

Behavioral Economics for the End of the World:

Limitations on the use of Moral Foundations to Shift Environmental Attitudes

By Max Gamerman

Undergraduate Thesis Submitted to the Department of Social and Decision Sciences
Carnegie Mellon University

April 2021

Supervised by Prof. Mark Patterson

Abstract

Feinberg and Willer (2013) present evidence that politically conservative individuals demonstrate differential response to pro-environmental messaging depending on the rhetorical approach that messaging uses. Messages which appeal to a purity / sanctity motive are more compelling for conservatives relative to messages which rhetorically employ language about minimizing harm (the two messaging styles do not differentially appeal to political liberals). We extend the work of Feinberg and Willer by (1) disambiguating the purity and sanctity motives, and (2) additionally testing the appeal of a motive which accentuates individual freedom. While we find a main effect of political party on pro-environmental attitudes, we do not find evidence of differential response to message type.

Introduction

Across the board, there is mounting evidence that our climate situation is worsening. We see extreme weather patterns and rising temperatures year after year. And yet, a majority (93%) of climate experts agree that CO₂ emitting infrastructure will continue to expand if uninterrupted by governmental policy—a path completely counterintuitive to our survival. Additionally, a majority (69%) agree that a global goal for average atmospheric CO₂ concentrations in 2030 or 2050 *must* be agreed on and translated into specific emissions and policy efforts. This is a matter of survival and yet despite the widely-held agreement regarding the need for policy solutions, we saw the Trump administration withdraw from the Paris Agreement. When the government fails to protect its people, the people must step in. Thus, we turn to behavioral science to attempt at curbing emissions on our own terms. 30% of all global CO₂ emissions come from individual consumer activity such as driving, food consumption, and household energy usage—this provides us with a sizeable avenue for reducing emissions through modifying individual consumer behavior!

There is already a fair amount of insight into the psychology of environmental attitudes. We already know social norms can play a huge role in steering individuals towards environmentally conscious behavior. Reno et. al.'s study examined how to use injunctive and descriptive social norms to get people to stop littering (1993). They were able to reduce littering in settings where the area was already clean, but especially in settings where someone was cleaning the area. Essentially, the pressure of a clean area or someone working to clean the area made the test subjects less apt to litter. In a different sphere, Mahmoodi et. al.'s study sought to see what reward structures were most effective at reducing household energy consumption (2018). Household energy consumption is a huge portion of CO₂ and, therefore, is a worthwhile subject for behavioral science. Their study found that, despite evidence for consumers being more responsive to fines than bonuses due to loss aversion, their participants were more responsive to tariffs that gave them bonuses for reduced household energy consumption.

“Moral Foundations Theory” (MFT) is a more interdisciplinary approach to the subject as it combines rhetoric with psychology to tailor messaging to individuals of different political backgrounds. Haidt & Graham. discusses five dimensions of morality outlined by MFT: harm/care, fairness/reciprocity, ingroup/loyalty, authority/respect, and purity/sanctity (2006). Their research finds that liberals and conservatives don't perceive moral issues in the same way. Liberals tend to view morality in terms of harm/care and fairness/reciprocity whereas conservatives are more responsive to dimensions of ingroup/loyalty, authority/respect, and purity/sanctity. Day et. al. applied this in a study framing different political issues using the

different dimensions of morality and found that the mere presence of conservative moral dimensions in liberal issues increased conservative's liberal attitudes (2014). This finding could hold the key to making environmental practice appeal to a broader audience.

Feinberg and Willer applied this to the dimension of environmental attitudes (2013). In their study titled "The Moral Roots of Environmental Attitudes," they found most pro-environmental messaging is framed in terms of harm/care, a commonly liberal framework. They then ran a subsequent experiment framing environmental messaging in terms of the MFT dimension of purity/sanctity and found conservatives were more likely to approve of environmental policy! These are both significant findings that could help us make environmental practice appeal to a wider audience than before! But still, there are a few questions left by Feinberg and Willer we need to address.

