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What Shapes Public Support for Climate Change Mitigation Policies? The Role of Descriptive Social Norms and Elite Cues

Adrian Rinscheid^{*†}, Silvia Pianta^{†♣‡} & Elke U. Weber[‡]

What are the roles of bottom-up and top-down signals in the formation of climate change policy preferences? Using a large sample of American residents (n = 1,520) and combining an experimental manipulation of descriptive social norms with two choice experiments, we investigate the effects of descriptive norms and policy endorsements by key political actors on climate policy acceptance. We study these questions in two areas considered to be central in a number of decarbonization pathways: the phase-out of fossil fuel cars, and the deployment of carbon capture and storage (CCS). Our study provides two important results. First, social norm interventions may be no silver bullet for increasing citizens’ acceptance of ambitious climate policies. In fact, we not only find that climate policy support is unaffected by norm messages communicating an increased diffusion of pro-environmental behaviors, but also that norm messages communicating the prevalence of non-sustainable behaviors decrease policy support. Second, in the presence of policy endorsements by political parties, citizens’ trust in these parties influences their acceptance of climate policies. The study contributes to research in behavioral climate policy by examining the impact of descriptive norms and elite cues on climate policy acceptance.

Keywords: Social Norms, Elite Cues, Climate Change Policies, CCS, Phase-Out

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Introduction

The recent Special Report of the Intergovernmental Panel on Climate Change (IPCC, 2018) emphasizes the importance of drastic reductions of greenhouse gas emissions in the near future (e.g., by 2030 rather than 2050). As such reductions will require public buy-in to a broad range of climate change mitigation policies, two questions are of central importance: What shapes public attitudes towards climate policies? And how can public support for rapid decarbonization be strengthened? Taking up two current strands in the behavioral and political science literatures, we theorize that information on *social norms* and about key political and social actors' positions on public policies (i.e., *elite cues*) are important factors in moving citizens' climate policy preferences.

Building on results in the behavioral literature, we study the effects of *descriptive* social norms, defined as predominant attitudes and patterns of behavior in a social group. By providing people information about such norms – for instance, informing them that their fellow citizens are increasingly using low-carbon means of transportation – people might adapt their own attitudes and behaviors. To assess the role of elite cues, we investigate whether public endorsements of policy proposals by politically relevant and visible actors (such as political parties and key policy stakeholders) affect citizens' support for these proposals. For example, if people learn that the car manufacturers' association supports a specific climate policy proposal, does this have an effect on a citizen's own policy appraisal, and if so, is this effect contingent on his or her trust in this actor?

We investigate the role of descriptive norms and elite cues in shaping climate policy preferences in an experiment involving 1,520 American residents. Our study aims to make three contributions. First, building on recent research that highlights the potentially productive role of social norms in getting a grip on climate change action (e.g., Hoffman, 2015;

Nyborg et al., 2016), we experimentally explore the role that descriptive norms interventions can play in increasing citizens' appetite for ambitious climate change mitigation measures. Extending prior work in this domain, we not only test the impact of 'positive' norms (i.e., descriptive norms favorable to climate change mitigation), but also investigate how 'negative' norms (i.e., descriptive norms *not* favorable to climate change mitigation) influence preferences. Second, by studying the impact of elite cues on climate policy preferences, our study contributes to understanding the polarization of climate attitudes among the American population (Fisher et al., 2013; Weber & Stern, 2011). Third, we explore potential differences in the effects of descriptive norms and elite cues across different mitigation options. As the climate policy literature (e.g., Green & Denniss, 2018) indicates, a mix of supply-side policies (targeting the suppliers of fossil fuels, such as mining and utility companies) and demand-side measures (targeting the consumer demand for emissions-intensive goods) is needed to address climate change, but little systematic research has been conducted to address whether and how preference formation among citizens differs across these different mitigation contexts. Our study contributes to filling this gap.

Descriptive social norms

Social norms, as predominant behavioral patterns within social groups, shape individuals' attitudes and behaviors. A consistent body of research has shown that altering perceptions of descriptive social norms – i.e. people's perceptions of what others typically think or do – can lead to substantial changes in pro-environmental behavior (Allcott, 2011; Cialdini et al., 1991; Farrow et al., 2017; Schultz et al., 2007). Based on this work, it has recently been hypothesized that social norm dynamics can trigger virtuous behavioral cycles that could contribute to solving large-scale problems like climate change (Huber et al., 2018; Nyborg et

al., 2016). Moreover, internalized social norms were shown to have considerable effects on people's climate policy preferences (Bechtel et al., 2017). If norms are to a certain extent influenced by observed peer behavior, information about descriptive social norms highlighting emerging sustainable behavioral patterns could lead people to become more supportive of ambitious climate policies.

A conceptual distinction is often made between descriptive social norms, which refer to attitudes and behaviors that are prevalent in a social group, and injunctive social norms, which refer to attitudes and behaviors considered appropriate in a group. As one important difference, descriptive norms generally do not involve any social sanction for nonconformity to the norm, whereas injunctive norms do (Christensen et al., 2004). Decision makers may employ descriptive norms as a source of information to identify the best or most convenient course of action, or they may conform to them simply to reduce cognitive processing effort (Farrow et al., 2017; Mead et al., 2014). Hence, it is argued in the literature that descriptive social norms lead (probabilistically) to conformity. Decision makers may also comply with injunctive norms, for instance to avoid sanctions or to signal agreement with the group norms and confirm identity. However, injunctive social norms have also been shown to potentially result in reactance (e.g., in an experiment on college-age binge drinking, see Jung et al., 2010) and might be expected to do so in a politically polarized domain like climate policy. Therefore, the social norms manipulation used in this study involved the provision of information on descriptive social norms. Other studies may investigate how climate policy attitudes are influenced by injunctive norms or by a combination of injunctive and descriptive norms.

As promising as descriptive norms might seem for furthering the diffusion of sustainable behaviors, the dynamics unleashed by the perception or communication of descriptive norms may well also point in the other direction. Political science work on negative

campaigning (Ansolabehere & Iyengar, 1995) suggests that negative social norms messages can have important consequences for political behavior. Drawing on this analogy, messages that highlight the prevalence of environmentally non-sustainable behavioral patterns might hamper individual behavioral changes and restrain public support for climate policies. While non-sustainable social norms signals are ubiquitous in the real world, their effectiveness is rarely tested and contrasted with messages that signal environmentally sustainable norms. A partial exception is the study by Bolsen and colleagues (2013) who showed that norm-based communications portraying others to be unsupportive of climate policies had a negative effect on individuals' willingness to support climate action. We take their work one step further and investigate the potentially differential impacts of positive and negative descriptive norms interventions in the context of public support for two specific and currently discussed measures for climate change mitigation.

