IT'S NOT ALL PARTISAN POLITICS: THE INTERACTION BETWEEN RELIGION AND

EXTREME WEATHER EVENTS IN SHAPING ATTITUDES TOWARD ANTHROPOGENIC

CLIMATE CHANGE IN THE GREATER HOUSTON METROPOLITAN AREA

by

GARY J. FITZSIMMONS

Presented to the faculty of the Graduate School of

The University of Texas at Arlington in Partial Fulfillment

of the Requirements for the Degree of

MASTER OF ARTS IN SOCIOLOGY

THE UNIVERSITY OF TEXAS AT ARLINGTON

DECEMBER 2019

Supervising Committee:

    Kelly Bergstrand, Supervising Professor
    Heather Jacobson
    Robert Kunovich

ABSTRACT

IT'S NOT ALL PARTISAN POLITICS: THE INTERACTION BETWEEN RELIGION AND

EXTREME WEATHER EVENTS IN SHAPING ATTITUDES TOWARD ANTHROPOGENIC

CLIMATE CHANGE IN THE GREATER HOUSTON METROPOLITAN AREA

Gary J. Fitzsimmons

The University of Texas at Arlington, 2019

Supervising Professor: Kelly Bergstrand

This study investigates the effect that Pope Francis' 2015 Encyclical Laudato Si had on Catholic beliefs about climate change using a Houston area case study, and presents a model for how religious affiliation and religious worldview impacts those beliefs. I tested three variables gauging respondent views on climate change included in the Rice | Kinder annual survey of Houston area residents for 2015, 2016 and 2018. My results show that Catholicism was not a factor in pro-climate belief formation in 2015, but was in 2018. The data also suggest that Catholics may have increased their risk perceptions of climate change in response to the Encyclical, but did not make a cognitive connection between climate change and prior severe weather events in Houston. Results also showed the Christian Fundamentalism is broadly predictive of climate denialist beliefs, which appear to have strengthened despite the Hurricane Harvey event in 2017. The study found evidence that pro-climate action by religious institutions can moderate the effect of partisanship and political ideology on their adherents' climate change belief formation.

ACKNOWLEDGEMENTS

I would like to thank my principal advisor, Dr. Kelly Bergstrand, for her guidance and support of my graduate research work. I would also like to thank my graduate committee members, Dr. Heather Jacobson and Dr. Robert Kunovich, for their interest and advice. Of course my graduate study would not have been possible but for the care and encouragement of my beloved parents James and Mona Fitzsimmons of the Sea Ranch, California.

This thesis project would not have been possible without the help of the Rice | Kinder Institute at Rice University, Houston, Texas, for kindly supplying the datasets used in the analysis.

TABLE OF CONTENTS

TABLE OF FIGURES

IT'S NOT ALL PARTISAN POLITICS: THE INTERACTION BETWEEN RELIGION AND EXTREME WEATHER EVENTS IN SHAPING ATTITUDES TOWARD ANTHROPOGENIC CLIMATE CHANGE IN THE GREATER HOUSTON METROPOLITAN AREA

CHAPTER 1

INTRODUCTION

On the evening of Friday, August 25th 2017, residents of Corpus Christi, Texas, braced themselves for the onslaught of a monster hurricane that only a few days before was thought to have dissipated. In less than 48 hours, a ragged band of thunderstorms that had been the remnants of Hurricane Harvey reformed over the Gulf of Mexico and morphed into a Category 4 storm making landfall on a barrier island just outside of Rockport, Texas, devastating the community and most of Aransas County. But an even worse fate was in store for the communities surrounding Houston. For two solid days beginning Saturday, August 26th, the downgraded hurricane stalled out over the greater Houston metro area dumping thirty inches of rain and flooding up to 30% of Harris County, the nation's third largest county. Most Houstonians thought they were out of harm's way. The storm, headed for southeast coast, was expected to weaken as it moved inland sparing the city the storm surge and high winds associated with hurricane landfalls. Indeed, the storm did weaken, but with the new "climate normal," that only means the flooding effects are even more acute as weakened tropical storms stall and release their moisture load in epic rainfall amounts (NOAA 2019). All told, up to 107 people lost their lives in the Harvey weather event and cost up to $160 billion in damage to homes, businesses and infrastructure, making it the second costliest storm to hit the U.S. coastline after Hurricane Katrina.

Much of the social research on climate change has focused on how partisanship and political ideology affects climate change beliefs, and the willingness of people to support climate change mediation efforts. Indeed, it is all too clear that political factors powerfully shape climate change beliefs and constrain the political consensus needed to take meaningful action to mitigate its effects and reduce carbon emissions. Yet partisanship and politics is intertwined with other structures of identity that form the lens through which people look at the world around them and form their beliefs. My primary focus is to get a better idea of how religiosity and religious institutions play a role in forming climate change beliefs independent of political factors. Did the Pope's 2015 Encyclical on the global consequences of climate change and his urgent call to action change how Catholics view the issue? Has the experience of repeated epochal storm events shaken the religious worldview of Christian Fundamentalists, well represented in the Houston community, prompting them to embrace pro-climate beliefs? Finally, must we wait for climate change consequences to get bad enough before political ideology gives way to a consensus favoring meaningful action, or can religious and other non-political institutions play a leading role in breaking through the 'partisan wall' to create that consensus?

CHAPTER 2

REVIEW OF THE LITERATURE

Historical Overview

Scientific research on the effect of greenhouse gases on the global climate dates as far back as 1896 when Swedish academic Svante Arrhenius proposed the idea that CO_2 derived from burning coal could raise planetary temperatures. In the 1930s, scientists determined that the North Atlantic had warmed in the previous half-century, and one amateur scientist, G.S. Callendar, suggested it was due to a 'greenhouse effect' (Mazur 1998). Since that time, additional evidence has accumulated showing a direct causal link between industrial emissions and rising global average temperatures. As early as 1965, Lyndon B. Johnson became the first President to warn the public that greenhouse gas emissions constituted a global experiment on the environment which threatened to fundamentally alter the climate in a way damaging to human beings (Weart 2008). Despite the consensus of the scientific community on anthropogenic (human induced) climate change, "climate skepticism" and outright denial of the scientific evidence is commonplace. Although some 71% of Americans believe the climate has warmed, an April 2018 survey by the Pew Research Center revealed that only 53% of Americans believe that it is caused by human activity. Only 49% of respondents believe that mitigation policies would be beneficial (Pew 2018). It is therefore not surprising that policy makers have had great difficulty moving even modest legislation forward.

Impediments to Social Action

>*"...given the long-term threat and the short-term nature of politics, the failure of*
>
>*policy makers to address climate change, including these issues and the costs of*
>
>*living in or near high-risk areas, is an existential threat."* - Evan Greenberg,
>
>C.E.O. of Chubb Ltd.

When the C.E.O. of Chubb Ltd, the world's largest property and casualty insurance company, described climate change as an "existential threat" in his annual letter to shareholders in April of 2019, Wall Street took notice (McKibben 2019). After all, risk management is the business of insurance companies and a dire warning from Chubb is certainly credible. If a scion of the global financial industry finds the risk of climate change to be so grave that he voluntarily divests his company's portfolio of coal and other fossil fuel producers at considerable cost to his shareholders, then how can President Trump formally withdraw from a non-binding Paris Climate Agreement effective election day, November, 4th, 2020, with the only opposition confined to his usual partisan opponents?

The challenge of mobilizing social action on behalf of climate change mitigation is the problem of the issue's close association with political partisanship and ideology, and the ambivalence that many Americans have shown toward climate change as an issue (Borick and Rabe 2010; Dietz et al. 2007; Smith et al. 2017). Shwom et al. (2015) showed that despite increasing concern among Americans over the potential effect of global warming, the priority given to it relative to other issues is fairly low. That low priority obviates the political costs elected officials might normally face by failing to take action on climate change mitigation. For example, even though up to 64% of the public opposed President Donald Trump's decision to withdraw from the Paris Accord, it had little or no impact on his standing in public opinion

(Swanson 2017). Schwom et al. (2015) also note that the low priority accorded to climate change is common among publics in the nations with the highest carbon emissions including Great Britain, Australia and China - not unexpected where climate change mitigation may be seen as a threat to economic life (Campbell and Kay 2010).

Dunlap et al. (2016) argue that current scholarship suggests that public attitudes and beliefs about anthropogenic climate change are shaped principally and perhaps even exclusively, by political ideology and partisan affiliation. Although anti-environmental sentiments have historically tended to cluster on the right wing of the political spectrum, bipartisan support for environmental legislation was not uncommon prior to the 1980s. After the election of Ronald Reagan in 1980, there has been a gradual increase in the level of partisan polarization on environmental issues, perhaps the result of a "wider polarization" of public opinion occasioned by the promotion of neoliberal political and economic ideologies (Antonio and Brulle 2011).

Dunlap el al. (2016) make the case that as partisanship has become progressively more bound up with a person's identity, embracing the idea of anthropogenic climate change is not simply a matter of "believing the science," but an important marker of identity (the converse would necessarily also be true). It is important to make a distinction between political ideology and partisanship since the two may have related effects on environmental values and beliefs, but with quite different levels of intensity. Smiley (2016) found in a study comparing respondents from Houston and Copenhagen on measures of climate change denial, that relative to political moderates, right and left wingers in those respective communities differed in opposite ways. He noted that the economic base of the two differ considerably: the former a "green" Scandinavian city and the latter and petro-chemical industry hub. He concluded that political ideology is potentially more fluid depending on those and other unique regional factors. Nevertheless, the

effect that political ideology, and its cousin partisanship, has on the formation of climate change beliefs cannot be understated.

Borick and Rabe (2010) analyzing a 2008 telephone survey measuring respondents' climate change beliefs, found that partisanship alone had a dominant effect on shaping those beliefs. They found that even the way in which Democrats and Republicans arrived at the conclusion that climate change is a real phenomenon differed. Democrats tended to rely on tertiary sources of information in construction of their opinion, while Republicans were more likely to rely on their personal observation of weather phenomena. They linked the increase in available information and the experience of climate related events as having contributed to an overall increase in climate change acceptance. On the contrary, Hamilton (2016) in his study of communities in the northeast (New Hampshire) hit by a series of devastating floods, found that despite the increasing severity of those events over time, and local media's connection of them to climate change, residents did not perceive those events *as an increasing trend* or attribute causation to climate change unless they were ideologically primed to do so.

Despite what may seem to be a fairly obvious evidence of the existence and disastrous effects of climate change, *motivated denial* may be playing an important role in preventing the development of a climate change consensus in this country. Dunlap, McCright and Yarosh (2008) link the growing polarization on the issue of climate change to the ideological antipathy that conservatives have toward regulation and taxes, along with their own strong belief in the efficacy of "market fundamentalism" (laissez faire capitalism) which has *driven organized climate change denial* because of the perceived threat that mitigation efforts may have on the prevailing economic system. Campbell and Kay (2014), taking a social psychological approach, note that political ideology is actually a relationship between moral and political attitudes that

shape how a person interprets information and acts on it, calling it 'motivated reasoning.' They argue that people may often deny the seriousness of a particular threat like climate change not because they see it as false, but rather that the solutions being posited to address it are themselves threatening. Mitigation policies may be seen as menacing material interests or a personal identity bound up in a political ideology and undermining "cherished beliefs." To pursue this line a bit further, Gauchat (2012) found that for the period 1974 to 2010, overall public trust in science did not significantly change despite theoretical models suggesting that as a result of increasing educational attainment, trust in science should deepen. Gauchat found that in 1974, conservatives had the highest level of trust in science relative to liberals, but by 2010, that pattern had reversed. In fact, the greatest decline occurred among *educated conservatives*. Gauchat found that conservatives have come to develop a unique understanding of science such that it is "knowledge that should conform to common sense and religious tradition." He found that they are particularly averse to scientific insights being used in the service of public policy or "regulatory science." Again, Campbell and Kay (2014) argue that educational efforts focused on the scientific evidence of climate change may not be effective among a milieu that fundamentally see mitigation as a threat to their job and way of life; or, as Gauchat notes, ill-disposed to what they see as science employed in public policy making inimical to their interests.

Demographic Factors Influencing Climate Change Beliefs

Notwithstanding the powerful effect that political ideology and partisanship have on shaping climate change beliefs, factors such as gender, race, education, and religion have also may potentially affect those views. We have already seen that educational attainment does not uniformly result in a greater appreciation of scientific evidence and insights. McCright and

Dunlap (2011) studied Gallup poll data and found that educational attainment had only a "mixed" effect on climate change beliefs. Although respondents with higher levels of education were more likely to believe that global warming is happening, it had no effect on what respondents believed is the cause, e.g. natural or anthropogenic. Gauchat (2012) argues that educational attainment and self-reported awareness of climate change appear to be mediated by political orientation. Higher educational attainment and greater awareness of climate change simply tend to make liberals more accepting of the scientific consensus; while for conservatives the effect *is weaker and even negative*.

Past social research has shown that women have a modestly higher level of environmental concern than men (Borick and Rabe 2010; Hunter et al. 2004). Bord and O'Connor (1997) attribute this increased environmental concern among women to a tendency to be more sensitive to perceptions of being vulnerable to risk in a general. Nevertheless, women consistently score higher in measures of environmental concern than men and indicate greater concern for global warming (Klineberg 1998). Gender differentials also work in the opposite direction. McCright and Dunlap (2011) have shown that climate change denialism is particularly intense among conservative white (American) males. They argue that this characteristic is a result of an "identity-protective cognition, reflecting a system-justifying tendency." The exponents of climate change denialism are typically white male elites with whom these men closely identify. In addition, climate change mitigation is seen, perhaps not without some justification, as a threat to fossil fuel industries dominated by white men; industries which fund and promote climate denialist viewpoints that conservative white men feel compelled to defend in social solidarity.

Although much of the sociological literature is focused on the relationship of race and ethnicity with a variety of social questions including issues like environmental racism, little work appears to have been done analyzing its connection specifically with climate change beliefs and attitudes. McMillan et al. (1997) describe early studies finding that pro-environmental attitudes and activism are typically associated with whites. Their study of North Carolina residents found the same pattern of results, although support for a host of environmental issues and policies tended to be most concentrated among affluent whites and whites with higher education levels even at rates higher than that of women. Although income was positively correlated with environmental concerns, that effect 'flattened out' after reaching very high incomes. Similar results were found in an earlier study by Jones et al. (1992) who noted that the residents of poorer, disproportionately minority communities in general tended to be less environmentally friendly during periods of acute economic stress. In an earlier study, Bullard et al. (1987) anticipated such a pattern of anemic support for environmental policies among black Americans citing the 'jobs vs. environment' conflict in the black community because environmental policies were seen as having a depressing effect on employment. However, they posited that the increasing concern with environmental racism by black activists and academics (in 1987) and its integration into the civil rights agenda would likely result in greater pro-environmental attitudes among blacks.

Indeed, Dietz et al. (2007) find that blacks by 2006, and higher income whites, typically had greater trust in environmentalists and are more likely to support climate change mitigation policies than other ethnic groups, provided they did not involve increases in taxes. Klineberg et al. (1998) investigated the ways that the wording and structure of surveys and questionnaires on environmental issues may misrepresent the attitudes and beliefs of respondents based race and

ethnicity. In their own analysis of four waves of the Texas Environmental Survey, they note blacks and Hispanics tended to be less amenable than whites to environmental policies that involve increased costs – no surprise there. However, they found that Hispanics were *more likely than whites or blacks to be concerned about global warming*, more supportive of environmental protection policies, and more likely to give financially to pro-environmental causes even though they professed to have less concern for ecological issues than either of the other two groups. Finally, I note that Marshall (2004) found differences in environmental risk perceptions between blacks and whites in communities with polluting industries such that blacks had higher risk perceptions than whites. They attributed this difference to a greater sense of vulnerability to the effects of pollution by persons in poor and minority communities. No such ethnic risk-perception distinctions were detected in communities that did not have such industries.

