Supplementary Materials

Study 1

Supplementary Table 1. Frequencies of hopes by gender and political orientation.

	Gender		Political Orientation		
	Male	Female	Conservative	Moderate	Liberal
Awareness/Info	27	36	6	24	34
	12.6%	16.4%	5.3%	12.9%	26.0%
Effort/Action	18	50	17	33	17
	8.4%	22.8%	15.0%	17.7%	13.0%
Human nature	23	15	7	21	7
	10.7%	6.8%	6.2%	11.3%	5.3%
Feeling effects	11	14	3	8	14
	5.1%	6.4%	2.7%	4.3%	10.7%
Other	32	14	16	19	10
	14.9%	6.4%	14.2%	10.2%	7.6%
Nature/God	15	12	15	10	2
	7.0%	5.5%	13.3%	5.4%	1.5%
Corp/Gov	11	15	5	11	9
	5.1%	6.8%	4.4%	5.9%	6.9%
Sci/Tech	27	14	12	11	18
	12.6%	6.4%	10.6%	5.9%	13.7%
Not hopeful	40	35	23	32	20
	18.6%	16.0%	20.4%	17.2%	15.3%
Don't know	11	14	9	17	0
	5.1%	6.4%	8.0%	9.1%	0.0%
Total	215	219	113	186	131
	100%	100%	100%	100%	100%

Note. Frequencies are unweighted and percentages are weighted.

Supplementary Table 2. Frequencies of doubts by gender and political orientation.

	Gender		Political Orientation		
	Male	Female	Conservative	Moderate	Liberal
Greed	37	44	13	32	36
	16.5%	18.4%	11.4%	15.8%	25.0%
Politics/Govt	25	20	8	9	28
	11.2%	8.4%	7.0%	4.5%	19.4%
Intl cooperation	22	7	8	12	9
	9.8%	2.9%	7.0%	5.9%	6.3%
Low priority	49	66	28	58	27
	21.9%	27.6%	24.6%	28.7%	18.8%
No doubt	18	14	3	16	13
	8.0%	5.9%	2.6%	7.9%	9.0%
Misinformation	7	18	2	9	13
	3.1%	7.5%	1.8%	4.5%	9.0%
Nature/God	18	29	22	21	4
	8.0%	12.1%	19.3%	10.4%	2.8%
Too late	14	11	8	10	7
	6.3%	4.6%	7.0%	5.0%	4.9%
Dont know	13	18	13	18	0
	5.8%	7.5%	11.4%	8.9%	0.0%
Other	21	12	9	17	7
	9.4%	5.0%	7.9%	8.4%	4.9%
Total	224	239	114	202	144
	100%	100%	100%	100%	100%

Note. Frequencies are unweighted and percentages are weighted.

Study 2

    Missing data. Respondents who said they are "extremely" or "very sure" global warming is not happening in the survey did not receive the hope and doubt questions on global warming and were, thus, excluded from analyses ($n = 198$ out of the original sample of 1,657 respondents). Of the remaining 1,459 respondents, 149 were excluded (about 10%) due to excessive missing data (i.e., refused to answer about a quarter to a third of items in each block). To be included in the sample, respondents had to have answered at least seven of the hope items (11 items in total), at least seven of the doubt items (10 in total), the one efficacy item, at least 10 of the political engagement items (14 in total), and at least four of the policy preferences items (seven in total).

    For the remaining cases, missing data for each item were imputed using the hot deck imputation method (Myers, 2011). To impute values, we used the Six Americas Short Survey (SASSY; see Chryst et al., 2018), an audience segmentation tool to categorize people based on their climate change views (i.e., worry about global warming, perceptions that it will harm oneself and future generations, and the issue's personal importance). Responses to the 4-item SASSY tool segment people into one of six groups (i.e., the "Six Americas;" Leiserowitz, 2005, Maibach et al., 2011): Alarmed, Concern, Cautious, Disengaged, Doubtful, or Dismissive. Because each group "differs meaningfully in their beliefs, attitudes, issue involvement, behaviors, and policy preferences about climate change" (Chryst et al., 2018, p. 2), we expected respondents' Six Americas segmentation to be useful for data imputation. We also used political ideology and party affiliation to impute values, which are shown to be strong predictors of climate change views (e.g., Hornsey et al., 2016; McCright and Dunlap, 2011). Of the final sample of 1,310 respondents, the percentage of cases that had at least one item imputed in any

one block of items (hope, doubt, political engagement, and policy preferences) ranged from 4.2% to 9.8%.

