

**Unveiling the Moral Landscape: Understanding the Role of Moral Identity and Moral
Disengagement in Public Acceptability of Future Energy Scenarios**

Alex Menke

S4362152

Department of Psychology, University of Groningen

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Group 08

Supervisor: Robert Görsch

First evaluator: prof. Goda Perlaviciute

Second evaluator: Miguel Garcia Pimenta

In collaboration with:

K.H. Bebendorf, S.B.Bootsma, K.E.W. Krikken, K.G.M.Mistral-Bernard

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Abstract

In consideration of the energy sector as the largest contributor to global warming, the TNO report proposes two future energy scenarios (ADAPT and TRANSFORM) for the modification of the Dutch energy system. Public acceptability of these energy scenarios could aid their implementation. Knowledge about potential predictors for their acceptability may advance the communication of the energy scenarios to the public. The current study investigated the relationship between moral identity and moral disengagement with the scenarios ADAPT and TRANSFORM, as well as a moderator role of climate change risk perception (CCRP) for the association between moral identity and both scenarios. We distributed a survey via convenience sampling ($N = 191$). Results showed that people with higher levels of moral identity and greater perceived climate risks accepted the TRANSFORM scenario more, whereas people with lower perceived climate risks accepted the ADAPT scenario more. A curvilinear relationship between moral disengagement and acceptability of the ADAPT scenario was detected, with lower and higher levels of moral disengagement resulting in lower acceptability of the ADAPT scenario and average levels in higher acceptability. No moderation effect of CCRP for the association between moral identity and both energy scenarios was found. Implications and limitations are discussed at the end of the paper.

Keywords: acceptability, climate change risk perception, energy scenario, moral disengagement, moral identity

Unveiling the Moral Landscape: Understanding the Role of Moral Identity and Moral Disengagement in Public Acceptability of Future Energy Scenarios

The recent IPCC report has stated that human-induced global warming has already reached a 1.1°C increase compared to pre-industrial levels, and is continuously approaching the 1.5°C threshold that was addressed as the goal of the *2015 Paris Agreement* (IPCC, 2022). Continuation with current carbon emissions rates will lead to substantial and irreversible changes to the climate system (Giger, 2021; IPCC, 2022; McKay, 2022). In order to avoid that scenario and limit global warming to 1.5°C, global anthropogenic CO₂ emissions must fall by 45% until 2030, reaching net zero by 2050 (IPCC, 2022).

In the Netherlands, the energy sector is the primary sector in the greenhouse gas emissions inventory and was responsible for 83% of the total CO₂ emissions in the country in 2019 (National Institute for Public Health and the Environment, 2021). Hence, major shifts in the Dutch energy system, including a transition from fossil-intensive to renewable energy sources, must be undertaken to prevent an overshoot. Various energy scenarios have been developed that project how energy consumption and production could change to achieve the Dutch climate goals (TNO, 2022). The realistic achievement of these energy scenarios and the associated changes in individual behavior, policies, and technologies crucial to their realization are contingent upon obtaining public acceptability (Allen & Chatterton, 2013; Huijts et al., 2012; Wüstenhagen et al., 2007). Public acceptability refers to the extent to which people evaluate those scenarios (un)favourably (Liu et al., 2020). Conceivably, exploring factors that may predict acceptability of future energy scenarios is crucial for meeting necessary climate targets. An important factor may be people's moral beliefs and attitudes. Even though little research has investigated the association between moral beliefs systems and acceptability of complex energy scenarios, existing studies have focused on the influence of moral beliefs and attitudes on individual aspects of energy scenarios, such as

behaviour, policy, and technology changes. For instance, previous research suggests that individuals who display stronger moral beliefs tend to be stronger environmentally involved (Jia et al., 2017; Misch et al., 2021). Studies further indicate that individuals with strong moral concerns about climate change are more likely to support climate policies (Doran et al., 2019) and base their acceptability of technologies upon moral evaluations if normative goals are focal (Huijts et al., 2012).

Following up on the evidence that suggests relevance of moral beliefs and attitudes for individual aspects of energy scenarios, this study explores the importance of moral belief systems for acceptability of whole energy scenarios. In particular, the present study examines the relation between moral identity and moral disengagement with public acceptability of the future energy scenarios ADAPT and TRANSFORM. The scenarios are introduced by the TNO, an independent Dutch research organization that provides information to businesses and governments (TNO, 2022). Both aim for a greenhouse gas reduction of 55% by 2030 and greenhouse gas neutrality in 2050. ADAPT proposes a general maintenance of the current lifestyle with less behaviour changes and partial continuation of fossil fuels as an energy source. TRANSFORM demands more behaviour changes and replaces fossil fuels almost entirely by renewable energy sources in the long term (Scheepers et al., 2022). Exploring the relevance of moral identity and moral disengagement for the Dutch energy scenarios could be helpful for their successful advertisement to the public and for communication strategies concerning energy scenarios in general. Furthermore, this study aims to examine a potential moderating effect of climate change risk perception on the relationship between moral identity and the acceptability of the ADAPT and TRANSFORM scenarios, following up on previous research indicating that the perceived risks of climate change are associated with pro-environmental behaviour, policy support, and technology acceptance (Bradley et al., 2020; Pigeon et al., 2012; Rhodes et al., 2017).

Theoretical context

Moral Identity

Moral identity generally refers to the degree to which being a moral person is important to an individual's identity (Aquino & Reed, 2002). The content of people's moral identities can vary but there are certain traits such as compassion, honesty, fairness, and care that are likely to be central to people's self-definitions (Aquino & Reed, 2002; Blasi, 1984). Following Piaget's (1932) *cognitive-developmental model* and Bandura's (1999) *social cognitive model*, moral identity is a consistent predictor for moral behaviour (Aquino & Reed, 2002; Hardy & Carlo, 2011). As individuals' behavioural changes, such as domestic heat reduction, make up a significant proportion in the TRANSFORM scenario, it can be assumed that moral identity may relate to the acceptability of the TRANSFORM scenario. The ADAPT scenario requires less behavioural changes, instead relying on policy and technology adjustments for which acceptability might be necessary. According to Schipper et al. (2022), moral identity can be used as a predictor for acceptability in the context of moral dilemmas. Following this premise, moral identity may be a significant predictor for acceptability in the context of energy scenarios too. Hence, I assume that moral identity also relates to acceptability of the ADAPT scenario.

Moral identity is indeed a good predictor for an individual's behaviour, as shown in studies concerning ethical behaviour (Hertz & Krettenauer, 2016), prosocial behaviour (Hart & Fegley, 1995), and civic engagement (Sunil & Verma, 2018). Furthermore, moral identity relates to pro-environmental behaviours, such as climate change activism (Misch et al., 2021), green consumption tendencies (Wu & Yang, 2018) and car use reduction (Culiberg et al., 2022) that might be especially relevant for the TRANSFORM scenario. Another study by Pfattheicher et al. (2016) showed that compassion, a trait of moral identity, promotes pro-

environmental tendencies. While there has not been much research on the association between moral identity and environmental policy and technology changes that are relevant for both scenarios, previous studies have investigated the influence of the individual aspects of moral identity, specifically fairness, compassion, and honesty. For instance, a study by Lu & Schuldt (2016) found evidence for the efficacy of compassion appeals for gaining stronger support for governmental actions to address climate change. Another study discovered that self-transcendent values, including social justice and equality, which are closely associated with fairness, are positively related to the acceptance of various climate change policies (Nilsson et al., 2004). Additionally, perceived honesty has shown a mediation role for communication strategies and trust in carbon capture organizations (Terwel et al., 2009).