Elite cues

Norms emerging from prevalent behaviors in a social group are an example of bottom-up signals for political preference formation. In a complementary fashion, political scientists and behavioral decision researchers have paid attention to top-down signals, such as endorsements of (political) agendas or messages by highly visible actors like political elites. Such endorsements provide cues to their recipients about how to appraise a message, based on its source.¹ Research on the role of the source in determining the persuasiveness of a message has origins in social and cognitive psychology. McGuire (1969, p. 198) contended that individuals use clearly valenced sources of information as cues for preference formation – a mode of making inferences without taking more detailed knowledge into account (see also

¹ Hence their description as “source cues” in the political science literature.

Chaiken et al., 1989). Political scientists have demonstrated that elite cues can influence political information processing. Accordingly, elite cues can be a powerful heuristic that enables voters to make decisions with minimal effort (Arceneaux & Kolodny, 2009; Nicholson, 2012). Voters have been shown to rely on different types of elite cues when forming political preferences, such as public statements by party leaders, or stakeholders' endorsements of a position or policy (Arceneaux, 2008; Kuklinski & Quirk, 2000; Lupia, 1994). Policy preferences seem to be particularly responsive to elite cues in situations of high complexity (Druckman et al., 2010; Nicholson, 2011). As the task of finding climate solutions is indeed a highly complex one (Levin et al., 2012), elite cues may be very important in this area.

Trust in the source of the cue has repeatedly been shown to be an important factor in influencing a message's effectiveness (Eagly & Chaiken, 1993; Miller & Krosnick, 2000). While the concept of trust is not unambiguously defined in the literature (see Nooteboom, 2002), we follow the literature on political trust and define trust as a relational judgment that an individual (the truster) makes with regard to a political actor (the trustee, such as a political party or interest group) concerning some expected behavior (Bauer & Freitag, 2017). Trust in an actor implies the willingness to making oneself vulnerable to the trustee that has the power to do harm or betray the truster (Levi & Stoker, 2000). Political trust is typically conceptualized as graded; that is, a truster evaluates a trustee to be trustworthy to a certain degree (Levi & Stoker, 2000; Schafheitle et al., 2019). In the political realm, the ideology of trusters and trustees is an important transmission belt in the evaluation that an actor will be trustworthy (Hartman & Weber, 2009). Along these lines, it has been shown that ideological congruence between the source of a message and its recipient facilitates framing effects (Bechtel et al., 2015). To illustrate, in Hartman and Weber's (2009) experiment, respondents received information about a proposed rally by the Ku Klux Klan (KKK) embedded either in a frame emphasizing free

speech, or a public safety and order frame. Additionally, the source of the frame was orthogonally manipulated as either originating from a liberal or conservative group. Respondents were then asked about their support for the KKK's request to hold the rally. The results demonstrate the power of source information, as respondents were just as likely to support the request as they were to oppose it, provided it was framed by the source they identified with, while if the exact same message came from a source respondents did not identify with, their attitudes were not shifted in any direction (Hartman & Weber, 2009). Moreover, elite cues can backfire if the message produces an "identity mismatch", coming from an actor that an individual does not trust (Aaroe, 2012). Building on this work, we test the impact of cues from political parties and key policy stakeholders, defined as endorsements of specific climate policy proposals, and investigate how the impact of elite cues on policy preferences depends on respondents' trust in the source of the cue.

CCS and the phase-out of fossil fuel cars: Two approaches to mitigate climate change

Based on these priors, we study US residents' preferences with regard to two climate change mitigation policies that could significantly contribute to deep decarbonization: the phase-out of fossil fuel cars, and the scale-up of carbon capture and storage (CCS) deployment. Policies to phase out fossil fuel cars are currently being discussed in many countries, several of which (e.g., Norway, France, India, and China) plan to phase out cars with internal combustion engines between 2025 and 2040 (Meckling & Nahm, 2019). CCS processes are based on a set of technologies that prevent the release of carbon dioxide (CO₂) produced by industrial processes or electricity generation into the atmosphere, or capture CO₂ already present in the atmosphere. The gas is usually captured and transported to a storage site, typically an underground geological formation, where it is deposited. CCS technologies can

be combined with fossil fuels-based electricity generation, but also with ethanol production and industrial processes. While the technology plays an important role in several climate change mitigation scenarios (IEA, 2018; IPCC, 2018), CCS deployment has not met projections so far (IEA 2009; Reiner 2016) and some CCS projects have faced public opposition (Terwel et al., 2012). CCS is on average less supported than other measures to decarbonize the energy system, such as electricity generation from renewable sources (Johnsson et al., 2010).

We selected CCS deployment and the phase-out of fossil fuel cars because they represent fundamentally different mitigation options with different behavioral implications. CCS is a supply-side solution addressing the supply of fossil fuels via macro-level technology deployment. Previous studies found that Americans, like most citizens of advanced economies, have on average extremely low awareness, low knowledge, and no strong attitudes with respect to this technology (Johnsson et al., 2010; L'Orange Seigo et al., 2014; Reiner et al., 2006), which is relatively far away from every-day experience and concerns. The transition to low-carbon mobility, on the other hand, has direct demand-side ramifications, requires the formation of habits compatible with climate change mitigation (Creutzig et al., 2018), and is related to policies and technologies most Americans are highly familiar with.

Hypotheses

We hypothesized that positive descriptive norms messages would increase citizens' support for mitigation policies, and negative norms messages would decrease support, compared to a situation of receiving no information about descriptive norms. Moreover, we expected the effects of negative descriptive norms to be stronger than positive norms effects. This hypothesis is based on broad evidence in psychology documenting a negativity effect in impression formation (e.g., Skowronski & Carlston, 1989). Specifically, many studies have

shown that negative information tends to have a stronger impact on attitudes and behaviors than positive information (Albarracín et al., 2008; Cacioppo et al., 1997; Klein, 1996). With regard to potential differences between the two climate change mitigation policies, we expected descriptive norms interventions to be more effective in shaping support for climate policies that have a direct impact on individual behaviors, as in the case of policies to phase out fossil fuel cars. For supply-side measures such as CCS, which have no bearing on everyday lives and behaviors of most citizens, we expected smaller effects of descriptive norms on policy support.

We hypothesized policy endorsement by trusted elites to increase respondents' policy support. However, we expected the effectiveness of elite cues to differ between CCS and fossil fuel cars phase-out policies. As literatures in psychology (e.g., Petty & Cacioppo, 1986) and political science (e.g., Nicholson, 2011) show, people rely more on cues when they do not have enough knowledge to rely on the substance of a message. Due to the lower familiarity of CCS, we expected elite cues to be more effective in shaping support for CCS policies, compared to policies relating to a phase-out of fossil fuel-powered cars.

Study design

We conducted a survey experiment on a representative (but non-probability) sample of 1,520 American residents, which matches well the distribution of key socio-demographic variables in the US population (see Table S1 in SM). Data were collected between 1 and 18 October 2018. The study was preregistered at the Open Science Framework² and got approval from Princeton University's Institutional Review Board.