Religious Affiliation and Climate Change Beliefs

Political, ideological and other demographic or educational factors can certainly be used to target populations most likely to respond positively to climate change mitigation messages and encourage them to take pro-climate action. However it does not necessarily promise the ability to reach out to populations who are not otherwise so pre-sensitized. Responding proactively to a global crisis ought not to be confined to the agenda of a particular political party whose fortunes rise and fall with elections cycles. Indeed, the United States' participation in the Paris Climate Agreement quickly fell victim after a change in party control of the White House, but no doubt will be restored should another party seize control in 2020. This is hardly a recipe for a successful climate change response over the long term. However, politics, education and demographic profile are not the only way people construct their identities. Religious affiliation

and religiosity, still strong in the United States, is a powerful lens through which people make sense of the world around them and understand the challenges they face individually in their lives and that of their community. Indeed "…religiosity is a 'carrier of group identity'" (Kunovich and Hodson 1999).

Research in the social (and the political sciences) on the relationship between religion and political issues did not gain ground until the 1980s after the emergence of the so-called "Christian Right" in the mid-1970s (Jelen 1989). Sociologists and political scientists intrigued by this phenomenon subsequently devised new survey techniques to measure the impact of religious affiliation and religious intensity in deeper ways (Olson 2007). Initially, the investigation of the religious dimension in political life was separated by a tripartite distinction in affiliation: Protestant, Catholic and Jew. This distinction was thought to neatly correlate with partisanship such that Protestants were typically Republicans, while Catholics and Jews voted Democratic. This easy categorization has since been replaced with a more nuanced view of the relationship between partisanship, ideology and activism based on the significant differences between Protestants and their many different theological traditions (Olson 2007).

Religious affiliation shapes the identities and worldview of adherents (Hayes et al. 2015) and Sherkat and Ellison (2007) note that religious cognitions arising out of church doctrine, religious teachings and group interaction - called "schemata" - are "transposed onto other social fields" which include political structures. The question here is how religious identity and cognitive schemata might impact views of politicized issues like climate change and willingness to engage in direct action. Olson (2007) argues that the intersection between religion and politics is a complex one and will differ significantly between communities even down to the neighborhood level, and therefore cannot be solely inferred from national studies. She notes that

the current literature suggests that individual faith communities greatly impact the formation of their member's political behavior through "bonds of commonalities" and do so in ways more powerful than those informed by their own "personal worldviews" (Olson 2007:446). Scheitle and Hahn (2011) see, at least in the case Evangelicalism, that religious affiliation does not directly influence policies and legislation, rather influencing it indirectly through the agency of social movement groups, the formation of public opinion and raising the salience of select issues in mass elections. Taken as a whole, religious identity can be seen as interposing itself, even at the minute parish level, in the formation of political attitudes and beliefs even if contrary to the larger 'worldviews' of adherents, and channeling that interposition into political action through the church's institutional resources.

Catholicism, Environment and Climate Change

As the Pope's Encyclical Laudato Si is as much an exhortation as it is pedagogic, motivated reasoning in the service of protecting one's livelihood may present an impediment to its acceptance among Catholics. Nevertheless, and at the same time, a Papal letter such as an Encyclical carries the weight of the church's doctrinal authority (Catechism Sec. 2034) and therefore tying the scientific consensus on climate change to that authority and religious tradition may, for conservatives in particular, militate against motivated denial. The central question of this study is whether Pope Francis' Encyclical Laudato Si on climate change might have influenced the beliefs of the Catholic faithful, and motivated pro-climate action. Wald (1992) asked a similar question on how the views of rank-and-file Catholics on the Reagan-era nuclear weapons buildup changed after the United States Conference of Catholic Bishops (USCCB) issued their 1983 Peace Pastoral. That Pastoral letter, addressed to the nation's Catholic laity,

was deeply critical of the Reagan Administration's weapon's policy. Wald notes Priest/Sociologist Andrew Greeley's finding that the Pastoral resulted in a 20% increase in the number of Catholics who reported that the U.S. spent too much on defense from 1983 to 1984. That statistic was subsequently challenged by others who showed a much more modest effect. Wald argues that what Greeley measured in surveys taken in 1983, and again in 1984, was only the immediate impact of the Pastoral. Follow-up surveys taken in 1987 found that Catholic opposition to Reagan's nuclear weapons build-up had indeed attenuated, but at a level higher than the pre-Pastoral equilibrium. At least as important, Wald (1992) notes that Protestant opposition during the same period, lagging behind the post-Pastoral Catholic spike, eventually converged with the new Catholic equilibrium *suggesting that Catholic moral leadership on the nuclear weapons issue had a corresponding influence on Protestant opinion.*

In addition to motivating an overall change in Catholic opinion, Wald argues that its effect was strongest among the most devout Catholics. This is likely not perhaps an unexpected finding given that the church's most devout are likely to be those who attribute the greatest credibility to the church's elite. The Pastoral's ideologically challenging content, penned by the nation's collective Bishops, interposed itself on the traditionally pro-defense views of the Church's most devout members producing a significant change in opinion. Wald (1992: 446) argued that the political views of religious people are shaped by the linkage religious elites make between political issues in ways that "may subvert rather than reinforce the established order."

Naturally not every church member can be expected to greet the latest pronouncement of religious elites with unqualified acceptance. Wald (1992) identified a number of barriers to the acceptance of the Bishop's Pastoral and hoped behavioral changes including inattention, distortion, selective perception/attention, resistance, compartmentalization, and attrition.

Specifically resistance to an "uncongenial new message" in a culture that prizes "individual autonomy" and judgment is problematic for any statement the church might make on a matter considered secular. In the case of the Pastoral, Bishops were also confronted with the difficulty of having to contradict a prior legacy of Catholic teaching. As alluded to above, that teaching encouraged Catholics to support a robust defense posture in confronting communist aggression, thus making Catholics more open to military action and intervention. In the case of Pope Francis' Laudato Si, Catholic Church elites have previously made pro-environmental statements, which is reflected by Catholics' greater receptivity to environmental policies (Pew 2015b).

Li et al. (2016) studied Catholic opinion on climate change less than a year after the Pope's release of Laudato Si in June of 2015, and found that it did not have a significant influence on Catholic opinion. Among Catholics who were aware of it, the Encyclical simply reinforced the pre-existing views of liberals toward climate change, while conservatives dismissed the Pope's credibility on the issue. They concluded that conservative political identity and conservative 'group norms' undermine any religious cross-pressuring that might attenuate conservative denialism. There is, however, a significant difference in the way in which Laudato Si was presented to the Catholic faithful, and the Bishop's Peace Pastoral in 1983. The Encyclical was a top down document issued from Rome; the Pastoral was the work of the nation's Catholic Bishops each of whom had a stake in implementing the pastoral in their respective dioceses. Li et al. note that American Bishops were somewhat less than enthusiastic about promoting Laudato Si in their dioceses immediately after its release.

We have seen thus far in this discussion how religious affiliation is a critical component of a person's identity, and how the religious community in which that person belongs can shape their political behavior and views, even if contrary to their ideological worldview. We have also

seen how a strong institution such as the Catholic Church can significantly modify its member's views on an issue like nuclear weapons proliferation in a way contrary to what had prevailed previously. In the alternative, we have seen how an attempt by the Pope to interpose a view on climate change did not appear to result in an *immediate change* among persons with a countervailing view born of partisanship in the absence of a meaningful effort on the part of local Catholic elites to promote it. At this point it may be helpful to review some of the current literature describing the relationship between political views, partisanship and religious affiliation in somewhat greater detail, and consider how that may be expressed in non-Catholic groups.

Religion, Politics and Social Movements

A wealth of statistical data has been produced documenting a strong relationship between religious affiliation, religiosity, partisanship and political ideology. Pew Research Center's 2015 *Religious Landscape Study* (Pew 2015a) found that a plurality of Catholics (44%) identified as Democrats, while a strong majority of Evangelical Protestants (58%) identified as Republicans. The survey also showed partisanship differences based on intensity of religious practice. Among those who attend church at least once per week, 46% identified as Republican, while 37% identified as Democrats. Among those who seldom or never attend religious services, 28% identified as Republican, and 51% identified as Democrats. Patrikios (2008) argues that the Republican Party has increasingly become home to the religiously affiliated and devout, while the Democratic Party has become home to the unaffiliated. He also found evidence that partisanship and political ideology actually affect the choices people make on what churches to join and which worship styles to engage in based on a person's political profile - a form of

"reciprocal causation." Some scholars have argued that the rise of the "Nones," those unaffiliated with any religious group, is a consequence of the rejection of religious identity by persons uncomfortable with growing religious base of the Republican Party (Campbell et al. 2018). Thus partisanship and political ideology, although having different characteristics, are intertwined (Mason 2015; Noel 2014) and actively shape religious affiliation, and motivate or de-motivate potential affiliation with a religious group.

If indeed religious adherents are embracing partisanship based on religious group norms, the question arises whether any differences on subjects like climate change may be due to *a priori* self-sorting rather than to any action on the part of a religious institution. Patrikios (2008) seems to suggest that this might be the case for Evangelicals, but not for Catholics, and not for Democrats. Indeed, Patrikios argues that conservative ideology has increasingly become linked to Evangelicalism and leveraged by Republican Party leaders for political benefit. He argues that Democrats have drifted to a more 'secularist' position, eschewing obvious religious connection. In other words, for Evangelicals, Republicanism is the group norm which becomes dynamically self-reinforcing. Past literature on the relationship between religion and politics assumes a one way interaction such that religious values and faith community bonds shape political views. More recent research is suggesting that ideological values and political relationships are affecting religious affiliation, transposing partisan polarization into the religious sphere. This is an important insight into current religious trends: anti-environmental views may very well be a part of a nexus of conservative viewpoints pushing people into church groups that tend to share such views.

Although this paper is primarily concerned with the possible influence the Catholic Church has on its member's beliefs on climate change, no discussion would be complete without

some understanding how another religious group may separately be influencing climate change beliefs of its adherents in quite different ways. Sociology is no stranger to the research and analysis in the origin, ideology and structure of right wing social movements in the United States stretching back to the post-war period. Rydgren (2007) described the numerous theoretical models used over that time to understand the phenomenon. Some of them, such as the anomie theory of mass society popular in the post-war period, have given way to theories that recognize the greater class diversity and relative economic stability of right wing movement adherents in the United States and other rich countries. In an attempt to better understand the apparent affinity that Fundamentalist Christians have for rightwing social movements, Rydgren notes the importance those movements attribute to fighting 'sociocultural liberalism' e.g.: abortion rights, immigration; and supporting ethno nationalism, law and order and 'family values.' In their analysis of the development of right wing and conservative movements, Blee and Creasap (2010) outline the development of the "New Right" characterized by neoliberal economic policies, patriotism and opposition to the erosion traditional moral norms. Citing past research they argue that the New Right was not initially a Fundamentalist enterprise, as it had been a fixture of what they called the "Old Right" typical of southern communities. In the wake of the civil rights movement, social conservatives downplayed overt racial rhetoric, reifying it into a strongly anti-government, anti-interventionist discourse that appealed to free-market (neoliberal) conservatives. Blee and Creasap argue that this resulted in the fusion of socially conservative Fundamentalism and libertarian economic ideology.

Religious Worldview, Partisanship and Climate Denialism

Thus far we have already demonstrated the close association of anti-environmental and climate change denialist views with partisanship and political ideology, the relationship between neoliberal economic values and climate change denialism, and the fusion between social conservatives, Fundamentalists, and libertarians in right wing social movements. However, there is an additional element of Christian Fundamentalism that shapes the environmental values of its adherents and may specifically connect it with climate change denialism. Dochuk (2015) argues that Protestant Fundamentalism in the United States was profoundly shaped by the ideology of 19th Century "wildcat oil producers." These producers were typically locked in an economic battle with Standard Oil and the other eastern corporate producers who attempted to impose regulatory constraints on the rampant resource exploitation of wildcatters. The populist, anti-establishment and libertarian rhetoric of the wildcatters was reflected by financial support for independent Fundamentalist missions. Those missions in turn, competed with the wealthy eastern Protestant denominations that were the home of the corporate elites the wildcatters were in conflict with. Christian Fundamentalism in this view developed around the values of oil industry wildcatters, sharing their same suspicion of institutional elites and a libertarian view that God gave natural resources to mankind for his use and exploitation free from constraint.

Evangelicalism and Fundamentalism are intertwined; indeed, Fundamentalists are almost always Evangelicals, but not all Evangelicals are Fundamentalists. Nevertheless, research has shown the Evangelicals in general tend to be more hostile to pro environmental policies and values. Hempel et al. (2014) identified certain common anti-environmental themes among Evangelicals: labeling environmentalism as an anti-scientific form of religion which is inimical to Christianity and personal freedoms; and linking laissez faire capitalism and its hostility to

environmental regulation to authentic Christian faith. They note, however, that hostility to environmentalism is not uniform among all Evangelicals but appears to be associated with "factions" within the movement. Smith and Leiserowitz et al. (2013) encountered similar findings among Evangelicals in their views of global warming. Persons having an "individualistic" cultural worldview (as opposed to "egalitarian") were less likely to embrace pro-climate policies, most especially government regulatory intervention in the private economy. Looking at the issue from the perspective of political science, Guth et al. (1995) found that a belief in biblical inerrancy was well correlated with anti-environmental views but did not directly impact opposition to environmental policies. Sherkat et al. (2007) found the same pattern, that conservative religious orientations motivate involvement in conservative politics, which in turn tends to diminish their perception of the severity of environmental problems. Sherkat also found that religious conservatives do tend to score high on Christian theological views of environmental stewardship which is correlated with to pro-social environmental behaviors – except among those who adhere to biblical inerrancy. The magnitude of the negative effect of biblical inerrancy on pro-environmental values actually overwhelms whatever positive effect may be engendered by a greater commitment to ideas of stewardship. Sherkat (2007) found the same pattern is reflected in members who belong to conservative Evangelical sects. Taken together, the literature suggests that a belief in biblical inerrancy, which is at the heart of Christian Fundamentalism, results at best in a profound ambivalence toward environmental issues, but in general is hostile to pro-environmental values, policies and behaviors relative to non-Fundamentalist Evangelical Christians. As Olson (2007) makes clear, the interplay between religious values and the formation of views on matters such as global climate change is complex.

Lived Experience of Severe Climate Events

Understanding whether the experience of climate change related disasters can be leveraged to mitigate anti-environmental views presents at least one possible avenue to engendering greater public support for pro-climate policies. It makes some intuitive sense that the experience of extreme weather events plausibly linked to climate change would tend to increase its salience, acceptance of the scientific basis for its reality, and willingness to support efforts toward its mitigation. Although some of the older literature is contradictory, more recent studies have indeed shown such a link.

Spence et al. (2011) analyzed 1,822 responses from a national survey conducted in the United Kingdom to assess links between the experience of major flooding events and attitudes and behaviors regarding climate change. Their study found that those who directly experienced flooding events had stronger beliefs about climate change, feel greater personal risk, and are more willing to engage in energy conservation measures. *The study also found that the perception that the events could be attributed to climate change was important in producing the effect.* The literature also suggests that flooding events are particularly associated with an increased sense of personal risk from climate change and willingness to take remedial action. Demski et al. (2016) found that following a widespread flooding event in the winter of 2013 and 2014 in England, those affected found climate change more salient, had greater risk perceptions, and were more likely to support climate change mitigation efforts than those who did not have the direct experience.

