

Brief exposure to Pope Francis heightens moral beliefs about climate change

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Abstract In his recent encyclical letter *Laudato Si': On Care for Our Common Home*, Pope Francis issued a moral appeal to the global community for swift action on climate change. However, social science research suggests a complex relationship between religious concepts and environmental attitudes, raising the question of what influence the pope's position may have on public opinion regarding this polarizing issue. In a national probability survey experiment of U.S. adults ($n = 1212$), we find that brief exposure to Pope Francis influenced the climate-related beliefs of broad segments of the public: it increased perceptions of climate change as a moral issue for the overall sample (and among Republicans in particular) and increased felt personal responsibility for contributing to climate change and its mitigation (among Democrats). Moreover, prior awareness of the pope's views on climate change mattered, such that those who indicated greater awareness of the pope's position showed stronger treatment effects, consistent with a priming account of these effects. Results complement recent correlational findings and offer further evidence of the Vatican's influence on climate change public opinion.

On June 18, 2015, Pope Francis issued the second encyclical letter of his Papacy, titled *Laudato Si'* ("Praise Be to You") and subtitled "On Care for Our Common Home." In it, he appealed to the plight of the world's poor—who are especially vulnerable to projected climatic changes (e.g., Burke et al. 2015)—in arguing that society has a moral obligation to act expeditiously in addressing climate change. Pope Francis implored not only Catholics but the broader global community to work together to adopt timely measures to protect the planet and its vital resources in the face of strong scientific evidence that human actions threaten the sustainability of the planet's ecosystems (Francis 2015).

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In light of Pope Francis's global popularity (Pew 2014), scholars have begun to ask what, if any, effect such religious appeals may have on public opinion regarding climate change (Li et al. 2016; Maibach et al. 2015; O'Neill 2016). Insights into the influence of such non-partisan factors may be especially critical within the U.S. and other nations where the highly politicized debate over climate change hinders policy action (McCright and Dunlap 2011). Indeed, surveys of the US public administered before the encyclical's release and after the pope's high-profile visit to the U.S. (in late September, 2015) reveal shifts on several key attitude and belief metrics that may well be attributable to the pope's influence, including increases in the number of respondents expressing concern about global warming (+8%; +11% among Catholics) and agreeing that global warming is a moral issue (+6%; +8 among Catholics) (Maibach et al. 2015). Moreover, following his U.S. visit, nearly half of respondents (45%) reported being aware of the pope's views on global warming and a majority (62%) reported trusting Pope Francis "somewhat" or "strongly" as a source of information about global warming (see Li et al. 2016, for factors predicting perceptions of the pope's credibility on climate issues).

These documented shifts in public opinion may reflect an influence of the pope's position on climate change; however, their correlational nature comes with some inherent limitations. For instance, the different levels of beliefs observed between early and late 2015 could be attributable to factors besides the pope's efforts, such as increased media coverage of climate change prior to the Paris Climate Conference held in December 2015 ("COP 21"), leaving the question of the pope's causal influence on climate change beliefs open to empirical inquiry.

1 Religion, moral appeals, and climate change beliefs

Research on the relationship between religious views and pro-environmental attitudes and beliefs paints a complex picture, with studies suggesting that religion can promote as well as hinder conservation efforts (Wardekker et al. 2009; see also Clements et al. 2014; Rottman et al. 2015). Nevertheless, there is reason to believe that messages highlighting pro-environmental views of popular religious leaders may be effective in motivating public concern for climate change. In general, moral appeals made by political and religious leaders have been shown to be highly effective for mobilizing public engagement on a wide range of social and political issues. In one study, people who read about a CEO's plan to provide healthy meals for employees were more supportive of the policy when it was described as looking out for employees' well-being (a moral justification) rather than as a practical effort to keep employees productive (Van Zant and Moore 2015). In a second experiment, people were more likely to support policies championed by leaders who were viewed as high in moral character, regardless of how the policies were framed (Van Zant and Moore 2015).

