Responsibility to Future Generations: A Moral Reframing Strategy for Combatting

Climate Change

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Abstract

Because of intergenerational discounting, individuals often fail to take meaningful action to address climate change. Such inaction is also increased by the widespread politicization of the issue, leading to polarization of discourse. Utilizing moral reframing theory, we hypothesized that one possible way to increase support for addressing climate change is to emphasize one's responsibility to future generations. We argue that responsibility to future generations is effective because it is a widely endorsed belief/attitude, it is an attitude that is mostly uncorrelated with demographic indicators, and it is less correlated with political ideology than other types of responsibility (i.e., personal responsibility to reduce climate change). Across six main and seven supplementary studies (k=35 countries, N=161,633), we provide evidence for these claims. Responsibility to future generations meaningfully predicted a host of different measures of self-reports of proenvironmentalism correlationally and in a pre-registered experiment with significant direct and indirect effects on proenvironmental outcomes.

Keywords: future generations, climate change, moral reframing, responsibility, legacy

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Change

Our society today is facing many challenges, some of which could be detrimental to

humanity's longterm potential (MacAskill, 2022; Ord, 2020). One such potential risk is climate

change. The destructive consequences of anthropogenic climate change have resulted in a planet

that is now increasingly inhospitable to humans and animals (IPCC, 2022). In fact, the

detrimental consequences of climate change will be even worse for future generations.

Consequently, when reasons for addressing climate change are concerned, the present generation

also has to take into consideration its duty to act on behalf of future generations (Jamieson,

2015). However, even though the majority of Americans believe in anthropogenic climate

change (Howe et al., 2015), perceive it as an active threat that is happening in the present (van

Valkengoed et al., 2023), and express concern about the issue (Howe et al., 2015), these

concerns often do not translate into action to mitigate and adapt to climate change (Gifford,

2011).

This inaction is especially prevalent in countries where climate change is highly polarized

along ideological and/or partisan lines, largely because of intentional efforts by vested interests

to sow uncertainty on the issue (Oreskes & Conway, 2010). This divide is especially apparent in

the United States, as research highlights both intergenerational and political divides in people's

beliefs about climate change as well as the degree to which they support individual-level and

societal responses to the issue (Funk, 2021; Kennedy, 2020). Building on some preliminary work

which finds that concern for future generations' well-being appears to be weakly or not at all

related to political identity or partisanship (e.g., Syropoulos & Markowitz, 2021; Zaval et al.,

2015), the current investigation examines such intergeneration concerns as a potential

mechanism for increasing the degree to which people are motivated to engage in proenvironmental action. In line with arguments about the need to morally reframe key social issues (Feinberg & Willer, 2019; Rottman et al., 2014) as a method to help reduce how politicized and polarizing they are, as well as driven by recent calls to focus on intergenerational approaches for the study of climate change mitigation and adaptation (Shrum et al., 2023; Syropoulos & Markowitz, 2023), we examined whether emphasizing one's responsibility to future generations would help motivate proenvironmental engagement. We theorized that there are two key reasons why such approaches should be effective: (1) caring for future generations is a widely endorsed principle, and (2) relative to one's own responsibility to reduce their contribution to climate change, responsibility to protect future generations is a less politicized belief. At the same time, such beliefs are likely of relatively low salience much of the time as people move through their daily lives and environmentally-relevant decisions, decreasing their impact on behavior in the absence of explicit intervention. Across a total of 13 studies (6 main studies, 7 supplementary studies; 7 of 13 were pre-registered), we examined whether these postulates are supported. We also investigated whether responsibility to future generations relates to self-reports of proenvironmentalism. Finally, we conducted a large experiment which tested both novel and existing interventions targeting responsibility to future generations to determine whether such beliefs can be meaningfully increased via psychological interventions.

Responsibility to Future Generations as a Moral Reframing Strategy

Work falling under the larger research umbrella of intergenerational decision-making (for a review see Wade-Benzoni & Tost, 2009; but also see Fox et al., 2010; Wade-Benzoni, 2019) has highlighted the capacity of responsibility-focused interventions to potentially increase intergenerational beneficence. From such work, there exists suggestive but limited evidence that

intergenerational approaches to promoting beneficence could also prove meaningful for increasing climate action and proenvironmental engagement. Work in this field has primarily focused on two relevant constructs: personal legacy and responsibility to future generations.

With regards to personal legacy, recent work suggests that experimentally manipulating a person's legacy motivation (i.e., their concern for being remembered by future generations as a good person) can increase different proenvironmental outcomes (e.g., Grolleau et al., 2020; Hurlstone et al., 2020; Shrum, 2021; Wickersham et al., 2020; Zaval et al., 2015). Work on responsibility to future generations is more mixed, as some correlational evidence highlights that those who feel more responsible to future generations also tend to act more proenvironmentally (Syropoulos et al., 2021). However, experimental work on the subject has yielded more inconclusive results (e.g., Watkins & Goodwin, 2020).

Although some work on the effectiveness of such intergenerational approaches exists, it is still in its infancy. Lacking, then, is a comprehensive investigation in whether such intergenerational concerns meaningfully predict proenvironmentalism and whether they can be reliably and robustly increased via intervention. Also lacking is a scientific account of why an emphasis on future generations might prove effective. As alluded to above, we suggest that such intergenerational approaches are effective because they appeal to a value that most people have in common—an expressed concern to protect future generations—but that is also relatively low salience most of the time. We also argue that they are effective because intergenerational concerns are not polarizing or politicized.

Moral reframing, i.e., reframing the narrative around an issue in an effort to make a position align with a particular individual's moral values (Feinberg & Willer, 2019), suggests this can make communications potentially more persuasive. Expressing a duty to protect future

generations, we argue, is widely endorsed cross-nationally. Recent research supports this claim

both at the individual level (e.g., Martínez & Winter, 2023) and when we look at policies enacted

by many nations that explicitly seek to protect the environment on behalf of future generations

(e.g., Gonzalez-Ricoy & Rey, 2019). Further, from an effective altruism/philosophical

perspective, the movement of longtermism (i.e., the belief that countless future people will live,

that their lives matter, and that those of us alive today have the ability to greatly influence their

lives) proposes that it is one of our biggest obligations as a society (MacAskill, 2022; Ord,

2020). Furthermore, future generations typically include a person's descendants, and a plethora

of research suggests that one's family is given the highest amount of moral consideration

(Crimston et al., 2016). In fact, such theoretical claims have been proposed in the past (Rottman

et al., 2015[1]) but have to date not received considerable empirical attention.

The Current Studies

Based on the aforementioned reasoning, the aims of the current investigation were

threefold. First, we sought to demonstrate that people generally feel responsible for protecting

future generations, highlighting that this is a value/principle that people highly endorse. We

examined this phenomenon by investigating how widely prevalent such beliefs are in nationally

representative datasets across many different countries (Study 1). We then examined the

perceived prevalence (descriptive norms) and approval (injunctive norms) of this type of

intergenerational responsibility (Studies 2A-2B). Then in Studies 2A-2B and 3A-3B, we

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[1] Rottman and colleagues write that "people report being concerned about leaving a positive legacy for future generations, especially after being instructed to think about the intergenerational burdens created by climate change (Wade-Benzoni et al. 2010); this feeling of responsibility could motivate people to engage in pro-environmental behaviors (Maibach et al. 2008)." Aside from the articles reviewed earlier in the paper, to the best of our knowledge, to date this work has not been further investigated.

considered whether responsibility towards protecting future generations (RFG) is endorsed more as a principle than perceived responsibility to reduce personal contributions to climate change (RCC). Importantly, a person's RCC has been established as a core antecedent of proenvironmental intentions and behaviors based on existing theories such as Norm Activation Theory (Schwartz, 1977; Schwartz & Howard, 1981) and Value Norm Belief Theory (Stern, 200; Stern et al., 1999). These theoretical models have been supported empirically (Helferich et al., 2023; Klockner, 2013; Syropoulos & Markowitz, 2022). Throughout all of these studies, we examine the degree to which RFG, different demographic indicators, and political ideology correlated with each other. Our pre-registered expectation was that there would be a non-significant or weak correlation between these indicators and RFG. We also examined whether feeling more responsible for protecting future generations related to increased self-reports of proenvironmentalism (Studies 3A-3B). Finally, we conducted a large-scale experiment involving the most effective existing experimental manipulations of RFG (e.g., Shrum, 2021; Watkins & Goodwin, 2020; Zaval et al., 2015), along with two novel interventions, to determine which method is most effective at directly—and indirectly, via increased responsibility to future generations—increasing proenvironmental engagement.

Importantly, these research questions were examined in a pre-registered fashion, across countries, with different types of samples (including nationally representative, community, online and student samples), each with several conceptual replications. For all studies, the relevant survey instruments, data files and code are available on the Open Science Framework (OSF), https://osf.io/8s6zw/?view_only=b5af3db79be646cc8fa4b7d7203657dd. For all pre-registered studies, the respective pre-registration can also be accessed via each study's sub-page

on OSF. All statistics were performed in SAS version 9.4. An overview of all main and

supplementary studies is provided in Table 1.

Table 1

Relevant Information for All Studies

Study	Aim	Pre-registered	Sample Type	M_{age} (SD_{age})	N	$N_{Dem.}$ (Rep.)	N_{White} (POC)	N_{female} (Male)	Countries
1	RFG is widely endorsed	Yes	Nationally representative	47.70 (12.01)	109,513	--	--	66,254 (57,248)	34 EU countries
S1A	Conceptual replication of Study 1	No	Nationally representative	42.21 (18.13)	11,729	--	--	6,084 (5,629)	12 EU countries
S1B	Conceptual replication of Study 1	No	Nationally representative	47.60 (18.19)	30,170	--	--	16,420 (13,750)	31 EU countries
S2	Conceptual replication of Study 1	No	Ecological Society of America	40-49[*]	1,215	--	--	396 (817)	USA
2A	RFG is endorsed more than RCC	No	CloudResearch	42.59 (12.79)	457	206 (109)	358 (84)	225 (225)	USA
2B	RFG is endorsed more than RCC	Yes	CloudResearch	42.27 (13.23)	906	430 (197)	692 (165)	438 (452)	USA
S3A	Conceptual replication of Studies 2A-2B	No	Undergraduates	19.61 (1.74)	628	--	389 (243)	500 (127)	USA
S3B	Conceptual replication of Studies 2A-2B	No	Undergraduates	19.68 (1.53)	756	--	493 (269)	576 (181)	USA
3A	RFG relates to proenvironmentalism	Yes	Prolific	35.27 (11.49)	395	209 (50)	274 (121)	193 (193)	USA
3B	RFG relates to proenvironmentalism	Yes	Prolific	41.69 (14.33)	1,800	621 (604)	1436 (364)	865 (886)	USA
S4	Conceptual replication of Studies 3A-3B	Yes	Community	48.40 (16.89)	328	--	181 (147)	133 (198)	USA
S5	Conceptual replication of Studies 3A-3B	Yes	Prolific	38.11 (13.74)	561	286 (65)	405 (156)	263 (280)	USA
4	Experimental manipulation increasing RFG	Yes	Prolific	38.50 (13.98)	3,175	1654 (469)	2215 (961)	1523 (1569)	USA

Note. *Age was captured in ranges, with the average value falling for the category of "40-49".

