjustment. Implementation of these technologies tended could be an explanation as to why successful adjustment was frequently coded in the TH condition. Conclusively, this suggests that global meaning encompassed both narratives, but it was supposed that transhumanism takes a more central role in controlling climate change.

**Potential stressors and appraised meaning.** There was a lot of agreement on the potential stressors. Most stressors related to escalation of today's problems, such as weather

events. As suggested, global meaning provided a means of comfort by increasing controllability over climate change. Implications were widespread but often included changes in personal lives to accommodate to climate change such as relocation. Responsibility to better the climate was heavily dependent on global meaning and governmental powers. This is in line with prior research that suggests responsibility for climate change should be supported by governments (Stoll-Kleemann et al., 2001). The threats were often still present in the future, however due to this increased controllability were better managed.

**Distress and successful adjustment.** One of the ways that seemingly buffered distress and may even later have helped facilitate successful adjustment was hope. Hope is a rising theme in research on climate emotions (Ojala, 2012). In this research, hope was mentioned in two ways. Firstly, through hope to better manage or cope with climate anxiety. Secondly, hope was seen on a wider societal scale through hope for a different and improved future. In Walsh's (2020) work on meaning-making, hope and transcendence during the pandemic, they suggest hope is highly important in the face of despair and can be a means to cope as it allows for perseverance or rebuilding. Therefore, hope could be a buffer to lessen the difference between global and situational meanings or could be a way to cope with this distress by motivating continued efforts.

**Meaning-making processes.** Many of the meaning-making processes included climate action. Climate action was often linked to comprehensibility and significance as participant's narrated the path to the future which often included rising climate action or important actions or advice which tended to highlight key climate positive actions. Furthermore, comprehensibility and significance seemingly reduced cognitive distress by suggesting positive improvements or an end-point to distress using climate action. Accommodation and assimilation were also closely linked to climate action. Spence and Pidgeon (2009) suggested that climate action occurs when both the threat of climate change is

highly salient and individuals feel, they have control over their actions. Climate action was often coded for using assimilation and the outcome of this tended to be changed global goals or beliefs. Interestingly, in the deep ecology condition, participants favoured personal assimilation as a way to help control climate change. This could be because deep ecology is reliant on reconnection to nature and the ecosystems and the easiest way this can be done is through personal changes. This idea suggests that many people in the DE condition put the responsibility on the government and scientists instead of changing themselves first to build societal pressure that results in change. On the reverse, the transhumanism condition favoured societal assimilation as this could be because control of climate change is reliant on wider societal changes such as the development and implementation of technology.

**Meaning-made.** Meaning-made often coincided with successful adjustment and the main forms of meaning made was acceptance and sense-making. Interestingly, participants narrated different types of successful adjustment with some saying climate change is no longer a concern and others saying it is but is less of a stressor. Therefore, it could be supposed there were differences in accepting climate change progression. This is in line with Ryghaug et al's (2010) work on sense-making and climate change as their research showed the vast majority of participants accepted climate change as a reality and that humans played a role, but there was doubt in the severity of climate change and how big of a role humans played.

### ***Future revisions of the meaning-making model for anticipation***

Future research using the model for anticipatory meaning-making should make significance, comprehensibility, and cognitive and emotional processing independent variables. In this research, significance and comprehensibility were seen synonymously and were often intertwined. For example, participants often wrote to past selves so that they could understand the future and changes that occurred and also included advice such as important

actions. This supports anticipation research on future consciousness, which links understanding, anticipation and future preparedness (Sools et al., 2022). It is thought that future consciousness is a basis for anticipatory behaviour and thought and has a crucial role in uncertain situations. It highlights that significance and comprehensibility can interplay. In the focus group, cognitive and emotional processing was often mentioned in the same speech. This suggests general processing of the future includes elements of rationalisation and emotions, which sometimes complement each other. Hayes et al (2007) also noted the overlap between cognitive and emotional processing meaning-making and they coined the term cognitive–emotional processing. Thus, in anticipatory meaning-making cognitive and emotional processing may be highly related and future research should acknowledge this complementation. Hence, in anticipatory meaning-making, there may not be as clear-cut or defined differences between significance vs comprehensibility or emotional vs cognitive processing.

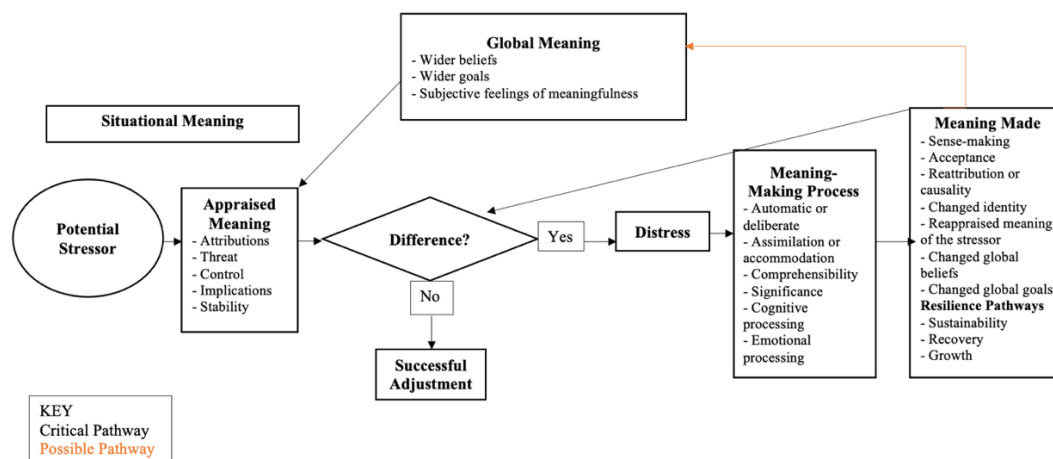
Further revisions of the model could also include a 5<sup>th</sup> appraised meaning which captures stability. The current four existing forms of appraised meaning all relate, to some degree, to changes, for example, threats increasing or decreasing or the implications better or worse. In terms of anticipatory meaning-making, stability may capture a few things. Stability may include preventative actions or beliefs that do not better or worsen the situation. Similarly, stability may include the continuum of present-day goals or beliefs into the future. In this research, stability can be seen through continued sustainable behaviours such as walking, that do not better a stressor but do not worsen it.

