Warm Glow Feelings Can Promote Green Behavior^{*}

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Abstract

For climate mitigation to be successful, vast numbers of people need to change how they go about daily life. Social scientists have tried to promote sustainable (i.e., "green") behavior with interventions involving cues, frames, and information, but the cumulative impact of those efforts is modest. A growing body of research—largely observational—suggests the promise of "warm glow" messaging that features the positive feelings associated with green behavior. While past work has established the relationship between intrinsic motivations and pro-social behavior, our study represents the first evidence that warm glow can be manipulated in the climate domain. In three survey experiments administered on different national samples, we induce feelings of warm glow and examine the impact on green behavioral intentions. The treatment, an adaptation of a standard feeling induction, has a significant influence on a wide range of actions—an effect that can be distinguished from the influence of general positivity. Most importantly, we observe the largest treatment effects in surprising places: among Republicans, and within this subgroup, on more socially visible activities. Manipulated warm glow also increases intentions to engage in more difficult (e.g., costly, effortful) activities. Our findings are valuable for scholars and practitioners seeking to promote broad-based climate mitigation across the ideological spectrum.

Classification: Social Sciences (Major), Political Sciences (Minor)

Keywords: pro-environmental behavior, warm glow, emotion

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Significance Statement. Do people engage in pro-environmental ("green") behavior because doing so makes them feel good? This question is answered across three experiments that manipulate "warm glow," an intrinsic emotional reward that has been linked to prosocial behavior in other areas. Here, we employ a novel method for inducing warm glow feelings and observe the effects across a range of sustainable behaviors. People who experience warm glow report more green behavioral intentions than those who do not. In contrast to the observational literature on this topic, the warm glow effect is most apparent among Republicans, and within this subgroup, on more socially visible activities. Finally, warm glow is most effective at motivating more difficult (e.g., costly, effortful) forms of sustainable behavior. Successful climate mitigation is going to require individual-level behavior change on a massive scale. Communication strategies that work across the political spectrum—those featuring images (1), group-based emotions (2), or other-regarding values (3)—are promising because they promote broad-based engagement with the issue. Recent work suggests that "warm glow" (WG) messaging, which highlights the positive feelings associated with sustainable behavior, might have similar effects. (4; 5; 6; 7). Yet current work on the technique is overly-reliant on weakly identified observational data.¹

We report the results of three experiments that manipulate WG and observe the effects on a broad range of behavioral intentions in different national samples. We deploy a feeling induction (e.g., 9), to exogenously induce warm glow in a non-deceptive manner. Respondents read that "Scientific studies show that taking actions to protect the environment, even small things, gives people a feeling of satisfaction," and then are asked to "describe a time when you did something for the environment and felt good afterwards" (10, Materials and Measures). Extensive pre-testing established the effectiveness of the feeling induction compared to other methods of manipulating WG (SI Appendix).

We hypothesized that manipulated warm glow would increase a person's intentions to engage in green behaviors relative to those who did not receive the WG treatment (H1). We also explored three research questions suggested by the literature. Some scholars speculate that the warm glow effect might be most apparent among people who already engage in climate mitigation (e.g., Democrats/pro-environmentalists; Brosh 2021). Yet van der Linden (2018) finds the correlation between WG feelings and green behavior to be similar for liberals and conservatives. Accordingly, we examine whether there are heterogeneous treatment effects (HTEs) for partisan subgroups (RQ1).

The repertoire of sustainable behaviors is vast (11), so we also explore whether there are HTEs based on the *visibility* (RQ2) and the *difficulty* (RQ3) of the activity. Previous

¹One previous study (8) attempted to manipulate WG with high production videos but the authors were only partially successful according to manipulation checks.

observational research finds that people take actions consistent with salient identities, resulting in a pattern whereby pro-environmentalists take high visibility actions (e.g., reusable bags) while anti-environmentalists take low visibility actions (e.g., conserve water) (12). Our second research question asks whether the effect of a warm glow treatment is conditional upon a person's political identity and the visibility of the behavior. If that were the case, we might observe a warm glow effect for Republicans, but only on low visibility behaviors. Likewise, the treatment effect on Democrats might be especially apparent on high visibility behaviors. Finally, there is evidence that warm glow effects occur on low- rather than highcost activities (13). Our third research question investigates whether treatment effects are conditional upon the difficulty of the behavior.

Research Design

In Studies 1 and 2 (AsPredicted Registration #153426), respondents were randomly assigned to one of two conditions (Warm Glow or Control) before answering a manipulation check and a 15-item green behavioral intentions scale (12). Analysis of the manipulation check shows the writing task elevated warm glow feelings relative to the control condition but the difference is significant at conventional levels (p < .05 two-tailed) only in the first study.²

In Study 3 (AsPredicted Registration #160884), respondents were randomly assigned to one of three conditions (Warm Glow, Placebo, Control) before completing a manipulation check and a 10-item green behavioral intentions scale (Materials and Measures). WG was manipulated in the same manner as Studies 1 and 2. The placebo condition involved a writing task that was expected to be positive but unrelated to the environment (e.g., "Scientific studies show that taking up a hobby, whatever the activity, gives people a feeling of satis-

²Engagement with the treatment might have differed because Study 2 was longer than Study 1 and included several questions on unrelated topics. Participants in Study 1 wrote more in response to the prompt than those in Study 2 (37.2 versus 14.4 words). All reported statistical tests are two-tailed.

faction. Please describe a time when you did something related to a hobby and felt good afterwards."). The content is non-deceptive (14) and the writing task involves self-reflection. Thus, any differences we observe in green behavior across treatment and placebo can be more confidently attributed to the experience of warm glow feelings, as opposed to general positivity. Analysis of the manipulation check from Study 3 shows that the writing task elevated warm glow feelings relative to the control (z = 1.94, p = .05). Somewhat unexpectedly, the placebo task had a positive effect that was marginally significant (z = 1.87, p = .06). Structural topic models (SI Appendix) show that the content of open-ended responses differed in the expected manner: people in the WG condition mentioned activities related to sustainability (e.g., "trash" "recycle" "plant"), while people in the Placebo condition cited positive feelings and activities unrelated to the environment (e.g., "paint" "read" "cook").³

Results

Figure 1 presents the treatment effects from Studies 1-3 in models with and without control variables. Across both specifications, respondents in the WG condition report more proenvironmental behavioral intentions than people in the control condition. The warm glow effect is significant at conventional levels (ts > 2.0, ps < .05) in Studies 1 and 3, and marginally significant in Study 2. Additionally, in Study 3 there was a tendency for people in the placebo condition to report more pro-environmental behavioral intentions relative to the control (t = 1.68, p = .09).

