Assessing the Effect of Visioning in Promoting Acceptance of Sustainable Policy Measures: An Investigation of Underlying Psychological Mechanisms

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Master Thesis – Environmental Psychology

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Abstract

Addressing urgent sustainability challenges such as climate change requires the implementation of transformative policy measures that can navigate societies towards sustainable pathways. However, the successful adoption of such policies is often impeded by resistance from various societal actors that perpetuate the status quo. Visioning, that is, the process of exploring desirable future states, has been identified as a crucial tool for instigating the radical change that is required to attain sustainable systems. Yet, psychological mechanisms that underly the transformative power of visioning remain largely unexplored. In an experimental online study ($N = 275$), this thesis tested whether envisioning a sustainable future leads to higher policy acceptance and whether this effect is mediated by motivation and positive emotions. Contradictory to previous findings, the study fails to detect significant effects of visioning on motivation, positive emotion or policy acceptance. In line with previous literature, however, it finds that motivation and both positive and negative emotions significantly predict policy acceptance. The absence of significant visioning effects is mainly attributed to flaws of the study's manipulation and sample characteristics. To leverage the potential of visioning for driving sustainability transformations, future research should employ diverse samples to generate meaningful insights that support decision-makers in designing effective interventions that promote public support and collective action for sustainability.

*Keywords: s*ustainability transformations, policy acceptance, visioning, resistance to change

Word count: 6452

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For the past decades, the global population has been facing urgent sustainability challenges. These challenges are predominantly caused by anthropogenic pressures on our planet, such as excessive greenhouse gas emissions, resource depletion, and environmental degradation (IPCC, 2023). These pressures exert profound impacts on both natural and human systems, contributing to interrelated global crises including climate change, pollution, and biodiversity loss, ultimately threatening human well-being (Hellweg et al., 2023; Isbell et al., 2023; Jaureguiberry et al., 2022).

Effective climate change mitigation and adaptation efforts require the implementation of transformative policy measures that can navigate societies towards sustainable pathways (van den Bergh et al., 2011). Transformative policies are defined as strategies designed to address key societal challenges by initiating profound changes in current socio-technical systems (Molas-Gallart et al., 2021; Schot & Steinmueller, 2018). However, the successful adoption of such policies is often impeded by resistance from various societal actors that perpetuate the status quo. This resistance towards change represents one of the major reasons why meaningful action towards achieving sustainability has been limited so far (De Gooyert et al., 2016; Harich, 2010; Matthews & Wynes, 2022).

From a psychological perspective, resistance towards change can be explained by the status quo bias – that is, people's inherent preference for maintaining their current situation over exploring new alternatives (Samuelson & Zeckhauser, 1988; Xiao et al., 2021). To overcome resistance towards change, it is essential to shift the persistent focus on the present towards a future-oriented perspective.

In particular, multiple scholars have emphasized the need for creating positive visions of alternative desirable futures to drive societal transformation towards sustainability (Costanza, 2000; Costanza & Kubiszewski, 2014; Meadows, 1996; Wiek & Iwaniec, 2014). Visions, that is, representations of desirable future states, are deemed crucial for motivating and guiding meaningful action for change (McPhearson et al., 2016). Yet, little is known about the psychological processes that underly the transformative power of visions. In an experimental online study, I test whether envisioning a desirable and sustainable future state leads to higher acceptance of sustainability policies, and whether motivation and positive emotion mediate this relationship.

Status Quo Bias as a Psychological Barrier Towards Change

A key psychological barrier to change is the status quo bias, a well-documented phenomenon describing individuals' general preference for maintaining their current situation over exploring new alternatives (Samuelson & Zeckhauser, 1988; Xiao et al., 2021). This bias can occur even if these alternatives encompass more benefits than maintaining the status quo (Suri et al., 2013). The status quo bias can be explained by loss aversion, which signifies people's tendency to experience losses more intensely than equivalent gains (Kahneman et al., 1991). This implies that, even when a change to the status quo entails substantial benefits, the prospect of giving up certain aspects of the status quo feels disproportionately more impactful, which consequently hinders individuals from taking action.

Both individual and political efforts towards sustainability may be impeded by the status quo bias. Regarding pro-environmental behaviour, the status quo bias was found to hinder energy-saving actions, manifesting for example in reluctance to change old appliances (Blasch & Daminato, 2020; Frederiks et al., 2015; Gill et al., 2022). Pertaining to the political sphere, the

International Energy Agency's World Energy Outlook has been observed to exhibit a status quo bias towards fossil fuels, conflicting with global targets for renewable energy (Gaede & Meadowcroft, 2016; Mohn, 2020). In line with this, Antal et al. (2012) emphasize that policymakers must account for status quo bias when designing transition policies to reduce resistance to change.

Godefroid et al. (2023) identified several measures effective for counteracting the status quo bias. Among these measures are (1) using mental simulation, (2) telling success stories, (3) providing more information about the change itself, (4) increasing the perceived value of the change and (5) framing a desired option as the default. I argue that envisioning a sustainable future may be theorized to overcome the status quo bias because it inherently entails these measures.

The Role of Visioning for Sustainability Transformations

Visioning encompasses the process of constructing visions. Visions are here referred to as desirable future states (Costanza, 2000; Strange & Mumford, 2005). Visions are normative in nature: They do not capture what is likely or possible based on current trends, but instead articulate a desired future goal state that is based on values and ideals, serving as a guide for what society aims to achieve (Wiek & Iwaniec, 2014). In other words, relating to the countermeasures of the status quo bias identified by Godefroid et al. (2023), visioning requires (1) mental simulation to conceive a (2) positive narrative of (3) how desirable future states might look like. It therefore (4) emphasizes the value such an alternative future could entail, and (5) frames these desired options as the default towards which the present state may be contrasted, thereby overcoming the status quo bias.

Visioning has been established as a crucial instrument in sustainability science and is commonly applied in the realm of urban planning and policy design (Bibri, 2018; Wiek & Iwaniec, 2014). It is assumed to hold the power to bring about the radical change that is required to attain sustainable systems (Hopwood et al., 2005; Smith et al., 2005). Specifically, it is ascribed a motivational and inspirational effect that serves as a foundation for steering transformation, directing action towards ambitious and constructive pathways (McPhearson et al., 2016). This transformative power is assumed to unfold when the envisioned goal state is used as a reference point for designing measures required to reach this state, which is also known as backcasting (Bibri, 2018; Dreborg, 1996; Robinson, 1990).

However, while it is established in sustainability research and practice that visioning is effective in the context of societal sustainability transformations, literature that investigates the psychological mechanisms explaining why these approaches are effective remains scarce. Notably, there appear to be no studies that specifically examine the impact of visioning on policy acceptance. Moreover, several authors have pointed out a lack of theoretical underpinnings of visioning in the context of sustainability transformations and related fields such as spatial planning (Shipley, 2002; Shipley & Michela, 2006; van der Helm, 2009). Both practitioners and scientists have thus largely based their work on the implicit assumptions about the effects of visioning (Shipley, 2002; van der Helm, 2009).

The aim of this master thesis is to contribute to a theoretical understanding of the effects of visioning. I propose that envisioning a sustainable future is effective for driving sustainability transformations because it increases people's acceptance of sustainable policy measures (H1). Policy acceptance refers to the degree to which individuals accept the implementation of a particular public policy addressing a specific politically relevant issue (Grelle & Hofmann,

2024). As was pointed out earlier, policy acceptance as a form of collective pro-environmental action is an essential driver for sustainability transitions, as successful implementation of transformative policies relies on public acceptance (Clayton et al., 2015). I suggest two psychological pathways trough which visioning may increase policy acceptance: firstly, through increasing motivation to engage in societal change activities, and secondly, through increasing positive emotions about the future.

Motivation to Engage on Societal Change Activities

One prevalent assumption in visioning literature is that visions have a motivating effect that drives change (McPhearson et al., 2016). In this context, specifically people's motivation to engage in collective change activities (e.g., protesting, engaging in political organisations) is relevant, as these activities are necessary for acquiring systemic change (IPCC, 2018). From a psychological perspective, visioning may have a motivating effect because it encompasses two functions relevant for motivation: goal setting and the enhancement of collective efficacy.

According to goal-setting theory, goals that are specific and high (i.e., ambitious) lead to higher levels of motivation and performance than easy or vague goals, or than setting no goal at all (Locke & Latham, 1990, 2006). This is because setting specific and high goals directs attention to relevant activities, increases effort and persistence, and activates knowledge and skills necessary for goal attainment (Locke & Latham, 1990).