One consistent criticism of MFT is the confounding of purity and sanctity. The two can manifest in different ways where purity lies in cleanliness and pristine qualities of a situation whereas sanctity takes on a more spiritual and Godly angle. Hence, can we disentangle the two and see which would drive conservative pro-environmental attitudes? In our experiment, we replicate the structure of Feinberg and Willer's priming material but revised the text into two separate conditions where one focuses on purity rhetoric and the other on sanctity. Additionally, there is a sixth dimension of morality outlined in John Haidt's *The Righteous Mind* called "liberty/oppression" which draws upon libertarian ideals of freedom and independence (2012). Koleva et. al. found evidence for this dimension from studying political libertarians. They found liberty was their most prominent guiding principle in judging worldly issues and that the other five dimensions of morality were less involved in their judgement processes (2012). Thus, could we develop a condition based on liberty/oppression to make environmental practice appeal to a broader audience? We took cues from libertarian environmentalist arguments that tie the value of personal freedoms to pro-environmental practice to develop our third experimental condition: freedom.

Building on existing literature, we sought to reproduce Willer and Feinberg's experiment as closely as possible while expanding to new dimensions of morality and actionable change. We replicate the general structure of their experiment with priming materials based off of their purity/sanctity condition utilizing disentangled rhetoric of purity and sanctity along with new rhetoric of freedom. Additionally, we use the exact same scales from Feinberg and Willer's experiment to measure environmental attitudes and general emotions, but add an additional scale to seek out whether or not this rhetoric can be used to influence behavior beyond a survey. Thus, we extend their analysis by exploring the disentanglement of purity and sanctity, the new dimension of freedom, and this new behavioral scale.

Experimental Design

Method: 998 participants were recruited via Amazon Mechanical Turk to participate in a short survey. We advertised our study to American MTurkers specifically, detailing how we wanted to gauge their environmental attitudes along with what choices they would make in a few hypothetical scenarios. Our task for the participants was described as reading a short text and responding to an online survey. We offered a compensation rate of \$0.40 per unique worker and estimated a completion time of no more than ten minutes.

After consenting to study participation, subjects were randomized into one of four conditions – in a control condition, subjects were given a short (3 paragraph) text detailing the history of neck ties. The control text was identical to the control condition used by Feinberg and Willer. Subjects who were randomized into the treatment conditions instead received a short pro-environmental argument, similar in length to the control condition. The pro-environmental texts were adaptations of the messaging used by Feinberg and Willer, and used language meant to appeal to either purity (e.g. [“When surrounded by wilderness, there is something especially pure and cleansing about the air you breathe and the sights you see.”]), sanctity (e.g. [“...there is something especially hallowed and divine about the air you breathe...”]), or individual autonomy / freedom (e.g. [“... there is something especially freeing and sovereign about the air you breathe...”])

*“We should regard the pollution of the places we live in to be **disgusting**. This is not just for the sake of the environment, but also because pollution in our environment inevitably **contaminates** us and our bodies. When we drink polluted water, live near toxic sites, or inhale dirty, smog-filled air **we contaminate our bodies with chemical impurities and pathogens**. Air pollution in many cities **makes the once crisp, pure blue sky into a foul grayish color**. Chemical particles end up everywhere – in our food, on our skin, and inside our lungs. Dirty, polluted air actually enters our bodies and **becomes a part of us**.”*

Figure 1.1: Excerpt of “Purity” condition argument

Figure notes: Rhetorical elements which are specific to the purity condition are highlighted

*“We should regard the pollution of the places we live in to be **an infringement on our own rights**. This is not just for the sake of the environment, but also **because an individual’s apathy towards the environment inhibits our right to pursue long, happy, and healthy lives**. When we drink polluted water, live near toxic sites, or inhale dirty, smog-filled air we contaminate our bodies with chemicals and pathogens. **We all have a right to a life unabridged by pollution and toxins**. Air pollution in many cities **makes the once sovereign** blue sky into a foul grayish color. Chemical particles end up everywhere – in our food, on our skin, and inside our lungs. Dirty, polluted air actually enters our bodies and **becomes a constraint within us**.”*

