

**We're All in This Together: Investigating the Relationships Between Climate Policy  
Acceptance, Public Participation Procedures, and Group Values**

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### **Abstract**

To combat climate change, it is essential to pass pro-environmental policies in the energy sector. There are currently two large avenues in environmental psychological research which could serve to assist this goal, however with little overlap between them: value research and public participation research. To consolidate this, the current study examined the relationship between policy acceptance, and perceived alignment between the values of one's group and one's own values. This is done in the context of public participation.  $N = 52$  participants took part in a 3 condition (top-down decision-making, referendum, citizen's assembly) between subjects online vignette study, to investigate the effect of public participation procedures on perceived value alignment with decision-makers and on acceptance of pro-environmental policy (deep geothermal heating). ANOVAs to this end revealed no effect. Further, we examined the direct effect of value alignment on policy acceptance. A linear regression analysis revealed no effect. Finally, we intended to examine whether this relationship was moderated by group identification, or by familiarity with the policy subject, neither of which we found evidence for. Exploratory analyses did reveal a near-significant negative correlation with a promising effect size of value alignment on policy acceptance, as well as a significant negative moderation by group identification, only in the assembly condition. Overall, these findings are contrary to most of the research body, and highlight the need to further investigate how various value constructs function within the context of public participation.

*Keywords:* values, value alignment, public participation, democratization, deep geothermal heating

## **We're All in This Together: Investigating the Relationships Between Climate Policy Acceptance, Public Participation Procedures and Group Values**

Throughout the 21st century, there has been a growing trend of rising costs and, more importantly, rising death tolls due to the effects of climate disasters (UNDRR, 2022). Such disasters are on the rise in both number and intensity, and the upwards trend will only worsen as climate change itself gets more severe (IPCC, 2023). The data is clear: if we wish to mitigate loss of human life, we need to mitigate the progress of climate change.

One way to address this issue is via sustainable energy production policy. The energy sector serves as an optimal avenue for change, as the main driver of climate change is carbon emissions, and the main driver of carbon emissions globally is energy production (IPCC, 2022; IPCC, 2023, p.4). Furthermore, carbon-based energy production is not only a pollutant due to its output, but its mining also creates severe environmental effects, such as disruption of ecosystems and deforestation, which are large drivers of climate change themselves. Finally, there already exist reports (see for instance Tong et al., 2019) which indicate that, even if no more carbon-emitting infrastructure is built, the expected output of already existing infrastructure throughout its expected lifetime already compromises global climate goals, such as the commonly agreed-upon 1.5C limit. That is to say, making sure new methods of energy production are sustainable is not enough, but rather that the current methods are already in need of replacement. Overall, there is ample reason to believe that the effective tackling of climate change should be spearheaded with an effective energy policy.

Successful implementation of such technologies depends on more than technical feasibility, however - in democratic settings, the matter of acceptance of low-carbon energy technologies must also be considered. Acceptance is a crucial variable from both a top-down and a bottom-up perspective. From the top-down direction, policy preferences are a determinant of voting behavior, and therefore, in an ideal democracy, more acceptable

policies will be voted upon more. Once a policy has passed, acceptance of it also becomes a crucial variable during its implementation phase. As Wüstenhagen (2007) points out, while global and general societal acceptance of a policy may direct decisions about policy-choice at the leadership level, if local acceptance by stakeholders is not considered the implementation of the actual policy may be hindered (for a concrete example of this phenomenon when it comes to energy change policy, see Lindvall, 2023). It does not merely matter what we vote for - it also matters how we feel about it after we have voted, and once it starts being implemented. Essentially, psychology provides a necessary, bidirectional backing for policy through support, which is crucial in the cyclical process of political behavior of both citizens and politicians alike.

One prominent research branch for garnering climate policy acceptance has been that of public participation. Public participation, generally defined as stakeholders' democratic input, can range from something as simple as voting for representatives, to complex processes of assemblies and consultative conferences. Not all of these procedures work as well as others (Zhang et al., 2019), and certainly none of them are without flaw (Bobbio, 2018; Böhmelt et al., 2015). These issues notwithstanding, several public participation procedures have been on the rise in both popularity and prominence (Walker et al., 2015), as has research examining ways to make participation processes more effective and accepted. This research body is, however, still young, and the mechanisms behind public participation's functioning are still unclear (although there are some promising findings, Liu et al., 2020).

Within the context of public participation, the current study focuses on two common public participation procedures - referenda and citizen's assemblies - and contrasts them to traditional, top-down decision-making. Though there are a large variety of procedures by which one can get the public to engage, these options were chosen because they represent a traditional divide in participation design: that of open-door settings vs. mini publics (Bobbio,

2018). A referendum qualifies as an open-door setting - anyone who wishes to can participate (eg. by voting directly on a policy), and the final result is based on the sum of inputs of all participants. A citizen's assembly, on the other hand, reflects a mini public - a smaller, representative group of individuals is selected from the general population (usually invited through random selection), who then get the chance to engineer, steer and dis/approve a certain policy. Importantly, these two methods also vary in many aspects deemed important for good public participation, such as diversity (as referenda are inherently self-selected, while assemblies are constructed to be representative), decision-making power (as referenda only come into effect at the final decision of a policy, while assemblies can influence the policy right from its initial design steps) (Perlaviciute, 2021). In this manner, though they both highly contrast top-down decision-making by actually involving citizens, the two procedures are vastly different. Our goal is to gain understanding of the underlying mechanisms which make or break the efficacy and desirability of public participation, and their effects on policy acceptance.