³Only a small number of people (fewer than four percent) said they had never done something for the environment or related to a hobby



Figure 1: Warm Glow Treatment Effects on Behavioral Intentions (Studies 1-3)

Note: Treatment effects of warm glow induction treatment (along with 90% and 95% confidence intervals) calculated from OLS regression models. Outcome variable is the 15-item Behavioral Intentions scale in Studies 1 and 2, and the 10-item Behavioral Intentions scale in Study 3 (both scales range from 1 to 7). Controls include partial partial partial scale, age, education, income, Hispanic, and Black. On the vertical axis, Study 1, Study 2, Study 3 indicate the treatment effect of warm glow in each study respectively, and Placebo indicates the effect of placebo treatment in Study 3.

Overall, there is a consistent pattern across the three studies in which exogenously induced WG feelings increase green behavioral intentions. This influence can be distinguished from the effect of general positivity, though the latter motivates green behavior to some degree.

Figure 2 presents findings regarding heterogeneous treatment effects by partisanship (RQ1) as well as the visibility (RQ2) and the difficulty (RQ3) of the behaviors. Past obser-

vational work suggests there may be differences in the effectiveness of a WG intervention based upon a person's political identity and characteristics of the activity.

Figure 2: Warm Glow Treatment Effects on Behavioral Intentions by Partisan Identity and Behavior Types (Study 3)



Note: Treatment effects of warm glow induction and placebo treatments (along with 90% and 95% confidence intervals) calculated from OLS regression models where the outcome variable is the 10-item Behavioral Intentions scale (ranges from 1 to 7).

In Panel A, the treatment effect is statistically significant for Republicans, indicating that WG feelings may be most influential on skeptical audiences. The partisan difference in treatment effects is not statistically significant (t = .90, p = .37), but the magnitude of the treatment effect for Republicans is almost double the size of the treatment effect for Democrats. The data reveal differences at baseline and in responsiveness to the treatment. Republicans express a significantly lower willingness to engage in sustainable activities than Democrats in the control group (t = 15.89, p < .01) and they respond to a greater degree to the WG induction.

Panel B investigates whether treatment effects vary with the identity-signaling potential of the behavior. One possibility, suggested by the literature (12), is that Republicans exhibit the largest treatment effects when asked about low-visibility behaviors. As Panel B shows, however, we observe larger treatment effects for Republicans on high visibility behaviors (t = 1.81, p = .07). To the extent that Republicans prefer (and already are doing) sustainable behaviors that are less visible, WG feelings may motivate them to do something new.

Panel C explores whether there are HTEs based on difficulty of the behavior. Past

work finds that WG feelings are more closely associated with low- rather than high-cost activities (13). In contrast, we observe a large, statistically significant warm glow effect for high-difficulty behaviors (t = 3.44, p < .01) and a modest effect for low-difficulty behaviors (t = 1.84, p = .07).

Across the three panels, manipulated WG increases the willingness to take green actions in unexpected ways. The treatment was especially powerful at overcoming identity-based resistance (e.g., Republicans, particularly visible activities) and hesitation regarding highdifficulty behaviors. In this way, our findings illustrate the distinctive power of intrinsic, as opposed to extrinsic, motivations in the climate domain (15).

Discussion

The observational literature suggests the promise of the warm glow effect in providing the impetus for pro-environmental behavior (4; 5; 6; 13). Our research represents the most comprehensive exploration of the causal effects of warm glow, which is vital for practitioners seeking new methods to promote broad-based behavior change.

Our study advances the climate science literature in several ways. First, we developed, validated, and documented the effectiveness of the warm glow feeling induction. The treatment is specific to a person's own experiences, and as a result, has greater impact than previous efforts at manipulating warm glow (8). Second, through the use of a placebo condition (Study 3), we showed that WG feelings are distinct from general positivity (i.e., the WG effect is intrinsic to sustainable behavior). Third, exploration of the three RQs illustrates the distinctive power of the warm glow effect. Specifically, there is a tendency for larger effects in surprising places: among Republicans, and within this subgroup, on more socially visible activities. Manipulated WG also increases intentions to engage in more difficult (e.g., costly, effortful) activities. These patterns contradict past observational work that found Republicans prefer lower visibility green behaviors, and that warm glow feelings have the greatest impact on low-cost behaviors.

We can only speculate about why our findings differ from previous studies, but it is common for researchers to come to different conclusions when the focal variable is measured versus manipulated (16; 17).⁴ One additional reason for the larger-than-expected effects on Republicans may be the language of the WG treatment, which asked people to write about protecting the environment (as opposed to climate change; 18). Even though the most provocative patterns (e.g., Figure 2) require further empirical validation, we see promise in these results for practitioners and scholars who may build upon our efforts. Warm glow messaging appears to be a potent method for targeting hard to reach audiences and motivating challenging activities. As such, this intervention makes a uniquely important contribution to broad-based climate mitigation.

⁴Measured WG might capture preexisting differences related to environmental attitudes, which would conflate the WG effect with those characteristics.

Materials and Measures

All studies received Institutional Review Board approval from Dartmouth College in these documents: Study 1 (00032816), Study 2 (00032853), and Study 3 (00032908).

The complete design of Study 1 is a 5-condition between-subjects experiment conducted on the CloudConnect platform in September of 2023 (N = 1,646). We compared the feeling induction to three other methods of inducing warm glow. The Feeling Induction was the most effective method for increasing WG. The text of that treatment reads: "Scientific studies show that taking actions to protect the environment, even small things, gives people a feeling of satisfaction. Please describe a time when you did something for the environment and felt good afterwards. If possible, please tell us in a few sentences and be as specific as possible. We're interested in learning about your experience." Analyses in the main text compare the WG Feeling Induction to the control condition (the other three treatment conditions are omitted).

After the treatment, respondents answered a manipulation check which asked them to rate their level of agreement with four statements (e.g., "I expect to feel good when I behave in an environmentally friendly way") on a 7-point scale (α =.90). The main dependent variable, separated from the treatment by six questions on unrelated topics, was a 15-item behavioral intentions battery (12). That item asked respondents to rate "how likely you would be to engage in the following behaviors in the future" on an 8-point scale. The list included a variety of activities (curtailment and adoption behaviors) and had a response option for "already doing." Values on the dependent variables represent a person's average likelihood across activities they were *not* already doing. Partisanship was measured pre-treatment, and from that variable we created separate indicators for self-identifying Democrats and Republicans.