Figure 1.2: Excerpt of “Freedom” condition argument

Figure notes: Rhetorical elements which are specific to the freedom condition are highlighted

Following exposure to the messaging, participants responded to four Likert scales used in Feinberg and Willer’s study that gauged their individual pro-environmental attitudes. The first three scales used a 1-5 Likert scale and gauged participants’ attitudes towards environmental practice on three dimensions: personal, legislative, and related to global warming. The personal scale was comprised of three prompts such as: “It is important to protect the environment.” The legislative scale was comprised of five prompts such as: “In general, I would support government legislation aimed at protecting the environment.” The global warming scale was comprised of three prompts such as: “I believe that humans are causing global warming.” Each scale item was positively coded such that we could aggregate the numeric response into a composite “attitude score” where a higher numeric value indicated a stronger preference for environmental practice. The fourth

scale was a 0-6 Likert scale that asked individuals to rate how much they are feeling five different emotions: disgust, worry, sadness, happiness, curiosity.

The fifth scale of our own design was comprised of seven binary choice scenarios regarding every day situations participants might encounter. Each scenario prompted participants to choose between an average option and one that had the highlighted benefit of being environmentally conscious. For example: “You’re washing your clothes and have the option of using hot water or tap cold water. Both options will adequately wash your clothes to the same degree. The only benefit to the tap cold water is reducing your energy consumption. Which option will you choose?” The answers were coded such that the environmentally conscious choice was a 1 and the unconscious alternative was a 0. This created the “behavioral score” where a higher numeric value indicated a stronger preference for environmentally conscious actions.

The final portion of the survey prompted individuals to report their age, gender, highest level of educational attainment, and political affiliation. Political affiliation was recorded on a five-point scale with the range of options being: “very liberal,” “liberal,” “moderate,” “conservative,” and “very conservative.” We coded responses of “very liberal” as “liberal” and “very conservative” as “conservative” following data collection in order to make analysis easier and boost statistical power.

Results

Subjects. A summary of the demographic composition of the recruited sample is presented in Table 1. Relative to the United States as a whole, our MTURK sample has slightly higher educational attainment (68% of our sample has graduated from college), but expresses a similar gender composition (52% male) and political preference profile (36% liberal, 26% moderate, 38% conservative).

Demographics			
	# of	% of Total	
	Observations	Participants	
Male	515	52%	Gender
Female	469	47%	
Non-Binary	6	<1%	
Other	2	<1%	
High School	75	8%	Education
Some College	127	13%	
Associates	94	9%	
Bachelors	491	49%	
Masters	169	17%	
Doctoral	26	3%	
Trade-School	3	<1%	
Other	7	<1%	
Liberal	360	36%	Political Affiliation
Moderate	255	26%	
Conservative	377	38%	

Table 1: Demographics Composition of MTURK sample

Table notes: This table depicts the demographic breakdown of our 998 participants across three features: gender, education, and political affiliation.

Model Structure

To identify the impact of rhetorical approach on attitudinal and behavioral support for pro-environmental policy, we ran a set of Ordinary Least Squares regressions of the following form:

$$Y_i^k = \beta_0 + \beta_1 * Freedom_i + \beta_2 * Purity_i + \beta_3 * Sanctity_i + \delta X_i$$

Where Y_i^k represents either the attitudinal or behavioral scale for individual i , $Freedom_i$, $Purity_i$, and $Sanctity_i$ are indicators for whether individual i is randomized into each of the respective conditions, and X_i is a vector of demographic features including gender, and educational attainment (both measured using categorical scales). Because of our primary interest in separate effects by political preference, we fit this model separately for each distinct combination of dependent measure type (attitudinal or behavioral), and political preference (liberal, moderate, or conservative). To test robustness, we report results with and without the inclusion of demographic controls. Results of the regression analysis are presented in Table 2.