² See https://osf.io/6w4h3/?view_only=b59087110dad4733b1dbc218c22a9eeb

To investigate the roles that descriptive social norms and elite cues play in shaping policy preferences, we combined two choice experiments with an experimental manipulation of perceived descriptive norms. Choice experiments have recently been adopted by social scientists to gauge citizens' preferences for policy proposals. By observing respondents' preferences when exposed to a series of multidimensional policy scenarios, this method provides a powerful approach to simultaneously estimate the individual effects of several attributes of a policy proposal on policy preferences (Bechtel & Scheve, 2013; Gampfer et al., 2014). In our case, this experimental design allowed us to investigate the impact of elite cues, one of the attributes of the presented proposals, on policy preferences across a wide range of policy proposals.

Study flow

Respondents first answered a range of questions that measured relevant covariates (see Table S3). Next, they were randomly assigned to either the choice experiment about fossil fuel cars phase-out policies or the experiment on CCS deployment policies, and received basic information about the respective policy debate and policy design attributes (see below). Before turning to the choice experiments, respondents were randomly assigned to either a control or one of two social norms treatment conditions (see Figure 1 and SM for more details). Respondents in the treatment conditions received information about descriptive social norms, describing policy-relevant attitudes and behaviors of citizens living in their state. After reading information on the policy and – for treated respondents – on relevant descriptive norms, participants completed the first choice experiment. Next, respondents who had first been assigned to the phase-out experiment were assigned to the CCS experiment, and vice versa, so that in the end all participants completed both choice experiments. Again, the

provision of policy information and the social norms manipulation preceded the choice experiment. After this second round, respondents answered some final questions and received a short debriefing.

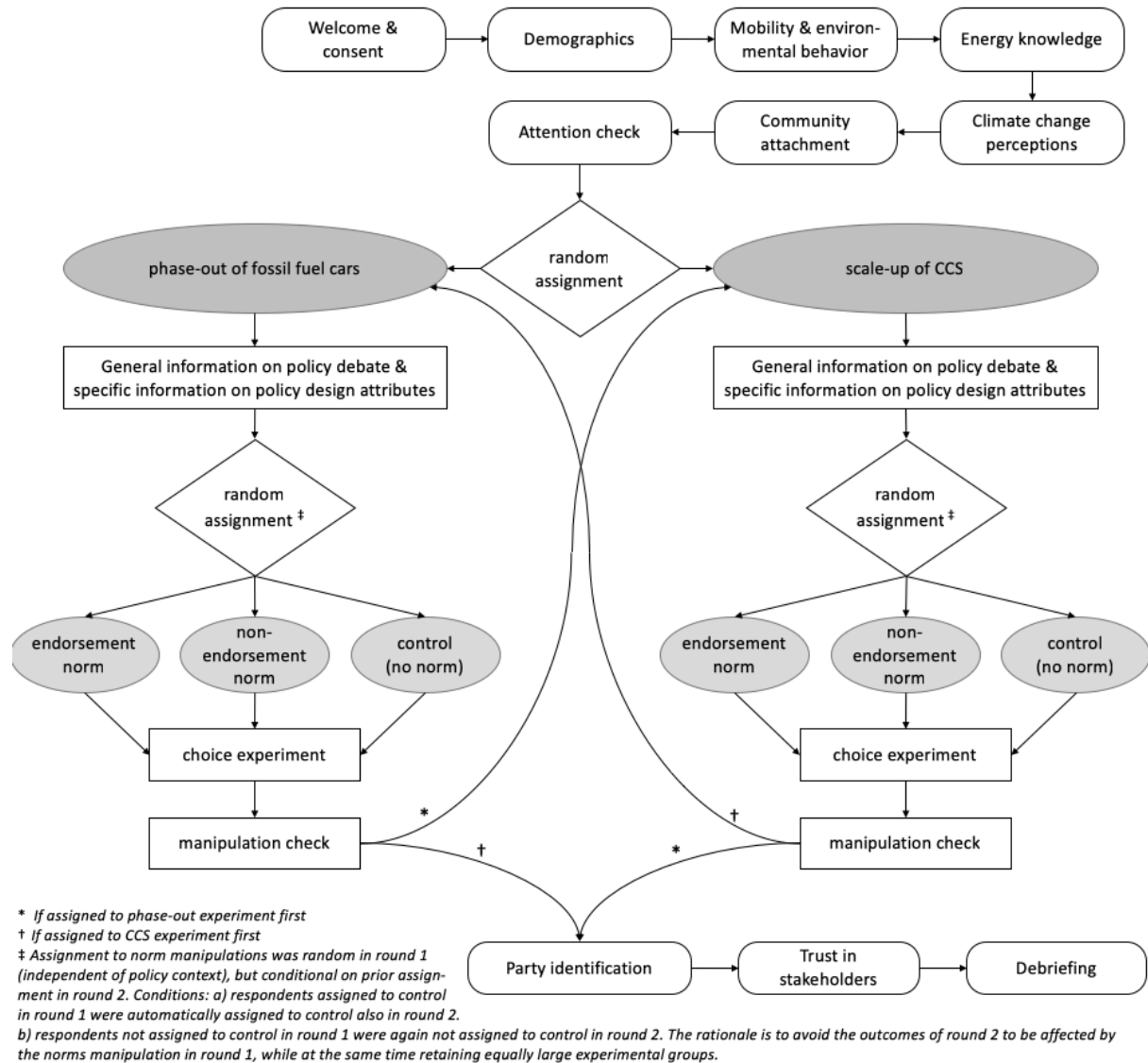


Figure 1: Summary of the study flow.

Note: 560 respondents that did not pass the attention check implemented before the choice experiment were excluded. These do not count into sample size of $n = 1,520$. This exclusion criterion was included in the preregistration.

Choice experiments

Participants were instructed that potential policy proposals to phase out fossil fuel cars (scale up CCS) in their state vary on a number of attributes, and received specific information about these attributes and their levels. The focal attribute of interest was elite cues, which we

operationalized as endorsements of policy proposals by either one of the two main American political parties or one of two key policy stakeholders. Other attributes included policy design features such as policy type, timing of policy implementation, policy costs, pollution reduction (only for phase-out policies), and required distance from residential areas (only for CCS policies). Table S2 shows all attributes and their levels.

Respondents were shown eight pairs of hypothetical policy proposals (choice tasks) to phase out fossil fuel cars (scale up CCS) in their state, one pair at a time. The description of each proposal provided information on stakeholder endorsement and the four policy design attributes, with levels that varied randomly both within and across the binary comparisons (Hainmüller et al., 2013). Figure S1 provides an example of a choice screen. For each pair of policy proposals, respondents' policy preferences were assessed with two measures. First, respondents were forced to choose which of the two proposals they preferred ('forced choice outcome'). Second, respondents were asked to imagine having the possibility to vote for either one of the proposals in a direct democratic vote and to indicate, on a scale from 0 to 10, how likely they would vote for each proposal ('rating outcome'). Tables S4 and S5 summarize the main results of the choice experiments. Because this study focuses on the extent to which top-down and bottom-up signals shape climate policy preferences, we focus on the elite cues attribute in the analysis below. The extent to which the policy design attributes influence citizens' preferences is analyzed in depth elsewhere (Rinscheid et al., 2019).