Another consideration is the inclusion of Schuhmann and van der Geugten's (2017) resilience pathways. These resilience pathways would be included in meaning-made. Resilience is not as wholly positive as the other forms of meaning-made may appear. Rather resilience could be a form of meaning-made that occurs without the distress ameliorating. In

their research on trauma, Schuhmann and van der Geugten (2017) expanded on the meaning-making model and discussed the relationship between existential meaning (comparable to Parks' global meaning) and resilience. The researchers suggest three pathways of resilience; sustainability, recovery and growth. Sustainability is the ability to continue pursuing aims that give life meaning, recovery is the process of returning to psychological and physical equilibrium or maintenance of mental health, and growth is comparable to Park's (2010) growth in meaning-made. Other research by Park et al., (2017) more recent work has also included resilience as they defined resilience as the ability to bounce back after a period of distress. Mah et al., (2020) suggest that psychological preparedness may influence resilience. They suggest that teaching people expectations and recognition of emotions may aid in better regulation of emotions in the future (Mah et al., 2020). Further research should develop upon these ideas and test the validity of including resilience within an anticipatory meaning-making model such as that displayed in figure 2.

**Figure 2**

*New Meaning-Making Model based on the revisions from this research*



**Limitations**

The first central limitation is transferability. The Netherlands is one of the top three most prepared nations for the development of a sustainable and low-carbon future (MIT

Technology review, 2022). This was determined by several factors including comparisons of countries policies, industries, and societies. This may also include incentives and investments in technology (Anderson et al., 2023). However, other countries may not have this preparedness. Some of the letters mentioned this preparedness by the government's ability to implement interventions, however, other countries may not have these luxuries. Without preparedness the disparity between global and situational meaning may be larger resulting in a higher level of distress. Similarly, as suggested by Adger et al., (2003) the impacts of climate change are unequal and those exposed to the most severe implications are likely to be the ones with the fewest resources. The combination of less preparedness and the most severe implications could heighten distress and lead to a different narration of meaning-making. This may be even be a narration where successful adjustment does not occur.

The second main limitation is the lacking of a comparative time frame. Changed identity, reattributions, reappraised meaning and restored or changed meaning in life were lesser themes in the research as there were no time frames to compare what was changed or revised. As this research is anticipatory and future-focused, it is likely that any identity changes are usually realised retrospectively (Gillies & Neimeyer, 2006). Reattributions and reappraised meanings were difficult to see what was an initial attribution or appraisal and what was a revision. Therefore, to better understand these elements in anticipatory research, reattributions and reappraised meanings may benefit from having two-time frames to compare.

### ***Future research***

Future research should be encouraged to use a longitudinal design to see if the effects of anticipatory meaning-making have a lasting effect. For example, by compare anticipatory perceived successful adjustment to actual successful adjustment. Fitzke et al., (2021) applied the meaning-making model in a quantitative study over 19 years. Fitzke et al's (2021)



focused on meaning-making post-trauma and found that meaning-making has positive long-term and sustained effects and further linked this to meaning in life. Like Fitzke et al.'s (2021) research, it could be the case that anticipatory meaning-making also has positive long-term effects. This assumption is based upon Park's (2010) statement that all meaning-making efforts are supposed to tighten towards successful adjustment. Using a longitudinal design for anticipatory research may highlight the role of psychological preparation in actual adjustment. As climate change progresses, investigating anticipatory meaning-making and its effects may ease the burden of actually adjusting to climate change.

Further research should investigate if and how the psychological barriers influence meaning-making. Many of the narratives suggested societal and personal intentions to act more sustainably. However, intentions do not necessarily directly result in actual action. Rather there are influencing factors that can help predict this relationship (Geiger et al., 2021). Gifford (2011) suggested that despite beliefs on the importance of climate action, psychological barriers or *Dragons of Inaction* can withhold performing these actions. *Dragons of Inaction* include but are not limited to overly ideological worldviews, perceived risks associated with change, and proactive, but limited action (Gifford, 2011). These barriers could influence meaning-making in several ways. For example, ideological views may create a bias in meaning-making and maybe a buffer for the disparity between global and situational meaning. This could lessen the distress or even facilitate successful adjustment. Particular interest should investigate whether the mere *intention* but no *actual action* still facilitates the long-term successful adjustment.

To conclude, this research suggests that the meaning-making model can applied in anticipatory settings such as climate futures. However, further adjustments to the model are suggested. Future research should also investigate related avenues such as hope and climate

action, but most importantly future research should investigate the longitudinal effects of anticipatory meaning-making.

## References

- Adger, W. N., Huq, S., Conway, D., & Hulme, M. (2003). Adaptation to climate change in the developing world. *Progress in Development Studies*, 3(3), 179–195.  
<https://doi.org/10.1191/1464993403ps060oa>
- Auhagen, A. E. (2000). On the psychology of meaning of life 1. *Swiss Journal of Psychology / Schweizerische Zeitschrift Für Psychologie / Revue Suisse De Psychologie*, 59(1), 34. <https://doi.org/10.1024/1421-0185.59.1.34>
- Baumeister, R. F. (1991). *Meanings of Life*. Guilford Press.
- Burke, S. E. L., Sanson, A., & Van Hoorn, J. (2018). The Psychological Effects of Climate Change on Children. *Current Psychiatry Reports*, 20(5).  
<https://doi.org/10.1007/s11920-018-0896-9>
- Capra, F. (2003). Deep Ecology: Educational Possibilities for the Twenty-First Century. *NAMTA Journal*, 28(1), 201–216. <http://files.eric.ed.gov/fulltext/EJ1078054.pdf>
- Caracciolo, M. (2022). Storying the Anthropocene: Narrative Challenges and Opportunities in Times of Climate Change 1. *The Routledge Companion to Narrative Theory*, 542-555.
- Doherty, T. J., & Clayton, S. (2011). The psychological impacts of global climate change. *American Psychologist*, 66(4), 265–276. <https://doi.org/10.1037/a0023141>
- Ferreira, J. J., Fernandes, C. I., & Ferreira, J. J. (2020). Technology transfer, climate change mitigation, and environmental patent impact on sustainability and economic growth: A comparison of European countries. *Technological Forecasting and Social Change*, 150, 119770. <https://doi.org/10.1016/j.techfore.2019.119770>
- Fitzke, R. E., Marsh, D. R., & Prince, M. (2021). A longitudinal investigation of the meaning-making model in midlife adults who have experienced trauma. *Journal of Clinical Psychology*, 77(12), 2878–2893. <https://doi.org/10.1002/jclp.23272>