Messages from religious leaders, in particular, may be influential in shaping moral judgments, including within the environmental domain. The notion of environmental stewardship is found in many religions, including in Judeo-Christian perspectives on "conservational stewardship" that consider the natural world to be sacred and worthy of protection (Wardekker et al. 2009). With regards to Pope Francis specifically, psychological research points to two moral dimensions broadly emphasized in the pope's encyclical—*harm-based* appeals that emphasize the protection of both humans and non-humans and appeals to the *purity and sanctity* of the natural world—dimensions that have been shown to enhance pro-environmental concern among both liberals and conservatives (see Haidt 2007 for a discussion of these moral dimensions). Feinberg and Willer (2013), for instance, found that whereas U.S. liberals tended to view environmental problems in terms of harm principles (see also Nisbet et al. 2012), conservatives tended to view environmental

issues in terms of purity and sanctity principles. Moreover, framing pro-environmentalism in terms of purity (e.g., emphasizing the need to keep natural spaces pristine) increased conservatives' belief in global warming and nearly eliminated the partisan gap in environmental concern (see also Wolsko et al. 2016). Additional research suggests that conservatives show a preference for leaders who personify virtues related to authority and sanctity and may, thus, be particularly attentive to appeals from religious authorities (see Graham et al. 2016).

Theories of pro-environmental engagement (e.g., value-belief-norm theory; Stern et al. 1985; Stern et al. 1999) highlight the activation of moral norms, which are posited to orient individuals toward harms to innocent people and natural systems and, in turn, bolster support for environmental conservation. From this perspective, climate change messaging from widely respected religious leaders, such as Pope Francis, may serve as one such situational cue that may activate moral norms and engender more environment-protecting beliefs.

2 Examining Pope Francis's influence: insights from information accessibility models

Taken together, the research discussed above suggests that increasing public perceptions of global warming as a moral issue (Maibach et al. 2015) may be partially attributable to the pope's recent efforts spotlighting climate change, owing to both the Vatican's dissemination of the encyclical (which casts climate change squarely in moral terms) and Pope Francis's global visibility as a moral authority figure. To further examine the potential influence of the pope's climate position on public opinion, we draw on information accessibility models from psychology to generate predictions about the conditions under which the public may express heightened moral beliefs about climate change as a function of two sources of potential influence: prior knowledge of the pope's position and direct exposure to the pope's views.

Contemporary models of priming posit that even brief exposure to information (e.g., a moral figure) can influence the accessibility of prime-related mental content (e.g., moral concerns), which can produce downstream effects on subsequent judgments, motivations, and actions (see Higgins 1989; Loersch and Payne 2011; Schwarz 1998). In a classic demonstration of priming in social judgment, brief exposure to words related to the traits *kindness* or *hostility* led observers to perceive the same ambiguous behavior exhibited by an actor as more friendly or hostile, respectively (Srull and Wyer 1979). Such accessibility effects have been demonstrated repeatedly in the survey context, where knowledge rendered accessible by preceding survey questions has been shown to influence responses to subsequent questions. For example, self-reported satisfaction in dating correlates highly with life satisfaction when answered in that order, but not in the reverse order (an example of an assimilation effect; for reviews, see Schwarz 1999; Tourangeau et al. 2000).

Models of information accessibility can help public opinion researchers generate predictions about the conditions under the public is likely to endorse climate change beliefs that are consistent with those of the pope, as well as how repeated exposure to related messaging may produce long-term effects on beliefs. Because frequently invoked information strengthens concept accessibility in memory, even brief exposure to concept-related cues can strengthen mental representations over time (Bargh and Morsella 2008). In particular, we hypothesized that if the shift toward greater public perception of climate change as a moral issue is indeed attributable to Pope Francis, then individuals reporting prior awareness of the encyclical message should be more likely to perceive climate change in moral terms. Moreover, because priming enhances the accessibility of previously stored knowledge, we also hypothesized that brief exposure to the pope's views (manipulated

experimentally) would strengthen these perceptions, particularly among those who indicated greater awareness of the encyclical.

The present study seeks to build upon recent correlational research on this topic (Li et al. 2016; Maibach et al. 2015) by testing these predictions in a nationally representative survey experiment, which examined whether brief exposure to Pope Francis would heighten beliefs about climate change among the U.S. public. Given the highly polarized U.S. context, we also examined the roles of political partisanship (e.g., Democrat vs. Republican), in addition to religious affiliation (e.g., Catholic vs. non-Catholic), in the hypothesized effects.