Study 2 was a 2-condition between-subjects experiment conducted by YouGov as part of the 2023 Congressional Election Study (CES) in November of 2023 (N = 1,000; AsPredicted Registration #153426). The feeling induction treatment, manipulation check, and dependent variables are the same as the instrumentation in Study 1 with one exception. One of the behavioral intentions changed from "Purchase clothing from environmentally friendly brands" to "Purchase clothing from environmentally friendly brands or from a thrift store."

Study 3 was a pre-registered 3-condition between-subjects experiment conducted by Verasight in February of 2024 (N = 8,320 self-reported Democrats and Republicans only; AsPredicted Registration #160884). The manipulation check consists of one of the four statements from the scale in Study 1 ("I expect to feel good when I behave in an environmentally friendly way."). The primary dependent variable is similar to Studies 1 and 2, but with 10 items. Five of the 10 questions ask about low visibility behaviors (e.g., high efficiency light bulbs) and five ask about high visibility behaviors (e.g., reusable bags). Within low/high visibility subscales, we balanced the lists in terms of difficulty. We identified low/high visibility and low/high difficulty activities with a pre-test from December 2023 (N=1986) on CloudResearchConnect. In Study 3 there was a willingness to pay (WTP) measure that asked respondents how much more (in dollars) they would be willing to pay for green electricity (options range from 0to30 with a write-in option for some other amount). Analysis of the WTP item appears in the SI Appendix. Partisanship (measured pre-treatment) is operationalized with a dummy term where Republican is coded as 1 (Democratic = 0).

An SI Appendix reports question wording and auxiliary analyses mentioned in the text.

References

- T Bolsen, R Palm, JT Kingsland, Counteracting Climate Science Politicization With Effective Frames and Imagery. *Science Communication* 41, 147–171 (2019) Publisher: SAGE Publications Inc.
- [2] NS Harth, Affect, (group-based) emotions, and climate change action. Current Opinion in Psychology 42, 140–144 (2021).
- [3] PG Bain, MJ Hornsey, R Bongiorno, C Jeffries, Promoting pro-environmental action in

climate change deniers. *Nature Climate Change* **2**, 600–603 (2012) Publisher: Nature Publishing Group.

- [4] P Hartmann, M Eisend, V Apaolaza, C D'Souza, Warm glow vs. altruistic values: How important is intrinsic emotional reward in proenvironmental behavior? *Journal of En*vironmental Psychology 52, 43–55 (2017).
- [5] L Jia, S van der Linden, Green but not altruistic warm-glow predicts conservation behavior. Conservation Science and Practice 2, e211 (2020) _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/csp2.211.
- [6] S van der Linden, Intrinsic motivation and pro-environmental behaviour. Nature Climate Change 5, 612–613 (2015) Publisher: Nature Publishing Group.
- [7] D Taufik, JW Bolderdijk, L Steg, Going green? The relative importance of feelings over calculation in driving environmental intent in the Netherlands and the United States. *Energy Research & Social Science* 22, 52–62 (2016).
- [8] PM Lohmann, E Gsottbauer, Svd Linden, A Kontoleon, Chilling results: how explicit warm glow appeals fail to boost pro-environmental behaviour. *Behavioural Public Policy*, 1–26 (2024).
- [9] D Keltner, PC Ellsworth, K Edwards, Beyond simple pessimism: Effects of sadness and anger on social perception. Journal of Personality and Social Psychology 64, 740–752 (1993) Place: US Publisher: American Psychological Association.
- [10] MT Schmitt, LB Aknin, J Axsen, RL Shwom, Unpacking the Relationships Between Pro-environmental Behavior, Life Satisfaction, and Perceived Ecological Threat. *Ecological Economics* 143, 130–140 (2018).
- [11] TM Andrews, R Kline, Y Krupnikov, JB Ryan, Too many ways to help: How to promote climate change mitigation behaviors. *Journal of Environmental Psychology* 81, 101806 (2022).
- [12] C Brick, DK Sherman, HS Kim, "Green to be seen" and "brown to keep down": Visibility

moderates the effect of identity on pro-environmental behavior. *Journal of Environmen*tal Psychology **51**, 226–238 (2017).

- [13] S van der Linden, Warm glow is associated with low- but not high-cost sustainable behaviour. Nature Sustainability 1, 28–30 (2018) Publisher: Nature Publishing Group.
- [14] HW Mak, et al., Hobby engagement and mental wellbeing among people aged 65 years and older in 16 countries. *Nature Medicine* 29, 2233–2240 (2023) Publisher: Nature Publishing Group.
- [15] JW Bolderdijk, L Steg, ES Geller, PK Lehman, T Postmes, Comparing the effectiveness of monetary versus moral motives in environmental campaigning. *Nature Climate Change* 3, 413–416 (2013) Publisher: Nature Publishing Group.
- [16] J Jerit, et al., Manipulated vs. Measured: Using an Experimental Benchmark to Investigate the Performance of Self-Reported Media Exposure. Communication Methods and Measures 10, 99–114 (2016) Publisher: Routledge _eprint: https://doi.org/10.1080/19312458.2016.1150444.
- [17] RJ LaLonde, Evaluating the Econometric Evaluations of Training Programs with Experimental Data. The American Economic Review 76, 604–620 (1986) Publisher: American Economic Association.
- [18] PS Hart, L Feldman, Would it be better to not talk about climate change? The impact of climate change and air pollution frames on support for regulating power plant emissions. *Journal of Environmental Psychology* **60**, 1–8 (2018).

Supplementary Information for Warm Glow Feelings Can Promote Green Behavior

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Contents

1	Mai	n Analyses	1
	1.1	Warm Glow Treatment Effects	1
	1.2	Warm Glow Effects by Partisan Identity and Behavior Types	3
2	Aux	ciliary Analyses	4
	2.1	Distribution of Demographic Variables	4
	2.2	Evidence on Treatment Effectiveness	5
	2.3	Pilot Study for Behavior Type Validation	6
	2.4	Power Analysis	6
	2.5	Structural Topic Modeling Results	8
3	Sur	vey Instrumentation	10
	3.1	Study 1	10
	3.2	Study 2	14
	3.3	Study 3	16
Re	efere	nces	17

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1 Main Analyses

This section provides the analyses referenced in the main text.

