"Beyond Personal Identity: The Role of Identification with All Humanity and Collective Efficacy in the Acceptability and Perceived Feasibility of Sustainable Energy Scenarios"

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Abstract

In response to the urgent need to tackle the current climate crisis, various energy scenarios have been developed with the aim of reducing carbon emissions and promoting sustainability**.** In this study, the public acceptability and the perceived feasibility of two realistic future energy scenarios were investigated by means of a survey study**.** It was hypothesised that identification with all humanity is positively associated with the acceptability of the more ambitious scenario, TRANSFORM, and negatively with the acceptability of the less ambitious scenario, ADAPT. It was also hypothesised that collective efficacy is positively associated with the perceived feasibility of TRANSFORM. The results show a positive significant association of identification with all humanity with the acceptability of TRANSFORM and a negative significant effect on the acceptability of ADAPT. No significant effect was found between collective efficacy and the perceived feasibility of the ambitious scenario.

Keywords: public acceptability, future energy scenarios, identification with all humanity, collective efficacy, perceived feasibility

Introduction

Humankind is currently faced with a range of pressing environmental challenges, including climate change, water shortages, air pollution, and biodiversity loss (Lynn & Longhi, 2011). Recognising the significance of addressing these issues is crucial, as they pose serious threats to the survival of numerous species and can have catastrophic consequences for ecosystems and human societies (IPCC, 2018). In response to the urgent need to tackle the current climate crisis, various energy scenarios have been developed with the aim of reducing carbon emissions and promoting sustainability (Scheepers, 2022). An energy scenario outlines a future energy system encompassing aspects such as energy supply and demand and the types of energy sources and technologies employed to meet those demands. These scenarios take into account numerous variables, including economic trends, population growth, technological innovations, environmental policies, and other factors that influence the energy system (Scheepers, 2022). However, the effectiveness of these scenarios relies heavily on their acceptance by the public. A lack of public acceptability and the local resistance that comes with it is often seen as a major obstacle to the development of new energy technology projects (Cohen et al., 2014). The concern is that this opposition from local groups can hinder the transition of the current energy infrastructure into a decarbonized grid, leading to a failure in achieving significant reductions in CO2 emissions.

While existing studies have predominantly focused on the public acceptability of individual aspects of an energy scenario, such as renewable energy adoption or energy efficiency measures, little research has investigated the general public's attitudes towards complex system changes that necessitate alterations across multiple dimensions, namely technological advancements, policy frameworks, and shifts in consumer/citizen behaviour.

To gain a deeper understanding of which factors influence public acceptability and facilitate the smooth implementation of sustainable energy scenarios, this study aims to

investigate the relationship between identification with all humanity (IWAH) and the acceptability of two future energy scenarios. In addition, the association between collective efficacy and the perceived feasibility of one of the scenarios is examined.

Public acceptability of energy scenarios

Before delving into the theoretical framework surrounding the psychological constructs examined in this study, it is important to provide a precise definition of public acceptability within the context of energy scenarios. Huijts et al. (2012) define acceptability as an individual's attitude towards new and existing technologies and their corresponding behaviours in response to these technologies. In the context of energy scenarios, public acceptability refers to the attitudes held by individuals towards the proposed changes in the energy system and their willingness to engage in behaviours that support or oppose the implementation of these scenarios. It encompasses the degree of support or resistance towards the transition to alternative energy sources, the adoption of sustainable practices, and the acceptance of potential changes in energy infrastructure and policies. Understanding public acceptability within the specific context of energy scenarios is crucial for effectively assessing and addressing the challenges associated with implementing sustainable energy transitions. A more detailed overview of the specific scenarios utilised in this study can be found in Appendix A.

Identification with All Humanity (IWAH)

The SIMPEA model, proposed by Fritsche and colleagues (2018), provides a comprehensive framework to understand individuals' psychological responses and attitudes towards societal and environmental issues, which in this study are the implementation of future energy scenarios. SIMPEA stands for "Social Identity Model of Pro-Environmental Action" and highlights the role of social identity and group processes in shaping individuals'

attitudes and behaviours. The model posits that people's social identities, including their ingroup identification, play a crucial role in influencing their perceptions, evaluations, and actions related to environmental and sustainability concerns. Ingroup identification refers to the extent to which individuals consider themselves part of a particular social group and incorporate that group's values, norms, and goals into their identity. According to the SIMPEA model, individuals' ingroup identification influences their perceptions of social norms, efficacy beliefs, and collective action tendencies. When people strongly identify with a particular group, such as their local community or a larger collective (e.g., humanity), they are more likely to adopt the norms and values associated with that group. This identification with the ingroup influences their appraisal of various situations and events, including environmental issues.

This study specifically focuses on people's sense of identification with the broadest group of all—humanity as a whole. McFarland et al. (2013) conceptualised this sense of identification as Identification with All Humanity (IWAH), which encompasses a deep caring for all human beings regardless of their race, religion, or nationality. Individuals with a strong IWAH view humanity, including future generations, as their ingroup, and this view can shape their attitudes and behaviours towards climate change mitigation.