There were some differences between the retained sample and cases that were dropped due to excessive missing data (see Supplementary Table 1). Respondents who were dropped were slightly less educated and had lower income than respondents who were retained. Also, those who were dropped were slightly younger, were more ideologically moderate, scored lower on constructive hope and doubt, and scored higher on false hope and fatalistic doubt. The retained and dropped cases, however, were relatively similar in levels of efficacy, policy support, and political behavioral intentions.

Principal components analyses of hope and doubt items. Hope and doubt items were examined via separate principal components analyses (PCAs). All analyses used an oblique rotation following the Kaiser rule (eigenvalues > 1) for exploratory purposes. We generally followed a rule of thumb identifying items with low communalities (< .25) and component loadings (<.40) from the pattern matrix as candidates for exclusion, in addition to items that strongly cross-loaded (i.e., if an item appeared to load about the same across components). We also examined reliability indices to assess whether a given item lowered the alpha coefficient.

First, all 11 hope items were analyzed. Findings suggested a three-component solution explaining 55% of variance in the items; however, some items cross-loaded across components and the scree plot suggested a two-component solution. Thus, we forced items into a two-component solution, which explained 45.4% of variance in the items. As shown in Supplementary Table 2, the first component (constructive hope) consisted of eight items with loadings greater than .50, and the second component (false hope) consisted of three items with loadings greater than .75. The reliabilities of both measures were good (above .70).

The same procedure was used for the 10 doubt items. Initially, a three-component solution emerged explaining 54.9% of variance in the items; however, like the hope analysis, multiple items cross-loaded and the screen plot suggested only two components. Accordingly, forcing a two-component solution explained 44.7% of the items. One item ("Most people deny that global warming is a problem") had a communality (.21) below our cut-off and was, thus, dropped from the analysis. After excluding this item, the two components explained 48.3% of variance in the nine items. In this analysis, we identified one item ("Politicians are incapable of taking action to reduce global warming") that strongly cross-loaded across components (.47 and .31). After excluding this item from the PCA, the percentage of variance explained in the eight items was slightly higher (51.3%). The first component (constructive doubt) consisted of four items with loadings above .55 and the second component (fatalistic doubt) was also made up of four items with component loadings above .55 (see Supplementary Table 3).

Principal components analyses of items about political engagement and policy preferences. We followed the same approach to the hope and doubt items examining the 14 political engagement and seven policy preference items separately. First, the PCA of the political engagement items suggested a single-component solution accounting for 63.9% of the variance in the items. All loadings from the component matrix were above .65 (see Supplementary Table 4).

The PCA of the seven policy preference items indicated a two-component solution with the one reverse-coded item loading on its own component ("Eliminate all federal subsidies for the renewable energy industry (solar, wind, and geothermal), which currently total an estimated $1.7 billion a year"). When forcing to a single-component solution, this item's loading was very low (.03) and was, thus, dropped from the analysis. After removing this item, results supported a

single-component solution explaining 59.8% of variance in the six items and all loadings were

above .65 (see Supplementary Table 5).

Supplementary Table 3. Differences Between Retained and Dropped Cases

	Retained (N = 1,310)	Dropped (N = 149)
Gender	52.9% female	50.9% female
Education	2.79 (1.00)	2.50 (0.95)
Income	3.76 (1.84)	3.43 (1.82)
Age	47.0 (16.4)	41.2 (18.5)
Political Ideology	2.96 (1.04)	3.12 (1.09) 34 missing data
Constructive Hope	3.14 (0.62)	2.97 (0.56) 67 missing data
False Hope	2.17 (1.00)	2.69 (1.05) 71 missing data
Constructive Doubt	3.55 (0.85)	3.14 (0.79) 70 missing data
Fatalistic Doubt	2.80 (0.78)	2.88 (0.59) 67 missing data
Efficacy	2.59 (0.90)	2.56 (0.86) 16 missing data
Policy Support	2.85 (0.66)	2.73 (0.69) 41 missing data
Political Behavioral Intentions	2.75 (0.79)	2.70 (1.07) 54 missing data

Note. Respondents from the dropped sub-sample had to have answered at least one item to form mean composites for each measure; otherwise, they were marked as missing.

