

Supplementary Materials

Pilot Study

Recurring Pro-environmental Behavior Scale development

The criteria for inclusion in the novel scale were individual actions that improve ecological health (Gardner & Stern, 2008) that are repeated and feasible for the majority of United States adults. For example, replacing inefficient appliances is ecologically impactful, but not available to individuals who do not own or cannot afford to replace the equipment, so appliance purchasing was excluded. Daily pro-environmental behaviors occur during moments that vary in distraction and contextual features compared to high-cost single-time behaviors (e.g., solar panel purchase). Therefore, daily behaviors may offer the best opportunity to study ecologically valid contextual features like visibility.

The behaviors scale item distributions and open-response answers were used to revise the instructions, item wording, and scale labels in order to increase item variance and to improve the construct coverage of pro-environmental behavior.

Method. 101 United States adults, 32.7% female, 67.3% male, age $M (SD) = 27.5 (7.6)$ years were recruited from Amazon MTurk and completed an online survey (21 other participants did not complete the survey and were excluded). The study began with a persuasive message about climate change in order to orient participants to the study topic and prepare them for the open-response. The topic of climate change was used to focus participants on a complex yet familiar environmental problem.

Next, participants provided up to eight open-response answers about what behaviors they personally do in response to climate change. Most participants (88) wrote one or more

entries, and 13 people completed all eight. Next, they provided up to eight open-response answers about what behaviors other people do. The majority (92) wrote two more entries, and 23 people completed all eight.

Two research assistants used published behavior measures (Carbon Footprint Ltd., 2012; Dietz et al., 2009; Union of Concerned Scientists, 2012) to categorize responses into the following domains: recycling, alternative transportation, electricity use/renewable energy/solar power, organic diet, water conservation, local goods/food, hybrid/low mileage vehicles, meat consumption, home heating/cooling, edible garden, efficient light bulbs, "green" merchandise, aerosol use, and reusable bags overlapped between self and other people; other people had additional responses: political advocacy, educating oneself, wasting less, and not having children. The lead author resolved discrepancies between the coders, collapsed redundant domains, and selected the most common responses for behaviors Americans think of as helping the environment.

Next, participants reported their environmentalist identity (see measure in Study 1) and completed a preliminary Recurring Pro-environmental Behavior Scale, which was then enhanced with additions from the categories described above. Demographics and political ideology were measured as in Studies 1-3.

Following the pilot study, examination of the distributions of frequency were used to exclude items unlikely to contribute useful variance to the revised measure. Questions on heating and cooling the home produced a great deal of incorrect (implausible) and missing data and were removed. Many participants commented that they did not have a car, or did not drive on the highway, so to develop a measure with minimal missing data questions on vehicle miles per gallon, daily driving distance, and tire inflation were all removed and an

item on alternative transportation use was retained. Two yes/no items with floor effects were removed: buying carbon offsets and having a hybrid car. Because behavior visibility is a key factor, and because behaviors at home are constrained by family norms and infrastructure, the single item on recycling was expanded into two questions on recycling in public and recycling in private. An early item on merchandise was difficult to answer because it was too broad, and this question was replaced by more specific items. See Appendix for the revised scale.

Study 1

Climate change belief measure

"Is it true that the average temperature on Earth has warmed over the past 50 years, regardless of the cause?", 1 (*very false*), 4 (*neither true nor false*), 7 (*very true*); "Is the news on climate change usually exaggerated?" [reversed], 1 (*not at all exaggerated*), 4 (*medium exaggerated*), 7 (*very exaggerated*); "About climate change science, is the research flawed?" [reversed], 1 (*not at all flawed*), 4 (*somewhat flawed*), 7 (*very flawed*); "Human activities are a major cause of climate change.", 1 (*very false*), 4 (*neither true nor false*), 7 (*very true*); "How much do you personally worry about climate change?", 1 (*not at all*), 4 (*somewhat*), 7 (*very much*); "Do you think that climate change will pose a serious threat to your way of life during your lifetime?", 1 (*not at all*), 4 (*somewhat*), 7 (*very much*).

Table 1

Demographics and Key Descriptives (Study 1)

<i>N</i> = 349	<i>M</i>	<i>SD</i>	%
Female			34.4
White ethnicity			77.1
Age	29.3	10.0	
Education (1-6)	3.83	1.24	
Income (1-6)	2.29	1.19	
Behavior visibility (1-7)	3.67	2.00	
Behavior difficulty (1-7)	3.37	1.85	

Table 2

Means, Standard Deviations, Scale Reliability, and Zero-order Correlations between Environmentalist Identity, Environmental Attitudes, Climate Change Belief, Political Orientation, and Pro-environmental Behavior (Study 1)

<i>r</i> (347)	1	2	3	4	5
<i>M</i>	4.60	3.68	4.82	4.53	2.86
(<i>SD</i>)	(1.36)	(.88)	(1.17)	(1.60)	(1.29)
Cronbach's α	.91	.78	.84	n/a	.82
1: Environmentalist identity (<i>I-7</i>)					
2: Environmental attitudes (<i>I-5</i>)	.54***				
3: Climate change belief (<i>I-7</i>)	.55***	.77***			
4: Political liberalism (<i>I-7</i>)	.32***	.32***	.33***		
5: Pro-environmental behavior (<i>I-5</i>)	.24***	.14**	.10	.09	

Note. ** $p \leq .01$, *** $p \leq .001$.