To supplement the results in our regression estimates, the aggregate attitudinal and behavioral effects are displayed across experimental condition and faceted by political affiliation in figures 2.1 and 2.2. These figures represent the average attitudinal and behavioral scores per experimental condition with a standard error bar at the 95% confidence level. While the figures report unadjusted averages across condition, the pattern of results reflects the same pattern confirmed by the regression analysis – broadly, we do *not* observe effects of rhetorical type on either pro-environmental attitudes or behavior. The figures do, however, show the expected main effect of political preferences on both the attitudinal and behavioral measures – liberals report more pro-environmental attitudes relative to both conservatives ($\beta = 0.62$, $p < .01$) and moderates ($\beta = 0.41$, $p < .01$)¹. Similar, liberals have greater values on the pro-environment behavioral scale relative to both conservatives ($\beta = 1.07$, $p < .01$) and moderates ($\beta = 0.43$, $p < .01$).

Attitudinal Effects:

Columns 1 – 6 of Table 2 present regression effects of rhetorical approach on attitudes. Surprisingly, we do not find evidence supporting the original set of Feinberg and Willer findings – despite using a well-powered approach ($N = 998$ in our sample, $N = 308$ in the original Feinberg and Willer study), we find no effect of rhetorical approach on environmental attitudes among conservatives ($\beta_1 = -0.14$, n.s.; $\beta_2 = 0.01$, n.s.; $\beta_3 = 0.02$, n.s.). We observe similar patterns (finding only null effects) among politically moderate participants. Of note, our model specification which excludes demographic controls identifies a marginally significant effect of rhetorical approach among liberal subjects – the Freedom condition causes a $\beta_1 = 0.17$ (p-value = 0.05) shift on the attitudinal scale, though that effect is not robust to the inclusion of demographic features ($\beta_1 = 0.14$, n.s). We observe a similar effect among liberal subjects in the Sanctity condition while excluding demographic controls. This condition causes a $\beta_3 = 0.19$ (p-value = 0.02) shift on the attitudinal scale, however, the effect is, once again, not robust to the inclusion of demographic features ($\beta_3 = 0.1$, n.s)

¹ The regressions below separately estimate the effect of condition for each political group separately. The regression coefficients reported here are drawn from a model using political preference to predict attitudes; this regression captures the on-average difference in attitudes across political party represented in the figures below.

Behavioral Effects

Columns 7-12 of Table 2 present regression effects of rhetorical approach on abstracted behavior. As mentioned previously, this scale was developed to move a step closer to how these rhetorical appeals can influence real-world behavior. Again, despite a well-powered approach ($n = 998$), we saw no effect of the rhetorical approach on environmentally conscious behavior among any political affiliation. This observation holds with the inclusion of demographic features. This posits two potential issues within our study: the scale did not properly operationalize real-world behavior *or* the rhetorical approach was ineffective at effecting real-world behavior.