3 The present study

A nationally representative survey of 1212 U.S. adults was fielded online by GfK (formerly KnowledgeNetworks) between April 15 and May 1, 2016, approximately 11 months after the release of the encyclical and 7 months after the pope's U.S. visit. As a part of the survey, respondents were asked a series of questions adapted from prior studies assessing perceptions of climate change as a moral issue and feelings of personal responsibility for both causing and mitigating climate change (e.g., Markowitz 2012). Specifically, the questions read: *Do you consider climate change to be a moral or ethical issue?* {Yes, definitely; Yes, somewhat; No; Not sure}; *Do you feel personally responsible for contributing to the causes of climate change?* {Yes, definitely; Yes, somewhat; No}; and *Do you feel personally responsible for helping to reduce climate change?* {Yes, definitely; Yes, somewhat; No}.

To examine Pope Francis's influence on moral perceptions of climate change, respondents were randomly assigned to answer the above three questions either *before* or *after* a question that was designed to prime thoughts about the pope and his views on climate change (i.e., a question-order manipulation; see Schuman and Presser 1996). In the treatment (pope prime) condition, participants were first presented with a picture of Pope Francis and a question assessing awareness of his views on climate change (i.e., how much they had heard or read about the encyclical), before answering the three moral perception questions (Fig. 1). In contrast, those in the control condition were presented with the identical image and question after answering the moral perception questions. The two conditions were identical in all other respects.

Fig. 1 The stimulus question assessing awareness of Pope Francis's views on climate change with the embedded image of the pope, positioned either before or after the three moral belief items



Table 1 summarizes key sample demographics. Of the 1212 respondents who completed the survey, 61.1% ($n = 741$) self-identified as “White, non-Hispanic” and 51.7% ($n = 627$) identified as male. A slight majority (57%) reported a household annual income under \$75,000, and approximately one third ($n = 372$) reported holding a Bachelor’s degree or higher. Over half (54%; $n = 654$) identified as a Democrat, 39.6% ($n = 480$) as Republican, and 6.4% ($n = 78$) as “Other” or refused. Protestants or Evangelical Christians ($n = 422$; 34.8%) and Catholics ($n = 365$; 30.1%) comprised the two largest religious groups, followed by the non-religious (Atheists) ($n = 197$; 16.3%) and “Other” Christians ($n = 63$; 5.2%).

4 Results

GfK provides survey weights that adjust for sample deviations from U.S. Census parameters for key demographic variables (age and gender, race/ethnicity, region, education, and income). All

Table 1 Summary of key sample demographic variables

Variable	<i>n</i> of valid cases (%)
Gender	
Male	627 (51.7)
Female	585 (48.3)
Race/ethnicity	
White, non-Hispanic	741 (61.1)
Black, non-Hispanic	86 (7.1)
Other, non-Hispanic	44 (3.6)
Hispanic	306 (25.2)
Two or more, non-Hispanic	35 (2.9)
Educational attainment	
Less than high school diploma	145 (12.0)
High school diploma	362 (29.9)
Some college	333 (27.5)
Bachelors degree	217 (17.9)
Masters degree or higher	155 (12.8)
Household income	
Less than \$25,000	197 (16.3)
\$25,000 to \$34,999	117 (9.7)
\$35,000 to \$49,999	138 (11.4)
\$50,000 to \$74,999	239 (19.8)
\$75,000 to \$99,999	166 (13.7)
\$100,000 to \$149,999	237 (19.5)
\$150,000 or more	118 (9.7)
Religious affiliation	
Catholic	365 (32.2)
Evangelical or Protestant Christian	422 (37.2)
Other Christian	63 (5.6)
Jewish	22 (1.9)
Other religion	65 (5.7)
No religion (atheist, agnostic)	197 (17.4)
Political party identification	
Democrat	654 (57.7)
Republican	480 (42.3)
Age (<i>M</i> (<i>SD</i>))	49 (17)

Sample $n = 1212$. Due to the small number of non-partisans in the sample, we restrict analyses involving political party identification to Democrats and Republicans only ($n = 1134$ combined)

analyses used weighted data to approximate the U.S. adult public. For analytic purposes, we collapsed the dependent variables into binary variables with categories “Yes” (combining “Yes, definitely” and “Yes, somewhat”) and “No” (combining “No” and “Not sure”). Effects of the experimental manipulation (pope prime vs. control) were not found to vary by respondent religion (e.g., Catholics vs. non-Catholics) or racial/ethnic self-identification (e.g., Whites vs. non-Whites)¹; thus, these variables are not discussed further.

