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# Climate policy support in the UK: An interaction of worldviews and policy types

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**Abstract**

Understanding predictors of climate policy support is important for tackling climate change. Previous research demonstrated that policy support is partially driven by cultural worldviews. Yet, treating policies as a homogeneous concept, this literature neglected the existence of different policy types. Making this distinction is important because each type implies a distinct solution to the same problem (i.e., carbon emissions) with varying degrees of retained freedom for agents. Given that diverging worldviews imply different preferences for individual freedom, we hypothesize an interaction between policy types and cultural worldviews on climate policy support: Policy support is stronger when the retained freedom of a policy type is aligned with the worldview-based preferences for such freedom. Using a representative sample of the UK population ($N = 1991$) and actual policy proposals of UK political parties, our results partly support our hypothesized interaction. Although communitarian-egalitarians, compared to all other worldview groups, indicated stronger support across policy types, contrary to our hypothesis they showed their weakest support for command-and-control and their strongest for information-based policies. Individualist-hierarchists, in contrast and in line with our argument, showed the weakest support for command-and-control policies and strongest support for voluntary policies.

**KEYWORDS**

cultural cognition, cultural worldviews, decarbonization, policy support, policy types, public opinion

## INTRODUCTION

In democratic countries, the implementation of climate policies to reach net zero is to a large extent, either directly or indirectly, determined by public support (Burstein, 2003; Page & Shapiro, 1983). Policy

support in turn is often driven by an individual's worldviews (Jones, 2011; Liu & Yang, 2023; Ripberger et al., 2014; Song et al., 2014; Tumlison & Song, 2019).

The use of worldviews embedded in cultural theory is well-established in policy studies (Swedlow, 2014) and has been fruitful in understanding policy preferences of both political elites (Jenkins-Smith et al., 2014; Ripberger et al., 2014; Swedlow, 2011) and the general public (Jones, 2011; Liu & Yang, 2023; Song et al., 2014; Tumlison & Song, 2019). To better comprehend climate change attitudes and policy preferences, some scholars investigated the interaction of framing and worldviews for trust in expert opinion related to climate policy (Lachapelle et al., 2014), while others used narratives (Jones, 2014) or interacting communication approaches (Kahan et al., 2015). To our knowledge, only Jones (2011, 2014) directly tested how worldviews link to different climate policies: cap-and-trade, nuclear energy, and renewable energies. Yet, research on the cultural worldviews—policy support relationship, particularly climate policy support, has hitherto neglected that policies differ in type, from command-and-control policy instruments that may prohibit a behavior to voluntary policies that are non-binding (Jang et al., 2015; Liao, 2018; Pereira Sánchez & Deza, 2015; Rogge & Reichardt, 2016).

Distinguishing between policy types is important because each policy type implies a distinct solution to the same problem (i.e., carbon emissions). From a practical perspective, different decarbonization policies translate into various degrees of actual decarbonization. Whereas the insufficiency of voluntary (Cames et al., 2016; Gillenwater et al., 2007; Martin & Saikawa, 2017; Potoski & Prakash, 2013; Rehan & Nehdi, 2005) and information-based policy types (Grolleau et al., 2016) is well-established, the relative effectiveness of market-based and command-and-control policies is more contested. Market-based policies are commonly judged to be theoretically most cost-effective in reducing emissions (Baranzini et al., 2017; Wills et al., 2022). However, empirical ex-post analyses suggest that command-and-control policies have been responsible for the greatest reduction of emissions (Cullenward & Victor, 2020; Green, 2021; Haites, 2018).

The question we aim to answer with this article is whether public support for policies that fundamentally address the same issue—decarbonization—varies not only depending on an individual's underlying cultural worldview but also on the type of policy proposed. This is important because in the United Kingdom—the country under investigation—partisan issues in climate politics, both on the party and individual level, play out for specific aspects of policy implementation, *not* around the general need for climate policies and the net zero target (Carter & Pearson, 2024). A more thorough understanding of the interaction of worldviews and policy types has thus also significant political and practical implications. We reason that cultural worldviews interact with policy types in shaping policy support. More specifically, we posit that there may be both important differences across worldviews for the same policy type as well as within worldviews across different policy types.

Our article makes several important contributions. First, by empirically analyzing data from a representative sample of UK individuals, the article extends theoretical and conceptual work on the association between cultural worldviews and policy type preference (Kahan & Braman, 2006; Ney & Thompson, 2000; Steg & Sievers, 2000; Verweij et al., 2006) and the restricted number of policies used by Jones (2011). Second, the use of actual policy proposals from the United Kingdom's major political parties and the Government adds a more concrete dimension to previous research on worldviews and general policy support that relied predominantly on synthetic policy proposals (Dietz et al., 2007; Jones, 2011). Third, studying the interaction of policy types and cultural worldviews contributes to and refines current scholarly debates on public policy support (e.g., Coleman et al., 2022) and policy instruments (Rhodes et al., 2017) by demonstrating the complexities involved in policy preferences beyond uni-dimensional explanations (e.g., attitudes; Kaiser et al., 2023; Sælen & Aasen, 2023). Overall, our findings have thus important repercussions for our understanding of public policy support and for the public discourse of decarbonization policy measures in the United Kingdom and beyond.

# LITERATURE REVIEW

## Policy types

Policy types group together the different instruments governments employ to "implement their policy objectives" (Howlett, 1991, p. 2). The method of categorizing policy instruments into types varies (Wurzel et al., 2013), but they generally differ in the degree to which an institution such as the government interferes with or limits an agent's freedom/constrains an agent's choice (Jordan et al., 2011; Karp & Gaulding, 1995; Liao, 2018). We adhere to a commonly applied distinction (Jang et al., 2015; Jordan et al., 2011; Pereira Sánchez & Deza, 2015) and differentiate between four policy types: command-and-control policy instruments (also referred to as regulatory), market-based instruments, information-based, and voluntary instruments.[1]

A policy falls within the realm of command-and-control when it directly affects behavior by restricting the available actions of an agent. Institutions then enforce these policies through penalties if the actors deviate from what is permitted, thereby directly prescribing behavior (Cho & Moon, 2019). Such prescriptions can take the form of an emission standard that sets a limit on the amounts of emissions of a process, for instance, the EU emission performance standards for cars and vans, or an outright ban of a product or substance such as the EU-Commissions plan to ban the use of more than 2000 harmful and polluting chemicals (European Commission, 2022). Another example of a command-and-control type of policy that is currently circulating would be the ban on selling cars with a conventional combustion engine after 2040.

While command-and-control instruments directly affect behavior by restricting the available actions of an agent (Jordan et al., 2005), market-based policies encourage behavior change by providing incentives or disincentives, respectively (Stavins, 2003). An example of a market-based policy is carbon-trading because it allows market participants to trade carbon permits (i.e., freedom is preserved to some extent) while it encourages to reduce carbon emissions through financial incentives (Meckling, 2011). Other examples include subsidies or taxes, as these act as incentives and disincentives by making some behavior more financially attractive than others.

Compared to both command-and-control and market-based policies, which rely on market interference either through explicit rules or through incentives, information-based policies work under the assumption that providing information is sufficient for actors to change their behavior (e.g., Ferraro & Miranda, 2013). These types of policies provide information to consumers with the aim of increasing awareness and, as a consequence, changing people's behavior. This policy type does not restrict the actions of companies or penalize certain behaviors. It merely mandates them to provide information on the potentially harmful ingredients or elements of a product or service. Yet, it leaves the decision to purchase a product or service to the consumer. A well-established information-based policy instrument are eco-labels on products or graphic warnings on cigarette packages.

Finally, voluntary policy instruments do not encourage behavior change through regulation or incentives nor do they force firms to provide information. As the name suggests, this type of instrument is often instigated by companies themselves to signal to customers they are going beyond the prescribed governmental standards. Examples for this policy type include industry-led standards such as the Carbon Trust Standard, ISO, the Global Reporting Initiative, and more recently company-level net-zero pledges. Adhering to these voluntary standards sets firms apart from others, thereby appealing to environmentally conscious consumers while also reducing emissions.

In short, any type of policy constitutes some degree of government involvement and a restriction of individual freedoms, with a de-escalating order from command-and-control to market-based, followed by information-based and ending in voluntary carbon policies (see Figure 1 below). In other words, in contrast to command-and-control policies that restrict the agent's freedom the most, other policies "allow social actors more freedom to coordinate amongst themselves in pursuit of societal goals, with far less (or even no) central government involvement" (Jordan et al., 2005, pp. 478–479). It is this role of retaining individual freedoms that, we hypothesize, directly resonates with different cultural worldviews (see Bretter & Schulz, 2023).