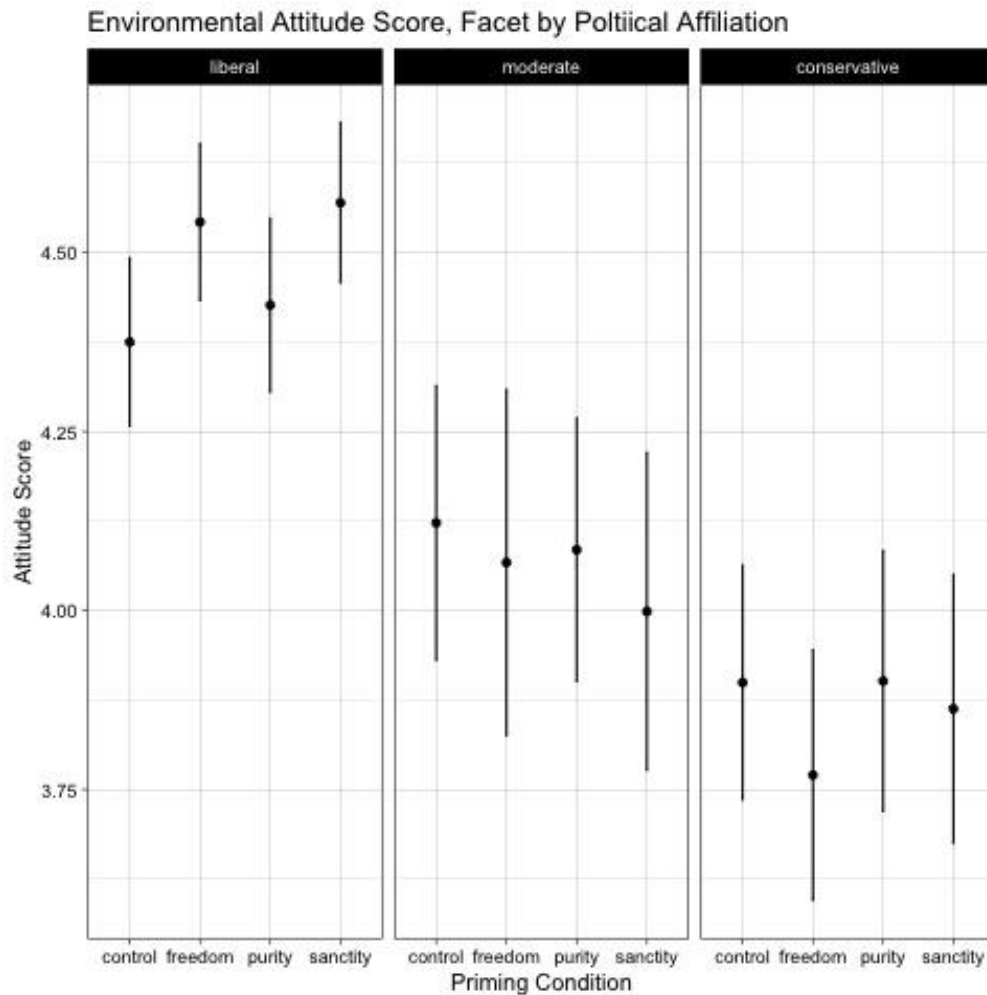


Figure 2.1: Distribution of Attitude Scores by Condition, Facetted by Political Affiliation

Figure Notes: These graphs depict the average attitude score per each experimental condition (control, purity, sanctity, freedom) across political affiliations (liberal, moderate, conservative). 95% confidence intervals around the mean are depicted using whiskers.

Regression Output												
Attitude Scale							Behavioral Scale					
	Liberal		Moderate		Conservative		Liberal		Moderate		Conservative	
Freedom	0.14	0.17*	-0.06	-0.06	-0.14	-0.13	0.16	0.2	-0.11	-0.14	0.16	0.17
	(0.08)	(0.08)	(0.16)	(0.16)	(0.12)	(0.12)	(0.24)	(0.2)	(0.32)	(0.31)	(0.27)	(0.27)
Purity	0.06	0.05	-0.01	-0.04	0.01	0	0.04	0.07	-0.09	-0.15	-0.13	-0.15
	(0.08)	(0.08)	(0.15)	(0.15)	(0.13)	(0.13)	(0.24)	(0.24)	(0.3)	(0.29)	(0.28)	(0.28)
Sanctity	0.1	0.19*	-0.06	-0.12	-0.02	-0.04	0.23	0.39	-0.19	-0.2	0.4	0.36
	(0.08)	(0.08)	(0.15)	(0.15)	(0.12)	(0.13)	(0.24)	(0.24)	(0.31)	(0.3)	(0.28)	(0.27)
Demographic Controls	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
N	360	360	255	255	377	377	360	360	255	255	377	377
R ²	0.15	0.02	0.05	<0.01	0.06	<0.01	0.05	<0.01	0.02	<0.01	0.04	<0.01

Table 2: Regression Outputs Table

Table Notes: This table depicts the results of all our main regression analysis. Regressions were run on both the attitude and behavioral scales, separated by political affiliation. Additionally, we ran each regression a second time including demographic controls for age, gender, and education level. This table also includes the number of observations present within the political demographic of interest, the multiple R² value from each regression, and the standard error of each coefficient below the coefficient.

An * indicates a coefficient was statistically significant to the 95% level.