### **Values**

Within the context of participation, a possible explanatory mechanism for why and when individuals find publicly passed policies acceptable are people's values, defined as beliefs specifically about desirable end goals, which are stable across situations, and that guide behavior towards the aforementioned desired end goal (Schwartz & Bilsky, 1987). Essentially, values affect behavior in broad situations, by serving as guiding principles (Lee et al., 2021). Four values have previously been found to be relevant for climate related behaviour: altruistic values (such as the concern for the wellbeing of others), hedonic values (for example the desire to have fun), egotistic values (which have to do with self-accomplishment), and biospheric values (specifically relating to principles about nature and the environment) (Stern et al., 1993; de Groot & Steg, 2007).

Relevantly for climate research, biospheric values have been found to positively affect a great many beliefs, intentions, and actions in the environmental domain, such as consumer behavior (Wu & Zhu, 2020; Stadlthanner et al., 2022) and notably pro-environmental policy support (Schuldt et al., 2019; Sharpe et al., 2021). Altruistic values behave much in the same way as biospheric ones, but as Steg & de Groot (2012) point out, if the domain is sufficiently environmentally focused, biospheric values do win out. The opposite holds true for egotistic and hedonic values, which result in lower levels of pro-environmental action, due to concern for personal costs to resources, comforts, or opportunities. (Nordlund & Gavill, 2002, or see Dietz, 2015 for a review, as cited in Steg, 2023). According to Perlaviciute and Steg (2014), values serve as the lens through which each individual interprets and prioritizes these various aspects of policies. In the cases of personal decisions, this process is guided by our own values - in the cases of public participation then, the public's values must be taken into account to ensure relevant aspects of policy are actualized appropriately.

Connecting to the idea of the public's values, a relatively new avenue in value research has been the introduction of group values - the extent to which people perceive a group they belong to to endorse a certain value. These group values seem to correlate with beliefs and attitudes much the same way as the values of the individual (Schuldt et al., 2019, Bouman et al., 2021a). Perhaps unsurprisingly, individuals are rather inaccurate in the judgement of said values, and in fact, when it comes to values they find especially important, most people rate their groups consistently lower than they rate themselves, and also lower than the actual average of other members' personal value ratings (Hanel et al., 2018; Bouman et al., 2021b). This is especially relevant considering the fact that biospheric values are generally relatively highly endorsed by most individuals (Bouman et al., 2021a), which may make them vulnerable to being perceived to be lower in the group than what they are in actuality. The reliance on personal perceptions, however, also opens group values up to the

possibility of malleability - an important contrast to personal values, which are by their definition stable and internal. This combination of inaccurate perceptions and potential malleability means that, if one wishes to achieve more pro-environmental behavior, true manipulation of group value perception may not even be necessary, and merely informing individuals of the actual group level might be sufficient. Whether by information or manipulation, if one wishes to garner policy acceptance, group values are a promising avenue.

As public participation is inherently a group process, group values also serve as a sensible avenue for research in this area. Furthermore, the important contextual elements of policies (costs, distributive justice, etc.) are value-relevant characteristics (Perlaviciute & Steg, 2014) - in the context of public participation, this should make group values both salient, and easily activated (an important aspect, see Steg & de Groot, 2012). Despite this, at time of writing, there is currently no overlap between these two burgeoning research traditions. It is unclear what role group values play during democratic procedures, whether they matter at all, and if so, in what contexts and in what way. The answers remain unknown, and the current study is intended to shed some light on this area.

For the purposes of this study, we have chosen to approach values through the construct of value alignment - the extent to which people perceive the group's values to align with their own values. The alignment approach provides a unique opportunity to examine whether or not counter-value decisions would be more accepted if they are made by a group with whom we find ourselves aligned. To illustrate, according to current literature, even if I myself am low in biospheric values, and I perceive my community to be also low in biospheric values, if my community still passes a pro-environmental policy (signaling that they find it acceptable from whatever value standpoint they have that I relate to), I should also, by extension, be more accepting of the policy. This is crucial for the achievement of



local acceptance (Wüstenhagen, 2007) - even if one is opposed to a certain (environmental) policy, if their similarly aligned group is the one that passed (or even engineered) that policy, the individual may be less likely to hinder its implementation, and therefore the policy could lead to greater success. It is obvious that a high-high combination of both personal and group values would lead to overall higher acceptance of value-relevant policy. What is not obvious, but is clearly plausible, is that a low-low combination might do the same, in the circumstance that counter-value policy is, nonetheless, passed by the community.

### ***Identification & Familiarity***

There are multiple other factors which could reasonably affect the relationship between value alignment and policy acceptance. For instance, there is ample evidence that the closer we are to a group, the more its values affect our behavior (Schuldt et al., 2019; Bouman et al., 2020). This should hold especially true in the context of public participation, where there are clear group differences in proximity based on procedure - it would stand to reason that one would identify with their fellow citizens more than with the political elite. Furthermore, identification should, in theory, be most useful for our value alignment construct. In effect, a lack of identification could influence both the high-high value combination - as solely high personal values would play a relevant role, leading to a weaker effect - and the low-low value combination - as solely low personal values would play a relevant role, and they would not be offset by the fact that the low group value members still passed a counter-value policy.

Finally, we wish to investigate the role of familiarity in this process as well. There is currently some contradictory information on this variable. Stern and colleagues (1998) state that values should guide behavior more in the case of “new attitude items” (p. 986), about which one has not yet formed a concrete, nuanced opinion. On the other hand, it is clear from the theory of Schwartz (1994) and research such as Steg and de Groot (2012) that values

influence behavior in value specific circumstances - which is to say there is concern that if one is not familiar with a certain attitude item, it may not sufficiently activate their relevant value orientation either. For instance, our study looks at the perceptions of participants regarding geothermal heating technology - a rather new direction in climate research and policy, compared to decades of coal, wind, solar and nuclear familiarity. If participants do not recognize geothermal technology as being sufficiently of a sustainable nature, the role their biospheric values would play in the perception of the policy may be muted. This holds true from the other direction as well - if participants aren't knowledgeable about the drawbacks of geothermal energy (for example long and noisy construction, a big comfort cost), their appropriate values (hedonic, in the previous instance) would not play as big of a role in the relationship either.