Visions can be conceptualised as specific, ambitious higher-level-goal states that an individual, community or society aims to achieve. Wiek and Iwaniec (2014) developed a framework which describes ten quality criteria of sustainability visions. Among these criteria, three align closely with the goal characteristics that Locke and Latham (1990) identified as particularly effective for driving motivation. The criterion of a "tangible" vision describes the

specificity required to provide clear guidance for designing and evaluating strategies (Wiek & Iwaniec, 2014, p. 502). The criteria "visionary" and "sustainable" describe the requirement for far-sighted, aspirational visions that comply with normative principles, for example the principle of intergenerational equity, matching the characteristics of a high goal (Wiek & Iwaniec, 2014, p. 500).

Although goal-setting theory emerged from the work context, Locke and Latham (2006) state it can be applied to any context in which an individual or a group has some control over the outcomes, which is the case in democratically organised societies. Thus, in such contexts, visions that fulfil these quality criteria should unfold a motivating effect based on goal-setting theory. Similar considerations have been brought forward by Shipley (2002).

Visioning may furthermore be theorised to have a motivating effect because it increases individuals' perceived collective efficacy, that is, the beliefs in the ability of an individual's social group to meet desirable objectives (Bandura, 2000; Thaker et al., 2016; van Zomeren et al., 2008). In line with this, the collective effort model by Karau and Williams (1993) states that when individuals perceive a collective goal as desirable and recognize their own efforts as instrumental in achieving it, they are inclined to invest their energy towards achieving that goal. Thus, when a vision reflects such a collectively desirable goal state, individuals are likely motivated to participate in behaviours aimed at societal change that are perceived as instrumental in progressing towards realisation of the vision (H2a). Indeed, recent studies have shown that visioning may increase collective efficacy beliefs and thereby motivation and intentions to engage in collective change action by increasing people's ability to imagine a better future society (Bosone et al., 2024; Fernando et al., 2018; Fernando et al., 2019; Kashima & Fernando, 2020). In light of these findings, it is likely that individuals' motivation to take action towards

societal transformation also increases acceptance for transformative policies, as these policies can be seen as broader regulating mechanisms to achieve the desired future state (H2b).

Positive Emotions

Next, visioning can also be hypothesized to be effective because it elicits positive emotions by presenting an inspiring and attainable image of what could be achieved (H3a). Social psychology has so far mostly focused on the role of negative emotions (e.g., anger, guilt, fear), suggesting that they may be crucial drivers for pro-environmental behaviour (e.g., Adra et al., 2020; Kaiser et al., 2008; Malott, 2010). However, also positive emotions may be significant determinants of pro-environmental actions (Corral-Verdugo, 2012).

Hope is deemed an essential emotion that may drive societal change. Previous studies have demonstrated a positive association between hope and participation in collective action (Wlodarczyk et al., 2017) and support for societal change (Greenaway et al., 2016). Badaan et al. (2022) have found that utopian thinking, which is closely related to how visioning is conceptualised here, increased feelings of hope, which in turn promoted collective action intentions[1]. In addition, Neef et al. (2023) have found that watching a video representing an optimistic future vision significantly increased feelings of empowerment and hope, as well as motivation to engage in sustainable plastic use, compared to watching a video representing the status quo.

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[1] Badaan et al. (2022, pp. 78–81) conceptualise utopias as "visions for better societies that emphasize equality, progress, and social justice", associating utopian thinking with "imagin[ing] a radically different future society", and constructing a "mental image of an ideal […] society".

Similarly, happiness has been found to be related to pro-environmental behaviours (Brown & Kasser, 2005). Cloutier and Pfeiffer (2015, p. 319) have proposed and implemented "happiness visioning" as a part of their Sustainability Through Happiness Framework. It entails a visioning process exploring how a sustainable community focused on happiness might look like, after which sustainability interventions are implemented in accordance with the outcomes of the visioning process. Cloutier and Pfeiffer have found that happiness as a goal was widely accepted by the community they investigated in their study and led to quicker community buy-in for the sustainability measures. Cloutier and Pfeiffer furthermore pointed out that sustainability transformations can be more politically acceptable if they are perceived to have the ultimate goal of improving happiness. These findings suggest that, if envisioning desirable futures elicits positive emotions, this might increase support for measures required for achieving that future (H3b).

Visualisation of Envisioned Future States

To enhance the effectiveness of the visioning process, visualisations of envisioned future states are frequently employed. These visualisations can take various forms, including pictures, three-dimensional models, and video representations (Wiek & Iwaniec, 2014). Visualisations are crucial for creating motivational and tangible visions, which is essential for providing clear guidance and inspiration. This potential is unlocked by enabling individuals to physically see the desirable future state, rather than merely imagining it. Communication literature indicates that visual representations may evoke higher emotional responses and increase engagement compared to verbal or text information (Sheppard, 2006). Thus, a visioning process making use of visualisation techniques may induce stronger effects than one that only employs text descriptions of the envisioned states (H4). However, few studies have evaluated the effectiveness of

visualisation techniques specifically for sustainability visions, indicating a need for further investigation (Sheppard, 2006; Ward et al., 2024).

In summary, based on the theoretical rational outlined above, the study will test the following hypotheses (see Figure 1 for a graphical representation):

H1: Acceptance of climate policies is higher among people who engage in visioning, compared to those who do not engage in visioning.

H2: a) Engaging in visioning increases motivation which b) predicts higher scores on policy acceptance and c) mediates the direct relationship between visioning and policy acceptance.

H3: a) Engaging in visioning increases positive emotions which b) predicts higher scores on policy acceptance and c) mediates the direct relationship between visioning and policy acceptance.

H4: The effect of visioning on a) policy acceptance, b) motivation and c) positive emotions is higher for people who engage in visioning processes supported by visualisation, compared to those who engage in visioning processes without visualisation.

Figure 1

Proposed Model Including Hypotheses
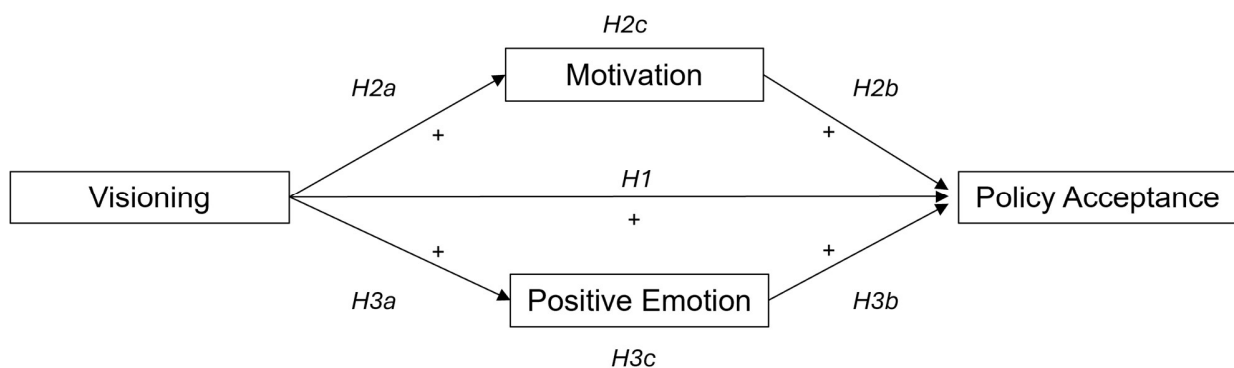
Note. Hypothesis H4 is not depicted in the model.

Method

Participants

An a-priori power analysis was conducted in G*Power (Version 3.1.9.6) to determine the required sample size (Faul et al., 2007). Assuming a medium effect size of Cohen's f = 0.2, a significance criterion of α = .05 and power = .80, the required sample size to test group differences with a fixed-effects one-way ANOVA was N = 280. The effect size estimate was based on the average effect size in psychology (Brysbaert & Stevens, 2018).

Largely conforming to the a-priori power analysis, the final sample for this study comprised 275 participants recruited from three different sources. Firstly, 42 participants were recruited from the seminar "Social environment and behaviour" for second-year psychology bachelor students at the University of Groningen. They were asked to participate in the study as preparation for a lecture. The survey was closed before the lecture. This was done to prevent that students who had learned about the hypotheses during the lecture would participate, as this would have caused biased data. Secondly, 175 participants were recruited from a pool of first-year psychology students via the SONA participation system of the University of Groningen. Participants were granted 0.4 SONA credits for taking part in the study. Lastly, 58 participants were obtained via snowball convenience sampling of personal contacts that were reached via messaging apps and Instagram. Participants from the convenience sample received no compensation for their participation.