Since IWAH has not received much attention in research, it is important to look at psychological constructs that are semantically intertwined with IWAH to formulate a solid theoretical framework. Altruism, particularly intergenerational altruism, involves being selfless and considerate toward future generations (Hu et al., 2018). Individuals with a strong IWAH may be motivated to extend their impact beyond their own existence and feel a sense of symbolic immortality by creating a psychological connection between the self and future generations. Xu et al. (2021) found that altruistic values positively influenced pro-

environmental behaviour, suggesting that altruism may contribute to the predicted relationship between IWAH and the acceptability of the TRANSFORM scenario.

Similarly, self-transcendence, described by Schultz et al. (2005) as an individual's tendency to include aspects of nature within their cognitive representation of the self and be concerned about more than just themselves, may also play a role. When activated, Schultz et al.'s meta-analysis (2005) revealed a positive relationship between self-transcendence and environmental behaviour. Corner et al. (2014) found that self-transcendent values are positively associated with people's involvement with environmental issues.

Interventions aimed at fostering a sense of affinity with future generations have been shown to positively influence individuals' environmental preferences and intentions (Meleady & Crisp, 2017). This suggests that a change in ingroup identification can influence the way people appraise situations or events, as demonstrated by the increased preference for sustainable goods following an intervention designed to reduce intergroup bias between current and future generations. These findings emphasize the significance of interventions that promote a collective concern for future generations, which is closely related to IWAH, in shaping individuals' attitudes towards the environment (Meleady & Crisp, 2017).

Based on this extended theoretical framework surrounding IWAH, it is posited that there is a positive relationship between IWAH and the acceptability of the TRANSFORM scenario (H1). Individuals who strongly identify with all humanity are likely to exhibit greater concern for future generations and people all over the world. Consequently, to counter climate change and create better living conditions for all humanity, they may perceive more drastic changes in energy supply and demand as necessary, leading to higher acceptance of the ambitious TRANSFORM scenario.

The second hypothesis (H2) posits a negative relationship between IWAH and the acceptability of the ADAPT scenario. Due to their concern for the collective well-being of all human beings, they are more inclined to seek comprehensive and transformative solutions that address the fundamental causes of climate change. Their commitment to protecting the interests of humanity as a whole might lead them to question the effectiveness and sufficiency of less ambitious approaches. Earlier research has shown that the acceptance of political measures to mitigate climate change increases as individuals have stronger self-transcendent and altruistic values (Nilsson et al., 2004). Linking this finding to the context of the ADAPT scenario and IWAH, individuals who strongly identify with all humanity may view the utilisation of fossil fuels, even with the implementation of carbon capture and storage technology, as a short-term remedy that fails to address the underlying necessity of transitioning to renewable energy sources. Thus, the negative relationship between IWAH and the acceptability of the ADAPT scenario would reflect their desire for more far-reaching actions and strategies to ensure the long-term sustainability and well-being of all individuals, because even though ADAPT essentially serves the same goal as TRANSFORM regarding the reduction of emissions, TRANSFORM can be seen as more ambitious in the long term.

Perceived feasibility

In this study, an additional objective is to examine individuals' perceived feasibility of the TRANSFORM scenario. The perceived feasibility of TRANSFORM relates to an individual’s subjective assessment of the practicality and attainability of the proposed scenario. It encompasses their beliefs and evaluations regarding how realistic they perceive successfully implementing the TRANSFORM scenario to be. Perceived feasibility encompasses considerations such as the availability of necessary resources, technological advancements, social and political support, and the overall perceived likelihood of overcoming potential barriers and challenges. Understanding individuals' perceptions of the

feasibility of the TRANSFORM scenario is crucial in assessing their willingness to support and engage in the necessary actions and changes required for its successful implementation. By exploring this aspect, the study aims to shed light on the factors that influence individuals' confidence and belief in the practicality of transitioning to the proposed TRANSFORM scenario.

Collective efficacy

While individual actions, such as reducing personal driving or energy consumption, can contribute to mitigating climate change (Wang, 2017), their impact may be limited unless these actions are undertaken collectively by a significant number of people. The effectiveness of addressing climate change extends beyond individual behaviour and encompasses broader aspects of societal change and policy implementation. A psychological concept relevant to this collective effort is collective efficacy, which refers to the belief that a group or community has the capacity to influence its environment (Van Zomeren et al., 2008). Homburg and Stolberg (2006) found that collective efficacy is more prominent in predicting pro-environmental behaviour than personal efficacy. Their study suggests that individuals perceive greater efficacy when considering actions from a collective perspective rather than solely from a personal standpoint. Since energy scenarios are such complex systems that require more than just individual pro-environmental behaviour and since collective efficacy has been found to be a strong predictor of pro-environmental behaviour, this study aims to investigate the association between collective efficacy and the perceived feasibility of the TRANSFORM scenario.