### **Hypotheses**

To sum up, based on the current gap of understanding about the mechanisms of public participation, the importance of values and the potential inherent in value alignment, and the roles of group identification and content familiarity, the hypotheses of the current study are as follows:

**H<sub>1</sub>:** There will be a difference in policy acceptance based on the decision-making procedure by which the policy has passed.

**H<sub>2</sub>:** There will be a difference in perceived value alignment with the final decision-makers of a policy, based on the decision-making procedure.

**H<sub>3</sub>:** Higher perceived value alignment will be associated with higher policy acceptance.

**H<sub>4</sub>:** The relationship between value alignment and policy acceptance will be positively moderated by group identification.

**H<sub>5</sub>:** The relationship between value alignment and policy acceptance will be positively moderated by familiarity with the policy content.

## Method

### Participants

An a priori power analysis using the programme GPower showed a minimum required sample size of 159 in order to be able to detect a medium effect size with a power of 0.8 at  $\alpha = 0.05$  in the analyses of  $H_1$  and  $H_2$  (due to different analysis methods,  $H_3$ ,  $H_4$ , and  $H_5$  would have required a smaller total sample to achieve the same parameters). To account for attrition and/or exclusion of participants, we set our intended number of responses to 200, which was not attained due to unforeseen complications. Of the 79 respondents, 27 were excluded from analysis due to failing the included attention check or incomplete participation, leading to a total sample size of  $N = 52$  participants. In light of this number, the actual power of  $H_1$  and  $H_2$  is 0.33, while the power of  $H_3$ ,  $H_4$ , and  $H_5$  is 0.78. The convenience sample partially consisted of first year psychology students at the University of Groningen, who are required to participate in psychological studies. In return for their participation, these students gained 0.7 out of the 38 total credits necessary for passing the requirement. A second subset of participants were collected from the same faculty through snowball sampling, using the researchers' personal circles.

Of the participants,  $N = 40$  (76.9%) were female,  $N = 11$  (21.2%) were male, and  $N = 1$  (1.9%) reported another, unspecified gender identity. The mean age among the participants was  $M = 20.96$  ( $SD = 2.433$ ).

$N = 29$  (55.8%) of the participants were of Dutch nationality, with the next largest nationality being German ( $N = 11$ , 21.2%), while the remaining  $N = 12$  (33%) participants reported a variety of different nationalities.

### Study Design

We conducted an online vignette study in Qualtrics using a 3 condition<sup>1</sup> between subjects design, differing in decision-making procedure (top-down, referendum and a student assembly mirroring traditional citizens' assemblies), that vary in important aspects, such as proximity to the group (faculty board in top-down vs. all fellow students in referendum vs. a smaller representative group of students in assembly).

At the start of the study, participants were asked to provide their informed consent. Participants then filled out demographic questions of gender, age, and nationality, as well as some background measures including personal values and familiarity with various energy production technology (see Appendix A, Table 1 for full overview of variables measures, but not part of the scope of the present study), after which they were randomly allocated to one of the three conditions.

First, participants were asked to “imagine that in order to combat climate change, the Behavioral and Social Sciences (BSS) faculty at their university wants to implement a policy to reduce its carbon footprint”. Next, they were presented with a description of one of the decision-making procedures, which were kept the same as much as practically possible, varying across only those factors that are part of the current study focus (see Appendix B for full vignettes). After having read the first part of the scenario, about the procedure only, participants were asked to fill in a questionnaire about their perceptions of said procedure, which included, amongst others perceived value alignment and perceived identification (see Appendix C, Table 2 for a complete overview of variables measured, but not included in the present analyses). Afterwards, they were presented with the second part of the scenario, which elaborated upon the decision/outcome of the procedure (the policy having been passed), after which they were asked to answer questions regarding their perceptions about

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<sup>1</sup> The full survey contained five conditions in total. Three of the five conditions were variations on referenda - for the purposes of this study, only the simple referendum condition was used (full vignettes of all five conditions can, however, be found in Appendix B).

the outcome, including, amongst others, policy acceptance (see Appendix D, Table 3 for full overview of variables measured, but not part of the scope of the present study).

## Measures

**Familiarity with policy content** was measured using one item with several 7 point Likert-like scales, ranging from 1 (never heard of it) to 7 (know it very well), on which participants indicated the extent to which they considered themselves familiar with several energy technologies, including wind turbines, natural gas, deep geothermal heating, oil, solar panels, coal, hydrogen, nuclear energy. Since the policy presented later to participants concerned deep geothermal heating, only the responses to that specific item were used in analysis ( $M = 3.020$ ,  $SD = 1.732$ ).

**Value alignment** was measured using two items, with 7 point Likert-like scales, ranging from 1 (completely disagree) to 7 (completely agree), on which participants indicated the extent to which they agreed with the statements that the decision makers “find the same things important in life as [them]” and “have the same values as [them]”. We computed the mean score of these two items, reflecting perceived value alignment with the decision makers ( $M = 4.308$ ,  $SD = 1.185$ ).

**Group identification** was measured using one item with a 7-point Likert-type scale ranging from 1 (completely disagree) to 7 (completely agree) on which participants indicated the extent to which they agreed with the statement “I identify with the [decision-makers]” ( $M = 4.404$ ,  $SD = 1.209$ ). The decision-makers presented were either the “faculty board members”, the “students that participate in the referendum”, or the “students that participate in the assembly”, varying based on condition.

**Attention check.** The attention check consisted of a 7-point Likert-type scale ranging from 1 (completely disagree) to 7 (completely agree). Participants were asked to select completely agree, failing the attention check in the case that they did not do so.