Study 1

The goal of our first study was to determine whether there is an overarching concern for

future generations. We obtained data from four rounds of public opinion surveys conducted

regularly on behalf of the European Commission and other EU institutions (i.e.,

Eurobarometers): Eurobarometer 72.4 (October-November 2009), Eurobarometer 73.4 (May

2010), Eurobarometer 72.2 (November-December 2010), and Eurobarometer 75.3 (May 2011).

We hypothesized that such concerns would be prevalent in at least half of the population. We

also hypothesized that expressing such concerns would not significantly relate to age (Wang et

al., 2021), gender (Xiao & McCright, 2013), political ideology (Cruz, 2017) and socioeconomic

status (Grandin et al., 2022), all of which have been found to correlate with self-reports of

proenvironmental attitudes. Analyses and hypotheses for this study were pre-registered prior to

accessing the data.

Methods

Since we did not expect any differences across time in the three years in which the four

Eurobarometers were conducted (2009-2011), we opted to collapse across these years. This

decision was also made because the countries and the measures of interest across these surveys

largely overlapped. However, due to merging across the studies, we were unable to utilize the

weights provided by the Eurobarometer team, as they were specific to each wave. Further, we set

our alpha to $< .001$ and did not consider any correlation coefficient below $r = .10$ as statistically

meaningful, due to the large sample size in each country which would make it possible for

statistically meaningless coefficients to emerge as statistically significant. These decisions were

pre-registered.

Participants

A total of 109,513 participants were surveyed over the span of 3 years. In total, 34

European countries were included across the four surveys (see Figure 1).

Materials

RFG was captured with a single item. Participants were asked to express their agreement

or disagreement (1-4 scale) to the statement: "We need to reform to benefit future generations

even if that means making some sacrifices now." Age was measured in years, and gender was

measured with two categories (male and female). Political ideology was measured with a 10-

point Likert scale ranging from 1= Left to 10 = Right, and subjective socioeconomic status (SES)

was measured with a single-item, "On the following scale, step '1' corresponds to "the lowest

level in the society"; step '10' corresponds to "the highest level in the society". Could you tell me

on which step you would place yourself?".

Results

Overall, we found that in the 34 countries (and both regions of Germany) reforms to

benefit future generations, even at the expense of present generations, were widely supported.

We pre-registered that this level of support would be present if more than 50% of the sample in

each country at least tended to agree with the statement. This was the case in 33 out of 34

countries, with Latvia being the only exception at 48%. One country was below 60% (Lithuania)

and all other countries were above 70%, with a considerable number being above 80% and 90%

respectively (see Figure 1).

Figure 1

Percentage of Participants that Tended to or Totally Agreed with the Statement "We need to reform to benefit future generations even if that means making some sacrifices now."
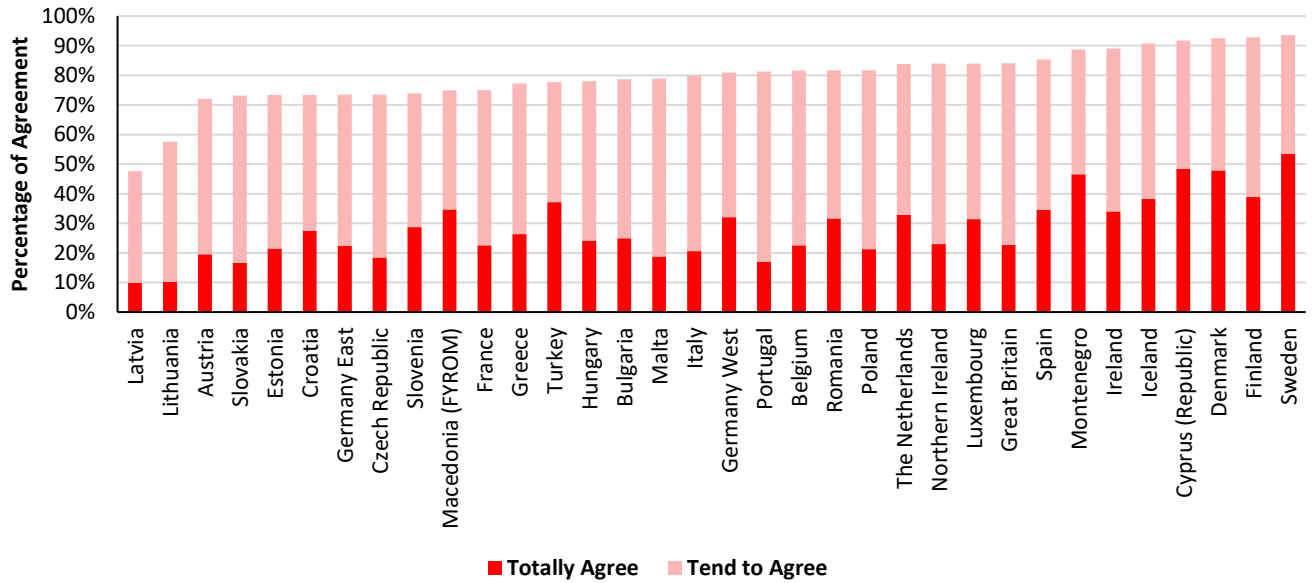
RFG and Demographic Indicators

We estimated bivariate (biserial for gender) correlations between age, gender, subjective SES and political ideology and RFG (see Table S5 in Supplementary Materials). We then used the methodology suggested by Goh and colleagues (2016) to estimate (mini) meta-correlations across all countries. Overall, only the association with SES passed the pre-registered r = .10 threshold to be considered meaningful, as a small positive association was observed.

Table 2

Meta-Correlations of the Four Demographic Indicators and RFG

Variable	Meta-Correlation	Fisher's Z	95% C.I.
Political Ideology	$r = .03$	4.35	.017, .045
Socioeconomic Status	$r = .13$	18.48	.118, .146
Age	$r = .07$	9.82	.056, .084
Gender (female = 1)	$r = -.05$	-7.56	-.068, -.040

Discussion

Results from 34 different countries, spanning four different surveys provided strong evidence for the claim that people are concerned about the welfare of future generations even when it comes to the expense of present generations. Further, such concerns appear to have a negligible correlation with a person's political ideology, age and gender, and a meaningful but weak correlation with subjective SES.

Supplementary Results

We were able to test the prevalence of RFG in additional Eurobarometer surveys, each with a different measure of responsibility to future generations. Agreement to a binary measure of RFG ranged from 25% to 79%. These surveys were conducted in 1988 and 2008, spanning 31 European countries and a total of 41,899 participants (see Studies S1A-S1B in Supplementary Materials). These questions focused on protecting the environment on behalf of future generations, and were each asked in a different manner. In one study interviewers simply noted if participants referenced future generations, and in the other participants were given a checklist of different reasons why one should address climate change (thus potentially confounding RFG and RCC).

We also tested the prevalence of RFG in a sample of members of the American Ecological Society surveyed in 2011 ($N = 1285$). In this sample of highly educated individuals (84% had a PhD/MD), RFG was deemed an important value for a scientist to possess, with 74.1% of scientists considering it a relevant value (see Study S2 in Supplementary Materials).

Studies 2A-2B

Having found evidence for the prevalence of RFG, we examined whether people think that others also share this value, and whether they think others find it morally right to endorse

this value. We also examined whether RFG is endorsed relatively more or less compared to

responsibility to address climate change (RCC), and whether this would potentially be the case

for those with a more conservative political ideology. We reasoned that since concern for climate

change is lower and concern for the ingroup is high for conservatives, this group could endorse

RFG to a larger degree than RCC.

Methods

Participants

Study 2A. A total of 457 participants were recruited via CloudResearch (Litman et al.,

2017) which operates data collection on MTurk. Participants signed up for a larger study in

which they rated public or private acts of generosity, which lasted 10 minutes and received $1.30

as remuneration.

Study 2B. A total of 906 participants were recruited via CloudResearch. Participants

signed up for a larger study, which lasted 12 minutes and received $1.80 as remuneration.

Materials and Procedure

Study 2A. RFG was captured with a single item ("When deciding how to live, I have a

duty to consider the impact of my actions on future generations"), as was RCC ("When deciding

how to live, I have a duty to consider the impact of my actions on climate change"). Importantly,

both items utilized the same stem, and were captured on a 1-7 scale (1 = strongly disagree, 7 =

strongly agree) to ensure that the only difference was the target of participants' reported sense of

responsibility. Perceived prevalence (descriptive norms) for each type of responsibility (i.e., how

much participants thought other Americans expressed such perceptions of responsibility) were

captured, respectively, with a single item ranging from 0-100 on a slider scale (e.g. "What

percentage of Americans do you think considers their duty to consider the impact of their actions

on future generations when considering how to live their life?"). The order of the two types of

responsibility was counterbalanced, so that half of the participants saw one type first, then

provided demographic information, and then responded to the two question on the other type.

Perceived prevalence ratings for each responsibility type were always shown after participants

expressed their own level of perceived responsibility.