Van der Linden (2014) found a strong link between the salience of climate change and personal experience of extreme weather events. The link resulted in a change an individual's feelings (affect) toward climate change and resulting behavior. Because climate change as an

abstract phenomenon cannot be experienced directly, it fails in his words to "activate a primal affective/associative risk response." The strong negative affect generated by the experience of a hurricane will normally only result in a risk perception oriented toward the hurricane as an "object." But if a person has cognitively linked hurricanes to climate change, then the experience results in a much stronger negative affect toward global warming and a greater perception of climate change risk. Van der Linden also found evidence that once the link between personal experience and climate change is made, a mutually reinforcing feedback system develops whereby an increase in climate risk results in people seeking out new information which in turn reinforces a 'negative affect' toward climate change. He therefore encourages climate advocates to adopt a public relations strategy designed to clearly and unambiguously establish a link between climate science and event experience in order to encourage pro-climate behaviors and beliefs. Using Van der Linden's insight into how a massive storm event may impact climate change beliefs when such a link is made, we can turn to a case close to home: Hurricane Harvey in Houston.

CHAPTER 3

HOUSTON AREA CASE STUDY

Houston as a Unique Nexus of Diversity and Climate Change Risk

As shown in Table 1, from 2005 to 2018, the Texas Gulf Coast including the greater Houston metropolitan area has been subject to five extreme climate related disasters with costs in excess of $1 billion (NOAA 2018). Research by the Pew Research Center (Pew 2018) has shown that residents of coastal areas are much more likely to say that climate change is affecting their communities, even cutting across partisan lines. Thus, exposure to widespread weather-related disasters, especially those involving flooding, and plausibly linked to climate change may tend to undermine anthropogenic climate change denialist beliefs. Intuitively, it seems that Hurricane Harvey, coming in a year which saw two other events of similar magnitude hit other parts of the country, would present a significant challenge to denialism. Houser et al. (2017) suggests that the experience of such events does in fact sensitize people to the existence of climate change and the need for mitigating its effects but does not necessarily result in an embrace of its anthropogenic origins. The effect of Hurricane Harvey and other severe weather events over the past decade might have been expected to spur a mass social movement in support of comprehensive climate change mitigation efforts across political lines. Yet even one year after the storm, and despite the slow reconstruction efforts, perceptions of climate change's seriousness still appear firmly linked to partisanship as shown in Figure 1 below.

Figure 1: Perceived Seriousness of Climate Change, 2016 and 2018 (WARMING variable).

Survey 2016

	Republican	Independent	Democrat
▪ Not Very Serious	54.65%	22.36%	11.23%
▦ Somewhat Serious	27.47%	29.81%	28.31%
▪ Very Serious	17.88%	47.83%	60.46%

Survey 2018

	Republican	Independent	Democrat
▪ Not Very Serious	57.50%	19.10%	5.04%
▦ Somewhat Serious	23.27%	35.96%	22.44%
▪ Very Serious	19.22%	44.94%	72.52%
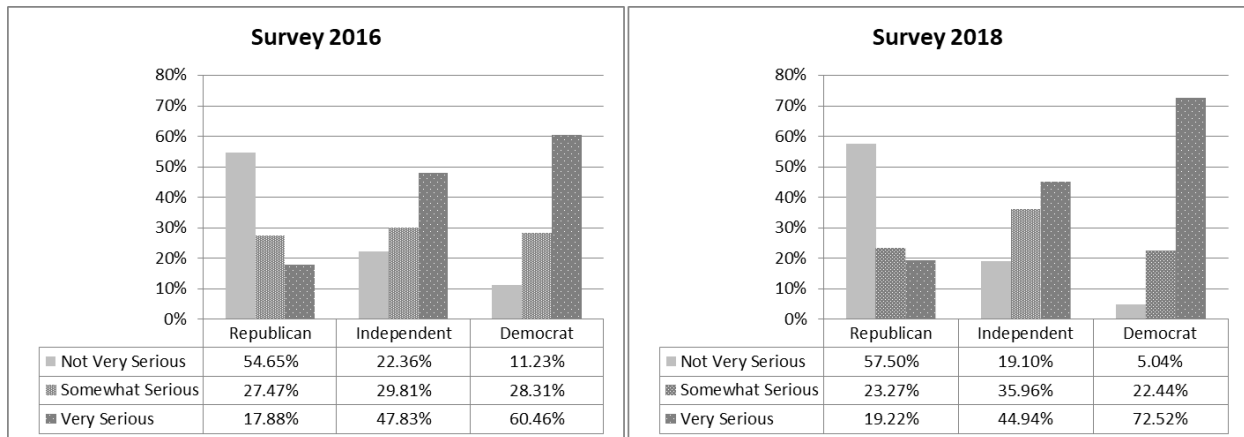
The Texas Gulf coastal region and the greater Houston metropolitan area is home to the nation's largest and most sophisticated petrochemical infrastructure in the world. In fact, Houston was slated to be the terminus of the controversial XL pipeline precisely because its refineries can actually process the dense, asphalt-like consistency of the Canadian tar sand slurry (Blum 2017). In addition to processing, the Port of Houston is the world's largest shipping hub for petrochemical products. Therefore, a significant proportion of residents of the Houston SMSA, 12%, are directly engaged in the petroleum extraction, services and processing industries, and another 2% in chemical manufacturing (Davis and Thompson 2018).

Texas is characterized by its high rates of religious affiliation and belief, and Gallup has ranked it in the top ten most religious states (Newport 2009). The *U.S. Religion Census* for 2010 puts the Houston SMSA as the fifth highest SMSA in the nation in its proportion of religious adherents. Harris County, which the city of Houston is almost wholly incorporated in, ranks seventh in the state in congregations per ten-thousand residents (ASARB 2012). The religious profile of Houston area's residents is quite a bit more varied relative to the rest of Texas. Whereas the Midland/Odessa "Petroplex" is predominantly white and Evangelical, the Gulf Coast region is significantly more diverse. Catholics represent almost a quarter of Houston's

church-goers, while half of all Evangelicals are African-American. Other religious groups, such as Buddhists, are well represented given the robust and growing Asian community in the region (ASARB 2012).

The Texas Gulf Coast is a region of great urban diversity. In fact, the *New York Times* called Fort Bend County, included in the Rice | Kinder sample, the nation's "most diverse county" given its equal proportions of whites, blacks, Hispanics and Asians in the population (Maclaggan 2013). This is a region where opinions and attitudes toward climate change are subject to multiple competing pressures stemming from direct experience of extreme weather events along with heightened risk perceptions, employment in petrochemical industries, and the clash between conservative political orientations typical of the south and the urban cosmopolitanism of Houston. The Houston region is a laboratory for how different factors can affect climate change awareness, and how institutions can either support or undermine climate change acceptance, or fuel denialism. One of these factors is religion.

Faith and Climate Change Belief in Houston

Figures 2 and 3 give an overview of the distribution of belief in the anthropogenic origin of climate change among the faithful of the Houston area in the post Hurricane Harvey 2018 survey wave. Specifically, the extent to which the adherents of the selected faith groups either accept the scientific consensus attributing the cause of climate change to human activities or attribute it to natural climate cycles. Figure 2 shows that members of each of the religious groups analyzed in this study; Protestant, Catholic, Jew, Other, None, accepted the scientific consensus on climate change, with Protestants having the lowest levels and Jews having the highest.

Figure 3 shows the distribution of belief in the anthropogenic origin of climate change by individual Protestant denominations. In most social surveys of religious groups in the United States, members of historical black churches are broken out into individual categories. The Rice | Kinder survey does not do this. Despite the popularity of the Baptist and Assembly of God denominations among Fundamentalists, those traditions are internally dispersed into sub denominations that are often clustered by race. It may appear that Baptists are supportive of the scientific consensus, but that may very well be the effect of African American Baptists who support it for partisan, as opposed to religious, reasons.

It is notable that among the denominational groups that do not embrace the scientific consensus are Lutherans and Methodists. Both the Evangelical Lutheran Church and United Methodist Church have public stands on faith and climate change and so their somewhat higher rates denialism may be puzzling. However, the Rice | Kinder survey instrument did not distinguish between inter-denominational families which may differ considerably in their view of the Bible (hermeneutics). Heen (2006) notes that the two main branches of American Lutheranism, the Evangelical Lutheran Church in America (ELCA), and the Lutheran Church Missouri Synod (LCMS), represent two hermeneutical traditions that developed in the first half of the twentieth century. The ELCA tradition broke with 17th Century Lutheran orthodoxy and "recovered" (Heen 2016:18) a fresh biblical interpretation inspired by the Reformation, while LCMS held to the 'Old Lutheran' orthodoxy. Essentially that split replicated the modernist/fundamentalist schism in the rest of American Protestantism creating the same denominational association between political, cultural and social values with theological outlook. In Texas, the LCMS (ASARB 2012) is the dominant Lutheran denomination and so it is not surprising that Houston Lutherans may appear to have higher levels of climate change denialism.

This is important to remember later on as I discuss the powerful relationship between climate denialism and biblical fundamentalism. Although outside the scope of this study, the same historical patterns that produced the modernist/fundamentalist split of the early twentieth century affected Methodists as well; a much larger and more theologically diverse branch of American Protestantism than the Lutherans.

2018 Anthropogenic Climate Change Belief by Religion

Legend: ■ Human Actvities ▦ Normal Cycles
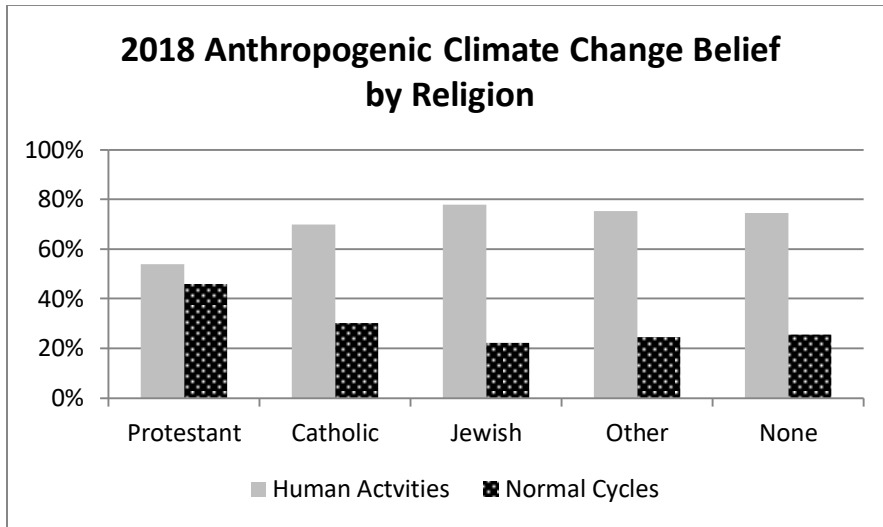
Figure 2: Belief in anthropogenic climate change by religion for respondents on survey wave 2018.

Survey 2018 Protestant Denominations & Climate Change Beliefs

Legend: ■ Normal Cycles ▦ Human Activities
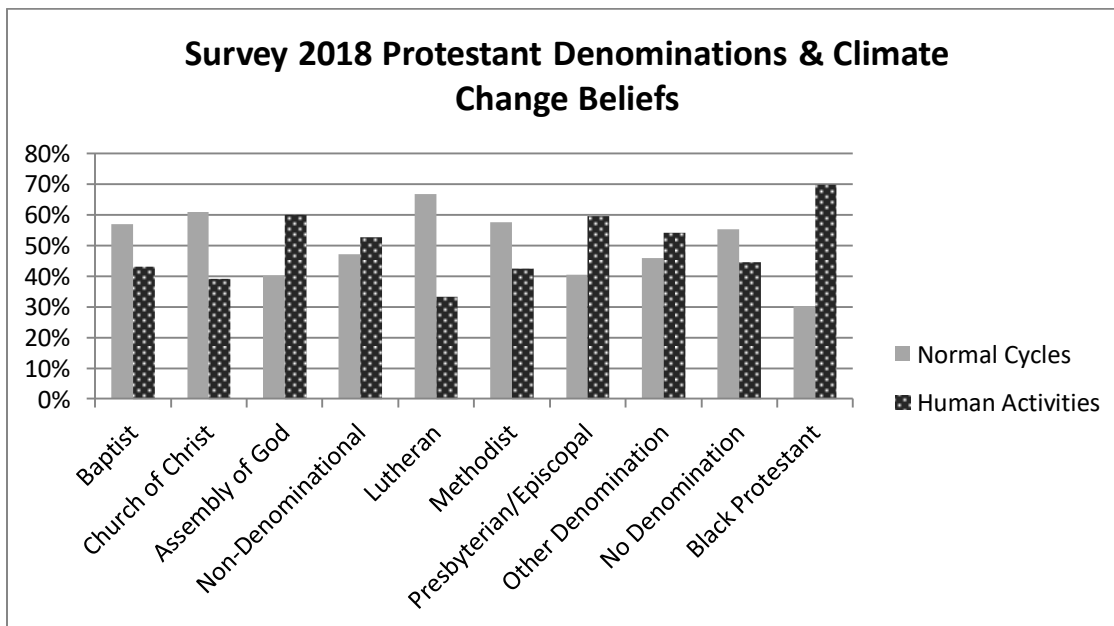
Figure 3: Belief in anthropogenic climate change by Protestant denomination for survey wave 2018. African American Protestants from all denominations.

CHAPTER 4

THE RELIGION/CLIMATE CHANGE EVENT MODEL

Figure 4 shows the hypothesized model for the interaction of different factors on the

formation of climate change beliefs. The model suggests that the driving factors are partisanship

and political ideology which is indicated by the bold lines. Gender and age are modeled to have a

direct effect on the climate change beliefs, while ethnicity is seen to have an indirect effect

mediated through partisanship. Educational level is modeled to impact partisanship by shaping

political ideology although Pew (2018) suggests it may now have a direct effect on partisanship.

It can also shape beliefs about climate change by promoting greater knowledge and awareness of

the issue, but only indirectly as it is mediated through political ideology (McCright and Dunlap

2016).

Instead of breaking out each religious group, I have modeled how religious worldview in

general relates to the other factors in the model. The possible "worldviews" are not exhaustive,

and I have only included fundamentalism, traditional Christianity, and no religious affiliation. I

have not included non-Christians, or separated a Catholic worldview from a traditional Protestant

one. Nevertheless, the overall point is illustrated: worldview can be seen to shape the selection of

a denomination if one is traditional, whilst Fundamentalists select individual congregations.