1.1 Warm Glow Treatment Effects

Table S1 shows model output for Figure 1 in the main text (Studies 1 and 2).

	Study	1	Study	2
WG Treatment	0.20** 0.09	0.22^{**} 0.09	$0.09 \\ 0.08$	0.13^{*} 0.07
Democrat		0.57^{***} 0.14		0.48^{***} 0.10
Republican		$-0.12 \\ 0.15$		-0.21^{*} 0.11
Female		$-0.01 \\ 0.09$		0.12^{*} 0.07
Education		0.37^{**} 0.18		0.43^{***} 0.13
Age		-0.01^{**} 0.00		-0.02^{***} 0.00
Income		$\begin{array}{c} 0.01 \\ 0.01 \end{array}$		$\begin{array}{c} 0.08 \\ 0.17 \end{array}$
Black		$\begin{array}{c} 0.07 \\ 0.14 \end{array}$		$\begin{array}{c} 0.10\\ 0.11 \end{array}$
Hispanic		$\begin{array}{c} 0.19 \\ 0.14 \end{array}$		$-0.11 \\ 0.11$
Constant	4.23*** 0.06	3.82*** 0.21	4.08*** 0.05	4.42*** 0.16
$\begin{array}{c} Adj. \ R^2 \\ N \end{array}$	$0.01 \\ 655$	$0.10 \\ 655$	0.00 999	$0.16 \\ 959$

Table S1: Treatment Effects on Behavioral Intentions (Studies 1 and 2)

Note: Cell entries are coefficients, with standard errors below, from OLS regression models where DV is 15-item Behavioral Intentions scale. ***p < .01; **p < .05; *p < .10 (two-tailed).

The Behavioral Intentions columns in Table S2 provide model output for Figure 1 in the main text (Study 3).

	Behavioral In	tentions	Willingnes	s to Pay
WG Treatment	0.10*** 0.04	0.11*** 0.03	$\begin{array}{c} 0.06 \\ 0.05 \end{array}$	0.09^{*} 0.05
Placebo	0.06^{*} 0.04	0.06^{*} 0.03	$\begin{array}{c} 0.06 \\ 0.05 \end{array}$	0.09^{*} 0.05
Republican		-0.65^{***} 0.03		-0.93^{***} 0.04
Female		$-0.05 \\ 0.03$		$-0.01 \\ 0.04$
Education		0.35*** 0.04		0.24*** 0.06
Age		-0.02^{***} 0.00		-0.03^{***} 0.00
Income		0.20*** 0.05		0.53^{***} 0.07
Black		0.10^{**} 0.05		$\begin{array}{c} 0.02 \\ 0.07 \end{array}$
Hispanic		0.15^{***} 0.04		$-0.01 \\ 0.07$
Constant	4.09*** 0.03	4.95*** 0.06		
Coeff Test (WG=Placebo)	$\begin{array}{c} 0.04 \\ 0.04 \end{array}$	$\begin{array}{c} 0.05 \\ 0.03 \end{array}$	$\begin{array}{c} 0.001 \\ 0.05 \end{array}$	$-0.001 \\ 0.05$
Adj. R ² N	$\begin{array}{c} 0.00\\ 8207\end{array}$	0.14 8093	8110	7928

Table S2: Treatment Effects on Behavioral Intentions (Study 3)

Note: Cell entries are coefficients, with standard errors below, from OLS regression models where DV is 10-item Behavioral Intentions scale and ordered logit of WTP variable (coefficients for cutpoints suppressed). ***p < .01; **p < .05; *p < .10 (two-tailed).

Study 3 permits an additional test of H1 with the quasi-behavioral willingness to pay (WTP) item. Respondents were asked how much more a month they would be willing to pay for green electricity (with options for \$0, \$10, \$20, \$30 or a write-in option for some other amount). Write-in responses (4%) included a range of content—both numeric and textual. We used grepl in R to identify numeric content, and manually assigned write-in

responses into 5 categories (\$0, \$10, \$20, \$30, More than \$30), generating an ordinal measure of WTP. In Table S2, we used ordered logistic regression to analyze the effects of WG and placebo on willingness to pay. Respondents who wrote textual response only (e.g., "We have solar on our home and are paying more than that now") were excluded from the analysis. As with the patterns reported in the main text, people in the WG condition move in a pro-environmental direction compared to the control group, selecting a higher monetary contribution to green electricity ($p_{no_controls} = .225$ and $p_{controls} = .095$. The placebo task had a marginally significant effect as well ($p_{no_controls} = .237$ and $p_{controls} = .089$) and in the model with controls, the two effects are indistinguishable from one another (p = .98).

1.2 Warm Glow Effects by Partisan Identity and Behavior Types

Table S3 shows model output for Figure 2 in the main text.

	A. Partisanship		B. Visit	oility	C. Diffic	culty	
			High	Low	High	Low	
WG Treatment	0.14^{***}	0.08	0.02	0.14^{***}	0.14^{***}	0.07^{*}	
	0.05	0.05	0.05	0.05	0.04	0.04	
Placebo	0.06	0.09^{*}	0.06	0.11^{**}	0.09^{**}	0.06	
	0.05	0.05	0.05	0.05	0.04	0.04	
Republican			-0.87^{***}	-0.65^{***}			
1			0.05	0.05			
WG x Republican			0.14^{*}	-0.05			
			0.08	0.08			
Placebo x Republican			0.01	-0.08			
			0.08	0.08			
Constant	3.71^{***}	4.46***	4.34***	4.60***	3.60***	4.82**	
	0.04	0.03	0.04	0.04	0.03	0.03	
Adj. \mathbb{R}^2	0.00	0.00	0.08	0.06	0.00	0.00	
Ν	4100	4107	8181	8017	8194	7646	

Table S3: Treatment Effects by Partisanship and Behavior Types (Study 3)

Note: Cell entries are coefficients, with standard errors below, from OLS regression models. For panel A, DV is 10-item Behavioral Intentions scale. For panel B, DV is 5-item high-visibility and 5-item low-visibility Behavioral Intentions scale respectively. For panel C, DV is 5-item high-difficulty and 5-item low-difficulty Behavioral Intentions scale respectively. ***p < .01; **p < .05; *p < .10 (two-tailed).