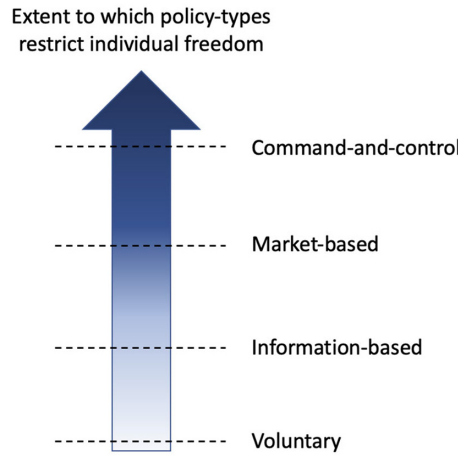


**FIGURE 1** The extent to which different policy types restrict individual freedom.

## Cultural theory and cognition

Cultural theory (Douglas, 1970; Wildavsky, 1987) has been repeatedly used in policy studies to link individuals' core beliefs to various public policy topics and choices (Jenkins-Smith et al., 2014; Liu & Yang, 2023; Ripberger et al., 2012, 2014; Song et al., 2014). As Jenkins-Smith et al. (2014) and Swedlow et al. (2020) point out, there are several different approaches to operationalizing cultural worldviews groups.

In this article, we follow the cultural cognition approach by Kahan et al. (2007, 2009, 2011). Cultural Cognition utilizes and extends the cultural theory framework by Douglas and Wildavsky (1982) by integrating social psychology with the aim to explain why individuals with particular worldviews prefer some policies over others (Kahan & Braman, 2006). Cultural cognition does not "just" evaluate how individuals perceive risks, but it has been developed specifically to explain support for different policies as social psychological mechanisms "should […] induce individuals to conform their beliefs about the empirical efficacy of […] policies to their cultural evaluations" (Kahan and Braman, 2006, p. 154). Indeed, cultural cognition has been shown to (a) predict environmental preferences well (Swedlow et al., 2020) and (b) refocus attention more closely to Douglas theoretical framework on the grid and group dimensions discussed below (Jenkins-Smith et al., 2014).

Cultural cognition can be understood as the psychological tendency of individuals to evaluate the efficacy of a policy on a given subject matter, such as decarbonization, through the lens of their cultural predisposition—that is, their beliefs about social and political relations (Kahan & Braman, 2006). "*In effect, value groups congeniality operate as a powerful heuristic for identifying which positions to espouse or denounce*" (Kahan & Braman, 2006, p. 161). This suggests that the evaluation of policies, that is, the support for proposed policies, is driven by their cultural worldviews, rather than by an objective evaluation of evidence (Kahan & Braman, 2006; for an application, see Liu & Yang, 2023).

Cultural worldviews are categorized using a typology along the two dimensions: "grid" and "group" (Douglas, 1970; see Figure 2). The grid dimension describes the extent to which one favors a society in which resources, responsibilities, and obligations are distributed in a stratified manner, determined by characteristics such as class, education, gender, or ethnicity (Kahan, Braman, Cohen, et al., 2010). The group dimension, in contrast, describes the extent to which collective needs trump individual needs and whether the responsibility to solve problems rather lies with the collective or with the individual (Kahan, Braman, Cohen, et al., 2010). Each dimension encompasses two opposing worldviews, one at either end, thereby giving rise to, in total, four cultural worldviews.

At one end of the "grid" dimension is the hierarchist worldview. Individuals adhering to this view favor a society in which opportunities, rights, and resources are distributed depending on fixed

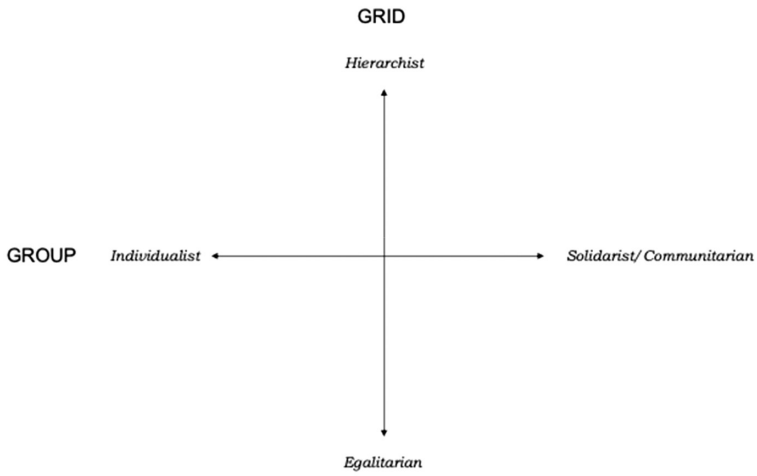


**FIGURE 2** Cultural typology developed by Douglas (1970); from Kahan and Braman (2006).

characteristics such as class, gender, education, birthright, or status; thereby imposing a social hierarchy on society. Hierarchists may perceive certain government interventions as a threat to the competence of particular social or economic elites. On the opposite end of the "grid" dimension is the egalitarian worldview. Individuals favoring an egalitarian society favor an equal distribution of resources across society and are hence sympathetic to government regulation of activities that promote social equality.

The "group" dimension ranges from individualist to communitarian worldviews. Individualists believe that each individual member of society is responsible for fulfilling their own needs. Therefore, each individual acts in her own self-interest whilst regulations aimed at managing collective needs for society are opposed for reasons of retaining "individual freedom." Individualists perceive the free market as the tool to drive growth and innovation that will help solve the climate crisis (Ney & Thompson, 2000). Communitarians, on the other hand, allocate priority to the collective needs of society and oppose the need for individuals to act with self-interest. Society as a whole should instead enable individuals to thrive. To this cultural group, the government is seen as important to ensure every individual's well-being, especially when markets alone are not able to do so.

This typology of cultural theory (Douglas & Wildavsky, 1982) thus results in four distinct cultural worldviews: individualist-hierarchist, individualist-egalitarian, communitarian-hierarchist, and communitarian-egalitarian. It is worth noting that the cultural groups individualist-hierarchist and communitarian egalitarian are the most polarized, that is, they differ the most in their preference for retaining individual freedom and the use of government intervention to foster collective well-being (Kahan & Braman, 2006; Kahan et al., 2011).

Studies in various fields have examined the effect of cultural cognition on people's perception. Johnson et al. (2020), for example, found that the grid dimension, but not the group dimension, is associated with perceived risks of climate change so that the more individuals favored a hierarchist worldview, the less they perceived climate change as a risk. Moreover, those who are hierarchical and communitarian have been shown to be supportive of outpatient commitment laws while individuals with egalitarian and individualistic worldviews have been shown not to be supportive (Kahan, Braman, Monahan, et al., 2010). Finally, Newman et al. (2018) found that the biases inherent in cultural worldviews, particularly the difference between individualist-hierarchists and communitarian-egalitarians, contribute to political polarization. Previous research on policy preferences of cultural groups, however, has been almost exclusively theoretical (Ney & Thompson, 2000; Verweij et al., 2006). Ellis and Thompson (1997) found an anti-market preference among egalitarians but did not compare preferences for different policies. Jones (2011) did find that individualists, relative to hierarchists and egalitarians, preferred a cap-and-trade policy, while hierarchists nuclear energy and egalitarians renewable energy.

However, a detailed investigation of preferences for distinct policy types for more than three single policy items is currently lacking.

Considering that each policy type incorporates different degrees of government involvement and encroachments on individual freedoms that are to different degrees aligned with existing cultural worldviews, we argue that a particular policy type resonates more with some, and less with other worldviews. Public support for decarbonization policies might therefore be less determined by the disagreement on whether policies per se are needed, as often framed in public discourse and academic literature (Chuang et al., 2020), and more about how the type of policy is perceived in terms of an individual's underlying worldview. We hypothesize:

> **Hypothesis 1.** Support for different policy types varies across cultural worldview groups.

Importantly, however, we also expect within-worldview differences where individuals with a particular worldview prefer some policy types over others. In other words, we expect the effect of cultural worldviews on policy support is contingent on the policy type, thereby hypothesizing an interaction between cultural worldviews and policy types. These specific within- and between-worldview differences are discussed in the following sub-chapters.

## Within-worldview differences in support for policy types

Upon probing the hypothesized interaction, we expect to see specific within-worldview differences. Communitarian-egalitarians give less importance to the preservation of individual freedom and prefer more government intervention for the greater societal good. Given these preferences, we expect that they show stronger support for policies that restrict individual freedom and less support for those that retain such freedom. Conversely, individualist-hierarchists prefer policies that retain as much individual freedom as possible and leave the task of finding solutions to decarbonization to economic elites who, in their view, are most likely to know best how and what needs to be changed. Preliminary evidence for our notion exists. In an experimental design, Cherry et al. (2017) have found that opposition to stricter policies is higher for hierarchists and individualists, compared to egalitarians and communitarians. From this it follows that:

> **Hypothesis 2a.** Communitarian-egalitarians show the strongest support for command-and-control policies, followed by market-based, information-based and voluntary policies.