Nones of course by definition do not affiliate with either a congregation or denomination. In this

model Fundamentalism has a two-way relationship with partisanship and political ideology

(mutually reinforcing) and a direct effect on climate change views. Catholics are treated as a

denominational type and can be seen in this model to have a direct effect on climate change

beliefs. Catholicism may have an effect on partisanship, but it is difficult to disentangle from

ethnicity and so is not reflected in the model. Note that denominations other than Catholic are

not seen to have a direct effect on climate change beliefs or the political factors. The Nones are

modeled to have a direct effect on the formation of political ideology and on climate change

beliefs. Protestant denominationalism is not modeled to have a meaningful impact on climate

change beliefs or the formation of political ideology and partisanship. Despite the pro-climate

statements made by some denominations, institutionally the churches are not seen to be

sufficiently authoritative to produce a direct effect on the belief formation of their adherents.
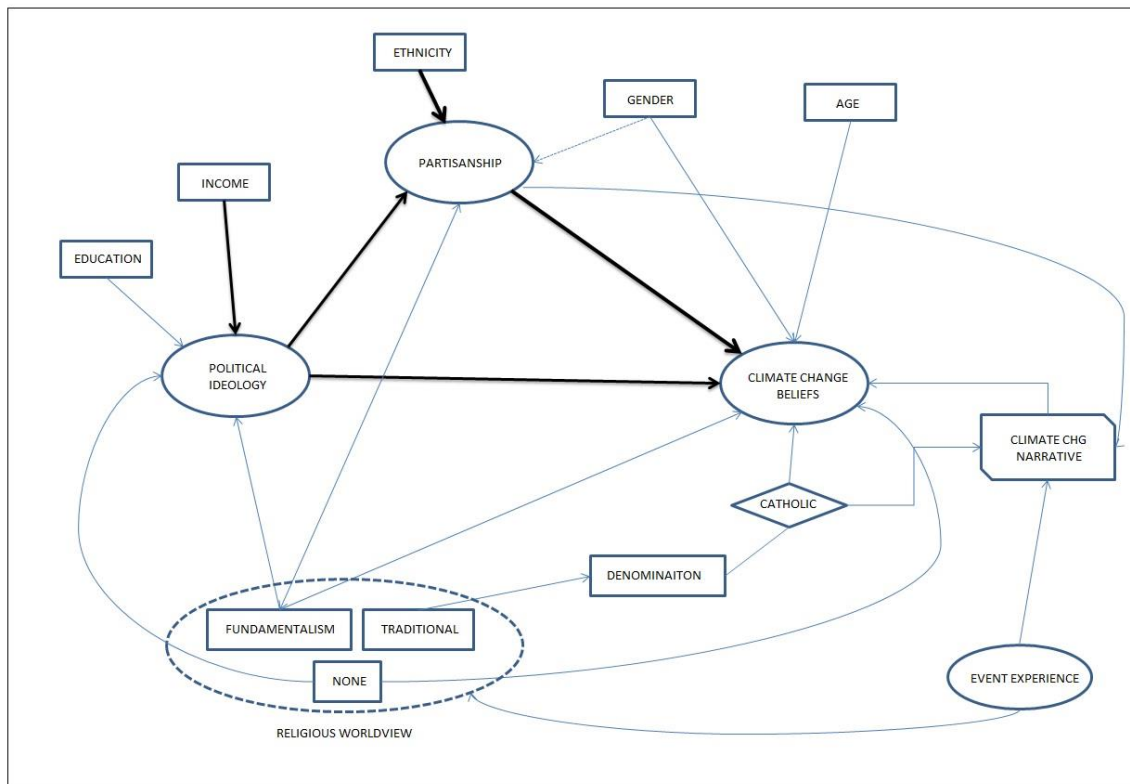
Figure 4: Hypothesized interaction model for the formation of climate change beliefs.

The experience of severe (likely repetitive) climate events is modeled as having an effect

on climate change beliefs mediated by an external narrative that provides a person with a 'road

map' to understand how they relate. That narrative may be provided by a political organization

such as a party, or in the case of the Pope's Encyclical, the Catholic Church. The experience of a

climate event is also modeled to potentially impact a person's religious world view which in turn may affect climate change beliefs. Such an event, for example, may shake the denialist views of Fundamentalists thus attenuating their denialism. Of course, it is possible that the least costly course of action is simply to re-interpret lived experience and attribute to it a supernatural cause rather than a scientific one.

CHAPTER 5

DATA AND METHODS

Data and Sample

      I used the Rice | Kinder Houston Surveys for 2015 to 2018 to evaluate the hypothesized influence of the Papal Encyclical on Catholic attitudes toward climate change relative to other religious groups, and the potential influence of property damage or personal injury caused by the Hurricane Harvey on their views. Rice University's Kinder Institute for Urban Research has conducted its Kinder Houston Survey since 1982. The survey is an annual representative sample of more than 1,000 randomly selected adult residents of Harris, Montgomery and Fort Bend counties, Texas, weighted to known population parameters. Each survey respondent receives a 30-minute interview conducted by telephone beginning the first week of February until mid-March, using both landlines and cell phones in equal proportions. Since 1982, the survey has expanded the geographic base of the sample from solely Harris County, adding the additional two counties to better represent the greater Houston metropolitan area (see Figure 5). Care must therefore be taken when using the datasets to compare responses longitudinally to ensure that respondents are sourced from the same geographical area. The 2015 through 2018 samples sourced residents from all three counties; and because Hurricane Harvey, as well as past flooding events, struck all of them, I will be using the full sample for this study.
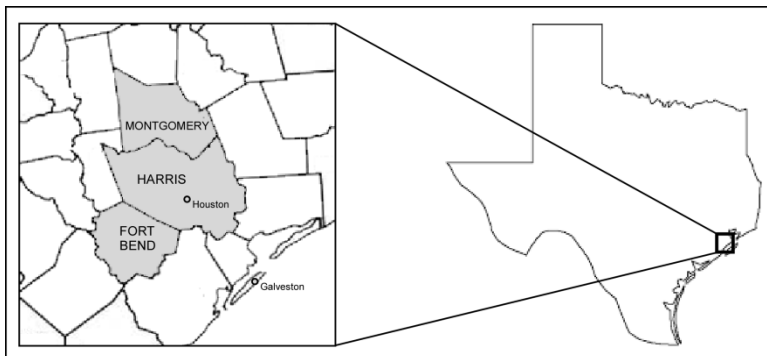
Figure 5. The location of residents sampled for the Rice | Kinder survey.

The Rice | Kinder Institute released full datasets for the 2015, 2016, 2017 and 2018 waves for my analysis. The 2017 wave did not include measures of the dependent variables used in this study, and the most recent wave from 2019 is currently embargoed until early 2020. Survey data from 2015 provides a baseline measure for public beliefs and attitudes toward climate change immediately prior to Pope Francis' release of Laudato Si. The hurricanes of 2005 and 2008 already presented a known risk to the community for those survey respondents who experienced them, but far enough in the past that the proximate effect on their beliefs will have attenuated. The 2018 survey was conducted one year after Hurricane Harvey, as well as two other back-to-back billion-dollar flooding events affecting the Houston-Galveston region in 2015 after that year's sample was collected, and in late 2016.

Measures

Dependent Variables.

The Rice | Kinder Survey includes three variables that can be used to measure for respondents' beliefs in the reality, effect and potential risks of climate change. Table 2 presents a frequency distribution for each found in the dataset for the respective wave.

WHYWARM What do you believe is the primary cause of the high global temperatures we have experienced in recent years? Are they mainly caused by human activities, or are they mainly caused by normal climate cycles? (2015, 2016, 2018)

WARMING   How serious a problem would you say is the "greenhouse effect," or the

threat of global warming? Would you say: very serious, somewhat serious,

or not very serious? (2016, 2018)

CO2STORMS   Do you think climate change (or global warming) has been causing

Houston storms to be more severe, less severe, or has it had no impact?

(2018). This variable was recoded as a dichotomous statistic

CO2STORM_RSK as described below.

The dichotomous WHYWARM variable asks respondents whether they believe that the

primary cause of the high global temperatures experienced in recent years are caused by human

activities or result from normal climate cycles. A respondent selecting 'human activities' signals

her acceptance of the scientific consensus on climate change, while the selection of 'normal

climate cycles' would signal a rejection of the consensus, or the denialist position. The survey

included the measure in the 2015 wave before the Encyclical was issued, and the 2018 wave

three years later making this the key variable I will use to assess change in beliefs over time. I

reverse coded the variable for the purpose of the analysis so all coefficients of those independent

variables hypothesized to be positively related to acceptance of the scientific consensus will also

be positive.

Introduced first in the 2016 wave and repeated again in the 2018 wave, the WARMING

variable measures the perceived seriousness of the "greenhouse effect" and global climate

change in the future on a three-level ordinal scale of severity. The scientific consensus on climate

change maintains that it will become progressively more serious in the future, and present very

serious problems for low-lying coastal communities such as Houston. Affirming the growing

seriousness of climate change is therefore consistent with the consensus and understanding it as a

very serious problem suggests that the respondent is familiar with what the scientific community expects for places like Houston. A belief that the consequences of climate change will not be very serious is therefore consistent with a denialist position.

The CO2STORMS variable was included in a special Hurricane Harvey section of the 2018 survey wave in order to measure whether respondents connect the hurricane event and previous Houston storms with climate change (or global warming). The scientific consensus is that climate change has very likely increased the severity of past storms, particularly in coastal areas such as Houston. A response of "more severe" would therefore be consistent with that consensus and a response of "less severe" or "not at all" with a denialist position. It is not, however, merely a proxy measure for denialism, as making the connection between climate change and storm severity requires a greater familiarity with the research. Thus, the variable, like the WARMING variables, measures applied knowledge of the impact of climate change.

The CO2STORMS variable attempts to measure the respondent's perceived impact of climate change on past weather events, but I find the "less severe" response difficult to interpret. If a respondent believes that climate change has not affected storm severity, then it follows that he rejects either the scientific consensus on the expected relationship or is simply unfamiliar with it. The response "less severe," however, suggests that a respondent believes climate change is actually happening, but that its effect on storm severity is the opposite of what the scientific community has been warning. That seems something of an unlikely position to take unless the respondent simply misunderstands the direction of the expected effect or is emphasizing his rejection of climate science. Although Rice | Kinder coded the response "don't know" as missing in its dataset, the response has integrity. 'Not knowing' may be an admission of a lack of information, or it may represent a transitional mental state. Perhaps the effect of Hurricane

Harvey resulted in some people reconsidering their previous skepticism of the effects of climate change and their vulnerability. With only a single data point it is difficult to know. Nevertheless, any response other than "more severe" would indicate that the respondent does not make, or has not yet made, the causal connection between climate change and the increasing severity of Houston storms consistent with the scientific consensus. With this caveat in mind, I have recoded the responses "don't know," "less severe" and "no impact" into a single "no change" response in order to create a dichotomous categorical variable.

Independent Variables

The key dependent variables in this study measure religious identity, belief structure and denominational affiliation. Measures of political ideology and partisanship, as well as demographic markers, are used to identify and hold constant these expected factors in the formation of climate change beliefs. The variables are described below, as well as the coding scheme used and the manner in which the religious worldview variable was constructed.

AGE <u>at last birthday</u>

GENDER <u>"0" Male, "1" Female</u>

ETHGROUP4 <u>"1" White, "2" Black, "3" Hispanic, "4" Asian and Other</u>

This is the ETHNIC variable in the dataset recoded to consolidate the low frequency Asian and "other" categories.

SELFBORN <u>"0" Native Born, "1" Foreign Born</u>

RELIG1 <u>"1" Protestant, "2" Catholic, "3" Jew, "4" Other, "5" No Religion</u>

I have opted not to consolidate the Jewish and 'other' religion categories despite the relatively low frequencies. Although not expected to yield statistical significance in my regression analyses, the direction of any variation on the dependent variables should be consistent with known properties for the groups and thus serve as a check on the overall reliability of the model. The category "no religion" is the group conventionally referred to as the "Nones" in the media.

EDUC_TWO   "0" Some college or Less, "1" College degree or more

I constructed this variable by consolidating the five responses on the EDUC5 measure: no high school diploma, high school diploma, some college, college degree, post graduate or professional degree into two categories representing those without any post high school education, and those who have at least some college including an associate's degree.

POLITIC7   "1" Very Conservative, "2" Somewhat Conservative, "3" Lean Conservative, "4" Neither, "5" Lean Liberal, "6" Somewhat Liberal, "7" Very Liberal.

I treated this variable as a continuous variable in the binomial regression analyses for ease of interpretation given the fairly large number of options. For the multinomial regression, the variable was treated as a continuous variable.

PARTISAN   "1" Republican, "2" Soft Republican, "3" Independent, "4" Soft Democrat, "5" Democrat

I computed this variable based on the Rice | Kinder dataset's PARTY and LEANING measures. Survey respondents were asked first to declare their partisan preference (PARTY), and if they indicated a party other than the two major ones, they were then asked to which of the two major parties they leaned (LEANING). Rice | Kinder computed a TRUPARTY variable in which those that leaned toward one of the two parties were consolidated into a single party category. Although partisanship is not the subject of my study, it does have a powerful effect on climate change beliefs and attitudes. Persons who freely self-identify with a political party are likely to be more influenced by their party's positions on issues than those who merely lean toward a party on Election Day. As my analysis suggests, treating these "leaners" separately brings the effect of partisanship into greater relief. The PARTISAN coding retains this distinction and those that leaned toward either the Republicans or Democrats were designated "soft", and those that expressed "neither" were classified as Independents.

BIBLE   "0" Fundamentalist, "1" Non-Fundamentalist

This is the survey's measure for a belief in biblical inerrancy; that every word of the Bible is literally true. The alternative responses were that the Bible is inspired, or that it is a collection of stories and legends. In Table 3, I have broken out the denominational preferences by the BIBLE variable, and grouped the denominations by evangelical and mainline.

Note that not all evangelicals believe in biblical inerrancy. Biblical inerrancy, however, is the core belief of Fundamentalist Christians

HOMEHURT1   Was your home, or the place where you were living, damaged at all as a result of the hurricane? "0" No, "1" Yes

CARHURT   Did you or anyone you know well have a personal vehicle that was damaged? "0" No, "1" Yes

ECONHURT   Did you or anyone you know well experience any loss of income as a result of the hurricane? "0" No, "1" Yes

The Rice | Kinder 2018 survey included measures of the impact Hurricane Harvey had directly on respondents, including damage to their property or person, magnitude of the damage, and perceived impact on the local economy. These dichotomous categorical variables will be used to assess whether the damage or costs suffered by respondents might have impacted their climate change beliefs.

CHAPTER 6

ANALYSIS

Only two of the three dependent variables, WHYWARM and WARMING, were repeated in subsequent survey waves and can therefore be analyzed longitudinally. The WHYWARM variable will be analyzed using a binomial logistic regression for Survey 2015 compared to 2018. The WARMING variable will be analyzed using a multinomial logistic regression for Survey year 2016 compared to 2018. The transformed CO2STORMS variable will be analyzed using a binomial logistic regression. The measures assessing damage sustained by respondents were all included with CO2STORMS in the Hurricane Harvey section of the 2018 survey and thus linked.

For each of my analyses, I use the five-part RELIG1 variable in order to show whether the Pope, as the spiritual leader of the Catholic Church, may have shifted Catholic views on climate change independent of any other non-religious factors. The use of the RELIG1 is preferred because it more clearly describes the differential effect Catholicism has on climate change beliefs relative to other groups. In addition, the variable represents the first response of each individual surveyed prior to any follow-up questions to determine denominational affiliation if Protestant. It therefore has the added benefit of being a simple, transparent measure that is easier to interpret. The institutional diversity of Protestantism, the greater autonomy of Protestant congregations relative to the national denominations with which they are affiliated; if affiliated at all, and the lack of recognized institutional authorities suggests Protestants will not be influenced by any single statement made by a denomination or clergyman on climate change during this period. Catholic beliefs will therefore vary against stable Protestant beliefs when considered a single group.

CHAPTER 7

RESULTS

Houstonians Changing Views on Global Warming

I begin by examining the frequency distributions of all of the independent variables used in this study for survey years 2015, 2016 and 2018 (see Table 4). Several of these measures have changed considerably over the three survey waves. I conducted a test to examine the differences in the partisan distribution of respondents by survey year; in this case 2015, 2016, 2017 and 2018. No significant differences (χ^2 = 3.62, p = .31, df = 3) were found among the five partisan categories (Hard Republican, Soft Republican, Independent, Soft Democrat and Hard Democrat.) I therefore conclude that the change in climate change beliefs shown in Figure 6 and Figure 7 among Houston area residents surveyed was not driven by a change in the partisan profile of those residents.