Moral belief We first analyzed whether brief exposure to Pope Francis influenced the proportion of respondents who considered climate change to be a moral or ethical issue with a logistic regression model in which responses to the moral belief item (“Yes” or “No”) were regressed onto experimental condition, controlling for demographic variables from GfK’s standard profile shown to predict climate beliefs in prior survey research (namely, age, gender, income, educational attainment, and race/ethnicity). Results revealed a main effect of the pope prime on the moral belief item, $B = .24$, $OR = 1.27$, $p = .04$ (see Table 2). Whereas a minority (46%) of respondents reported perceiving climate change as a moral issue in the control condition, this figure rose to 51% among those in the pope prime condition. Notably, this effect remained significant ($B = .26$, $OR = 1.30$, $p = .03$) when political party (Democrat or Republican) was included as a covariate—a variable that was a strong predictor of responses to the moral belief item, such that Democrats were significantly more likely than Republicans to report perceiving climate change as a moral or ethical issue ($B = 1.04$, $OR = 2.84$, $p < .001$), consistent with the politicized nature of the issue (e.g., Feinberg and Willer 2013; McCright and Dunlap 2011; see also Suhay and Druckman 2015). Further analysis found that the pope prime exerted a stronger effect on the moral beliefs of Republicans: 30% of Republicans in the control group reported perceiving climate change as a moral issue compared to 39% of Republicans in the pope prime condition, $X^2(469) = 4.32$, $p = .04$. By comparison, Democrats were equally likely to report perceiving climate change as a moral or ethical issue regardless of condition (61% vs. 58% in the treatment versus control group, respectively), $X^2(662) = .57$, $p = .45$.

Causal responsibility A logistic regression analysis of feelings of personal responsibility for contributing to climate change, again controlling for the aforementioned covariates, revealed a marginally significant main effect of the pope prime on feelings of causal responsibility ($B = .22$, $OR = 1.25$, $p = .08$). Specifically, whereas a slight minority (48%) of those in the control condition felt personally responsible for contributing to climate change, that figure rose to 52% among those who were first primed with Pope Francis. As in the previous analysis, we again examined effects separately among Democrats and Republicans. This time, results revealed a significant effect among Democrats, such that the pope prime increased felt responsibility for causing climate change relative to the control group (64% vs. 56%; $X^2(660) = 4.18$, $p = .04$). Republicans, in contrast, showed no effect of experimental condition, with a steady 36% reporting felt personal responsibility for contributing to the causes of climate change in both conditions.

¹ Complementing previous findings (see Leiserowitz and Akerlof 2010; Schuldt and Pearson 2016), those identifying with a racial or ethnic minority group were more likely than Whites to endorse each of the three climate belief items: 53.1 vs. 46.4% for moral belief, 53.9 vs. 48.0% for causal responsibility, and 69.8 vs. 59.0% for mitigation responsibility, respectively. All experimental effects remain when race/ethnicity (Whites vs. non-Whites) is included as a covariate in the regression models.

Table 2 Logistic regression models predicting each of the three belief items (dichotomized as “Yes” and “No”), without (A) and with the interaction term (B)

Predictor variable	Dependent variable					
	<i>Moral belief</i>		<i>Causal responsibility</i>		<i>Mitigation responsibility</i>	
	(A)	(B)	(A)	(B)	(A)	(B)
(Constant)	-2.96**	-3.57*	-3.43**	-2.66*	-3.02**	-1.78*
Condition	0.26*	0.67	.22 [¶]	-0.30	0.12	-0.72 [¶]
Political party	1.04**	1.43*	1.05**	0.55	.92**	0.10
Condition × Political party	—	-0.25	—	0.33	—	0.55*

Condition was coded 0 = Control, 1 = Pope prime; Political Party was coded 0 = Republican, 1 = Democrat. All models control for age, gender, income, and educational attainment

[¶] $p < .10$; * $p < .05$; ** $p < .01$

Mitigation responsibility Finally, we repeated the above analyses on feelings of personal responsibility for helping to mitigate climate change. Although we observed no main effect of our experimental treatment ($B = .12$, $OR = 1.12$, $p = .37$), a significant interaction effect between treatment and political party again emerged, $B = .55$, $OR = 1.73$, $p = .04$. As with felt causal responsibility, the treatment effect was again stronger among Democrats, who were marginally more likely to report feeling personally responsible for helping to mitigate climate change after being primed with the pope (74% vs. 67%, respectively, $X^2(655) = 3.61$, $p = .06$). In contrast, no effect of the pope prime was observed among Republicans on this measure (prime: 49% vs. control: 53%, $X^2(463) = .98$, $p = .35$).