Participants were excluded if they did not finish the study (n = 71), did not provide meaningful text responses (n = 2) or showed no item variance in responses across the measured scales (n = 2). Thus, from a total of 350 participants who had started the questionnaire, 75 participants were removed, resulting in a final sample of N = 275. From the final sample, 70%

(n = 193) of participants identified as female, 25% (n = 70) as male, 1.8% (n = 5) as non-binary, 1.4% (n = 4) preferred not to indicate their gender, and 1% (n = 3) did not answer the question.

Age was measured in categories with an average span of 9 years (e.g., 25-34). Most people (74%, n = 205) were between 16 and 24 years old. This age category also represented the median, with 25% (n = 70) being older. See Appendix A for an overview of age range distribution.

Procedure

The study was conducted using Qualtrics. In the beginning of the study, participants read an introduction text about the study's content and purpose and gave consent for the processing of their data. Consequently, participants were randomly assigned to one of four conditions (for details, see the section "manipulation" below). Following their respective experimental manipulation, participants filled in a questionnaire containing measures for policy acceptance as the main dependent variable, motivation to engage in societal change activities and emotions towards the future as potential mediating variables, and goal focus as an exploratory variable. Afterwards, participants were shown visualisations and descriptions of three sustainable scenarios for the Netherlands in the year 2100. These scenarios were developed by the PBL Netherlands Environmental Agency (PBL, 2023; see Appendix B). Participants' perceived similarity of these scenarios to the present as well as scenario acceptability as additional exploratory variables was measured exploratively. Lastly, participants filled in demographic data (age, gender, climate change concern). The analysis only included the measures for policy acceptance, motivation and emotions, hence only these variables will be elaborated in more detail below (see Appendix C for exact formulations of the survey items).

Manipulation

The four conditions were designed to be able to compare people who engaged in a visioning process (imagined visioning and visualised visioning condition) to those who did not (present focus and control condition) to be able to test hypotheses H1, H2 and H3. Two separate visioning conditions were created to compare (1) people who only imagined and described their vision to (2) people who additionally received pictures supporting the visioning process to be able to test hypothesis H4. Appendix D shows the intervention groups' task instructions.

Participants in the imagined visioning condition were asked to describe in three to five sentences what they hoped a sustainable society will look like in the year 2100. They were asked to consider future diet, way of living, mobility, energy sources and other aspects they find important. Participants in the visualised visioning condition received the same description task as the imagined visioning condition. Additionally, after describing their vision of a sustainable society, they were shown pictures of four scenarios developed by the PBL Netherlands Environmental Assessment Agency to support the visioning process (see Figure D1). Participants were asked to carefully look at the pictures and to visualise in their head how their own vision would look like. Participants in the present focus condition were asked to describe the society they currently live in, also with regard to sustainability, considering current diet, way of living, mobility, energy sources and other aspects they find important. Participants in the control group did not receive any intervention. They only filled out the questionnaire that the intervention groups completed after receiving their respective manipulation.

Measures

Policy Acceptance

Policy acceptance was measured using a 6-item scale reflecting environmental policies related to legal, infrastructural, and fiscal changes and opportunities. One item pertaining to laws against 'ecocide' was adopted from Holm (2023). Two items pertaining to subsidising of renewable energies and taxation of fossil fuels were adopted from van Valkengoed et al. (2021). Two items pertaining to increase of the EU renewable energy target and an embargo of diesel and petrol car sale were based on the regulation package "Fit for 55" and the "Renewable Energy Directive" of the European Union (Directive (EU) 2023/2413.; Regulation (EU) 2023/851). One item was based on considerations of the Dutch government to increase meat taxes (USDA, 2022). Participants were asked how much they are opposed to or in favour of each of the policies. All policy acceptance items were answered using a 7-point Likert scale (1 = *strongly opposed* to 7 = *strongly in favour*). The policy acceptance scores were averaged to create a scale (α = .82 M = 5.3, SD = 1.0).

Motivation to Engage in Societal Change Activities

The motivation measure was an adaption of Fernando et al.'s (2018) Citizenship for Change scale. Using a single item, participants were asked how motivated they are to engage in activities aimed at transitioning to a sustainable future. Examples given for these activities were participation in political parties, demonstrations and protests, petitioning and voting. Participants answered the question on a 7-point Likert scale (1= *strongly unmotivated* to 7 = *strongly motivated*). The mean for the motivation measure was M = 4.5, the standard deviation was SD = 1.6.

Emotions Towards the Future

Positive emotions were measured with three items from a longer list of six emotions. The items assessed the positive emotions happiness, hope and inspiration. Participants were asked to answer to what extent thinking about their society's future brings up each of these emotions. Responses were recorded on a 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*). The items reflecting positive emotions were averaged to create a scale (α = .75 *M* = 4.0, *SD* = 1.1). Exploratively, negative emotions were measured as well using three items assessing guilt, anger and helplessness. Likewise, the items were averaged to create a scale (α = .69, *M* = 4.5, *SD* = 1.2). The Cronbach's alpha value of α = .69 indicates that the scale's reliability is close to acceptable (Tavakol & Dennick, 2011).

Results

The analysis was conducted in RStudio (Version 2024.04.2+764). Out of the 275 participants included in the analysis, 74 were in the control condition, 65 each in the in the imagined visioning and visualised visioning condition, and 71 in the present focus condition. To compare participants who engaged in visioning to those who did not in a follow-up analysis, the imagined visioning and the visualised visioning groups were merged to form the overarching visioning group (*N* = 130, coded as 1), and the present focus and control conditions were merged to form the overarching non-visioning group (*N* = 145, coded as 0).

When testing the assumptions for ANOVA, it was shown that policy acceptance, motivation and negative emotion were non-normally distributed. Hence, non-parametric tests were conducted for these variables. Positive emotion was normally distributed, although homogeneity of variance was not given, which is why a Welch's ANOVA and Welch's t-test were conducted to test for group differences.

Effect of Visioning on Policy Acceptance

To test for differences in policy acceptance between groups (H1), a Kruskal-Wallis test was conducted that accounted for non-normal distribution of policy acceptance. The results showed no significant differences regarding policy acceptance between groups ($\chi^2(3) = 1.02$, $p = .79$) with a mean policy acceptance score of $M = 5.4$ for the visualised visioning, $M = 5.4$ for the imagined visioning, $M = 5.4$ for the present focus, and $M = 5.3$ for the control condition.

To test for differences in policy acceptance between the visioning and non-visioning group, a Wilcoxon rank sum test was performed. The results indicated that there was no significant difference between the policy acceptance of the visioning group ($M = 5.4$) and the non-visioning group ($M = 5.3$) regarding policy acceptance, $W = 8885.5$, $p = .41$.

Effect of Visioning on Motivation

To test for differences in motivation to engage in societal change activities between groups (H2a), a Kruskal-Wallis test was calculated that accounted for the non-normal distribution of motivation. The results showed no significant differences between groups ($\chi^2(3) = 0.20$, $p = .97$) with a mean motivation score of $M = 4.4$ for the visualised visioning, $M = 4.6$ for the imagined visioning, $M = 4.5$ for the present focus, and $M = 4.4$ for the control condition.

To test for differences in motivation between the visioning and non-visioning group, a Wilcoxon rank sum test was performed. The results indicated that there was no significant difference between the motivation of the visioning group ($M = 4.5$) and the non-visioning group ($M = 4.5$) regarding motivation, $W = 9222$, $p = .75$.

Effect of Visioning on Positive Emotions

To test for differences in positive emotions between groups (H3a), a Welch's ANOVA was calculated that accounted for the heteroscedasticity of the positive emotion scale. The results show no significant differences between groups, $F(3, 147.32) = .30$, $p = .82$, with a mean positive emotion score of $M = 4.0$ for the visualised visioning, $M = 4.0$ for the imagined visioning, $M = 3.9$ for the present focus, and $M = 3.9$ for the control condition.

To test differences in positive emotions between the visioning and non-visioning group, a Welch's t-test was performed. The results indicated that there was no significant difference between the visioning group ($M = 4.0$) and the non-visioning group ($M = 3.9$) regarding positive emotions, $t(265.5) = -0.76$, $p = .44$.