This study predicts that collective efficacy is positively related to the perceived feasibility of the more ambitious TRANSFORM scenario. Individuals with a strong sense of collective efficacy might be more likely to believe in their ability to make a difference and achieve desired outcomes. This shared belief in effectiveness can contribute to a positive

perception of the feasibility of TRANSFORM, as individuals are more likely to view the scenario as realistic to implement.

As Bandura (1995) conceptualized, collective efficacy encompasses the belief in overcoming obstacles and persevering in the face of difficulties. It represents a resilient mindset where individuals with a strong sense of collective efficacy view challenges as surmountable and setbacks as temporary hurdles. For example, limited financial resources for implementing the TRANSFORM scenario could be a potential hurdle. Individuals with high collective efficacy could be more likely to perceive this challenge as an opportunity for collective action rather than an insurmountable barrier. They might mobilize community resources, engage in crowdfunding initiatives, or lobby for government support, drawing upon their shared belief in their collective ability to overcome financial constraints. This collective mindset empowers individuals to approach obstacles as shared responsibilities, fostering a sense of solidarity and collaborative problem-solving that can contribute to a positive perception of the feasibility of the TRANSFORM scenario.

Social support and collaboration among individuals are important aspects of what collective efficacy entails (Bandura, 1995). When individuals believe in their collective power, they are more likely to seek support from others, collaborate on shared goals, and engage in collective problem-solving. This sense of social support and collaboration can enhance the perceived feasibility of TRANSFORM, as individuals recognize the potential for collective action to generate meaningful change and address complex societal issues.

It remains uncertain whether collective efficacy extends its influence to other components of the energy scenario beyond individual behaviour. The relationship between collective efficacy and factors such as technological advancements, policy implementation, and societal acceptance within the energy transition context has not been extensively

explored. It is possible that collective efficacy may have varying degrees of influence on different aspects of the energy scenario.

Method

Participants

A priori G*power analysis was conducted to determine the appropriate sample size for the present study. This analysis helps to ensure that the study has adequate statistical power to detect the expected effects. In this case, the desired sample size of 152 participants was determined based on a Linear Multiple Regression: Fixed Model design, with a power of 0.8, an expected effect size of 0.053, and a significance level of $\alpha = 0.05$ (Faul et al., 2007). Data were collected from a total of 323 participants. However, several exclusion criteria were applied to ensure data quality and adherence to the research objectives. Individuals who declined consent or whose consent was missing were excluded (37 participants). Participants who did not provide their age or were under 16 years old were excluded from the analysis (four participants). Additionally, individuals who failed the initial attention check, which stated *'Throughout this survey, please read the questions carefully and indicate the answer that most accurately represents your opinion.'* (six participants), who did not pass the seriousness check at the end of the study or indicated their preference to exclude their data (85 participants) were also excluded. After applying these criteria, the final sample consisted of 191 participants (51.9%). No outliers were excluded from the analysis.

The gender distribution in the final sample was as follows: 117 participants identified as female, 70 as male, 2 as non-binary/third gender, and 1 preferred not to say. The age range of the participants varied from 16 to 70 years old. The majority of participants (48.7%) fell into the 21-25 years old category. Among the participants, 165 currently live in the Netherlands, and 111 were Dutch citizens.

Ninety-five participants were first-year psychology students recruited through the SONA platform. Students were awarded 0.4 SONA credits upon completion of the survey. Additionally, ninety-six participants were recruited through snowballing in the researcher's personal networks, where initial participants were asked to refer other potential participants to the study. The first participants of this study were therefore most likely in the personal networks of the researchers. Participants accessed the survey through a generated link to the digital survey platform Qualtrics XM (Qualtrics, Provo, UT) and were not compensated. Both of these methods make the sample a convenience sample. Informed consent to their data being used for the purpose of this research was given by all included participants. Data collection through snowballing took place from May 3rd, 2023 until May 23rd, 2023. The survey was accessible through SONA from May 8th, 2023 until May 23rd, 2023, since approval from the SONA administration took longer. The research design is a cross-sectional study.

Procedure

The faculty ethics committee granted fast-tracked ethical approval and the project was pre-registered as a correlational survey study on the Open Science Framework (https://doi.org/10.17605/OSF.IO/ZMYRU).

First, participants were provided with the research information, which informed them that "the purpose of the present research was to explore participants' acceptability of future energy scenarios" and asked for informed consent. The survey continued by asking for demographic information (age, gender, student status, nationality, country of residency), after which participants completed (among others) the IWAH and collective efficacy measure.

Then, the first scenario was presented, followed by the acceptability measurement relating to this first scenario (view Appendix A for scenario presentation). After, the second scenario was introduced, followed by the acceptability measurement relating to this second scenario. The order of scenarios was randomised. Then, the key differences between the

scenarios were presented after which participants indicated their preference for a scenario. The study ended with a seriousness check, asking participants whether they had answered the survey truthfully and felt the researchers should include their data. Lastly, participants had the option to leave a comment. After completion, the participants were thanked for their participation.