Awareness of Pope Francis’s position Finally, we examined whether awareness of the pope’s views on climate change predicted an increased tendency to view climate change in moral terms, and moreover, whether respondents with higher awareness of the pope’s views would show a greater effect of the experimental manipulation, as suggested by psychological models of priming and information accessibility. This was indeed the case. First, compared to respondents who reported having heard or read “nothing at all” or “a slight amount” about the pope’s views on climate change, those reporting relatively high awareness (defined as “a moderate amount” or greater) were more likely to endorse all three of the moral perception items ($Bs > .31$, $ORs > 1.37$, $ps < .05$)². This observation is consistent with previous work on the “Francis Effect” (Maibach et al. 2015) and may reflect a persuasive effect of the pope’s messaging. Second and more germane to the present work, a significant awareness by condition interaction emerged on the moral belief item ($B = 0.62$, $OR = 1.86$, $p = .04$) such that the experimental effect was especially pronounced among those with high awareness of the pope’s views on climate change—a pattern that emerged for the causal responsibility and mitigation responsibility items as well. Specifically, whereas those reporting low awareness showed no treatment effects ($X^2s < .18$, ns), among respondents who reported high awareness,

² Overall, the awareness measure was distributed as “nothing at all” (43.9%), “a slight amount” (29.2%), “a moderate amount” (18.4%), “a large amount” (5.9%), and “an extreme amount” (1.5%) (2.6% missing data). Perhaps unsurprisingly, awareness was greater among Democrats (29.0%) than Republicans (22.6%) ($X^2(1126) = 5.88$, $p = .02$). Moreover, awareness was greater among Catholics (30.0%) and Atheists (30.2%) than Evangelical or Protestant Christians (19.1%). The positive relationship between issue awareness and the three belief items remained significant in models controlling for political partisanship and religious affiliation.

those in the pope prime condition were more likely to report perceiving climate change as a moral issue (67% vs. 53%, $X^2(303)=6.10, p=.01$) and more likely to report feeling personally responsible both for causing climate change (66% vs. 54%, $X^2(301)=4.07, p=.04$) and for helping to mitigate it (73% vs. 63%, $X^2(305)=3.26, p=.07$) (Fig. 2).

5 Discussion

Religion and science are often viewed as being in conflict, particularly among the U.S. public (Jones et al. 2014). Nevertheless, in a national-level survey experiment, we find evidence that Pope Francis—a widely known and highly respected religious leader whose efforts to frame climate change as a moral imperative have attracted international attention—may exert a significant influence over public opinion by enhancing moral beliefs about climate change. Building upon recent longitudinal analyses of survey data, which suggest that Pope Francis's stance on climate change may be shifting U.S. public opinion (Maibach et al. 2015), the present study offers complementary experimental evidence that Francis's views may indeed prompt moral and ethical considerations of global warming and climate change among the general public.

Specifically, drawing on cognitive models of information accessibility, we examined whether priming respondents to think about Pope Francis using a question-order manipulation would heighten the public's tendency to see climate change in moral terms, and moreover, whether such a priming effect would be more pronounced among those with greater awareness of the pope's views on climate change, as those models would predict. We found that compared to respondents in the control condition, those who were primed to think about Pope Francis's views on climate change were more likely to report perceiving climate change as a moral issue (this was the case for the overall sample, and Republicans in particular) and were more likely to report feeling personally responsible for contributing to its causes and mitigation (this was the case for Democrats). Notably, these effects were found more than 7 months after the pope's 2015 visit to the U.S. and more than 11 months after the encyclical's release, suggesting an enduring effect of the Vatican's messaging on public opinion, over-and-above other potential extraneous influences (e.g., heightened media attention to climate change

