Public Acceptability of Direct Air Carbon Capture with Storage (DACCS): The Effect of Knowledge and Mediating Role of Perceived Climate Severity

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Abstract

The IPCC stated that carbon dioxide removal through negative emission technologies (NETs) is necessary to limit global warming to 1.5°C or even 2°C. Public acceptance of such technologies is an important factor that determines whether large-scale implementation and integration into society is possible. This research aimed to clarify the role of knowledge in the specific context of public acceptance of Direct Air Carbon Capture with Storage (DACCS). Previous research that investigated the effect of knowledge on acceptance of NETs found contradictory results. The impact of perceived climate severity was examined both as an independent predictor and as a moderator in the relationship between knowledge and acceptance. Specifically, this study tested whether providing more knowledge decreases acceptance of DACCS. Furthermore, it was hypothesized that perceived climate severity is positively associated with acceptance, and that the effect of knowledge is reversed for those with high perceived climate severity. A multiple regression analysis was conducted to test this model ($N = 150$). The results did not reveal a significant main effect of knowledge or perceived climate severity on acceptance of DACCS. Moreover, no evidence for a moderation effect of perceived climate severity was found. This indicates that other factors are more important for explaining acceptance of DACCS. Future research could investigate the relationship between perceived climate severity and perceived effectiveness, as proposed by the Protection Motivation Theory. Knowledge about DACCS does not increase acceptance of the technology, but it is still crucial for people to develop informed opinions. Information about DACCS should be contextualized to ensure that a comprehensive understanding of the technology and its implications is possible.

Keywords: public acceptance, negative emission technologies, DACCS, knowledge, perceived climate severity

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Addressing Climate Change Challenges: The Role of Negative Emission Technologies

Climate change poses significant threats to humanity worldwide such as higher temperatures, more frequent extreme weather events, damage to the environment and important ecosystems, biodiversity loss, negative health impacts, food insecurity, and increased social inequality (European Commission, n.d.). Human activities (e.g. unsustainable energy use, land use and lifestyles) have caused climate change and global warming, primarily via immense emissions of greenhouse gases (GHGs). Recognizing the threats and the need to collectively combat climate change, 196 parties signed the Paris Agreement in 2015, setting the ambitious target to limit global average temperatures to well below 2°C, and ideally to 1.5°C above pre-industrial levels by the end of the century (IPCC, 2023).

However, as implied by the nationally determined contributions announced in October 2021, global GHG emissions by 2030 will still be too high to the meet climate goals, making it likely that average global temperatures will exceed 1.5°C during the 21st century (IPCC, 2023). Therefore, next to deep, rapid, and sustained reductions in GHG emissions, experts point to the necessity of implementing negative emission technologies and practices (NETPs) at a large scale to achieve net zero GHG emissions and make it possible to limit or even reverse global warming (Cobo et al., 2023; IPCC, 2022).

NETPs are a portfolio of mechanisms designed to remove GHGs from the atmosphere. Direct Air Carbon Capture with Storage (DACCS) is one example of such a technology. DACCS filters carbon dioxide from the air so that it can be pumped and stored underground, while the purified air is released back into the atmosphere (Patrizio et al., 2022). DACCS has the potential for quick and large-scale carbon dioxide removal, while not requiring much space. Another advantage is that the carbon dioxide can be stored permanently with low risks of leakage. However, DACCS is more expensive compared to other NETPs, and the process of separating carbon dioxide from the air needs a lot of energy, which is especially problematic if this energy comes from burning fossil fuels (Patrizio et al., 2022). Implementation of DACCS and other NETPs requires overcoming the technical, biophysical, ecological, and economic challenges, but also faces significant socio-cultural barriers such as public perception and acceptance (IPCC, 2023; Nemet et al., 2018).

Understanding Public Acceptance: Necessity and Determinants

While individual citizens and communities may not be directly involved in decisions to adopt a NETP, they can heavily influence these decisions via democratic processes such as elections and protests. (Nemet et al., 2018). Public acceptance may thus determine whether and how many people and institutions will adopt a technology (Wenger et al., 2021). It may be particularly decisive in the context of NETPs and DACCS, because of the large-scale implementation and upscaling of these technologies that is required to meet the 1.5°C and 2°C targets (Nemet et al., 2018). However, previous research found that the current public acceptance of DACCS is low to moderate at best (Satterfield et al., 2023; Wenger et al., 2021), highlighting the need to understand which factors influence people's acceptance of DACCS.

The Controversial Role of Knowledge in Shaping Public Acceptance of DACCS and Other NETPs

Knowledge is one factor influencing public acceptance of technologies that received lots of attention from scholars (Gupta et al., 2012). This factor refers to people's understanding of how a technology works but can also include more detailed awareness of specific benefits and risks related to it. The relationship between knowledge and public acceptance is far from clear, however, since previous research found contradicting results and theoretical implications.