Supplementary Table 4. Descriptive Information and Reliability of Hope Scales

Item	Mean	SD	Alpha if Item Deleted	Component Loading
Constructive Hope (alpha = .73)				
1. More and more people are becoming informed about global warming/climate change	3.46	0.99	.71	.57
2. Individuals are already taking action to reduce global warming/climate change	3.41	0.97	.70	.61
3. Most people want to save resources for our children and grandchildren	3.70	1.07	.72	.52
4. Corporations are starting to find ways to reduce global warming/climate change	3.14	1.03	.70	.60
5. Once people feel the impacts of global warming/climate change, they will do something about it	3.35	1.07	.71	.60
6. Government will take responsible and necessary actions to reduce global warming/climate change	2.59	1.11	.71	.58
7. Humanity will rise to the occasion and reduce global warming/climate change	2.89	1.07	.69	.68
8. The nations of the world will cooperate to reduce global warming/climate change	2.56	1.09	.71	.57
False Hope (alpha = .76)				
1. We don't need to worry about global warming/climate change because nature will take care of it	2.23	1.25	.59	.83
2. We don't need to worry about global warming/climate change because God will take care of it	2.20	1.31	.68	.79
3. We don't need to worry about global warming/climate change because science and technology will solve it	2.08	1.07	.74	.79

Note. Respondents were asked "Please indicate how strongly you agree or disagree with each of the following statements." Scales range from 1 (Strongly disagree) to 5 (Strongly agree) with "Don't know" as the midpoint.

Supplementary Table 5. Descriptive Information and Reliability of Doubt Scales

Item	Mean	SD	Alpha if Item Deleted	Component Loading
Constructive Doubt (alpha = .65)				
1. Corporations care only about their own profits and not global warming/climate change	3.79	1.10	.56	.72
2. People are too greedy and selfish to reduce global warming/climate change	3.44	1.13	.53	.76
3. Most people are unwilling to take individual action to reduce global warming/climate change	3.42	1.07	.58	.69
4. Most people don't know enough about what they can do to reduce global warming/climate change	3.69	1.05	.66	.57
Fatalistic Doubt (alpha = .67)				
1. It will be too costly for society to reduce global warming/climate change	2.75	1.16	.58	.72
2. Humans can't affect global warming/climate change because you can't fight Mother Nature	2.38	1.26	.53	.81
3. It's already too late to do anything about global warming/climate change	2.27	1.11	.62	.71
4. People have higher priorities to worry about than global warming/climate change	3.37	1.19	.66	.58

Note. Respondents were asked "Please indicate how strongly you agree or disagree with each of the following statements." Scales range from 1 (Strongly disagree) to 5 (Strongly agree) with "Don't know" as the midpoint.

Supplementary Table 6. Descriptive Information and Reliability of Political Behavioral Intentions

Item	Mean	SD	Alpha if Item Deleted	Component Loading
Political Behavioral Intentions (alpha = .95)				
1. Write letters, email, or phone government officials about global warming/climate change	2.65	1.33	.95	.85
2. Write letters, email, or phone a newspaper about global warming/climate change	2.60	1.33	.95	.84
3. Sign a petition about global warming/climate change, either online or in person	3.45	1.39	.96	.70
4. Sign a pledge to vote only for political candidates who share your views on global warming/climate change	2.97	1.40	.95	.76
5. Volunteer your time to an organization working on global warming/climate change	2.73	1.30	.95	.85
6. Donate money to an organization working on global warming/climate change	2.60	1.31	.95	.78
7. Donate money to a political candidate because they share your views on global warming/climate change	2.38	1.27	.95	.76
8. Attend a public meeting or presentation about global warming/climate change	2.89	1.33	.95	.81
9. Meet with an elected official or their staff about global warming/climate change	2.57	1.30	.95	.84
10. Volunteer your time to elect a political candidate because they share your views on global warming/climate change	2.53	1.28	.95	.85
11. Attend a neighborhood meeting to discuss global warming/climate change	2.85	1.34	.95	.80
12. Host a neighborhood meeting in your home to discuss global warming/climate change	2.10	1.17	.95	.77
13. Support an organization engaging in non-violent civil disobedience (e.g., sit-ins, blockades, or trespassing) against corporate or government activities that make global warming/climate change worse	2.40	1.32	.95	.81
14. Personally engage in non-violent civil disobedience (e.g., sit-ins, blockades, or trespassing) against corporate or government activities that make global warming/climate change worse	2.13	1.24	.95	.78