Study 2B. Measures relevant to this study were displayed right before the demographic

information in a randomized order. RFG and RCC were captured with a single item identical to

Study 2A. Perceived prevalence for both responsibility types were measured with two identical

items to Study 2A. Perceived moral rightness (injunctive norms) were captured with two items

(one per type of responsibility) each using the same stem "What percentage of Americans do you

think believes that it is morally right to care about the impact of their actions on...[future

generations/climate change]". All items were captured on a slider scale ranging from 0-100.
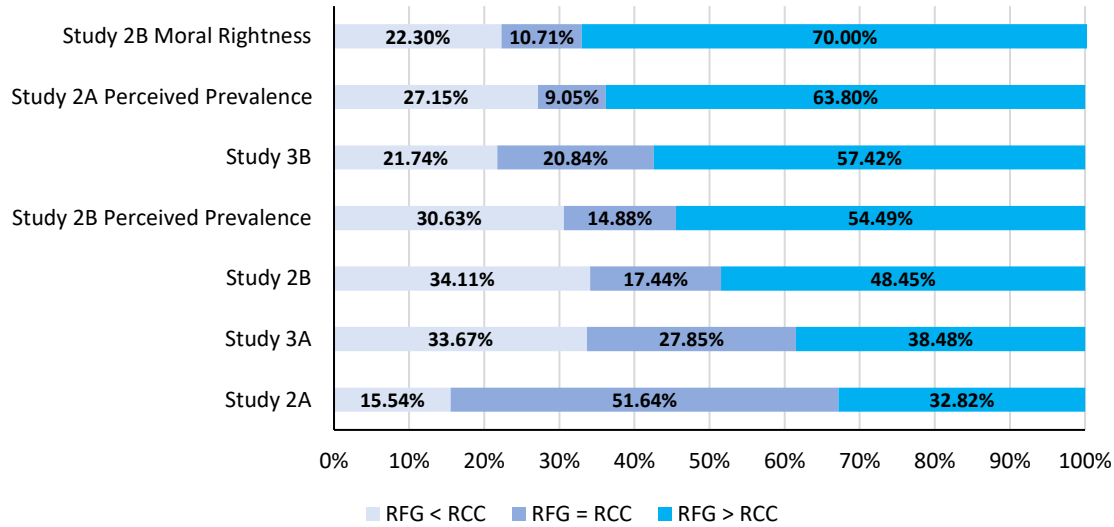
Results

Comparison of RFG to RCC

Study 2A. RCC and RFG were strongly correlated, $r = .67$, $p < .001$. RFG ($M = 5.48$, SD

$= 1.30$) was endorsed significantly more than RCC ($M = 5.17$, $SD = 1.58$, $t(457) = 5.61$, $p < .001$,

$d = 0.26$).

Study 2B. RCC and RFG were strongly correlated, $r = .58$, $p < .001$. RFG ($M = 66.51$,

$SD = 26.50$) was endorsed significantly more than RCC ($M = 60.08$, $SD = 30.54$, $t(906) = 7.36$, p

$< .001$, $d = 0.26$). The distribution of respondents who endorsed one responsibility more, less or

equally to the other for all studies is given in Figure 2. These results were also replicated in

Studies 3A (see Supplementary Materials).

Figure 2.

Percentages of Participants who Personally Endorsed and Thought that Others Endorsed RFG

More, Less and Equal to RCC

Note. For Study 3B results are reported collapsing across RCC frames. Results are consistent for each individual frame of RCC (see Supplementary Materials.

Partisan Differences in RFG and RCC

Study 2A. The difference between RFG and RCC appears to be larger for Republicans than Democrats or Independents. Separate analyses for each group revealed that Republicans expressed greater responsibility towards future generations compared to climate change ($t(109) = 6.41$, $p < .001$, $d = 0.61$), as did Independents, ($t(132) = 3.71$, $p < .001$, $d = 0.32$). Democrats, however, did not display such a tendency ($t(207) = -1.22$, $p = .222$), and were the highest on average in both RFG and RCC.

Study 2B. This difference was also noted in Study 2B. Separate analyses for each group revealed that Republicans expressed greater responsibility towards future generations compared to climate change ($t(196) = 9.31$, $p < .001$, $d = 0.66$), as did Independents ($t(253) = 5.40$, $p <$

.001, $d = 0.34$). Democrats, conversely, expressed a slightly higher responsibility towards

climate change ($t(429) = -2.53$, $p = .012$, $d = -0.12$). Overall, democrats scored the highest in

both types of responsibility. These results were also replicated in Study 3A (see Supplementary

Materials).

Figures 3A-3C

Bar Graphs (with 95% C.I.) Depicting Differences in Perceptions of Responsibility for Studies

2A-2B, and 3A.
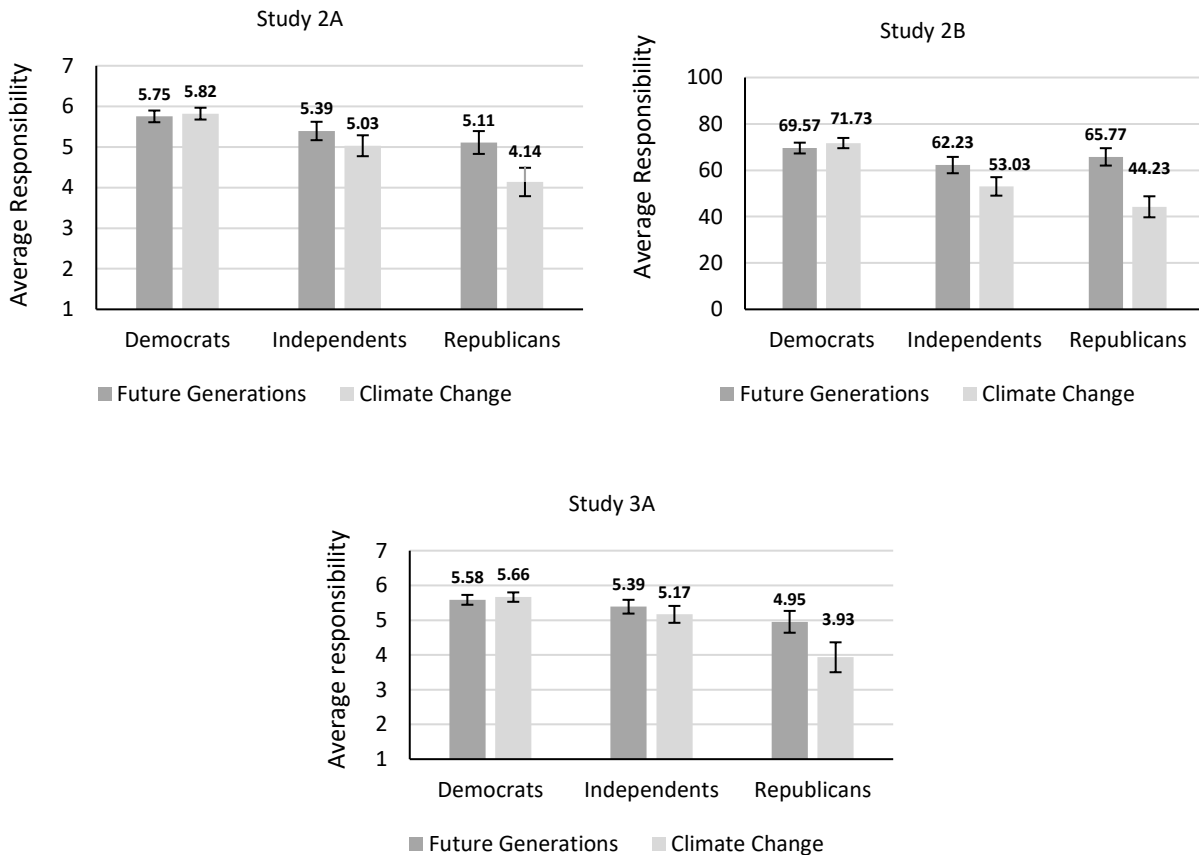
Perceived Prevalence of RFG and RCC

  Study 2A. Similar to a person's own endorsement of RFG and RCC, perceptions of

others' endorsement were strongly correlated, $r = .69$, $p < .001$. Further, participants thought that

other Americans expressed greater RFG ($M = 49.92$, $SD = 21.58$) than RCC ($M = 44.65$, $SD = 20.84$, $t(457) = 6.69$, $p < .001$, $d = 0.31$).

Study 2B. Participants thought that other Americans expressed greater RFG ($M = 57.48$, $SD = 22.84$) than RCC ($M = 48.59$, $SD = 21.89$, $t(905) = 13.11$, $p < .001$, $d = 0.44$).

Partisan Differences in Perceived Prevalence of RFG and RCC

Study 2A. The aforementioned difference appeared consistently for each political party. Republicans thought that other Americans expressed greater RFG compared to RCC ($t(109) = 3.80$, $p < .001$, $d = 0.36$), as did Independents ($t(131) = 4.60$, $p < .001$, $d = 0.40$), and Democrats ($t(207) = 3.24$, $p = .001$, $d = 0.22$).

Study 2B. The difference in perceived prevalence of RFG and RCC appeared consistently for each political party. Republicans thought that other Americans expressed greater RFG compared to RCC, ($t(196) = 6.63$, $p < .001$, $d = 0.47$), as did Independents, ($t(253) = 7.95$, $p < .001$, $d = 0.50$), and Democrats ($t(429) = 8.34$, $p = .001$, $d = 0.40$).

Differences in Perceived Moral Rightness of RFG and RCC

Study 2B. Participants thought that other Americans believed that RFG ($M = 67.99$, $SD = 21.54$) is more morally right, compared to RCC ($M = 56.83$, $SD = 22.70$, $t(905) = 16.64$, $p < .001$, $d = 0.54$). Importantly, this difference appears consistently for each political party, such that Republicans thought that other Americans found RFG relative to RCC to be more morally right, ($t(196) = 7.60$, $p < .001$, $d = 0.58$), as did Independents, ($t(253) = 9.23$, $p < .001$, $d = 0.55$), and Democrats ($t(429) = 12.52$, $p = .001$, $d = 0.60$).