- García-Alandete, J. (2015). Does Meaning in Life Predict Psychological Well-Being?: An Analysis Using the Spanish Versions of the Purpose-In-Life Test and the Ryff's Scales. *European Journal of Counselling Psychology*, 3(2), 89–98.  
<https://doi.org/10.5964/ejcop.v3i2.27>
- Geiger, N., Swim, J. K., Gasper, K., Fraser, J. F., & Flinner, K. (2021). How do I feel when I think about taking action? Hope and boredom, not anxiety and helplessness, predict intentions to take climate action. *Journal of Environmental Psychology*, 76, 101649.  
<https://doi.org/10.1016/j.jenvp.2021.101649>
- Gifford, R. (2011). The dragons of inaction: Psychological barriers that limit climate change mitigation and adaptation. *American Psychologist*, 66(4), 290–302.  
<https://doi.org/10.1037/a0023566>
- Hayes, A. M., Beevers, C. G., Feldman, G., Laurenceau, J., & Perlman, C. A. (2005). Avoidance and processing as predictors of symptom change and positive growth in an integrative therapy for depression. *International Journal of Behavioral Medicine*, 12(2), 111–122. [https://doi.org/10.1207/s15327558ijbm1202\\_9](https://doi.org/10.1207/s15327558ijbm1202_9)
- Heintzelman, S. J., & King, L. A. (2014). Life is pretty meaningful. *American Psychologist*, 69(6), 561–574. <https://doi.org/10.1037/a0035049>
- Jarva, V. (2014). Introduction to Narrative For Futures Studies. *Journal of Futures Studies*, 18(3), 5–25.  
<https://www.airitilibrary.com/Publication/alDetailedMesh?DocID=10276084-201403-201404230002-201404230002-5-25>
- Lyon, D., & Carabelli, G. (2016). Researching young people's orientations to the future: the methodological challenges of using arts practice. *Qualitative Research*, 16(4), 430–445. <https://doi.org/10.1177/1468794115587393>

- Maccallum, F., & Bryant, R. A. (2011). Imagining the future in Complicated Grief. *Depression and Anxiety*, 28(8), 658–665. <https://doi.org/10.1002/da.20866>
- Mah, A. Y., Chapman, D. P., Markowitz, E. M., & Lickel, B. (2020). Coping with climate change: Three insights for research, intervention, and communication to promote adaptive coping to climate change. *Journal of Anxiety Disorders*, 75, 102282. <https://doi.org/10.1016/j.janxdis.2020.102282>
- McBride, S., Hammond, M. D., Sibley, C. G., & Milfont, T. L. (2021). Longitudinal relations between climate change concern and psychological wellbeing. *Journal of Environmental Psychology*, 78, 101713. <https://doi.org/10.1016/j.jenvp.2021.101713>
- MIT Technology Review. (2022, March 24). *The Green Future Index 2022*. <https://www.technologyreview.com/2022/03/24/1048253/the-green-future-index-2022/>
- Moomal, Z. (1999). The Relationship between Meaning in Life and Mental Well-Being. *South African Journal of Psychology*, 29(1), 36–41. <https://doi.org/10.1177/008124639902900106>
- Morgan, D. L., Morgan, D. L. . . , & Krueger, R. A. (1998). *The Focus Group Guidebook*. SAGE.
- Murray, M., & Sools, A. (2014). Narrative research. *Qualitative research in clinical and health psychology*, 133-154
- Naess, A. (1984a). A Defence of the Deep Ecology Movement. *Environmental Ethics*, 6(3), 265–270. <https://doi.org/10.5840/enviroethics19846330>
- Nikoleris, A., Stripple, J., & Tenngart, P. (2017). Narrating climate futures: shared socioeconomic pathways and literary fiction. *Climatic Change*, 143(3–4), 307–319. <https://doi.org/10.1007/s10584-017-2020-2>

- Noyle, A. (2021, January 26). *Beyond the human condition: Reconciling our green, Socialist, transhumanist future*. NotAlexNoyle. Retrieved March 2, 2023, from <https://write.as/notalexnoyle/beyond-the-human-condition-reconciling-our-green-socialist-transhumanist>
- Park, C. L. (2010). Making sense of the meaning literature: An integrative review of meaning making and its effects on adjustment to stressful life events. *Psychological Bulletin*, *136*(2), 257–301. <https://doi.org/10.1037/a0018301>
- Park, C. L. (2013). The Meaning Making Model: A framework for understanding meaning, spirituality, and stress-related growth in health psychology. *The European Health Psychologist*, *15*(2), 40–47. <https://www.ehps.net/ehp/index.php/contents/article/download/ehp.v15.i2.p40/1041>
- Park, C. L., & Blake, E. A. (2020). Resilience and Recovery Following Disasters: The Meaning Making Model. *Springer EBooks*, 9–25. [https://doi.org/10.1007/978-3-030-32007-2\\_2](https://doi.org/10.1007/978-3-030-32007-2_2)
- Park, C. L., Currier, J. M., Harris, J. I., & Slattery, J. M. (2017). Developing resilience.
- Prince, D. M. (2014). What about place? Considering the role of physical environment on youth imagining of future possible selves. *Journal of Youth Studies*, *17*(6), 697–716. <https://doi.org/10.1080/13676261.2013.836591>
- Riessman, C. K. (1993). *Narrative Analysis*. SAGE.
- Schuhmann, C., & Van Der Geugten, W. (2017). Believable Visions of the Good: an Exploration of the Role of Pastoral Counselors in Promoting Resilience. *Pastoral Psychology*, *66*(4), 523–536. <https://doi.org/10.1007/s11089-017-0759-z>
- Sessions, G. (1987a). The Deep Ecology Movement: A Review. *Environmental Review*, *11*(2), 105–125. <https://doi.org/10.2307/3984023>