Materials

To measure Identification with all Humanity, three statements from the IWAH scale were presented (McFarland et al., 2012). Responses were measured using a five-point Likert scale, with answer options from "not at all" (1) to "very much" (5). With the first statement, participants were asked to rate their identification with people anywhere in the world. In the second item, participants were asked to rate how much they would care if bad things happen to people in the whole world. The third item measured how much participants want to be responsible citizens of the world. The items formed an internally consistent scale ($\alpha = .78$).

To measure collective efficacy, two items are adapted from Chen's (2015) research about which type of efficacy more effectively explains people's self-reported pro-environmental behaviour ($r = .523$). These were on a seven-point Likert scale with answer options from "strongly disagree" (1) to "strongly agree" (7). The first statement is *'I am confident that together we can solve the problem of climate change.',* and the second statement is '*We can come up with creative ideas to solve environmental problems effectively, even if the external conditions are unfavourable.'.*

The acceptability of each energy scenario was measured after presenting the scenario (Liu et al., 2020). Each scenario was presented via summarising bullet points, a graph on the energy supply factors (2018 vs. 2050), and a table summarising the most important numbers. More detailed descriptions of how the scenarios were shown can be found in Appendix A.

Three items, acceptability, positivity, and goodness of scenario were measured on a seven-point Likert scale to form one acceptability score ($\alpha = .92$ for ADAPT and $\alpha = .89$ for TRANSFORM). ADAPT was presented as Scenario A and TRANSFORM was presented as Scenario B to prevent participants to be biased by the labelling of the scenarios. The perceived feasibility of the scenarios was measured with one item, using a five-point Likert scale. Participants were asked to rate how realistic they consider each of the two scenarios to be with the statement *'How realistic do you consider each of the two pathways?'* The item was created for this study.

Statistical analysis

The data was analysed using descriptive statistics, correlation analysis, and linear regression analysis to test the hypotheses. Correlation analysis was used to examine the bivariate relationships between all variables included in the analysis. Linear regression analysis was used to test the hypotheses, with the acceptability of the TRANSFORM scenario and ADAPT scenario as dependent variables, and IWAH as the independent variable. In addition, a linear regression was performed to predict the feasibility of the TRANSFORM scenario from collective efficacy. Assumptions of linearity, homoscedasticity, normality, and independence were checked for each model. All analyses were conducted using the statistical software package IBM SPSS Statistics (Version 27).

Results

Assumption checks

To ensure the validity of the statistical analyses, the assumptions of normality, linearity, and homoscedasticity were examined. Normality was assessed using P-P plots, which visually depict the distribution of the variables. The linearity assumption was examined by plotting the independent variable against the dependent variable and inspecting scatterplots

for any discernible non-linear patterns. Homoscedasticity was assessed by examining the scatterplots of the residuals. Upon examination, the assumptions of normality, linearity, and homoscedasticity were found to be reasonably met for the variables included in the analyses. No significant deviations or violations of these assumptions were observed. The P-P plot for the perceived feasibility of TRANSFORM showed the largest deviation from normality. No further transformations have occurred because the Q-Q plot did show normality. The assumption of independence of observations was taken into account with the study design and data collection methods. Therefore, the statistical tests conducted in this study were deemed appropriate for the data and can be interpreted with confidence.

Descriptive statistics and correlations

The descriptive statistics and the correlations between the relevant variables are presented in Table 1.

Table 1

Descriptive Statistics and Correlations for Study Variables

Variable	N	M	SD	1	2	3	4	5
1.IWAH Score	190	3.66	.80	-	-	-	-	-
2. Collective Efficacy Score	190	5.25	1.09	.246**	-	-	-	-
3.Acceptability of TRANSFORM	189	5.68	1.03	.189**	.121	-	-	-
4.Acceptability of ADAPT	189	4.35	1.31	-.241**	.132	-.008	-	-
5.Feasibility of TRANSFORM	189	2.48	.98	-.005	.129	-.032	-.065	-

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

The correlations between the variables in the study provide a preliminary insight into the direction of the tested hypotheses. The correlation between IWAH and the acceptability of TRANSFORM was found to be positive and statistically significant ($r = .189$, $p < .01$**). This suggests that individuals with higher levels of IWAH are more likely to perceive TRANSFORM as acceptable. On the other hand, there was a negative and significant correlation between IWAH and the acceptability of ADAPT ($r = -.241$, $p < .01$**). This indicates that individuals with higher levels of IWAH are less likely to view ADAPT as acceptable. Additionally, the correlation between collective efficacy and the feasibility of TRANSFORM was positive but relatively weak ($r = .129$, $p = .077$).