The present study explores the relationship between moral identity and the future energy scenarios ADAPT and TRANSFORM. Following up on previously presented research suggesting associations between moral identity and scenario-related criteria, I expect a positive relationship between moral identity and acceptability of the ADAPT scenario and a positive relationship between moral identity and acceptability of the TRANSFORM scenario (see Figure 1). As the TRANSFORM scenario requires more extensive energy system changes, including stronger changes in people's behaviour, the effect may be stronger for the association of moral identity with acceptability of the TRANSFORM scenario than with the ADAPT scenario.

H1a. Moral Identity is positively associated with the acceptability of the ADAPT scenario.

H1b. Moral Identity is positively associated with the acceptability of the TRANSFORM scenario.

Climate change risk perception

Climate change risk perception (CCRP) refers to the subjective evaluation of climate change as a hazard, threat, or phenomenon (Shakeela & Becken, 2014). CCRP may play a major role in acceptability of energy scenarios, as shown by research findings concerning pro-environmental behaviour, policy support, and technology acceptance (Bradley et al., 2020; Pigeon et al., 2012; Rhodes et al., 2017). According to Wicker & Becken (2013), people who are concerned about climate change are more likely to engage in climate change mitigation behaviours, agree with energy policies, and believe in energy consumption change. There are also multiple findings indicating the relevance of CCRP for technologies for carbon emission reduction. Higher concern about climate change was linked to positive evaluations of renewables (Spence et al., 2010) and greater support for carbon dioxide removal and solar radiation management (Pidgeon et al., 2012). Another study found a direct effect of risk perception on acceptability of aerosol injection (Merk & Pönitzsch, 2017). In addition to technology support, CCRP also seems relevant for policy support, as shown by studies indicating that people with higher concern for climate change displayed more support for energy policies (Wicker & Becken, 2013) and climate policies (Rhodes et al., 2017). Lastly, CCRP plays a role in pro-environmental behaviours (Bradley et al., 2020), such as climate activism support (Misch et al., 2021) and stronger intentions to reduce meat consumption (Hunter & Rööös, 2016).

As elaborated in the previous section, we generally assume that moral identity is related to higher acceptability of sustainable energy scenarios. However, this association might be stronger for people who perceive higher climate risks; thus, people with a clearer understanding of the risks of climate change would be more inclined to go in line with their moral identity and accept sustainable energy scenarios. The assumption follows Petty and Cacioppo's (1986) *elaboration likelihood model* which includes that greater knowledge of a

particular problem leads with a higher likelihood to central route processing. Central route processing relies on consideration of existing beliefs, including one's moral identity, for the creation of attitudes. Following the premise, people with greater perceived climate risks may take their moral identity more likely into account and accept the proposed scenarios more. Gilbert & Lachlan's (2023) proposal that CCRP is often considered a necessary antecedent for climate change attitudes supports the reasoning. Contrary to the assumption, a study by Misch et al. (2021) could not find an interaction effect of CCRP on the association between moral identity and climate change activism. Nevertheless, following evidence for the relevance of CCRP for energy-scenario related aspects and the reasoning of the *elaboration likelihood model*, raises the question whether the association between moral identity and acceptability of the ADAPT and TRANSFORM scenario depends on CCRP. Hence, I expect that CCRP strengthens the positive association between moral identity and the acceptability of both energy scenarios (see Figure 1).

H2a. The positive effect of Moral Identity on the acceptability of the ADAPT scenario is stronger the higher a person's climate change risk perception.

H2b. The positive effect of Moral Identity on the acceptability of the TRANSFORM scenario is stronger the higher a person's climate change risk perception.

Moral disengagement

Moral disengagement is an extension of Bandura's (1999) aforementioned *social cognitive theory*. It describes the process by which an individual convinces themselves that ethical standards do not apply to them within a particular situation or context (Bandura, 1999). According to Bandura (1999), there are eight mechanisms (moral justification, euphemistic labelling, advantageous comparison, displacement of responsibility, diffusion of responsibility, distortion of consequences, dehumanization, attribution of blame) that people employ to morally disengage. In this study, the term moral disengagement will be used as a

general propensity to disengage from moral imperatives by exercising any of those mechanisms.

Due to the fact that high carbon behaviours are deeply embedded in societal structures, in order to justify their behaviours, people may inevitably turn to moral disengagement (Gardiner, 2006; Gifford, 2011). Most people believe that climate change needs to be combatted but do not necessarily adopt a sustainable lifestyle themselves, partly because it is hard to avoid at least indirectly producing greenhouse gas emissions (Woods et al., 2018). This dissonance between moral values and actual behaviour may lead to guilt (Markowitz & Shariff, 2012). In order to cope with the arising guilt, one may exert mechanisms of moral disengagement (Bandura, 1999; Bandura, 2007, Bandura et al., 1996).

Previous findings have shown that moral disengagement increases unethical decision-making amongst students (Detert et al., 2008) and antisocial behaviour in sports (Hodge & Gucciardi, 2015). Furthermore, moral disengagement has also shown implications for pro-environmental behaviour. A study by Leviston & Walker (2021) found that moral disengagement mediated the relationships between climate scepticism and disavowal of climate responsibility with reduced engagement in pro-environmental behaviour, while Wu et al.'s (2021) study showed that moral disengagement amongst tourists reduced their intentions to engage in pro-environmental behaviour.. Furthermore, moral disengagement mechanisms have been shown relevant in climate change related reasoning (Woods et al., 2018). Apart from implications on behaviour, moral disengagement seems to influence policy and technology support. Research findings suggest that moral disengagement is an important predictor of intentions to violate security policies in Korean and American organizations (D'arcy et al., 2014; Herath et al., 2018). Additionally, consumer's willingness to pay more for renewable energies decreased with higher levels of moral disengagement from environmental concerns in a study by Venugopal & Shukla (2019).