- Sools, A. (2020). Back from the future: a narrative approach to study the imagination of personal futures. *International Journal of Social Research Methodology*, 23(4), 451–465. <https://doi.org/10.1080/13645579.2020.1719617>
- Sools, A., De Groot, I., Coppers, J., & Triliva, S. (2022). Young people's situated capacity to imagine a desired post-pandemic future: A qualitative methodology for assessing futures consciousness. *Futures*, 144, 103045. <https://doi.org/10.1016/j.futures.2022.103045>
- Sools, A. M., & Mooren, J. (2012). Towards Narrative Futuring in Psychology: Becoming Resilient by Imagining the Future. *Graduate Journal of Social Science*, 9(2), 203–226.
- Stoll-Kleemann, S., O'Riordan, T., & Jaeger, C. (2001). The psychology of denial concerning climate mitigation measures: evidence from Swiss focus groups. *Global Environmental Change-Human and Policy Dimensions*, 11(2), 107–117. [https://doi.org/10.1016/s0959-3780\(00\)00061-3](https://doi.org/10.1016/s0959-3780(00)00061-3)
- Van De Goor, M., Sools, A. M., & Westerhof, G. J. (2019). Unraveling the Wonder of the Ordinary: A Narrative Analysis of Meaning Construction in Memories of Familiar Routines. *Journal of Constructivist Psychology*, 32(3), 292–308. <https://doi.org/10.1080/10720537.2018.1499158>
- Verdoux, P. (2009). Transhumanism, Progress and the Future. *Journal of Evolution and Technology*, 20(2).
- Wahle, J. (2012). Exploring Psychological Functions in Narrative Futuring: A qualitative analysis of the "letters from the future". *Unpublished Master's Thesis, University of Twente, Enschede, The Netherlands.*

Walsh, F. (2020). Loss and Resilience in the Time of COVID-19: Meaning Making, Hope, and Transcendence. *Family Process*, 59(3), 898–911.

<https://doi.org/10.1111/famp.12588>



## Appendix

### Appendix 1 - Information Sheet (Part 1)

Dear reader,

In this information brochure I would like to inform you about the study “Letters from the Future: Imagining a Preferred Personal Life (Part 1)” for which you have registered. This research is based on prior research conducted at the University of Twente and is carried out under the responsibility of research leader Dr Anneke Sools. This is a voluntary study and consent can be withdrawn at any point in the study, even without providing a reason. There will be no consequences if consent is withdrawn and all collected data will be deleted. The procedure of the investigation. The study consists of one or two parts. Both parts of the study will be online. All consenting participants take part in the first part and a small group of participants will be invited to a focus group for the second part of the study. Further information on part two will be provided at a later date.

#### Part One

The researchers conducting this research are Sophie Thomson and Teun H. Voost. In part one of the research, you will be asked to write and submit a future letter after seeing a short video. Further instructions will be given to help inspire you to write this letter, but generally, it is an open letter where you imagine yourself and the world 20 years in the future and write a letter to the present. We expect the letter to be a maximum of 500 words and to take approximately 20 minutes to write. If you wish to take longer on this, this is also perfectly acceptable. When analysing data, key identifiers will be pseudonymised and your identity will be protected and confidential. After writing the letter, you will be asked to complete a short questionnaire which will ask questions about your background and writing process. It is important to get both the background information and the letters so the researchers can better understand and compare the letters. Filling out the questionnaire should take less than 10 minutes. You can decide where and when you want to write the letter, this can be at home, but also in a different place. We advise you to write the letter in one go, as exiting the study will result in the exclusion of your data in analysis and if you do wish to participate you will have to start again from the beginning. If you do experience problems, please contact the researchers (with the email addresses below). We will only analyse data and letters from participants who have fully completed the study.

We do not foresee any major risks in the research, however, if you would like an extra conversation, it is possible to make an appointment with one of the researchers.

#### Conditions for the examination:

In order to participate in part one of the study, you must meet a number of conditions. These conditions are listed below.

- This research is only open to those over 18. Moreover, participants must be between the ages of 18 and 28.
- The ability to write the letter in English (for specifics or words that you cannot translate it is acceptable to use another language briefly but primarily it should be in the English language).
- You must have access to a computer with an internet connection (this can be on a mobile device or computer).
- You must be prepared to make time for the research and to complete this in one go.

- The research could be burdensome for people with psychological complaints. Therefore, you cannot participate in the study if you have moderate to severe psychological complaints.
- Participants must be living in the Netherlands.

What you can expect from the researchers:

- Writing a future letter and talking about it can be very personal. You have control over how much detail you want to include in the letter. We advise you to use fake names to protect your confidentiality.
- Sharing your letter to the future can also be personal, you have control over how much you would like to share. If certain details feel too personal to share the details can be omitted.

### Data

Your data will only be used for this research under the responsibility of the research leader Anneke Sools, and not provided to third parties. In part one, letters will be analysed and personal data will be deidentified, again we encourage you to also use fake names when writing. In part two, recordings and notes are transcribed and analysed, after transcription recordings and notes will be destroyed. At all stages, your data will be treated confidentially and processed anonymously so that they can never be traced back to you personally. Readers of the research will see the disidentified accounts where personal information will be omitted. You have the right up to 24 hours after the end of the investigation without giving a reason to withdraw from participating in the study. All your data will then be destroyed.

If you have any further questions, please email the researchers using the addresses below and they will be happy to answer any questions.

Thank you for your interest in the study,

Sophie Thomson (Masters student - Positive Clinical Psychology and Technology, University of Twente) [s.j.thomson@student.utwente.nl](mailto:s.j.thomson@student.utwente.nl); +447579214693

Teun. H. Voost (Bachelors student- Psychology, University of Twente)  
[t.h.voost@student.utwente.nl](mailto:t.h.voost@student.utwente.nl)

Dr Anneke Sools (Assistant Professor at the Department of Psychology, Health and Technology and supervisor of the study, University of Twente) [a.m.sools@utwente.nl](mailto:a.m.sools@utwente.nl)

Also available at the University of Twente Faculty of Behavioural, Management and Social Sciences Cubicus B131A P.O. Box 217 7500 AE Enschede The Netherlands

### **Appendix 2 – Questionnaire**

Thank you very much for submitting your letter to the future.

As a final step, we would like to invite you to answer 5 questions about your background and 8 questions about the tasks you participated in (video watching and letter writing).

Q4.1 What is your age?

---

Q4.2 What is your gender?

---

Q4.3 What is your nationality?

---

Q4.4 What is your employment status? (Working, self-employed, student etc.)

---

Q4.5 What is the highest diploma you have obtained?

---

Questions about the letter assignment

Q4.6 Where did you write the letter?

---

Q4.7 Did you understand the instructions when writing the letter?

- Yes
- No
- Partially (please detail below)

---

Q4.8 Do you have any further comments on the process of letter writing?