H1: The relationship between IWAH and the acceptability of TRANSFORM

A regression analysis was conducted to examine the relationship between Identification with All Humanity (IWAH) and the acceptability of the TRANSFORM scenario. For an overview of the regression results, see Table B1 in Appendix B. The results indicated that IWAH significantly predicted the acceptability of the TRANSFORM scenario ($\beta = .189$, $p = 0.009$, two-tailed). The significant association between IWAH and the acceptability of the TRANSFORM scenario suggests that individuals who strongly identify with all humanity are more likely to exhibit a higher acceptance of the TRANSFORM scenario. The unstandardized coefficient (B) was .241, indicating that for every one-unit increase in the IWAH score, the acceptance score for the TRANSFORM scenario increased by .241 units. The model summary statistics revealed a weak positive relationship between IWAH and the acceptability of the TRANSFORM scenario, as indicated by the correlation coefficient ($r = .189$). The coefficient of determination (R^2) indicated that IWAH accounted for 3.6% of the variance in the acceptability of the TRANSFORM scenario, which is a very low effect size.

H2: The relationship between IWAH and the acceptability of ADAPT

The second hypothesis aimed to examine the relationship between IWAH and the acceptability of ADAPT. The regression results revealed a significant negative association between IWAH and the acceptability of ADAPT (β = -.241, p = 0.001, two-tailed) (Appendix B). These findings indicate that higher levels of identification with all humanity were associated with lower levels of acceptability for ADAPT. The unstandardised coefficient (B) for IWAH was -.391, indicating that for every one-unit increase in the IWAH score, the acceptability score for ADAPT decreased by -.391 units. The model summary statistics showed that IWAH accounted for 5.8% of the variance in the acceptability of ADAPT, as reflected by the coefficient of determination (R^2). These results support the hypothesis and suggest that individuals' identification with all humanity significantly predicts their acceptance of ADAPT, with higher identification levels associated with lower acceptability scores.

H3: The relationship between Collective Efficacy and the perceived feasibility of TRANSFORM

A regression analysis was performed to examine the relationship between the perceived feasibility of TRANSFORM and the collective efficacy score. The coefficient for the Collective Efficacy Score was positive but insignificant (B = .116, p = 0.077), suggesting a tendency for higher levels of collective efficacy to be associated with greater perceived feasibility of TRANSFORM (Appendix B). However, since the results are not significant and the current study's sample size is reasonably large, there is no support for H3. The model summary statistics showed that the Collective Efficacy Score accounted for 1.7% of the variance in the perceived feasibility of TRANSFORM, as reflected by the coefficient of determination (R^2). These findings suggest that the Collective Efficacy Score has very low

explanatory power in relation to the perceived feasibility of implementing the TRANSFORM scenario.

Discussion

Research objectives

This study aimed to understand the relationship between psychological constructs on the public acceptability of different energy scenarios that aim to address environmental challenges and reduce carbon emissions. The research sought to examine the predictors that play a role in determining the level of public acceptability, as support from the public is crucial for implementing significant changes in the energy system (Demski et al., 2017). Specifically, the study investigated the influence of IWAH on the public acceptability of two energy scenarios, ADAPT and TRANSFORM (Scheepers, 2022). Furthermore, the research aimed to explore the predictive power of collective efficacy on the perceived feasibility of the more ambitious of the two scenarios, TRANSFORM.

IWAH and the acceptability of TRANSFORM

The results of the study support Hypothesis 1, revealing a positive association between IWAH and the public acceptability of the TRANSFORM scenario. These findings indicate that individuals who strongly identify with all of humanity are more accepting of the TRANSFORM scenario. Individuals with a stronger sense of IWAH may have a tendency to exhibit heightened concern for future generations and people in countries that are affected directly by climate change disasters and thus recognize the necessity for substantial shifts in the energy system. Their inclination towards embracing the more ambitious TRANSFORM scenario could stem from a genuine desire to facilitate these necessary changes.

The findings of McFarland et al. (2012) in their series of studies, which establish a theoretical framework for understanding IWAH as a distinct construct, offer a valuable

connection between the present study's results and the existing knowledge on IWAH. One particular study conducted by McFarland and colleagues revealed that individuals with a stronger sense of IWAH demonstrated a higher level of concern for global issues and universal human rights and that this concern translated into a willingness to commit American financial resources to prevent genocide and promote and safeguard human rights globally. This tendency to support international efforts aimed at preventing global disasters and advancing human living conditions worldwide could be an explanatory factor in the current study's results on the positive relationship of IWAH with the acceptability of the TRANSFORM scenario.

Another study conducted by McFarland et al. (2012) produced results indicating that IWAH has a positive relationship with knowledge of global humanitarian concerns. These findings suggest that individuals with a stronger sense of IWAH are more likely to possess a greater understanding of global issues, such as climate change. Linking these findings to the results of the current study, it is reasonable to infer that individuals who exhibit a higher level of IWAH possess a greater knowledge of global concerns. This connection implies that their acceptance of the TRANSFORM scenario might be shaped by their awareness of the urgent need for substantial changes in energy supply and demand to address global challenges like climate change. Therefore, the present study's findings align with the previous research conducted by McFarland et al. (2012), supporting the notion that IWAH plays a crucial role in shaping attitudes and knowledge related to global issues.