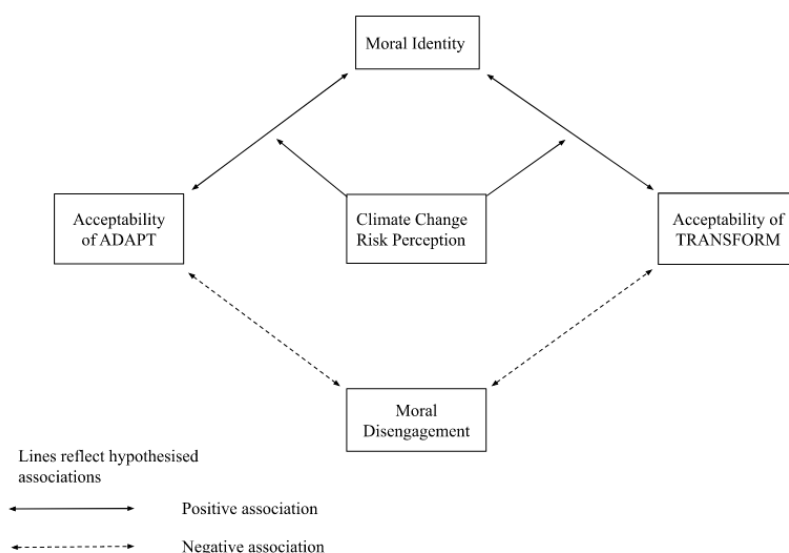
Overall, research suggests that Bandura's (1999) theory of moral disengagement has great relevance for climate change but it has not received enough attention yet (Heald, 2017; Salomon et al., 2017). This present study aims to provide further evidence for the importance of moral disengagement in climate change related matters. Specifically, it will examine the relationship between moral disengagement and acceptability of the energy scenarios ADAPT and TRANSFORM. Following up on previous findings, I expect a negative relationship between moral disengagement and acceptability of the ADAPT, as well as the TRANSFORM scenario (see Figure 1). As the TRANSFORM scenario requires more extensive energy system changes, including behavioural changes on a broader scale, the effect may be stronger for the association of moral disengagement with acceptability of the TRANSFORM scenario than with the ADAPT scenario.

H3a. Moral disengagement is negatively associated with the acceptability of the ADAPT scenario.

H3b. Moral disengagement is negatively associated with the acceptability of the TRANSFORM scenario.

Figure 1

Model of Hypotheses



Methods

Participants

An a priori G*power analysis was conducted to determine the appropriate sample size for the present study with the application of a linear multiple regression with a fixed model design. The calculated desired sample size of 152 participants was based on an expected effect size of $f^2 = 0.053$, with a power of 0.8, and a significance level of $\alpha = .05$. Participation in the online questionnaire was possible in two ways. Participants were invited to partake via Whatsapp and Instagram by the researchers and were encouraged to share the questionnaire within their own social networks. Thus, this snowball sample mostly consisted of friends and family of the researchers. Additionally, participants were recruited via the SONA system which granted first year psychology students from the university of Groningen SONA credits in exchange for their participation. Hence, our sample is a convenience sample. In total, we recruited 323 participants of which 191 were retained after applying the exclusion criteria. Of the participants who did not pass the criteria, four did not give their consent, 38 did not pass the attention check, 19 did not pass the seriousness check, one was below the age of 16, while 70 did not answer all relevant questions for this study. Of the remaining 191 participants, 97 were sampled via the SONA system and 94 via snowball sampling. The data collection took place from 03/05 until 23/05 for snowball sampling and 08/05 until 23/05 for SONA participants. The final sample consisted of 117 women, 70 men, two non-binary/third gender persons, one participant preferred not to say and one with missing data on gender. The participants were between 16 and 70 years old; 164 of them were between 16 and 25 years old. Out of the 191 participants, 86.4% were currently living in the Netherlands and 58.1% were Dutch citizens.

Materials

The data collection was carried out for five individual bachelor theses. This section only includes those constructs relevant to this thesis which are moral identity, climate change risk perception, moral disengagement, acceptability of the ADAPT scenario and acceptability of the TRANSFORM scenario.

The independent variable moral identity was measured by four items derived from the Self-Importance of Moral Identity Questionnaire (Aquino & Reed, 2002) on a seven-point Likert scale with answer options ranging from *strongly disagree* (1) to *strongly agree* (7). I chose four questions of the internalization scale of the questionnaire and inserted the four values (honesty, fairness, compassion, care) that were judged as the most important for the assessment of a moral person in Aquino & Reed's (2002) study (*'It would make me feel good to be a fair person'*; *'Being caring is an important part of who I am'*, *'Being honest is not really important to me'*; *'I strongly desire to be compassionate'*), as shown in Figure B5. The third question concerning honesty was reverse-coded. The scale had a high level of internal consistency, as determined by Cronbach's alpha of 0.73.

The moderator variable climate change risk perception was measured by a single item (*'The consequences of climate change are dramatic'*) assessing participants' perceived danger of climate change on a seven-point Likert scale with answer options ranging from *strongly disagree* (1) to *strongly agree* (7) (see Figure B4). The item was derived from Misch's et al. (2021) study on moral identity.

The independent variable moral disengagement was measured by two items (*'I feel a moral duty to do something about climate change'*; *'I feel it is my ethical responsibility to change my individual behaviour to combat climate change'*) that operationalize Bandura's (1999) construct of moral disengagement on a seven-point Likert scale from *strongly disagree* to *strongly agree* (see Figure B5). The questions were adopted from Leviston &

Walker's (2021) study and measured people's general propensity to morally disengage from climate change-related moral imperatives. The questions were reverse-coded so that higher values indicate higher disengagement. Both items had a high correlation, $r = .80$, $p < .001$.

The dependent variables were acceptability of the ADAPT scenario and acceptability of the TRANSFORM scenario. Both scenarios are incorporated from the aforementioned TNO report (Scheepers et al., 2022). Each of the variables was measured by three items, rated on a seven-point Likert scale, to form the overall acceptability scales: acceptability from *very unacceptable* (1) to *very acceptable* (7), positivity from *very negative* (1) to *very positive* (7), goodness *very bad* (1) to *very good* (7). The items were derived from Liu et al.'s (2020) study on public acceptability of renewable energy projects. See Appendix B for a more detailed description. Both scales had a high level of internal consistency, as determined by Cronbach's alpha of 0.92 for acceptability of the ADAPT scenario and 0.89 for acceptability of the TRANSFORM scenario.

Procedure and Design

Because of the low ethical risks of the study there was no ethics evaluation but instead the fast track was used. Pre-registration took place on the Open Science Framework (<https://doi.org/10.17605/OSF.IO/ZMYRU>). The questionnaire was designed and processed on the platform Qualtrics XM (Qualtrics, 2005). After giving their informed consent at the beginning of the questionnaire, participants were asked to fill in general demographic information. Next, an attention check was administered that asked participants to answer the following questions accurately and required agreement for the continuation of the questionnaire. Subsequently, the constructs *moral identity*, *climate change risk perception*, and *moral disengagement* were assessed. Moral identity and moral disengagement were presented in one block and the order of the items was randomized together. The question for climate change risk perception was displayed separately. Afterward, the participants were

presented with both scenarios via bullet points of their main components, a graph comparing how energy is currently supplied in the Netherlands and how it could be supplied in 2050, and a table showing main economic changes. In the questionnaire, scenario A refers to the ADAPT scenario and scenario B to the TRANSFORM scenario to avoid any influence the scenarios' names could have on the results. After each scenario presentation, participants had to rate the acceptability of the scenarios. To avoid any order effects, the order of the scenarios was counterbalanced. At the end of the survey, participants were asked to indicate if they took the survey seriously and their data should be used for the research. The whole study had correlational design.

Analysis plan

In the preliminary analysis, bivariate correlation analyses were run between the criterion variables acceptability of the ADAPT scenario and acceptability of the TRANSFORM scenario, respectively, and the predictor variables moral identity, climate change risk perception, and moral disengagement. Two standard multiple regression models were run predicting acceptability of the ADAPT scenario and acceptability of the TRANSFORM scenario, respectively, from moral identity, climate change risk perception, moral disengagement, and the interaction term of moral identity and climate change risk perception.