Knowing the effect of providing information and thus improving knowledge may be especially important in the context of DACCS and other NETPs, because most people are very unfamiliar with these technologies and have never even heard of them (Wenger et al., 2021; Jobin and Siegrist, 2020; Merk et al., 2019).

Some research on the public acceptance of technologies suggests a positive effect of knowledge on acceptance. For example, a review article about the psychological factors influencing sustainable energy technologies found mainly positive correlations between knowledge and acceptance of hydrogen technologies and carbon capture and storage (Huijts et al., 2012). In a study examining public acceptance of various NETPs, including DACCS, people showed higher acceptability of the technologies after reading a brief section that provided information about climate change, NETPs in general, and a short description of a specific NETP (Wenger et al., 2021). These findings are in line with the knowledge deficit model, which suggests that public opposition to a controversial technology comes from a lack of knowledge, and that providing factual information about it will lead to greater acceptance (Parkins et al., 2018).

It should be noted, though, that the knowledge deficit model received much criticism for being overly simplistic and largely ineffective. (Suldovsky, 2016). In line with these critics, other research suggests that providing information and improving people's knowledge about NETPs and DACCS specifically will reduce public acceptance of the technology. This seems to be the case when providing more extensive information concerning the risks and benefits of the technology. Two studies compared public acceptance of different NETPs (afforestation, DACCS, Bioenergy with Carbon Capture and Storage, Solar Radiation Modification, Carbon Capture and Storage) under two conditions: one providing only basic information about the underlying mechanisms of the technology, and one including additional information about its risks and benefits. Both studies found that support for each NETP decreases when providing additional information about the key tradeoffs (Wolske et al., 2019; Braun et al., 2017). These findings can be explained with the hint-of-risk effect, which suggests that more detailed discussion about risks and benefits can invoke a bias towards negative perceptions, due to the greater relative salience of risks compared to benefits (Rozin and Royzman, 2001).

Yet other research, a review about the factors influencing public perception of Carbon Capture and Storage (CCS), suggests that there is only a weak relationship between knowledge and acceptance, with other contextual factors such as trust in the promoters of the technology being much more influential (Seigo et al., 2014). This further complicates our understanding of the effect of knowledge on acceptance. Nevertheless, the authors point to the necessity of providing participants with adequate and neutral information, arguing for an ethical obligation to do so (Seigo et al., 2014). Perhaps, we can better understand the effect of information by investigating other factors that might influence the relationship between knowledge and acceptance.

Perceived Climate Severity: Implications for Public Acceptance of DACCS and NETPs

Possibly, individual differences concerning their perceived climate severity can explain this controversial relationship. Initial evidence suggests that people with high perceived climate severity are more acceptant of NETPs than those with low perceived climate severity (Satterfield et al., 2023; Baum et al., 2024; Oltra et al., 2010; Braun et al., 2017). This might be because people high in perceived climate severity are more likely to search for solutions and hence also more strongly perceive the beneficial side of NETPs (Satterfield et al., 2023). In line with this idea, evidence from a study on public acceptance of CCS suggests that perceived climate severity has a negative effect on risk perception and a positive effect on benefit perception (Wallquist et al., 2010). Another study also found that perceived climate severity, reflected in an expressed need to prevent global warming, increases the perceived benefits of CCS, making it essential for the acceptance of these technologies (Tokushige et al., 2007). Generally, benefit perception positively influences technology acceptance, while risk perception has a negative impact (Seigo et al., 2014).

If perceived climate severity affects people's risk and benefit perceptions of NETPs, then it is likely that this factor also influences how people evaluate and interpret information about the pros and cons of these technologies. However, so far, no studies have tested whether perceived climate severity moderates the effect of information on acceptance in the context of DACCS. The potential of DACCS for quick and large-scale carbon dioxide removal with permanent storage may be a very strong argument for accepting implementation if the person believes that climate change is a serious and urgent problem. However, someone with low perceived climate severity might think that DACCS is unnecessary or not cost-effective. Information about pros and cons of DACCS would then only lead to more acceptance for people high in perceived climate severity, because the main benefit of DACCS (quick carbon dioxide removal with permanent storage) is only relevant and convincing for them. In contrast, this benefit should not be important to people who do not think climate change is urgent or existent, so the risks probably outweigh the benefits in this group, causing them to be less acceptant of the technology when hearing about DACCS pros and cons.