Reese (2013) found a positive association between respondents' identification with a collective human identity, which is similar to IWAH, and their belief that the inequalities between the rich and the poor in the world were unjust and illegitimate, rather than justified. Furthermore, these justice beliefs were found to be predictive of stronger intentions to take action against global inequality. Such actions included expressing a willingness to lower their

own living standards and opting to purchase organic produce. In the context of the study's focus on the acceptability of TRANSFORM, it can be inferred that individuals with a stronger IWAH may also exhibit a recognition of systemic injustices and the motivation to address them may contribute to a broader perspective that extends beyond personal interests and promotes a willingness to support and embrace ambitious energy scenarios like TRANSFORM.

Other research indicates that individuals who strongly identify with all humanity exhibited higher levels of concern for nature, while simultaneously holding lower beliefs in the unprecedented power of humans over nature (Reese, 2015). These findings hold implications for the relationship between IWAH and the acceptability of the TRANSFORM scenario. As individuals identify more strongly with the common human ingroup and exhibit heightened concern for nature, they may be more receptive to initiatives that promote sustainable and environmentally friendly practices. This increased concern for nature, coupled with a reduced belief in humans' power over nature and care for future generations, may contribute to a greater acceptance of the TRANSFORM scenario. It suggests that individuals with a stronger IWAH may be more inclined to support and engage in behaviours aligned with the goals of the TRANSFORM scenario, such as adopting sustainable lifestyles, embracing renewable energy sources, and advocating for environmentally just policies.

IWAH and the acceptability of ADAPT

Additionally, this study examined the relationship between IWAH and the acceptability of the ADAPT scenario. As expected, the results revealed a significant negative association between IWAH and the acceptability of ADAPT, supporting Hypothesis 2. This suggests that individuals with high levels of IWAH are less likely to find the ADAPT scenario acceptable. The negative relationship between IWAH and the acceptability of the ADAPT

scenario can be further understood by examining the characteristics and priorities of the ADAPT scenario and linking this to existing research findings.

In the ADAPT scenario, the focus lies on building upon the Netherlands' existing strengths while simultaneously reducing CO2 emissions (Scheepers, 2022). The country's historical reliance on oil, coal, and gas to support industry, transportation, and energy supply for comfortable living is acknowledged. Individuals with high levels of IWAH might view the ADAPT scenario as prioritising short-term job security and a comfortable lifestyle over long-term sustainability. Building upon the findings of Nilsson et al. (2004), which established a positive association between self-transcendent and altruistic values and the acceptance of political measures to mitigate climate change, it is plausible to argue that the relationship between values and acceptance may also extend to the evaluation of different energy scenarios. It is reasonable to argue that individuals with strong altruistic values may exhibit lower acceptability of less ambitious scenarios like ADAPT, as they prioritise the urgency of addressing environmental challenges in line with their deeply-held values. Since individuals with a strong IWAH possess greater knowledge about international concerns, it could also be argued that those people have a more thought-out insight into which measures are sufficient in countering the climate change issues and are therefore not accepting of the ADAPT scenario (McFarland, 2012).

In the ADAPT scenario, where the government takes the lead in implementing policy measures to optimize the existing energy system, there is general societal acceptance with minimal objections regarding the use of fossil fuels with carbon capture and storage, as well as the importation of biomass (Scheepers, 2022). However, individuals with a strong IWAH may question the reliance on these measures within the ADAPT scenario. Research by Braun et al. (2017) supports this notion, as they found that individuals with stronger altruistic values,

which align with the concept of IWAH, tend to respond more negatively to carbon capture and storage. These individuals prioritize long-term sustainability and are inclined to advocate for more drastic actions to address climate change. From their perspective, the continued use of fossil fuels, even with carbon capture and storage, may be seen as a temporary solution that does not address the fundamental need for transitioning to renewable energy sources.

Although two significant positive effects have been established, the variance explained by IWAH in the acceptability of the scenarios is relatively small. Therefore, future investigations could focus on similar constructs such as Common Human Identity or altruism, assessing their impact on the acceptability of the scenarios.

Collective efficacy and the perceived feasibility of TRANSFORM

The results regarding Hypothesis 3 showed a positive direction of association between collective efficacy and the perceived feasibility of the TRANSFORM scenario, although this relationship did not meet the threshold for statistical significance. While the non-significant finding suggests that the data did not provide strong evidence to support Hypothesis 3, it is worth noting that the trend observed in the data may still provide valuable insights. The non-significant relationship between collective efficacy and feasibility suggests that while individuals may believe in their collective ability to achieve goals, such as transitioning to renewable energy sources, this belief may not necessarily translate directly into a perception of the TRANSFORM scenario being feasible. It is possible that other factors that are not included in this research, such as practical considerations or other perceived barriers, influence individuals' assessments of feasibility beyond their belief in collective efficacy alone. It is also possible that the sample size or other methodological factors could have influenced the statistical power to detect significant effects.