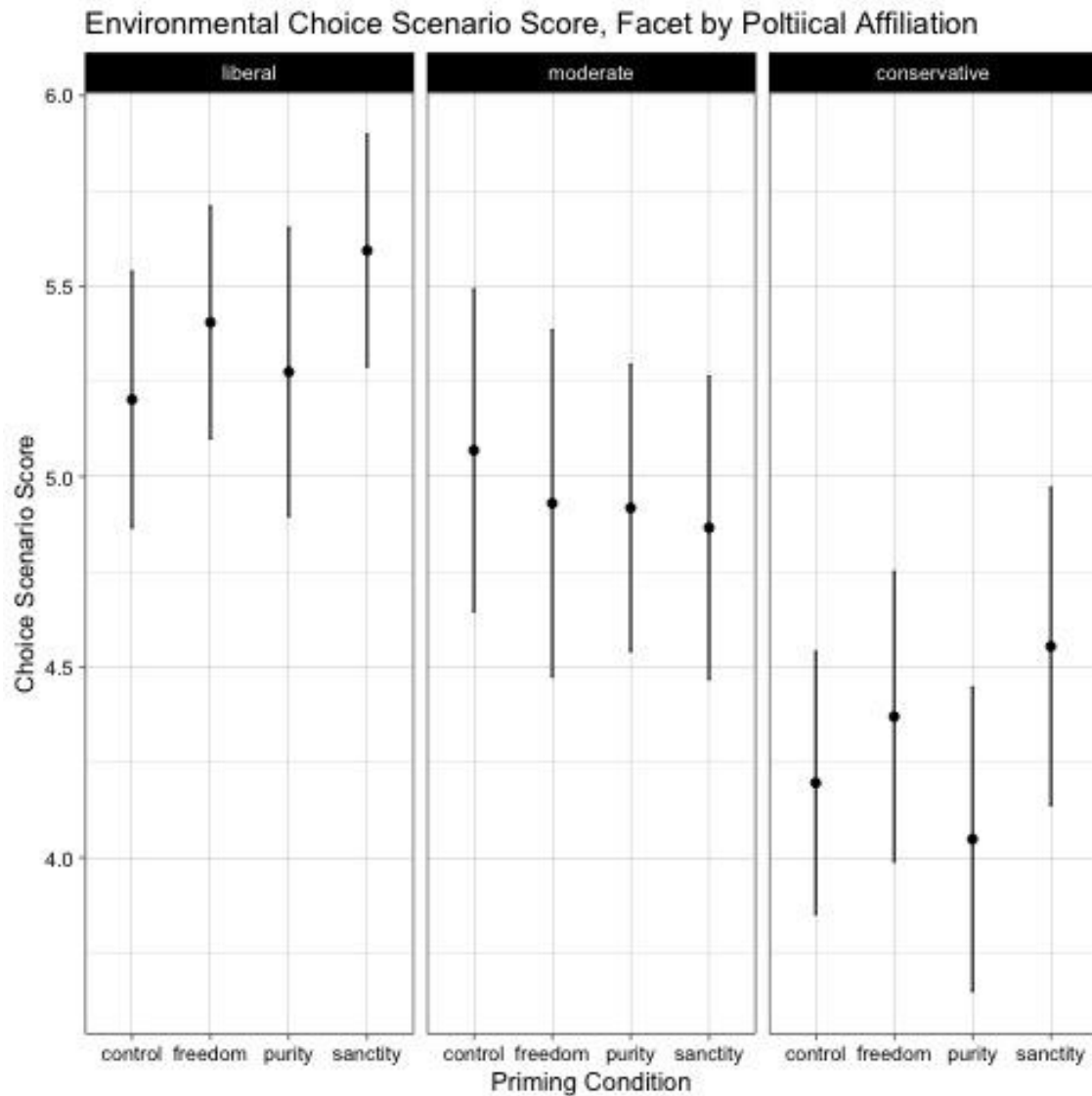


Figure 2.2: Distribution of Behavioral Scores by Condition, Facetted by Political Affiliation

Figure Notes: These graphs depict the average behavioral score per each experimental condition (control, purity, sanctity, freedom) across political affiliations (liberal, moderate, conservative). 95% confidence intervals around the mean are depicted using whiskers.