The importance of perceived climate severity is also reflected in the Protection Motivation Theory (PMT), which was originally developed to explain when people engage in protective behaviors based on their risk and coping appraisals (Maddux and Rogers, 1983). However, the theory has also been applied to explain when people engage in climate change mitigation and adaptation behaviors (Van Valkengoed and Steg, 2019; Regasa and Akirso, 2019). In this context, risk appraisals involve someone's perceived severity and susceptibility to climate change, which must be high to perceive climate change as a threat worth addressing with solutions (Regasa and Akirso, 2019). The coping appraisals in this case entail that the potential solutions also need to be considered effective in addressing the threat of climate change for a person to adopt adaptation and mitigation strategies (Regasa and Akirso, 2019). Thus, according to the PMT, acceptance of DACCS requires high perceived climate severity to first recognize the need for the technology. Then, DACCS needs to be perceived as effective in mitigating climate change. This perceived effectiveness, however, also depends on a high perceived climate severity because the technology might be deemed unnecessary otherwise.

Current Study

Analyzing the literature revealed that the effect of knowledge on public acceptance of NETPs and DACCS remains largely unclear. However, the findings suggest that the effect depends on the type and extent of information provided. Basic information about NETPs tends to increase acceptance, while more detailed information about its risks and benefits tends to decrease it. Although perceived seriousness of climate change can be a significant predictor of acceptance on its own, there is also evidence that it influences how individuals perceive risks and benefits of NETPs. In the case of DACCS, perceived severity of climate change may then also influence how people evaluate and interpret information about the pros and cons of the technology.

In this study, we used an experimental design to clarify how providing information about DACCS influences public acceptance of this NETP and to examine the moderating role of perceived climate severity in this relationship. Particularly, I examine three hypotheses in this study. First, I expect that people who receive only basic information on DACCS are more likely to accept it than people who also receive additional information about pros and cons of the technology. Second, I expect that perceived climate severity is positively related to acceptance of

DACCS technology. Finally, the third hypothesis addresses the interaction of perceived climate severity on the relationship between knowledge and acceptance of DACCS. Specifically, I predict that knowledge about the pros and cons of DACCS will only increase acceptance for participants with higher perceived climate severity. For participants with lower perceived climate severity, I expect that the provision of additional information will decrease acceptance.

Method

Research Design and Procedure

This study was approved by the Ethical Committee of the Faculty of Behavioural and Social Sciences at the University of Groningen (EC-BSS). Participants were recruited through convenience sampling. Individuals from the researchers' social networks and social media circles were invited by a link to participate in an online survey administered through Qualtrics survey software. The data collection was conducted over the course of ten days, beginning on May 17 and ending on May 27, inclusive. Participation in the study was completely voluntary for every participant.

The study was designed to be a cross-sectional experiment. The information was retrieved using a single survey, which was available in English, Dutch, or German. The survey was available online and took between 10 and 15 minutes to complete.

In the beginning of the questionnaire, participants gave their consent to participate in the study and stated their age, gender and nationality. After that, participants read a brief text providing information about the impact of climate change and the importance of carbon dioxide removal. Following this, participants had to indicate how much they perceive climate change to be serious and how much they are familiar with DACCS. Then, participants were randomly assigned to either a low knowledge condition, containing only information about the process of DACCS, or a high knowledge condition, containing additional information about three pros and three cons of the technology (see Appendix A). After that, participants answered questions about their acceptance of DACCS. At the end of the questionnaire there was a debriefing, informing the participants that they had been assigned to one of the two knowledge conditions. Lastly, contact details of the research team and a box for general comments were provided, giving the participant the opportunity to contact the research team for any further questions or concerns.

The questionnaire also included questions regarding participants' political orientation, the environmental values of their political group, environmental identity, and their perceived risks, benefits, and effectiveness of DACCS. However, these variables were not included in this analysis since they are out of the scope of this study.

Participants

Using the software G-power, an a priori power analysis was conducted to find the sample size required to detect a small to median effect size (f_2 =.06) with a power of 80%. This analysis returned a required sample size of 133. In total, 203 people consented to participate and completed the questionnaire. However, 53 participants were excluded because of failing attention and/or manipulation checks. Thus, 150 participants were included in the analysis in this study (66.7% women, 30.7% men, 2.7% others). The age range of participants was between 18 and 87 years old (M = 31.39, SD = 16.13). Among them, 14.7% participants were Dutch, 40.7% were German, and 19.3% were British. Other nationalities included Spanish, Bosnian, Norwegian, Russian, Luxembourgish, Czech, Slovak, Finnish, Austrian, Romanian, Portuguese, Swedish, Polish, Colombian, and Korean, with 38 participants identifying as one of these nationalities.