Descriptive social norm treatments

The choice experiments were embedded in an orthogonal experimental manipulation of perceived social norms. Respondents were randomly assigned to an endorsement norms condition, a non-endorsement norms condition, or a control condition (see Figure 1). In the

experimental conditions, respondents read a short text highlighting prevalent policy-relevant attitudes and behaviors. Individuals in the control group received no text. As humans are motivated to pay attention in particular to the norms of groups they belong to (Tankard & Paluck, 2016, p. 184), all treatments mentioned residents of the state where each respondent lived as the reference group.

Social norms manipulations differed slightly for the two policies. For fossil fuel car phase-out policies, respondents received information about the policy-relevant behaviors of their peers. In the endorsement condition, this included a statement about the increased diffusion of sustainable mobility behaviors, while in the non-endorsement condition, it included a statement about the limited diffusion of sustainable mobility behaviors. For CCS, a manipulation based on peer behavior would likely not have been credible, as the technology carries less behavioral relevance and is unknown to large parts of the population. Instead, respondents received information on the prevalent attitudes of people living in their state with respect to CCS policies. In the endorsement condition, this entailed a statement that policies to scale up CCS find broad public support in their state, while in the non-endorsement condition, this entailed a statement about low public support for CCS (see SM). Our manipulation check shows that the manipulations altered respondents' perceptions of descriptive social norms significantly (and symmetrically for positive and negative norms), relative to the control condition for both policy contexts (see SM).

Results

Pre-experimental support for decarbonization policies

After being provided with basic information about each of the two types of policies, respondents were asked about their general policy support. About 34 percent of respondents

answered that they (strongly) support policies to phase out fossil fuel cars (corresponding to '5' or '6' on the 6-point scale), while 20 percent indicated to (strongly) oppose such measures ('1' or '2'; see Figure 2a). For the scale-up of CCS, preferences were less settled: only about 18 percent (strongly) opposed or (strongly) supported policies, respectively, and 63 percent took an intermediate position on CCS ('3' or '4' on the 6-point scale; see Figure 2b). This is due in part to the fact that only 19 percent of respondents were sure that they had heard about CCS before taking the survey, a number that might still be inflated.

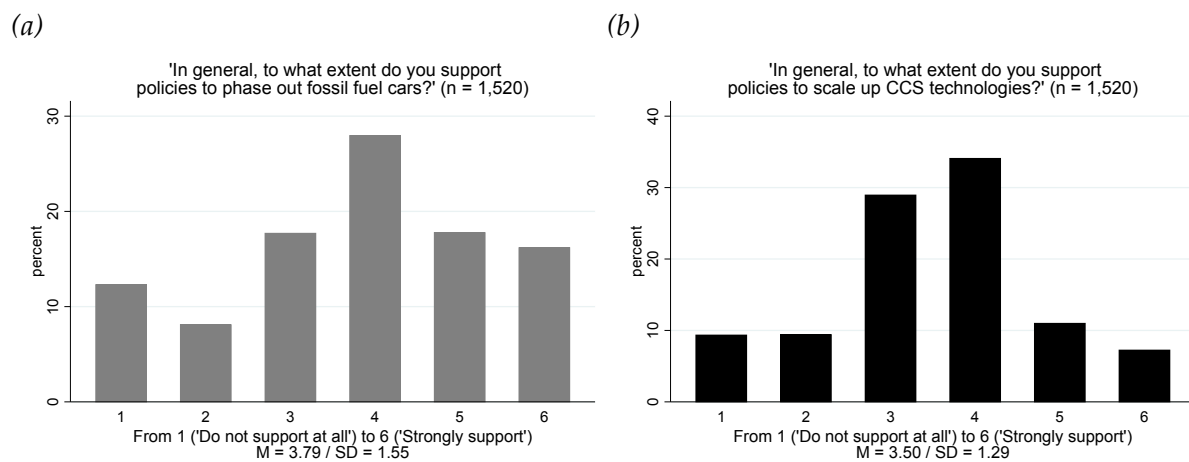


Figure 2: Initial support for policies to (a) phase out fossil fuel cars, and (b) scale up CCS.

Notes: Pre-experimental support for the two policies was administered with a scale from 1 to 6. Only the endpoints were labeled (1 = Do not support at all; 6 = Strongly support).

Descriptive social norms and support for decarbonization policies

To assess the impact of descriptive social norms on citizens' policy preferences, we relied on the rating outcome of our choice experiments. The dependent variables of our main regression models correspond to respondents' mean policy ratings (out of 16 individual ratings per individual). In order to ease interpretation of the marginal effects shown below, we transformed the dependent variables to the probability scale and regressed the transformed mean policy ratings on the experimental manipulations. The dependent variable can be interpreted as a measure of overall policy support. We also run extended models

including a set of covariates to control for potential imbalances between the experimental groups, but also to identify factors beyond those manipulated in the experiment that may explain support for our policies of interest.

As outlined earlier, we expected negative norms to have a stronger impact on policy preferences than positive norms. As indicated in Table 1, we do indeed find some evidence for this hypothesis, as the coefficients for non-endorsement norms are statistically significant and point into the expected direction in the case of phase-out policies, while the coefficients for the endorsement norm condition fail to attain significance (see Models 1 and 2). Hence, ‘negative’ descriptive norms may have a more discernible impact on citizens’ policy preferences. When comparing the relevance of social norms across mitigation contexts, we had expected norms to be less effective in the context of CCS than in the context of fossil fuel cars phase-out policies. As can be seen in Table 1 (Models 3 and 4), there is indeed no effect of descriptive norms information on CCS policy support. We also conducted linear contrasts directly comparing the positive and negative norms conditions for both policies. Accordingly, we identify a significant effect of descriptive social norms for the case of phase-out, but not CCS policies (see SM for further details).

While the fact that we did only find effects of descriptive norms on phase-out policy support might be related to the different manipulations for the two policies, this finding lends suggestive evidence to our expectation of descriptive social norms being more important drivers of preferences with respect to policies that entail more direct implications for citizens’ everyday lives and behaviors. Other covariates included in Models (2) and (4), such as pre-experimental support for the respective policies, the perceived psychological distance of climate change (i.e., the extent to which respondents perceive climate change as distant or

proximal),³ people’s environmental behavior, age, party identification, and community attachment, are significantly related to support for both phase-out and CCS deployment policies (see Table 1).