> **Hypothesis 2b.** Individualist-hierarchists show the strongest support for voluntary policies, followed by information-based, market-based and command-and-control policies.

Given that these two cultural worldviews (communitarian-egalitarians and individualist-hierarchists) are the most polarized out of the four in terms of their preferences for individual freedom, we expect that policy type preferences of the other two, less polarized worldviews (i.e., individualist-egalitarian and communitarian-hierarchy) lie somewhere between these extremes. In other words, they will neither prefer those policies that restrict their freedom the most (i.e., command-and-control), nor will they prefer policies that restrict freedom the least (i.e., voluntary). However, we refrain from stating specific hypotheses for these two worldviews because their policy preference will depend on which dimension, group or grid (see Figure 2), exerts stronger influence on their preferences, which to date remains a gap in the literature.

### Between-worldview differences in support for policy types

To form opinions on a given subject, individuals are often affected by their cultural worldviews and use them as a heuristic rather than attempting to evaluate evidence (Kahan, 2012; Kahan & Braman, 2006; Kahan et al., 2011). Indeed, Kahan and Braman (2006) refer to cultural cognition as "the psychological disposition of persons to conform their factual beliefs about the instrumental efficacy (or perversity) of law to their cultural evaluations of the activities subject to regulation" (pp. 149–150). Therefore, differences in worldviews may imply different heuristics and thus potentially lead to divergent appraisals of the same policy type. To hypothesize these between-worldview differences we again commence with the most polarized groups. Given the cultural-worldview-dependent preferences for governmental intervention and retained individual freedom, we hypothesize:

> **Hypothesis 3a.** Support for command-and-control and market-based policies across worldviews will be strongest for communitarian-egalitarian and weakest for individualist-hierarchists.

> **Hypothesis 3b.** Support for information-based and voluntary policies across worldviews will be strongest for individualist-hierarchists and weakest for communitarian-egalitarians.

Again, elaborating hypotheses for the less polarized groups is more challenging. However, for between-worldview tests we expect differences between individualist-egalitarian and communitarian-hierarchy worldviews because individualist-egalitarians tend to perceive environmental risks as more serious, compared to communitarian-hierarchists (Kahan et al., 2007). It therefore follows that the former will show stronger support for policies that to some extent restrict individual freedom, compared to the latter. We thus expect:

> **Hypothesis 3c.** Support for command-and-control and market-based policies will be stronger for individualist-egalitarians, compared to communitarian-hierarchists.

> **Hypothesis 3d.** Support for information-based and voluntary policies will be stronger for communitarian-hierarchists, compared to individualist-egalitarians.

## METHOD

### Data sample

To test our hypotheses, we followed existing research of cultural cognition (Kahan et al., 2009, 2012) and conducted a survey. The survey captured participants' cultural worldviews, their agreement to various command-and-control, market-based, information-based, and voluntary decarbonization policies as well as several covariates (see measures below) that may potentially influence individual policy support.

We collected the data via Qualtrics and recruited an overall sample of $N = 1991$ participants via the survey panel Prolific. We ensured that our sample was representative of the UK population in terms of age, gender, and ethnicity (see data preparation and analysis for more information) by using Prolific's filters for representativeness. Prolific enables researchers to obtain representative samples by making the survey available to only those demographics that are underrepresented in the sample so that the final sample matches the criteria for representativeness. Participants were paid an equivalent of £8.20 per hour to complete the survey, in line with the ethical principles of Prolific.

We also included two attention checks, a common practice when conducting online surveys to filter out inattentive participants (Bretter et al., 2023; Peer et al., 2017). The first check read "*I*

*am still reading all the statements and that is why I click 'Disagree' here.*" While the second read "*I am still reading all the statements and that is why I move the slider to position 9 here.*" Participants who did not click "*Disagree*" for the first and did not move a slider to position 9 for the second were excluded from the analysis (see Data preparation and analysis). We have obtained ethical approval for our study from the Faculty Research Ethics Committee.

## Measurements

Unless otherwise stated, all variables were measured on a 6-point Likert scale from (1) "*Strongly disagree*" to (6) "*Strongly agree*". All constructs measured, their scales, and corresponding items can be found in the Supplemental Materials. Items of each construct were presented to participants in a randomized order.

### Cultural worldviews

Different approaches to operationalize cultural worldviews have been proposed and tested (Swedlow, 2014). We measured cultural worldviews using the 12-item scale developed by Kahan et al. (2011) that has been shown to (a) converge well with other approaches to cultural theory and (b) predict environmental policy responses well (Swedlow et al., 2020). While six items relate to the hierarchy-egalitarian dimension (e.g., "*We have gone too far in pushing equal rights in this country*"), further six items relate to the individualist-communitarian dimension (e.g., "*The government interferes far too much in our everyday lives*"). Both the hierarchy-egalitarian dimension ($\alpha = 0.89$) and the individualist-communitarian dimension ($\alpha = 0.80$) formed reliable scales.

### Decarbonization policies

We measured participants' agreement to four distinct policy types: Command-and-control policies, market-based policies, information-based policies, and voluntary policies. We identified policy proposals aimed at reducing carbon emissions in manifestos of the four major political parties in the UK—Conservative, Labour, Liberal Democrats, and Greens—as well as in official documents of the UK Government that directly target decarbonization—*Net Zero Strategy, Industrial Decarbonization Strategy, Ten Point Plan for Green Industrial Revolution*—and the UK Climate Change Committee. We attempted to remedy support biases resulting from strong opinions about one particular policy or area by including four different proposals for each policy type. To group policy proposals, we followed the categorization of policy types as presented in section 2.1. We classified bans and mandatory standards as common-and-control policies; taxes, tax exemptions, and subsidies as market-based policies; information campaigns, information disclosure requirements, and labels as information-based; and non-binding advice, voluntary alliances, voluntary industry standards or codes as voluntary instruments.

After categorizing 16 policies into the four policy types, we consulted two senior academics engaged in decarbonization policies in different applied areas to judge the grouping. Based on their feedback, we slightly re-phrased the original policy proposals to achieve language consistency. All policy proposals were phrased in a way that directly relates to an action performed by the government so that each proposal started with: "The government should …." All 16 decarbonization policies and their sources can be found in the Supplemental Materials and in Table 1. All participants were shown all policies. All policy type composite measures showed satisfactory reliability (command-and-control: $a = 0.87$; market-based: $a = 0.77$; information-based: $a = 0.86$; voluntary: $a = 0.84$).

**TABLE 1** CFA results.

| Latent factor | Indicator | *SE* | *β* | *δ* | *α* | AVE |
|---|---|---|---|---|---|---|
| Policy support: Command-and-control | The government should require car manufacturers to only produce vehicles that emit zero emissions during use | | 0.79 | 0.38*** | 0.87 | 0.63 |
| | The government should require companies to reject any business transactions that conflict with climate principles set by the government | 0.03 | 0.80*** | 0.37*** | | |
| | The government should set new binding product standards for vehicles and appliances in line with best sustainability practices | 0.02 | 0.83*** | 0.31*** | | |
| | The government should ban all forms of fossil fuel extraction | 0.03 | 0.77*** | 0.41*** | | |
| Policy support: Market-based | The government should introduce a carbon tax on all fossil fuel imports based on their greenhouse gas emissions | | 0.83 | 0.32*** | 0.77 | 0.50 |
| | The government should provide financial support for research and development into carbon capture & storage and other carbon removal technologies | 0.02 | 0.62*** | 0.61*** | | |
| | The government should develop a carbon market: Companies have to buy carbon emission permits, which they can trade in a carbon market with other companies | 0.02 | 0.59*** | 0.64*** | | |
| | The government should stop all subsidies currently paid to fossil fuel-related activities | 0.02 | 0.71*** | 0.49*** | | |
| Policy support: Information-based | The government should introduce a public information campaign to raise awareness for the carbon dioxide costs and impacts of companies' activities | | 0.80 | 0.37*** | 0.86 | 0.61 |
| | The government should expand existing labelling for consumer products to include assessment of embodied emissions | 0.03 | 0.79*** | 0.38*** | | |
| | The government should require companies to use labels that inform consumers of durability, repairability, and recyclability of products | 0.02 | 0.68*** | 0.54*** | | |
| | The government should introduce a green taxonomy that defines which economic activities tackle climate change and environmental degradation to help better guide investors and consumers | 0.03 | 0.83*** | 0.31*** | | |