Measures

Familiarity with DACCS

Before giving any information about DACCS, participants were asked about their familiarity with the technology. We assumed that participant's baseline familiarity with DACCS would be very low, which was required for effective manipulation of the independent variable knowledge. The participants had to indicate their familiarity on a five-point Likert scale ranging from “never heard of it before” (1) to “very familiar” (5). Our participants’ familiarity was indeed very low, as most participants had never heard about DACCS before or at least did not know what it is (*M* = 1.80, *SD* = 0.93).

Manipulation and Attention checks

Two items were included as manipulation checks. The first item prompted participants to recall previously introduced knowledge on DACCS: “Without going back to check, please answer the following question: What have you read about in previous descriptions? (selecting multiple answers is possible)”. Options included “How DACCS works”, “Pros of DACCS”, and “Cons of DACCS”. Participants in the basic knowledge condition were supposed to select only the first option (“How DACCS works”), while those in the high knowledge condition should select all three options. In addition, a second attention check was added in the section about risk and benefit perception: “Please select ‘disagree’ as your answer” (1 = strongly disagree, 6 = strongly agree).

Perceived Severity of Climate Change

To assess perceived severity of climate change, participants indicated their level of agreement with five statements on a six-point Likert scale ranging from “strongly disagree” (1) to “strongly agree” (6), adapted from Satterfield et al. (2023). I averaged the scores on the five statements as they formed a reliable scale (Cronbach’s α = 0.772, *M* = 5.42, *SD* = 0.73). An example statement is: “The human causes of climate change need to be addressed immediately”. I came up with one additional statement concerning explicitly the urgency of climate change (“There is a great urgency to find and implement solutions to combat climate change”). The complete scale can be found in Appendix B.

Public Acceptance of DACCS

Finally, we asked participants how acceptable they find the usage and implementation of DACCS, which was the dependent variable of the study. Participants were presented with four statements for which they had to indicate their level of agreement on a six-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (6). Again, I computed the mean of the four items as they showed good internal consistency (Cronbach's $\alpha = 0.931$, $M = 4.27$, $SD = 0.85$). An example statement of this section is "I find the use of DACCS technology acceptable". The complete scale can be found in Appendix C. This revealed that participants were generally acceptant of DACCS technology.

Data Analysis

All the data preparation and statistical analyses were conducted by using IBM SPSS Statistics (Version 26). A multiple regression analysis was performed to test the effect of knowledge on the public acceptability of DACCS, and the moderating effect of perceived climate severity. To check whether a multiple linear regression analysis is appropriate to test this model, I first validated the assumptions of linearity, normally distributed residuals, multicollinearity, and homoscedasticity. A scatterplot showed that there is a linear relationship between the continuous predictor and dependent variable. Next, QQ plots showed that the residuals were normally distributed for the relevant variables. Investigating the correlation matrix revealed no significant correlations between predictors, so multicollinearity is not a problem. Finally, the assumption of homoscedasticity was validated as the scatterplot analysis did not reveal any clear patterns. All plots of the assumption checks can be found in appendix D-G. Additionally, one-way analysis of variance (ANOVA) was used to test the main effect of knowledge, for which the assumption of equal group variances had to be validated. Levene's test returned a p-value of $p = .26$, meaning that this assumption was met.

Results

Main analysis

The first hypothesis was that acceptance of DACCS would be higher for participants in the low knowledge conditions compared to the high knowledge condition. The results of ANOVA did not reveal any significant differences between the groups, and therefore the first hypothesis was rejected (F (1, 148) = 0.66, p = .42, R^2 = .004). This means that people who receive only basic information about DACCS are not more likely to accept it than people who receive additional information about pros and cons. The mean acceptance of DACCS in the basic knowledge condition was M = 4.33 (SD = 0.75), which is slightly higher than the mean scores in the high knowledge condition (M = 4.21, SD = 0.94).

The second hypothesis implied that perceived climate severity is positively correlated with acceptance of DACCS. We added perceived climate severity in the previous model and the results showed that there is no significant effect of perceived climate severity and the amount of explained variance barely changes (F (2, 147) = 0.35, p = .70, R^2 = .005). Moreover, there was no significant correlation between perceived climate severity and acceptance of DACCS, r (148) = .025, p = .76. Therefore, whether a person perceives climate change as serious or not was unrelated to acceptance of DACCS.

Finally, the third hypothesis concerned the interaction between knowledge and perceived climate severity. Specifically, individuals with higher perceived climate severity and more knowledge were expected to be more likely to accept DACCS compared to those with higher perceived severity but less knowledge. In contrast, individuals with lower perceived climate severity and more knowledge were expected to show a decrease in acceptance of DACCS compared to those with lower perceived severity and less knowledge. After adding the interaction between A and B, the overall model is still not significant (F (3, 146) = 0.24, p = .871, R^2 = .005).

