Appendices

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S1 Survey instrument

S1.1 Demographic and other pre-test questions

S1.1.1 Demographic questions

1. To the best of your ability, identify your political views (coded from 0 (Very liberal) to 6 (Very Conservative))
   (a) Very Liberal **(0)**
   (b) Liberal **(1)**
   (c) Somewhat Liberal **(2)**
   (d) Neutral **(3)**
   (e) Somewhat Conservative **(4)**
   (f) Conservative **(5)**
   (g) Very Conservative **(6)**
2. Generally speaking, do you usually think of yourself as a Republican, Democrat, Independent, or what? (Coded from -3 to 3, along with questions 3 and 4. No preference is coded as 0)
   (a) Republicans
   (b) Democrat
   (c) Independent
3. To Dem/Rep: Would you call yourself a strong [Republican/Democrat] or a not very strong [Republican/Democrat]?
   (a) Strong [Republican **(3)** /Democrat **(-3)**]
   (b) Not very strong [Republican **(2)** /Democrat **(-2)**]?
4. To Independents: Do you think of yourself as closer to the Republican or Democratic party?
   (a) Closer to the Republican party **(1)**
   (b) Closer to the Democratic party **(-1)**
   (c) No preference **(0)**

S1.1.2 Attention checks

1. Color Theory is the study of how colors can impact feelings and behavior. To what extent would you say you like the color brown? Please select "strongly like" to confirm that you are paying attention to this survey.
   (a) Strongly dislike **(0)**
   (b) Somewhat dislike **(0)**
   (c) Neutral **(0)**
   (d) Somewhat like **(0)**
   (e) Strongly like **(1)**
2. To what extent would you say that it is important to read survey questions in full and answer them to the best of your knowledge? If you are paying attention, please select both "strongly disagree" and "neither agree nor disagree." (multiple choice question, coded as 1 if both "Strongly disagree" and "neither agree nor disagree" are selected, and coded as 0 otherwise)
   (a) Strongly disagree
   (b) Somewhat agree
   (c) Neither agree nor disagree
   (d) Somewhat agree
   (e) Strongly agree

S1.1.3 Other pre-test measures

1. How much do you trust scientific advice? (Scale of 1 - 5)
   (a) Never trust scientific advice **(1)**
   (b) Tend to ignore scientific advice **(2)**
   (c) Impartial to scientific advice **(3)**
   (d) Tend to trust scientific advice **(4)**
   (e) Always trust scientific advice **(5)**
2. Do you think you are better motivated by fear of a future consequence or a future reward? (Coded as 1 or 2)
   (a) Consequence **(1)**
   (b) Reward **(2)**
3. How religious are you? (Scale of 1 - 5)
   (a) Not Religious **(1)**
   (b) Not very Religious **(2)**
   (c) Somewhat Religious **(3)**
   (d) Very Religious **(4)**
   (e) Extremely Religious **(5)**

4. *[Only for people responding (2) Not very religious (3) Somewhat Religious, (4) Very religious, and (5) Extremely Religious]* What religion do you identify with?
   (a) Catholic **(1)**
   (b) Protestant **(2)**
   (c) Jewish **(3)**
   (d) Muslim **(4)**
   (e) Other **(5)**
5. *[Should only be asked if they answer (1) Catholic or (2) Protestant (3) Jewish (4) Muslim in the previous question]* How often do you attend (church (if 1 or 2), synagogue (if 3), mosque (if 4)? *Also coded as 1 if missing.*
   (a) Never **(1)**
   (b) Rarely **(2)**
   (c) Every few months **(3)**
   (d) Monthly **(4)**
   (e) Weekly **(5)**
   (f) Daily **(6)**
6. How important is economic reasoning to you? (Scale of 1 - 5)
   (a) I don't value economic reasoning **(1)**
   (b) I think economic reasoning should play a role in few decisions **(2)**
   (c) I think economic reasoning should play a role in some decisions **(3)**
   (d) I think economic reasoning should play a role in all decisions **(4)**
   (e) I think economic reasoning is most important to all decisions **(5)**
7. Prosociality Test:
   https://socialdilemma.com/wp-content/uploads/2017/07/triple-dominance-me1febc19.pdf
   In this task we ask you to imagine that you have been randomly paired with another person, whom we will refer to simply as the "Other." This other person is someone you do not know and that you will not knowingly meet in the future. Both you and the "Other" person will be making choices by circling either the letter A, B, or C. Your own choices will produce points for both yourself and the "Other" person. Likewise, the other's choice will produce points for him/her and for you. Every point has value: the more points you receive, the better for you, and the more points the "Other" receives, the better for him/her.
   Here's an example of how this task works:

	A	B	C
You get	500	500	550
Other gets	100	500	300

   Depending on whether you pick A, B, or C, that would be the points added to you and the other person's total points. If you choose A you would receive 500 points and the other would receive 100 points.
   Please keep in mind that there are no right or wrong answers. Choose the option that you, for whatever reason, prefer most. Also, remember that the points have value: the more of them you accumulate the better for you.
   For each of the following nine situations, pick A, B, or C

1.