Notable differences include a reduction in the number of Catholics surveyed from 28% in 2015 to 24% in 2018. The "Nones" (persons unaffiliated with any religious group or denomination) saw an increase from 10% in 2015 to 15% in 2018, reflecting a larger national pattern of increase seen throughout the nation (Pew 2015b). In addition to these changes, the 2018 survey included a larger number of blacks (21%) relative to 2015 (17%). Latinos were 22% of the survey in 2018 but 27% in 2015. On a three-part measure of political ideology, respondents in 2018 were somewhat less conservative (42%) relative to 2015 (48%), and slightly more liberal in 2018 (22%) than in 2015 (21%). Gallup surveys suggest the Houston area is considerably more conservative than the nation, both in 2015 and 2018. Nationally, there has been a small reduction in the proportion of conservatives, 37% in 2015 and 35% in 2018 in, with a corresponding small increase in the proportion of self-described liberals, 24% in 2015 and 26%

in 2018 (Gallup Inc. 2018). The average age of survey respondents in 2018 was a fairly high 51 years. Fully 87% of all respondents reported having experienced one or more types of damage from Hurricane Harvey including damage to home, automobile or some form of economic damage.

Houston area residents' views on the causes and seriousness of global warming appear to have changed rapidly from 2015 to 2018. The number reporting global warming as a "very serious" problem climbed from 34% in 2016, to 47% in 2018 – a 7% increase. Those reporting it as "not very serious" fell from 32% in 2016 to 28% in 2018. A similar decline is seen among those reporting it as "somewhat serious" (see Figure 6). From 2015 to 2018, the surveys showed that nearly two-thirds of Houston residents now accept the scientific consensus that climate change is caused by human activities; from 52% in 2015 to 62% in 2018 - a 10% increase over the period (see Figure 7).
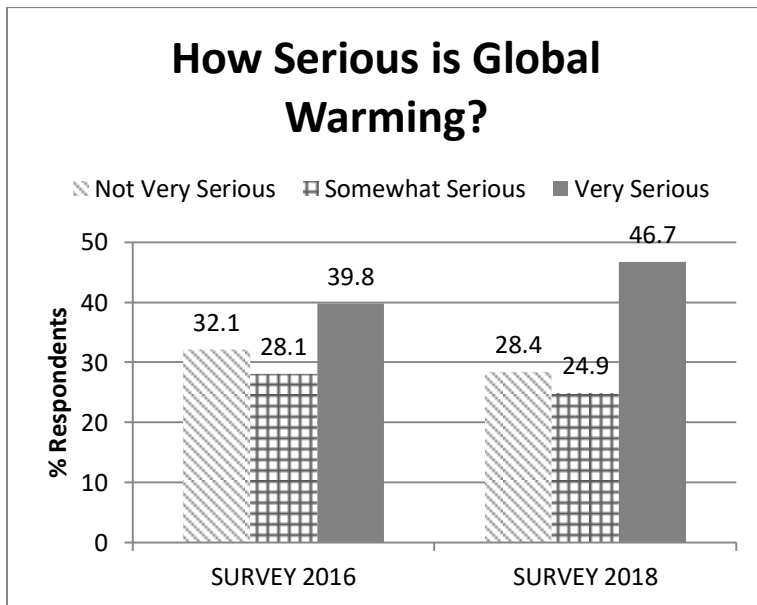
Figure 6. Change in public opinion on the seriousness of global warming among Houston area residents from 2016 to 2018 (WARMING variable).
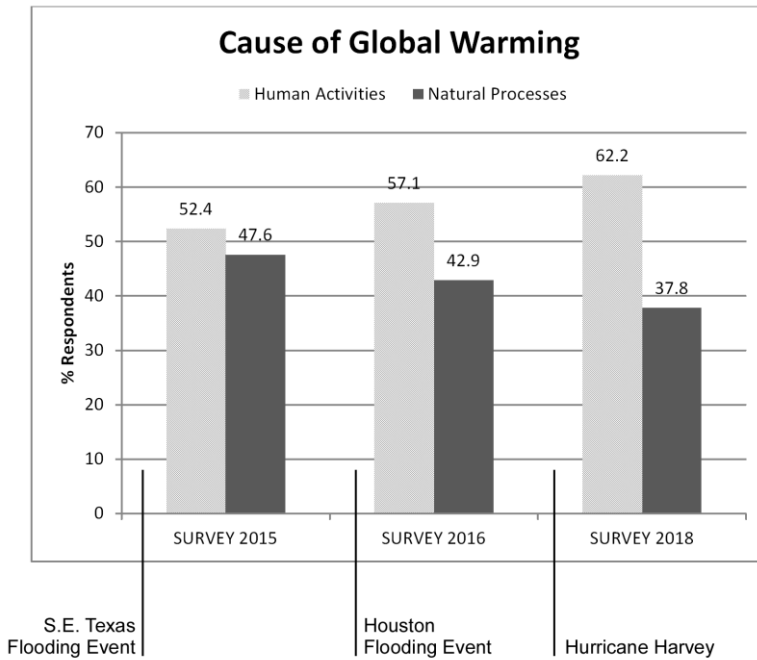
Figure 7. Change in public opinion of Houston area residents on the causes of global warming for survey years 2015, 2016 and 2018 (WHYWARM variable).

Predicting Religious Adherents' Views on Anthropogenic Climate Change:

Binomial Logistic Regression on the WHYWARM Variable

The WHYWARM variable measures whether a respondent accepts the scientific consensus that global climate change is due to human activities or denies that consensus believing that it is only due to natural cycles. Studies have shown that political ideology and partisanship are the principal drivers of those beliefs, along with age and gender. Religious factors such as affiliation, religiosity and theological views are thought to indirectly influence climate change beliefs only through their formative impact on partisanship and political ideology. That indirect influence is graphically shown in the hypothesized model above.

The Rice | Kinder 2015 survey wave was conducted in February and March of that year. The Papal Encyclical Laudato Si was not released by the Pope until May 24th, almost three months after the completion of the survey. The hypothesized model suggests that Catholic affiliation has a direct influence on climate change beliefs because the church's institutional

resources have been leveraged to promote the scientific consensus that its causes are anthropogenic. However, the direct effect of Catholic affiliation on climate beliefs is not thought to exist before Pope Francis released his Encyclical letter. The first hypothesis (Climate Belief) may be written as follows:

CB[1]: The Papal Encyclical Laudato Si was not issued until after completion of the Rice | Kinder 2015 Survey. Catholic affiliation on the RELIG1 variable will therefore have no significant ($p>.05$) impact relative to Protestants on respondents' climate change beliefs as measured by the WHYWARM variable in the 2015 survey wave.

Survey waves after 2015 show an increasing proportion of respondents who accept the scientific consensus for an anthropogenic origin of climate change. The hypothesized model suggests that this may be due to the growing salience of the issue and the effect of Hurricane Harvey and other unusually severe storms. The Rice | Kinder 2018 survey wave was completed two years and ten months after the Pope issued his Encyclical. Over the intervening period, the substance of the new teaching was covered in the media and implemented in the church's educational activities. It is thought that part of the increase in the acceptance of the scientific consensus is due to the direct effect this teaching has had on Catholic beliefs about climate change, not otherwise mediated my political ideology and partisanship.

CB[2]: The Papal Encyclical Laudato Si was issued almost three years before the completion of the Rice | Kinder 2018 Survey. During the intervening period, the Encyclical's circulation among Catholics has resulted in an increase in Catholic support for the scientific

consensus on climate change. Therefore, Catholics on the RELIG1 will be significantly

(p<.05) more likely than Protestants to attribute 'human activities' as the cause of climate

change measured by the WHYWARM variable in the 2018 survey wave.

In order to test these hypotheses, I ran binomial logistic regressions for survey year 2015

when the variable first appeared, and again for survey year 2018. The independent variables

regressed on WHYWARM included age, gender, race, religion, partisan affiliation, political

ideology, foreign born, and college degree. For the purpose of this test and for ease of

interpretation, the political ideology variable was treated as continuous from most conservative

to most liberal. Table 5 shows the results of the binomial logistic regressions for survey years

2015 and 2018. I used Protestants as the reference category for both analyses as Protestants and

Catholics are the two major streams of American Christianity. I find in the 2015 survey that

Catholic affiliation had no significant effect on respondents' climate change beliefs as measured

by the WHYWARM variable (B=.112, p=.501). Only the Nones (no religion) statistically

differed from Protestants, such that the Nones are significantly more likely to embrace

anthropogenic climate change holding all other factors constant (B=.604, p=.010). Age is also

significant (B=-.012, p<.001) such that advancing age is a predictor of denialism. Foreign born

persons, 24% of the sample in 2015, are significantly more likely to believe anthropogenic

climate change relative to the native born (B=.442, p=.019). As expected, the coefficients for

partisanship are both significant and large (Hard Democrats relative to Hard Republicans

B=1.220 p<.000). It is clear that in 2015, partisanship and political ideology (B=.215, p<.001)

are robust predictors of climate change views. Overall this model accounts for 29% of the total

variation (Nagelkerke R^2 = .285) and successfully predicts respondents' views 72% of time.

Based on this analysis, I find that support for hypothesis CB[1] that Catholicism had no direct effect on climate change beliefs in 2015.

In survey wave 2018, the overall patterns look much the same relative to the non-religious variables. However, I find that Catholics in 2018 are significantly more likely to embrace the scientific consensus on climate change relative to Protestants (B=.439, p = .024). However, the effect of having no religion is not significant (B=.032, p=.243). The 2018 survey continues to demonstrate the powerful relationship between partisanship and political ideology with climate change belief. It also shows for the first time shows that Independents are now significantly more likely to embrace an anthropogenic cause for climate change. The model explains 40% of the variation in the sample (Nagelkerke R^2 = .398) and successfully predicts the views of respondents 77% of the time. Based on this analysis, I find evidence to support hypothesis CB[2] that Catholics in 2018, almost three years after the release of Laudato Si, are significantly more likely to support a human cause for climate change.

The WHYWARM variable separates the proverbial wheat from the chaff. Although some climate change denialists continue to reject the credibility of the data showing that global temperatures have rapidly increased since pre-industrial times, many more now accept the data. What denialists now typically reject is the scientific consensus that *human activities* are the cause: anthropogenic climate change. The Rice | Kinder data suggests that Houston area residents have become more likely to embrace that consensus in general. In 2015 it was mostly confined to Democrats and political liberals, but in 2018 it came to include Independents as well. But we must add to those groups Catholics who became more likely to embrace the scientific consensus independent of any of the political, partisan or demographic factors. I conclude that

the Papal Encyclical Laudato Si likely influenced Catholics to accept the pope's teaching on the root causes of climate change.

Assessing Perceived Risk: Multinomial Logistic Regression on the WARMING Variable

The WARMING variable provides a means of measuring the perceived seriousness that respondents attribute to the future effects of climate change. Figure 6 shows that Houston area survey respondents have been increasingly likely to view climate change as a serious problem since 2016, spiking after Hurricane Harvey. The purpose of releasing the Encyclical was not simply to notify Catholics of the existence of the phenomenon, but to document in grim detail the serious consequences of failing to take immediate action to reduce global emissions, and the serious effects on at risk and poor communities. Rice | Kinder data on the WARMING variable is available in the 2016 and 2018 survey waves. The values for 2016 were sourced from respondents eight months after the Encyclical was issued. Nevertheless, understanding the deleterious effects of climate change in the future requires respondents to more through apply its contents and warnings. It is altogether one thing to acknowledge climate change's existence, it is quite another to understand its impact. I therefore do not expect that after such a short period of time, most Catholics will have digested the material the Pope presented, nor did the local Diocese have sufficient time to promote the Encyclical on the parish level. Note that the WARMING variable has three dimensions: not serious, somewhat serious, and very serious. The Pope clearly argues that the effects of climate change will be very serious. It is entirely possible that eight months is time enough for Catholics to at least internalize that much and view the problem as something other than not serious at all. The hypotheses for testing the likely effects

that being Catholic can have on the dependent variable WARMING in the 2016 survey wave can be written thus (Religion Serious = RS):

RS[1]   Sufficient time elapsed from the Encyclical's release in May of 2015 until the date of the 2016 survey wave for Catholics to have internalized the seriousness with which the Pope views the effects of climate change. Catholics are significantly ($p<.05$) more likely to view climate change as "somewhat serious" on that dimension of the dependent variable WARMING in the 2016 survey wave relative to Protestants.

RS[2]   Insufficient time elapsed from the release of the papal Encyclical for Catholics to have fully internalized the Pope's 'very serious' view of climate change. Catholics are therefore not significantly ($p>.05$) more likely to believe that climate change is "very serious" on that dimension of the dependent variable WARMING in the 2016 survey wave relative to Protestants.

Responses for the 2018 survey wave were sourced in February and March of that year; almost three years after the promulgation of the Encyclical. It is expected that sufficient time elapsed for the Pope's central message that the consequences of not acting on climate change will be devastating to have percolated through the Catholic community. Indeed, Hurricane Harvey occurred six months before the survey responses for the 2018 wave were sourced. It is expected that the catastrophic flooding, damage and economic impact on the community will have heightened the salience of climate change for Houstonians in general. For Catholics, the Encyclical will have provided a narrative framework for understanding the unprecedented severity of the storm and its connection with climate change in a real world, real time

demonstration of the prescience of the Pope. Armed with that narrative provided by a credible institutional authority, Catholics are expected to be more likely to regard climate change as very serious in 2018. The hypotheses can be described thus:

RS3   Catholics will be significantly (p<.05) more likely to view climate change as a "somewhat serious" problem than Protestants on that dimension of the WARMING variable in survey wave 2018.

RS4   Catholics will be significantly (p<.05) more likely to view climate change as a "very serious" problem than Protestants on that dimension of the WARMING variable in survey wave 2018.

The literature has shown that flooding events in particular can have a powerful impact on environmental beliefs given the scale of the destruction associated with them. As indicated earlier, Hurricane Harvey was one such event, causing up to $160 billion in damages and 107 fatalities. In fact, 87% of all Rice | Kinder survey respondents in 2018 reported that they suffered some form of damage or loss from the storm. The literature suggests that there is a strong correlation between Christian Fundamentalism and climate change denialism. I have noted above that a belief in the seriousness of climate change increased proportionately among all Houston residents in the 2018 survey. Using the BIBLE variable as a proxy for Christian Fundamentalism provides an opportunity to understand whether religious fundamentalists may have changed their views on the seriousness of climate change under the lash of Hurricane Harvey. For this discussion, I propose that Catholics will be more likely to see it as a serious problem in 2018, while the views of Christian Fundamentalists *will not differ from those of other Christians.* I

expect that the lived experience of Hurricane Harvey, and its effect on the community, will challenge the denialism of Fundamentalists and thus reducing the effect of their religious worldview on their climate beliefs. In order to test this, I have constructed the following hypotheses:

RS[5]   Christian Fundamentalists identified by the BIBLE variable will be significantly ($p<.05$) less likely to regard climate change as "somewhat serious" compared to non-fundamentalists on that dimension of the WARMING variable for survey wave 2016.

RS[6]   Christian Fundamentalists identified by the BIBLE variable will be significantly ($p<.05$) less likely to regard climate change as "very serious" compared to non-fundamentalists on that dimension of the WARMING variable for survey wave 2016.

RS[7]   Christian Fundamentalists will not be significantly ($p<.05$) less likely to regard climate change as "somewhat serious" compared to non-fundamentalists on that dimension of the WARMING variable for survey wave 2018.