---

Other questions

Q4.9 Which video did you watch? (Video 1)

- Deep Ecology
- Transhumanism

Q4.10 Please answer the following questions on the video of the perspective you saw (transhumanism or deep ecology).

0 10 20 30 40 50 60 70 80 90 100

Level of understanding
Level of identification with this perspective
Level of pleasure while watching the video
Level you had the video in mind while writing the letter

Q4.11 When watching the video, did you gain any new insights

Yes (please briefly outline this below)

\_\_\_\_\_

No

Q4.12 Please answer the following questions on climate change.

0 10 20 30 40 50 60 70 80 90 100

Level of interest into climate change	
Level of anxiety around climate change and its implications	
Level of which you actively engage with climate change action in daily life	

Q4.13 There is a follow-up part of the research which is voluntary. This follow-up will involve a focus group whereby participants will share their letters and reflect on the writing process and the visions for the future.

Are you willing to participate in a focus group? If so, please provide your e-mail address.

\_\_\_\_\_

Q4.14 I would like to be informed on the results of the study and be sent a copy of the final thesis.

Yes (provide email address)

\_\_\_\_\_

No

### Appendix 3 - Information Sheet (Part Two)

Dear reader,

You have been invited to part two of the research Letters to the Future: Imagining a preferred personal life in uncertain climate futures. This research is based on prior research conducted at the University of Twente and is carried out under the responsibility of research leader Dr Anneke Sools and is completed as a part of the Master thesis by Sophie Thomson. This is a voluntary study and consent can be withdrawn at any point in the study, even without providing a reason. There will be no consequences if consent is withdrawn and all collected data will be deleted.

It is expected that this research will be insightful and helpful to aid members in understanding some of their goals, wishes and desires for the future in the face of potential stressors. The research is reflective and is thought to be an enjoyable experience.

### The procedure of the investigation

This part of the research will involve an online focus group. We expect about 6 people in each focus group. To start the focus group, I will set some ground rules to try and facilitate an open and respectful environment. The focus group is expected to last about an hour and will be held on an appropriate online platform. This discussion will be video recorded and data will be handled similarly to the first half of the research with the dis-identification of publicised data and output. The researchers may make notes within the focus group to help with follow-up questions. Transcripts will be made after the completion of the focus group and will be used as the main form of analysis. Video recordings will be stored on a safe and appropriate platform until the full completion of the research.

To start the focus group, you will be reminded of either the transhumanism or deep ecology video that you watched. Before starting the focus group, I will send you your letter again for you to re-read privately and then in the focus group you will be asked to share this letter. You are welcome to change any identifying details such as names or places if you wish. After all the letters have been shared, I will ask you some short questions about how you made meaning in these futures and a group discussion will commence. Questions will include things such as what potential stressors you see in the future, what are the implications of these stressors and what is the process of meaning-making looks like for you. Further prompts may be given to help.

### Risks

We do not foresee any major risks of the research, however, if you would like an extra conversation, after the research it is possible to make an appointment. Please email [s.j.thomson@student.utwente.nl](mailto:s.j.thomson@student.utwente.nl). As to protect confidentiality in the focus group, we require all members to agree to not share any of the information from other members outside of the focus group.

### What you can expect from the researchers:

- Sharing your letter to the future can also be personal, you have control over how much you would like to share. If certain details feel too personal to share the details can be omitted. Additionally, in the discussion personal opinions may be discussed and the participant has the option to share as much as they feel comfortable with. The researchers will also respect your decision to do this.
- Your data will only be used for this research under the responsibility of the research leader Anneke Sools, and not provided to third parties. Recordings and notes are transcribed and analysed and will be stored on an appropriate platform.
- At all stages, your data will be treated confidentially and processed anonymously so that they can never be traced back to you personally. Readers of the research will see the disidentified accounts where personal information will be omitted.
- You have the right up to 24 hours after the end of the investigation without giving a reason to withdraw from participating in the study. All your data will then be destroyed.
- Psychology students requiring SONA credits will be given this post-participation.

For further questions please contact the research team.

Thank you for your interest in the study,

Sophie Thomson

(Masters student - Positive Clinical Psychology and Technology, University of Twente)

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Also available at:

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Cubicus B131A, P.O. Box 217, 7500 AE Enschede, The Netherlands

#### **Appendix 4 - Questions asked in the focus group**

Questions about the narratives

1. In general, fewer people completed the research if they watched the deep ecology video and very few even suggested interest in participating in the focus group. You should have all now watched both videos. Now I would like to invite you to speak for about a minute and to maybe suggest why fewer people completed the research in the deep ecology condition and why they may not wish to participate in a focus group. Were the videos clear or could they be more specific? Did you fully understand them?
2. I would also like to invite you to say after watching the two videos in preparation for today, which one you most closely align with (if at all) and why.
3. And finally, can you sum up in one or two sentences what are your experiences with climate change and how big of a concern this is now and when you wrote your letter in the future?

Questions directly about the meaning-making model

1. When thinking about the future, did you identify events or situations that cause distress for you either in your present life or in anticipation of the future? If so, what are the situations that cause distress the most for you? and do you perceive those as threatening in any way?
2. When you think of these distressing events/situations, do you feel you could cope with them already or do you think that you will need new resources to do so?
3. which one of the two cultural narratives (deep ecology or transhuman) would help you the most in dealing with the current or anticipated distress and how?
4. which of the two cultural narratives (DE or TH) would cause the most distress (present and future) and how?
5. what would you need to cope meaningfully with living in a DE or TH future?
6. Okay, so I have one final question for this section, in the letters most people mentioned both distress and successful adjustment. But when you imagine your life in the future how do you imagine it? So, you imagine it going back to the way it was before the stressor, or do you foresee any changes in who you are and what you value?

#### **Appendix 5 – Video links and instructions (the highlighted words were drawn)**

Transhumanism – <https://youtu.be/3Wsci5z6E6s>

Deep Ecology – [https://youtu.be/s\\_yMfWX01E](https://youtu.be/s_yMfWX01E)

Letters from the future – <https://www.youtube.com/watch?v=RaYs4u2UMcs>

## TRANSHUMANISM

Imagine the future, the world is no longer in its current state. Climate change has progressed and it is no longer a huge concern for humanity.

Climate change has affected the world, but through the use of technology, humanity is able to have control over climate change. Technology has played a big role in the future, many people have called this technological movement transhumanism.