Table 1: The influence of social norms treatments on climate policy support

	Model (1) Support for phase-out of fossil fuel cars	Model (2) Support for phase-out of fossil fuel cars	Model (3) Support for scale-up of CCS	Model (4) Support for scale-up of CCS
Endorsement norms	0.0115	0.0103	0.0054	0.0062
Non-endorsement norms	-0.0314*	-0.0221*	-0.0140	-0.0162
Age		-0.0280***		-0.0338***
Gender (baseline female)		0.0105		0.0043
Income		-0.0043		-0.0105*
Rural (baseline urban)		-0.0148**		-0.0130***
Car ownership		-0.0067		
Democrat (baseline Independent)		0.0462***		0.0449***
Republican (baseline Independent)		0.0212		0.0197
Energy knowledge		-0.0003		
Knowledge about CCS				0.0043
Environmental behavior (low to high)		0.0115*		0.0106*
Community attachment (low to high)		0.0310***		0.0249***
Psychological distance of climate change (high to low)		0.0609***		0.0619***
Pre-experimental policy support		0.0867***		0.0925***
Constant	0.492***	0.451***	0.463***	0.434***
<i>n</i>	1520	1511	1520	1511
<i>R</i> ²	0.006	0.485	0.001	0.475

Notes: Coefficients from OLS regressions; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Standard errors are clustered at the level of the individual. For measurements of independent variables, see Table S3; for measurement of pre-experimental policy support, see Figure 2. Age was recoded to 6 groups (18-29; 30-39; 40-49; 50-59; 60-69; 70+). Party identification is captured with two dummy variables for Democrats and Republicans, respectively. Continuous predictor variables were standardized before conducting the analysis (Mean = 0; SD = 1).

³ We follow Liberman and Trope (2008) in conceptualizing perceived psychological distance as four dimensional, including temporal, spatial, social distance, and uncertainty (i.e., the perceived likelihood of an event). Our composite measure of perceived psychological distance of climate change reflects these dimensions (see Table S3).

According to sensitivity analyses, we cannot exclude the possibility of type II error due to limitations of statistical power. Our sample size provides sufficient power to detect effects bigger than 0.04. Hence, there is a high probability that if non-detected effects of descriptive norms exist, they are nonetheless quite small in size. As we further show in the SM, the detection of smaller effects would have necessitated a massive sample.

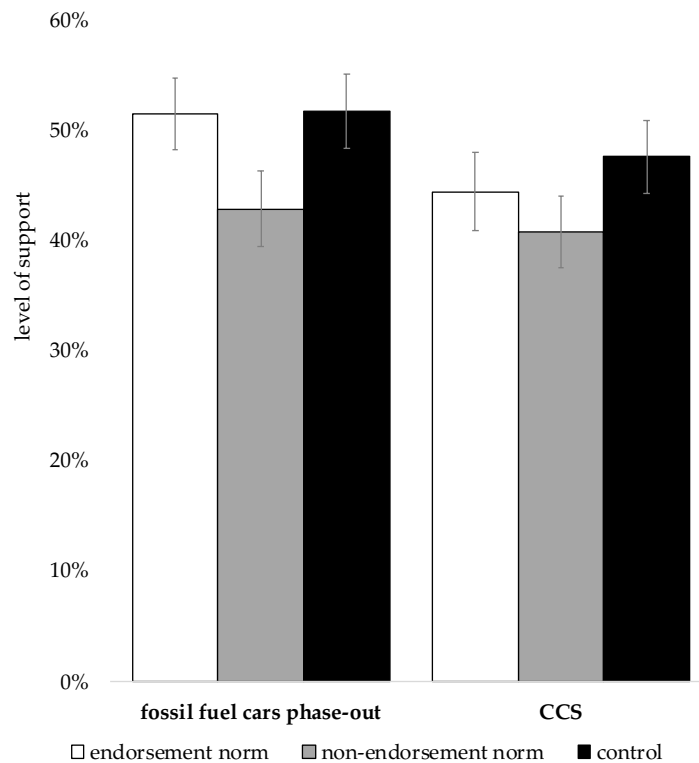


Figure 3: Predicted values of policy support, contingent on social norms treatment.
Note: Bars represent associated 95% confidence intervals.

To shed more light on the differential effect of descriptive social norms information on policy support for phasing out fossil fuel cars versus scaling up CCS deployment, we compute (absolute) support levels based on predicted values. Figure 3 shows the simulation results to assess levels of policy support for the three experimental groups, averaging over all policy attribute levels varied in the choice experiment. The results corroborate our intuition. Descriptive social norms might be more influential in the context of phase-out policies, which have more direct implications for individual behavior. In particular, the average support level

for phase-out policies amounts to only 42.9 percent in the non-endorsement condition, while it reaches 51.5 (51.7) percent in the endorsement norm (control) condition, and the difference between non-endorsement and endorsement / control is statistically significant. Average support levels for CCS range from 40.8 (non-endorsement) to 47.6 (control) percent, but the differences are not significant.

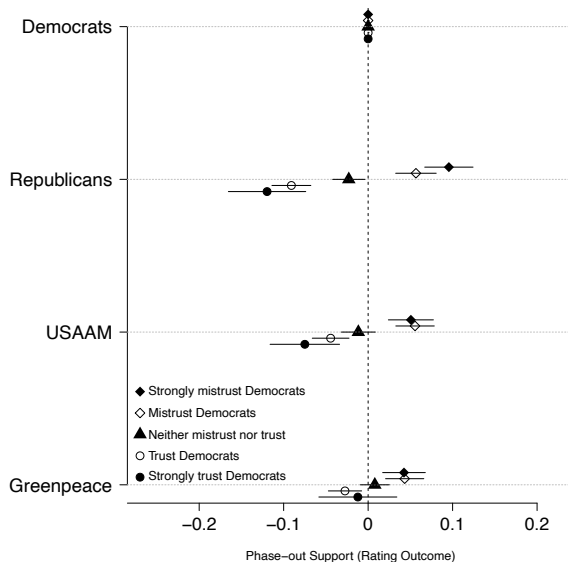
Elite cues and support for decarbonization policies

We investigate the potential influence of elite cues on policy preferences based on the analysis of the respective attribute implemented in our choice experiments. To analyse the choice experiment data, we used linear regression models (Hainmueller et al., 2014), including dummies to control for the social norms intervention. We did not expect endorsements to play a role in the aggregate, but that respondents' trust in the respective actors would moderate endorsement effects. Therefore, apart from the main models documented in Tables S4 and S5, we ran a series of regression models interacting the individual levels of the endorsement attribute with respondents' levels of trust in the actors included in the choice experiment (Democrats; Republicans; Greenpeace; and the US Alliance of Automobile Manufacturers (USAAM) or Carbon Capture (CC) Coalition, respectively). We relied on the following item to measure trust in these political actors: *"To what extent do you mistrust or trust the following actors and organizations?"* using a labeled 5-point-scale from "strongly mistrust" to "strongly trust" (see Table S3).