**Policy acceptance.** Policy acceptance was measured using a 7-point Likert-type scale ranging from 1 (very unacceptable) to 7 (very acceptable). Participants were asked to indicate “how un/acceptable would [they] find implementing deep geothermal heating at the faculty” ( $M = 5.000$ ,  $SD = 1.400$ ).

## Results

To test our hypotheses, we conducted several one-way ANOVAs and general linear regression analyses using the statistical software SPSS. When investigating whether there was a difference in policy acceptance based on the decision-making procedure ( $H_1$ ), an ANOVA revealed no effect ( $F(2, 49) = 1.867$ ,  $p = 0.165$ ). Similarly, an ANOVA testing whether there was a difference in value alignment based on the decision-making procedure ( $H_2$ ), we found no effect ( $F(2, 49) = 0.086$ ,  $p = 0.918$ ).

When it comes to value alignment, a linear regression found no significant main effect of value alignment on policy acceptance ( $H_3$ ,  $\beta = -0.065$ ,  $p = 0.647$ ). Then, to test whether the relationship between policy acceptance and value alignment would be moderated by identification or familiarity, we once again ran a general linear regression analysis with an extended model, including interaction variables. As for a positive moderation by group identification ( $H_4$ ), the regression revealed no effect ( $\beta = -0.109$ ,  $p = 0.454$ ). Finally, concerning a positive moderation by familiarity with the content policy ( $H_5$ ), again, no effect was found ( $\beta = 0.013$ ,  $p = 0.936$ ).

## Statistical Assumptions

In order to test the normality and equality of variances within conditions assumptions necessary for our ANOVA analyses, we conducted a Shapiro-Wilk and Levene’s test, respectively. No significant effects were found in either analysis, indicating no violation of the assumptions.

When it comes to the linear regression analyses, we conducted a Shapiro-Wilk test to

test for normality of the variables, and correlation analysis to check for multicollinearity. The results of the Shapiro-Wilk test revealed significant violations of normality in all variables ( $p = 0.004$  for policy acceptance,  $p = 0.018$  for value alignment,  $p = 0.007$  for identification and  $p = < 0.001$  for familiarity). Furthermore, the correlation analysis revealed significant multicollinearity between value alignment and group identification ( $r = 0.428$ ,  $p = 0.002$ ).

## Discussion

The current study set out to investigate the effects of perceived value alignment on policy acceptance, within the context of public participation, using a 3 condition (top-down decision-making, referendum and citizens' assembly) between subjects study. We found no significant differences in policy acceptance depending on the decision-making procedure ( $H_1$ ), as well as no significant differences in value alignment based on the decision-making procedure ( $H_2$ ) either. We further found no evidence of a positive correlation between value alignment and policy acceptance ( $H_3$ ), no evidence of a moderation by group identification ( $H_4$ ), and no evidence of a moderation by familiarity with the policy content ( $H_5$ ). There could be several plausible explanations for these results.

When it comes to policy acceptance based on decision-making procedure ( $H_1$ ), it is possible that our design simply did not capture the aspects which would be important for this relationship. As Liu and colleagues (2020) point out, *procedural fairness* in particular is a crucial variable determining the favorability of public participation processes. It may be likely that we didn't attain sufficient between-groups variance in this regard - specifically, the contrast between the top-down procedure and participation procedures might not have been enough. As the decision-makers in our top-down condition are still members (employees) of the same faculty as the participants, they would logically be beholden to the same potential consequences (both negative and positive) as their constituents - this is not always the case for a national political elite. Furthermore, there could be a coincidental history effect present

here as well. Participant collection took place close to university elections - a legally enshrined practice in Dutch higher education, during which students and staff get the chance to elect representatives to be in close contact with, monitor, and influence the boards of their faculties and universities. As the elections brought with them widespread advertising, posterage, and in location canvassing, it is possible that the student body from which participants were drawn were inherently aware and especially conscious of the fact that the faculty board (depicted as the decision-makers in the top-down condition) had serious checks and balances by diverse members of the academic community. In this sense, even in the top-down conditions, participants had relatively close electoral representation (in the form of their democratically elected fellow students), which may have been perceived as already sufficient for the achievement of fairness. It is possible that, as long as students had the chance to participate in *any* way, the involvement (or lack thereof) of the participants themselves did not result in any perceived issues to fairness whatsoever, which therefore resulted in no difference in policy acceptance. To amend this in future research, it would be crucial to investigate just how and under what circumstances individuals find their traditional, elected representation fair and sufficiently representative, and whether/how this connects to public participation procedures.

The lack of difference in value alignment based on procedure ( $H_2$ ) could have encountered similar issues, meaning the differences between the decision-makers may not have been large enough to also suggest differences in value alignment. It is also noteworthy that the faculty we sampled from is quite large, consisting of some ~4500 students, many of whom come from diverse, international backgrounds - this is to say that perhaps just the description of “students” was too broad to sufficiently imply an important enough ingroup membership amongst participants, which could have resulted in participants having difficulty determining what that large group in general find important. Contrast effects can be utilized



to test this relationship in the future - by presenting participants with a more explicit and further removed outgroup, they may find it easier to interpret their own groups' alignment in comparison, and therefore provide more meaningful results.

Concerning the relationship between value alignment and policy acceptance ( $H_3$ ), the lack of effect could be explained by methodological reasons. It is possible participants simply didn't see the presented policy as sufficiently value-relevant. This may be extrapolated by the overall low familiarity with the policy content (deep geothermal heating), a variable which was heavily right skewed, with 30% of participants (the mode of the responses) indicating they have "never heard of it", the lowest possible rating. Although participants received information about the process by which the policy was passed, they were presented with little to no details about the policy itself, or its implications and consequences (see vignettes in Appendix B). Steg already points out that activation of values is integral to their proper effect, while Steg and de Groot (2012) clearly state (as mentioned above) that values are relevant in value-related contexts. Essentially, the lack of pre-existing knowledge about the subject of the policy and lack of knowledge provided within the study itself may have resulted in people's values not being activated at all. To illustrate, it stands to reason that, without knowledge of a sustainable energy alternative, I may not recognize it as sustainable at all, therefore not activating my biospheric values. Similarly, if I don't know the specifics of the implementation of said energy alternative, I wouldn't know to have, for instance, worries about annoyances stemming from my hedonic values.