Transhumanism is a futuristic movement. This means that as opposed to movements such as Darwinism and evolution that look at the past, transhumanism looks to the **future**

The purpose of transhumanism is to advance and enhance humanity using technology. The aim of transhumanism is to go **beyond** current capabilities and limitations. This means we apply technology to help us overcome our biology.

There are three main purposes of transhumanism, these are super longevity, super intelligence, and super wellbeing. **Super longevity** is all about extending life. **Super intelligence** is progressing technology in order to further advance human intelligence. **Super wellbeing** is the ability to remove, phase out or largely reduce suffering.

Super longevity, intelligence and wellbeing may seem a little abstract, but they are already represented in our current day to day lives.

In the future, it could be the case that humans have to opt-in to gain technological advances. An example of this is for super longevity, humans could take a **magic pill** that allows us to live forever, or choose to **upload** our consciousness to a computer.

Another route could be that technology is already ingrained within us before we are born. For **super wellbeing**, this could mean that **genes** are modified before we are born so we never feel depressed.

Another example could be that, for super intelligence, we could extend the mind with an **external microchip**.

By having this level of intelligence, meaning we can enhance our problem-solving abilities which means that we are better equipped to solve bigger problems such as **changing climates**. It could also be the case that by using technology we can better adapt to issues such as **climate change** and therefore eliminate some of the associated climate anxiety.

Transhumanism could help humans go **beyond** their current capabilities and limitations. The use of technology could be a helper to humans or a means for enhancement when it comes to the three pillars of transhumanism; longevity, intelligence, and wellbeing.

An extreme example could also be to leave the earth entirely and create life/ live on a new planet.

As noted, humans can play an active role and opt into the use of technology or choose not to use it. In other cases, it could be that some technology is already within humans and human **genetics**.

Transhumanism does not suggest that technology replaces humans, but rather it can help humans to enhance their capabilities and transcend their humanity. The overarching goal is to obtain super status in **longevity, intelligence and wellbeing**.

Governments can also play a role, as they help the implementation of technology, for example by increasing sustainable technology.

There are already some examples of technology that have been used to help us go beyond our natural humanistic abilities. Examples of technologies associated with transhumanism include **artificial intelligence, genetic engineering, cloning, and cognitive enhancements**.

A concrete example you may have heard of is **pacemakers**. Pacemakers are devices that can be medically inserted into the heart to help pump blood around the body. This then means that technology has helped people to live longer.

All in all, we can see that transhumanism is highly futuristic, ambitious and progressive. All the while trying to create a future that embodies the progression of technology and its integration into our lives.

## **DEEP ECOLOGY**

Imagine the future, the world is no longer in its current state. Climate change has progressed and it is no longer a huge concern for humanity.

Climate change has affected the world, but through the restored connection to the earth, cosmos, humanity is able to have control over climate change.

A **societal** change to be more reductionist has played a big role in the future, many people have called this naturalistic movement deep ecology. Deep ecology is a restorative movement. This means that as opposed to movements such as transhumanism that look at enhancing the future, deep ecology looks at restoring the **balance** of the ecosystems once more.

The purpose of deep ecology is to ultimately restore and protect the environment and create a sustainable future. The aim of deep ecology is to restore the **balance** in the ecosystem. This means we consider everything equally with no **hierarchy** of importance, and that we are part of an ecosystem. So because we are connected by nature and require each other, a human has the same importance as all animals and all nature and should not manipulate the ecosystem for our own needs. Deep ecologists consider the grass that we stand on as being equally valuable as animals and therefore we should protect them **equally**.

There are some pillars of deep ecology, which are central to this movement. These are equality and intrinsic value of the living world, richness and diversity in the ecosystem, and to only satisfy our vital needs as humans. Deep ecology is highly centred around connecting to the earth, cosmos, and the diversity on earth through our **intrinsic value**. This means that to protect the environment and our future we need to make fundamental changes to **society**.



Deep ecologists suggest having diversity in our ecosystems is more valuable than our personal needs and we should be intrinsically motivated to **protect** this diversity.

Deep ecology may seem a little abstract, but it is already represented in our current day to day lives, by trying to be more minimalistic. In the future, it could be the case that humans become considerably less consumerist and more reductionist. An example of this is people who do not use unnecessary resources and who only take resources from the ecosystem for their vital needs e.g., growing your own produce. Therefore, deep ecologists really question, what **do I or we actually need?** Another route could be population decrease. By having less humans we can restore the inequity in the ecosystem. As we cannot simply increase diversity and nature, it seems important to the deep ecology movement to **decrease the population**. This means that we use less natural resources and this has a vast impact on bigger problems such as **climate change**. It could also be the case that by decreasing non-vital consumption we as a population have a decreased carbon dioxide emission to a level at which the natural environment can sustainably absorb. This therefore, influences issues such as **climate change**.

Deep ecology could help humanity and its future, by **protecting** and restoring many natural resources in the ecosystem. The use of communities could be a helper to humans or a means for the reduction of waste or overconsumption. An extreme example, could be by shopping local, or even better using community **gardens**, society can massively decrease its carbon footprint as there is considerably less polluting infrastructure needed.

As noted, humans can play an active role and opt into **reductionist** methods. Deep ecology does not suggest that we should use no resources, but rather that we only take our **vital needs** from the ecosystem such as food and water. The overarching goal is to obtain equity in the ecosystem and to restore a sustainable balance to what it once was. **Governments** can also play a role, as they help humanity by advocating and implementing societal changes and regulations to promote minimalism and reductionist lifestyles.

An example of why it is important to protect the environment and not just for our own needs, is **bees**. We do not eat bees, nor do they directly contribute to our lives, yet they are vital to our functioning and survival. Bees are important, because they cross **pollinate** plants which allows trees, crops and all sorts of flowers to grow. Therefore, without bees we do not have a maintenance or balance of the ecosystems.

All in all we can see that deep ecology is highly environmentally focused and geared towards creating a new environmental balance. All the while trying to create a future that embodies the protection and restoration of the ecosystem.

### **Instructions for the letters**

We would now like you to write a **letter** about what the future might look like.

This is a **creative** exercise where we will ask you to imagine yourself in the future and write a letter about what it is like. It will take about 20 minutes to write this letter. For this experience to work optimally, we encourage you to relax and let your creativity flow as much as possible. This could mean sitting comfortably and trying to keep an open mindset.

Please keep in mind that it is a letter that is written **backwards** from the future to the present, so try to imagine a desired future situation as if it is already realised.  
You are welcome and encouraged to use your full imagination.