Looking at the coefficient for the interaction in the complete regression model revealed that this predictor is also not significant (*B* = .022, *SE* = 0.19, 95% *CI* [-.36, .41], *t* (146) = 0.11, *p* = .911). This means that the effect of knowledge about DACCS on its acceptance does not depend on a person's perceived climate severity.

Discussion

This study aimed to shed light on how knowledge, perceived climate severity, and their interaction impact acceptance of DACCS. First, I expected that people with more knowledge would be less acceptant of DACCS compared to people with less knowledge about the technology. Second, I expected that perceived climate severity is positively associated with acceptance of DACCS. Lastly, I expected an interaction effect of knowledge and perceived climate severity on the acceptance of DACCS. Specifically, I believed that more knowledge would only be associated with greater acceptance for individuals with higher perceived climate severity. Conversely, I expected that more knowledge would be associated with less acceptance for individuals with lower perceived climate severity. However, none of the tested hypotheses turned out to be significant.

Context Matters: Integrating Our Findings with Previous Research

Previous research has found contradictory effects of knowledge about NETPs on their acceptance. Our results indicate that the amount of information that a person has about DACCS technology does not influence whether the person accepts the technology or not, providing evidence against the knowledge deficit model and hint-of-risk effect. The findings are more in line with research on CCS, which suggested that the aspects or consequences of CCS itself have limited influence on the acceptance of this technology (De Best-Waldhober et al., 2009). Instead, risk and benefit perception, as well as trust in stakeholders, were found to be the best predictors of acceptance of CCS (Seigo et al., 2014).

Indeed, the results of our study also suggest that people's evaluation of DACCS depends on more than just the information about the technology itself. Therefore, understanding acceptance of DACCS requires consideration of the broader context of the technology. For example, it is necessary to state how these technologies are embedded in a more comprehensive plan to combat climate change. This can increase perceived benefit and decrease perceived risk of DACCS by leading to clearer understanding of the actual role of DACCS (i.e. as bridging technology) and thereby reduce the fear of a continued reliance on fossil fuels and undermining of other important mitigation strategies and sustainability transitions. Such moral concerns regarding the role of NETPs have been found in other studies (Seigo et al., 2014; Cox et al., 2020; Satterfield et al., 2023) but were also evident in some comments that participants left us at the end of our study.

In contrast to previous research, our results also do not suggest any effect of perceived climate severity on acceptance of DACCS. This might be because acceptance of DACCS requires not just higher perceived climate severity, but also perceiving the technology as effective, as suggested by the protection motivation theory. In line with this idea, some research on the protection motivation theory found that coping appraisals (here: perceived effectiveness) are a better predictor of protective intentions and behavior than threat appraisals (here: perceived climate severity) (Bubeck et al., 2017).

As stated above, however, perceived effectiveness of DACCS depends on more than just information about the technology and this remains true regardless of someone's level of perceived climate severity. For example, DACCS' potential for large-scale carbon removal can only be recognized as important benefit if the role of carbon dioxide for climate change is clear, which is not the case for everyone high in perceived climate severity, as indicated by research on CCS (Seigo et al., 2014).

Moreover, even if someone has high perceived climate severity and understands how the removal of carbon dioxide through DACCS can reduce the greenhouse effect and slow down global warming, this does not necessarily mean that this person accepts the technology. This is because people can have different opinions and beliefs about the best way to achieve our climate goals (Dabla-Norris et al., 2023). In our study, for example, one participant stated that excess overproduction and waste are causing most environmental problems, so we should focus on this and let carbon dioxide be handled by trees and nature instead. Yet another person stated that instead of investing in DACCS, we need to focus on a full-scale transition towards renewable energy and minimize the creation of new emissions.

Therefore, regardless of one's perceived climate severity, acceptance of DACCS depends on important contextual factors, for example understanding the greenhouse effect, how DACCS is combined with alternative mitigation options in a more comprehensive strategy to combat climate change, or the level of trust in the stakeholders of DACCS, as suggested by the research on CCS (Seigo et al., 2014). These factors are important for acceptance of DACCS because they influence how individuals perceive and evaluate the technology and its associated risks and benefits.

Limitations

One limitation of this study is that we used convenience sampling, and thus it is hard to generalize the findings of this study. Possibly, the consensus for high perceived climate severity found in this sample does not accurately reflect the general population, but rather the views of the younger generation. In a sample with more variability regarding perceived climate severity, the explanatory effect both as single predictor and moderator might be more pronounced.

Another limitation concerns the operationalization and manipulation of the variable knowledge. Perhaps, the difference between the high and low knowledge condition was not large enough to produce a measurable effect on acceptance. Moreover, our study did not provide participants with a lot of contextual information, for example, about the exact role of carbon dioxide for climate change, the stakeholders of DACCS, or the potential place of DACCS in a more comprehensive mitigation strategy. The value of opinions from participants in the basic knowledge condition is also questionable, given that these participants still knew very little about DACCS when they had to indicate their acceptance. This was also reflected in some comments by participants, who remarked that they would have liked more information before making a decision, or at least an option to indicate neutral acceptance.