Predicting Policy Acceptance from Emotions and Motivation

To test whether positive emotions and motivation predict policy acceptance independently from experimental conditions (H2b, H3b), a multiple linear regression was conducted. Exploratively, it was tested whether negative emotions predict policy acceptance by adding them to the model testing H2b and H3b as well. The model significantly explained 29% of the variance ($R^2 = .29$, $F(3,271) = 39.95$, $p < .001$). Higher scores on positive emotions, negative emotions and motivation were indicative of higher scores on policy acceptance (see Table 1). Since condition neither had a significant effect on policy acceptance nor on motivation or positive emotions, no mediation analysis was conducted as was initially planned to test H2c and H3c.

Table 1

Multiple Linear Regression Results Using Policy Acceptance as the Criterion

Predictor	B	SE B	95% CI B		β	*p*	Partial η²
			LL	*UL*			
Positive Emotions	0.14	0.05	0.05	0.24	0.15	.002	0.02
Negative Emotions	0.27	0.05	0.18	0.37	0.30	< .001	0.08
Motivation	0.24	0.04	0.17	0.32	0.36	< .001	0.11

Note. Total *N* = 275. CI = confidence interval; *LL* = lower limit; *UL* = upper limit.

Discussion

In an experimental online study, the present research investigated whether envisioning a desirable sustainable future increases acceptance for sustainability policies. I proposed two pathways through which this effect of visioning could be explained: firstly, through increasing motivation, and secondly through increasing positive emotions. I further proposed that this effect is enhanced when the visioning processes is supported by visualisation.

The results neither showed a significant effect of visioning on policy acceptance, nor on the hypothesized mediators motivation and positive emotions. Further, the results did not indicate that visioning supported by visualisation increased these effects, either. Hence, the study provided no support for the hypotheses H1, H2a, H2c, H3a, H3c and H4. However, the results indicated that, across the whole sample, the higher people scored on motivation, positive emotions and negative emotions, the higher was their acceptance of the sustainable policy measures. Hence, the study provided support for the hypotheses H2b and H3b.

Theoretical Implications

Firstly, the non-significant results for the effectiveness of visioning stand in contrast to the effects previous studies have found for visioning on positive emotion as well as motivation to engage in societal change behaviour (Badaan et al., 2022; Bosone et al., 2024; Fernando et al., 2018; Neef et al., 2023). The following section draws on limitations to the manipulation and the sample as potential explanations for the lack of support for these findings.

The ineffectiveness of the manipulation in increasing motivation is surprising, given that highly similar manipulations were effective in earlier studies (e.g., Study 3, Fernando et al., 2018). Yet, the present study's manipulation differed in two key aspects, which may explain its ineffectiveness. First, respondents in the visioning conditions and in the present focus condition were asked to describe different aspects of their life (e.g., diet, way of living). This may have constrained participants' associations, leading them to think in terms of smaller-scale changes, which potentially restricted the effectiveness of the visioning process. Further, participants in both the visioning conditions and in the present focus condition were asked to describe these aspects also with regard to sustainability. This approach aimed to rule out potential priming effects of the term "sustainability". However, this may have triggered respondents in the present focus condition to also think about future states. Particularly, I suspect that this led some participants to mentally contrast the present state of their society to a sustainable future state. Indeed, the qualitative answers of some respondents in the present focus condition show criticism of the status quo, suggesting what should be done, rather than describing the current state without any normative judgements. Examples of responses that suggest implicit contrasting of the present to a sustainable future state are presented in Appendix E.

Interestingly, Fernando et al. (2018) found that mentally contrasting the present to a desired future state led to an equal increase in motivation to engage in societal change activities as did visioning processes. Hence, if this effect also occurred for participants in the present focus condition, this might have increased the group mean for motivation to engage in societal change activities to a similar degree as did the visioning effect in the two visioning conditions. On the other hand, this would only explain why the present focus condition had similar scores as the visioning conditions, but not why the control condition did not significantly differ from the visioning conditions.

It is possible that the visioning conditions were not significantly different from the control condition because the investigated sample was not sufficiently susceptible to the visioning manipulation due to its composition. The majority of the sample, 72%, consisted of students acquired from the University's SONA participant pool. The sample thus predominantly represented a rather homogenous group of young and educated people, who tend to have relatively high acceptance for climate change mitigation policies (Bergquist et al., 2022). Indeed, ceiling effects for policy acceptance were observed in the present study, which limited the ability to detect differences between experimental conditions due to restricted variance.

In addition, participants from the SONA pool were recruited in the end of the academic year, between April and June. Some research indicates that participation at the end of an academic term might produce lower data quality (i.e., lower reliability and accuracy; Porfido et al., 2020). An explanation for lower data quality may be that students who participate towards the end of an academic term tend to be less conscientious (Aviv et al., 2002; Witt et al., 2011), and more extrinsically motivated (Nicholls et al., 2015). These circumstances might have led students to mainly aim at fulfilling their credit requirements while neglecting meaningful

engagement in the tasks and response process. As a consequence, the manipulation might not have been as effective as it could have been for more attentive and conscientious participants.

Interestingly, previous findings suggest that students participating towards the end of an academic term tend to be more focused on the present (Harber et al., 2003) and more loss aversive (Grimm et al., 2012), which might indicate a higher status quo bias. If these characteristics also pertain to the investigated student sample, this might have interfered with the manipulation. Arguably, a visioning intervention, aiming to shift the focus towards the future, is less likely to be effective for a sample that scores above average regarding present focus and loss aversion levels. This might serve as a further explanation for why no significant differences between the control and intervention conditions were found.

Secondly, the finding confirming hypotheses H2b and H3b and the explorative finding that also negative emotions significantly predicted policy acceptance support the notion that both positive and negative emotions may be drivers for societal change and pro-environmental behaviour, which is in line with the argumentation of Corral-Verdugo (2012) and findings by Coelho et al. (2017). It is important to note that the standardized regression weight for negative emotions was about twice as large as for the positive emotions, suggesting that negative emotions influenced policy acceptance more strongly than positive emotions did.

Nevertheless, regarding practical implications of these findings, Vlasceanu et al. (2024) underscore that interventions inducing negative emotions must be applied with care and with thorough consideration of the target group. Having investigated over 80.000 people from 63 countries in their recent study, Vlasceanu and colleagues found that inducing negative emotions through exposure to negative consequences of climate change was highly effective at encouraging intentions to share climate change related information. It did, however, reduce tree

planting efforts, and, most importantly, decrease policy support among participants low in climate change concern. Hence, when addressing people with low climate change concern, inducing negative emotions seems to be a counter effective measure. Instead, when it comes to societal groups that are difficult to convince of pro-environmental actions, such as climate change deniers, inducing positive emotions by emphasizing the value of an alternative sustainable future is argued to be more effective (Prinzing, 2020).

Limitations

As one of the major limitations, it appears that the employed sample was too small, resulting in the study being underpowered. Fernando et al. (2018) found an effect for utopian thinking on motivation of Cohen's $d = 0.3$ in their Study 3. This suggests that the effect size of $d = 0.4$, which the present study anticipated based on average effect sizes in psychology, was estimated too high. Hence, the sample size resulting from the a-priori power analysis was assumably too small. Although in the present study no significant effects of visioning were observed, descriptively, the means of the control group for policy acceptance, positive emotion and motivation were lower than the aggregated means for the three intervention conditions, while it was higher negative emotions (see Appendix F). This descriptive trend might indicate that significant differences could possibly be observed in a larger sample.

The small sample size strongly impedes the generalizability of the study's results. It increases the risk of Type II errors, where true effects may not be detected due to insufficient statistical power. This limitation implies that even if an effect of visioning on policy acceptance mediated by motivation and positive emotions exists, the present study might not have been capable of identifying this effect reliably. The lack of significant findings could therefore be attributed to the sample size and data quality rather than the absence of actual effects. Moreover,

even if the sample size had provided sufficient power, results could not be generalized to a hold implication for a broader population (e.g., citizens of Groningen), since the sample was dominated by a narrow group of first-year psychology bachelor students.

Additionally, it is possible that the manipulation for the visualised visioning condition failed because the stimuli were ineffective. Previous literature recommends the use of large, immersive, possibly animated pictures and realistic pictures to increase engagement (Furness III et al., 1998, as cited in Sheppard, 2006; Sheppard, 2006). However, the present study's survey was optimized for mobile use, so even if participants responded on a computer, the pictures were displayed in a rather small size (about 7.5cm x 5.3 cm). Moreover, the pictures of the scenarios created by the PBL Environmental Agency were illustrated in an abstract style (see Appendix B). Consequently, the pictures were likely not sufficiently engaging to exhibit a significant effect on the visualised visioning condition.