The assumption of normality was checked by visual inspection of the histogram and PP-plot. Linearity was checked by partial regression plots and a plot of studentized residuals against the predicted values. Homoscedasticity was checked by visual inspection of a plot of studentized residuals versus unstandardized predicted values. The assumption of no multicollinearity was checked by VIF values for each independent variable where a value above 5 indicates multicollinearity (Sheather, 2009). Outliers were checked by visual inspection of boxplots with the assistance of Cook's distance values using a cut-off score of

$4/n = 4/185 = .022$ (Glen, n.d.). By inspecting boxplots (see Appendix D) and applying the cut-off score, 13 outliers were detected. However, as climate change is a polarizing topic, I decided to leave them in the data set. Statistical analyses were performed using SPSS version 29.

Results

Preliminary analysis

Table 1 presents the descriptive statistics and correlation matrix of all study relevant variables. The correlations among the variables in the study provide a preliminary insight into the direction of the tested hypotheses. Our first dependent variable acceptability of the ADAPT scenario was not associated with any of the predictor variables except for a small direct negative correlation between CCRP and the acceptability of the ADAPT scenario ($r = -.19, p = .01$), suggesting that people who perceived greater climate risks accepted the ADAPT scenario less. Moral identity ($r = -.01, p = .85$) and moral disengagement ($r = .05, p = .53$) showed no significant relation with acceptability of the ADAPT scenario. Our second dependent variable acceptability of the TRANSFORM scenario showed a medium positive correlation with moral identity ($r = .30, p < .001$), indicating that people with higher levels of moral identity accepted the TRANSFORM scenario more. Furthermore, there was a strong positive association between CCRP and the acceptability of the TRANSFORM scenario ($r = .52, p < .001$), suggesting that people who perceived greater climate risks accepted the TRANSFORM scenario more. No significant correlation between moral disengagement and the acceptability of the TRANSFORM scenario ($r = -.12, p = .12$) was found.

Table 1*Descriptive Statistics and Correlations for Study Variables*

Variable	N	M	SD	1	2	3	4	5
1. Moral Identity	187	5.86	.75	–	.25**	-.18*	-.06	.30**
2. CCRP	191	6.03	1.15	.25**	–	-.01	-.19**	.52**
3. MD	191	3.59	1.84	-.18*	-.01	–	.05	-.12
4. ADAPT	189	4.35	1.31	-.06	-.19**	.05	–	-.01
5. TRANSFORM	189	5.68	1.03	.30**	.52**	-.12	-.01	–

Note. * Correlation is significant at the .05 level (2-tailed)

**Correlation is significant at the 0.01 level (2-tailed)

CCRP = Climate Change Risk Perception, MD = Moral Disengagement, ADAPT = Acceptability of ADAPT scenario, TRANSFORM = Acceptability of TRANSFORM scenario

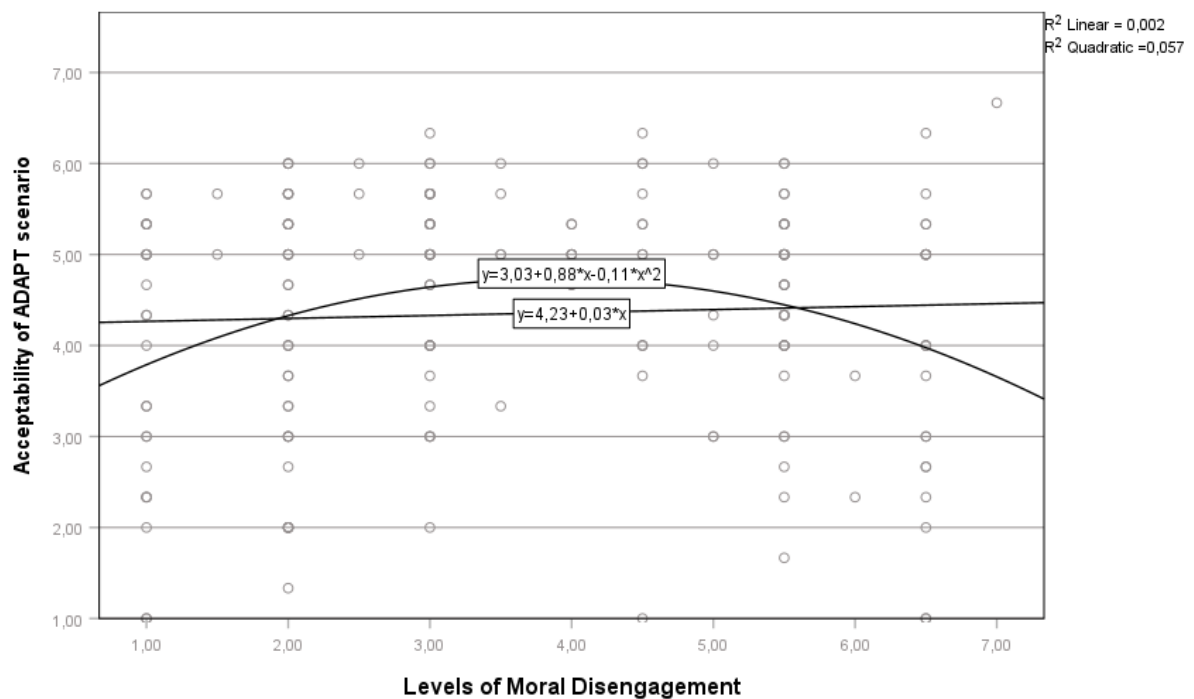
Acceptability of the ADAPT scenario

A multiple linear regression model was run predicting the acceptability of the ADAPT scenario from moral identity, CCRP, the interaction term of moral identity and CCRP, and moral disengagement. Two percent of the variance in acceptability of the ADAPT scenario was explained by the four predictor variables which can be considered as not meaningful, $R^2_{Adjusted} = .02$ (see table 2). Except for CCRP ($b = -.25$, $p = .01$), none of the predictors showed a significant association with acceptability of the ADAPT scenario, indicating either no support for any of the hypotheses or flaws in

the regression model. No assumption violations for homoscedasticity and multicollinearity were detected. Checking the histogram showed slight deviations from normality, as the data was slightly left-skewed. However, the PP-plot showed an approximately normal distribution of the data which led to the conclusion that normality held reasonably enough (see Appendix C). The assumption for linearity was violated, as the partial regression plot of moral disengagement and ADAPT showed a curvilinear relation (see Figure 2).

Figure 2

Scatterplot depicting the correlation between Moral Disengagement and Acceptability of the ADAPT scenario including estimated regression lines



Note. The plotted quadratic regression line appears to be a better fit for the association between moral disengagement and acceptability of the ADAPT scenario than the linear regression line.