RS[8]   Christian Fundamentalists will not be significantly ($p<.05$) less likely to regard climate change as "very serious" compared to non-fundamentalists on that dimension of the WARMING variable for survey wave 2018.

An ordinal logistic regression on the WARMING dependent variable was initially selected as the preferred test of the model. However, the test did not meet the assumption of proportional odds. I made the decision to substitute the ordinal test for a multinomial logistic regression that permits the use of a categorized dependent variable but requires it to be treated at a nominal level. A multinomial logistic regression has the added benefit of being a somewhat

more straightforward statistic to compute. Nevertheless, the purpose of multinomial logistic regression is the same as an ordinal one: to predict the value of a categorical level dependent variable by a set of independent variables.

Prior to performing the regression, I performed a test for multicollinearity using the continuous age variable, and dummy variables for each of the categorical variables less the reference categories. I was particularly concerned about the possibility of collinearity involving the partisanship and political ideology variables. The results of my test did not return VIF coefficients indicating a significant collinearity issue.

Two separate models were run, one for survey wave 2016 and the other for survey wave 2018. The reference category for the dependent variable is 'not very serious.' The intercept for each analysis is white, native-born, male, average age, some college or less, very conservative, hard Republican, Protestant, non-Fundamentalist. Tables 6 and 7 are arranged in such a way that a comparison can be made between the two survey years, bearing in mind that the coefficients are not standardized and cannot be directly compared. For the 2016 regression, the overall model accounts for 36% of the total variation (Nagelkerke R^2 = .355). For the 2018 regression, the overall model accounts for 43% of the total variation (Nagelkerke R^2 = .430).

Table 6 presents the first set of results for a multinomial logistic regression using "not very serious" as the reference category of the WARMING variable regressed on the response "somewhat serious." On the 2016 survey, none of the religious variables reached significance (p<.05), nor did fundamentalism. Age, ethnicity, nativity and education did not reach significance, however age with the expected negative coefficient (B=-.010, p=.052) and blacks (B=.498, p=.092) did approach statistical significance. Females were significantly more likely than males to find climate change somewhat serious (B=.494, p=.002). As expected, both hard

Democrats (B=.920, p=.001) and soft Democrats (B=.839, p=.009) as well as Independents (B=.591, p=.043) were significantly more likely than hard Republicans to view climate change as somewhat serious. Conservatives are significantly (B=-.283, p<.001) less likely than liberals to believe climate change is somewhat serious.

The analysis for the 2018 survey showed, again, that none of the religious affiliation variables were significant (p<.05), expect that the Nones (not religiously affiliated) approached significance (B=.596, p=.076). However, Christian Fundamentalist were significantly less likely (B=-.361, p=.004) to believe that climate change is "somewhat serious." Age (B=-.008, p=.026), Gender (female) (B=.421, p<.001) were both significant, as were two of the ethnic categories, blacks (B=.724, p=.001) and Hispanic/Latino (B=.517, p=.006). Both partisanship and political ideology were strong predictors of the belief in the seriousness of climate change with Democrats significantly (B=1.205, p<.001) more likely, and conservatives significantly less likely (B=-.226, p<.001) to view climate change as somewhat serious.

Table 7 presents the second set of results for the multinomial logistic regression on the response category "Very Serious" again using "Not Very Serious" as the reference category on the dependent WARMING variable. In the 2016 survey wave, Catholics are significantly more likely to believe that climate change is a very serious problem (B=.686, p=.017). Fundamentalists are also significant but in the opposite direction, much less likely to believe the problem is very serious (B=-.480, p=.007). Gender continues to be a strong driver of beliefs about climate change and is significant (B=.591, p<.001), while age (B=-.010, p=.078) and Hispanic/Latino ethnicity (B=.502, p=.060) approach significance. As might be expected, given the disparity between "not very" and "very" in the response categories, the partisan and political ideology coefficients are robust and significant.

In the 2018 survey wave, the pattern looks much the same as it did in 2016. The Catholic variable is again significant (B=.455, p=.027) as is Fundamentalism (B=-.535, p<.001) but in the opposite direction from Catholics. Age (B=-.008, p=.029) and gender (female) (B=.611, p<.001) are both significant, as are two ethnic categories blacks (B=.497, p=.019) and Hispanic/Latino (B=.587, p=.002). In 2018 persons with college degrees approached significance (B=.232, p=.062) being more likely to believe that climate change is a very serious problem. The partisan and political ideology variables all had significant and robust coefficients, Democrats (B=2.506, p<.001) and conservatives (B=-.309, p<.001).

Turning to my two hypotheses on the effects of the Papal Encyclical, RS[1] and RS[2], the results suggest a quite different effect. RS[1] hypothesized that Catholics would be more likely to believe that climate change was somewhat serious; however, none of the religious affiliation variables were significant in survey year 2016 on the 'somewhat serious' level of the WARMING variable. All variation in the data was associated with the expected relationship with partisanship, political ideology, and gender. However, Catholics in 2016 were significantly more likely to believe that climate change was a very serious problem contrary to the hypothesis of RS[2] which suggested Catholics would not have had an opportunity after eight months to thoroughly digest the Pope's warning.

The results for 2018 survey show the same pattern on the religious affiliation variables as the 2016 survey. None of the religious affiliation variables were significant on the somewhat serious dimension of the WARMING variable. Catholics however are again significant on the very serious dimension (B=.455, p=.027). RS[3] and RS[4] hypothesized that after three years, Catholics would be significant on both dimensions of the WARMING variable, having fully processed the Pope's urgent message. Regrettably we do not have a baseline measure for the

WARMING from prior to the Pope's Encyclical, and since Catholics in general are noted for having higher rates of environmental concern than non-Catholics, I cannot conclude that the Encyclical was responsible for the significantly greater likelihood that Catholics believe that climate change is very serious. However, given the results on the WHYWARM variable which did show a difference in Catholic opinion in 2015 and 2018, these results on the WARMING variable suggest that the Encyclical also changed Catholic perception of the seriousness of climate change. Apprised of the Pope's urgent concern for the matter, many Catholics quickly surmised that the issue was one not of minor concern, but of great concern. A qualitative study is likely needed to determine whether that indeed happened, and the extent to which the Pope's statement motivated a change of belief.

Turning now to the question of how religious fundamentalism may be influencing beliefs on the seriousness of climate change, and whether the impact of Hurricane Harvey impacted those beliefs, I find evidence for the former, but none for the latter. Christian Fundamentalism is significant in each of the models on climate change severity in both years, except on the dimension 'somewhat serious' of the WARMING variable for survey year 2016. RS[5] hypothesized that Christian Fundamentalists would be significantly less likely to believe that climate change was somewhat serious that year. In fact, it appears that Christian Fundamentalism had no significant effect (B=-.155, p=.856). RS[6] hypothesized that Christian Fundamentalists would be significantly more likely to deny that climate change was very serious in 2016, and indeed they did (B=-.480, p=.007).

Both RS[7] and RS[8] hypothesized that Christian Fundamentalism in the 2018 survey would have no significant impact on beliefs in the seriousness of climate change because the impact of Hurricane Harvey would have the effect of attenuating them. However, the data show that

fundamentalism is strongly predictive of a belief that climate change, with fundamentalists significantly less likely to believe that it is somewhat serious (B=-.361, p=.004) and very serious (B==.535, p<.001) in 2018. I can therefore reject my hypotheses with some confidence and conclude that the effects of Hurricane Harvey did not "shake" the worldviews of Christian Fundamentalists. In fact, it appears that the denialist beliefs of Christian Fundamentalists may have actually strengthened after 2016 in spite of Hurricane Harvey. Additional data and research may be needed to determine how the beliefs and attitudes of Christian Fundamentalists are being shaped by partisan polarization and other political factors that may be indirectly driving fundamentalist denialism.

Assessing Perceived Causal Links Between Climate Change and Houston Disasters: Binomial Logistic Regression on the CO2STORMS Variable

The final dependent variable in the study is CO2STORMS which appeared first in the 2018 survey wave, asking respondents whether climate change has made Houston storms more severe. As discussed above, the Houston region has experienced repeated and sometimes unprecedented flooding events over the past fifteen years since Hurricane Rita hit in 2005. Therefore, this survey question asks respondents to apply their belief in climate to the tangible lived experience of its likely effects on the region. Given the magnitude of damage caused by Hurricane Harvey, and that most Houston area residents actually experienced some form of damage from it as shown in Figure 8, Catholics were likely primed by 2018 to interpret the cause of the events through the narrative lens of the Pope's encyclical which makes clear that such events are to be expected. Catholics should therefore be more likely than other groups to believe

that climate change is the root cause of these storms. That hypothesis is described as follows (Climate Cause = CC):

CC^1 The Pope's Encyclical outlined the effects of climate change on at-risk communities such as the Houston area. Almost three years after its release, Catholics will be significantly ($p<.05$) more likely to attribute the severity of Houston storms to the effects of climate change than Protestants.

In the case of the Catholic Church, the institution itself provides its adherents with the narrative frame to understand climate change effects on their lived experience. Some mainline Protestant denominations have issued statements on climate change. However, churches that have weak institutional bonds, or do not have universally recognized clerical authorities such as the Pope, may not be able to impose such narratives on their members in a way sufficient to overcome larger social forces such as partisanship in shaping beliefs. Although Christian Fundamentalists were equally impacted by Hurricane Harvey, they have no institutional narrative to fall back on that would help shape their understanding of how climate change may be impacting storm severity. As the literature suggests, in such cases people may not see a trend no matter how repetitive the events become. Christian Fundamentalism is strongly denialist in its views and its adherents are therefore unlikely to embrace a climate change explanatory cause for the storms they have been experiencing. The hypothesis can be stated thus:

CC^2 Christian Fundamentalists will be significantly ($p<.05$) less likely to attribute the severity of past Houston storms to the effects of climate change than non-fundamentalists.

The Rice | Kinder survey included questions regarding damage suffered by respondents as a result of Hurricane Harvey (see Figure 8). Such personal experience of damage is thought to make the issue of climate change more salient for those persons such that they will be more willing to connect the effects of climate change to their loss. Therefore, Houston residents that did experience either damage to their home, car, or perceived economic damage to the community, will be significantly more likely to attribute the increasing severity of Houston storms to climate change. The hypotheses are stated as follows (Climate Hurt = CH):

CH[1]   Houston residents who report that their home was seriously damaged by Hurricane Harvey will be significantly ($p<.05$) more likely to believe that climate change has made Houston storms more severe than those who did not experience such damage.

CH[2]   Houston residents who report that their car was totaled by Hurricane Harvey will be more significantly ($p<.05$) more likely to believe that climate change has made Houston storms more severe than those who did not experience such damage.

CH[3]   Houston residents who report that that the Houston economy was damaged by Hurricane Harvey will be more significantly ($p<.05$) more likely to believe that climate change has made Houston storms more severe than those who did not experience such damage.
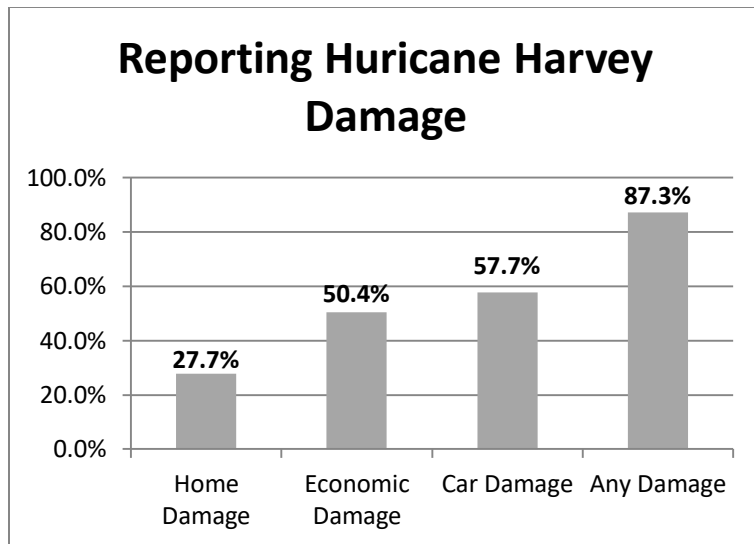
Figure 8. Respondents reporting damage suffered as a result of Hurricane Harvey.

Table 8 shows the results of the binomial regression run with my set of independent variables. It should be recalled that I have used the CO2STORMS dependent variable collapsed into two groups 'No Change' and 'Worse. The model accounts for 38% of the variation (Nagelkerke R^2 = .379) and correctly predicts the value of the dependent variable 77% of the time. The intercept is white, male, average age, native born, without a college degree, hard Republican of average political ideology, Protestant and non-Fundamentalist.

These results show the same pattern of politically motivated drivers of opinion, Democrats (B=1.594, p<.001) are significantly more likely to believe climate change has made Houston storms worse as are the more politically liberal (B=.194, p<.001). In this analysis both age (B=-.013, p = .006) and gender (female) (B=.412, p=.004) variables are significant, as are the ethnic categories of black (B=.467, p=.033) and Hispanic/Latino (B=.593, p=.009). None of the religious affiliation variables were significant with one exception: non-Christians (B=.923, p=.027) who were more likely to make to make a climate change attribution. Christian Fundamentalists were significantly (B=-.563, p=.001) less likely to view climate change as a causative factor. On the personal experience of storm damage from Hurricane Harvey, none of

the variables was significant although a perception that the Houston economy was damaged approached significance (B=.256, p=.082).

The results of my analysis suggest that hypothesis CC^1 stating that the Catholic Church's narrative framework connecting the experience of severe repetitive weather events with climate change is not supported by the data. Catholics are not more likely to see such a trend in Houston. My hypothesis with CC^2 that Christian Fundamentalists will reject an attribution of the increasing severity of Houston storms with climate change is supported by the data. Where Catholicism is simply not influencing its adherents' beliefs on this aspect of climate change, there can be little doubt that Fundamentalism as a worldview drives its adherents to assume a climate denialist position on most any framing of the issue. A personal experience of damage from Hurricane Harvey also does not appear to make a respondent more likely to attribute climate change as a cause for the increasing severity of Houston storms. I therefore find no evidence to support my hypotheses CH^1 associated with damage to a home, or CH^2 associated with damage to a vehicle. I found insufficient evidence to conclude that CH^3 a perception of damage to the local economy resulted in a greater likelihood of embracing climate change as the cause of increasing storm severity.

CHAPTER 8

DISCUSSION

This paper began as a case study of how a major statement on climate change made by a religious institution, in this case the Catholic Church, might have changed the attitudes and outlook of her members in the Houston area. The selection of Houston was motivated as much by the wealth of information available from data compiled by the annual Rice | Kinder surveys, as it was the vulnerability of the Houston area to climate change impacts. Indeed, the area has been hit by a succession of serious and unprecedented weather-related disasters plausibly linked to global warming. In addition, the economy of the Houston area is strongly linked to the petrochemical and fossil fuel industries, and unlike other communities with a similar economic profile, the Houston area is one of the fastest growing metropolitan areas in the country and includes a diversity of persons who differ not only by race and ethnicity, but also by religious faith. The combination of these factors and the availability of the data make it ripe for study.

My analysis of the Rice | Kinder data found compelling evidence that climate change views are strongly influenced by partisanship and which is in keeping with much of the existing research. Although the partisan profile of survey respondents from 2015 to 2018 has not meaningfully changed, partisanship now shapes Houstonians views on climate change with much greater intensity than before. This may be linked to national patterns of increased partisan polarization after the election of Donald Trump.