Figure 4

Bar Graph (with 95% C.I.) Depicting Differences in Perceptions of Other Americans Endorsement and Rightness for Each Responsibility Type for Studies 2A-2B.
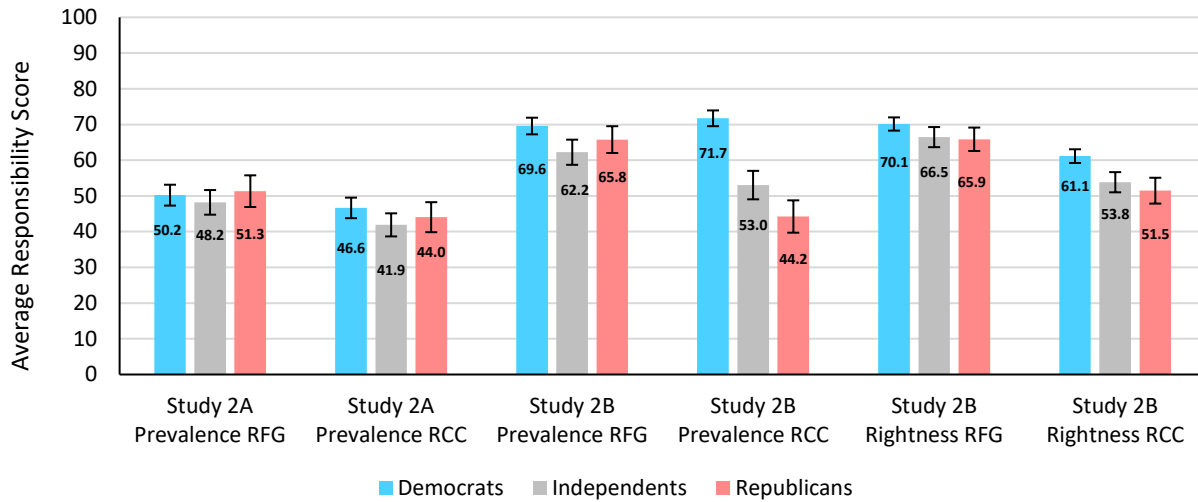
Associations with Demographic Indicators

Study 2A. Overall, both types of responsibility were not significantly correlated, or weakly correlated with age, income, education, gender, race, and religiosity (see Table 3). Importantly, RFG was weakly correlated with conservative political ideology, while RCC was moderately to strongly and negatively correlated with conservative political ideology. This difference in magnitude between these coefficients was significant, (*Fischer's Z* = 4.00, *p* < .001).

Study 2B. In line with our pre-registered expectation, and replicating our previous findings, we find that both types of responsibility were not significantly correlated with age, income, education (see Table 3). RFG weakly and positively correlated with religiosity. RFG was not significantly correlated with conservative political ideology, while RCC was moderately to strongly and negatively correlated with conservative political ideology. This difference in magnitude was significant (*Fischer's Z* = 7.69, *p* < .001).

Meta-analytical estimates from Studies 2A-2B, and 3A-3B suggest that RFG correlates with political conservatism at *r* = -.21, while RCC correlates with conservatism at *r* = -.45,

suggesting that this association is twice as large. Further a weak negative correlation between

RCC and religiosity was also observed.

Table 3

Bivariate, Biserial and Meta-Correlations Between RFG and RCC and Demographic Indicators.

Variable	Study 2A (N = 457)		Study 2B (N = 906)		Study 3A (N = 395)		Study 3B (N = 1800)		Meta-Correlations (N = 3558)	
	RFG	RCC	RFG	RCC	RFG	RCC	RFG	RCC	RFG	RCC
Age	0.01	0.05	**0.12*****	-0.04	0.02	-0.05	0.05	0.01	0.06 [0.03, 0.09]	-0.00 [-0.04, 0.03]
Income	0.09	-0.05	0.05	-0.04	0.08	0.02	0.01	-0.03	0.04 [0.01, 0.07]	-0.03 [-0.06, 0.00]
Education	**0.10***	0.02	0.02	0.07	0.08	**0.12***	0.05	0.04	0.06 [0.03, 0.10]	0.05 [0.02, 0.09]
Gender (Male = 1)	-0.08	-0.09	-0.05	-0.08	-0.04	**-0.13****	-0.08	-0.08	-0.07 [-0.10, -0.03]	-0.09 [-.12, -0.05]
Race (White = 1)	-0.03	-0.01	0.01	-0.01	-0.01	0.02	0.01	-0.04	-0.00 [-0.03, 0.03]	-0.02 [-0.05, 0.01]
Conservatism	**-0.18*****	**-0.42*****	-0.05	**-0.39*****	**-0.29*****	**-0.50*****	**-0.27*****	**-0.47*****	**-0.21 [-0.24, -0.17]**	**-0.45 [-0.48, -0.42]**
Religiosity	**0.10*****	-0.07	**0.11*****	-0.08	0.01	**-0.14****	-0.00	**-0.16*****	0.04 [0.01, 0.07]	**-0.13 [-0.16, -0.09]**

Note. In Studies 3A-3B RCC related to conservative political ideology significantly more strongly than RFG: Study 3A: *Fischer's Z* = 3.51, *p* < .001. *Study 3B: Fischer's Z* = 6.95, *p* < .001. Bolded values highlight significant correlations at *r* > .10.
* *p* < .05, ** *p* < .01, *** *p* < .001.

Discussion

Studies 2A-2B find consistent evidence that people express significantly more RFG

compared to their RCC. Importantly, such a pattern emerges when we consider the perceived

prevalence of each type of responsibility (Studies 2A-2B), and how morally right each type of

responsibility is perceived to be (Study 2B). In addition, consistent with and replicating the

results of Study 1 from Europe in the U.S., RFG (and RCC) appear to not significantly correlate

with most demographic indicators. The only consistent correlation is a weak negative correlation

with political conservatism. Importantly, meta-analytical results including findings from Studies

3A-3B (total N = 3558) suggest that RCC also correlates with conservatism negatively and twice

as strongly as RFG. Finally, RCC and not RFG correlated weakly and negatively with religiosity.

Supplementary Results

We replicated the pattern of results which suggests that people endorse RFG more than RCC in two separate undergraduate samples (total N = 1394) from a large public university. These sample were primarily white, female, and climate conscious. However, even in a highly proenvironmental sample, we found that students expressed more RFG than RCC: (Study S3A: $t(616) = 7.55$, $p < .001$, $d = 0.30$; Study S3B: $t(751) = 5.71$, $p < .001$, $d = 0.20$). For more information on these studies see the Supplementary Materials.

Study 3A

Our next study examined the degree to which RFG related to self-reports of proenvironmental behaviors. It also replicated the results of Studies 2A-2B. This study was pre-registered.

Methods

Participants

A total of 395 participants were recruited via Prolific. Participants signed up for a study, which lasted 10 minutes and received $2.00 as remuneration. Two participants were removed due to failing an attention check in accordance with our preregistered exclusion criteria.

Materials and Procedure

Measures were shown to participants in the following groups, with measures within each group presented in a randomized order: (1) responsibility, (2) proenvironmental outcomes, (3) charity donation, (4) demographic variables. We measured responsibility towards future generation with 5 items ($a = .93$). The same items were used to measure responsibility to reduce climate change ($a = .96$). See Supplementary Materials for the full set of items.

To measure engagement in proenvironmental behaviors we used the self-report measure created by Brick and colleagues (2017; $M = 2.86$, $SD = 0.51$, $a = .83$). This measure captures

how frequently participants engage in 21 different proenvironmental behaviors (e.g., "How often

do you eat meat?"; "How often do you go on personal (non-business) air travel?") on a 1-5

Likert scale (1 = never, 5 = always). We also included an item capturing concern about climate

change ("how worried are you about climate change/global warming"; 1 = not at all – 7 =

extremely), an item measuring how many years from now participants thought climate change

will harm people in the US, measured on a slider scale ranging from 0 – 100 years in the future,

and perceptions of harm from climate change towards: one's self, one's family, people in their

community, people in the US, future generations of people, and plants/animal species (1 = not at

all – 5 = a great deal). Scores on this measure were averaged across items ($M =$ 3.38, $SD = 0.98$,

$a = .94$). Finally, we also captured how much people donate to charitable organizations per

month in USD.

Results

RFG and Proenvironmental Outcomes

      RCC and RFG were strongly correlated, $r = .76$, $p < .001$, but RFG ($M =$ 5.44, $SD =$

1.10) was endorsed significantly more than RCC ($M = 5.28$, $SD = 1.34$, $t(394) = 3.65$, $p < .001$, d

$= 0.13$).[2] Due to the very high correlation between the two types of responsibility, we ran

separate linear regression models for each type of responsibility. Unsurprisingly, participants

who felt more RCC also scored higher on proenvironmental behaviors. For these results see the

Supplementary Materials. We estimated linear regression models with and without demographic

covariates. These covariates were: political ideology, education level, income level, age, and

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[2] Replicating findings from Studies 2A-2B, Republicans expressed greater RFG compared to
RCC, $t(49) = 5.84$, $p < .001$, $d = 0.75$, as did Independents, , $t(125) = 2.77$, $p = .006$, $d = 0.17$.
Democrats, conversely, did not differ in their perceptions of responsibility, $t(208) = -1.89$, $p =$
.060.

religiosity. Overall, with and without the addition of demographic covariates, greater RFG

predicted increased engagement in proenvironmental behaviors, concern for climate change,

perceptions of harm from climate change and that climate change will harm people in the US

sooner rather than later in the future. Only for existing donations to charity did RFG not have a

significant association as the sole predictor. However, with the addition of covariates, this

association became significant.

Findings were similar for RCC, with RCC relating to all outcomes positively, in line with

existing research (e.g., Helferich et al., 2023; Klockner, 2013; Syropoulos & Markowitz, 2022).

For these results see the Supplementary Materials.