2 Auxiliary Analyses

2.1	Distribution	of Demographic	Variables
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	Study 1	Study 2	Study 3
	CloudConnect	CES	Verasight
Gender			
Female	54.2	53.6	56.2
Male	43.7	45.8	43.4
Other	2.1	0.6	0.4
Partisan Identity			
Democrat	62.6	44.0	49.7
Republican	25.3	36.1	50.3
Independent	12.1	15.9	0.0
Not sure		4.0	
Age			
18-24	39.0	9.1	4.9
25-34	27.9	17.3	17.0
35-44	16.6	14.7	25.4
45-54	11.6	14.1	21.5
55-64	4.3	20.6	17.5
65 or older	0.5	24.2	13.6
Race/Ethnicity			
White	76.7	66.1	70.4
Black	11.6	13.0	11.3
Hispanic/Latino	10.0	12.5	11.6
Education			
College degree or more	68.7	44.4	41.7
Some college	19.4	21.7	35.1
High school or less	11.9	33.9	23.2
N	1658	1000	8323

Note: Cell entries indicate percentages of each category. For partian identity, Independent refers to pure independents who are not partian leaners.

2.2 Evidence on Treatment Effectiveness

We utilize the full design of Study 1 to test the effectiveness of different methods of inducing WG. The key outcome in this analysis is the 4-item scale used by Jia and van der Linden (2020) to measure WG feelings. These items asked respondents to rate their level of agreement with four statements (e.g., "I expect to feel good when I behave in an environmentally friendly way") on a 7-point scale ($\alpha = .90$). If a treatment was effective at priming warm glow, respondents should have higher values on this scale. Table S5 shows the effect of the treatments on the 4-item manipulation check. Although coefficients for all treatments are positively signed, only the feeling induction had a statistically significant effect on WG feelings.

	Model 1	Model 2
Feeling Induction	0.20** 0.10	0.20** 0.10
Choose New Action	$\begin{array}{c} 0.09 \\ 0.10 \end{array}$	$\begin{array}{c} 0.07 \\ 0.10 \end{array}$
Scientific Study	$\begin{array}{c} 0.12 \\ 0.10 \end{array}$	$\begin{array}{c} 0.14 \\ 0.10 \end{array}$
Third-Party Quotes	$\begin{array}{c} 0.15 \\ 0.10 \end{array}$	$\begin{array}{c} 0.15 \\ 0.10 \end{array}$
Democrat		0.67^{***} 0.10
Republican		$\begin{array}{c} 0.09 \\ 0.11 \end{array}$
Socially Desirable Responding (SDR)		0.08^{***} 0.03
Constant	5.22^{***} 0.07	4.75^{***} 0.11
Adj. R ² N	$\begin{array}{c} 0.00\\ 1646 \end{array}$	$\begin{array}{c} 0.06\\ 1646\end{array}$

Table S5: Manipulation Check (Studies 1 and 2)

Note: Cell entries are coefficients, with standard errors below, from OLS regression models where the DV is 4-item Warm Glow scale. Terms are dummy indicators except for SDR which is a person's score on the 8-item index rescaled to range from 0 to 1. ***p < .01; **p < .05; *p < .10 (two-tailed).

Compliance with the writing task was high across treatment conditions (avg length of response = 34.6 words). However, responses were longer in the Feeling Induction condition compared to the other three (avg = 37.2 words; p < .05). In addition, people in this condition were highly specific in how they talked about the environment; for example, listing concrete

actions (e.g., drying clothes outside, composting) or specific experiences (e.g., beach cleanup). These differences in respondent engagement may have resulted in a stronger effect for the feeling induction compared to the other manipulations in Study 1 as well as the treatment in Lohmann et al. (2024).

2.3 Pilot Study for Behavior Type Validation

We identified low/high visibility and low/high difficulty with a pre-test from December 2023 (N = 1986) on CloudResearchConnect. The survey asked about 23 green behaviors based on the items used in Brick et al. (2017). Participants in the pilot study rated the social visibility (how much a behavior can be observed by other people) and the difficulty (in terms of effort and expense) in two separate grids that ranged from "Not at all" (1) to "Extremely" (5). When creating the scale for Study 2 we identified items that were at the bottom and top of the visibility distribution (and significantly different from the sample mean) while balancing on difficulty.

Item Wording	Visibility	Difficulty
Limit consumption of meat and/or dairy product	2.24	2.50
Turn personal electronics off or put in low-power mode when not in use	2.27	1.55
Conserve water when showering, doing dishes, or watering plants	2.27	2.13
Use high efficiency light bulbs	2.39	1.51
Reduce non-essential air travel	2.32	2.31
Use reusable bags at the grocery store	3.58	1.56
Walk, bicycle, carpool, or take public transportation instead of driving a vehicle	3.61	3.26
Carry a reusable water bottle	3.68	1.40
Engage in political action related to protecting the environment	3.97	2.95
Purchase an electric/hybrid vehicle	4.21	3.81
Average rating for 23 behaviours	2.84	2.28
	SD = 0.63	SD = 0.58

Table S6: Selection of Items for Subscales

Note: Visibility and Difficulty were scored on a 5-pt scale, ranging from "Not at all" (1) to "Extremely" (5). Items above the gray bar represent "low visibility" behaviors while items below it represent "high visibility" behaviors. Individual items are significantly different from the sample mean on visibility (ps < .01, two-tailed).

2.4 Power Analysis

We determined the sample size for Study 3 with simulation-based power analyses. The purpose was to detect effects of interest and to be able to consider any potential null effects as informative as possible. We used data from Study 1 to make the assumptions about the means and standard deviations.

For instance, for the 15-item behavioral intentions scale, the means and standard deviations for control and treatment conditions were assumed to be: mean_control = 5.21, mean_treat = 5.41, SD_control = 1.23, SD_treat = 1.17 (see Table S7 below). Assuming a two-condition design (i.e., control vs. treatment), we conducted 1000 simulations of the data-generating processes for the assumed effect sizes of [0.1, 0.19 (observed effect size), 0.3, 0.4]. As shown in Figure S1, assuming the effect size of 0.19, .80 power is achieved with a total sample size of 1400. For a two-condition study, the suggested sample size is 700 per condition.

Figure S1: Power, Effect Size, and Sample Size: 15-item Behavioral Intentions Scale (All Respondents)



Note: The first dashed line (from the top) indicates .90 power, and the second dashed line indicates .80 power.

The same simulation procedure was applied to the 15-item scale, 5-item high-visibility scale, and 5-item low-visibility scale for all respondents and by partial groups. Table S7 summarizes the sample size per condition suggested by simulation-based power analyses for each case (R code for each simulation will be included in the replication data/code upon publication).