Directions for Future Research

Although the present research failed to demonstrate significant effects of visioning on motivation, positive emotions and policy acceptance, I argue that further investigation of these effects holds high potential for future study, as previous research has highlighted the pivotal role visioning could play in sustainability transitions. Yet, systematic research regarding underlying psychological mechanisms of visioning is still in its nascent stages, and crucial gaps remain, particularly regarding its impact on policy acceptance as a collective behaviour relevant to system change. It is plausible that the effectiveness of visioning depends on specific methodologies and conditions. Therefore, future research could investigate which visioning methods, under what conditions, and for which populations, yield the most significant outcomes.

More specifically, future research that builds on the study design of the present study should address the identified limitations. Firstly, the present study suggests investigating more diverse samples that may be more susceptible to visioning effects. In line with the findings of Prinzing (2020), it might be particularly interesting to also research visioning effects for societal groups such as climate change deniers. Moreover, it seems crucial that task descriptions are precise to prevent unintended cognitive processes, such as mental contrasting, which could introduce confounding effects. Furthermore, it might be worthwhile to test to what extent more engaging visualisations of future scenarios induce significant effects, for example by comparing exposure to realistic versus abstract representations of envisioned future states.

Additionally, it might be interesting to include information from the qualitative responses in the analysis. To systematically investigate whether mental contrasting might have occurred, responses could be coded according to prespecified criteria that are indicative of mental contrasting, for example criticism and suggestions for change (Fernando et al., 2018). The data could followingly be re-analysed while controlling for mental contrasting. Moreover, assessing simple text characteristics such as length or level of detail might reveal differences in effectiveness of the manipulation. Arguably, participants who wrote longer rather than shorter responses, and describe multiple rather than few aspects of their sustainable vision, engaged more deeply in the visioning process; hence the intervention's effect might be stronger for them.

Conclusion

The present study was unable to replicate the effects of visioning on motivation to engage in collective action and positive emotions, which were observed in previous research. Further, no effect of visioning on policy acceptance was found, and visualisation of sustainable visions was not found to be effective either. This lack of replication is primarily attributed to the

characteristics of the study's sample and the insufficient strength of the manipulation. However, the study identified motivation, positive and negative emotions as significant predictors of acceptance for sustainable policies. In line with previous literature, this underscores the importance of including positive emotions in research on emotional factors of societal change, which has traditionally focused predominantly on negative emotions.

To leverage the potential of visioning to drive sustainability transformations, systematic investigation of underlying psychological mechanisms of visioning processes is indispensable. I recommend future research to focus on employing strong manipulations on more diverse samples, testing under which conditions visioning might elicit significant effects. Results of that research can inform decision-makers at various governance levels, supporting them in designing effective interventions that foster public support and collective action towards sustainability.

References

Adra, A., Harb, C., Li, M., & Baumert, A. (2020). Predicting collective action tendencies among Filipina domestic workers in Lebanon: Integrating the Social Identity Model of Collective Action and the role of fear. *Group Processes & Intergroup Relations*, *23*(7), 967–978. https://doi.org/10.1177/1368430219885180

Antal, M., Gazheli, A., & van den Bergh, J. (2012). *Behavioral foundations of sustainability transitions* (Working Paper No. 3). WWWforEurope. https://www.econstor.eu/bitstream/10419/125658/1/WWWforEurope_WPS_no003_MS31.pdf

Aviv, A., Zelenski, J., Rallo, L., & Larsen, R. (2002). Who comes when: personality differences in early and later participation in a university subject pool. *Personality and Individual Differences*, *33*(3), 487–496. https://doi.org/10.1016/S0191-8869(01)00199-4

Badaan, V., Akil, C., Zebian, Y., & Jost, J. T. (2022). Envisioning Change: An Empirical Test of the Social Psychological Model of Utopian Thinking and Collective Action. *Journal of Social Psychology Research*, 77–96. https://doi.org/10.37256/jspr.1120221140

Bandura, A. (2000). Exercise of Human Agency Through Collective Efficacy. *Current Directions in Psychological Science*, *9*(3), 75–78. https://doi.org/10.1111/1467-8721.00064

Bergquist, M., Nilsson, A., Harring, N., & Jagers, S. C. (2022). Meta-analyses of fifteen determinants of public opinion about climate change taxes and laws. *Nature Climate Change*, *12*(3), 235–240. https://doi.org/10.1038/s41558-022-01297-6

Bibri, S. E. (2018). Backcasting in futures studies: a synthesized scholarly and planning approach to strategic smart sustainable city development. *European Journal of Futures Research*, *6*(1). https://doi.org/10.1186/s40309-018-0142-z

Blasch, J., & Daminato, C. (2020). Behavioral Anomalies and Energy-related Individual Choices: The Role of Status-quo Bias. *The Energy Journal*, *41*(6), 181–214. https://doi.org/10.5547/01956574.41.6.jbla

Bosone, L., Thiriot, S., Chevrier, M., Rocci, A., & Zenasni, F. (2024). Visioning sustainable futures: Exposure to positive visions increases individual and collective intention to act for a decarbonated world. *Global Environmental Psychology*, *2*, Article e11105. https://doi.org/10.5964/gep.11105

Brown, K. W., & Kasser, T. (2005). Are Psychological and Ecological Well-being Compatible? The Role of Values, Mindfulness, and Lifestyle. *Social Indicators Research*, *74*(2), 349–368. https://doi.org/10.1007/s11205-004-8207-8

Brysbaert, M., & Stevens, M. (2018). Power Analysis and Effect Size in Mixed Effects Models: A Tutorial. *Journal of Cognition*, *1*(1), 9. https://doi.org/10.5334/joc.10.

Clayton, S., Devine-Wright, P., Stern, P. C., Whitmarsh, L., Carrico, A., Steg, L., Swim, J., & Bonnes, M. (2015). Psychological research and global climate change. *Nature Climate Change*, *5*(7), 640–646. https://doi.org/10.1038/nclimate2622

Cloutier, S., & Pfeiffer, D. (2015). Sustainability Through Happiness: A Framework for Sustainable Development. *Sustainable Development*, *23*(5), 317–327. https://doi.org/10.1002/sd.1593

Coelho, F., Pereira, M. C., Cruz, L., Simões, P., & Barata, E. (2017). Affect and the adoption of pro-environmental behaviour: A structural model. *Journal of Environmental Psychology*, *54*, 127–138. https://doi.org/10.1016/j.jenvp.2017.10.008

Corral-Verdugo, V. (2012). The positive psychology of sustainability. *Environment, Development and Sustainability*, *14*(5), 651–666. https://doi.org/10.1007/s10668-012-9346-8

Costanza, R. (2000). Visions of alternative (unpredictable) futures and their use in policy analysis. *Conservation Ecology*, *4*(1), 5–22. https://www.jstor.org/stable/26271746

Costanza, R., & Kubiszewski, I. (2014). Why We Need Visions of a Sustainable and Desirable World. In R. Costanza & I. Kubiszewski (Eds.), *Creating a Sustainable and Desirable Future* (pp. 3–8). World Scientific. https://doi.org/10.1142/9789814546898_0001

De Gooyert, V., Rouwette, E., van Kranenburg, H., Freeman, E., & van Breen, H. (2016). Sustainability transition dynamics: Towards overcoming policy resistance. *Technological Forecasting and Social Change*, *111*, 135–145. https://doi.org/10.1016/j.techfore.2016.06.019

Dreborg, K. H. (1996). Essence of backcasting. *Futures*, *28*(9), 813–828. https://doi.org/10.1016/S0016-3287(96)00044-4

Directive (EU) 2023/2413 of the European Parliament and of the Council of 18 October 2023 amending Directive (EU) 2018/2001, Regulation (EU) 2018/1999 and Directive 98/70/EC as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652, Official Journal of the European Union.

Regulation (EU) 2023/851 of the European Parliament and of the Council of 19 April 2023 amending Regulation (EU) 2019/631 as regards strengthening the CO2 emission

performance standards for new passenger cars and new light commercial vehicles in line with the Union's increased climate ambition, Official Journal of the European Union.