Table 4

Linear Regression Models with and without Covariates for RFG as the Predictor

Outcome	RFG only				RFT and covariates			
	β	Lower 95% C.I.	Upper 95% C.I.	Adj. R^2	β	Lower 95% C.I.	Upper 95% C.I.	Adj. R^2
Proenvironmental behaviors frequency	0.48**	0.19	0.27	0.23	0.41**	0.15	0.24	0.27
Concern for climate change	0.52**	0.62	0.86	0.27	0.37**	0.41	0.64	0.44
Years in the future climate change will occur	-0.27**	-9.65	-4.52	0.07	-0.14**	-6.30	-1.26	0.22
Climate change will harm people	0.50**	0.36	0.51	0.25	0.36**	0.24	0.38	0.39
Donation per month (USD $)	0.08	-1.32	11.05	0.01	0.12*	1.39	14.09	0.13

Note. Adj = Adjusted. *$p < .05$, **$p < .001$

Discussion

Study 3A replicated our previous results and expanded on them by providing evidence

for a positive association between rfg and self-reports of proenvironmentalism. Linear regression

models suggested that both types of responsibility appear to contribute in proenvironmental

beliefs and behaviors, although we were not able to test both in the same model due to the high

intercorrelations between the two types of responsibility.

Supplementary Results

A secondary analysis of data obtained from a survey fielded in Detroit (N = 328), accessed via the Inter-University Consortium for Political and Social Research (ICPSR 24320 Detroit Area Study, 2002), allowed us to replicate the results of Study 3A, namely evidence that suggests a positive association between RFG and self-reports of proenvironmentalism in a community sample. Out of a total of 16 proenvironmental outcomes included in this survey, ranging from proenvironmental behavioral intentions, environmental concern, climate change risk perception and environmentalist identity (among others), small to moderate positive associations was found for 15 outcomes (βs $\geq$ 0.20, all ps $\leq$ .003, Adjusted R^2 ranged from .05 to .22). All associations remained significant after accounting for age, gender, income, education, conservative political Ideology and religiosity. The only outcome for which a non-significant association was observed was the belief that nature is sacred and should be left alone (see Study S4 in Supplementary Materials).

Study 3B

Study 3B re-examined whether RFG relates to self-reports of proenvironmentalism. It did so by utilizing a longer battery of measures. Further, we explicitly surveyed a large sample of Democrats, Independents and Republicans to be able to observe meaningful associations for each group. Finally, we examined whether people endorse RFG to a greater degree compared to RCC, even when framing reducing climate change in other ways (e.g., addressing global warming, greenhouse gas emissions, carbon emissions). This study was pre-registered.

Methods

Participants

We sought to obtain a large sample of 1800 participants via Prolific, to encompass enough participants for the comparison of responsibility to future generations and responsibility to reduce climate change, phrased in four different ways (i.e., climate change, carbon emissions, greenhouse gas emissions, global warming), and to be adequately powered for separate analyses by political group (Republican, Democrat, Independents). We screened participants to recruit 600 Republicans, 600 Democrats, and 600 Independents, based on Prolific's screening questions. We did this purposely so that we can meaningfully examine associations for each political group. Participants signed up for a study, which lasted 4 minutes and received $0.80 as remuneration. Seven participants were removed due to failing an attention check.

Materials and Procedure

Participants were randomly assigned to one of four conditions. Regardless of the condition they were assigned to, they were first presented with the measures of responsibility (to future generations and to reducing climate change/carbon emissions/greenhouse gas emissions/global warming). Importantly, both of these measures were displayed on the same page and on the same scale (ranging from 0 = strongly disagree – 100 = strongly agree). Then, they completed a short, 3-item version of the following subscales of the Environmental Attitudes Inventory (Milfont & Duckitt, 2010): interventionist conservation policies ($M = 5.00$, $SD = 1.49$, $a = 0.86$), environmental concern ($M = 5.93$, $SD = 1.00$, $a = 0.71$), environmental threat ($M = 5.46$, $SD = 1.38$, $a = 0.86$), personal conservation behaviors ($M = 5.53$, $SD = 1.19$, $a = 0.88$), and environmental movement activism ($M = 4.05$, $SD = 1.64$, $a = 0.88$). They then provided some basic demographic information and were subsequently debriefed.

Results

Comparison of RFG to RCC

Responsibility to reduce climate change, regardless of how it was framed, and responsibility towards future generations were strongly correlated, with *r*s ranging from *r* = .67 to *r* = .75, all *p*s < .001. Across all participants, regardless of how responsibility to reduce climate change was framed, participants reported significantly more responsibility to protect future generations (see Table 5). Thus, results from our previous studies were replicated, across all possible frames of climate change.

Table 5

Comparisons of the Two Types of Responsibility Across the Different Frames for All Groups

Comparison of RFG with…	Full Sample		Democrats		Independents		Republicans	
	t-test (df)	*d*	t-test (df)	*d*	t-test (df)	*d*	t-test (df)	*d*
… responsibility for reducing Global Warming	*t*(437) = 7.73***	0.37	t(151) = 0.99	0.08	t(130) = 3.71***	0.32	t(148) = 7.28***	0.60
… responsibility for reducing Greenhouse Gas Emissions	*t*(448) = 8.83***	0.42	t(159) = 0.95	0.07	t(137) = 4.54***	0.39	t(150) = 9.47***	0.77
… responsibility for reducing Carbon Emissions	*t*(444) = 11.96***	0.56	t(1543 = 4.95***	0.40	t(136) = 5.25***	0.45	t(149) = 10.17***	0.83
… responsibility for reducing Climate Change	*t*(447) = 9.03***	0.43	t(154) = 2.83**	0.23	t(137) = 4.74***	0.40	t(152) = 7.61***	0.61

Note. ** *p* < .01, *** *p* < .001.

Partisan Differences in RFG and RCC

Replicating the findings from our previous studies, Republicans and Independents reported greater RFG compared to RCC for each of the four frames. Democrats also reported greater RFG compared to RCC for two out of four frames (carbon emissions, climate change). Across the board, Democrats scored higher than Independents and Republicans in RFG and RCC.

Figures 5a-5d

Bar graphs with 95% C.I. for Comparisons of the two Types of Responsibility across all Frames

for Republicans, Democrats and Independents
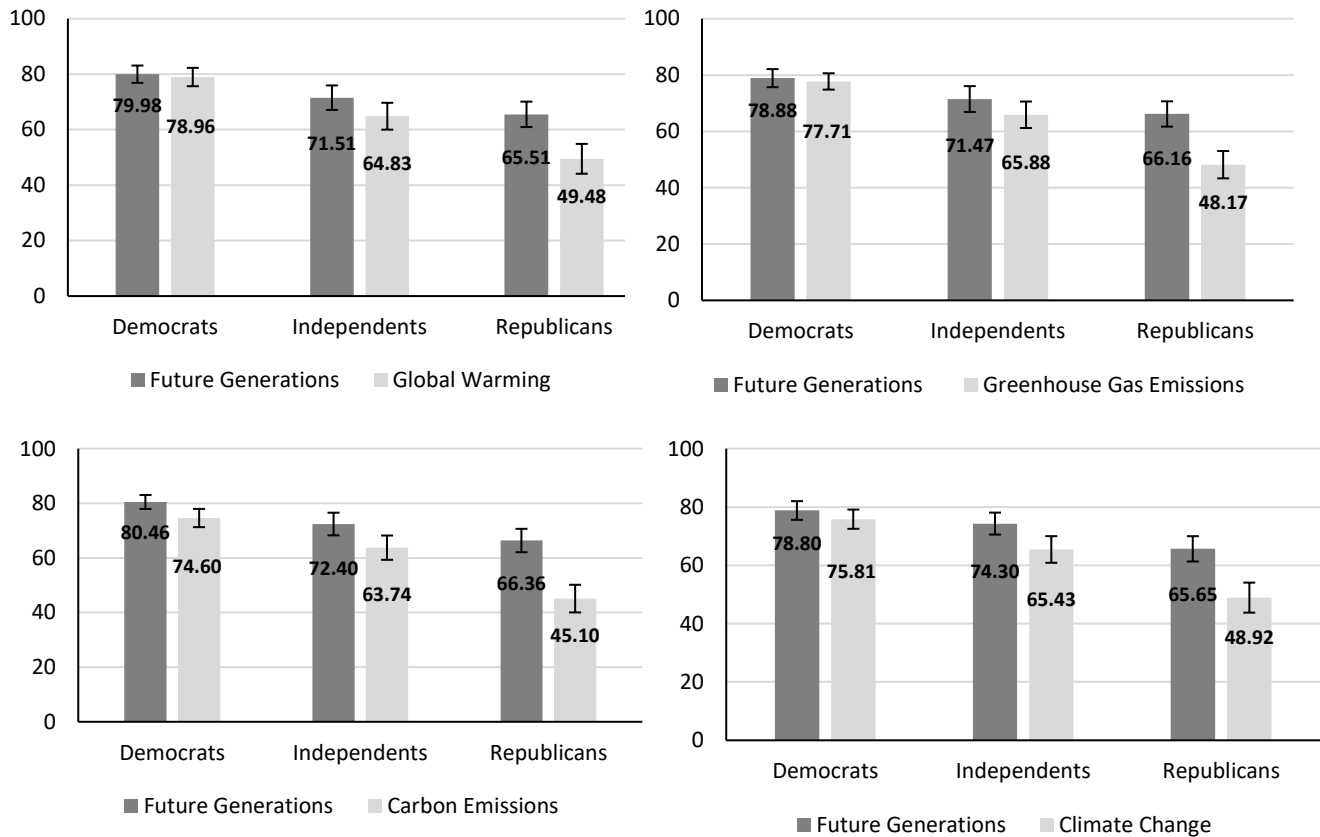
RFG and Proenvironmental Outcomes

Again, due to the very high correlation between the two types of responsibility, we ran separate linear regression models for each type of responsibility. Similar to Study 3A, those who felt more RCC also scored higher on all proenvironmental outcomes. For these results see the Supplementary Materials. We estimated linear regression models without and with demographic

covariates. These covariates were: political ideology, education level, income level, age, and religiosity.[3]

Overall, with and without the addition of demographic covariates, greater RFG predicted increased support for interventionist conservation policies, environmental concern, environmental threat, personal conservation behaviors and environmental movement activism.

Table 6

Linear Regression Models with and without Covariates for Responsibility to Future Generations as a Predictor

	RFG only				RFG and covariates			
Outcome	β	Lower 95% C.I.	Upper 95% C.I.	Adj. R^2	β	Lower 95% C.I.	Upper 95% C.I.	Adj. R^2
Support for interventionist conservation policies	.47*	.026	.031	.22	.35*	.019	.023	.44
Environmental concern	.48*	.018	.021	.23	.40*	.015	.018	.32
Environmental threat	.49*	.025	.030	.24	.38*	.019	.023	.43
Personal conservation behaviors	.54*	.024	.028	.29	.49*	.022	.025	.33
Environmental Movement Activism	.54*	.033	.038	.29	.46*	.028	.033	.39

Note. Adj = Adjusted. *$p < .001$.