(Continues)

**TABLE 1** (Continued)

| Latent factor | Indicator | *SE* | *β* | *δ* | *α* | AVE |
|---|---|---|---|---|---|---|
| Policy support: Voluntary | The government should provide non-binding advice to companies as to how to reduce their emissions | | 0.68 | 0.54*** | 0.84 | 0.56 |
| | The government should launch a voluntary carbon-offset standard (e.g., voluntary rules for the planting of trees to offset emissions) | 0.04 | 0.70*** | 0.51*** | | |
| | The government should introduce non-binding "greener" product standards for vehicles and appliances | 0.04 | 0.78*** | 0.40*** | | |
| | The government should support businesses to make greener choices through the formation of a voluntary buyers' alliance (e.g., voluntary "green" purchases along the supply chain) | 0.04 | 0.83*** | 0.31*** | | |
| Free-market beliefs | An economic system based on free markets unrestrained by government interference automatically works best to meet human needs (R) | | 0.60 | 0.65*** | 0.76 | 0.42 |
| | I support the free-market system, but not at the expense of environmental quality | 0.04 | 0.19*** | 0.97*** | | |
| | The free-market system may be efficient for resource allocation, but it is limited in its capacity to promote social justice | 0.04 | 0.59*** | 0.65*** | | |
| | The preservation of the free-market system is more important than localized environmental concerns (R) | 0.05 | 0.61*** | 0.62*** | | |
| | Free and unregulated markets pose important threats to sustainable development | 0.05 | 0.82*** | 0.33*** | | |
| | The free-market system is likely to promote unsustainable consumption | 0.05 | 0.83*** | 0.31*** | | |
| Biospheric values | Preventing pollution: Protecting natural resources | | 0.87 | 0.24*** | | |
| | Respecting the earth: Harmony with other species | 0.02 | 0.88*** | 0.23*** | 0.93 | 0.77 |
| | Unity with nature: Fitting into nature | 0.02 | 0.84*** | 0.30*** | | |
| | Protecting the environment: Preserving nature | 0.02 | 0.92*** | 0.15*** | | |
| Climate change knowledge | The different causes of climate change | | 0.88 | 0.23*** | 0.88 | 0.72 |
| | The different consequences of climate change | 0.02 | 0.92*** | 0.16*** | | |
| | The different ways in which we can fight climate change | 0.02 | 0.75*** | 0.44*** | | |

*Note*: $\chi^2 = 3628.77$; df = 356; $p < 0.001$; RMSEA = 0.069; SRMR = 0.070; CFI = 0.91; TLI = 0.90; $N = 1911$; ***p < .001.

### Free-market beliefs

We measured participants' free-market beliefs as a covariate with a six-item measure developed by Heath and Gifford (2006). "*The preservation of the free-market system is more important than localized environmental concerns*" represents an example item and the scale showed acceptable reliability ($\alpha = 0.76$). Free-market beliefs also served as an outcome-neutral test for our cultural worldview measure (see Results).

### Climate change knowledge

Using the 3-item scale developed by Vainio and Paloniemi (2013), we measured participants' self-reported knowledge of climate change as an additional covariate. Asking for the extent to which participants believed they were informed about climate change, participants responded on a 4-point Likert scale from (1) "*Not at all informed*" to (4) "*Well informed*" for items such as "*The different causes of climate change*." The scale showed satisfactory reliability ($\alpha = 0.88$).

### Biospheric values

Following the procedure outlined by De Groot and Steg (2007), we measured participants' biospheric values as a covariate to assess whether our hypothesized effects hold when controlling for the extent to which participants place value on nature per se. The scale has four items (e.g., "*Protecting the environment: Preserving nature*") and is answered on a 7-point scale from (1) "*Not important to you*" to (4) "*Very important to you*." The scale showed acceptable reliability ($\alpha = 0.93$).

### Demographic information

We also collected information on participants' demographical information such as gender, age, and ethnicity. In addition, we measured their political affiliation, income, and education. All corresponding scales and items for these measures can be found in the Supplemental Materials.

## Data preparation and analysis

Before we analyzed the data, we excluded participants who failed the first ($n = 32$) and the second attention check ($n = 48$). Accordingly, our final sample comprised $N = 1911$ individuals (Age: $M = 45.88$ years, $SD = 15.67$ years; gender: *female* = 983 individuals, *male* = 918 individuals, *none of the above* = 10 individuals; ethnicity: *white* = 1674 individuals, *black* = 60 individuals, *Asian* = 131 individuals, *other* = 46 individuals).

### Categorizing cultural worldviews

In the first step of our analysis, we categorized our participants into one of the four cultural worldviews. To do this, we followed the procedure outlined by Kahan et al. (2011). For each of the two dimensions (see section Measurements), we conducted a median split. Individuals were thus either categorized as "Hierarchists" or "Egalitarian" on the grid dimension and as "Individualists" or "Communitarian" on the group dimension. This allowed us to place each individual into one of the four resulting quadrants (i.e., cultural worldviews). Our analysis showed that $n = 534$ individuals were categorized as "individualist-hierarchy" (27.9%) whilst $n = 628$ were categorized as "communitarian-egalitarian"

(32.9%). Slightly fewer individuals were categorized as either "individualistic-egalitarian" ($n = 397$; 20.8%) or as "communitarian-hierarchy" ($n = 352$; 18.4%).

## Confirmatory factor analysis

Following the categorization of participants into their cultural worldviews, we first ran descriptive analyses and conducted a confirmatory factor analysis (CFA) to establish discriminant validity of our latent constructs. The results of CFA are displayed in Table 1 and show that all latent variables apart from free-market beliefs extract sufficient unique variance (based on Fornell and Larcker's (1981) threshold of ≥0.50). For latent variables that do not meet this criterion, Fornell and Larcker (1981) propose that the variance extracted must be greater than the squared correlation between that latent variable and other variables in the model. Given that the average variance extracted (AVE) of free-market beliefs is AVE = 0.42 (see Table 1) and the highest correlation is with market-based policies ($r = -0.57$; $r^2 = 0.32$), this criterion is met. Therefore, all of our latent constructs show discriminant validity.

## Outcome neutral test

We then conducted our outcome neutral test for cultural worldviews to examine whether, as we would expect, individuals in differing cultural worldviews show differences in free-market beliefs. We conducted a one-way Analysis of Variance (ANOVA) with our cultural worldviews as the independent variable and free-market beliefs as the dependent variable. As reported in the Supplemental Materials, individuals with differing cultural worldviews showed the expected differences in free-market beliefs.

## Statistical analyses

We then conducted our main statistical analyses using two steps, with different statistical approaches. In the first step, we tested our hypotheses and examined whether participants' policy support was contingent on a policy type—cultural worldview interaction. To do this, we conducted a mixed-design Multivariate Analysis of Variance (MANOVA) with our four policy type composite measures as the within-subject factors and with our four cultural worldviews as the between-subject factor. We probed the interaction using pairwise comparisons adjusted for multiple comparisons using the Bonferroni adjustment. To demonstrate the robustness of our results, we conducted the same analysis but controlled for our covariates, thus conducting a Multivariate Analysis of Covariance (MANCOVA).

In the second step, to facilitate the interpretation of our results, we run binomial logistic regression models of our analysis and calculated log odd rations, that is, the likelihood of agreeing (versus disagreeing) with each policy type, depending on the cultural worldviews. To do so, we categorized our responses for each policy type composite measure as either agree (>3.5) or as disagree (≤3.5) and conducted the binomial logistic regression with these new binary policy type composite measures as the dependent variable and our cultural worldviews as the independent variable.

Finally, to judge the quality of our model we used confusion matrices to display predictive accuracy. A confusion matrix visualizes the predictive performance of a model by comparing the number of actual cases in a class (rows) with the number of predicted cases in the class (columns). Accuracy refers to the percentage of cases predicted correctly with the model.

# RESULTS

## MANOVA and MANCOVA

### Hypothesis 1

The means, standard deviations, and confidence intervals of participants' policy support per cultural worldview and policy type are presented in Table 2. Using our cultural worldviews as the between-subjects factor and our four policy type composite measures as the within-subject factor, multivariate effects of our mixed MANOVA suggested a policy type × cultural worldview interaction ($F(9, 4636.42) = 11.65$; $p < 0.001$; $\eta^2 = 0.02$). With and without assuming sphericity of the data, within-subject effects again showed the policy type × cultural worldview interaction ($F = 17.02$; $df = 7.49$; $p < 0.001$; $\eta^2 = 0.03$). Importantly, this interaction remains significant for the multivariate effects ($F(9, 4619.38) = 1.89$; $p = 0.049$; $\eta^2 < 0.01$) and for the within-subject effects ($F = 2.34$; $df = 7.60$; $p = 0.018$; $\eta^2 < 0.01$) after adding control variables via a mixed MANCOVA. These results support Hypothesis 1.