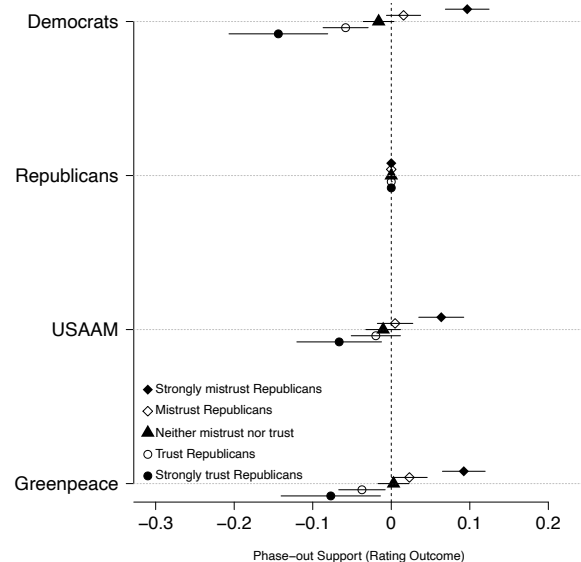
Figures 4 and 5 show the average marginal component effects of stakeholder endorsements, conditional on the level of trust in political actors. Overall, trust in political parties is associated with strong cueing effects. As Fig. 4(a) shows, trust in the Democratic Party leads to significantly lower support for phase-out proposals endorsed by almost any

other actor, except for Greenpeace. For example, a proposal endorsed by the Republican Party leads to a 9 (12) percentage points decrease in the probability of being supported by respondents who (strongly) trust the Democratic party. Mistrusting the Democratic Party, on the other hand, is associated with increasing policy support if endorsement comes from actors other than the Democratic Party. The results are very similar when assessing trust in the Republican Party (see Fig. 4(b)). A proposal endorsed by the Democratic Party leads to a 6 (14) percentage points decrease in the probability of being supported by respondents who (strongly) trust the Republican Party.

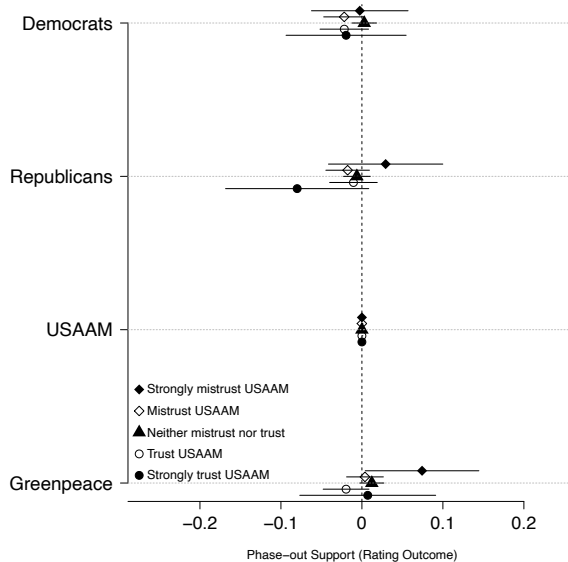
(a) Cue effects conditional on trust in Democrats



(b) Cue effects conditional on trust in Republicans



(c) Cue effects conditional on trust in USAAM



(d) Cue effects conditional on trust in Greenpeace

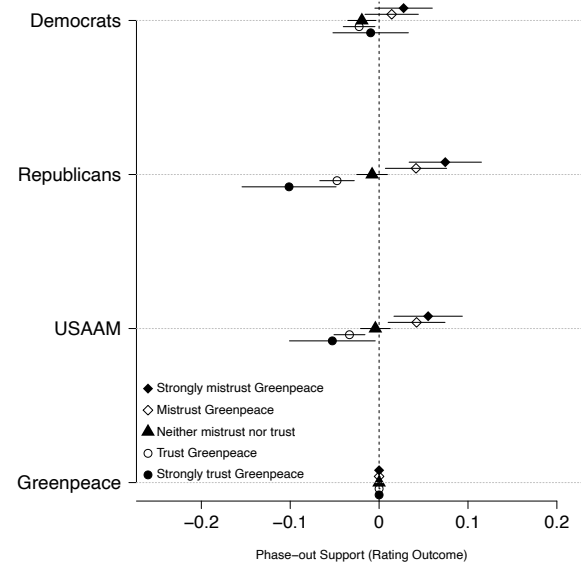
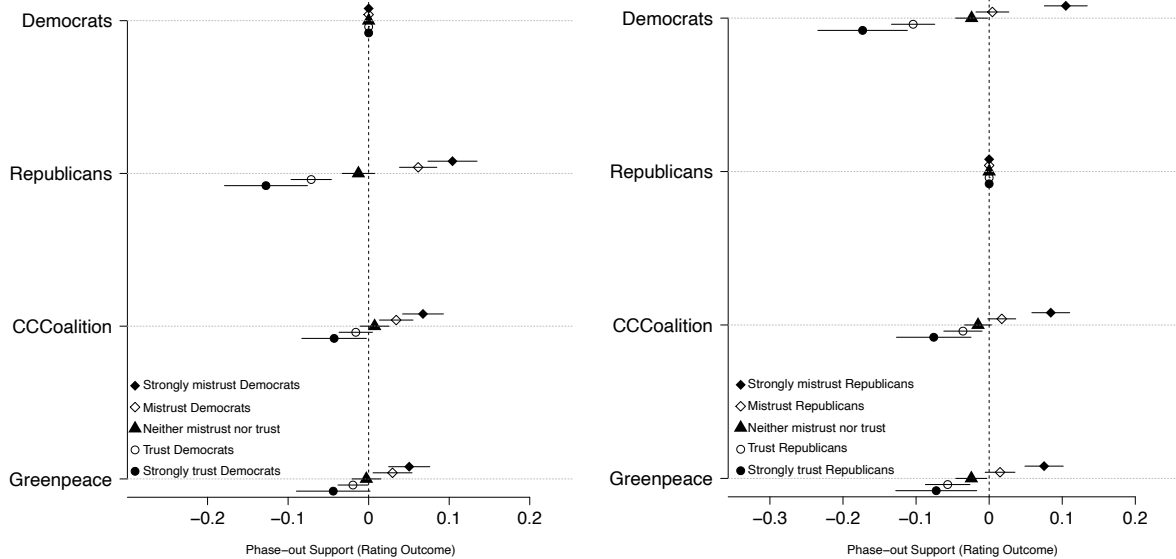


Figure 4: Effects of stakeholder endorsements on phase-out policy support, conditional on respondents' level of trust in these actors.