Discussion

Regardless of how we framed different aspects of climate change, our results suggest that, on average, Americans report feeling more RFG than RCC. This effect held when both types of responsibility were shown simultaneously to participants and was primarily driven by Independents and Republicans who felt more responsible for protecting future generations than

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[3] Importantly, when examining these associations specifically for each political group, the same pattern of results emerges (see Supplementary Materials).

they do for addressing climate change. Crucially, when we look at overall endorsement of RFG and RCC, Democrats scored the highest, not differing between these two types of responsibility.

Further, for each of the three political groups, feeling more responsible for future generations related to each of five proenvironmental outcomes included in the study, explaining between 22% to 29% of the variance, and remaining a significant predictor even after accounting for different demographic indicators. Having amassed extensive evidence for the prevalence of people's responsibility to future generations[4], its relatively depoliticized nature, and its association with a host of proenvironmental outcomes, in our final study we sought to experimentally manipulate this mechanism.

Supplementary Results

An additional study (Study S5 in the Supplementary Materials) was also conducted on Prolific. This study aimed to test the same hypothesis as Study 3B. However, due to an unexpected but significant order effect in our survey, and a very low number of Republicans in our sample (65 out of 561 participants), we were unable to compare the different types of responsibility. Again, RFG was associated with greater scores for personal conservation behaviors ($\beta = .40$, $p < .001$), support for conservation policies ($\beta = .58$, $p < .001$), environmental concern ($\beta = .45$, $p < .001$), perceived threat to the environment ($\beta = .53$, $p < .001$) and lower scores for protecting the environment for anthropocentric reasons ($\beta = -.35$, $p < .001$), even after adjusting for demographic covariates.

Study 4

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[4] In fact, even when we present participants with a forced choice between protecting future generations or reducing climate change, a similar pattern of results were observed (see Supplementary Materials).

Our final study sought to experimentally manipulate responsibility to future generations. Existing research has attempted to manipulate this type of responsibility (e.g., Watkins & Goodwin, 2020) or related constructs such as legacy concerns/motives (e.g., Shrum, 2021; Zaval et al., 2015). Considering this, we sought to both conduct a pre-registered (conceptual) replication of existing research and to test novel ways of increasing people's sense of responsibility to future generations someone. This study was pre-registered.

Methods

Participants

This study tested five different manipulations. Our focus was on comparing each of these manipulations relative to a control condition. Thus, rather than conducting an a priori power analysis for an omnibus effect, we estimated a power analysis for a t-test with two independent means, a small effect size (d = .20), power set to .90, assuming equal samples sizes for each condition. We set our sample size to $d = .20$ because previous research found effect sizes around this magnitude, and due to established norms about small and meaningful effect sizes. A sample of 527 participants per condition was large enough to detect effect sizes of d = .20. We rounded this number up to 540 participants per condition. Multiplying this number by the number of conditions (i.e., a total of six) we reached a sample of 3240 participants across all conditions. We collected data via Prolific. Participants signed up for a study, which lasted 7 minutes, and received $1.20 as remuneration. Per our pre-registered exclusion criteria, 67 participants were removed, leaving a total of 3175 participants.

Procedure

Participants were randomly to one of six conditions described below. Materials for each condition are available on OSF.

Letter. In the letter condition, participants completed a modified version of the manipulation created by Shrum (2021). In this condition, participants are asked to write a letter to a person born today (i.e., 2022), who will be 28 years old in the year 2050. In this letter participants are telling this person what they (i.e., the participant) can do today to help create a sustainable future for them (i.e., the person who will be 28 years old in 2050). We opted to use this adapted version of the manipulation, as it allows us to use this intervention regardless of one's parental status, while having the same target recipient in mind.

Legacy. This condition was identical to the legacy reflection exercise used by Zaval and colleagues (2015). Participants were asked to reflect on and write about the legacy they want to leave behind, as well as the skills and traits they would want to pass onto others.

Sacrifice. Participants in the sacrifice condition were shown instructions that were identical to that of Watkins and Goodwin (2020, Study 1). In particular, participants were asked to reflect on and write about the sacrifices made by members of the past generation and how they (i.e., the participant) benefited from them.

Video. Participants in the video condition saw a 1-minute video about how we should try to preserve a national park (in this case the Grand Canyon) for future generations. This video is available online and was produced by the National Parks Foundation:

https://www.grandcanyontrust.org/keep-the-canyon-grand.

Longtermism. Participants in the longtermism condition read an excerpt of the book "What We Owe The Future" (MacAskill, 2022). This section was 385 words, and was taken from the Introduction of the book at the beginning of the section "Future People Count".

Control. Participants in the control condition were instructed to write about their daily routine in the morning after they wake up and in the evening hours before they go to bed.

Regardless of condition, after completing the relevant condition-specific task, participants responded to the different outcomes (RFG, RCC, intentions, policy support and donation task) in a randomized order.

Materials

Responsibility. Three items ($a = .92$) on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree) were used to capture perceived responsibility to future generations. These items, on the same 7-point Likert scale, were slightly modified to capture responsibility to reduce climate change ($a = .94$).

Proenvironmental intentions. Six items ($a = .77$), on 6-point Likert-type scale (1 = never, 6 = all the time) taken directly from Zaval et al. (2015) were used to capture self-reports of proenvironmental intentions for the next three months.

Proenvironmental policy support. Six items ($a = .85$), on 6-point Likert scale (1 = strongly oppose, 6 = strongly support) taken directly from Zaval et al. (2015) were used to capture proenvironmental intentions for the next three months.

Donation task. Finally, participants were also instructed that 1 participant would receive a $10 bonus as a thank you for participating in the study. Participants were given the option to keep this $10 prize, or to donate part or all of it to a charity. We chose Trees for the Future as the designated charity for this task. Participants were given a brief description of Trees for the Future and were asked to allocate any amount from the $10 to themselves or the charity. This measure was taken directly from Zaval et al. (2015).

 Results

We had no a priori hypothesis about the differences among the experimental conditions (and thus the omnibus effect); thus, we pre-registered analyses comparing each condition to the

control. We chose this strategy, as our hypothesis was that the five experimental conditions will increase each of the five outcomes relative to the control. To determine this difference, we ran a series of five linear regression models, one per outcome of interest. In each regression model five dummy-coded variables representing each experimental condition were entered as simultaneous predictors. Thus, each dummy-coded predictor showed the difference of that specific condition relative to the control. Finally, in each model, the intercept indicates the value for the control.

These results are summarized in Table 7 and depicted visually in Figures 6a-6c.

Responsibility to Future Generations

Supporting our hypothesis, all conditions significantly increased RFG relative to the control condition. Importantly, this test served as a replication of Zaval et al. (2015), Shrum (2021) and Watkins and Goodwin (2021).

Responsibility to Reduce Climate Change

All conditions except for the sacrifice condition significantly increased RCC. Importantly, this test served as a conceptual replication of Zaval et al. (2015). This measure was not included in Watkins and Goodwin (2020). Given that this manipulation did not focus on climate change, or the environment, but rather focused on the sacrifices made by previous generations more broadly, it is perhaps not surprising that participants in this condition reported feeling more responsible towards future generations, but not towards reducing climate change. Further, the fact that we were able to shift responsibility to future generations without shifting responsibility to reduce climate change adds to our argument that these are two separate mechanisms, despite their high correlation.

Proenvironmental Intentions

Supporting our hypothesis, all conditions significantly increased self-reports of proenvironmental intentions for the next 3 months. Importantly, this test served as a replication of Zaval et al. (2015), and Shrum (2021). A measure of proenvironmental intentions was not included in Watkins and Goodwin (2020).

Proenvironmental Policy Support

Only the letter and longtermism conditions significantly increased support for proenvironmental policies. Effects for the legacy condition were marginal, failing to replicate the findings of Zaval et al (2015). Similar to Watkins and Goodwin, we did not find a significant effect of the manipulation on policy support.

Donations to Charity

Only the letter condition significantly increased donations to charity, thus replicating the results of Shrum (2021). This pattern of results failed to replicate Zaval et al. (2015).

Robustness of Results

Per our pre-registered analytical plan, we also ran analyses controlling for demographic variables that were significantly related to our outcomes or variables for which there was an error of random assignment. There were no differences in any demographic variables across conditions, suggesting that there was no error of random assignment. Further, when including any demographic variables that related to outcomes at $r > .10$, results remain highly consistent and significant (see Supplementary Materials for further information).