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*(2), 175–191. https://doi.org/10.3758/BF03193146

Fernando, J. W., Burden, N., Ferguson, A., O'Brien, L. V., Judge, M., & Kashima, Y. (2018). Functions of Utopia: How Utopian Thinking Motivates Societal Engagement. *Personality & Social Psychology Bulletin*, *44*(5), 779–792. https://doi.org/10.1177/0146167217748604

Fernando, J. W., O'Brien, L. V., Burden, N. J., Judge, M., & Kashima, Y. (2019). Greens or space invaders: Prominent utopian themes and effects on social change motivation. *European Journal of Social Psychology*, *50*(2), 278–291. https://doi.org/10.1002/ejsp.2607

Frederiks, E. R., Stenner, K., & Hobman, E. V. (2015). Household energy use: Applying behavioural economics to understand consumer decision-making and behaviour. *Renewable and Sustainable Energy Reviews*, *41*, 1385–1394. https://doi.org/10.1016/j.rser.2014.09.026

Gaede, J., & Meadowcroft, J. (2016). A Question of Authenticity: Status Quo Bias and the International Energy Agency's World Energy Outlook. *Journal of Environmental Policy & Planning*, *18*(5), 608–627. https://doi.org/10.1080/1523908X.2015.1116380

Gill, C. A., Atlas, S. A., Hardisty, D. J., & Scott, S. P. (2022). Consumer matching costs to context: Status quo bias, temporal framing, and household energy decisions. *Journal of Consumer Behaviour*, *21*(5), 1018–1027. https://doi.org/10.1002/cb.2051

Godefroid, M.-E., Plattfaut, R., & Niehaves, B. (2023). How to measure the status quo bias? A review of current literature. *Management Review Quarterly*, *73*(4), 1667–1711. https://doi.org/10.1007/s11301-022-00283-8

Greenaway, K. H., Cichocka, A., van Veelen, R., Likki, T., & Branscombe, N. R. (2016). Feeling Hopeful Inspires Support for Social Change. *Political Psychology*, *37*(1), 89–107. https://doi.org/10.1111/pops.12225

Grelle, S., & Hofmann, W. (2024). When and Why Do People Accept Public-Policy Interventions? An Integrative Public-Policy-Acceptance Framework. *Perspectives on Psychological Science : A Journal of the Association for Psychological Science*, *19*(1), 258–279. https://doi.org/10.1177/17456916231180580

Grimm, L. R., Markman, A. B., & Maddox, W. T. (2012). End-of-Semester Syndrome: How Situational Regulatory Fit Affects Test Performance Over an Academic Semester. *Basic and Applied Social Psychology*, *34*(4), 376–385. https://doi.org/10.1080/01973533.2012.693427

Harber, K. D., Zimbardo, P. G., & Boyd, J. N. (2003). Participant Self-Selection Biases as a Function of Individual Differences in Time Perspective. *Basic and Applied Social Psychology*, *25*(3), 255–264. https://doi.org/10.1207/S15324834BASP2503_08

Harich, J. (2010). Change resistance as the crux of the environmental sustainability problem. *System Dynamics Review*, *26*(1), 35–72. https://doi.org/10.1002/sdr.431

Hellweg, S., Benetto, E., Huijbregts, M. A. J., Verones, F., & Wood, R. (2023). Life-cycle assessment to guide solutions for the triple planetary crisis. *Nature Reviews Earth & Environment*, *4*(7), 471–486. https://doi.org/10.1038/s43017-023-00449-2

Holm, H.-M. (2023). *The Curious Case of Art and Climate Change: The Impact of Art-Induced Distance on 'Out-Of-The-Box' Climate Policies and Feelings Overwhelmed* [Master Thesis, University of Groningen].

Hopwood, B., Mellor, M., & O'Brien, G. (2005). Sustainable development: mapping different approaches. *Sustainable Development*, *13*(1), 38–52. https://doi.org/10.1002/sd.244

IPCC. (2018). *Global warming of 1.5°C: An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.* https://www.ipcc.ch/site/assets/uploads/sites/2/2022/06/SR15_Full_Report_HR.pdf

IPCC. (2023). *Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland.* https://doi.org/10.59327/IPCC/AR6-9789291691647.001

Isbell, F., Balvanera, P., Mori, A. S., He, J.-S., Bullock, J. M., Regmi, G. R., Seabloom, E. W., Ferrier, S., Sala, O. E., Guerrero-Ramírez, N. R., Tavella, J., Larkin, D. J., Schmid, B., Outhwaite, C. L., Pramual, P., Borer, E. T., Loreau, M., Omotoriogun, T. C., Obura, D. O., . . . Palmer, M. S. (2023). Expert perspectives on global biodiversity loss and its drivers and impacts on people. *Frontiers in Ecology and the Environment*, *21*(2), 94–103. https://doi.org/10.1002/fee.2536

Jaureguiberry, P., Titeux, N., Wiemers, M., Bowler, D. E., Coscieme, L., Golden, A. S., Guerra, C. A., Jacob, U., Takahashi, Y., Settele, J., Díaz, S., Molnár, Z., & Purvis, A.

(2022). The direct drivers of recent global anthropogenic biodiversity loss. *Science Advances*, *8*(45), eabm9982. https://doi.org/10.1126/sciadv.abm9982

Kahneman, D., Knetsch, J. L., & Thaler, R. H. (1991). Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias. *Journal of Economic Perspectives*, *5*(1), 193–206. https://doi.org/10.1257/jep.5.1.193

Kaiser, F. G., Schultz, P. W., Berenguer, J., Corral-Verdugo, V., & Tankha, G. (2008). Extending Planned Environmentalism. *European Psychologist*, *13*(4), 288–297. https://doi.org/10.1027/1016-9040.13.4.288

Karau, S. J., & Williams, K. D. (1993). Social loafing: A meta-analytic review and theoretical integration. *Journal of Personality and Social Psychology*, *65*(4), 681–706. https://doi.org/10.1037/0022-3514.65.4.681

Kashima, Y., & Fernando, J. (2020). Utopia and ideology in cultural dynamics. *Current Opinion in Behavioral Sciences*, *34*, 102–106. https://doi.org/10.1016/j.cobeha.2020.01.002

Locke, E. A., & Latham, G. P. (1990). *A theory of goal setting & task performance. A theory of goal setting & task performance*. Prentice-Hall, Inc.

Locke, E. A., & Latham, G. P. (2006). New Directions in Goal-Setting Theory. *Current Directions in Psychological Science*, *15*(5), 265–268. https://doi.org/10.1111/j.1467-8721.2006.00449.x

Malott, R. W. (2010). I'll save the world from global warming—Tomorrow: Using procrastination management to combat global warming. *The Behavior Analyst*, *33*(2), 179–180. https://doi.org/10.1007/BF03392214

Matthews, H. D., & Wynes, S. (2022). Current global efforts are insufficient to limit warming to 1.5°c. *Science (New York, N.Y.)*, *376*(6600), 1404–1409. https://doi.org/10.1126/science.abo3378

McPhearson, T., Iwaniec, D. M., & Bai, X. (2016). Positive visions for guiding urban transformations toward sustainable futures. *Current Opinion in Environmental Sustainability*, *22*, 33–40. https://doi.org/10.1016/j.cosust.2017.04.004

Meadows, D. H. (1996). Envisioning a Sustainable World. In R. Costanza, O. Segura, & J. Martinez-Alier (Eds.), *Getting Down to Earth, Practical Applications of Ecological Economics.* Island Press.