Table 2*Multiple regression results for Acceptability of ADAPT scenario*

ADAPT	<i>b</i>	SE	β	t	Sig.	R^2	R^2_{Adj}
Model	–	–	–	–	–	.05	.02
Constant	5.12	.99	–	5.20	<.001**	–	–
Moral Identity	.12	.19	.05	.64	.52	–	–
CCRP	-.25	.09	-.22	-2.86	.01*	–	–
IA term	-.05	.09	-.04	-.56	.58	–	–
MD	.04	.05	.05	.67	.51	–	–

Note. * Correlation is significant at the .05 level (2-tailed)

** Correlation is significant at the .01 level (2-tailed)

ADAPT = Acceptability of ADAPT scenario, CCRP = Climate Change Risk

Perception, IA term = Interaction term of Moral Identity and Climate Change Risk

Perception, MD = Moral Disengagement

Therefore, a curvilinear regression model was performed as an exploratory analysis using a hierarchical multiple regression approach to test a potential quadratic relationship between moral disengagement and acceptability of the ADAPT scenario. I added the quadratic term for moral disengagement to the initial model. As a result, there was a small effect size with 8% of the variance in acceptability of the ADAPT scenario being explained by the predictor variables, $R^2_{Adjusted} = .08$ (see Appendix A for coefficients). Hence, 6% of the variance was explained by the addition of the quadratic effect of moral disengagement, $R^2_{Change} = .06$. Different from the initial model, there was a significant linear association between moral disengagement and the ADAPT scenario ($\beta = 1.36, p < .001$), suggesting that people with higher moral disengagement

are more supportive of the ADAPT scenario. The quadratic term further qualifies this, as it indicates that support increases for medium levels of moral disengagement, but then decreases at very high levels of moral disengagement, $\beta = -1.33, p < .001$ (see Figure 2). Concerning the remaining predictors, there was no significant change compared to the initial model. The results showed no significant relation between moral identity and the acceptability of the ADAPT scenario ($b = 1.02, p = .31$), indicating that people with higher levels of moral identity did not accept the ADAPT scenario more than people with lower levels. Furthermore, CCRP did not significantly moderate the association between moral identity and the acceptability of the ADAPT scenario ($b = -.06, p = .51$), indicating that the extent to which people with higher levels of moral identity accepted the ADAPT scenario was not increased by their greater perceived climate risks. Instead, there was a direct effect of risk perception on the acceptability of the ADAPT scenario ($b = -.19, p = .02$), which suggests that people who perceived greater climate risks accepted the ADAPT scenario less.

Acceptability of the TRANSFORM scenario

A multiple linear regression was run predicting the acceptability of the TRANSFORM scenario from moral identity, CCRP, the interaction term of moral identity and CCRP, and moral disengagement. It showed a medium effect size with 29% of the variance in acceptability of the TRANSFORM scenario being explained by the four predictors, $R^2_{Adjusted} = .29$ (see Table 3). No assumption violations for normality, linearity, homoscedasticity, and multicollinearity were detected.

As shown in table 3, moral identity showed a significant association with acceptability of the TRANSFORM scenario ($b = .21, p = .02$), which suggests that people with higher levels of moral identity accepted the TRANSFORM scenario more.

CCRP did not moderate the positive association of moral identity with acceptability of the TRANSFORM scenario ($b = -.06, p = .27$), which indicates that the extent to which people with higher levels of moral identity accepted the TRANSFORM scenario was not increased by their greater perceived climate risks. Instead, there is a positive direct effect of climate change risk perception on the acceptability of the TRANSFORM scenario ($b = .42, p < .001$), which indicates people who perceive greater climate risks accepted the TRANSFORM scenario more. Furthermore, moral disengagement did not show a significant association with acceptability of the TRANSFORM scenario ($b = -.05, p = .18$), suggesting that people with higher levels of moral disengagement did not accept the TRANSFORM scenario less than people with lower levels.

Table 3

Multiple regression results for Acceptability of TRANSFORM scenario

TRANSFORM	<i>b</i>	<i>SE</i>	β	<i>t</i>	Sig.	<i>R</i> ²	<i>R</i> ² _{Adj}
Model	–	–	–	–	–	.30	.29
Constant	2.16	.60	–	3.60	<.001**	–	–
Moral Identity	.21	.09	.15	2.27	.02*	–	–
CCRP	.42	.06	.46	7.17	<.001**	–	–
IA term	-.06	.06	-.07	-1.10	.27	–	–
MD	-.05	.04	-.09	-1.34	.18	–	–

Note. * Correlation is significant at the .05 level (2-tailed)

** Correlation is significant at the .01 level (2-tailed)

TRANSFORM = Acceptability of TRANSFORM scenario, CCRP = Climate Change Risk Perception, IA term = Interaction term of Moral Identity and Climate Risk Perception, MD = Moral Disengagement

Discussion

The aim of the study was to determine the role of moral identity and moral disengagement in predicting the acceptability of the ADAPT and TRANSFORM energy scenarios. Additionally, the study investigated whether people's perceived climate risks strengthened the association between moral identity and acceptability of both scenarios.

I predicted that moral identity would have a positive relationship with the acceptability of both scenarios. The results provided support that people with a strong moral identity show more acceptability of the TRANSFORM scenario (Hypothesis 1b). The TRANSFORM scenario focuses on individual behavioural changes, the use of renewables as energy sources, and, to a lesser extent, on compensating methods, such as carbon capture, which is why it may align with moral identity. Hence, the findings go in accordance with previous research that found a predictive role of moral identity for pro-environmental behaviours (e.g. Culiberg et al., 2022; Misch et al., 2021; Wu & Yang, 2018) and with studies that have shown the relevance of individual moral identity traits (compassion, fairness, honesty) for support of governmental climate change communication (Lu & Schuldt, 2016), energy policy acceptance (Nilsson et al., 2004) and trust in sustainable technologies (Terwel et al., 2009).

Conversely, the results did not provide evidence for the relationship between moral identity and acceptability of the ADAPT scenario (Hypothesis 1a). My hypothesis was predicated on the assumption that participants with higher levels of moral identity would accept most climate scenarios if those meet the targeted goals by the IPCC. On the one hand, explanation for the conclusive result may be that people with high levels of moral identity, despite appreciating the goal to limit climate change,

could still disagree with the means that this scenario proposes - the focus of the ADAPT scenario on marginal individual sacrifices and comparably strong use of fossil fuels may not seem effective enough. This is supported by previous literature that found abundant implications of moral identity for an array of pro-environmental behaviours (e.g. Culiberg et al., 2022; Misch et al., 2021; Pfattheicher et al., 2016; Wu & Yang, 2018), which are less pronounced in the ADAPT scenario. On the other hand, the result is not supported by earlier presented research findings concerning policy and technology support (see Lu & Schuldt, 2016; Nilsson et al., 2004; Terwel et al., 2009), which are more central to the ADAPT scenario. This indicates that moral identity may be more relevant for acceptability of behavioural aspects of energy scenarios than for the policy and technology components. Exploration of this presumption could be the subject of future research directions.