Regression including demographic covariates

Environmentalists performed more pro-environmental behavior than non-environmentalists, $\beta = .22$, $SE = .02$, $p < .001$. Difficult behaviors were done less frequently, standardized $\beta = -.58$, $SE = .01$, $p < .001$. The final main effect was that behaviors considered more visible relative to other behaviors were performed less frequently, standardized $\beta = -.11$, $SE = .01$, $p < .001$. This was qualified by the interaction reported next. All other main effects *n.s.*, $ps \geq .13$.

Table 3

Visibility Moderated the Relationship between Identity and Pro-environmental Behavior in a Multi-level Random-effects Linear Regression with Participant and Behavior Type as Levels with Demographic Covariates included (Study 1, observations = 7328)

<i>N</i> = 349	Standardized β	<i>SE</i>	<i>p</i>
Female	.03	.02	.11
White ethnicity	.03	.02	.24
Age	-.01	.02	.69
Education	.01	.02	.71
Income	.01	.02	.58
Environmentalist identity	.22**	.03	< .001
Political liberalism	-.00	.02	.87
Environmental attitudes	-.02	.03	.49
Climate change beliefs	.02	.03	.47
Difficulty	-.58**	.01	< .001
Visibility	-.11**	.01	< .001
Identity \times visibility	.03*	.01	.01
Liberalism \times visibility	-.01	.02	.68
Identity \times difficulty	-.02	.01	.13

Note. * $p \leq .01$, ** $p \leq .001$.

Consistent with the primary analysis, identity moderated the relationship between visibility and behavior, two-way interaction standardized $\beta = .03$, $SE = .01$, $p = .01$, controlling

for age, gender, income, education, environmental attitudes, climate change beliefs, political orientation, the perceived difficulty of the behaviors, and the interaction between difficulty and visibility. This result should be considered in the context of the large main effect of difficulty. The visibility \times identity interaction remained significant with difficulty in the regression and also without, standardized $\beta = .04$, $SE = .01$, $p = .003$, indicating that the effect of visibility is independent of the perceived difficulty of behaviors. Overall, this supplemental regression demonstrates the interaction of visibility and identity is robust to a wide range of competing constructs and demographic covariates.

Study 2

Participants and procedure. Two participants were excluded for participating from the same IP address as an earlier participant and also for not following instructions. Twelve other participants were removed for not completing the survey. Exclusions were completed before hypothesis testing. The 332 remaining cases were analyzed: 58.4% female, 41.6% male; 76.7% White/Caucasian, 6.6% Black/African-American, 8.1% Asian/Asian-American, 6.9% Hispanic/Latino, and 1.5% Other; age $M (SD) = 31.8 (11.1)$ years. Participants gave informed consent, were compensated with \$0.50, and were debriefed after the study.

Measures. Environmentalist identity. Identity was again reliable, Cronbach's $\alpha = .93$. The Whitmarsh scale was included for exploratory analyses and is not mentioned further (see Footnote 2).

Recurring Pro-environmental Behavior Scale. The 21 items were reliable, Cronbach's $\alpha = .84$.

Results

Table 4

Demographics and Key Descriptives (Study 2)

<i>N</i> = 332	<i>M</i>	<i>SD</i>	%
Female			58.6
White ethnicity			76.7
Age	31.8	11.1	
Education (<i>1-6</i>)	3.80	1.21	
Income (<i>1-6</i>)	2.28	1.11	
Behavior visibility (<i>1-3</i>)	1.78	.83	
Behavior difficulty (<i>1-7</i>)	3.33	1.84	
Behavior effectiveness (<i>1-7</i>)	4.13	1.79	

Table 5

Means, Standard Deviations, Scale Reliability, and Zero-order Correlations between Environmentalist Identity, Climate Change Belief, Political Orientation, and Pro-environmental Behavior (Study 2).

<i>r</i> (330)	1	2	3	4
<i>M</i>	4.56	4.78	3.69	2.83
(<i>SD</i>)	1.48	1.36	1.72	.51
Cronbach's α	.93	.88	n/a	.84
1: Environmentalist identity (1-7)				
2: Climate change belief (1-7)	.60***			
3: Political liberalism (1-7)	.31***	.39***		
4: Pro-environmental behavior (1-5)	.39***	.32***	.14**	

Note. * $p < .05$, ** $p \leq .01$, *** $p \leq .001$.