Mohn, K. (2020). The Gravity of Status Quo: A Review of IEA's World Energy. *Economics of Energy & Environmental Policy*, *9*(1). https://doi.org/10.5547/2160-5890.9.1.kmoh

Molas-Gallart, J., Boni, A., Giachi, S., & Schot, J. (2021). A formative approach to the evaluation of Transformative Innovation Policies. *Research Evaluation*, Article rvab016. Advance online publication. https://doi.org/10.1093/reseval/rvab016

Neef, N. E., Fußwinkel, S., Roos, C., Frank, L., Shihepo, K., & Richter, I. (2023). Optimistic narrative future visions: A communication tool for promoting sustainable (plastic) behavior. *Frontiers in Psychology*, *14*, 1252895. https://doi.org/10.3389/fpsyg.2023.1252895

Nicholls, M. E. R., Loveless, K. M., Thomas, N. A., Loetscher, T., & Churches, O. (2015). Some participants may be better than others: Sustained attention and motivation are higher early in semester. *Quarterly Journal of Experimental Psychology*, *68*(1), 10–18. https://doi.org/10.1080/17470218.2014.925481

PBL. (2023). *Vier scenario's voor de inrichting van Nederland in 2050. Ruimtelijke Verkenning 2023*. https://www.pbl.nl/sites/default/files/downloads/pbl-2023-vier-scenarios-voor-de-inrichting-van-nederland-in-2050-4832.pdf

Prinzing, M. (2020). Going Green Is Good for You: Why We Need to Change the Way We Think about Pro-environmental Behavior. *Ethics, Policy & Environment*, *26*(1), 1–18. https://doi.org/10.1080/21550085.2020.1848192

Robinson, J. B. (1990). Futures under glass. *Futures*, *22*(8), 820–842. https://doi.org/10.1016/0016-3287(90)90018-D

Samuelson, W., & Zeckhauser, R. (1988). Status quo bias in decision making. *Journal of Risk and Uncertainty*, *1*(1), 7–59. https://doi.org/10.1007/BF00055564

Schot, J., & Steinmueller, W. E. (2018). Three frames for innovation policy: R&D, systems of innovation and transformative change. *Research Policy*, *47*(9), 1554–1567. https://doi.org/10.1016/j.respol.2018.08.011

Sheppard, S. R. J. (2006). Bridging the sustainability gap with landscape visualisation in community visioning hubs. *Integrated Assessment*, *6*. https://iaj.journals.publicknowledgeproject.org/index.php/iaj/article/view/1093/956

Shipley, R. (2002). Visioning in Planning: Is the Practice Based on Sound Theory? *Environment and Planning a: Economy and Space*, *34*(1), 7–22. https://doi.org/10.1068/a3461

Shipley, R., & Michela, J. L. (2006). Can vision motivate planning action? *Planning Practice and Research*, *21*(2), 223–244. https://doi.org/10.1080/02697450600944715

Smith, A., Stirling, A., & Berkhout, F. (2005). The governance of sustainable socio-technical transitions. *Research Policy*, *34*(10), 1491–1510. https://doi.org/10.1016/j.respol.2005.07.005

Strange, J. M., & Mumford, M. D. (2005). The origins of vision: Effects of reflection, models, and analysis. *The Leadership Quarterly*, *16*(1), 121–148. https://doi.org/10.1016/j.leaqua.2004.07.006

Suri, G., Sheppes, G., Schwartz, C., & Gross, J. J. (2013). Patient inertia and the status quo bias: When an inferior option is preferred. *Psychological Science*, *24*(9), 1763–1769. https://doi.org/10.1177/0956797613479976

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, *2*, 53–55. https://doi.org/10.5116/ijme.4dfb.8dfd

Thaker, J., Maibach, E., Leiserowitz, A., Zhao, X. [Xiaoquan], & Howe, P. (2016). The Role of Collective Efficacy in Climate Change Adaptation in India. *Weather, Climate, and Society*, *8*(1), 21–34. https://doi.org/10.1175/WCAS-D-14-00037.1

USDA. (2022). *Concept of a Meat Tax Under Discussion in the Netherlands* (NL2022-0037). United States Department of Agriculture Foreign Agricultural Service. https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Concept%20of%20a%20Meat%20Tax%20Under%20Discussion%20in%20the%20Netherlands_The%20Hague_Netherlands_NL2022-0037.pdf

van den Bergh, J. C., Truffer, B., & Kallis, G. (2011). Environmental innovation and societal transitions: Introduction and overview. *Environmental Innovation and Societal Transitions*, *1*(1), 1–23. https://doi.org/10.1016/j.eist.2011.04.010

van der Helm, R. (2009). The vision phenomenon: Towards a theoretical underpinning of visions of the future and the process of envisioning. *Futures*, *41*(2), 96–104. https://doi.org/10.1016/j.futures.2008.07.036

van Valkengoed, A. M., Steg, L., & Perlaviciute, G. (2021). Development and validation of a climate change perceptions scale. *Journal of Environmental Psychology*, *76*, 101652. https://doi.org/10.1016/j.jenvp.2021.101652

van Zomeren, M., Spears, R., & Leach, C. W. (2008). Exploring psychological mechanisms of collective action: Does relevance of group identity influence how people cope with collective disadvantage? *The British Journal of Social Psychology*, *47*(Pt 2), 353–372. https://doi.org/10.1348/014466607X231091

Vlasceanu, M., Doell, K. C., Bak-Coleman, J. B., Todorova, B., Berkebile-Weinberg, M. M., Grayson, S. J., Patel, Y., Goldwert, D., Pei, Y., Chakroff, A., Pronizius, E., van den Broek, K. L., Vlasceanu, D., Constantino, S., Morais, M. J., Schumann, P., Rathje, S., Fang, K., Aglioti, S. M., . . . van Bavel, J. J. (2024). Addressing climate change with behavioral science: A global intervention tournament in 63 countries. *Science Advances*, *10*(6), eadj5778. https://doi.org/10.1126/sciadv.adj5778

Ward, S., Forrow, D., Kirk, S., Worthington, R., Paling, N., Stacey, F., & Brunt, O. (2024). Visualising, Illustrating and Communicating Future Water Visions to Support Learning and Sustainability Transitions. *Water*, *16*(1), 14. https://doi.org/10.3390/w16010014

Wiek, A., & Iwaniec, D. (2014). Quality criteria for visions and visioning in sustainability science. *Sustainability Science*, *9*(4), 497–512. https://doi.org/10.1007/s11625-013-0208-6

Witt, E. A., Donnellan, M. B., & Orlando, M. J. (2011). Timing and selection effects within a psychology subject pool: Personality and sex matter. *Personality and Individual Differences*, *50*(3), 355–359. https://doi.org/10.1016/j.paid.2010.10.019

Wlodarczyk, A., Basabe, N., Páez, D., & Zumeta, L. (2017). Hope and anger as mediators

between collective action frames and participation in collective mobilization: The case of

15-M. *Journal of Social and Political Psychology*, *5*(1), 200–223.

https://doi.org/10.5964/jspp.v5i1.471

Xiao, Q., Lam, C. S., Piara, M., & Feldman, G. (2021). Revisiting status quo bias. *Meta-*

Psychology, *5*. https://doi.org/10.15626/MP.2020.2470

Appendix A

Age Distribution

Figure A1

Age Distribution
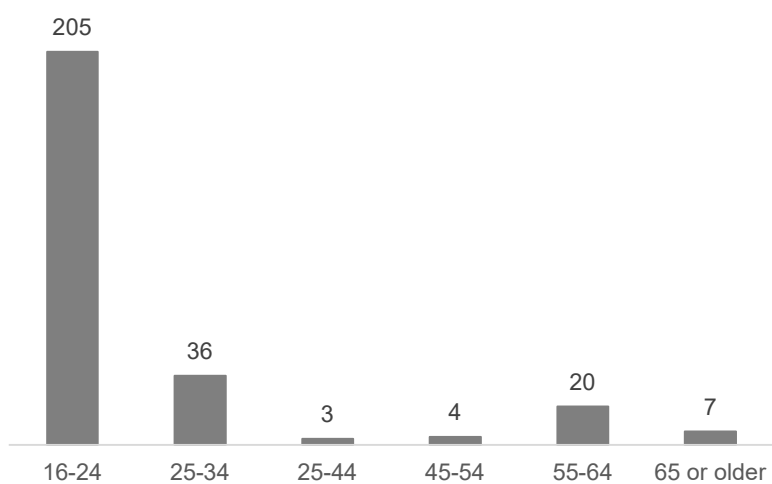
Note. Age categories are indicated in years.