Note. Respondents were asked "How likely would you be to do each of the following things if a person you like and respect asked you to?" Scales range from 1 ("Definitely would not") to 5 ("Definitely would") with "Don't know" as the midpoint.

Supplementary Table 7. Descriptive Information and Reliability of Policy Preferences

Item	Mean	SD	Alpha if Item Deleted	Component Loading
Policy Support (alpha = .84)				
1. Regulate carbon dioxide (the primary greenhouse gas) as a pollutant	2.98	0.82	.83	.83
2. Require electric utilities to produce at least 20% of their electricity from wind, solar, or other renewable energy sources, even if it costs the average household an extra $100 a year	2.74	0.88	.83	.83
3. Fund more research into renewable energy sources, such as solar and wind power	3.07	0.83	.84	.80
4. Provide tax rebates for people who purchase energy-efficient vehicles or solar panels	3.05	0.81	.84	.78
5. Eliminate all federal subsidies for the fossil fuel industry (coal, oil, and natural gas), which currently total an estimated $10.4 billion a year	2.80	0.88	.86	.67
6. 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	2.45	0.91	.85	.73

Note. Respondents were asked "How much do you support or oppose the following policies?" Scales range from 1 ("Strongly oppose") to 4 ("Strongly support").

Supplementary Table 8. Hope and Doubt Predicting Policy Support ($N = 1,310$)

Predictor	b	SE	β	95% CI LL	95% CI UL
Model 1					
Constant	2.64	0.11	--	2.42	2.87
Constructive Hope	0.21	0.03	.20***	0.16	0.26
False Hope	-0.16	0.02	-.25***	-0.20	-0.12
Constructive Doubt	0.12	0.02	.14***	0.08	0.17
Fatalistic Doubt	-0.20	0.03	-.25***	-0.25	-0.15
Model 2					
Constant	2.49	0.13	--	2.24	2.74
Constructive Hope	0.20	0.03	.19***	0.15	0.25
False Hope	-0.16	0.02	-.24***	-0.20	-0.12
Constructive Doubt	0.12	0.02	.14***	0.08	0.17
Fatalistic Doubt	-0.18	0.03	-.23***	-0.23	-0.13
Self-efficacy	0.05	0.02	.07**	0.02	0.09
Model 3					
Constant	3.55	0.09	--	3.38	3.71
Constructive Hope	0.20	0.03	.19***	0.15	0.25
False Hope	-0.16	0.02	-.24***	-0.20	-0.12
Constructive Doubt	0.13	0.02	.15***	0.09	0.17
Fatalistic Doubt	-0.18	0.03	-.23***	-0.23	-0.13
Self-efficacy	0.05	0.02	.07**	0.02	0.09
Const. Hope*Const. Doubt	0.05	0.03	.04	-0.01	0.10

Note. ***$p < .001$; **$p < .01$; *$p < .05$; Model 1 Adjusted $R^2 = .28$, $F(4, 1299) = 127.39$, $p < .001$; Model 2 Adjusted $R^2 = .28$, $F(5, 1298) = 103.99$, $p < .001$; Model 3 Adjusted $R^2 = .28$, $F(6, 1297) = 87.30$, $p < .001$; Model 3 predictors were mean centered prior to analysis.