We did not conduct a power analysis for Study 2 because data collection was part of a collaborative study, with sample size for all participants set at N=1000.

All Respondents	Behavioral Intentions			High-visibility PEB			Low-visibility PEB					
An Respondents	(15 items)			(5 items)			(5 items)					
	Mean	(SE)	(SD)	Ν	Mean	(SE)	(SD)	Ν	Mean	(SE)	(SD)	Ν
Study 1												
Treatment	5.41	-0.06	-1.17	319	5.2	-0.08	-1.35	319	5.61	-0.08	-1.39	319
Control	5.21	-0.07	-1.23	336	5.11	-0.08	-1.39	336	5.44	-0.08	-1.41	336
Difference (treatment effect)	0.19	-0.09		655	0.1	-0.11		655	0.17	-0.11		655
t-test value	-2.07				-0.89					-1.53		
p-value (two-tailed)	0.04				0.37					0.13		
	700				> 9500				1100			
Sample size needed per condition	700				>2500				1100			
Democrate	Beha	avioral	Intentio	ons	Higl	n-visibi	lity PE	В	Lov	v-visibi	lity PE	В
Democrats		(15 ite	ems)		_	(5 iter	ms)		(5 items)			
	Mean	(SE)	(SD)	Ν	Mean	(SE)	(SD)	Ν	Mean	(SE)	(SD)	Ν
Study 1			. ,								. ,	
Treatment	5.61	-0.09	-1.11	162	5.51	-0.1	-1.26	162	5.79	-0.11	-1.35	162
Control	5.45	-0.09	-1.2	167	5.48	-0.1	-1.25	167	5.57	-0.11	-1.4	167
Difference (treatment effect)	0.16	-0.12		329	0.03	-0.14		329	0.22	-0.15		329
t-test value	-1.24				-0.19				-1.48			
p-value (two-tailed)	0.22				0.85				0.14			
Sample size needed per condition	800				>2500				1300			
		. 1	T			1 .1		D	т	1 .		D
Republicans	Beha	avioral	Intentio	ons	Higi	n-visibi.	lity PE.	В	Lov	v-visibi	hty PE	В
	M	(15 10	$\frac{\text{ems}}{(\text{CD})}$	N	M	(5 Itel (CE)	$\frac{\text{ms}}{(\text{cD})}$	N	M	(5 Ite	$\frac{\text{ms}}{(\text{cD})}$	N
	Mean	(SE)	(SD)	IN	Mean	(SE)	(SD)	IN	Mean	(SE)	(SD)	IN
Study 1	F 00	0.10	1.0	60	4 7	0.10	1 5	60	5.05	0.10	1 47	60
Treatment	5.09	-0.16	-1.3	69	4.7	-0.18	-1.5	69	5.25	-0.18	-1.47	69
Control	4.54	-0.16	-1.22	57	4.12	-0.18	-1.32	57	4.85	-0.19	-1.44	57
Difference (treatment effect)	0.55	-0.23		126	0.59	-0.25		126	0.4	-0.26		126
t-test value	-2.44				-2.34				-1.55			
p-value (two-tailed)	0.02				0.02				0.12			
Sample size needed per condition	88				100				200			

Table S7: Power Analysis: Observed Baseline Means and SD, Treatment Effects, and Proposed Sample Size

2.5 Structural Topic Modeling Results

For Study 3, we employed Structural Topic Modeling (STM) to explore respondent behavior in the WG and Placebo conditions and further validate the effect of the WG feeling induction. Across both conditions, approximately 90% of respondents provided an open-ended response that was consistent with the instructions. A small number (less than 4%) said they could not recall a personal experience and the remainder (6-7%) left the open-ended text box blank.

Using the methods in Roberts et al. (2014) we used STMs to explore the content of the open-ended responses. The results in Figure S2 are based on a structural topic model that assumes 10 topics.

Figure S2: Structural Topic Modeling Results Assuming 10 Underlying Topics

A. Proportion of topics in the corpus (x-axis), Most frequent words for each topic B. Topic prevalence in WG Treatment condition compared to Placebo condition



C. Topic correlations



D. Frequent words for each topic



In Figure S2, Panel A illustrates the expected proportion of open-ended responses that belongs to each topic on the horizontal axis. It also shows three most frequent words per topic. The two most common topics are Topic 10 and Topic 7, both related to pro-environmental behaviors, followed by Topic 3, related to hobbies. Panel B compares the relative topic prevalence for each topic in WG treatment condition and placebo condition. Topics 7, 8, 10 are more prevalent among respondents assigned to WG treatment condition, whereas Topics 1-6 and 9 are more prevalent among respondents in placebo condition. Panel C illustrates correlations among topics, where positive correlations between two topics indicate that those topics are likely to be discussed within open-ended responses. The results indicate Topics 7, 8, 10 are likely to be discussed together, whereas Topics 1-6 and 9 are likely to be discussed together in open-ended responses. Lastly, Panel D lists most frequent words for each topic.

We also conducted a regression analysis in which the proportion of each topic (Topic 1 through 10) was regressed on treatment status (1 = WG; 0 = placebo), Republican, and the interaction. There is a positive and statistically significant effect for WG in models predicting Topics 7, 8, and 10 (p < .01). In all other models, the coefficient for WG is negative and statistically significant. These findings (similar to Panel B) further validate the distinctiveness of open-ended responses across the WG and Placebo conditions in Study 3.

	Topic 1	Topic 2	Topic 3	Topic 4	Topic 5
WG Treatment	-0.062^{***}	-0.050^{***}	-0.205^{***}	-0.036^{***}	-0.015^{**}
Republican	-0.010^{**}	0.012^{***}	-0.017***	0.002	0.013^{***}
WG x Republican	-0.012^{*}	-0.017^{***}	0.015*	-0.003	-0.016^{***}
Constant	0.131^{***}	0.110^{***}	0.215***	0.098***	0.072^{***}
	Topic 6	Topic 7	Topic 8	Topic 9	Topic 10
WG Treatment	-0.083^{***}	0.209***	0.110***	-0.151^{***}	0.282***
Republican	-0.002	-0.0005	-0.003	0.006	-0.003
WG x Republican	0.013^{**}	0.035^{**}	* -0.011	-0.008	0.005
Constant	0.114^{***}	0.019***	0.073***	0.157^{**}	* 0.012**

Table S8: Associations between Topic Proportion and WG Treatment and Partisanship

Note: Cell entries are coefficients, from OLS regression models where DV is the proportion of each topic in open-ended responses. ***p < .01; **p < .05; *p < .10 (two-tailed).