The title of this paper asks the question whether Pope Francis' Encyclical on global climate change made a difference among Catholics. My analysis has found unambiguous evidence that it did. The Pope's Encyclical, released with great fanfare to a global audience on the steps of St. Peter's Basilica in Rome, had the effect of sharpening Catholic opinion on the

issue. Although Catholicism is in general correlated with more progressive viewpoints on environment and climate change prior to 2018, that differential was entirely explained by Catholics' greater Democratic partisanship, and the faith's disproportionate representation among Latinos. Catholicism had no independent impact on climate change beliefs. In 2018, almost three years after the Pope issued Laudato Si, Catholics are significantly more likely to believe that climate change is real and caused by human activities. By calling on the Catholic community to address climate change as a critical mandate of the Catholic faith, the Pope interposed the institutional resources of the church which militated against the raw partisanship that normally defines American's views on the issue even in today's hype-polarized political environment.

The Papal Encyclical is a strident warning of the consequences of climate change and global CO_2 emission on vulnerable communities such as Houston. However, my analysis did not find evidence that the Pope's message resulted in a greater appreciation for the seriousness of climate change among Houston Catholics relative to Protestants even immediately after the disaster of Hurricane Harvey. Because the Encyclical did impact Catholic views on climate change, this fact suggests that the local Houston Catholic Diocese has not successfully communicated the connection that the Pope made between climate change and its impact on at-risk communities. I note that the Houston diocese has only recently begun promoting the Encyclical on the parish level, holding its first diocesan climate change conference in the summer of 2019. However, I cannot rule out other factors that may militate against perceptions of immediate risk.

The CO2STORMS variable asks respondents to evaluate whether past storms were worsened by climate change. This question asks respondents to apply their own beliefs about

climate change to their lived experience, rather than speculate on what might be the case in the future. On this measure, my analysis found evidence that Catholics are more likely to believe that climate change has been impacting the lengthy spate of Houston storms over the past decade and a half, but then it also found other religious groups do as well. Future Rice | Kinder datasets may show that the differential among Catholics seen on this variable persists even after the immediate impact of Hurricane Harvey has attenuated while disappearing among others. It is also quite possible that it is Evangelical Fundamentalists who differ from every other religious group, uniformly rejecting any attribution of causality to climate change in relation to severe weather events.

My analysis suggests that a belief in biblical inerrancy may be a significant driver of climate change denialism, and therefore my model of the association between religion and the climate change beliefs should include the direct negative effect of Fundamentalism. Where the Catholic Church leverages its not inconsiderable institutional authority to sway her members views on climate change, Fundamentalist churches simply default to denialism as a consequence of their theology built on a belief in biblical inerrancy; a worldview hostile to science and positively disposed to the unconstrained extraction of natural resources. What my study also suggests is that Mainline Protestant denominations, despite their official pro-climate change positions, have had little impact in forming member's views on the issue. The weak institutional structures combined with theological ambiguity and an emphasis on individual choice may militate against connecting denominational statements with member's behavior. I am also intrigued by the apparent willingness of non-Fundamentalist Evangelicals to be more supportive of pro-climate change sentiments than their Fundamentalist brethren.

This study presents evidence that the religious institutions can be agents of positive change in the climate change debate, blunting the powerful effect of partisanship in forming opinion and perhaps motivating pro-environmental behavior. A fuller and more comprehensive dissemination of the Pope's teaching on the parish level in the Houston diocese, in much the same way as the Bishop's Peace Pastoral in the early 1980s, will likely result in a greater sensitivity to the serious consequences of climate change among Catholics resulting in meaningful political action. In like manner, mainline Protestant churches, recognizing some of the institutional constraints on imposing "authoritative teaching" on their members, may devise improved strategies for inculcating their pro-climate change statements into more robust educational efforts targeting more politically conservative parishes. Finally, recognizing that Evangelical Christians are not necessarily monolithic in their views on science and environmental values may give added incentive to pro-climate persons of faith, especially among Protestants, to leverage religious language to strengthen such views.

CHAPTER 9

CONCLUSION

This study began by noting the difficulty in effectively mobilizing action to reduce

carbon emissions, and to prepare for a world facing the economic and social fallout arising from

climate change. It appears that public opinion has largely fallen along increasingly partisan lines.

Regrettably that suggests meaningful action is dependent on the electoral fortunes of a single

political party. The trouble with waiting until the next election to take action on climate change

is that delays measured in a single year have long term consequences felt over generations

(NOAA 2019). In any case, as has been made abundantly clear with the Trump Administration's

withdrawal from the Paris Agreement, eight years of climate progress can be completely

reversed in very short order with a single election. How then do we build a consensus for

immediate action on the climate crisis that is not bounded by the constraints of a polarized

partisan environment?

One way perhaps is to simply wait until the deleterious effects of climate change have

become so obvious and so severe that denialism is simply unsustainable. Yet the literature

suggests that people are quite capable of not seeing clear trends in increasing storm severity even

when they repeatedly experience such events. This is evident from our case study of Houston.

Houstonians were more likely to view climate change as 'very serious' in 2018 than in 2016, but

the change seems to have occurred largely because Democratic opinion converged on that view.

We have also seen that actually experiencing damage from Hurricane Harvey had little, if any,

impact on climate change beliefs. Although the Rice | Kinder 2019 survey wave dataset is not yet

available to the public, the executive summary of the report released for the year notes that

respondents have lower scores for climate change concern than respondents did on the 2018

survey. This is a sobering reminder that human beings have a well-developed capacity to normalize increasing risk.

Van der Linden (2014) suggests that public relations efforts should be focused on helping people to make the connection between their experience and the expected impacts of climate change. The Pope did just that with his Encyclical in May of 2015, nevertheless in March of 2018, Catholics do not appear to have made it. Greater research is therefore needed in analyzing why some people make such connections and why others don't. What are the social and psychological factors that prevent people from seeing self-evident trends?

Another path involves leveraging non-partisan institutions and institutional opinion leaders in promoting pro-climate views and behavior. We have seen in this study that statements made by a church authority, in this case the Pope, made a difference to Catholics and likely changed their views. Even a cursory reading of Laudato Si makes clear that the Pope's message is not simply a recitation of the scientific evidence for climate change and the ecological consequences of unchecked capitalism, although it is that, but the Pope also uses religious, that is to say, moral language not found in an IPCC[1] report or a journal article. Consider this vignette:

> *The earth, our home, is beginning to look more and more like an immense pile of*
>
> *filth. In many parts of the planet, the elderly lament that once beautiful*
>
> *landscapes are now covered with rubbish. (Section 21)*

This is but one example of the way in which the Pope has peppered his letter with stinging moral rebuke for the way humans have treated the environment and caused an ecological catastrophe. He goes on to characterize that treatment as a fundamental affront to the entire Judeo-Christian tradition thereby rejecting any (fundamentalist) claim to a divine mandate for unrestricted human exploitation of natural resources.

---

[1] Intergovernmental Panel on Climate Change / United Nations

We have seen how many conservatives view with skepticism any application of science employed in the interest of public policy making or that may result in regulation of the economy. We have also seen that many conservatives also view authentic science as conforming to traditional views of the world, and by extension, their moral universe. What religious authorities have is the ability to credibly leverage moral values in the interest of promoting what many might believe are strictly secular political issues. Especially for religious people, moral values are presumably important and characterizing climate change as a "moral issue" may be a means of untethering people from fixed ideas born of political ideology and partisanship. Additional research and analysis is needed to understand whether pro-climate statements made by mainline Protestant churches impact the opinion of members, and if not, why not. As this study noted, biblical fundamentalism is strongly predictive of climate denialism. How can pro-climate activists in the Christian community best leverage religious and moral values to challenge fundamentalist views on the divine right of humans to liberally exploit the environment? If fundamentalist worldviews cannot be changed by the lived experience of climate events, can it be changed by a more assertive pro-climate discourse in the Christian community? The answer to these questions requires further research.

REFERENCES

Antonio, Robert J. and Robert J. Brulle. 2011. "The Unbearable Lightness of Politics: Climate Change Denial and Political Polarization." *The Sociological Quarterly* 52(2):195-202.

Association of Statisticians of American Religious Bodies (ASARB). 2012. "U.S. Religion Census 1952 to 2010." Retrieved (http://www.usreligioncensus.org/compare.php).

Blee, Kathleen M. and Kimberly A. Creasap. 2010. "Conservative and Right-Wing Movements." *Annual Review of Sociology* 36(1):269–86.

Blum, Jordan. 2017. "There Is a Risk for an Overbuild' for Texas Pipelines." *Houston Chronicle*, August 26. Retrieved January 9, 2019 (https://www.houstonchronicle.com/business/energy/article/There-is-a-risk-for-an-overbuild-for-Texas-11969059.php).

Bord, Richard J., and Robert E. O'Connor. 1997. ''The Gender Gap in Environmental Attitudes: The Case of Perceived Vulnerability to Risk.'' *Social Science Quarterly* 78:830–40.

Borick, Christopher P. and Barry G. Rabe. 2010. "A Reason to Believe: Examining the Factors That Determine Individual Views on Global Warming." *Social Science Quarterly* 91(3):777–800.

Bullard, Robert and Beverly Hendrix Wright. 1987. "Environmentalism and the Politics of Equity: Emergent Trends in the Black Community." *Social Thought and Research*.

Campbell, Troy H. and Aaron C. Kay. 2014. "Solution Aversion: On the Relation between Ideology and Motivated Disbelief." *Journal of Personality and Social Psychology* 107(5):809–24.

Catechism of the Catholic Church, 2nd ed. Vatican: *Libreria Editrice Vaticana*, 2012.

Davis, Kristin and Jesse Thompson. 2018. *At the Heart of Texas: Cities' Industry Clusters Drive Growth, Houston–The Woodlands–Sugar Land: Texas' Gulf Coast Hub and Nation's Energy Capital.* Dallas Federal Reserve. Retrieved January 5, 2019 (https://www.dallasfed.org/research/heart.aspx).

Davis, Nicholas T. 2018. "Religion and Partisan-Ideological Sorting 1984-2016." *Social Science Quarterly* 99(4):1446-1466.

Demski, Christina, Stuart Capstick, Nick Pidgeon, Robert Gennaro Sposato and Alexa Spence. (2019). "Experience of extreme weather affects climate change mitigation and adaptation responses." *Climatic Change*. 140(2):149-164.

Dietz, Thomas, Amy Dan, and Rachael Shwom. 2007. "Support for Climate Change Policy: Social Psychological and Social Structural Influences." *Rural Sociology* 72(2):185–214.

Dochuck, Darren. 2015. "Fighting for the Fundamentals: Lyman Stewart and the Protestant Politics of Oil." Pp. 124-163 in *Faithful Republic: Religion and Politics in Modern America*, edited by Edited by Andrew Preston, Bruce J. Schulman, and Julian E. Zelizer. Philadelphia, PA: PennPress.

Dunlap, Riley E. and Robert J. Brulle. 2015. *Climate Change and Society: Sociological Perspectives*. New York, NY: Oxford University Press.

Dunlap, Riley E., Aaron M. Mccright, and Jerrod H. Yarosh. 2016. "The Political Divide on Climate Change: Partisan Polarization Widens in the U.S." *Environment: Science and Policy for Sustainable Development* 58(5):4–23.

Gallup, Inc. 2018. "Ideology." *Ideology | Gallup Topic*. Retrieved November 9, 2019 (https://news.gallup.com/topic/ideology.aspx).

Gauchat, Gordon. 2012. "Politicization of Science in the Public Sphere." *American Sociological Review* 77(2):167–87.

Greene, S. 2004. "Social identity theory and party identification." *Social Science Quarterly*, 85(1):136–153.

Grossman, Matt and David A. Hopkins. 2016. *Asymmetric Politics: Ideological Republicans and Group Interest Democrats.* Oxford:Oxford University Press.

Guth, James L., John C. Green, Lyman A. Kellstedt, and Corwin E. Smidt. 1995. "Faith and the Environment: Religious Beliefs and Attitudes on Environmental Policy." *American Journal of Political Science* 39(2):364–82.

Hamilton, Lawrence C., Cameron P. Wake, Joel Hartter, Thomas G. Safford, and Alli J. Puchlopek. 2016. "Flood Realities, Perceptions and the Depth of Divisions on Climate." *Sociology* 50(5):913–33.

Hayes, Jeff Schimel, Todd J. Williams, Andrea L. Howard, David Webber, and Erik H. Faucher (2015). "Worldview Accommodation: Selectively Modifying Committed Beliefs Provides Defense Against Worldview Threat." *Self and Identity.* 14(5):521–548.

Heen, Erik M. 2006. "The Bible among Lutherans in America: The ELCA as a Test Case." Dialog: A Journal of Theology. 45(1) 9:20.

Hempel, Lynn, Kelsey MacIlroy, and Keith Smith. 2014. "Framing the Environment: The Cornwall Alliance, Laissez-Faire Environmentalism, and the Green Dragon." *Journal of the Sociology and Theory of Religion.* 3(1).

Houser, Matthew, Diana Stuart and Michael Carolan. 2017. "Is Seeing Blieving? Apply a Realit Framework t Examine Agriculture and Climate Change." *Environmental Sociology* 3(4).

Hunter, Lori M., Alison Hatch, and Aaron Johnson. 2004. "Cross-National Gender Variation in Environmental Behaviors." *Social Science Quarterly* 85(3):677–94.

Iannaccone, Laurence R. 1994. "Why Strict Churches Are Strong." *American Journal of Sociology* 99(5):1180–1211.

Jones, Robert Emmet and Riley E. Dunlap. 2010. "The Social Bases of Environmental Concern: Have They Changed Over Time?1." *Rural Sociology* 57(1):28–47.

Kim, Sung Eun and Johannes Urpelainen. 2017. "The Polarization of American Environmental Policy: A Regression Discontinuity Analysis of Senate and House Votes, 1971-2013." *Review of Policy Research* 34(4):456–84.

Klineberg, Stephen L. and Mathhew McKeever, Bert Rothenbach. 1998. "Demographic Predictors of Environmental Concern: It Does Make a Difference How It's Measured." *Social Science Quarterly*. 79:(4).

Kunovich, R. M. and R. Hodson. 1999. "Conflict, Religious Identity, and Ethnic Intolerance in Croatia." *Social Forces* 78(2):643–68.

Li, N., J. Hilgard, and D.A. Scheufele. 2016. "Cross-pressuring conservative Catholics? Effects of Pope Francis' encyclical on the U.S. public opinion on climate change." *Climatic Change* 139(3-4):367–380.

Maclaggan, Corrie. 2013. "What Ethnic Diversity Looks Like: Fort Bend." *New York Times*, November 23. Retrieved (https://www.nytimes.com/2013/11/24/us/what-ethnic-diversity-looks-like-fort-bend.html).

Marshall, B.K., 2004. "Gender, race, and perceived environmental risk: the 'white male' effect in cancer alley, LA." *Sociological Spectrum* 24, 453–478.

Mazur, Allan. 1998. "Global Environmental Change in the News." *International Sociology*. 13(4).

McCammack, Brian. 2007. "Hot Damned America: Evangelicalism and the Climate Change Policy Debate." *American Quarterly*. 59: 645– 668.

McCright, Aaron M. and Riley E. Dunlap. 2011. "The Politicization of Climate Change and Polarization in the American Publics Views of Global Warming, 2001–2010." *The Sociological Quarterly* 52(2):155–94.

McCright, Aaron M. and Riley E. Dunlap. 2011. "Cool Dudes: The Denial of Climate Change among Conservative White Males in the United States." *Global Environmental Change* 21(4):1163–72.