Supplementary Table 9. Hope and Doubt Predicting Political Behavioral Intentions ($N = 1{,}310$)

Predictor	b	SE	β	95% CI LL	95% CI UL
Model 1					
Constant	2.86	0.14		2.59	3.13
Constructive Hope	0.22	0.03	.17***	0.16	0.28
False Hope	-0.18	0.03	-.23***	-0.23	-0.13
Constructive Doubt	0.09	0.03	.09***	0.04	0.15
Fatalistic Doubt	-0.27	0.03	-.29***	-0.33	-0.21
Model 2					
Constant	2.53	0.15		2.23	2.82
Constructive Hope	0.19	0.03	.15***	0.13	0.25
False Hope	-0.17	0.03	-.21***	-0.22	-0.12
Constructive Doubt	0.09	0.03	.09***	0.04	0.14
Fatalistic Doubt	-0.24	0.03	-.25***	-0.30	-0.17
Self-efficacy	0.12	0.02	.13***	0.07	0.16
Model 3					
Constant	3.45	0.10		3.24	3.65
Constructive Hope	0.19	0.03	.15***	0.13	0.25
False Hope	-0.18	0.03	-.22***	-0.23	-0.13
Constructive Doubt	0.11	0.03	.11***	0.06	0.16
Fatalistic Doubt	-0.23	0.03	-.25***	-0.29	-0.17
Self-efficacy	0.12	0.02	.14***	0.07	0.16
Const. Hope*Const. Doubt	0.16	0.03	.12***	0.10	0.22

Note. ***$p < .001$; **$p < .01$; *$p < .05$; Model 1 Adjusted $R^2 = .26$, $F(4, 1299) = 116.41$, $p < .001$; Model 2 Adjusted $R^2 = .28$, $F(5, 1298) = 100.06$, $p < .001$; Model 3 Adjusted $R^2 = .29$, $F(6, 1297) = 89.46$, $p < .001$; Model 3 predictors were mean centered prior to analysis.

Supplementary Table 10. Hope and Doubt Predicting Policy Support ($N = 1,297$)

Predictor	b	SE	β	95% CI LL	95% CI UL
Model 1					
Constant	3.27	0.14		2.99	3.55
Gender	-0.07	0.03	-0.05[*]	-0.13	-0.01
Age	0.00	0.00	-0.04	0.00	0.00
Education	0.03	0.02	0.05[*]	0.00	0.06
Political Ideology	-0.17	0.02	-0.27[***]	-0.20	-0.14
Constructive Hope	0.18	0.02	0.17[***]	0.13	0.23
False Hope	-0.11	0.02	-0.17[***]	-0.15	-0.07
Constructive Doubt	0.11	0.02	0.12[***]	0.07	0.15
Fatalistic Doubt	-0.20	0.02	-0.25[***]	-0.24	-0.15
Model 2					
Constant	3.15	0.15		2.85	3.45
Gender	-0.07	0.03	-0.06[*]	-0.13	-0.01
Age	0.00	0.00	-0.04	0.00	0.00
Education	0.03	0.02	0.05[*]	0.00	0.06
Political Ideology	-0.17	0.02	-0.26[***]	-0.20	-0.14
Constructive Hope	0.17	0.02	0.16[***]	0.12	0.22
False Hope	-0.11	0.02	-0.17[***]	-0.15	-0.07
Constructive Doubt	0.11	0.02	0.12[***]	0.06	0.15
Fatalistic Doubt	-0.18	0.03	-0.23[***]	-0.23	-0.13
Self-efficacy	0.04	0.02	0.06[*]	0.00	0.07
Model 3					
Constant	3.15	0.15		2.85	3.45
Gender	-0.07	0.03	-0.06[*]	-0.13	-0.01
Age	0.00	0.00	-0.04	0.00	0.00
Education	0.03	0.02	0.05[*]	0.00	0.06
Political Ideology	-0.17	0.02	-0.26[***]	-0.20	-0.14
Constructive Hope	0.17	0.02	0.16[***]	0.12	0.22
False Hope	-0.11	0.02	-0.17[***]	-0.15	-0.07
Constructive Doubt	0.11	0.02	0.12[***]	0.06	0.15
Fatalistic Doubt	-0.18	0.03	-0.23[***]	-0.23	-0.13
Self-efficacy	0.04	0.02	0.06[*]	0.00	0.08
Const. Hope*Const. Doubt	0.00	0.03	0.00	-0.05	0.05