There could furthermore be conceptual reasons for these findings, stemming from the construct of value alignment itself. While value alignment may provide unique benefits stemming from a bidirectional approach of high-high and low-low combinations, it is possible it doesn't capture the full functioning of distinct personal and group values. For instance, as Bouman and colleagues (2020) point out, group values are more influential in the

circumstance that a value isn't already highly endorsed by an individual. To illustrate, this could essentially mean that even if I don't care about environmental policy, but my group does, I will most likely simply concede without much issue. The opposite can also be true: if my group doesn't necessarily find the environment important, but I very much do, I may simply go against their wishes and still support pro-environmental issues. These circumstances would lead to situations with low value alignment, but otherwise high policy acceptance. Future research may benefit from taking a more indirect approach to value alignment, such as by using tools like group-specific, modified versions of the Environmental Portrait Value Questionnaire (Bouman et al., 2018), to better understand the relation between personal and group values, and both their effects on policy acceptance.

The lack of an interaction effect between value alignment and group identification ( $H_4$ ), could be caused by design differences, specifically in how identification was measured. Our study only used one, direct item for the measurement of group identification. Studies such as that conducted by Leach and colleagues (2008) warn against this approach, stating that identification may be more multifaceted - while individuals may identify with their groups in one way (eg. viewing themselves as a stereotypical member), they may not in other way (eg. thinking membership is central to their own self-conception). In fact, in the original study which identified group identification as an important component for the effect of group values, Bouman and colleagues (2020) used five items to measure identification (though their exact items are not defined). Furthermore, the aforementioned study's participants were presented with more clearly ideological group categories (such as liberals or conservatives), which may have inferred easier and clearer identification than merely the group category of students. Although the effect of broad group identification could still prove valuable in practice, future research could benefit from a more all-encompassing measure, such as one that covers all the components proposed in Leach et al. (2008).

When it comes to the role of familiarity as a moderator (**H<sub>5</sub>**), the high skewness of our data on this variable specifically, as mentioned above, could be the simplest explanation for the lack of results, under the assumption that the theory of Stern and colleagues (1998) still holds. Furthermore, it is possible that our policy no longer sufficiently qualifies as a new attitude item - although familiarity with the content was indeed quite low, the intro section of our survey did explicitly tell participants that the policy is meant to reduce their faculty's carbon footprint (see Methods section above). It is never specified just *how new* an attitude item has to be for values to have an especially strong effect (Stern et al., 1998) - perhaps this simple snippet already served to weaken this connection. In future investigations of policy acceptance and policy familiarity, a wider range of policy options could be presented to serve as a base for comparison.

As a general note, it is also possible that when it comes to public participation, value alignment is not a catch-all mechanism, and instead functions differently when in the context of different decision-making procedures, obfuscating the data when it is merely considered on its own. Indeed, an exploratory linear regression split by condition indicated, specifically within the student assembly condition, a potential significant negative correlation between value alignment and policy acceptance, were the study to have higher power ( $\beta = -0.613$ ,  $p = 0.051$ ) with group identification being a significant negative moderator ( $\beta = -0.475$ ,  $p = 0.015$ ). No other significant results were found in the assembly condition, nor in either of the top-down or referendum conditions. The direction of these relationships is counter-intuitive to the current understanding of values. With the identification variable, contrary to Bouman and colleagues (2020), perhaps individuals deem aligned values more important when they aren't already highly identified with the group, in order to better insure preferable outcomes (low identification + high value alignment), and/or they may be more forgiving of unaligned values if they are already identified with the group (high identification + low value

alignment). Both/either of these possible explanations would lead to a negative moderation, though the fact that they are contrary to the current research body warrants further investigation. The negative direction of the value alignment correlation is not so easily explained. Liu and colleagues (2022), have identified *competence-based trust* as a significant correlate of policy acceptance in public participation - it is possible that our participants simply did not believe that their group (that is, fellow students) was competent enough to make such big policy decisions. Both the effect of identification and the effect of value alignment in general could be further extrapolated by the fact that students in the assembly condition have, by far, the most decision-making power, being able to engineer the policy right from the start. In fact, this crucial element of the assembly condition could explain wholesale the presence of this relationship here, but not in any other conditions. Individuals may only view value alignment as important under circumstances like this, when they themselves do not get the chance to participate at all (contrary to the referendum condition), but at least some subsection of a relatively close group of theirs, such as fellow students, does still have considerable effect policy content (contrary to the top-down condition). With the popularity of citizen's assemblies on the rise, this unique dynamic is also worthy of further investigation.

Finally, the statistical limitations of the current study must also be mentioned - with the sample size being smaller than intended and resulting in low power as well, it might be possible (though not likely, given the seemingly small effect sizes) that there are indeed effects that were simply not detected. The small sample also leads to other statistical problems, namely that none of our variables are normally distributed. Significant multicollinearity was also present between two of the variables investigated, value alignment and group identification. Though this makes sense from a psychological perspective (as individuals would most likely identify closer with groups whose values they are aligned with,

or adopt the values of those they closely identify with), both multicollinearity and lack of normality make for unideal circumstances for linear regression analysis.