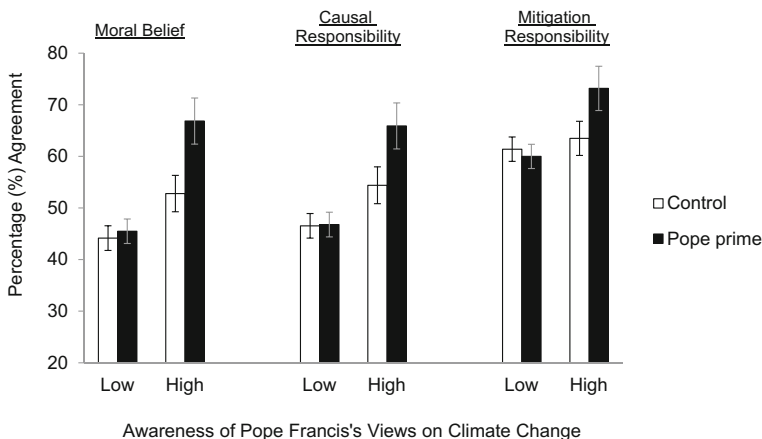


Fig. 2 Effect of experimental treatment (pope prime) on each belief item, by prior awareness of Pope Francis's views on climate change (Low, High). Error bars depict mean standard errors

surrounding the pope's visit). Moreover, we found that the treatment effect was especially pronounced among respondents who reported greater awareness of Pope Francis's views on climate change, consistent with a cognitive accessibility or priming account of these effects. The pope's prominence as a global spiritual leader and popularity across religious and non-religious groups alike may well have contributed to the similar pattern of effects observed for those groups here (see Maibach et al. 2015; Pew 2014).

The observed role of political affiliation in these effects may, in part, reflect previously observed differences in the ways in which political partisans view and moralize climate change. For instance, our finding that the pope prime exerted a stronger effect on Republicans' (vs. Democrats') perceptions of climate change as a moral issue may reflect a stronger tendency for Democrats to view climate change in moral terms to begin with (see Feinberg and Willer 2013). Indeed, in the control condition, perceiving climate change as a moral/ethical issue was the majority view among Democrats but the *minority* view among Republicans. Thus, Republicans' perceptions of climate change as a moral issue may have been more prone to shift in the direction aligned with Pope Francis's views from the outset (Fishbein and Yzer 2003; Hornik and Woolf 1999). Although the pope prime enhanced Republicans' perceptions of climate change as a moral issue, its influence did not extend to Republicans' felt personal responsibility for contributing to or helping to mitigate climate change. Although future work is required to more carefully examine this seemingly inconsistent pattern, one explanation may relate to the well-documented politicization of attributions for climate change. A recent analysis of nearly three dozen U.S. public opinion surveys conducted from 2010 to 2015 found that whereas a majority of Democrats agreed that "Climate change is happening now, caused mainly by human activities," a *minority* of Republicans agreed with this view (Hamilton et al. 2015). Given that Republicans are less likely to accept that climate change is caused by human activities in the first place, it may prove especially difficult to influence this group's feelings of personally responsibility for causing and mitigating climate change (which presume that humans play a causal role), as compared to viewing the issue in moral terms, which need not implicate human causality³. Future work may examine these and other mechanisms for the partisan differences we observed here.

Several limitations of this work are worth noting. Although the observed interaction effects between the pope prime and prior awareness of the pope's encyclical suggest that exposure to Pope Francis activates moral concerns that resonate with broad segments of the public, the present design cannot rule out the possibility that exposure to other positive messages about climate change (e.g., from widely respected non-religious leaders) might produce similar effects. Future work may examine the potential generalizability of the present effects to other leaders and/or morality-related stimuli. Similarly, the present design cannot speak to whether the effect of the pope prime is limited to moral perceptions about climate change, specifically, or if it would heighten moral perceptions of other societal issues, more broadly. In addition, the present findings reflect the U.S. public's attitudes at a particular time and within a particular context. As such, additional research is required to examine whether these findings replicate beyond the U.S.—an important consideration, given the highly politicized nature of climate change in the U.S. and the Vatican's global reach. Finally, future work may include additional measures that reveal *how* climate change constitutes a moral problem—and the potentially

³ See Roser-Renouf et al. (2016) for recent survey data on the relationships between causal attributions for global warming, religious beliefs, and political affiliation.

differing ways that Democrats and Republicans perceive its moral and ethical aspects—that may shed further light on the psychological mechanisms underlying these effects.

Nevertheless, the present findings suggest that even brief exposure to Pope Francis's efforts to spur global action on climate change can impact perceptions of climate change as a moral issue, and particularly among those with previous exposure to the pope's views. That we observed effects more than 7 months after the pope's 2015 U.S. visit and among respondents who may show greater resistance to prioritizing climate action (i.e., Republicans) suggests that the pope's message may transcend political boundaries and fundamentally re-shape how the issue is conceptualized among the public.

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