Note. [***]$p < .001$; [**]$p < .01$; [*]$p < .05$; Gender (1 = Male, 2 = Female), education (1 = Less than high school, 2 = High school, 3 = Some college, 4 = Bachelor's degree or higher), political ideology (1 = Very liberal, 2 = Somewhat liberal, 3 = Moderate, middle of the road, 4 = Somewhat conservative, 5 = Very conservative); Model 1 Adjusted $R^2 = .349$, $F(8, 1278) = 87.16$, $p < .001$; Model 2 Adjusted $R^2 = .351$, $F(9, 1277) = 78.25$, $p < .001$; Model 3 Adjusted $R^2 = .350$, $F(10, 1276) = 70.37$, $p < .001$; Model 3 predictors were mean centered prior to analysis.

Supplementary Table 11. Hope & Doubt Predicting Political Behavioral Intentions ($N = 1,297$)

Predictor	b	SE	β	95% CI LL	95% CI UL
Model 1					
Constant	4.01	0.17		3.68	4.35
Gender	-0.11	0.04	-0.07**	-0.18	-0.04
Age	0.00	0.00	-0.05*	0.00	0.00
Education	-0.06	0.02	-0.07**	-0.09	-0.02
Political Ideology	-0.22	0.02	-0.29***	-0.26	-0.19
Constructive Hope	0.18	0.03	0.14***	0.12	0.24
False Hope	-0.13	0.03	-0.17***	-0.18	-0.08
Constructive Doubt	0.07	0.03	0.07**	0.03	0.12
Fatalistic Doubt	-0.26	0.03	-0.28***	-0.32	-0.20
Model 2					
Constant	3.71	0.18		3.36	4.07
Gender	-0.11	0.04	-0.07**	-0.18	-0.04
Age	0.00	0.00	-0.05*	0.00	0.00
Education	-0.06	0.02	-0.07**	-0.09	-0.02
Political Ideology	-0.22	0.02	-0.29***	-0.25	-0.18
Constructive Hope	0.16	0.03	0.13***	0.10	0.22
False Hope	-0.13	0.03	-0.16***	-0.17	-0.08
Constructive Doubt	0.07	0.03	0.07**	0.02	0.12
Fatalistic Doubt	-0.23	0.03	-0.24***	-0.29	-0.17
Self-efficacy	0.10	0.02	0.11***	0.06	0.14
Model 3					
Constant	3.64	0.18		3.28	3.99
Gender	-0.11	0.04	-0.07**	-0.18	-0.04
Age	0.00	0.00	-0.05*	0.00	0.00
Education	-0.06	0.02	-0.07**	-0.09	-0.02
Political Ideology	-0.21	0.02	-0.28***	-0.25	-0.17
Constructive Hope	0.16	0.03	0.13***	0.10	0.22
False Hope	-0.13	0.03	-0.17***	-0.18	-0.08
Constructive Doubt	0.08	0.03	0.08**	0.03	0.13
Fatalistic Doubt	-0.23	0.03	-0.24***	-0.29	-0.17
Self-efficacy	0.10	0.02	0.11***	0.06	0.14
Const. Hope*Const. Doubt	0.08	0.03	0.06**	0.02	0.14

Note. ***$p < .001$; **$p < .01$; *$p < .05$; †$p < .10$; Gender (1 = Male, 2 = Female), education (1 = Less than high school, 2 = High school, 3 = Some college, 4 = Bachelor's degree or higher), political ideology (1 = Very liberal, 2 = Somewhat liberal, 3 = Moderate, middle of the road, 4 = Somewhat conservative, 5 = Very conservative); Model 1 Adjusted $R^2 = .35$, $F(8, 1278) = 88.75$, $p < .001$; Model 2 Adjusted $R^2 = .36$, $F(9, 1277) = 82.44$, $p < .001$; Model 3 Adjusted $R^2 = .37$, $F(10, 1276) = 75.20$, $p < .001$; Model 3 predictors were mean centered prior to analysis.