Indeed, the dependent variable acceptance could have been operationalized better as well, for example by distinguishing between different types of acceptance (i.e. acceptance for full scale implementation, for research, for supplementing other mitigation and adaptation strategies, active versus passive acceptance, …). This could have led to a better understanding of the acceptance of DACCS by revealing more detailed differences in participants' preferences or concerns about various types of acceptance.

Practical Implications

In general, participants in our study somewhat agreed with the statements reflecting acceptance of DACCS, suggesting that large-scale resistance to its implementation is unlikely. However, most people have little awareness of DACCS because it is a relatively new technology. Therefore, providing information about DACCS is crucial for people to develop informed opinions, and I agree that there is an ethical obligation to do so. The results of this experiment suggest that information about DACCS itself does not influence acceptance. This is because judgements about the acceptance of DACCS require more context than just the facts about the technology. Contextual factors such as the importance of reducing the greenhouse effect, the place of DACCS in a more comprehensive mitigation strategy, and trust in the stakeholders of

DACCS are likely to influence how individuals evaluate and perceive information about the technology and should be considered when presenting DACCS to someone who has little awareness of it. Thus, rather than merely providing information, involving the public in the discussion might be important to stress how DACCS can be effective and address some of the main concerns associated with the technology.

Interestingly, our results suggest that perceived climate severity is not directly associated with acceptance of DACCS. Rather, it appears to be more important that the technology is also perceived as effective to limit climate change. This would be expected according to the protection motivation theory. Given the consensus for high perceived climate severity in our study, this theory then implies that the focus should now be on increasing people's perceived effectiveness of DACCS to increase acceptance. However, future research should test first if the protection motivation theory can be applied to effectively predict acceptance of DACCS and other NETPs.

Conclusion

Our results did not support the previous evidence of the effect of knowledge or perceived climate severity on public acceptance. Other factors could be more important for explaining acceptance of DACCS. It is still important to inform people about the technology so that they can develop meaningful opinions, but this information needs to be contextualized and go beyond simply aspects and consequences of the technology.

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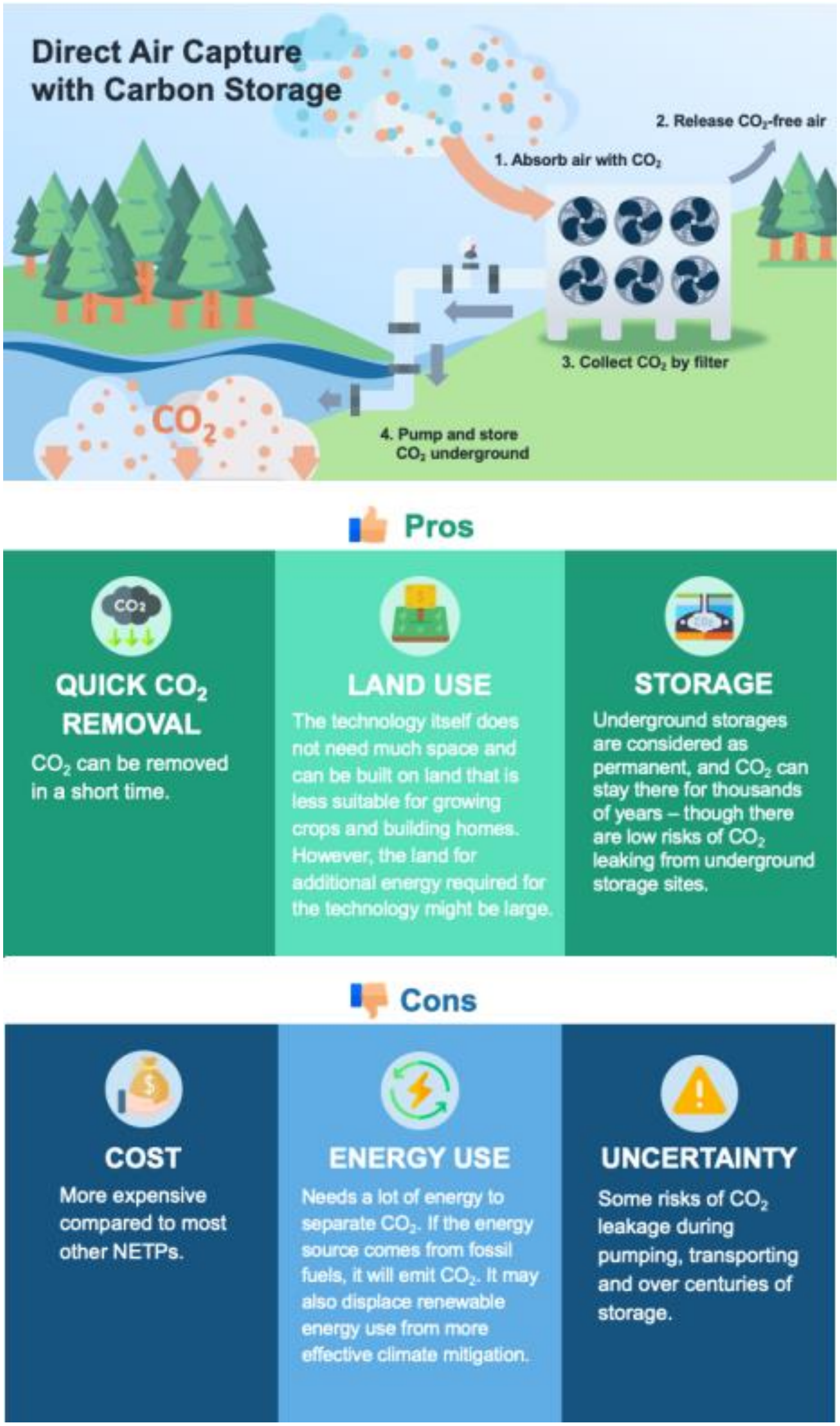
Appendix A