We then probed the interaction using pairwise comparisons with the Bonferroni adjustment for multiple comparisons, once between policy types but within cultural worldviews (thus testing H2a and H2b) and once between cultural worldviews, but within policy types (thus testing H3a to H3d). Although we will only focus on those comparisons most relevant to our hypotheses, both comparison tables are presented in the Appendix (Tables A1 and A2). Our policy type × cultural worldview interaction is visualized in Figure 3.

### Hypothesis 2

Hypothesis 2a stated that communitarian-egalitarians show their strongest support for command-and-control policies, followed by market-based, information-based and voluntary policies. Contrary to this, communitarian-egalitarians instead showed strongest support for information-based policies ($M = 5.00$; $SD = 0.72$; 95% CI = [4.95, 5.06]), followed by voluntary ($M = 4.84$; $SD = 0.78$; 95% CI = [4.77,

**TABLE 2** Means, standard deviations, and 95% confidence intervals per cultural worldview and policy type.

| Policy type | Cultural worldview | *M* | *SD* | 95% CI |
|---|---|---|---|---|
| Command-and-control | Individualist-hierarchy | 3.27 | 1.20 | [3.17, 3.37] |
| | Individualist-egalitarian | 4.31 | 1.01 | [4.21, 4.41] |
| | Communitarian-hierarchy | 3.80 | 1.01 | [3.70, 3.91] |
| | Communitarian-egalitarian | 4.51 | 0.88 | [4.44, 4.58] |
| Market-based | Individualist-hierarchy | 3.66 | 1.06 | [3.57, 3.75] |
| | Individualist-egalitarian | 4.57 | 0.76 | [4.49, 4.66] |
| | Communitarian-hierarchy | 4.06 | 0.88 | [3.97, 4.15] |
| | Communitarian-egalitarian | 4.77 | 0.73 | [4.71, 4.82] |
| Information-based | Individualist-hierarchy | 3.98 | 1.08 | [3.88, 4.07] |
| | Individualist-egalitarian | 4.79 | 0.83 | [4.71, 4.88] |
| | Communitarian-hierarchy | 4.37 | 0.84 | [4.28, 4.46] |
| | Communitarian-egalitarian | 5.00 | 0.72 | [4.95, 5.06] |
| Voluntary | Individualist-hierarchy | 4.09 | 1.04 | [4.00, 4.18] |
| | Individualist-egalitarian | 4.74 | 0.83 | [4.66, 4.82] |
| | Communitarian-hierarchy | 4.39 | 0.83 | [4.30, 4.48] |
| | Communitarian-egalitarian | 4.84 | 0.78 | [4.77, 4.90] |

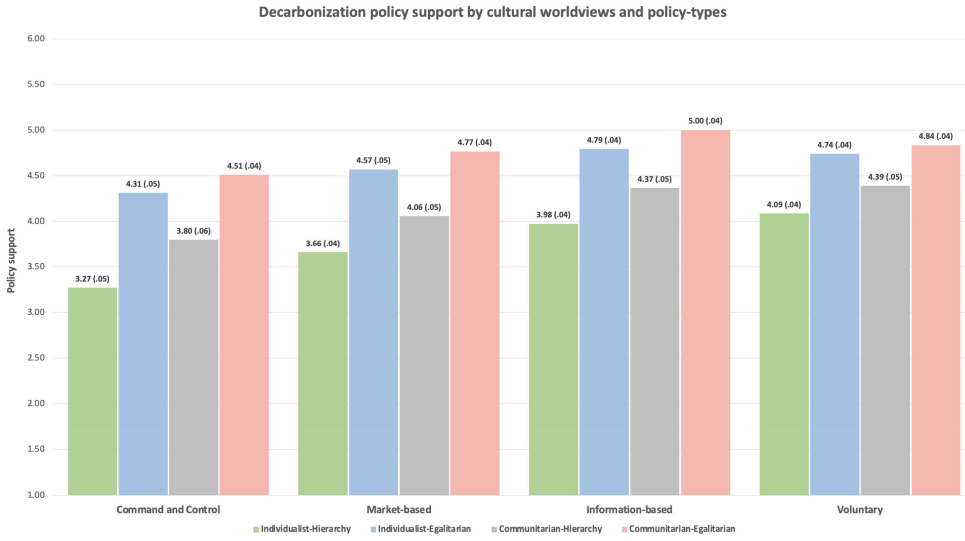


**FIGURE 3** Decarbonization policy support by cultural worldviews and policy types. The numbers show the estimated marginal means. Standard errors are shown in parentheses. $N = 1911$.

4.90]; $p < 0.001$) and market-based policies ($M = 4.77$; $SD = 0.73$; 95% CI = [4.71, 4.82]; $p < 0.001$). Compared to these three policy types, command-and-control policies received the lowest support from communitarian-egalitarians ($M = 4.51$; $SD = 0.88$; 95% CI = [4.44, 4.58]; $p_s < 0.001$). Therefore, Hypothesis 2a was not supported.

In contrast, Individualist-hierarchists expressed their strongest support for voluntary policies ($M = 4.09$; $SD = 1.04$; 95% CI = [4.00, 4.18]) followed by information-based policies ($M = 3.98$; $SD = 1.08$; 95% CI = [3.88, 4.07]; $p < 0.001$). Compared to both of these policy types, individualist-hierarchists showed weaker support for market-based policies ($M = 3.66$; $SD = 1.06$; 95% CI = [3.57, 3.75]; $p_s < 0.001$). Compared to all three policy types, individualist-hierarchists expressed weaker support for command-and-control policies ($M = 3.27$; $SD = 1.20$; 95% CI = [3.17, 3.37]; $p < 0.001$). This supports Hypothesis 2b.

## Hypothesis 3

After having examined differences in policy support within cultural worldviews, but between policy types, we then tested policy support within policy types, but between cultural worldviews. Hypothesis 3a stated that support for command-and-control and market-based policies across worldviews will be strongest for communitarian-egalitarians and weakest for individualist-hierarchists. For command-and-control policies, our pairwise comparisons (see Appendix and Figure 3) demonstrated that communitarian-egalitarians showed the strongest policy support (see above), compared to all other worldviews (individualist-egalitarian: $M = 4.31$, $SD = 1.01$, 95% CI = [4.21, 4.41], $p = 0.018$; communitarian hierarchy: $M = 3.80$, $SD = 1.01$, 95% CI = [3.70, 3.91], $p < 0.001$; individualist hierarchy: $M = 3.27$, $SD = 1.20$, 95% CI = [3.17, 3.37], $p < 0.001$). Similarly, communitarian-egalitarians also expressed the strongest support for market-based policies (see above), compared to all other worldviews (individualist-egalitarian: $M = 4.57$, $SD = 0.76$, 95% CI = [4.49, 4.66], $p = 0.003$; communitarian hierarchy: $M = 4.06$, $SD = 0.88$, 95% CI = [3.97, 4.15], $p < 0.001$; individualist hierarchy: $M = 3.66$, $SD = 1.06$, 95% CI = [3.57, 3.75], $p < 0.001$). Individualist-hierarchists, compared to all other worldviews, show the weakest support for command-and-control and market-based policies ($p_s < 0.001$). Accordingly, we found full support for Hypothesis 3a.

Hypothesis 3b concerned information-based and voluntary policies and stated that support will be strongest for individualist-hierarchists and weakest for communitarian-egalitarians. Here, our results

were surprising. Information-based policies received the weakest support from individualist-hierarchists ($M = 3.98$, $SD = 1.08$, 95% CI = [3.88, 4.07]), compared to all three worldviews (individualist-egalitarian: $M = 4.79$, $SD = 0.83$, 95% CI = [4.71, 4.88], $p = 0.003$; communitarian hierarchy: $M = 4.37$, $SD = 0.84$, 95% CI = [4.28, 4.46], $p < 0.001$; individualist hierarchy: $M = 3.98$, $SD = 1.08$, 95% CI = [3.88, 4.07], $p < 0.001$; communitarian-egalitarian: $M = 5.00$, $SD = 0.72$, 95% CI = [4.95, 5.06]; $p < 0.001$). Similarly, voluntary policies received the weakest support from individualist-hierarchists ($M = 4.09$; $SD = 1.04$; 95% CI = [4.00, 4.18]), compared to all other worldviews (individualist-egalitarian: $M = 4.74$, $SD = 0.83$, 95% CI = [4.66, 4.82], $p < 0.001$; communitarian hierarchy: $M = 4.39$, $SD = 0.83$, 95% CI = [4.30, 4.48], $p < 0.001$; communitarian-egalitarians: $M = 4.84$, $SD = 0.78$, 95% CI = [4.77, 4.90], $p < 0.001$). Both information-based and voluntary policies received the strongest support from communitarian-egalitarians. Hypothesis 3b was thus not supported.