The findings from the current study could be explained by findings from previous research by Reese and Junge (2017) on the relationship between collective efficacy beliefs and the perceived difficulty of a particular task. Results from this study suggest that, as predicted by the authors, the predictive power of collective efficacy beliefs depends on the perceived difficulty of a task and that medium task difficulty can induce the strongest collective efficacy beliefs. In this study, it was found that participants' perceptions of the feasibility and acceptability of the TRANSFORM scenario were influenced by their collective efficacy beliefs, although this relationship did not reach statistical significance.

It is worth considering that the perceived difficulty of implementing the TRANSFORM scenario, which requires extensive system-wide changes over an extended period, might have influenced the predictive power of collective efficacy in the current study. The relatively low mean score of the perceived feasibility of TRANSFORM (2.48) suggests that participants indeed perceive the implementation of this scenario as a challenging task. However, when reflecting on who individuals believe can facilitate the scenario, it is important to recognize that ordinary citizens may not perceive themselves as directly responsible for building wind parks, abolishing coal and gas, or introducing ambitious environmental legislation. Instead, they may attribute more power and capability to other stakeholders such as politicians or industry. The notion of "collective" in collective efficacy may not fully capture individuals' perceptions of these other influential actors. As a result, the associations between collective efficacy and personal or collective pro-environmental behaviour may be stronger, as these actions align more closely with the participants' sphere of influence. Therefore, while collective efficacy may play a significant role in motivating personal and collective pro-environmental behaviour, it is important to acknowledge the perceived roles and capabilities of other stakeholders in realising transformative scenarios like TRANSFORM.

Dividing the energy scenarios into multiple medium-difficulty tasks has the potential to increase the predictive power of collective efficacy on the perceived feasibility of the scenarios. By breaking down the complex energy transition process into manageable steps, individuals may perceive a higher level of feasibility and efficacy in tackling each task individually. This approach allows for a more focused and targeted approach, where individuals can build their confidence and sense of collective efficacy incrementally. Although research on the specific link between task difficulty and the implementation of energy scenarios is scarce, exploring the influence of task division on collective efficacy and perceived feasibility could be a valuable direction for future research.

However, it is important to keep in mind that future energy scenarios are more than just a collection of separate tasks and that they are complex systems with multiple interdependent aspects. Future research could explore additional variables, such as social norms, environmental values, and trust in institutions, or employ alternative measures, e.g. qualitative interviews or experimental designs to further investigate the relationship between collective efficacy and the perceived feasibility of energy scenarios, contributing to a more comprehensive understanding of the factors influencing public attitudes toward future energy systems.

Limitations

One important limitation of the present study is that it focused on investigating two distinct pairs of variables IWAH and acceptability, as well as collective efficacy and feasibility. This narrow focus restricts the depth of our understanding regarding the potential interconnections between these constructs. By examining these variables independently, I miss the opportunity to explore their potential synergistic effects and how they may interact to shape public attitudes towards energy scenarios. Future research should aim for a more

comprehensive analysis of datasets to gain a deeper understanding of the complex relationships between these variables. Additionally, the association between collective efficacy and feasibility was only tested for the TRANSFORM scenario, while the ADAPT scenario was not included in the analysis. Future research could focus on a more broad insight into the relationship between collective efficacy and the perceived feasibility of energy scenarios.

Another limitation concerns the complexity of the scenario descriptions and the sole focus on The Netherlands. The scenarios involved technical aspects and concepts that may have posed challenges for participants who lacked familiarity with energy discussions or lacked expertise in the field. The inclusion of intricate details, such as the implications of carbon capture and storage and biomass import, could have made it difficult for participants to fully comprehend the nuances of the scenarios.

While the current study utilised a collective efficacy measure with medium internal consistency (r = .523), it is worth noting that the measure may not comprehensively or consistently capture the construct. It is possible that the limited number of items or the specific wording and phrasing used in the measure contributed to the lower reliability. Consequently, caution should be exercised when interpreting the findings and drawing conclusions based on the collective efficacy measure employed in this study. In future research, consideration should be given to selecting a measure that better captures the multidimensional nature of collective efficacy and enhances its internal consistency.

Additionally, the correlational design employed in the study limits the ability to establish causality or the direction of relationships. Future research should consider experimental or longitudinal designs to provide stronger evidence of causality. An example would be to have an experimental group that would undergo an intervention aimed at

enhancing their identification with all humanity. This intervention could involve engaging participants in activities designed to foster a sense of common humanity, such as group discussions on global challenges or narratives emphasising shared values and interdependence. Jugert et al., (2016) experimentally manipulated collective efficacy beliefs by having one group read a piece of text where a group of young people was pro-environmentally active, which had a positive impact on the use of electric vehicles in Germany. Another group read a text where the young people were also active but without a positive effect on electric car use.