Hypotheses 2a and 2b proposed that the positive relationship of moral identity and acceptability of the energy scenarios ADAPT and TRANSFORM is strengthened by CCRP. However, the results showed that the relationship between moral identity and acceptability of both scenarios did not differ for different levels of CCRP. The hypotheses were built on the assumption that people's moral identity may be more important for the acceptance of sustainable energy scenarios if they understand the risks of climate change, following the *elaboration likelihood model*. The results are supported by the study by Misch et al. (2021) that discovered no effect of CCRP on the association between moral identity and climate change activism. Instead, CCRP was found to be an even more important factor for both energy scenarios than moral identity. These findings suggest that people with greater perceived climate risks accepted the TRANSFORM scenario more and the ADAPT scenario less. This goes in line with previous research that found that CCRP is associated with increased pro-

environmental behaviour, an important aspect in the TRANSFORM scenario, such as climate activism support (Misch et al., 2021) and reduced meat consumption (Hunter & Rööös, 2016). However, it does not entirely cohere with the findings concerning policy support and technology acceptance (e.g. Pigeon et al., 2012; Rhodes et al., 2017), as these aspects are important for the implementation of both scenarios, even if more so for the TRANSFORM scenario. This may indicate that CCRP is more relevant for acceptability of behavioural aspects of energy scenarios than for the policy and technology components.

Furthermore, I hypothesized that moral disengagement would have a negative relationship with acceptability of the ADAPT scenario (Hypothesis 3a). This prediction was not supported by the results. Instead, a curvilinear relationship between both variables was found. Extremely low and extremely high levels of moral disengagement resulted in lower acceptability of the ADAPT scenario, while average levels resulted in higher acceptability. This might be because people who scarcely morally disengage from climate change issues are not supportive of the less ambitious ADAPT scenario, while people who often morally disengage might not be very supportive of energy scenarios to limit climate change in general. Explanation may be found in the details of the ADAPT scenario. The ADAPT scenario consists of a multitude of aspects from which some, i.e. proposed policy changes and sustainable technology incorporation may seem morally sufficient, and others such as marginal behaviour changes do not. As a result, the scenario might seem as a way of climate change mitigation that does not incorporate all changes generally seen as an ethical standard in the context of climate change combat. Therefore, people may require a certain tendency to morally disengage from climate change in order to support such an energy scenario. This theory goes in line with previous studies that found a negative linear relationships of moral

disengagement with pro-environmental behaviours (Wu et al., 2021) which are mostly absent in the ADAPT scenario and with consumer's willingness to pay more for renewable energies (Venugopal & Shukla, 2019) which may be part of the scenario.

Additionally, I hypothesized that moral disengagement would have a negative relationship with the acceptability of the TRANSFORM scenario (Hypothesis 3b). The results did not support the hypothesis, indicating that people's higher levels moral disengagement did not affect their acceptability of the TRANSFORM scenario. This finding does not go in line with previous research which suggested implications of moral disengagement for pro-environmental behaviour (Leviston & Walker, 2021; Wu et al., 2021), policy violations (D'arcy et al., 2014; Herath et al., 2018), and renewable energies (Venugopal & Shukla, 2019). A possible explanation for the missing association posits that the operationalization of moral disengagement potentially lacked construct validity. The construct was operationalized by two items that roughly encompassed four of the eight moral disengagement mechanisms, namely moral justification, displacement of responsibility, diffusion of responsibility, and distortion of consequences. Euphemistic labelling, advantageous comparison, dehumanization, and attribution of blame were not explicitly measured by the items. Hence, further research incorporating a more elaborate scale for moral disengagement is necessary to confirm the findings.

Limitations and Future Directions

The study has several limitations. First, the descriptions of the scenarios only included a selection of scenario criteria. The ADAPT scenario puts emphasis on missing behaviour changes and continuation of fossil fuels as an energy source which people may perceive as incompatible with their moral identity. Future research could

investigate the importance of moral identity, if the scenario description accentuates the benefits of an energy scenario that mainly builds on an already established system. Moreover, the extensiveness of the scenario descriptions may have led to poor comprehension of the whole scenario and we cannot draw conclusions on how people perceived individual aspects of the scenarios. Future research could conduct a more simplistic research design that explores parts of the energy scenarios that are mostly accepted by people with high levels of moral identity and low levels of moral disengagement, respectively. The cross-sectional design presents another limitation of this study, as it does not allow drawing a causal inference. Future studies could experimentally manipulate moral identity or moral disengagement, for example by involving participants in a task that activates their moral identity (e.g. visual presentation of a climate change victim) or moral disengagement (e.g. confederates talking about lesser individual climate change mitigation actions) and then measure their acceptability for the energy scenarios.

Practical Implications

The study could have important implications for policy- and decision-makers, and their communicators who play central roles for the implementation of the energy scenarios into reality. Policy- and decision-makers require accurate data on the acceptability of potential energy scenarios to guide policy development and design incentives to transition towards sustainable energy systems. The present research proposes that activating people's moral identity and underlining the risks of climate change may be an effective strategy to promote acceptance for comparably radical system changes such as proposed by the TRANSFORM scenario. On the other hand, gaining acceptance for less ambitious scenarios such as the ADAPT scenario may

require that the public partly morally disengages from their ideal climate change initiatives (e.g. by making comparisons to other countries with less sustainable system changes), alongside a general lower perception of climate risks.

Conclusions

Taken together, moral identity and CCRP may play a significant role in the public acceptability of the TRANSFORM scenario, while moral disengagement and CCRP may be relevant for the public acceptability of the ADAPT scenario. The study provides new theoretical insight for the role of morality in the acceptability of complex energy scenarios and practical insight for communication strategies of policy- and decision-makers.

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Appendix A

Table A1

Exploratory analysis: Multiple regression results for Acceptability of ADAPT scenario

Model		b	SE	β	t	Sig.	R ²	R ² _{Adj}	R ² _{Change}
1		–	–	–	–	–	.05	.02	.05
	Constant	5.77	.89	–	6.47	<.001**	–	–	–
	Moral Identity	-.02	.14	-.01	-.18	.86	–	–	–
	CCRP	-.23	.09	-.20	-2.66	.01*	–	–	–
	IA term	-.06	.09	-.05	-.68	.50	–	–	–
	MD	.03	.05	.04	.53	.60	–	–	–
2		–	–	–	–	–	.11	.08	.06
	Constant	3.19	1.16	–	2.74	.01*	–	–	–
	Moral Identity	.14	.14	.08	1.02	.31	–	–	–
	CCRP	-.19	.08	-.17	-2.28	.02*	–	–	–
	IA term	-.06	.09	-.05	-.65	.51	–	–	–
	MD	.98	.29	1.36	3.39	<.001**	–	–	–
	MD quadratic	-.13	.04	-1.33	-3.35	<.001**	–	–	–

Note. * Correlation is significant at the .05 level (2-tailed)

** Correlation is significant at the .01 level (2-tailed)

CCRP = Climate Change Risk Perception, IA term = Interaction term of Moral Identity and Climate Risk Perception, MD = Moral Disengagement

Appendix B

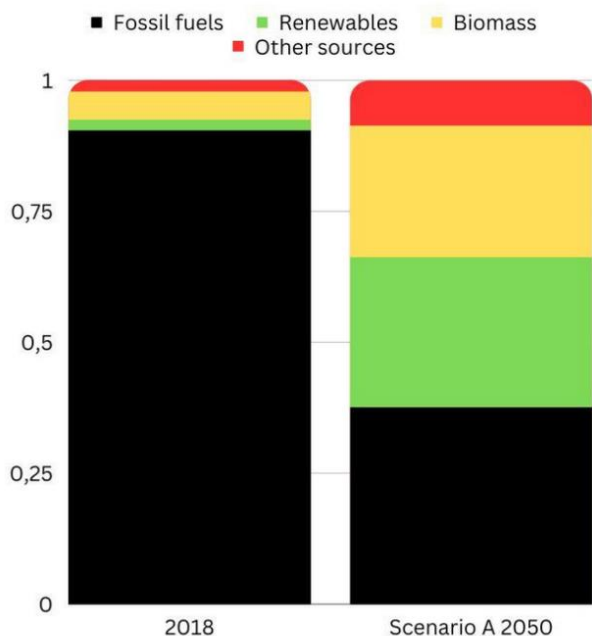
Figure B1

Presentation of the ADAPT scenario

Below are several graphs and information on Scenario A. **Please read the descriptions carefully to understand the scenarios.** You will be asked a series of questions about the details of the scenario and its advantages, disadvantages and acceptability. Note: hover over underlined words for more information about the concept.