From both a practical and theoretical standpoint, it should also be noted that our sample is not representative. A sample of only university students leads to generalizability issues stemming from the low mean age of the sample, as well as the likely relative affluence, and (soon-to-be) high education status, none of which capture the full range of the general population. Stemming from this setting, there are also issues with the presentation of the conditions, like the previously mentioned relatively close proximity to even the furthest removed decision-makers. A future study could benefit from a bigger, more representative sample and a scenario that captures the full lived experience of the whole political system.

Though we found no evidence for our initial hypotheses, at the very least the current study highlights the complex and numerous nature of psychological mechanisms within the context of democratization of decision-making. The research gap between group values and public participation remains. In sum, future research could benefit from a deeper dive into how, if at all, do values function within the framework of public participation. Because they serve as a logical meeting point of the two directions, group values should be given specific attention. Specifically, it should be investigated whether it is group values that matter on their own, or if value alignment is equally important, whether unfamiliar policies hinder this relationship, and if so, how to combat this, and whether there is a causal relationship. It should then be researched in which specific procedures do group values matter to the most, and does identification make them superfluous in some cases. As the 21st century keeps heating up, we urge researchers to attempt to close this gap, as both of these avenues could serve not only to predict, but also motivate more climate-friendly policy choices. Our study is but one in a long line of future research which is necessary for the safety of our planet and the

lives of the people who live upon it, while still upholding our foundational, democratic values as a society.

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**Appendix A**  
**Background Measures**

**Table 1***Background Measures Exact Phrasings*

Variable	Phrasing
Values intro text	Below are several statements that describe a certain hypothetical person; specifically about their values, what they generally find important in life. On a scale of 1 to 7, please indicate the extent to which you consider yourself this person to be dis/similar to yourself. It is important to this person...
Biospheric value 1	...to prevent environmental pollution.
Biospheric value 2	...to protect the environment.
Biospheric value 3	...to respect nature.
Biospheric value 4	...to be in unity with nature.
Altruistic value 1	...for everyone to have equal opportunities.
Altruistic value 2	...to take care of those people who are worse off.
Hedonic value 1	...to have fun.
Hedonic value 2	...to enjoy life's pleasures.
Egotistic value 1	...to be influential.
Egotistic value 2	...to work hard and be ambitious.
<b>Familiarity</b>	<b>Below are several energy sources and/or technologies. On a scale from 1 to 7, please indicate the extent to which you are familiar with them.</b>
Eco-guilt intro text	Next, we are interested in your feelings in relation to climate change. On a scale from 1 to 7, please indicate the extent to which you dis/agree with the following statements. I feel...
Eco-guilt 1	...guilty for not paying enough attention to the issue of climate change.
Eco-guilt 2	...like I should be doing more than I have done to address the problem climate change
Eco-guilt 3	...I sufficiently fulfill my duty to alleviate climate

Variable	Phrasing
Conformity intro text	Finally, we are interested in how you generally relate to others. On a scale from 1 to 7, please indicate the extent to which you dis/agree with the following statements.
Conformity 1	I tend to go along with my friends when I have to quickly decide on something.
Conformity 2	I often ignore the advice of my peers.
Conformity 3	Fitting in with my group is important to me.
Conformity 4	I don't care what people in my inner circle think of me.

*Notes.* Variables of interest are presented in the table in bold. For the ‘Familiarity’ variable, the exact options presented were wind turbines, natural gas, deep geothermal heating, oil, solar panels, coal, hydrogen, nuclear energy. Typos in the ‘Eco-guilt 2’ and ‘Eco-guilt 3’ phrasings are true to how participants received the survey due to oversight

## Appendix B

### Condition Vignettes

#### Top-down Condition Vignette

Imagine that, in order to combat climate change, the BSS faculty needs to implement a policy to reduce its carbon footprint.

This is being decided by the **BSS faculty board**.

Specifically, the **BSS faculty board members suggest and discuss several options** to reduce the faculty's carbon footprint. One of these options concerns *deep geothermal heating*; a technology that heats buildings with warmth that is naturally present at 500 meters below the earth's surface.

After discussing amongst each other, the board puts the *geothermal heating* option up for a board vote. **All board members can vote on whether the policy will be implemented.**

#### Simple Referendum Condition Vignette

Imagine that, in order to combat climate change, the BSS faculty needs to implement a policy to reduce its carbon footprint.

This is being decided by means of a **faculty-wide referendum**.

Specifically, the **BSS faculty board members suggest and discuss several options** to reduce the faculty's carbon footprint. One of these options concerns *deep geothermal heating*; a technology that heats buildings with warmth that is naturally present at 500 meters below the earth's surface.

After discussing amongst each other, the board puts the *geothermal heating* option up for a faculty-wide referendum vote: **all students at the BSS faculty can vote on whether the policy will be implemented.**

#### Referendum with Expert Pamphlet Condition Vignette

Imagine that, in order to combat climate change, the BSS faculty needs to implement a policy to reduce its carbon footprint.

This is being decided by means of a **faculty-wide referendum**.

Specifically, the **BSS faculty board members suggest and discuss several options** to reduce the faculty's carbon footprint. One of these options concerns *deep geothermal heating*;

a technology that heats buildings with warmth that is naturally present at 500 meters below the earth's surface.

After discussing amongst each other, the board puts the *geothermal heating* option up for a faculty-wide referendum vote: **all students at the BSS faculty can vote on whether the policy will be implemented.**

Before the referendum takes place, **all students are provided with a voter pamphlet**: a one-page report that summarises pros and cons of implementing deep geothermal heating at the faculty.

This voter pamphlet was **produced by an expert review panel**.

Specifically, various experts were invited to take part in the panel. The **panel members met for several consecutive weekends to review** the geothermal policy proposal. After discussing amongst each other, the panel members summarized the pros and cons that they deemed most important into a one-page pamphlet.

### **Referendum with Student Pamphlet Condition Vignette**

Imagine that, in order to combat climate change, the BSS faculty needs to implement a policy to reduce its carbon footprint.