Table 7

Results for the Effect of Each Condition on

Donations to charity	b	β	SE	t	p	d	95% C.I.	
Intercept (control)	3.31	0.00	0.13	24.89	<.001		3.05	3.57
Legacy	0.26	0.03	0.19	1.39	.165	0.086	-0.11	0.64
Letter	**0.49**	**0.06**	**0.20**	**2.51**	**.012**	**0.154**	**0.11**	**0.87**
Longtermism	0.14	0.02	0.19	0.77	.443	0.047	-0.22	0.51
Sacrifice	0.16	0.02	0.19	0.85	.397	0.051	-0.21	0.54
Video	0.23	0.03	0.19	1.23	.220	0.075	-0.14	0.60

Policy support	b	β	SE	t	p	d	95% C.I.	
Intercept (control)	4.49	0.00	0.04	101.37	<.001		4.40	4.57
Legacy	0.11	0.04	0.06	1.79	.073	0.109	-0.01	0.24
Letter	**0.19**	**0.06**	**0.07**	**2.87**	**.004**	**0.183**	**0.06**	**0.31**
Longtermism	**0.15**	**0.05**	**0.06**	**2.35**	**.019**	**0.142**	**0.02**	**0.27**
Sacrifice	0.03	0.01	0.06	0.41	.684	0.024	-0.10	0.15
Video	0.10	0.04	0.06	1.66	.097	0.100	-0.02	0.23

Proenvironmental Intentions	b	β	SE	t	p	d	95% C.I.	
Intercept (control)	2.94	0.00	0.04	67.89	<.001		2.86	3.03
Legacy	**0.18**	**0.06**	**0.06**	**2.92**	**.004**	**0.184**	**0.06**	**0.30**
Letter	**0.54**	**0.19**	**0.06**	**8.46**	**<.001**	**0.539**	**0.41**	**0.66**
Longtermism	**0.24**	**0.09**	**0.06**	**3.92**	**<.001**	**0.236**	**0.12**	**0.36**
Sacrifice	**0.22**	**0.08**	**0.06**	**3.58**	**<.001**	**0.221**	**0.10**	**0.35**
Video	**0.19**	**0.07**	**0.06**	**3.15**	**.002**	**0.187**	**0.07**	**0.31**

Responsibility to reduce Climate Change	b	β	SE	t	p	d	95% C.I.	
Intercept (control)	5.01	0.00	0.06	82.43	<.001		4.89	5.13
Legacy	**0.19**	**0.05**	**0.09**	**2.14**	**.033**	**0.130**	**0.02**	**0.36**
Letter	**0.42**	**0.10**	**0.09**	**4.67**	**<.001**	**0.299**	**0.24**	**0.59**
Longtermism	**0.24**	**0.06**	**0.09**	**2.84**	**.005**	**0.174**	**0.08**	**0.41**
Sacrifice	0.14	0.03	0.09	1.57	.118	0.094	-0.03	0.31
Video	**0.19**	**0.05**	**0.09**	**2.15**	**.031**	**0.129**	**0.02**	**0.35**

Responsibility to future generations	b	β	SE	t	p	d	95% C.I.	
Intercept (control)	5.17	0.00	0.05	96.24	<.001		5.06	5.27
Legacy	**0.27**	**0.08**	**0.08**	**3.54**	**<.001**	**0.213**	**0.12**	**0.42**
Letter	**0.37**	**0.10**	**0.08**	**4.70**	**<.001**	**0.288**	**0.22**	**0.53**
Longtermism	**0.18**	**0.05**	**0.08**	**2.38**	**.017**	**0.140**	**0.03**	**0.33**
Sacrifice	**0.29**	**0.08**	**0.08**	**3.73**	**<.001**	**0.224**	**0.14**	**0.44**
Video	**0.19**	**0.06**	**0.08**	**2.51**	**.012**	**0.147**	**0.04**	**0.34**

Figures 6a-6c

Bar Graphs Depicting Scores for All Outcomes with 95% C.I. for Each Condition
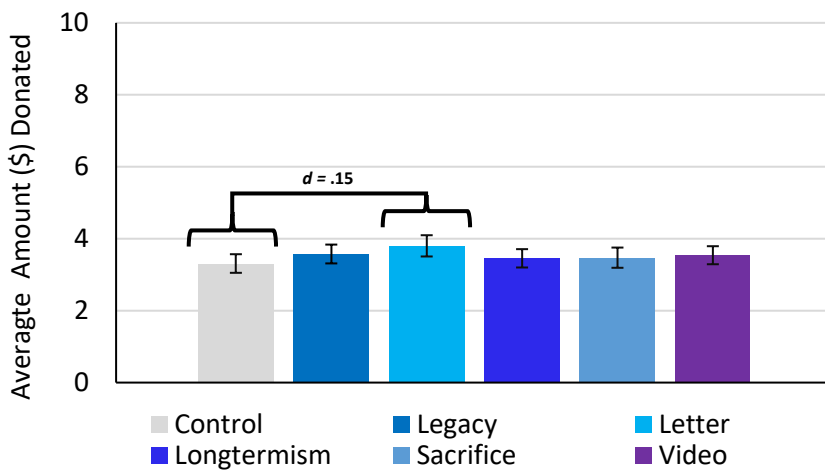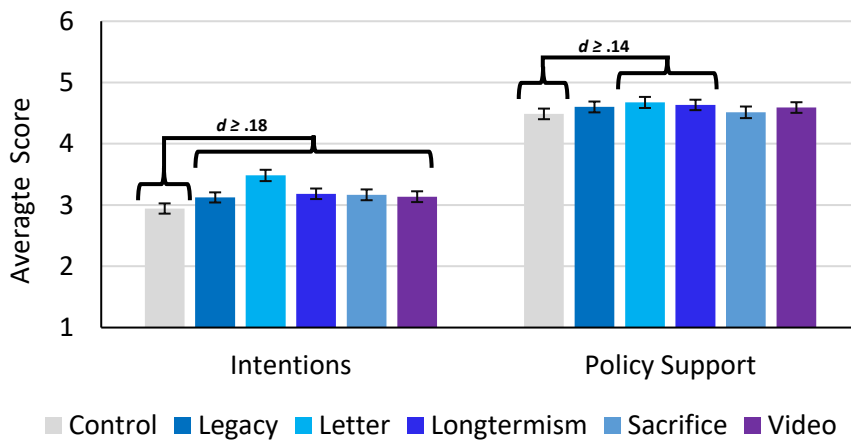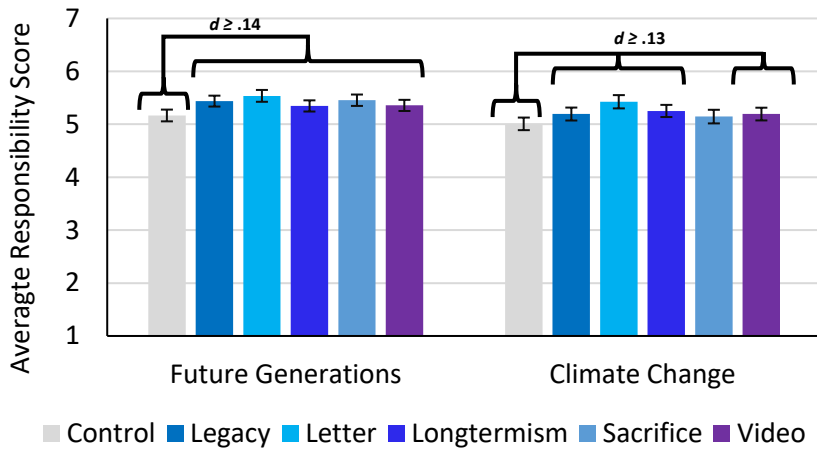
Exploratory Analysis: Indirect Effects via Responsibility to Future Generations

In our pre-registration we also pre-registered an exploratory analysis in which responsibility to future generations would act as a mediator for the effect of condition on all outcomes. This analysis was conducted in all existing investigations: Zaval and colleagues (2015) and Shrum (2021) treated legacy concerns (i.e., whether one is seen by future generations positively) as a mediator; and Watkins and Goodwin (2020) treated obligation to future generations as a mediator. Mirroring this approach, we estimated a path model with the five dummy-coded variables for each condition (i.e., condition = 1, control = 0) as exogenous variables, RFG as a mediator[5] and the three outcomes (intentions, policy support, donations) as parallel outcomes. This model is akin to a mediation model and thus it was fully saturated (i.e., it had zero degrees of freedom, and thus produced no fit indexes). However, in the same model, if the non-significant effects of condition on the outcomes are trimmed from the model, the resulting model fit meets the criteria (e.g., Kline, 2016) for good model fit: $\chi^2(7) = 0.69$, $p = .686$, CFI = .999, RMSEA < .001, SRMR = .006.

Importantly, in this model, the effects of each condition (relative to the control) on the mediator were significant, such that each condition significantly increased responsibility to future generations. In turn, RFG was also significantly and positively related to each of the three outcomes. Importantly, all indirect effects of condition on each of the three outcomes, via increased RFG were significant and positive (see Table 11).

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[5] We did not include RCC as a mediator, due to concerns for collinearity with responsibility to future generations, $r = .75$, $p < .001$. However, we did consider a model in which this type of responsibility is a sequential mediator after RFG. In this model RFG still predicted two out of the three outcomes even after accounting for the effect of RCC (see Supplementary Materials).

Figure 7

Pre-registered Path Model with RFG as a Mediator
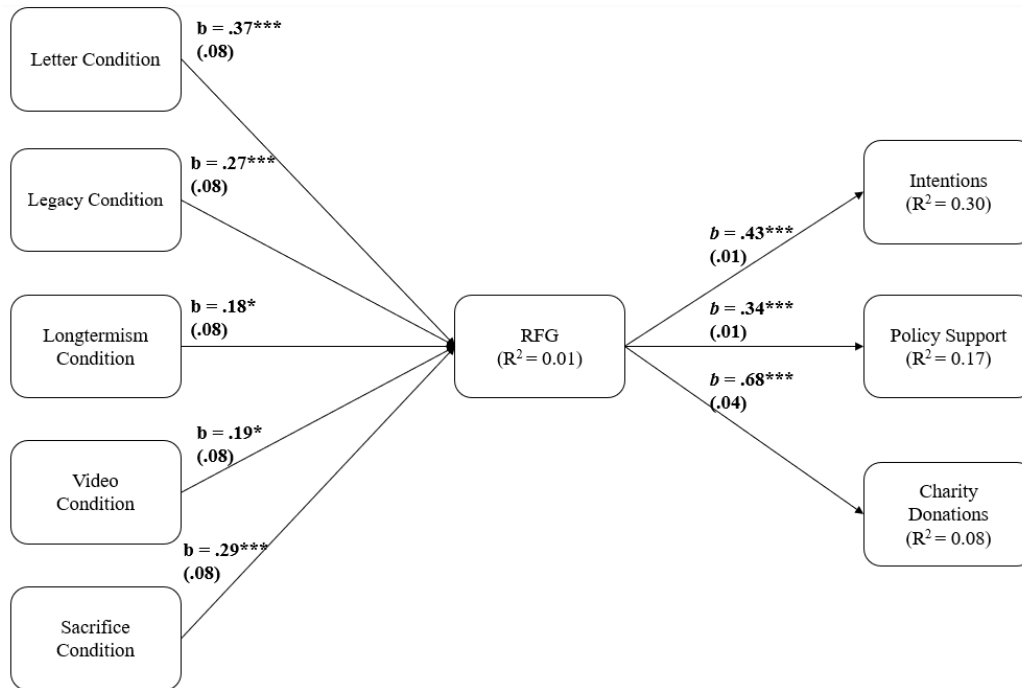
Note. Unstandardized weights are displayed. * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 8