Notes: Each dot represents an average marginal component effect (AMCE) of an individual attribute level (i.e., stakeholder endorsement) on respondents' probability to choose a policy proposal in relation to a proposal with the reference level. Horizontal bars represent associated 95% confidence intervals. The calculations are based on regression analyses with rating outcomes, the full set of attribute levels included, and standard errors grouped at the level of the individual (clustered standard errors). $n = 1,520$

(a) Cue effects conditional on trust in Democrats (b) Cue effects conditional on trust in Republicans



(c) Cue effects conditional on trust in CC Coalition (d) Cue effects conditional on trust in Greenpeace

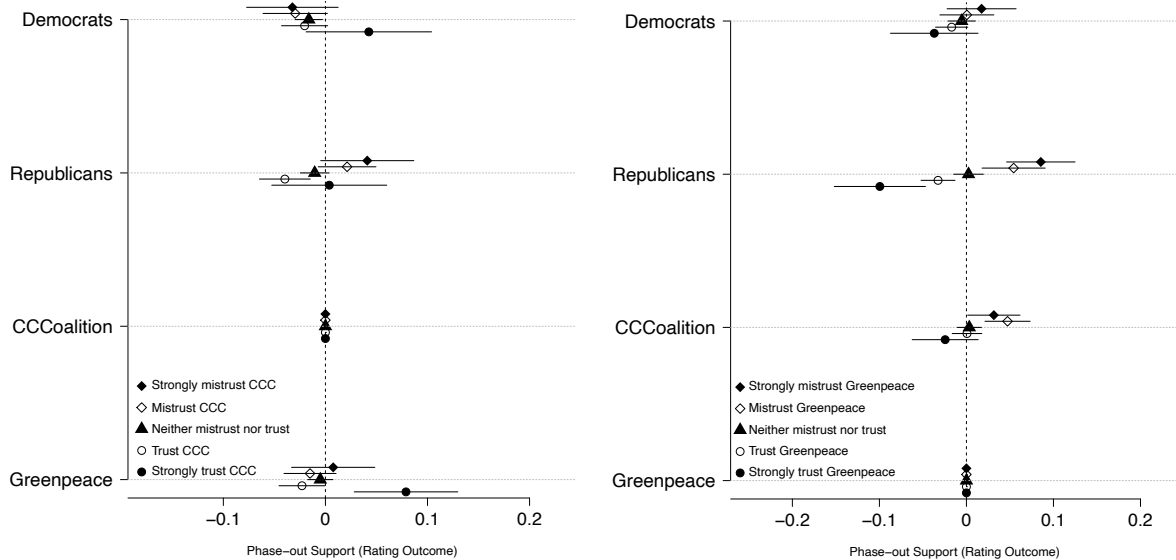


Figure 5: Effects of stakeholder endorsements on CCS policy support, conditional on respondents' level of trust in these actors.

Notes: See Figure 4.

Trust in other stakeholders is associated with weaker cueing effects. As can be seen in Figure 4(c), neither trusting nor mistrusting USAAM leads to cueing effects (except that respondents who strongly mistrust USAAM prefer proposals endorsed by Greenpeace). Trusting Greenpeace, on the other hand, is associated with significantly lower support for policy proposals endorsed by the Republican Party and USAAM (Fig. 4(d)). Mistrusting Greenpeace, in turn, leads to significantly higher support for policy proposals endorsed by USAAM or the Republican Party.

Overall, the influence of elite cues follows similar patterns in the case of CCS policies (see Figure 5). To remember, we expected stakeholder endorsements to play a more important role in the context of CCS. For the more familiar and less complex matter of fossil fuel car phase-outs, stakeholders' recommendations were hypothesized to be less influential. As a yardstick that allows for direct comparison, we computed predicted values of policy support levels. If our expectations were true, we would expect to see a larger difference in absolute support levels for the case of CCS policies, contingent on the variation in the source of the cues. As the previous analysis shows that partisan cues are more important than cues by other stakeholders, Figure 6 focuses on how trust in parties moderates respondents' support for policies that are endorsed by either one of the two parties.

For this analysis, we classified respondents into five categories: (1) those that trust the Democratic but not Republican Party (n = 518), (2) those that trust the Republican but not Democratic Party (n = 434), (3) those that mistrust both parties (n = 263), (4) those that neither trust nor mistrust any party (n = 238), and (5) those that trust both parties (n = 67; for details, see SM). Figure 6 illustrates the results for respondent profiles (1) and (2), while the Figure S2 entails the full results. For the first group (trust in the Democratic Party), the predicted level of support for phase-out policies is 63.0 percent if endorsement comes from the Democratic

Party and 53.2 percent if endorsement comes from the Republican Party. For CCS policies, the predicted level of support within this group amounts to 52.6 percent with Democratic endorsement and 49.2 percent with Republican endorsement. Hence, contrary to our expectations, for this group, the difference between a Republican and a Democratic endorsement is even lower for CCS (3.4 percentage points) than for phase-out (9.8) policies.

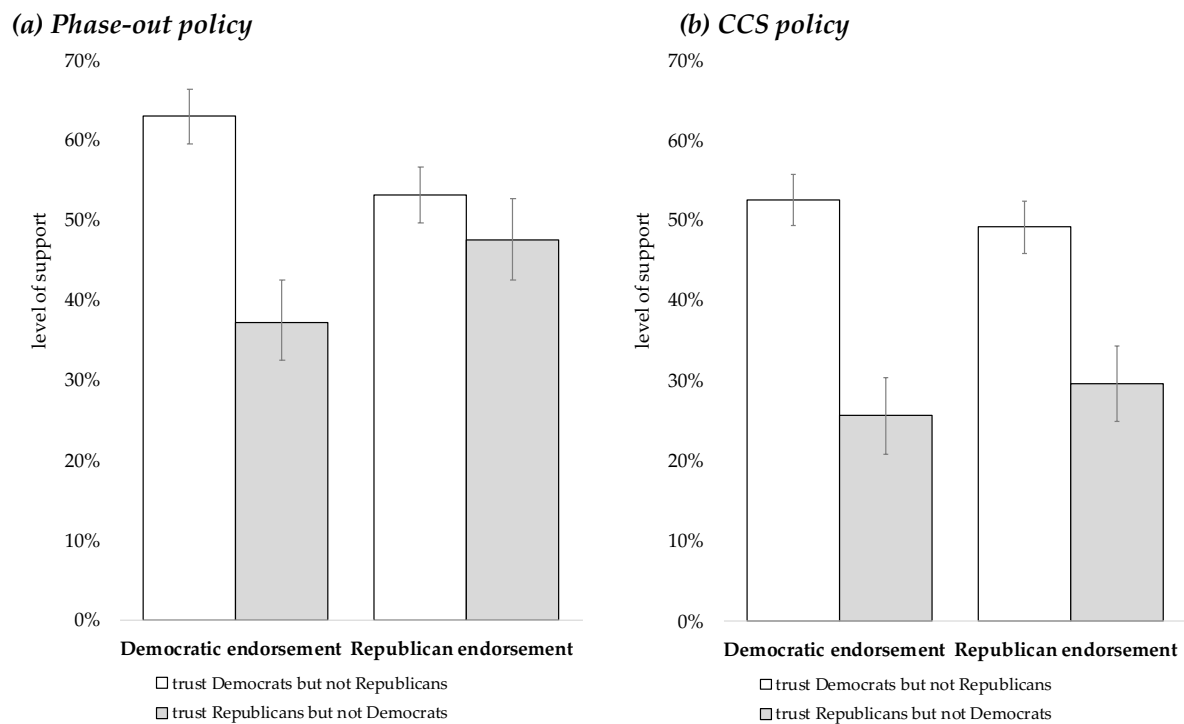


Figure 6: Predicted values of policy support, contingent on partisan endorsement and trust in parties.
Note: Error bars represent associated 95% confidence intervals.