	A	B	C
You get	480	540	480
Other gets	80	280	480

   (a) A
   (b) B
   (c) C

2.

	A	B	C
You get	560	500	500
Other gets	300	500	100

   (a) A
   (b) B
   (c) C

3.

	A	B	C
You get	520	520	580
Other gets	520	120	320

   (a) A
   (b) B
   (c) C

4.

	A	B	C
You get	500	560	490
Other gets	100	300	490

(a) A
(b) B
(c) C

5.

	A	B	C
You get	560	500	490
Other gets	300	500	90

(a) A
(b) B
(c) C

6.

	A	B	C
You get	500	500	570
Other gets	500	100	300

(a) A
(b) B
(c) C

7.

	A	B	C
You get	510	560	510
Other gets	510	300	110

(a) A
(b) B
(c) C

8.

	A	B	C
You get	550	500	500
Other gets	300	100	500

(a) A
(b) B
(c) C

9.

	A	B	C
You get	480	490	540
Other gets	100	490	300

(a) A
(b) B
(c) C

The pro-sociality measure is coded as 1 if responses are primarily pro-social (joint outcomes are largest), 2 if they are pro-individual (own outcomes are largest), and 3 if they are pro-competition (gap between own and other outcomes are largest).

S1.2 Response: collected pre- and post-treatment

1. How much do you support or oppose the following policies?
   (a) Increase taxes on gasoline by 25 cents per gallon and return the revenues to taxpayers by reducing the Federal income tax. (0 - 3 scale)
      i. Strongly Oppose **(0)**
      ii. Oppose **(1)**
      iii. Support **(2)**
      iv. Strongly Support **(3)**
   (b) Require companies that produce or import fossil fuels (coal, oil, and natural gas) to pay a tax (a "carbon tax") even if it costs the average household an average of $180 per year. (0 - 3 scale)
      i. Strongly Oppose **(0)**
      ii. Oppose **(1)**
      iii. Support **(2)**
      iv. Strongly Support **(3)**
   (c) United States signing an international treaty that requires the US to cut its emissions of carbon dioxide 90% by the year 2050. (0 - 3 scale)
      i. Strongly Oppose **(0)**
      ii. Oppose **(1)**
      iii. Support **(2)**

iv. Strongly Support **(3)**

(d) Regulate Carbon dioxide (the primary greenhouse gas) as a pollutant. (0 - 3 scale)

i. Strongly Oppose **(0)**
ii. Oppose **(1)**
iii. Support **(2)**
iv. Strongly Support **(3)**

S1.3 Post-Treatment Reflection

1. Please take a moment to share your thoughts on the text.
   (a) Coded as an open response text box

S1.4 Framing

S1.4.1 Empirical-Science Frames

1. Negative: According to scientific authorities, human emissions of greenhouse gasses are the primary cause of rising average global temperatures. If humans continue to emit greenhouse gasses at current rates future temperatures will rise even higher. According to the Intergovernmental Panel on Climate Change, we will have to halve carbon emissions by 2030, and completely stop emitting carbon entirely by 2050 to avoid the worst consequences of climate change. This has consequences. For example, climate change will raise sea levels as ice caps melt; higher temperatures will increase the damage to coastal ecosystems. The science is clear: unless we do something about climate change these ecosystems face dire consequences.

S1.4.2 Deontological-Moral Frames

1. Religious/Biblical: According to religious leaders, the bible says we have a duty to ensure that the environment is protected as stewards of God's creation. Religious leaders have acknowledged that human emissions of greenhouse gasses are the primary cause of climate change. These leaders have emphasized human responsibility to take action to limit global warming and protect fragile environments. For example, climate change will raise sea levels as ice caps melt; higher temperatures will increase the damage to all types of coastal life. The message endorsed by religious leaders is clear: unless we do something about climate change, God's children, and all living things, face dire consequences.
2. Secular: According to experts, we have a moral duty to ensure that the environment is protected. Human emissions of greenhouse gasses are the primary cause of climate change, and there is a human responsibility to take action to limit global warming and protect fragile environments. For example, climate change will raise sea levels as ice caps melt; higher temperatures will increase the damage to all types of coastal life. The ethical message is clear: unless we do something about climate change, our children, and all living things, face dire consequences.