Remember that it is about the future which has not occurred yet. Consider it an opportunity to think about **possibilities** that could happen.

Imagine that you are travelling in a **time machine**.  
This time machine has taken you 20 years into the future.

So around **2042**. In 2042, imagine a desired future where climate change has become a reality.

Desired could mean that some of the difficulties we are experiencing in today's world, maybe the difficulties like climate change, have been managed or maybe there are good ways of coping with it. So climate change is still a thing, but it no longer poses a big problem. Keep in mind the previous video that you just watched and try to imagine yourself in a future like that one....Where those ideas have become a reality...

Try to imagine this future vividly as possible, you could try closing your eyes or focussing on the images on the screen to stimulate your imagination... and think about the following things:

#### **WHERE**

- **Where** exactly are you in the future?
- What is happening around you? What do you see, hear, and smell?
- What are your surroundings like?
- Is there anyone around you maybe?

#### **DESIRED SITUATION**

- Now try to zoom into this desired situation you find yourself in
- What is happening in this situation?

#### **YOU**

- What do **you** look like? (for example, what are you wearing?)
- How are you feeling?
- What are you doing?
- What are the others around you doing?

#### **PATH FROM PRESENT TO FUTURE**

- How did your desired future come into being?
- What happened along the way?
- What actions did you take?
- What decisions did you make?

#### **MESSAGE TO THE PRESENT WORLD**

- Who are you writing the letter to? This could be a specific person or group or yourself
- What is your message to the receiver or the letter?

Try to describe the situation you are in and **write** what it is like down. Feel free to use these instructions as a basis or start to write the letter in your own way.

The letter should include a description of the **future**, and the path towards this future, how it came into being. Try to include climate change, and how we got from the present day to this desired future. Write this down in your letter From the Future.

### Appendix 6 – Table of definitions and codes with an example

#### Definitions and examples

Elements of the model	Definition	What it includes	Definition	Example with a brief explanation
Situational meaning	Perceived future meaning within a specific context or circumstance.	Potential stressors, appraised meaning, distress and successful adjustment, meaning-making processes, and meaning-made	See below	
Global meaning	Perceived future meaning resulting from larger societal or cultural powers including wider views, beliefs, goals core schemas, and the feeling of meaningfulness.	Transhumanism components	Expressed or inferred human enhancements or technology that aimed to improve the quality of life	“Thanks to Transhumanism we have become cleverer in adapting to the climate” (letter 27, TH) – <i>direct reference to transhumanism</i>
		Deep ecology components	Expressed or inferred a reconnection to humanity, nature, or a desire to be more reductionist.	“Humans are much more community-focused than before” (letter 2, DE) – <i>reference to humanity reconnecting</i>
		Both deep ecology and transhumanism components	Expressed or inferred transhumanism components and deep ecology components.	“The world looks much greener, as we stay planting more green that are genetically mutated to be able to handle weather changes” (letter 11, TH). – <i>genetic modification (transhumanism) helping to aid and help restore the ecosystem (deep ecology)</i>
Potential stressors	Objective, physical or	Implied Past	A perceived potential stressor that was	“We smell roses and eucalyptus and not oil

	experienced factors that cause perceived to cause future or current day stress.		implied in the past, but is no longer present or better managed in the future (usually seen through comparing the future and past).	and fuel” (letter 12, DE) – <i>implication that oil and fuel is not a nice smell thus the old planet did not smell as nice.</i>
		Past	A perceived potential stressor that was explicitly mentioned in the past but is no longer present or better managed in the future.	“I cared and was worried about the climate” (letter 13, TH) – <i>past tense of worry and care.</i>
		Future (2042)	A perceived potential stressor that was explicitly mentioned in 2042.	“The present is full of discomfort” (letter 12, DE) - <i>the word present.</i>
Appraised meaning	Perceived future potential consequences, initial appraisals, or meaning of potential stressors.	Threat	Perceived dangers of potential stressors in the future.	“We wanted to make sure we were out of harm’s way (or at least as much as possible)” (letter 1, TH) – <i>harm or threat of unspecified climate change</i>
		Attribution	Initial or automatic explanation of supposed outcomes of potential stressors in the future.	“Technology made it possible to save the energy that is not used at a certain moment, so nothing goes to waste” (letter 9, TH) – <i>attribution of technology to minimise waste</i>
		Controllability	The perceived level of influence of potential stressors in the present or future.	“In order to get a hold of climate change, a lot of changes had to be made” (letter 11, TH) – <i>climate change is out of control as inferred by a hold of and changes needed a certain level of control</i>
		Implications	Future perceived or supposed future outcomes of potential stressors.	“Desertification made the countries around the Mediterranean, southern USA, Africa and Asia

				uninhabitable, which in turn caused climate refugees” (Letter 24, DE) – <i>implication is that people had to move and this caused problems such as being a climate refugee</i>
Distress and Successful Adjustment	A perceived future alignment or difference between situational and global meaning.	Emotional Distress	Future perceived distress expressed through emotive language.	“No one can seal with the grief of climate change by themselves” (Letter 2, DE) – <i>grief</i>
		Cognitive Distress	Future perceived distress expressed through rationalising or non-emotive language.	“People displaced from their homes and memories. And that was if they even got away, because due to weather extremes and poverty, a lot of people lost their lives” (Letter 24, TH) – <i>distress explained via the path of what happened using non-emotive language</i>
		Successful Adjustment	Future perceived no difference or a newly found alignment between global meaning and situational meaning.	“It’s a change for sure, but I like it” (Letter 32, TH) – <i>positive outcome from changes suggests a new alignment or future improvement</i>
Meaning-making processes	Attempts or efforts to uncover meaning as to reduce perceived future distress.	Automatic	Immediate efforts to decrease the perceived future distress.	“I use an electric car as those are the only ones that get sold today” (Letter 28, TH) – <i>no explain later why only electric cars are sold</i>
		Deliberate	Non-immediate or reflective efforts to reduce the perceived future distress.	“This was all made possible by new policies and the work of many committed climate change advocates” (Letter 11, TH) – <i>understanding of why something happens with deliberate thought of the cause</i>