Indirect Effects via Increased RFG of Condition Relative to Control Tested in Figure 7

Predictor (Condition)	Outcome	b	β	Lower 95% C.I.	Upper 95% C.I.	p
Video	Donation	0.13	.02	0.03	0.23	.013
Sacrifice	Donation	0.20	.02	0.09	0.30	<.001
Longtermism	Donation	0.12	.02	0.02	0.22	.018
Letter	Donation	0.25	.03	0.14	0.36	<.001
Legacy	Donation	0.18	.02	0.29	0.14	<.001
Video	Intentions	0.08	.03	0.02	0.14	.012
Sacrifice	Intentions	0.12	.04	0.06	0.19	<.001
Longtermism	Intentions	0.08	.03	0.01	0.14	.017
Letter	Intentions	0.16	.05	0.09	0.22	<.001
Legacy	Intentions	0.12	.04	0.05	0.18	<.001
Video	Policy Support	0.06	.02	0.01	0.11	.012
Sacrifice	Policy Support	0.10	.03	0.05	0.15	<.001
Longtermism	Policy Support	0.06	.02	0.01	0.11	.018
Letter	Policy Support	0.13	.04	0.07	0.17	<.001
Legacy	Policy Support	0.09	.03	0.04	0.14	<.001

Discussion

Our final study tested the effectiveness of five different interventions, each aiming to increase responsibility to future generations. Three of these interventions have been validated in past work (sacrifice: Watkins & Goodwin, 2020; letter: Shrum, 2021; legacy: Zaval et al., 2015), while two were created for this study (longtermism and video). Our results suggest that each of these interventions can indeed increase RFG and proenvironmental intentions. Further, each intervention except for the reflection on sacrifices made by past generations also increased RCC, even though two of the interventions did not mention climate change (i.e., legacy and longtermism). Moreover, only the letter, legacy and longtermism interventions successfully increased support for policy, with the letter also being the only intervention that increased donations to a charity. Considering these results, it appears that the letter intervention is the most consistent method of both increasing responsibility to future people and proenvironmental intentions and behaviors (in the lab). Importantly, all conditions (relative to the control) had significant indirect effects on all three outcomes, through increased responsibility to future generations.

Although the effects noted were mostly small, these results partially replicate existing investigations and also highlight that interventions focusing on engendering the longtermism philosophy could prove successful. Further, the fact that a 1-minute video was also effective proves promising for developing interventions that do not rely on reflections (such as the letter, legacy and sacrifice interventions). Ultimately, these results suggest that it is possible to enhance people's sense of responsibility to future generations and that doing so can instill greater proenvironmental intentions.

General Discussion

Our society is facing many challenges, chief among them being climate change. The consequences of climate change are felt today and will be felt even more acutely by future generations. However, can we harness our concern for future generations to motivate proenvironmental action? Across a series of 13 studies we find evidence that supports this claim. First, both in the U.S. (in a sample of scientists/experts, a community sample, undergraduate students, and online convenience samples) and across 34 European countries, we find evidence that people feel responsible for protecting future generations. Importantly, they feel more responsible towards future generations than they do for reducing their personal contributions to climate change. Americans in particular also think that others feel the same way, and that others find it more morally right to care for future generations than to reduce climate change.

Crucially, this felt responsibility towards future generations seems to be largely uncorrelated or weakly correlated with age, gender, race, income level, religiosity and education attainment. The only consistent correlations were with socioeconomic status, where across the 34 European countries a small positive correlation was observed, and with political ideology. Importantly, across our many samples, the correlation between RFG and political ideology ranged from non-significant (in Europe and in some U.S. samples) to moderate. However, in every single study, this correlation was significantly weaker than the correlation between RCC and political ideology. In fact, this correlation was twice as large in magnitude. This suggests that the former (i.e., responsibility to future generations) is less politicized than the latter (i.e., responsibility to reduce climate change). This is an important finding, as most research so far has focused on the latter, which appears to be conflated with a person's political leaning, while calls

for the former are relatively recent (e.g., Wade-Benzoni, 2019; Shrum et al., 2023; Syropoulos &

Markowitz, 2023).

Our perceived duty to future generations appears to be relatively widespread and

depoliticized. Moreover, those who reported feeling more responsible to future generations also

exhibited greater self-reports of proenvironmental engagement. This finding was consistent

across samples (i.e., undergraduate students, Prolific survey-takers, experts/scientists, and a

community sample) and proenvironmental outcomes. In fact, feeling more responsible to future

generations also correlated with decreased psychological distance of climate change, increased

perceptions of harm for others, as well as general worry for and responsibility to reduce climate

change. These findings are also complemented by our experimental findings.

Study 4 served both as a replication of existing interventions—which had participants

reflect on their legacy (Zaval et al., 2015), write a letter to future people (Shrum, 2021) or reflect

on sacrifices made by past generations (Watkins & Goodwin, 2020)—and as a test of two novel

interventions. The first presented participants with an excerpt of text focusing on the principles

of longtermism (e.g., MacAskill, 2022). Longtermism is connected to but distinct from effective

altruism. Its core principles propose that it is our moral obligation to positively influence the

long-term future, that we have the ability to do so, and that future people matter. Exposing

participants to these principles increased responsibility to future generations and self-reports of

proenvironmentalism, even though climate change was not mentioned in this intervention.

The second manipulation presented participants with a short 1-minute video on how

protecting nature for future people is important. Our rationale for the video condition was that it

was more externally valid than the writing-driven interventions, as people are much more likely

to watch such a short video in their day-to-day life, or at least, they are more likely to do so

relative to reflecting on their legacy, sacrifices made by past generations, or to writing a letter to future generations. Further, both the longtermism and the video conditions did not feature any writing component, which potentially makes them easier to scale up, as they require the consumption of content rather than engaging in a task.

Our results replicated work on the three existing interventions and suggested that the two new interventions are also effective. In fact, every single intervention increased proenvironmental intentions and perceptions of responsibility to future generations. However, our results point to the letter-writing condition as the potentially most effective method of increasing proenvironmental engagement. This was supported both by the number of outcomes affected directly (i.e., all five outcomes) and by the magnitude of the effect. In addition, every condition had a significant indirect effect on each of the three proenvironmental outcomes, with responsibility to future generations positively predicting each one.

Thus, our findings suggest that intergenerational approaches for motivating proenvironmental engagement appear to have a small but consistent positive effect on proenvironmental outcomes. Future work can extend these findings in four meaningful ways. First, longitudinal interventions can determine the enduring nature of these effects, and their application to everyday sustainability behaviors. Second, educational interventions with a focus on younger populations are needed to determine if enhancing longtermist and future-generation-related values can have meaningful implications for one's beliefs, career choice, and other consequential decisions later in life. From our preliminary evidence, it seems that reading about longtermism does seem to have a small positive influence. However, extensive longitudinal work is needed to determine whether a more thorough engagement with the principles of longtermism can have a lasting positive effect. Third, additional evidence on how responsibility to future

generations relates to different moral values and virtues could further reveal its pervasive and

depoliticized nature. Fourth, it is important to discover whether enhancing or making salient

concerns for future generations also translates into greater support for and action towards

addressing other (intergenerational) issues beyond climate change, such as inequality, poverty,

and core extinction threats that longtermists have identified (e.g., advanced artificial intelligence,

nuclear war, and engineered pandemics; MacAskill, 2022).

Limitations

This investigation was not without limitations. First, it is important to determine the

prevalence of how responsible people feel towards future generations in representative samples

that are not WEIRD (Henrich et al., 2010). Our evidence speaks solely to WEIRD countries, and

thus extending this work to other populations would meaningfully contribute to arguments about

the universality of the prevalence of such beliefs. It is possible that these effects are even more

pronounced in countries with a more collectivistic culture (Triandis, 1995), greater cultural

tightness (Gelfand et al., 2006), and/or higher long-term orientation (Hofstede & Bond, 1984), as

these countries/cultures tend to value the collective survival/well-being of their members and

tend to prepare for the future more.

Second, most of our measures were self-reported. Although we experimentally

manipulated how responsible to future generations people felt and established a cause-and-effect

relationship between such feelings of responsibility and self-reports of proenvironmentalism, the

effect on our behavioral outcome (i.e., donations) was small. Through collaborations with

different communities, the combination of self-reports with life-cycle assessments and

greenhouse gas emissions associated with specific practices (e.g., Nielsen et al., 2022), or

through the use of more recent behavioral paradigms such as the Work for Environmental

Protection Task (W.E.P.T.; Lange & Dewitte, 2022), more tangible outcomes can be measured.

Finally, it is important to understand what the term "future generations" means to people.

For example, are people thinking about their own descendants, or future people more broadly?

How far into the future do they think? The present investigation cannot address these questions.

We propose that qualitative work can add to this gap meaningfully, helping researchers use

terminology that might be more appealing to specific demographics as far as intergenerational

approaches to proenvironmentalism are concerned.

Table 9

Limitations and Recommendations for Future Research

Limitation	Reason	Recommendation
Lack of generalizability	All of the studies relied on data collected in Europe or the United States	Replicate and expand upon this work in non-WEIRD countries, through cross-lab collaborations.
Behavioral outcomes	The investigation aimed to replicate existing work which used a donation task	Using the W.E.P.T. or other tasks could help increase the confidence in the findings
What do people think of when they think of future generations?	The present investigation focused on examining the prevalence of responsibility to future generations and their effectiveness as a mechanism for promoting proenvironmental engagement.	Include open-ended questions. These could ask participants: 1) who they thought about? 2) why? 3) how far into the future did they think about? 4) what issues will future generations face?

Conclusion

Addressing climate change is one of the most important challenges we face as a society.

Politicization of the issue and polarization of public opinion often prohibit meaningful individual

and, especially, collective action to confront this global threat to humanity and all other life on

the planet. We argue and provide evidence that emphasizing our responsibility to protect future

generations can potentially act as a moral reframing mechanism, shifting the narrative away from

the politicized nature of climate change, and instead highlighting how we can act today to ensure

that future people inherit a greener and flourishing world.

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