In full support of Hypothesis 3c, we found that individualist-egalitarians expressed stronger support for command-and-control and market-based policies (for values, see above), compared to communitarian-hierarchists ($p_s < 0.001$). Individualist-egalitarians, compared to communitarian-hierarchists (for values, see above), also showed stronger support for information-based and voluntary policies ($p_s < 0.001$), thereby providing no support for Hypothesis 3d.

Overall, as can be seen in Figure 3, differences in support vary along the grid dimensions (hierarchist vs. egalitarian) and less along the group dimension (individualist-communitarian). For all policy types, individualist-egalitarian and communitarian-egalitarian show stronger support than individualist-hierarchist and communitarian-hierarchist groups.

## Logistic regression

The results of our binomial logistic regression models per policy type and the corresponding odd ratios are presented in Table 3. Compared to individualist-hierarchists, people with a communitarian-egalitarian worldview are, all else equal, three times more likely to agree with command-and-control, market-based, and information-based policies while they are more than twice as likely to agree with voluntary policies.

Although we did not find support with our mixed MANOVA (see above) for Hypothesis 2a, which stated among other relationships that communitarian-egalitarians show stronger support for command-and-control policies, compared to voluntary policies, the results of our logistic regression support our thinking. In particular, Table 3 shows that, compared to individualist-hierarchists, the likelihood of communitarian-egalitarians agreeing (vs. disagreeing) with command-and-control policies is higher (3.07) than the likelihood of agreeing with voluntary policies (2.24). It is also interesting to note that individualist-egalitarians are twice as likely to agree with command-and-control, market-based, and voluntary policies; and 1.5 times more likely to agree with information-based policies, compared to individualist-hierarchists.

Moreover, the stronger participants supported a free market system, the less likely they were to agree with any policy type; and when they valued the environment more, they were more likely to agree with any policy type. Our results also highlight a potential gender difference for certain policy types. Specifically, those who identified as female, compared to those who identified as male, were 1.5 times more likely to support command-and-control and voluntary policies.

Finally, we examined the predictive accuracy of our binomial logistic regression model per policy type. The confusion matrices can be found in the Supplemental Materials. The predictive accuracy of our models range from 76.6% in the case of command-and-control policy support to as high as 89.1% for information-based policies.

## Sensitivity analysis

We applied standard practices in machine learning to improve the generalizability of our findings (Stoltzfus, 2011; Valizade et al., 2022). First, we randomly split our dataset into a training (70% of the

**TABLE 3** Logistic regression results and odds ratios per policy type.

| | | Policy type | | | |
|---|---|---|---|---|---|
| **Variable group** | **Independent variable** | **Command-and-control** | **Market-based** | **Information-based** | **Voluntary** |
| Cultural worldviews | Individualist-hierarchist (ref) | | | | |
| | Individualist-egalitarian | 2.57*** (0.46) | 2.35*** (0.49) | 1.72* (0.42) | 2.31*** (0.57) |
| | Communitarian-hierarchist | 2.09*** (0.34) | 1.46* (0.25) | 1.48* (0.29) | 1.59* (0.31) |
| | Communitarian-egalitarian | 3.07*** (0.54) | 3.26*** (0.72) | 3.04*** (0.84) | 2.24*** (0.53) |
| | Biospheric values | 1.62*** (0.08) | 1.46*** (0.08) | 1.60*** (0.10) | 1.38*** (0.08) |
| | Climate change knowledge | 1.08 (0.12) | 1.06 (0.14) | 1.02 (0.15) | 0.87 (0.12) |
| | Free-market beliefs | 0.42*** (0.04) | 0.25*** (0.03) | 0.30*** (0.04) | 0.56*** (0.06) |
| | Income | 1.00 (0.01) | 1.00 (0.01) | 1.01 (0.01) | 1.00 (0.01) |
| | Age | 0.98*** (0.01) | 0.98*** (0.01) | 0.98*** (0.01) | 0.98*** (0.01) |
| Political orientation | Conservative party (ref) | | | | |
| | Alliance party | 0.58 (0.32) | 0.50 (0.30) | 0.95 (0.62) | 1.23 (0.79) |
| | Co-operative party | 0.67 (0.44) | 1.09 (0.90) | 0.42 (0.34) | 0.29 (0.20) |
| | Democratic Unionist party | 0.64 (0.47) | 0.34 (0.24) | 0.41 (0.30) | 0.58 (0.41) |
| | Green party | 1.90* (0.49) | 1.52 (0.50) | 2.04 (0.95) | 1.26 (0.47) |
| | Labor party | 1.81*** (0.28) | 1.15 (0.20) | 1.14 (0.23) | 0.92 (0.18) |
| | Liberal Democrats | 1.36 (0.27) | 0.91 (0.21) | 0.68 (0.17) | 1.01 (0.26) |
| | Plaid Cymru | 0.85 (0.77) | 2.01 (2.25) | 0.86 (0.91) | 0.60 (0.53) |
| | Scottish national party | 1.36 (0.42) | 0.97 (0.37) | 0.65 (0.26) | 0.59 (0.22) |
| | Sinn Fein | 0.69 (0.52) | 1.63 (1.95) | 0.68 (0.79) | 1.02 (1.11) |
| | Democratic and labor party | 0.85 (0.45) | 0.93 (0.67) | 0.74 (0.60) | 0.53 (0.36) |
| Education | Doctoral degree (ref) | | | | |
| | Postgraduate degree | 0.70 (0.28) | 0.53 (0.31) | 1.11 (0.65) | 0.87 (0.46) |
| | Undergraduate degree | 0.96 (0.36) | 0.50 (0.29) | 0.95 (0.53) | 0.77 (0.39) |
| | A-levels | 0.99 (0.39) | 0.37 (0.22) | 0.98 (0.57) | 0.84 (0.44) |
| | GCSE | 1.09 (0.45) | 0.67 (0.39) | 1.47 (0.86) | 1.89 (1.05) |
| | Vocational Education | 0.98 (0.40) | 0.35 (0.21) | 1.23 (0.73) | 1.28 (0.71) |
| Gender | Male (ref) | | | | |
| | Female | 1.49*** (0.18) | 1.14 (0.16) | 1.33 (0.22) | 1.48* (0.23) |
| | Other | 1.15 (1.23) | 0.43 (0.48) | n/a | 1.11 (1.38) |
| | Constant | 0.53 (0.69) | 40.31*** (0.87) | 11.78*** (0.92) | 9.72*** (0.86) |
| | Pseudo $R^2$ (McFadden) | 0.27 | 0.30 | 0.29 | 0.16 |
| | Akaike Information Criterion | 1856.43 | 1451.58 | 1152.47 | 1303.30 |

*Note*: $N = 1911$.

Abbreviation: ref., reference group for factor variables.

***$p < 0.001$; *$p < 0.05$.

sample; $n = 1336$) and a test dataset (30% of the sample; $n = 575$). Second, we applied five-fold cross-validation to the training dataset. In five-fold cross-validation, we randomly split our training data into five approximately equally sized groups. Our logit model was run randomly on four of the five groups. This is repeated five times so that each group is used both as a hold-out sample and as a test sample. As the aforementioned logistic regression model is thus applied to five slightly different samples (within the training dataset) and averaged, the outcomes will show how robust our initial findings (see Table 3)

**TABLE 4** Summary of hypotheses tests.

| Hypothesis number | Hypothesis | Support |
|---|---|---|
| H1 | There will be an interaction between cultural worldviews and policy types, where stronger policy support exists when the retained individual freedom of a policy type is more aligned with worldview-dependent preference for individual freedom | Support |
| H2a | Communitarian-egalitarians show the strongest support for command-and-control policies, followed by market-based, information-based and voluntary policies | No support |
| H2b | Individualist-hierarchists show the strongest support for voluntary policies, followed by information-based, market-based and command-and-control policies | Support |
| H3a | Support for command-and-control and market-based policies across worldviews will be strongest for communitarian-egalitarian and weakest for individualist-hierarchists | Support |
| H3b | Support for information-based and voluntary policies across worldviews will be strongest for individualist-hierarchists and weakest for communitarian-egalitarians | No support |
| H3c | Support for command-and-control and market-based policies will be stronger for individualist-egalitarians, compared to communitarian-hierarchists | Support |
| H3d | Support for information-based and voluntary policies will be stronger for communitarian-hierarchists, compared to individualist-egalitarians | No support |

were. As can be seen in the Supplemental Materials, the findings of the logistic regression models for each policy type remain the same, providing additional robustness to our results.