This is being decided by means of a **faculty-wide referendum**.

Specifically, the **BSS faculty board members suggest and discuss several options** to reduce the faculty's carbon footprint. One of these options concerns *deep geothermal heating*: a technology that heats buildings with warmth that is naturally present at 500 meters below the earth's surface.

After discussing amongst each other, the board puts the *geothermal heating* option up for a faculty-wide referendum vote: **all students at the BSS faculty can vote on whether the policy will be implemented.**

Before the referendum takes place, **all students are provided with a voter pamphlet**: a one-page report that summarises pros and cons of implementing deep geothermal heating at the faculty.

This voter pamphlet was **produced by a student review panel**.

Specifically, students were invited to take part in the panel. **50 students were randomly selected from the entire faculty, by lottery.** This lottery used quotas to select a 'mini-public' that mirrors the wider population: the panel's percentages of different groups of people (of different age, gender, nationality, etc.) were similar to these groups' percentages in

the broader population. For example, if 30% of the faculty are first year students, about 30% of the assembly members are also first year students.

Supported by various experts, the **panel members met for several consecutive weekends to review** the geothermal policy proposal. After discussing amongst each other, the panel members summarized the pros and cons that they deemed most important into a one-page pamphlet.

### **Student/Citizen Assembly Condition Vignette**

Imagine that, in order to combat climate change, the BSS faculty needs to implement a policy to reduce its carbon footprint.

This is being decided by means of a **student assembly**.

Specifically, students were invited to take part in the assembly. **50 students were randomly selected from the entire faculty, by lottery**. This lottery used quotas to select a ‘mini-public’ that mirrors the wider population: the panel’s percentages of different groups of people (of different age, gender, nationality, etc.) were similar to these groups’ percentages in the broader population. For example, if 30% of the faculty are first year students, about 30% of the assembly members are also first year students.

Supported by various experts, the **panel members met for several consecutive weekends to suggest and discuss several options** to reduce the faculty’s carbon footprint. One of these options concerns *deep geothermal heating*; a technology that heats buildings with warmth that is naturally present at 500 meters below the earth’s surface.

After discussing amongst each other, the assembly puts the *geothermal heating* option up for an assembly vote. **All assembly members can vote on whether the policy will be implemented.**

## Appendix C

### In-between Measures

**Table 2**

*In-between Measures Exact Phrasings*

Variable	Phrasing
Intro text	The following questions are about your thoughts about the situation described above. Before we ask you questions about the situation in general, we are interested in your perceptions of the people involved in the situation in particular. On top of each page, we will again present you with the description of the situation. You are free to reread it, in case this helps you answer the questions about it.
Decision-makers perception intro text	The questions below are about the [decision-makers]. On a scale from 1 to 7, please indicate to which extent you dis/agree with them. I feel that the [decision-makers]... ...carefully weigh and balance different pros and cons of different policy options.
Deliberation 1	...carefully reflect on different environmental policies from different angles.
Deliberation 2	...are diverse.
Diversity	
<b>Value alignment 1</b>	<b>...find the same things important in life as me.</b>
<b>Value alignment 2</b>	<b>...have the same values as I have.</b>
Influence 1	...have considerable influence over the decision that is being made.
Influence 2	...can significantly steer the outcome of the decision-making process in a certain direction.
Trust (Integrity) 1	...are honest and sincere.
Trust (Integrity) 2	...take different interests into account.
Trust (Competence) 1	...are competent.
Trust (Competence) 2	...have the right knowledge and expertise.



Variable	Phrasing
Descriptive representation 1	...are similar to me.
Descriptive representation 2	...resemble BSS students at large.
Substantive representation 1	...have the same policy preferences as I have.
Substantive representation 2	...have the same policy preferences as BSS students.
Individual interest	...act in my interest.
Collective interest	...act in the interest of BSS students.
<b>Identification</b>	<p><b>Please indicate to which extent you dis/agree with the following statement: I identify with the [decision-makers].</b></p> <p>Next we are interested in your overall perceptions of the overall situation you just read about. At the top of each page we will again present you with the description of the situation. You are free to reread it in case it helps you answer the questions about it.</p> <p>Considering the situation described earlier, on a scale from 1 to 7, please indicate to which extent you dis/agree with the following statements. I feel that, in the situation described above...</p>
Overall measures intro text	
Control/voice perception intro text	
Control (Individual)	...I would be able to affect the decision that is made.
Control (Collective)	...BSS students would be able to affect the decision that is made.
Voice (Individual)	...I would be able to express my thoughts on the matter at hand.
Voice (Collective)	...BSS students would be able to express their thoughts on the matter at hand.
Respect 1	...I would feel heard and listened to.
Respect 2	...I would feel taken seriously.
Respect 3	...I would treated with respect and dignity.
Attention check	Please select 'completely agree' to show you are paying attention to this question.

Variable	Phrasing
Representation perception intro text	In decision-making contexts, people sometimes talk about 'being represented'. In the context of the situation described above, on a scale from 1 to 7, to what extent would you dis/agree with the following statements? I feel that, in the situation described above, ...
Representation (Individual)	...I would be represented.
Representation (Collective)	...faculty students would be represented.
Policy perceptions intro text	The following questions are about your perceptions of the policy that is up for decision. On a scale from 1 to 7, please indicate the extent to which you dis/agree with the statements. I feel that the decision on deep geothermal heating at the faculty...
Complexity 1	...is a complex one.
Complexity 2	...is of a highly technical character.
Impact 1	...can have considerable impact on BSS students.
Impact 2	...doesn't involve any significant implications for BSS students.
Procedure perceptions intro text	The following questions are about your opinions about the way of decision-making described above. On a scale from 1 to 7, please indicate the extent to which you dis/agree with the following statements. I find that this way of decision-making...
Democratic ideals 1	...is open and transparent.
Democratic ideals 2	...is unbiased.
Democratic ideals 3	...is inclusive.
Democratic ideals 4	...treats people as equals.
Democratic ideals 5	...holds decision-makers accountable for their actions.
Democratic ideals 6	...is democratic.
Procedural fairness 1	...is fair.