The same pattern emerges for the second group (trust in the Republican Party). In this group, predicted support for phase-out policies amounts to 47.6 percent for Republican endorsement and 37.3 percent for Democratic endorsement. For CCS policies, predicted policy support amounts to 29.7 percent with Republican endorsement and 25.6 with Democratic endorsement. Phase-out policy support hence changes by 10.3 percentage points if endorsement shifts from Democrats to Republicans, while CCS policy support changes only by 4.1 percentage points if the same shift occurs. Based on these results, we reject our

hypothesis of elite cues being more relevant for the formation of climate policy preferences in the (arguably less familiar) domain of CCS. One explanation for this finding might be that knowledge about a specific subject matter should reach at least a certain base level for elite cues to substantially influence policy preferences. Clearly, more research should be conducted to understand how elite cues (and other factors) can influence public support for less known decarbonization options.

Discussion

Summary and policy relevance

To assess the political feasibility of different decarbonization strategies, it is important to better understand what drives their public perception. This is particularly true in times of deepening political polarization around the issue of climate change, driven in part by right-wing populist agendas and post-truth politics (Fraune & Knodt, 2018; Lockwood 2018). In this paper, we explored how support for climate change mitigation policies is shaped by bottom-up and top-down signals, investigating the roles that descriptive social norms and elite cues play in the construction of policy preferences. By assessing their influence across two different climate change mitigation contexts (fossil fuel car phase-outs and CCS deployment), our study allowed us to examine whether the effects of norms and cues vary across policies that differ in their impact on citizens' routines and behaviors.

Moderating recent hopes that social norms might be a promising back-door path to increase support for climate change mitigation policies (Doherty & Webler, 2016; Huber et al., 2018; Nyborg et al., 2016), we found the impact of descriptive social norms on climate policy support to be less pronounced than expected. Importantly, our study tested the impact of both positive and negative descriptive social norms messages. While neither positive nor negative

social norms information had a significant impact on CCS policy acceptance when compared with the control condition of no normative information, only negative norms information had a significant impact on fossil fuel car phase-out policy preferences, reducing policy support. These findings suggest the impact of normative information to vary across mitigation contexts, depending on the familiarity and behavioral relevance of policies. For decarbonization efforts that strongly affect user practices and everyday routines, like those in the transportation sector, the perceived prevalence of negative social norms may constitute an important barrier. In the case of policies to phase out fossil fuel cars, our test of the difference between positive and negative norms conditions shows that providing information on the increased diffusion of sustainable mobility behaviors produced significantly higher levels of policy support with respect to providing information on the prevalence of non-sustainable mobility behaviors. This suggests that turning a negative norm into a positive one may be an effective tool to shift policy support. However, the results of our study also indicate that descriptive social norms have their limits in shaping individual climate policy preferences. On the one hand, this should come as no surprise, as preference formation depends on a variety of factors. Nevertheless, we also caution that this finding should not be overinterpreted, for reasons we address below.

In contrast to our results relating to social norms, the effects of elite cues on policy acceptance are quite straightforward and substantial: cues that come from a trusted source clearly and significantly influence climate policy support. At the same time, endorsements of policies that emanate from an untrusted source lower citizens' policy acceptance. The finding that political elites can influence mass attitudes and behaviors is not new, but our experimental application to the context of climate policies provides some important lessons. Our results suggest that parties (rather than other economic stakeholders) constitute the relevant in- and

outgroups of American climate politics (cf. Nicholson, 2012). Interestingly, party cues are more influential in the context of fossil fuel car phase-out policies, but they also affect policy support in the less familiar mitigation context of CCS. As party cues may be crucial levers to increase public acceptance of rapid decarbonization policies, climate policy communicators might be well advised to take their potential impact on public acceptance into account.

Limitations and implications for further research

The design of our study and hence the interpretation of the results are subject to a number of limitations that however also open up avenues for future research. First, the study relies on a rather complex design. A more straightforward design could have tested the impact of different elite cues on support for a single policy proposal, probably identifying even stronger source cue effects. We argue, however, that presenting policy endorsements as one among other varying elements characterizing potential policy packages and gauging respondents' preferences over several rounds more realistically simulates preference formation in light of messy real-world climate policy debates. While our design does not sacrifice internal validity, our results are characterized by high external validity (Hainmueller et al., 2014).

A second limitation of our study is that the reference group (people living in the respondent's state) chosen for our social norms manipulations might not hold the highest normative importance for most respondents. Social identity theory (see Hornsey, 2008), for instance, predicts that norm interventions are more influential if the reference group is perceived as more central to one's identity. While we acknowledge that selecting reference groups closer to respondents (e.g., friends, coworkers or neighbors) might have led to stronger impacts on policy attitudes, selecting residents in respondents' states allowed us to avoid

deception and to present identical and realistic manipulations to all respondents. Moreover, as the normative importance of groups is context-dependent (Hogg & Reid, 2006), we assumed the group of people living in a respondent's state to carry a certain relevance in the context of a decision about a state policy. In order to spur theoretical growth on this topic, we would like to redouble Tankard and Paluck's (2016, p. 197) call for more research to identify the relevant reference groups and sources of normative information in different contexts and for different populations of interest.

Future studies on the effects of descriptive norms could employ improved experimental manipulations and better attend to the psychological processes that these may trigger. As evidenced by the analyses of our manipulation checks, while the treatments produced statistically significant differences in perceptions of descriptive norms across experimental groups, a comparison of mean scores (see SM, p. 9) suggests that our descriptive norms manipulations were not particularly strong. This, again, might mirror real-world processes of information processing more closely than a setting in which a manipulation would have been highly effective, but it also helps to explain the limited effects of social norms detected in this study.

While this study focused on the impact of descriptive social norms, we would welcome future studies that investigate the impact of injunctive social norms on climate policy attitudes. Moreover, it would be valuable to interrogate and test whether combinations of descriptive and injunctive norms maximize persuasive power in this context. Our findings on the impact of trusted elite cues on policy support should also be extended in future studies. While our results suggest that single-party policy endorsements increase polarization among partisan supporters, future studies could investigate the impact of bi-partisan policy endorsements, which may prove successful in increasing the acceptance of climate policies across political

camps. The role of elite cues in shaping policy support should also be studied in jurisdictions other than the US to assess the extent to which our results might be confined to this specific political system. Finally, potential interactions between top-down and bottom-up signals in shaping climate policy support are ripe for investigation.

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