3 Survey Instrumentation

3.1 Study 1

The first treatment (Feeling Induction) is based on the induction method used in emotion research (Banks and Valentino 2012). The second treatment (Choose New Action) is adapted from the content-controlled method for measuring tolerance (Sullivan et al. 1982). The third treatment (Scientific Study) describes the findings from a scientific study about the relationship between pro-environmental behaviors and life satisfaction and asks respondents to speculate about the reason for that finding (as in Groenendyk and Krupnikov 2021). The fourth treatment (Third-Party Quotes) invokes the above relationship but adds quotations from interviewees in the scientific study (adapting the vignette approach of Carlson and Settle 2022).

All the claims in Treatments 1-4 are non-deceptive. Past research has shown an association between pro-environmental behaviors and life satisfaction (e.g., Schmitt et al. 2018).

Treatment Wording

For all treatments, the text box appears on the same screen as the treatment.

TREATMENT 1 (Feeling Induction)

Scientific studies show that taking actions to protect the environment, even small things, gives people a feeling of satisfaction. Please describe a time when you did something for the environment and felt good afterwards. If possible, please tell us in a few sentences and be as specific as possible. We're interested in learning about your experience.

TREATMENT 2 (Choose New Action)

Many people try to do something, however small, to help the planet. They also think about additional ways they could contribute to climate protection in the future.

Please look at the list below. Is there anything you are not currently doing for the environment that you think you might start doing? If you see more than one idea you like, pick the one that best fits your lifestyle.

change your diet take fewer flights eat organic or local food buy a more efficient vehicle reduce use of gas-powered vehicle cut energy use in home use public transportation buy items secondhand instead of new conserve water reduce food waste

If you were able to do [PIPE IN RESPONSE], how do you think it would make you feel? Please give us your thoughts in a few sentences.

TREATMENT 3 (Scientific Study)

According to a recent scientific study of citizens in the U.S. and Canada, people who engaged in more pro-environmental behaviors reported higher life satisfaction than those who did fewer. Similar results were found in research from Sweden, Mexico, Spain, and China. All around the world, contributing to the health of the planet increases feelings of personal well-being.

If you had to explain why pro-environmental behavior is linked to life satisfaction, what would you say? Please share your thoughts in a few sentences and be as specific as possible.

TREATMENT 4 (Third-Party Quotes)

A recent scientific study shows that taking actions to protect the environment gives people a feeling of satisfaction. Here are some of the reactions from people in this study:¹

- ◊ Female, 55: I just think that I am doing something. I can't be a member of Greenpeace or anything like that. I know it's very small. But it's positive; it's something I feel good about.
- ◊ Male, 40: I feel like that there is a small part of me that is making a bit of a difference. Probably not a huge amount in the overall scheme of things but I feel better in my mind and my heart.
- ◊ Female, 54: I feel good that I am doing what I can. There is a good feeling that at least I am doing something.
- ◊ Male, 43: It mainly comes down to that feeling of pride and satisfaction in doing something that helps, while knowing it's never going to be quite enough, it does feel good to know that I can do something. I'm happy that I can do something.

Now imagine that *you* did something beneficial for the environment. How do you think it would make you feel? Please give us your thoughts in a few sentences and be as specific as possible.

Question Wording

Manipulation Check

Please read the statements below and indicate your level of agreement or disagreement with them.

"I expect to feel good when I behave in an environmentally friendly way."

"I anticipate that I would feel good when I do something to help the environment."

"I'd feel guilty if I did not behave in an environmentally friendly way."

"Doing something good for the environment would make me feel positive about myself."

¹The quotes are excerpts from interviewees in Hartmann et al. (2017, see Appendix 2)

1. Strongly agree

- 2. Agree
- 3. Slightly agree
- 4. Neither agree nor disagree
- 5. Slightly disagree
- 6. Disagree
- 7. Strongly disagree

Emotion Self-Report

When you think about the environment or the planet, how do you feel?

Proud

Excited Happy Hopeful Satisfied Worried Afraid Nervous Scared

- 1. Not at all
- 2. A little
- 3. Slightly agree
- 4. Somewhat
- 5. Very
- 6. Extremely

Behavioral Intentions Scale

Please read the list below and tell us how likely you would be to engage in the following behaviors in the future. Don't feel any pressure, just indicate what you are likely to do.

Use reusable bags at the grocery store Walk, bicycle, or take public transportation instead of driving a vehicle by yourself Limit non-essential air travel Compost your household food garbage Limit consumption of meat and dairy products Eat organic/locally produced food Purchase an electric or hybrid vehicle Install energy efficient appliances in your home Turn personal electronics off or in low-power mode when not in use Buy high efficiency light bulbs Conserve water when showering, doing dishes, or watering plants Dry clothes on a clothesline instead of using the dryer Purchase clothing from environmentally friendly brands Carry a reusable water bottle Engage in political action related to protecting the environment

- 1. Extremely unlikely
- 2. Very unlikely
- 3. Somewhat unlikely
- 4. Neither unlikely nor likely
- 5. Somewhat likely
- 6. Very likely
- 7. Extremely likely
- 8. Already doing

3.2 Study 2

Treatment Wording

The text box appears on the same screen as the treatment.

FEELING INDUCTION

Scientific studies show that taking actions to protect the environment, even small things, gives people a feeling of satisfaction. Please describe a time when you did something for the environment and felt good afterwards. If possible, please tell us in a few sentences and be as specific as possible. We're interested in learning about your experience.

Question Wording

Manipulation Check

Please read the statements below and indicate your level of agreement or disagreement with them.

"I expect to feel good when I behave in an environmentally friendly way."

"I anticipate that I would feel good when I do something to help the environment."

"I'd feel guilty if I did NOT behave in an environmentally friendly way."

"Doing something good for the environment would make me feel positive about myself."

"I don't think I would feel any different if I did something to help the environment." $(Reverse\-coded)$

1. Strongly agree

- 2. Agree
- 3. Slightly agree
- 4. Neither agree nor disagree
- 5. Slightly disagree
- 6. Disagree
- 7. Strongly disagree

Behavioral Intentions Scale

Please read the list below and tell us how likely you would be to engage in the following behaviors in the future. Don't feel any pressure, just indicate what you are likely to do.