Conclusion

In conclusion, this study examined the influence of IWAH on the public acceptability of different energy scenarios aimed at addressing environmental problems and reducing carbon emissions. The findings revealed that IWAH played an important role in shaping the acceptability of the TRANSFORM scenario, with individuals who strongly identified with all of humanity expressing greater acceptance of the more ambitious scenario. In contrast, high levels of IWAH were associated with lower acceptability of the ADAPT scenario, possibly due to concerns about its long-term sustainability and urgency in addressing global challenges. Additionally, the study explored the relationship between collective efficacy and the perceived feasibility of the TRANSFORM scenario but found no significant association. These findings provide valuable insights into the factors influencing public acceptability toward and the perceived feasibility of energy scenarios. However, it is important to acknowledge the methodological limitations of the study, such as the sampling approach and the relatively small effect sizes. Future research should address these limitations and explore additional variables to gain a more comprehensive understanding of public attitudes toward future energy systems.

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Appendix A

The Scenarios as Presented in the Questionaire

Scenario Intro

The energy sector is the largest contributor to greenhousegas emissions which are driving climate change.To address this, the Netherlands pledged to reach **net zero emissions by 2050**, for which future energy scenarioshave been developed. Future energy scenarios are calculations of how energy consumption, demand and production must change while considering factors such as changing environmental effects, growing population,sustainability goals and international cooperation. All while the Dutch economy continues to grow at the same rate. Here, we present **two realistic future energy scenarios** for the Netherlands: the scenario A and B.

Presentation of Scenario A

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.

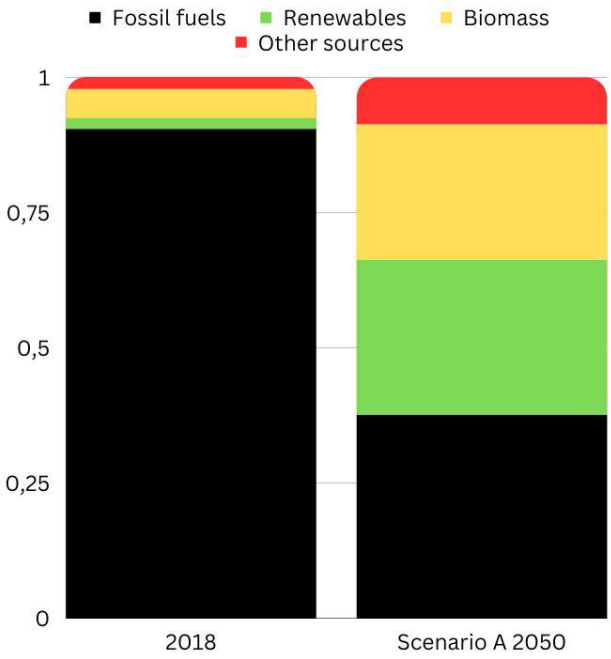
*Here the hover option is indicated by highlighting of the terms

In scenario A:

- 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)

Presentation of Scenario B

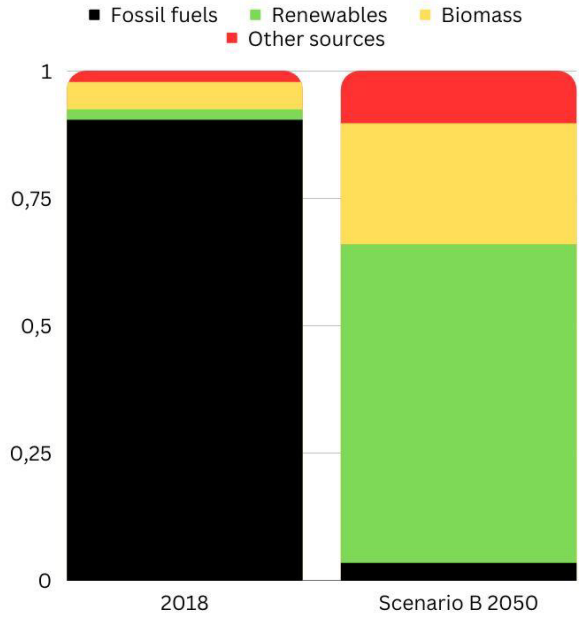
Below are several graphs and information on Scenario B. **Please read the descriptions carefully to understandthe scenarios**. You will be asked a series of questions about the details of the scenario and its advantages,disadvantages and acceptability. Note: hover over underlined words for more information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

In scenario B:

- 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 storage facilities (e.g. gas reservoirs, deep ocean sediments)

Appendix B

Table B1

Overview of Regression Results

Variable	B	SE	t	p	%CI
Acc. TRANSFORM					
IWAH-score	.241	.092	2.623	.009	[.060, .422]
Acc. ADAPT					
IWAH- score	-.391	.116	-3.382	.001	[-.619, -.163]
Feas. TRANSFORM					
Collective Efficacy	.116	.065	1.778	.077	[-.013, .245]

Note. Acc.TRANSFORM = Acceptability of TRANSFORM, Acc.ADAPT = Acceptability of ADAPT, Feas.TRANSFORM = Perceived Feasibility of TRANSFORM