Discussion

As stated previously, we were unsuccessful in replicating the results from Feinberg and Willer. This is strange in that the variation in materials wasn't too significant. The disentangled purity and sanctity priming content was a slightly modified version of materials that we obtained from Feinberg, changing the rhetoric to fit different values. If anything, the purity and sanctity conditions should have been statistically significant compared to control for conservatives, but the regressions on the attitude scale showed us otherwise. On the behavioral scale, however, the

sanctity score was higher than any other condition. Despite statistical insignificance, it is interesting that this condition was slightly more environmentally conscious for conservatives. Additionally, there were additional significant effects on the attitude scale for the freedom and sanctity conditions for liberals which was an unexpected but pleasant finding. The freedom condition might align well with the liberal value of “harm and care” that Feinberg and Willer discuss as the rhetoric present in that priming material regards taking care of property and ensuring you don’t harm the property of others. Sanctity was a surprising effect as that particular condition used rhetoric related to religion and sacredness—something that would likely more closely align with conservative thought.

One possible explanation for the failure to replicate the Feinberg and Willer results is a shift in political attitudes over time. “The Moral Roots of Environmental Attitudes” was published in 2012. Since then, the United States has seen a great deal of political upheaval. Polarization is an emerging political difficulty—one that likely held a huge role in the difference we saw in our study and Feinberg and Willer’s. Many liberal individuals are apt to jump on environmentally conscious thought while conservatives can be quick to shy away from it. Polarization makes these tendencies starker as political discourse relies on the identity of being “liberal” or “conservative” where individuals immediately align with something that fits their narrative. Hence, despite the use of conservative values to frame environmental discourse, there is still a “knee-jerk” reaction to it that persists, more so than in 2012 than when the previous study was run.

Still, there is still optimism for the future of behavioral science and sustainability as many other studies have found success and improved the world’s sustainable narrative. But time poses a huge threat as culture shifts, politics develop, and the world grows in new and unexpected ways. The findings of Feinberg and Willer regarded a much different political landscape than the one we have today. Thus, it shows behavioral science is racing against time. The world needs interventions for sustainability now more than ever, and while these interventions for the 30% weren’t successful, that doesn’t mean they’re not out there. And still, there was limited success in appealing to liberals! Still, in future studies, there should be examination of how to properly appeal to broader political audiences and make effective change in producing environmentally conscious ideals and behavior.

Works Cited

- Day, M. V., Fiske, S. T., Downing, E. L., & Trail, T. E. (2014). Shifting liberal and conservative attitudes using moral foundations theory. *Personality and Social Psychology Bulletin*, 40(12), 1559-1573.
- Dolan, E. (2020, November 16). What's wrong with libertarian environmentalism. Retrieved April 13, 2021, from <https://www.niskanencenter.org/whats-wrong-with-libertarian-environmentalism/>
- Feinberg, M., & Willer, R. (2013). The moral roots of environmental attitudes. *Psychological science*, 24(1), 56-62.
- Haidt, J. (2012). *The righteous mind: Why good people are divided by politics and religion*. Vintage.
- Haidt, J., & Graham, J. (2007). When morality opposes justice: Conservatives have moral intuitions that liberals may not recognize. *Social Justice Research*, 20(1), 98-116.
- Iyer, R., Koleva, S., Graham, J., Ditto, P., & Haidt, J. (2012). Understanding libertarian morality: The psychological dispositions of self-identified libertarians. *PloS one*, 7(8), e42366.
- Mahmoodi, J., Prasanna, A., Hille, S., Patel, M. K., & Brosch, T. (2018). Combining “carrot and stick” to incentivize sustainability in households. *Energy Policy*, 123, 31-40.
- Reno, R. R., Cialdini, R. B., & Kallgren, C. A. (1993). The transsituational influence of social norms. *Journal of personality and social psychology*, 64(1), 104.
- Vision prize. (2015, February 24). Retrieved April 13, 2021, from <http://visionprize.com/co2/>