Second, we used the outcome of the five-fold cross-validation to predict policy support ("*Disagree*" versus "*Agree*") in the test data. This indicates how well the model predicts policy support in unseen data (Sarstedt & Danks, 2022). The results suggest that our model performs equally well when confronted with unseen data (predictive accuracy: command-and-control = 76.4%; market-based = 83.8%; information-based = 89.6%; voluntary: 87.7%). This highlights the generalizability of our findings and their reproducibility.

Table 4 provides a summary of our hypotheses and whether they were supported.

# DISCUSSION

## Summary of findings

Our study demonstrates that individual decarbonization policy support in the UK is associated with an interaction between cultural worldviews and policy types. While some worldview groups such as communitarian-egalitarians prefer, for example, information-based policies over voluntary policies, other cultural worldview groups such as individualist-hierarchists provide stronger support for voluntary policies over information-based policies. Concurrently, we found strong differences between cultural worldview groups where communitarian-egalitarians, for instance, provide stronger support for command-and-control and market-based policies, compared to individualist-hierarchists or communitarian-hierarchists. Lastly, there was a clear tendency for policy support for all policy types along the grid dimension (hierarchist-egalitarian) of the cultural cognition framework, but not along the group dimension (individualist-communitarian). Our findings have important implications for theory and practice, which we will elaborate on in the remainder of this paper.

## Theoretical implications

Our findings are important for the application of cultural cognition theory (Kahan & Braman, 2006) and cultural theory in the field of policy studies. First, in line with previous work by Jones (2011), Liu

and Yang (2023), Song et al. (2014), and Tumlison and Song (2019), our results suggest a consistent and strong relationship between cultural worldview groups and policy support. For each policy type, support was strongest for egalitarian-communitarians and weakest for individualist-hierarchists. Interestingly, we found differences in support to be partly driven by contrary cultural worldviews along the grid dimension (hierarchist-egalitarian) and not along the group dimension (individualist-communitarian). This is in line with findings that show the grid dimension, but not the group dimension, to be associated with perceived risks of climate change (Johnson et al., 2020) and with support for outpatient commitment laws (Kahan, Braman, Monahan, et al., 2010). It might thus also be the case that the comparably larger perceived threat of climate change and not only preferences for individual freedom may increase support for more stringent climate policies among egalitarians.

Second, although our results supported Hypothesis 2b and are thus aligned with how cultural cognition theory predicts policy preferences for individualist-hierarchists, our findings are not aligned with the theory's prediction for communitarian-egalitarian's policy preferences. Rather than showing the strongest support for command-and-control policies and, in a de-escalating order, showing less support for market-based, information-based, and voluntary policies, communitarian-egalitarians prefer all policy types over command-and-control policies.

While the retained individual freedom of each policy type seems to matter for individualist-hierarchists in determining policy support (as we hypothesized), these findings imply that such freedom may also matter for communitarian-egalitarians' policy support, though they are more in favor of all policy types, compared to individualist-hierarchists. This is important for the theory of cultural cognition because it assumes, but to our knowledge never tested, that preferences for individual freedom and government coercion act as heuristics in determining policy support (Kahan & Braman, 2006). In other words, our findings imply, in contrast to cultural cognition, that preferences for notions of individual freedom do not necessarily fully translate into favoring specific policy types over others, at least for communitarian-egalitarians.

One way to explain this finding might be found in Verweij et al.'s (2006) cultural worldview—environmental policy support conceptualization. The authors argued that egalitarians are strongly in favor of urgent climate action. Yet, this group is also said to favor voluntary simplicity, grassroots actions, and decentralized decision-making due to a distrust in authorities (Ney & Thompson, 2000). Their call for climate action might explain this group's stronger support for any type of climate policy compared to the other groups, while their focus on voluntary action and distrust in authorities can explain that individuals with this worldview prefer less stringent government intervention. Future research should investigate the relationship between cultural worldview groups and different dimensions of trust as well as the interaction of these two phenomena with climate policy support.

Yet, in support of the robustness of our results, we have also found that cultural worldviews impact policy support across policy types above and beyond the effect of variables such as free-market beliefs, political orientation, and biospheric values. This suggests that cultural cognition per se has unique explanatory power even when controlling for factors that are often assumed to predict policy support such as free-market beliefs and political orientation (Dharshing et al., 2017).

In addition, our interaction between policy types and cultural worldviews implies that policy support is more complex than previously anticipated. Research has shown, separately, that policy support is driven by worldviews (Dietz et al., 2007), policy types and attributes (Coleman et al., 2022), free-market (Cook & Lewandowsky, 2016) or political orientation (Mccright & Dunlap, 2011). Results of our study, however, suggest that policy types and cultural worldviews interact in determining decarbonization policy support, beyond the effect of these other influencers; and that support depends, at least in part, on whether the retained individual freedom of a proposed policy and its alignment with cultural worldviews. It is too simplistic to think that individuals with a particular worldview support and others reject decarbonization policies. Our results show that even those who are often portrayed as neglecting the importance of climate change or as putting themselves first (e.g., individualist-hierarchists) prefer some policy types over others (e.g., information-based over market-based) and that even those who are often portrayed as being very protective about the environment (e.g., communitarian-egalitarians) prefer some policy types over others (e.g., market-based over command-and-control). As such our results

extend previous work by Jones (2011) to a more systematic understanding of cultural groups preference for distinct policy types to deal with climate change.

Lastly, our findings on the interaction of worldviews and policy types add to the empirical work that aims at increasing public attitudes and support for climate change action by looking at the interaction of cultural worldviews with framing (Lachapelle et al., 2014), narratives (Jones, 2014) and communication approaches (Kahan et al., 2015). They demonstrate that support is not uni-dimensional but that it can vary depending on the interaction of worldviews and policy types.

## Practical implications

Our findings have several important practical implications. On a positive note, they suggest that participants across cultural worldviews tend to show support rather than non-support (see means in Figure 3) for all policy types apart from command-and-control policies. This is promising as it shows that even those often portrayed as climate denialists (i.e., individualist-hierarchists) tend to support these policy types. The findings relate well to the UK climate political context which is characterized by high levels of support for net zero targets and decarbonization (Kirby, 2023), but differs across the specific implementation approaches (Carter & Pearson, 2024). Recent strategies of senior figures of the Conservative Party to water down climate targets and underplay the urgency of significant climate action (Finnegan, 2023; Paterson, 2023), are therefore unlikely to increase support from UK voters.

On a more pessimistic note, hierarchists tend to fundamentally disagree with command-and-control policies. Similarly, across cultural worldviews, support for policy types that restrain individual freedom the least and thus have the smallest degree of government intervention, is higher, compared to command-and-control policies. This has negative repercussions on the feasibility of future net-zero pathways. Specifically, research has shown that voluntary (Koehler, 2007; Potoski & Prakash, 2013) and information-based policies (Bengston et al., 2004) have only limited potential in achieving environmental protection. Instead command-and-control policies and market-based policies (Blum, 2020; Rosenbloom et al., 2020) have been shown to achieve environmental protection targets (Lamperti et al., 2020; Trancoso, 2021). Yet, according to our results, command-and-control policies received the weakest support across all cultural worldviews, thereby impeding their implementation and thus the efficiency with which future net zero pathways can be realized.

More generally, our results point to the importance of cultural worldviews in affecting policy support and policymakers should take those into consideration. Considering that those with egalitarian cultural worldviews tend to support decarbonization policies, regardless of policy types and those with hierarchical worldviews tend to provide less support across all policy types, policymakers and practitioners should focus their persuasive efforts on those with hierarchical worldviews so that they do not "preach to the already converted." Given that the importance individuals place on freedom and on free-market beliefs are suggested to be highly correlated with worldviews, policymakers' persuasion strategies need to shift away from such concepts in efforts to increase policy support. Indeed, our results show that the stronger individuals believe in a free-market system, the less support they show for climate policies, thus further underscoring the importance of the freedom ideology for policy support.

With the current cost of living crisis in the United Kingdom (Harari et al., 2024), one way to strengthen support for much-needed command-and-control and market-based policies may be the use of eco-social policies (Büchs & Koch, 2017; Koch, 2020). These policies aim to "both improve the ecological situation and redistribute resources from upper to lower and middle-income groups, since those with extensive financial resources tend to have the highest ecological impact" (Khan et al., 2023, p. 2). Providing the means to reduce emissions and supporting citizens financially, for instance by providing more public goods, could alleviate support for command-and-control policies that are otherwise perceived as limiting individual freedoms.