Appendix B

PBL Scenarios

Figure B1

PBL Scenario Regional Roots
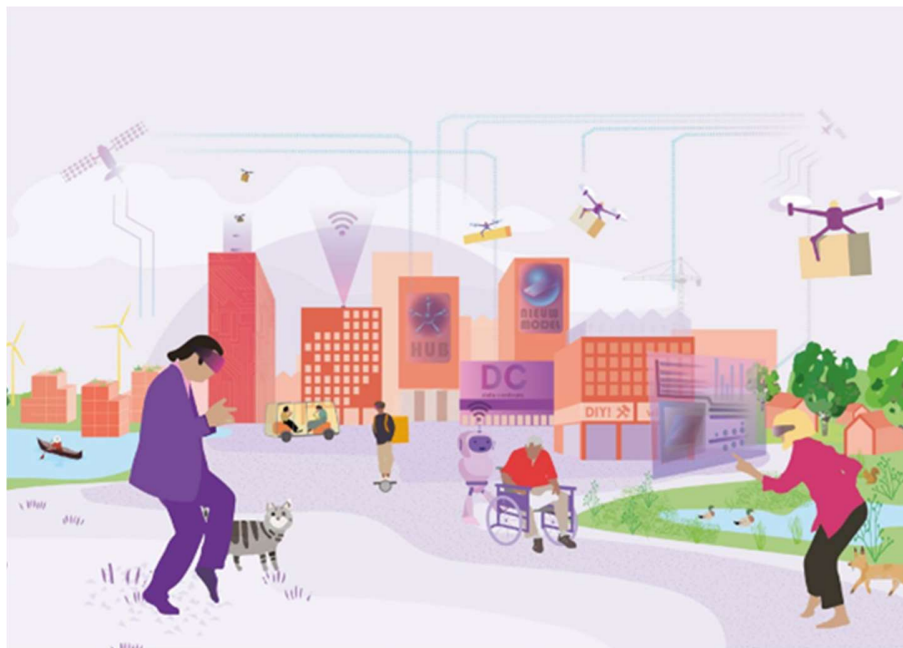

Figure B2

PBL Scenario Green State

Figure B3

PBL Scenario Volatile World

Appendix C

Measurement Scales

Policy Acceptance Scale

In the last decades, human activities have led to pressing environmental issues, such as climate change and depletion of natural resources. To secure a sustainable future and ensure the well-being of the global community, substantial changes are needed.

How much are you in favour of or opposed to the following policies aimed at steering us toward a more sustainable and secure future?

Strongly opposed	Opposed	Somewhat opposed	Neutral	Somewhat in favour	In favour	Strongly in favour
1	2	3	4	5	6	7

1. Implementing laws against 'ecocide', forbidding large-scale destruction of ecosystems and biodiversity

2. Using public money to subsidize renewable energy such as wind and solar power

3. Increasing taxes on fossil fuels, such as oil, gas, and coal

4. Banning the sale of new petrol and diesel cars after 2035, while used petrol and diesel cars purchased after 2035 can still be driven until the end of their lifespan

5. Setting the overall EU target for Renewable Energy Sources consumption by 2030 to 45%. For reference, in 2021, almost 22% of the energy consumed in the EU came from renewable sources.

6. An increase in taxes on beef so that the price of beef products doubles

Emotions Scale

To what extent does thinking about our society's future bring up each of these feelings within you?

Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

1. Happiness

2. Hope

3. Inspiration

4. Anger

5. Guilt

6. Helplessness

Motivation Scale

How motivated are you to engage in activities aimed at transitioning to a sustainable future (for example, participating in political parties, demonstrations and protests, petitioning and voting)?

Strongly unmotivated	Unmotivated	Somewhat unmotivated	Neutral	Somewhat motivated	Motivated	Strongly motivated
1	2	3	4	5	6	7

Appendix D

Participant Instructions Intervention Groups

Task Description Imagined Visualisation Condition

We are interested in your opinion of what a desirable sustainable future looks like. Imagine you live in the year 2100. What do you hope a sustainable society will look like in 2100? In 3-5 sentences, please describe your vision of that future. Please consider what we will eat, where we will live, how we will move around, where we will source our energy as well as any other aspects you find important.

There are **no** right or wrong answers: We are interested in **your ideas** about what a desirable sustainable future could look like.

Task Description Visualised Visualisation Condition

We are interested in your opinion of what a desirable sustainable future looks like. Imagine you live in the year 2100. What do you hope a sustainable society will look like in 2100? In 3-5 sentences, please describe your vision of that future. Please consider what we will eat, where we will live, how we will move around, where we will source our energy as well as any other aspects you find important. There are **no** right or wrong answers: We are interested in **your ideas** about what a desirable sustainable future could look like.

Below, you will see pictures and descriptions of four scenarios that show how a sustainable future of the Netherlands might look like in **2100**. The scenarios were developed by the *PBL Netherlands Environmental Assessment Agency.*

Please carefully look at the four scenarios. Take 15 seconds to visualise in your head how the **sustainable future you described on the previous page** would look like. After 15 seconds, the next button will appear again and you can continue the questionnaire by clicking on it.

Figure D1

Visualisation of PBL Scenarios Displayed to Visualised Visioning Condition

Task Description Present Focus Condition

We would like you to think about the society you currently live in, also regarding sustainability. In 3-5 sentences, please describe today's society. Please consider what we eat, how we live, how we move around, where we source our energy as well as any other aspects you find important. There are **no** right or wrong answers: We are interested in **your perception** of the society you live in.

Appendix E

Table E1

Exemplary Responses From Present Focus Condition Suggesting Mental Contrasting

German	English (Translation)	Comment
Ich empfinde die Gesellschaft als sich spaltend. In der Komplexität der aktuellen Themen (Krieg, Klimakrise, Zukunft der Arbeit mit KI) habe ich das Gefühl, dass ein Teil der Gesellschaft nicht folgen kann oder will und dann immer mehr auch den Bezug zur aktuellen Politik verliert. Ich habe zudem das Gefühl, dass Umweltthemen im Moment an Relevanz verlieren, da ein Großteil der Menschen so sehr bei sich und den eigenen Problemen ist dass sie wichtige globale Themen ausblenden. Zudem denke ich, dass sie die Wirkungen ihres heutigen Handelns für nicht relevant für die Zukunft halten/ oder es nicht absehen können. Ich wünschte es wäre wieder ein gemeinschaftlicheres, unterstützendes Umfeld in dem wir leben.	I feel that society is dividing. Given the complexity of current issues (war, climate crisis, future of work with AI), I have the feeling that part of society can't or doesn't want to follow and is increasingly losing touch with current politics. I also have the feeling that environmental issues are losing relevance at the moment, as the majority of people are so focused on themselves and their own problems that they are ignoring important global issues. I also think that they don't consider the effects of their actions today to be relevant for the future or can't foresee them. I wish we lived in a more collaborative, supportive environment again.	Formulates what is desirable (a more collaborative, supportive environment)
Ich bin froh, dass die junge Generation , auch meine Söhne (27 und 25), sich für Tier- und Klimaschutz einsetzt , indem sie vegan leben und Fahrrad fahren. Das hat auch mich noch stärker motiviert. Aber es muss insgesamt ein Umdenken in der Gesellschaft stattfinden	I am glad that the younger generation, including my sons (27 and 25), are committed to animal welfare and climate protection by going vegan and cycling. That has also motivated me even more. But there needs to be a mindset shift in society as a whole.	Describes what is ought to be done (create mindset shift in society) rather than describing what current society looks like.
	The society I live in is anything but sustainable. It seems that the majority doesn't really care about it. And by "really," I mean changing behavior in our everyday lives. People know what could happen in the future, but it seems that this knowledge doesn't lead to action, even though it also concerns our well-being and the well-being of our children.	Focus on what does not yet work
	Todays society is more and more conscious about living sustainable and environmentally acceptable. There are still a lot of people that do not care about the environment enough and are not acting environmentally concious. There could still be a lot of improvement for society.	Describes what is ought to be done

German	English (Translation)	Comment
	In the current society we use way more than the world can generate. We still use a lot of fossil fuel which doesnt get replenished. Our meat consumption is much bigger than it should be which also costs a lot of energy and resources. The way we move around should change a lot as well, less planes and more (and faster) trains.	Backcasting, formulating actions that should be done
	We are wasting natural resources and most of us are not aware of it. Many natural resources could be saved with a little thought by the individuals. Although awareness has been rising in the last years, but for individuals, it is not so easy to live more sustainable. Citizens have two different mindsets: one part wants to live more sustainable and expects the government to increase efforts, others perceive any government efforts as an infringement in their personal freedom.	Focuses on what does not work rather than what the current society looks like

Appendix F

Table F1

Means of Intervention and Control Conditions

	Intervention Conditions						Intervention Mean		Control	
	Visualised visioning		Imagined visioning		Present focus					
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Policy Acceptance	5.39	1.11	5.35	1.24	5.41	0.85	5.39	1.07	5.26	1.07
Motivation	4.38	1.72	4.56	1.54	4.51	1.28	4.48	1.51	4.39	1.79
Positive Emotion	4.01	1.01	4.02	1.3	3.93	1.17	3.98	1.16	3.89	1.03
Negative Emotion	4.20	1.17	4.62	1.41	4.64	1.03	4.49	1.22	4.60	1.12

Note. Intervention mean represents the arithmetic mean of all three intervention conditions (imagined visioning, visualised visioning, present focus).