- The Netherlands builds on its current strengths and works to reduce its CO2 emissions.
- National security is a priority, which means maintaining employment rates and their current way of life are important goals.
- While sustainability is important, the country will still rely on some non-renewable energy sources such as fossil fuels.
- The energy system will be transformed to be carbon neutral, but this transformation will have a relatively small impact on energy use in industrial sectors.
- The government will take the lead in guiding citizens and companies towards the energy transition, using policy measures such as insulation standards for new buildings.
- Despite growth in mobility demand and industrial production, efforts will be made to reduce greenhouse gas emissions from international aviation and shipping by 50%.
- The Netherlands will use large imports of biomass as an energy source to help transition to a carbon-neutral energy system.

The below graph indicates the percentages of Dutch energy supply sources in 2018 compared with those projected by scenario A in 2050.



The table below provides you with more detailed information on the scenario.

	Scenario A
National greenhouse gas reduction target	2030: 55% 2050: 100%
Greenhouse gas reduction target international flying and shipping	2050: 50%
Fossil fuel prices	Constant after 2030
Energy demand	
• Industry	↑
• Service sector	↑
• Agriculture sector	↑
Industry production	↑
Mobility demand*	
• Domestic	↑
• International	↑
Biomass availability**	
• Domestic	+++
• Imports	+++
Use CO2 capture and storage (CCS)***	+++
Use coal-fired power plants	No

↑ means growth, ↓ shrinkage and ↑↑ extra growth, +++ means large, ++ moderate and limited availability

Explanation of terms

* **Mobility demand:** transportation (e.g. cars, buses, trains, bicycles)

** **Biomass availability:** availability of organic matter for energy production (e.g. wood, vegetable and garden waste, sewage)

*** **CO2 capture and storage:** technology capturing and storing CO2 underground or in long-term storage facilities (e.g. gas reservoirs, deep ocean sediments)

Figure B2

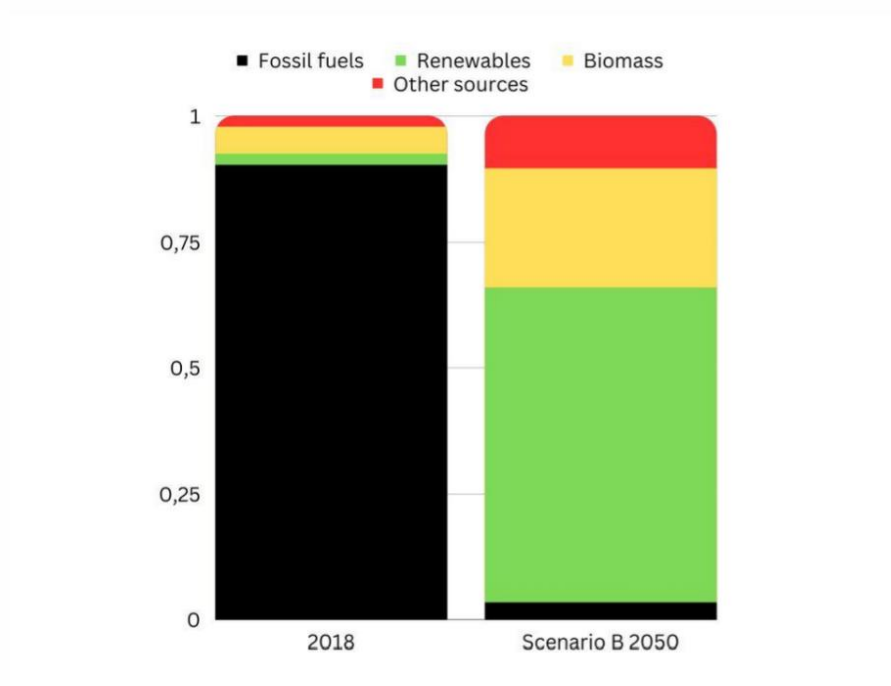
Presentation of the TRANSFORM scenario

Below are several graphs and information on Scenario B. **Please read the descriptions carefully to understand the scenarios.**

You will be asked a series of questions about the details of the scenario and its advantages, disadvantages and acceptability. Note: hover over underlined words for more information about the concept.

- The Netherlands relies on its strong knowledge and innovative business community to transition to cleaner energy sources.
- The country focuses on using renewable technologies while also developing a more circular economy , which helps reduce energy usage.
- The government plays an important role in facilitating and promoting the adoption of sustainable technologies.
- People become more aware of their energy usage and make changes to reduce their carbon footprint. This includes behaviour like eating less meat and choosing seasonal foods.
- New technologies, such as electric and hydrogen-powered transportation, are welcomed and encouraged.
- The demand for energy decreases as people's mobility behaviour changes and industries shift towards less energy-intensive processes.
- Companies are making big changes to become more sustainable.
- The service sector grows as the economy shifts towards more sustainable, circular practices.
- The agricultural sector switches to more sustainable energy sources, such as solar panels, wind turbines and geothermal energy for farm operations.
- To meet international climate goals, international aviation and shipping are required to reduce their greenhouse gas emissions by 95%.
- Carbon Capture and Storage is only used to a limited extent, and biomass is only used if no other options are available.

The below graph indicates the percentages of Dutch energy supply sources in 2018 compared with those projected by scenario B in 2050.



The table below provides you with more detailed information on the scenario.