Infographics for the Manipulation of 'Knowledge'



Appendix B

Climate Severity Scale

First of all, we are interested in your views on climate change. Please read the statements below carefully and indicate your level of agreement on a 6-point scale from strongly disagree (1) to strongly agree (6).

	1 Strongly disagree	2 disagree	3 Somewhat disagree	4 Somewhat agree	5 agree	6 Strongly agree
Climate change does not pose any risk to the environment	o	o	o	o	o	o
Human impacts are causing changes at a worldwide scale that are destabilizing the Earth's systems	o	o	o	o	o	o
The suggestion that climate change will cause large-scale ecosystem changes is exaggerated	o	o	o	o	o	o
The human causes of climate change need to be addressed immediately	o	o	o	o	o	o
There is a great urgency to find and implement solutions to combat climate change	o	o	o	o	o	o

Appendix C

Acceptance Scale

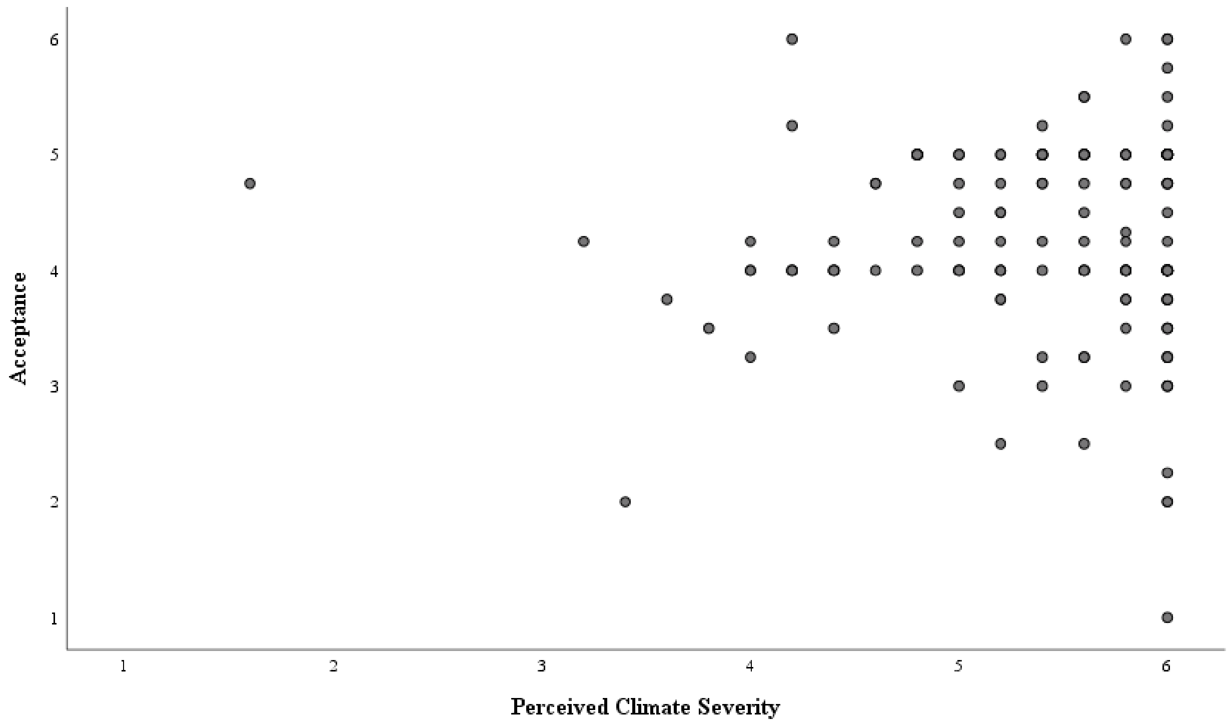
We are interested in your opinion on how acceptable it is to implement DACCS. Please read the statements below carefully and evaluate them on a 6-point scale from strongly disagree (1) to strongly agree (6).