Assimilation	A perceived future attempt to change or distort situational meanings to include them in their global meaning.	“Once we helped people communicate better” (Letter 29, DE) – <i>rest of letter suggests individual (in situational meaning) communication has changed things (bottom-up changes)</i>
Accommodation	A perceived future attempt to change or distort global meanings to include situational meaning.	“It's just that no one needs to worry to keep up with the current trends and spend their money on things they don't actually need” (Letter 33, DE) – <i>inferred societal change to be more minimalist (top-down changes)</i>
Comprehensibility	A perceived future attempt to narrate for understanding.	“Maybe you can prepare your place that it will fit in the future world already” (Letter 4, TH) – <i>letter detailed the path of how we got to this future</i>
Significance	A perceived future attempt to narrate for importance.	“It is probably important for you to know that my living situation is not an exception but merely the norm” (Letter 8, DE)- <i>highlighting what is important</i>
Cognitive Processing	A perceived future attempt to understand or rationalise the distress.	“As you can see, although it took us long enough and the road to a better future didn't start off quite as easy, everything changed for the better” (Letter 33, TH) – <i>detailing the path in the rest of the letter</i>
Emotional Processing	A perceived future attempt to understand	“Never give up on finding your place in this world, as it may

			the emotions about the distress.	seem difficult at times.” (Letter 29, DE) – <i>suggestion that it was emotionally difficult to adjust to this new world as hinted in the rest of the letter</i>
Meaning-made	A perceived future outcome of meaning making processes.	Sense-making	A perceived future feeling that the event makes sense and is clear.	“There is nearly no more fear of deadly diseases like cancer and stuff like that since now there is a technology that allows people to replace their damaged organs and limbs with new robotics easily” (Letter 32, TH) – <i>clear path of how technology was used to no longer have disease.</i>
		Acceptance	A perceived future sense of coming to terms with an event either on a personal or wider societal scale.	“Most everybody follows this lifestyle” (Letter 28, TH)– <i>suggestion that most people have accepted these changes.</i>
		Reattribution	A perceived future newfound understanding of the causation post-event.	“This year nature loves us because we love her.” (Letter 12, DE) – <i>this year suggests there was a time when there wasn’t this love.</i>
		Changed Identity	A perceived future personal or group changes in identity.	“I know it wasn’t easy to be who you are today” (Letter 12, DE) – <i>suggestion that identity in the future is different to 2022</i>
		Reappraised Meaning	A perceived future transformation in appraised meanings to be more in line with pre-existing global beliefs.	“Sustainable consumption is no longer a trend but a way of life.” (Letter 22, TH) – <i>global belief is that they should be more sustainable and now actually act in line with that</i>

Changed Global Beliefs	A perceived future change in wider beliefs.	“Apart from new technologies, societal shifts have had a major impact on the common feeling about the importance of basic needs of one's life, like water, shelter and love.” (Letter 10, DE) – <i>societal shifts and the common feeling</i>
Changed Global Goals	A perceived future change in wider goals.	“In the society I live in now, it is always possible to develop yourself further and continue to learn” (Letter 33, DE) – <i>societal changes that emphasise continued learning. Learning more is a goal.</i>
Restored or Changed Meaning in Life	A perceived positive change or newfound in meaning in life in the future.	“I live a nomadic life” (Letter 21, TH) – <i>previously stated don't follow a nomadic lifestyle and goal is now to use minimal resources</i>
Growth	Perceived positive future changes due to changes in the appraised meaning or perceived future positive outcomes of changes.	“The world has changed, but for humans for the better” (Letter 24, DE) – <i>positive changes</i>

## Appendix 7 - Full table of potential stressors

### *Potential stressors split by time frame*

Time frame	Potential stressors	Total (n = 32)		Deep ecology (n = 13)		Transhumanism (n = 19)	
		N	N	N	N	N	N
		letters	codes	letters	codes	letters	codes



Implied Present	Societally changes including consumerism and lack of community.	18	35	9	16	9	19
	Lack of development/implementation of technologies including sustainable or green energies.	14	35	2	6	12	29
	Pollution or the environment not looking/feeling healthy.	12	24	6	16	6	8
	Farming/food changes.						
	Governmental issues.	9	20	4	7	5	13
	Lack of respect/understanding of nature and subsequent changes in nature.	8	13	3	7	5	6
	Personal changes/challenges particularly with inaction.	7	13	5	11	2	2
	Infrastructure.						
	Other: Unspecified difficulties, water entering the house, relocation away from earth, overpopulation, lacking education, protocols.	4	4	2	2	2	2
	High temperatures.	3	5	1	3	2	2
	Global support.	3	4	1	1	2	3
		2	4	1	1	1	3
			Total codes = 165		DE codes = 76		TH codes = 88
	Present	Unspecified climate change.	14	22	5	11	9
Governmental issues.		12	28	4	12	8	16
Temperature and weather changes including the effects.		11	19	5	5	6	14
Social issues.		11	15	4	6	7	9
Emotions towards new futures or the climate.		10	11	3	3	7	8
Current sustainability is inept.		10	20	3	7	7	15
Adaptation struggles.		8	14	5	8	3	6
Population decreases.		7	8	4	2	2	3
Consumerism and fast fashion.		6	14	4	11	3	5
Pollution.		6	10	3	5	7	13
Other: deforestation, loss of species, increased cost of living, decreased living space, life goals not possible.		5	7	2	2	3	5
Climate refugees and overpopulation.		4	8	2	5	2	3
Wars (unspecified what type).		4	6	3	5	1	1
Lacking healthcare.		2	4	-	-	2	4

	A specific person or country not coming up with a solution or policy and not following through.	2	4	-	-	2	4
			Total codes = 195		DE codes = 85		TH codes = 110
Future (2042)	Temperature and weather issues.	11	24	2	9	9	15
	Other: people are more selfish, in-habitual areas, food insecurities, issues with the production of goods, pricey penalties for not following rules, livestock farming still existing, many not making it to the future, increased ambiguity, imprisonment of climate activists.	9	11	2	2	7	9
	Missing nature and the restoration of nature.	8	19	4	10	4	9
	Governmental issues including conflicts and wars.	7	12	4	5	3	7
	Fear for the future or other climate-related emotions.	7	10	2	4	5	6
	Progression is still needed.	6	9	2	3	4	6
	Fear of the implications of technology.	2	8	-	-	2	8
	Pollution and the use of unsustainable energies.	2	3	1	1	1	2
	Earth is not in a good state.	2	2	-	-	2	2
	People are not as happy.	1	2	1	2	-	-
			Total codes = 103		DE codes = 39		TH codes = 64