	Scenario B
National greenhouse gas reduction target	2030: 55% 2050: 100%
Greenhouse gas reduction target international flying and shipping	2050: 95%
Fossil fuel prices	Constant after 2030
Energy demand	
• Industry	↓
• Service sector	↑↑
• Agriculture sector	↓
Industry production	↓
Mobility demand*	
• Domestic	↓
• International	↓
Biomass availability**	
• Domestic	++
• Imports	++
Use CO2 capture and storage (CCS)***	+
Use coal-fired power plants	No

↑ means growth, ↓ shrinkage and ↑↑ extra growth, +++ means large, ++ moderate and + limited availability

Explanation of terms

* **Mobility demand:** transportation (e.g. cars, buses, trains, bicycles)

** **Biomass availability:** availability of organic matter for energy production (e.g. wood, vegetable and garden waste, sewage)

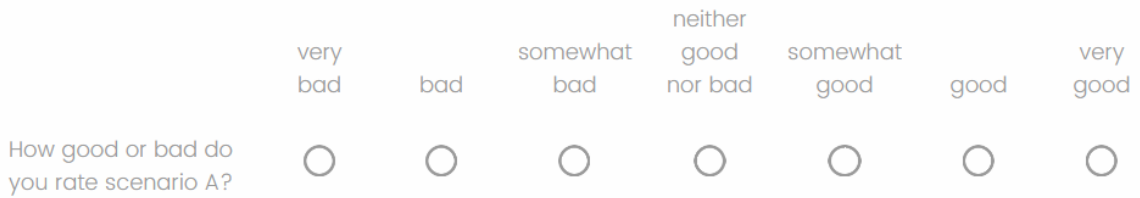
*** **CO2 capture and storage:** technology capturing and storing CO2 underground or in long-term and garden waste, sewage)

*** **CO2 capture and storage:** technology capturing and storing CO2 underground or in long-term storage facilities (e.g. gas reservoirs, deep ocean sediments)

Figure B3

Acceptability scale

Now we are interested in your evaluation of scenario A

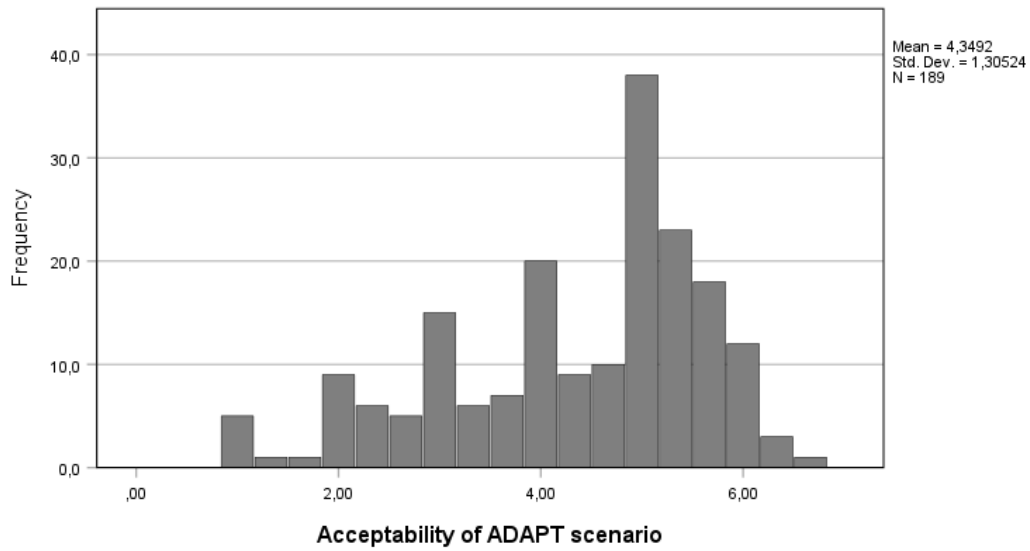


Note. Answer option *very acceptable* is missing in the figure as the highest rating for the first item.

Appendix C

Figure C1

Normality Assumption Check for Acceptability of the ADAPT scenario via histogram

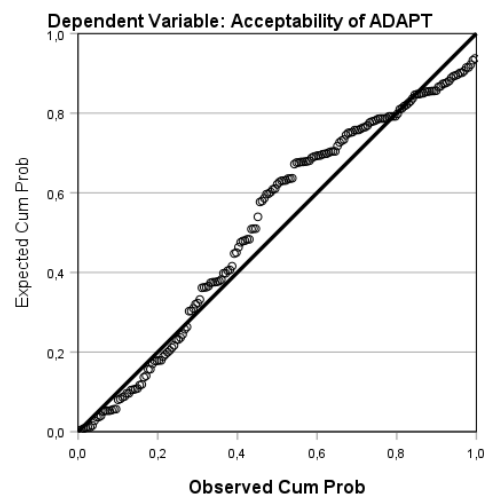


Note. The data is slightly left-skewed which suggests a violation of the normality assumption.

Figure C2

Normality Assumption Check for Acceptability of the ADAPT scenario via PP-plot

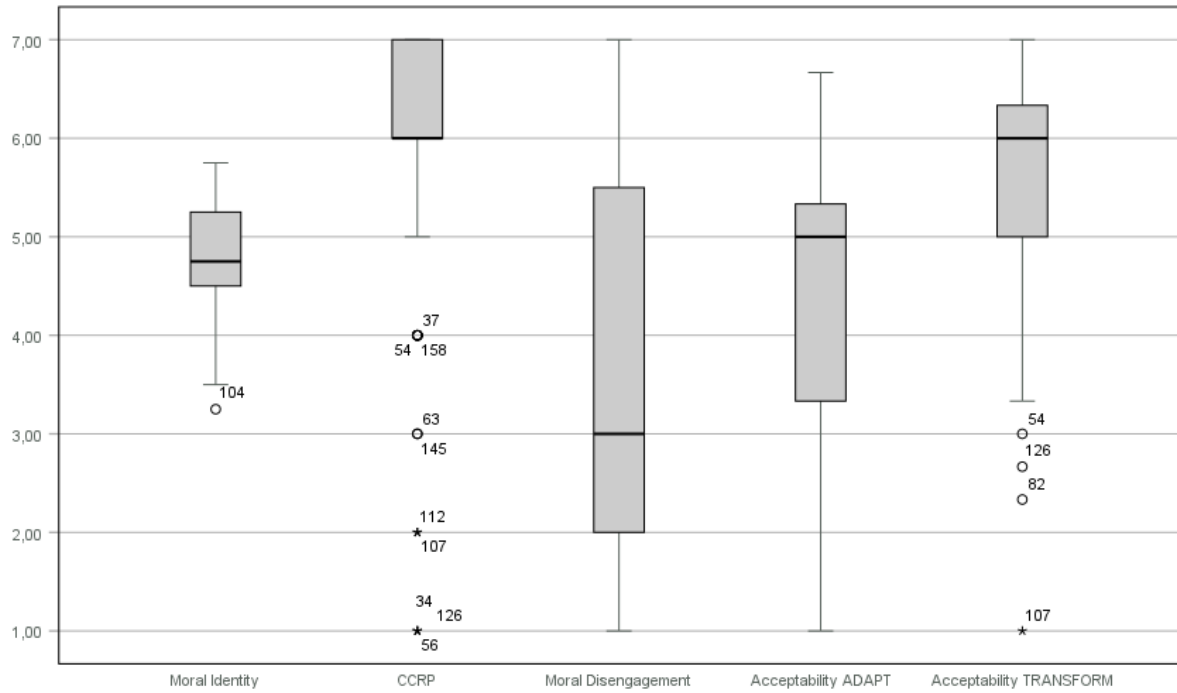
Normal P-P Plot of Regression Standardized Residual



Appendix D

Figure D1

Data Distribution



Note. Ceiling effects could be observed for CCRP and acceptability of the TRANSFORM scenario. Responses for moral identity were slightly left-skewed; responses for moral disengagement were slightly right-skewed; responses for acceptability of the ADAPT scenario were left-skewed.