Variable	Phrasing
Procedural fairness 2	...is just.
Procedural fairness 3	...is legitimate.
Procedural fairness 4	...upholds ethical and moral standards.
Substantive procedural dimension 1	...can lead to decisions that are made based on the right knowledge and expertise.
Substantive procedural dimension 2	...can lead to effective solutions for difficult problems.
Constructive procedural dimension 1	...is able to identify a shared common ground in a diverse mix of perspectives.
Constructive procedural dimension 2	...can settle conflicts of interests.
Creativity	...can bring in new and original ideas for ways in which climate change might be addressed.
Procedural acceptance pre-policy 1	...is a good way to come to decisions.
Procedural acceptance pre-policy 2	...is acceptable.
Pamphlet perceptions intro text (only in pamphlet conditions)	The following questions are about your thoughts about the voter pamphlet that the [expert/student] review panel produced. On a scale from 1 to 7, please indicate the extent to which you dis/agree with the following statements. I think that the information on the voter pamphlet would be ...
Accuracy	...accurate; the pamphlet presents information that is factually correct.
Understandability	...understandable; the pamphlet discusses policy characteristics that referendum voters can make sense of.
Relevance	...relevant; the points addressed by the pamphlet align with what BSS students would want to know.
Diversity	...diverse; the pamphlet addresses various kinds of aspects of the proposal.
Policy opinion pre-decision intro text	Now, we are interested in your own opinion about deep geothermal heating at the faculty.
Opinion	On a scale from 1 to 7, how negative or positive is your opinion about deep geothermal heating at the faculty?

Variable	Phrasing
<b>Certainty</b>	And, on a scale from 1 to 7, how un/certain are you of your opinion?
Participation intro text (only in referendum conditions)	Finally, the following questions are about your thoughts on participating in the referendum yourself.
<b>Participation importance</b>	On a scale from 1 to 7, how important do you find it that you yourself participate in this referendum on an environmental decision?
<b>Participation likelihood</b>	And, on a scale from 1 to 7, how likely is it that you yourself would actually participate in this referendum on an environmental decision?

*Note.* Variables of interest are presented in the table in bold. Typo in the ‘Respect 3’ phrasing is true to how the questionnaire was presented to participants due to oversight.

## Appendix D

### Post-decision Measures

**Table 3**

*Post-decision Measures Exact Phrasings*

Variable	Phrasing
Intro Text	Now, we are interested in your thoughts about the decision to implement deep geothermal heating at the faculty. On a scale from 1 to 7, please indicate the extent to which you dis/agree with the following statements: Implementing deep geothermal heating at the faculty...
Collective will	...reflects the will of BSS students.
Favourability (Individual)	...serves my interests.
Favourability (Collective)	...serves the interests of BSS students.
Environmental impact	...reduces the faculty's carbon footprint considerably.
Risk 1	...involves significant risks for the environment.
Risk 2	...involves significant risks for BSS students.
Risk 3	...involves considerable annoyances for BSS students.
Policy opinion post-decision	Considering the decision to implement deep geothermal heating at the faculty, on a scale from 1 to 7, how negative or positive would your opinion be about deep geothermal heating at the faculty?
Certainty	And, on a scale from 1 to 7, how un/certain would you be of your opinion?
Policy acceptance	<b>Considering the scenario you have read, how un/acceptable would you find implementing deep geothermal heating at the faculty?</b>
Procedural perception post-policy intro text	Now, considering the decision to implement deep geothermal heating at the faculty, what would be your overall evaluation of the entire decision-making process you have read about? On a scale from 1 to 7, please indicate the extent to which you dis/agree with the following statements. I find that this way of decision-making...

Variable	Phrasing
Procedural fairness	...is fair.
Procedural acceptance post-policy 1	...is a good way to come to decisions.
Procedural acceptance post-policy 2	...is acceptable.
Participation	<p>Considering the scenario you just read, on a scale from 1 to 7, how much would you dis/agree with the followings statements? For the following questions, please imagine that you yourself [had voted in the referendum/were selected as a member in the student review panel, as well as had voted in the referendum/were selected as a member in the assembly]. On a scale from 1 to 7, how much would you dis/agree with the followings statements? On a scale from 1 to 7, to what extent do you feel you would have participated in the decision-making process leading up to the implementation of deep geothermal heating at the faculty?</p> <p>And, on a scale from 1 to 7, how much would you dis/agree with the followings statements? [My voting in the referendum/My student review panel membership as well as voting the referendum/My assembly membership]...</p>
Contribution intro text	
Contribution 1	...would have helped advance remedies against global warming.
Contribution 2	...would be a considerable contribution to the solving of climate change.
Eco-guilt post-decision intro text	<p>And, considering [the scenario/that you voted in the referendum/were selected as a member in the student review panel, as well as had voted in the referendum/were selected as a member in the assembly], what would you be feeling in relation to climate change afterwards? On a scale from 1 to 7, please indicate the extent to which you dis/agree with the following statements. I would feel...</p>
Eco-guilt 1	...guilty for not paying enough attention to the issue of climate change.

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Variable	Phrasing
Eco-guilt 2	...like I should be doing more than I have done to address the problem climate change.
Eco-guilt 3	...I sufficiently fulfil my duty to alleviate climate change.

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*Note.* Variables of interest are presented in the table in bold. Typos in the ‘Participation’, ‘Contribution intro text’, ‘Ego-guilt 2’, and ‘Eco-guilt 3’ phrasings are true to how the survey was presented to participants due to oversight.