It is noteworthy that self-reported climate change knowledge was not associated with policy support in our sample. Although we do not provide the first evidence for this finding (Bretter & Schulz, 2024), it is important to mention that self-report measures of climate change knowledge can considerably differ from actual climate change knowledge (Stoutenborough & Vedlitz, 2014). We are therefore cautious to provide practical suggestions based on our results.

### Limitations and future research

While our research has some limitations and thus needs to be taken cum *grano salis*, it also revealed avenues for future research. First, we used a representative sample of the UK population and therefore one of our limitations is the application of our findings to other countries and contexts. Until recently, support for climate policy and emission targets had not been partisan issues among political parties, while general concern for climate change extends to all groups and layers of society (Hinchliffe, 2022; Kirby, 2023). In countries where climate change is more partisan, such as the United States, Australia, or Canada, things might play out differently. We suggest that future research should apply our model in other countries, particularly in developing economies to better understand decarbonization policy support.

Second, we treated decarbonization policy types as distinct constructs. In practice, however, governments and political parties propose a range of different policy types. Although understanding the interaction between policy types and cultural worldviews is the necessary first step, the generalization of our findings to a mixture of different policy proposals is limited and we do not suggest that we can estimate from our studies public support for a mix of decarbonization policies. Future research may thus examine public support of a mix of policies that comprise different policy types.

Third, although it is possible to support different policy types in practice, during elections such support often translates into binary decisions of whom to vote for based on the advocated policy type of a political party. Given that we were interested in examining the preferences of individuals for different policy types, our study could not capture these dynamics, but we urge researchers to present participants with contrasting policy types and ask them to decide which they prefer.

Fourth, although this was not the aim of our study, policy support of different policy types may change over time and may be influenced by the party currently in power and by the party who proposed the policy. Research has shown, for example, that trust in the current government and in other citizens is an important predictor of policy support (Harring & Jagers, 2013). As our study did not capture these dynamics over time, we believe that the necessary next step in understanding policy support is to explore how it changes over time and what the influencing factors are (i.e., changes in governments).

Fifth, cultural cognition theory offers one way of capturing an individual's core beliefs. Future research should test whether similar results can be found when using the concept of values (Rokeach, 1973; Schwartz, 1992).

Finally, we collected our sample via an online survey panel (Prolific), thus making our results prone to self-report biases. Although these are common in any survey design, it is important that scholars are aware of our sampling method to evaluate the robustness of our results.

## CONCLUSION

Understanding decarbonization policy support is crucial for mitigating the consequences of climate change and thus important for scholars and policymakers. Using a representative sample of the UK population and actual policy proposals of the UK political parties and government institutions, we found that decarbonization policy support is driven by an interaction between cultural worldviews and policy types, even when controlling for other factors such as political orientation or free-market beliefs. Across cultural worldviews, we found the least support for command-and-control policies and

relatively stronger support for information-based and voluntary policies. Moreover, we found that individualist-hierarchists consistently showed the lowest support for any policy type and that they prefer voluntary policy measures, compared to all other policy types. Communitarian-egalitarians, in contrast, prefer information-based policies over all others. It is these interactions between policy types and cultural worldviews that create a more comprehensive understanding of policy support and that open up avenues for future research. Given that command-and-control policies seem to be most promising in decarbonizing the economy, our results paint a rather pessimistic picture for the future of net-zero pathways.

## CONFLICT OF INTEREST STATEMENT

We have no conflict of interest to declare.

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## ENDNOTE

[1] This classification also bears close resemblance to Vedung's (1998) typology – regulation, market-based, information-based – and to Wurzel et al. (2013) application of this typology as regulatory, market-based and suasive (information-based) instruments.

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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## APPENDIX A

**TABLE A1** Pairwise comparisons between policy types and within cultural worldviews.

| Cultural worldviews | Policy type (I) | Policy type (II) | Mean difference | *SE* | *p*-value |
|---|---|---|---|---|---|
| Individualist-hierarchy | Command-and-control | Market-based | −0.39 | 0.03 | <0.001 |
| | | Information-based | −0.71 | 0.03 | <0.001 |
| | | Voluntary | −0.82 | 0.04 | <0.001 |
| | Market-based | Information-based | −0.32 | 0.03 | <0.001 |
| | | Voluntary | −0.43 | 0.03 | <0.001 |
| | Information-based | Voluntary | −0.11 | 0.03 | <0.001 |
| Individualist-egalitarian | Command-and-control | Market-based | −0.26 | 0.03 | <0.001 |
| | | Information-based | −0.48 | 0.04 | <0.001 |
| | | Voluntary | −0.43 | 0.05 | <0.001 |
| | Market-based | Information-based | −0.22 | 0.03 | <0.001 |
| | | Voluntary | −0.17 | 0.04 | <0.001 |
| | Information-based | Voluntary | 0.05 | 0.03 | 0.720 |
| Communitarian-hierarchy | Command-and-control | Market-based | −0.26 | 0.04 | <0.001 |
| | | Information-based | −0.57 | 0.04 | <0.001 |
| | | Voluntary | −0.59 | 0.05 | <0.001 |
| | Market-based | Information-based | −0.31 | 0.04 | <0.001 |
| | | Voluntary | −0.33 | 0.04 | <0.001 |
| | Information-based | Voluntary | −0.02 | 0.04 | 0.999 |
| Communitarian-egalitarian | Command-and-control | Market-based | −0.26 | 0.03 | <0.001 |
| | | Information-based | −0.49 | 0.03 | <0.001 |
| | | Voluntary | −0.32 | 0.04 | <0.001 |
| | Market-based | Information-based | −0.24 | 0.03 | <0.001 |
| | | Voluntary | −0.07 | 0.03 | 0.156 |
| | Information-based | Voluntary | 0.17 | 0.03 | <0.001 |

*Note*: P-values are adjusted using the Bonferroni adjustment for multiple comparisons.

**TABLE A2** Pairwise comparisons between cultural worldviews and within policy types.

| Policy type | Cultural worldviews (I) | Cultural worldviews (II) | Mean difference | *SE* | *p*-value |
|---|---|---|---|---|---|
| Command-and-control | Individualist-hierarchy | Individualist-egalitarian | −1.04 | 0.07 | <0.001 |
| | | Communitarian-hierarchy | −0.53 | 0.07 | <0.001 |
| | | Communitarian-egalitarian | −1.24 | 0.06 | <0.001 |
| | Individualist-egalitarian | Communitarian-hierarchy | 0.51 | 0.08 | <0.001 |
| | | Communitarian-egalitarian | −0.20 | 0.07 | 0.018 |
| | Communitarian-hierarchy | Communitarian-egalitarian | −0.71 | 0.07 | <0.001 |
| Market-based | Individualist-hierarchy | Individualist-egalitarian | −0.91 | 0.06 | <0.001 |
| | | Communitarian-hierarchy | −0.40 | 0.06 | <0.001 |
| | | Communitarian-egalitarian | −1.11 | 0.05 | <0.001 |
| | Individualist-egalitarian | Communitarian-hierarchy | 0.51 | 0.07 | <0.001 |
| | | Communitarian-egalitarian | −0.20 | 0.06 | 0.003 |
| | Communitarian-hierarchy | Communitarian-egalitarian | −0.71 | 0.06 | <0.001 |
| Information-based | Individualist-hierarchy | Individualist-egalitarian | −0.82 | 0.06 | <0.001 |
| | | Communitarian-hierarchy | −0.39 | 0.06 | <0.001 |
| | | Communitarian-egalitarian | −1.03 | 0.05 | <0.001 |
| | Individualist-egalitarian | Communitarian-hierarchy | 0.43 | 0.06 | <0.001 |
| | | Communitarian-egalitarian | −0.21 | 0.06 | <0.001 |
| | Communitarian-hierarchy | Communitarian-egalitarian | −0.64 | 0.06 | <0.001 |
| Voluntary | Individualist-hierarchy | Individualist-egalitarian | −0.66 | 0.06 | <0.001 |
| | | Communitarian-hierarchy | −0.30 | 0.06 | <0.001 |
| | | Communitarian-egalitarian | −0.75 | 0.05 | <0.001 |
| | Individualist-egalitarian | Communitarian-hierarchy | 0.35 | 0.06 | <0.001 |
| | | Communitarian-egalitarian | −0.09 | 0.06 | 0.606 |
| | Communitarian-hierarchy | Communitarian-egalitarian | −0.45 | 0.06 | <0.001 |

*Note*: P-values are adjusted using the Bonferroni adjustment for multiple comparisons.

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