Use reusable bags at the grocery store Walk, bicycle, or take public transportation instead of driving a vehicle by yourself Limit non-essential air travel Compost your household food garbage Limit consumption of meat and dairy products Eat organic/locally produced food Purchase an electric or hybrid vehicle Install energy efficient appliances in your home Turn personal electronics off or in low-power mode when not in use Buy high efficiency light bulbs Conserve water when showering, doing dishes, or watering plants Dry clothes on a clothesline instead of using the dryer Purchase clothing from environmentally friendly brands or from a thrift store Carry a reusable water bottle Engage in political action related to protecting the environment

- 1. Extremely unlikely
- 2. Very unlikely
- 3. Somewhat unlikely
- 4. Neither unlikely nor likely
- 5. Somewhat likely
- 6. Very likely
- 7. Extremely likely
- 8. Already doing

3.3 Study 3

Treatment Wording

For all treatments, the text box appears on the same screen as the treatment.

FEELING INDUCTION

Scientific studies show that taking actions to protect the environment, even small things, gives people a feeling of satisfaction. Please describe a time when you did something for the environment and felt good afterwards. If possible, please tell us in a few sentences and be as specific as possible. We're interested in learning about your experience.

PLACEBO

Scientific studies show that taking up a hobby, whatever the activity, gives people a feeling of satisfaction. Please describe a time when you did something related to a hobby and felt good afterwards. If possible, please tell us in a few sentences and be as specific as possible. We're interested in learning about your experience.

Question Wording

Manipulation Check

How much do you agree or disagree with the following statement:

"I expect to feel good when I behave in an environmentally friendly way."

- 1. Strongly agree
- 2. Agree
- 3. Slightly agree
- 4. Neither agree nor disagree
- 5. Slightly disagree
- 6. Disagree
- 7. Strongly disagree

Behavioral Intentions Scale²

Please read the list below and tell us how likely you would be to engage in the following behaviors in the future. Don't feel any pressure, just indicate what you are likely to do.

Turn personal electronics off or in low-power mode when not in use

 $^{^{2}}$ In the question used for Study 3, the top 5 items are the low visibility behaviors (and have significantly lower visibility than the mean of the 23-item scale) and the bottom 5 items are high visibility behaviors (significantly higher visibility than the mean of the 23-item scale). In the administration of Study 3, the order of behaviors was randomized.

Use high efficiency light bulbs

Limit consumption of meat and/or dairy products

Reduce non-essential air travel

Conserve water when showering, doing dishes, or watering plants

Use reusable bags at the grocery store

Engage in political action related to protecting the environment

Carry a reusable water bottle

Walk, bicycle, or take public transportation instead of driving a vehicle by yourself Purchase an electric or hybrid vehicle

- 1. Extremely unlikely
- 2. Very unlikely
- 3. Somewhat unlikely
- 4. Neither unlikely nor likely
- 5. Somewhat likely
- 6. Very likely
- 7. Extremely likely
- 8. Already doing

Willingness to Pay

If you had to decide about a new electricity contract for your home, how much more (in dollars) would you be willing to pay each month for green electricity (e.g., solar, wind, geothermal) instead of electricity from non-renewable sources.

- 1. (nothing)
- 2. \$10
- 3. \$20
- 4. \$30
- 5. Some other amount: _____

References

- Antoine J. Banks and Nicholas A. Valentino. Emotional Substrates of White Racial Attitudes. *American Journal of Political Science*, 56(2):286–297, 2012.
- Cameron Brick, David K. Sherman, and Heejung S. Kim. "Green to be seen" and "brown to keep down": Visibility moderates the effect of identity on pro-environmental behavior. *Journal of Environmental Psychology*, 51:226–238, August 2017. ISSN 0272-4944.
- Taylor N. Carlson and Jaime E. Settle. *What Goes Without Saying: Navigating Political Discussion in America.* Cambridge University Press, Cambridge, 2022.
- Eric Groenendyk and Yanna Krupnikov. What Motivates Reasoning? A Theory of Goal-Dependent Political Evaluation. *American Journal of Political Science*, 65(1), 2021.

- Patrick Hartmann, Martin Eisend, Vanessa Apaolaza, and Clare D'Souza. Warm glow vs. altruistic values: How important is intrinsic emotional reward in proenvironmental behavior? *Journal of Environmental Psychology*, 52:43–55, October 2017. ISSN 0272-4944. doi: 10.1016/j.jenvp.2017.05.006. URL https://www.sciencedirect.com/ science/article/pii/S0272494417300725.
- Lili Jia and Sander van der Linden. Green but not altruistic warm-glow predicts conservation behavior. *Conservation Science and Practice*, 2(7):e211, 2020. ISSN 2578-4854. doi: 10. 1111/csp2.211. URL https://onlinelibrary.wiley.com/doi/abs/10.1111/csp2.211. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/csp2.211.
- Paul M. Lohmann, Elisabeth Gsottbauer, Sander van der Linden, and Andreas Kontoleon. Chilling results: how explicit warm glow appeals fail to boost pro-environmental behaviour. *Behavioural Public Policy*, pages 1–26, March 2024. ISSN 2398-063X, 2398-0648. doi: 10.1017/bpp.2024.4.
- Margaret E. Roberts, Brandon M. Stewart, Dustin Tingley, Christopher Lucas, Jetson Leder-Luis, Shana Kushner Gadarian, Bethany Albertson, and David G. Rand. Structural Topic Models for Open-Ended Survey Responses. American Journal of Political Science, 58(4):1064–1082, 2014. ISSN 1540-5907. doi: 10.1111/ajps.12103. URL https://onlinelibrary.wiley.com/doi/abs/10.1111/ajps.12103. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/ajps.12103.
- Michael T. Schmitt, Lara B. Aknin, Jonn Axsen, and Rachael L. Shwom. Unpacking the Relationships Between Pro-environmental Behavior, Life Satisfaction, and Perceived Ecological Threat. *Ecological Economics*, 143:130–140, January 2018. ISSN 0921-8009. doi: 10.1016/j.ecolecon.2017.07.007. URL https://www.sciencedirect.com/science/article/pii/S0921800917303415.
- John L. Sullivan, James Piereson, and George E. Marcus. *Political Tolerance and American Democracy*. University of Chicago Press, Chicago, IL, May 1982. ISBN 978-0-226-77992-8. URL https://press.uchicago.edu/ucp/books/book/chicago/P/bo3775122.html.