S1.4.3 Economic Frames

1. Equity: The economic costs of climate change are unevenly and unfairly distributed. Lower income communities and communities of color will incur the largest costs due to climate change. This has consequences. For example, the poorest third of counties in the US are projected to face much larger relative costs of climate change compared to the richest third of counties. This will reduce living standards in these communities, and will widen the income gap between rich and poor parts of the country. The economics are clear: unless we do something about climate change there will be dire consequences for poor and marginalized communities.
2. Efficiency: The economic costs of climate change are much larger than the costly investments needed to combat the problem. The United States emits greenhouse gasses—the primary cause of climate change. Without new policies, climate change will harm the U.S. economy, even with modest amounts of warming. This has consequences. For example, various sectors will be negatively impacted, including agriculture and energy; and there will be rising costs due to coastal storms and extreme weather events, with negative impacts on crime, human mortality, and labor. The economics are clear: unless we do something about climate change there will be dire financial consequences for the people of the United States.

S2 Sample

Supplementary Table S1. Summary Statistics

	Mean	SD	Min	Max
Policy support (pre-test)	1.564	0.807	0.000	3.000
Gas tax support (pre-test)	1.186	0.939	0.000	3.000
Carbon tax support (pre-test)	1.205	0.999	0.000	3.000
Treaty support (pre-test)	1.858	1.094	0.000	3.000
Policy support (post-test)	1.616	0.846	0.000	3.000
Age	40.176	12.686	18.000	86.000
College degree	0.570	0.495	0.000	1.000
Democrat	0.467	0.499	0.000	1.000
Republican	0.375	0.484	0.000	1.000
Independent	0.157	0.364	0.000	1.000
Male	0.506	0.500	0.000	1.000
White	0.753	0.431	0.000	1.000
Relationship	0.438	0.496	0.000	1.000
Prosociality	1.259	0.656	0.000	3.000
Religiosity	2.346	1.300	1.000	5.000
Religious frequency	2.052	1.517	1.000	6.000
Economic reasoning	3.451	0.781	1.000	5.000

The sample is all respondents, $n = 2{,}344$. Columns represent the mean, standard deviation, minimum, and maximum values for each variable.

Table S1 reports descriptive statistics for the main sample used in the study.

Table S2 reports covariate balance across treatment conditions.

Table S3 presents fold-level average treatment effect estimates from the cross-validation procedure.

Supplementary Table S2. Balance Table: Means by Treatment Condition

Variable	No framing	Negative science	Religious	Equity	Efficiency	Secular
Policy support (pre-test)	1.631	1.543	1.557	1.558	1.546	1.546
	(0.039)	(0.040)	(0.043)	(0.040)	(0.041)	(0.043)
Gas tax support (pre-test)	1.263	1.172	1.218	1.157	1.185	1.120
	(0.045)	(0.049)	(0.050)	(0.048)	(0.046)	(0.048)
Carbon tax support (pre-test)	1.301	1.215	1.170	1.169	1.168	1.207
	(0.050)	(0.051)	(0.050)	(0.049)	(0.050)	(0.052)
Treaty support (pre-test)	1.864	1.813	1.838	1.888	1.878	1.864
	(0.053)	(0.056)	(0.060)	(0.054)	(0.054)	(0.057)
Age	39.614	39.696	41.419	40.415	40.083	39.940
	(0.594)	(0.652)	(0.677)	(0.618)	(0.639)	(0.674)
College degree	0.606	0.590	0.553	0.570	0.550	0.550
	(0.025)	(0.025)	(0.026)	(0.025)	(0.025)	(0.025)
Democrat	0.485	0.446	0.453	0.475	0.467	0.476
	(0.025)	(0.025)	(0.026)	(0.025)	(0.025)	(0.026)
Republican	0.359	0.395	0.380	0.361	0.387	0.372
	(0.024)	(0.025)	(0.026)	(0.024)	(0.024)	(0.025)
Independent	0.157	0.159	0.168	0.164	0.146	0.152
	(0.018)	(0.018)	(0.020)	(0.018)	(0.017)	(0.018)
Male	0.533	0.501	0.486	0.517	0.530	0.466
	(0.025)	(0.025)	(0.026)	(0.025)	(0.025)	(0.026)
White	0.758	0.737	0.791	0.726	0.766	0.746
	(0.022)	(0.022)	(0.022)	(0.022)	(0.021)	(0.022)
Relationship	0.462	0.397	0.511	0.423	0.426	0.414
	(0.025)	(0.025)	(0.026)	(0.025)	(0.024)	(0.025)
Prosociality	1.245	1.243	1.271	1.241	1.243	1.314
	(0.033)	(0.033)	(0.035)	(0.033)	(0.032)	(0.035)
Religiosity	2.392	2.281	2.399	2.289	2.350	2.369
	(0.064)	(0.063)	(0.069)	(0.064)	(0.067)	(0.067)
Religious frequency	2.220	1.914	2.103	2.015	2.005	2.060
	(0.082)	(0.069)	(0.081)	(0.077)	(0.074)	(0.078)
Economic reasoning	3.457	3.453	3.461	3.450	3.428	3.461
	(0.038)	(0.042)	(0.042)	(0.039)	(0.039)	(0.037)