	1 Strongly disagree	2 disagree	3 Somewhat disagree	4 Somewhat agree	5 agree	6 Strongly agree
I find the use of DACCS technology acceptable	o	o	o	o	o	o
I find it acceptable to implement DACCS technology in my country	o	o	o	o	o	o
I find it acceptable to use DACCS technology to reach global climate goals	o	o	o	o	o	o
I find it acceptable to use more DACCS technology in my country than is used now	o	o	o	o	o	o

Appendix D

Assumption Tests

Linear Relationship Between Perceived Climate Severity and Acceptance of DACCS

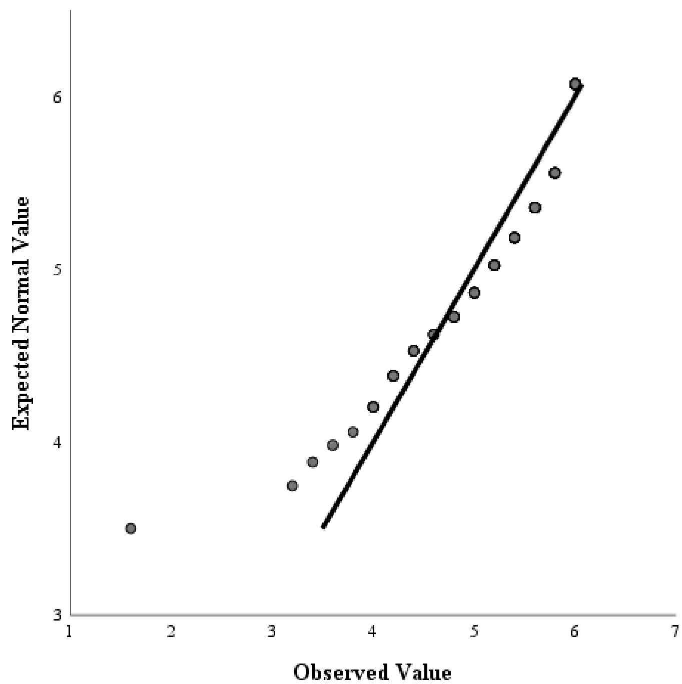


Appendix E

Assumption Tests

Normal Distribution of Residuals

Normal Q-Q Plot of Perceived Climate Severity.

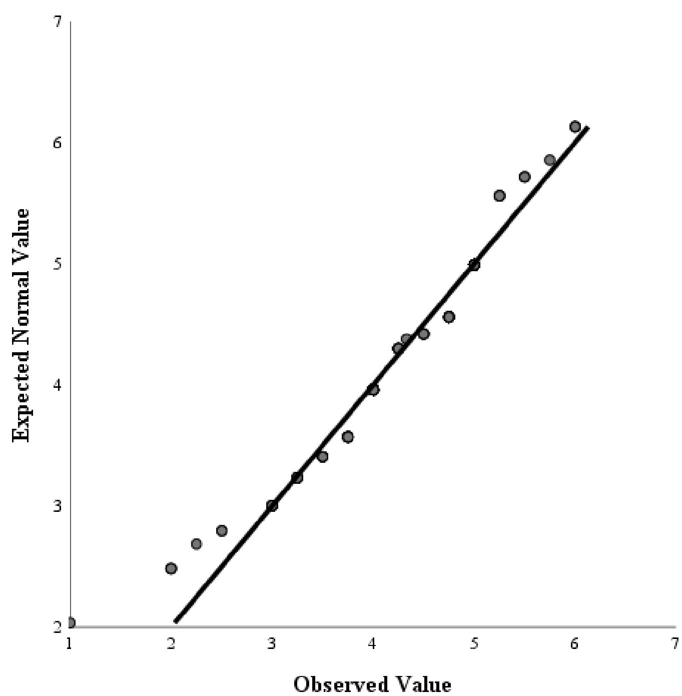


Appendix F

Assumption Tests

Normal Distribution of Residuals

Normal Q-Q Plot of Acceptance.



Appendix G

Assumption Tests

Homoscedasticity