Between-subjects visibility analysis. Behaviors were separated in quintiles by visibility as in Study 1. Composites were created from the four behaviors with the highest and the four with the lowest visibility across subjects (high: bags, alternative transportation, public recycling, political action; low: air travel [reversed], aerosol [reversed], private recycling, education). Separate regressions predicted high- and low-visibility behavior from identity, using the same covariates as above. Identity predicted low-visibility behaviors, $\beta = .17$, $SE = .03$, $p < .001$, and high-visibility behaviors more strongly, $\beta = .28$, $SE = .04$, $p < .001$. This pattern is consistent with the primary analysis and provides convergent validity that visibility moderated the effect of identity.

Effectiveness ratings

Table 6

Perceived Effectiveness of Behaviors to Help Climate Change (Study 2)

<i>N</i> = 332	<i>M</i>	<i>SD</i>
Using reusable bags	3.98	.09
Using alternative transportation	4.98	.09
Reducing highway speed	3.65	.09
Reducing air travel	4.12	.09
Composting	4.14	.09
Reducing meat consumption	3.43	.10
Reducing dairy consumption	3.25	.09
Eating organic food	3.60	.10
Eating local food	4.09	.10
Eating food from a home garden	4.38	.10
Turning off electronics when not in use	4.54	.09
Using high-efficiency light bulbs	4.72	.09
Conserving water	4.63	.10
Reducing aerosol use	4.48	.09
Recycling in public	4.39	.10
Recycling in private	4.52	.10
Discussing environmental topics	3.31	.10
Buying sustainable clothing	3.63	.09
Using a reusable water bottle	4.50	.09
Engaging in environmental activism	4.09	.10
Educating oneself about the environment	4.31	.10

Note: Effectiveness ratings (1-7) *M* (*SD*) = 4.13 (.09), range 3.25-4.98

Note: Values were highly similar in Studies 1 & 3. Study 2 is displayed because it was the first instance of the final wording of the effectiveness ratings.

Study 3

Additional measure details

Need for social status. Four items were adapted from the modesty and greed-avoidance facets of the well-validated personality trait Honesty-Humility from the six-factor HEXACO model (Ashton & Lee, 2007): "Having a lot of money is NOT especially important to me" [reversed]; "I would get a lot of pleasure from owning expensive luxury goods"; "I think that I am entitled to more respect than the average person is"; and "I want people to know that I am an important person of high status," rated 1 (*Strongly disagree*) to 5 (*Strongly agree*). The scale had poor reliability, Cronbach's $\alpha = .60$, indicating some uncertainty as to what was measured by the four items, and so the most face-valid item, "I want people to know that I am an important person of high status," was used in place of a composite in the analyses.

Behavior avoidance. To check whether the key interaction from Studies 1 & 2 was related to conscious awareness, participants responded to: "I avoid environmental behaviors when others can see me," rated 1 (*Disagree extremely*) to 7 (*Agree extremely*). This item was exploratory, had a non-normal distribution (kurtosis = 3.01), and is not analyzed further.

Political polarization. As part of separate research (Van Boven, Judd, & Sherman, 2012), participants responded about the magnitude of political polarization in the United States. These measures came after the variables reported here and are not described further.

Table 7

Demographics and Key Descriptives (Study 3)

<i>N</i> = 437	<i>M</i>	<i>SD</i>	%
Female			51.3
White ethnicity			74.7
Age	48.4	17.4	
Education (1-6)	3.86	1.53	
Income (1-6)	2.48	1.30	
Behavior visibility (1-3)	3.42	1.26	
Behavior difficulty (1-7)	3.31	1.00	
Behavior effectiveness (1-7)	4.52	1.28	

Table 8

Means, Standard Deviations, Scale Reliability, and Zero-order Correlations between Environmentalist Identity, Environmental Attitudes, Attitudes about Environmentalists, Need for Social Status, Political Orientation, and Pro-environmental Behavior (Study 3)

<i>r</i> (435)	1	2	3	4	5	6
<i>M</i>	4.06	3.45	4.12	2.40	3.92	2.85
(<i>SD</i>)	1.59	.65	1.24	.77	1.73	.57
Cronbach's α	.96	.85	.92	n/a	n/a	.87
1: Environmentalist identity (<i>I-7</i>)						
2: Environmental attitudes (<i>I-5</i>)	.44***					
3: Attitudes about environmentalists (<i>I-7</i>)	.66***	.35***				
4: Need for social status (<i>I-5</i>)	.10*	-.21***	.09			
5: Political liberalism (<i>I-7</i>)	-.31***	-.28***	-.34***	-.10*		
6: Pro-environmental behavior (<i>I-5</i>)	.67***	.33***	.53***	.01	-.20***	

Note. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.