The sample is all respondents, $n = 2{,}344$. Columns represent treatment conditions. Standard errors are reported in parentheses below estimates.

Supplementary Table S3. Mean average treatment effect estimates by fold.

Treatment	Fold 0	Fold 1	Fold 2	Fold 3	Fold 4	Fold average
Best fixed	0.139*	0.034	0.004	0.075	0.097*	0.07**
	(0.055)	(0.046)	(0.052)	(0.057)	(0.047)	(0.023)
Best personalized	0.043	−0.01	0.053	0.063	0.07	0.044+
	(0.051)	(0.045)	(0.049)	(0.06)	(0.053)	(0.023)
Fixed - personalized	0.096*	0.043	−0.05	0.012	0.027	0.026
	(0.045)	(0.044)	(0.046)	(0.043)	(0.043)	(0.02)
Fixed - sub-optimal	0.065	0.047	−0.009	0.026	0.06	0.038*
	(0.043)	(0.041)	(0.046)	(0.041)	(0.042)	(0.019)

The sample is all respondents, $n = 2{,}344$, split into five equal folds. Columns represent estimates within different folds; the last column represents average estimates across folds. Estimates are average treatment effects as compared to the control on the post-test policy index measure. Estimates are produced from causal forests. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

S3 Additional Analysis

Supplementary Table S4. Treatment effect estimates and response by party identification.

	Democrat	Independent	Republican
(Control mean)	2.033	1.480	1.158
	(0.040)	(0.093)	(0.068)
Negative science	0.064	0.048	−0.056
	(0.059)	(0.143)	(0.095)
Religious	0.054	−0.009	−0.107
	(0.059)	(0.139)	(0.097)
Equity	0.016	0.047	−0.098
	(0.056)	(0.130)	(0.098)
Efficiency	0.130*	−0.067	−0.081
	(0.056)	(0.137)	(0.098)
Secular	0.087	0.063	−0.151
	(0.058)	(0.134)	(0.099)

The sample is all respondents, $n =$ 2,344. Columns represent party identification. Estimates are average treatment effects on the post-test policy index measure as compared to the control. Estimates are produced as simple differences in means. Standard errors are reported in parentheses below estimates. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table S4 measures the average change from our hypothesized average to the actual average support for each party's positive support for climate change measures using difference-in-means estimates. Effects are directionally negative for Republican opinions, directionally positive for Democrats, and varying for Independents. However, standard errors are large relative to effect magnitude, and are largely not statistically significant.

Supplementary Table S5. Mean response estimates by party identification.

	Democrat		Independent		Republican	
Treatment	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
No framing	1.993	2.02	1.518	1.495	1.177	1.156
	(0.042)	(0.042)	(0.1)	(0.1)	(0.071)	(0.07)
Negative science	1.976	2.084	1.527	1.518	1.03	1.076
	(0.043)	(0.045)	(0.109)	(0.113)	(0.064)	(0.071)
Religious	2.079	2.087	1.447	1.49	1.004	1.048
	(0.04)	(0.044)	(0.106)	(0.114)	(0.066)	(0.073)
Equity	1.966	2.043	1.415	1.487	1.024	1.026
	(0.041)	(0.041)	(0.094)	(0.098)	(0.07)	(0.073)
Efficiency	2.048	2.179	1.368	1.462	1.053	1.108
	(0.042)	(0.04)	(0.094)	(0.103)	(0.068)	(0.074)
Secular	2.009	2.117	1.583	1.578	0.955	1.019
	(0.042)	(0.044)	(0.102)	(0.101)	(0.069)	(0.075)
Failed attention check (percent)	8.9%		11.9%		8.5%	

The sample is respondents that passed both attention checks, $n =$ 2,127. Columns represent party identification. Standard errors are reported in parentheses below estimates.

Table S5 replicates Table 1 from the main text, dropping all respondents who failed either of the two pre-test attention checks.