McKibben, Bill. 2019. "Money Is the Oxygen on Which the Fire of Global Warming Burns." *The New Yorker*, September 17.

McMillan, MaryBe and Thomas J. Hoban, William B. Clifford, and Margaret R. Brant. 1997. "Social and Demographic Influences on Environmental Attitudes." *Southern Rural Sociology*. 13(1)89-107.

Newport, Frank. 2009. "State of the States: Importance of Religion." *State of the States: Importance of Religion*. Retrieved (https://news.gallup.com/poll/114022/state-states-importance-religion.aspx).

NOAA. 2019. "Global Warming and Hurricanes: An Overview of Current Research Results." *GFDL*. Retrieved November 11, 2019 (https://www.gfdl.noaa.gov/global-warming-and-hurricanes/).

Noel, Hans. 2014. *Political Ideologies and Political Parties in America*. Cambridge: Cambridge University Press.

Patrikios, Stratos. 2008. "American Republican Religion? Disentangling the Causal Link Between Religion and Politics in the US." *Political Behavior* 30:367-389.

Pew Research Center, 2015a. "America's Changing Religious Landscape." *Religious Landscape Study*.

Pew Research Center. 2015b. "Religion in America: U.S. Religious Data, Demographics and Statistics." Pew Research Center's Religion & Public Life Project. Retrieved February 14, 2019 (http://www.pewforum.org/religious-landscape-study/party-affiliation/).

Pew Research Center. 2018. "Most Americans Say Climate Change Affects Their Local Community, Including Two-Thirds Living near Coast." Retrieved December 1, 2018 (http://www.pewresearch.org/fact-tank/2018/05/16/most-americans-say-climate-change-affects-their-local-community-including-two-thirds-living-near-coast/ft_18-05-15_climate-affect-community_coastline/).

Pope Paul VI. 1965. "Christus Dominus: Decree Concerning the Pastoral Office of Bishops." Retrieved February 14, 2019 (http://www.vatican.va/archive/hist_councils/ii_vatican_council/documents/vat-ii_decree_19651028_christus-dominus_en.html).

Prochnau, Bill. 1981. "The Watt Controversy." The Washington Post, June 30. Retrieved December 2, 2018 (https://www.washingtonpost.com/archive/politics/1981/06/30/the-watt-controversy/d591699b-3bc2-46d2-9059-fb5d2513c3da/?noredirect=on&utm_term=.fed56321cb8a).

Rydgren, Jens. 2007. "The Sociology of the Radical Right." *Annual Review of Sociology* 33(1):241–62.

Scheitle, C. P. and B. B. Hahn. 2011. "From the Pews to Policy: Specifying Evangelical Protestantism Influence on States Sexual Orientation Policies." *Social Forces* 89(3):913–33.

Schmidt, Eric R. (2018). "The Influence of Religious–Political Sophistication on U.S. Public Opinion." *Political Behavior* 40(1):21-53.

Sherkat, Darren E. and Christopher G. Ellison. 2007. "Structuring the Religion-Environment Connection: Identifying Religious Influences on Environmental Concern and Activism." *Journal for the Scientific Study of Religion* 46(1):71–85.

Shwom, Rachel L., Aaron M. McCright, Steven R. Brechin Riley E. Dunlap, Sandra T. Marquart-Pyatt, and Lawrence C. Hamilton. 2015. "Public Opinion on Climate Change." Pp. 269-199 in *Climate Change and Society: Sociological Perspectives,* edited by Riley E. Dunlap and Robert J. Brulle. New York, NY: Oxford University Press.

Smiley, Kevin T. 2016. "Climate Change Denial, Political Beliefs, and Cities: Evidence from Copenhagen and Houston." *Environmental Sociology* 3(1):76–86.

Smith, Nicholas and Helene Joffe (2013). "How the Public Engages with Global Warming: A Social Representations Approach." *Public Understanding of Science.* 22(1):16–32

Smith, Nicholas and Anthony Leiserowitz. 2013. "American Evangelicals and Global Warming." *Global Environmental Change* 23(5):1009–17.

Smith, Tom W., Jibum Kim, and Jaesok Son. 2017. "Public Attitudes toward Climate Change and Other Environmental Issues across Countries." *International Journal of Sociology* 47(1):62–80.

Spence, Alexa, Wouter Poortinga, Catherine Butler, and Nick F. Pidgeon (2011). "Perceptions of climate change and willingness to save energy related to flood experience." *Nature Climate Change.* 1(1):46-49.

Swanson, Michael Biesecker. 2017. "Poll: Few Favor Trump Move to Ditch Paris Accord." *PBS.* Retrieved November 8, 2019 (https://www.pbs.org/newshour/nation/poll-favor-trump-move-ditch-paris-accord).

Van der Linden S (2014) On the Relationship Between Personal Experience, Affect and Risk Perception: The Case of Climate Change. *European Journal of Social Psychology.* 44(5):430–440

Wald, Kenneth D. (1992). "Religious Elites and Public Opinion: The Impact of the Bishops' Peace Pastoral." *The Review of Politics.* 54(1): 112-143.

Weart, Spencer, 2008. "The Discovery of Global Warming." Cambridge: Harvard University Press.

APPENDIX A

REGRESSION TABLES 1 THROUGH 5

TABLE 1: SEVERE WEATHER EVENTS AFFECTING THE HOUSTON AREA SINCE 2005

EVENT	DATE	COST[1]
Hurricane Rita	September, 2005	$24.40
Hurricane Ike	September, 2008	$35.70
S.E. Texas Flooding Event	May, 2015	$1.10
Greater Houston Flooding Event	April, 2016	$2.80
Hurricane Harvey	September, 2017	$127.50
Tropical Storm Imelda[2]	September, 2019	$1.00

[1] Billions, 2018 adjusted dollars

SOURCE: NOAA National Centers for Environmental Information
"U.S. Billion-Dollar Weater & Climate Disasters 1980-2018
https://www.ncdc.noaa.gov/billions/

[2] SOURCE: *Washington Post* , 9/27/2019

TABLE 2: FREQUENCY DISTRIBUTIONS FOR DEPENDENT VARIABLES SURVEY YEARS 2015, 2016, AND 2018

	SURVEY YEAR 2015				SURVEY YEAR 2016				SURVEY YEAR 2018		
WHYWARM	Frequency	Percent	Cumulative %		Frequency	Percent	Cumulative %		Frequency	Percent	Cumulative %
HUMAN ACTIVITIES	797	49.5%	52.4		861	53.5%	57.1%		868	57.6%	62.2%
NORMAL CLIMATE CYCLES	725	45.0%	100		647	40.2%	100.0%		528	35.0%	100.0%
Total	1522	94.5%			1508	93.7%			1396	92.6%	
System Missing	89	5.5%			102	6.3%			111	7.4%	
TOTAL	1611	100.0%			1610	100.0%			1507	100.0%	
WARMING					Frequency	Percent	Cumulative %		Frequency	Percent	Cumulative %
NOT VERY SERIOUS					504	31.3%	32.1%		423	28.1%	28.4%
SOMEWHAT SERIOUS					442	27.5%	60.2%		370	24.6%	53.3%
VERY SERIOUS					626	38.9%	100.0%		694	46.1%	100.0%
Total					1572	97.6%			1487	98.7%	
System Missing					38	2.4%			20	1.3%	
TOTAL					1610	100.0%			1507	100.0%	
CO2STORMS									Frequency	Percent	Cumulative %
NO CHANGE									667	44.3%	44.4%
WORSE									836	55.5%	100.0%
Total									1503	99.7%	
System Missing									4	3.0%	
TOTAL									1507	100.0%	

TABLE 3: SURVEY 2018 DENOMINATION BY BIBLE BELIEF

DENOMINATION	LITERAL		INSPIRED		LEGENDS	
Evangelicals:						
Baptist	165	66.5%	80	32.3%	3	1.2%
Church of Christ	35	55.6%	27	42.9%	1	1.6%
Assembly of God	27	75.0%	9	25.0%	0	0.0%
Christian, non-denominational	98	51.9%	88	46.6%	3	1.6%
Mainline:						
Lutheran	19	48.7%	19	48.7%	1	2.6%
Methodist	32	27.6%	82	70.7%	2	1.7%
Presbyterian, Episcopalian	13	25.5%	33	64.7%	5	9.8%
Other denomination	6	26.1%	15	65.2%	2	8.7%
No denomination	13	31.0%	26	61.9%	3	7.1%
Total Evangelicals	325	60.6%	204	38.1%	7	1.3%
Total Mainline	70	30.6%	149	65.1%	10	4.4%

TABLE 4: SURVEY 2015, 2016 AND 2018 DESCRIPTIVE STATISTICS

	2015	2016	2018
N =	1537	1541	1507
GENDER			
FEMALE	48.6%	49.1%	48.6%
PARTISANSHIP			
HARD REPUBLICAN	26.9%	30.6%	26.7%
SOFT REPUBLICAN	14.3%	14.7%	14.4%
INDEPENDENT	14.2%	11.7%	13.3%
SOFT DEMOCRAT	13.3%	11.7%	14.9%
HARD DEMOCRAT	31.3%	31.3%	30.6%
POLITICAL IDEOLOGY			
VERY CONSERVATIVE	21.5%	23.0%	19.5%
SOMEWHAT CONSERVATIVE	26.1%	22.3%	22.3%
LEAN CONSERVATIVE	10.1%	7.2%	13.0%
NEITHER	13.0%	20.3%	12.9%
LEAN LIBERAL	8.7%	6.9%	10.3%
SOMEWHAT LIBERAL	13.9%	12.2%	14.8%
VERY LIBERAL	6.7%	8.6%	7.3%
POLITICAL IDEOLOGY (3)			
CONSERVATIVE	47.6%	44.9%	41.8%
MODERATE	31.8%	34.4%	36.2%
LIBERAL	20.6%	20.8%	22.0%
RELIGION			
PROTESTANT	55.6%	56.0%	55.4%
CATHOLIC	28.0%	27.5%	23.9%
JEW	1.3%	1.5%	1.4%
OTHER	5.2%	2.0%	4.2%
NONE	9.9%	13.0%	15.1%
EDUCATION			
COLLEGE DEGREE	44.7%	45.1%	50.6%
NATIVITY			
FOREIGN BORN	24.3%	23.6%	21.0%
RACE/ETHNICITY			
WHITE	49.6%	50.5%	47.8%
BLACK	16.5%	16.8%	20.5%
HISPANIC/LATINO	27.0%	25.6%	22.4%
ASIAN & OTHER	6.9%	7.2%	9.3%
RELIGIOUS WORLDVIEW			
FUNDAMENTALIST	41.4%	38.6%	34.8%
TRADITIONAL	58.6%	61.4%	65.2%
EXPERIENCED DAMAGE			
HOME DAMAGE	-	-	27.8%
AUTO DAMAGE	-	-	58.1%
ECONOMIC DAMAGE	-	-	51.0%

	X̄	MIN	MAX
AGE			
2015	51.1	18	98
2016	53.3	18	98
2018	51.7	18	96

Source: 2018 Rice | Kinder Houston Area Survey.

TABLE 3: BINOMIAL LOGISTIC REGRESSION ON WHYWARM VARIABLE FOR SURVEY 2015 AND 2018

	SURVEY YEAR 2015 (N=1,316)				95% C.I.for EXP(B)			SURVEY YEAR 2018 (N=1,190)				95% C.I.for EXP(B)	
	B	S.E.	Sig.	Exp(B)	Lower	Upper		B	S.E.	Sig.	Exp(B)	Lower	Upper
AGE	-.012 **	.004	.001	.988	.980	.995		-.021 **	.005	.000	.979	.970	.988
FEMALE	.098	.128	.445	1.103	.858	1.417		.113	.148	.444	1.120	.838	1.497
COLLEGE DEGREE OR MORE	.018	.136	.897	1.018	.780	1.327		.138	.151	.363	1.147	.853	1.543
FOREIGN BORN	.442 *	.189	.019	1.556	1.075	2.253		.447	.239	.061	1.564	.979	2.498
IDEOLOGY (CONS TO LIB)	.215 **	.036	.000	1.240	1.156	1.331		.246 **	.047	.000	1.279	1.165	1.404
RACE / ETHNICITY													
WHITE	R							R					
BLACK	.250	.207	.226	1.284	.856	1.925		-.352	.226	.119	.703	.452	1.095
HISPANIC / LATINO	.235	.210	.263	1.264	.838	1.907		.224	.235	.340	1.251	.789	1.983
ASIAN / OTHER	.096	.300	.749	1.101	.611	1.984		.743 *	.330	.024	2.101	1.101	4.011
PARTISANSHIP													
HARD REPUBLICAN	R							R					
SOFT REPUBLICAN	-.089	.203	.661	.915	.614	1.363		-.057	.212	.788	.945	.623	1.432
INDEPENDENT	.520 *	.222	.019	1.682	1.089	2.598		.973 ***	.260	.000	2.646	1.589	4.405
SOFT DEMOCRAT	1.140 ***	.231	.000	3.125	1.986	4.918		2.153 ***	.309	.000	8.607	4.699	15.764
HARD DEMOCRAT	1.220 ***	.198	.000	3.386	2.299	4.987		1.889 ***	.244	.000	6.615	4.097	10.681
RELIGION													
PROTESTANT	R							R					
CATHOLIC	.112	.166	.501	1.119	.807	1.550		.439 *	.195	.024	1.552	1.058	2.275
JEW	1.183	.615	.054	3.266	.979	10.897		.925	.689	.179	2.522	.654	9.729
OTHER- NONCHRISTIAN	.207	.339	.541	1.230	.633	2.391		.048	.401	.905	1.049	.478	2.300
NONE	.604 *	.235	.010	1.829	1.153	2.901		.032	.243	.895	1.033	.642	1.662
Constant	-.923	.291	.002	.397				-.408	.345	.236	.665		

*p <.05   **p <.01 ***p <.001 (two-tailed).*

R = Reference Category

TABLE 6: MULTINOMIAL LOGISTIC REGRESSION ON WARMING VARIABLE FOR SURVEY 2016 AND 2018 FOR SOMEWHAT SERIOUS

	Not Very Serious' relative to 'Somewhat Serious'												
	Survey Year 2016							Survey year 2018					
	B	S.E.	Sig.	Exp(B)	95% Confidence Interval			B	S.E.	Sig.	Exp(B)	95% Confidence Interval	
					Lower	Upper						Lower	Upper
Intercept	1.245	.479	.009					.764	.348	.028			
AGE (LAST BIRTHDAY)	-.010 †	.005	.052	.990	.980	1.000		-.008 *	.004	.026	.992	.984	.999
GENDER													
FEMALE	.494 **	.158	.002	1.639	1.202	2.235		.421 ***	.118	.000	1.523	1.208	1.921
MALE	R	.	.	.	.	.		R	.	.	.	.	.
NATIVITY													
FOREIGN BORN	.185	.246	.451	1.203	.744	1.947		.169	.186	.362	1.184	.823	1.704
NATIVE	R	.	.	.	.	.		R	.	.	.	.	.
EDUCATION													
COLLEGE DEGREE	-.031	.163	.849	.969	.704	1.335		.100	.120	.404	1.106	.873	1.399
NO COLLEGE DEGREE	R	.	.	.	.	.		R	.	.	.	.	.
RACE / ETHNICITY													
BLACK	.498 †	.295	.092	1.646	.923	2.935		.724 **	.216	.001	2.063	1.351	3.150
HISPANIC / LATINO	.312	.259	.229	1.366	.822	2.272		.517 **	.189	.006	1.677	1.158	2.428
ASIAN / OTHER	.135	.370	.714	1.145	.554	2.365		.288	.262	.272	1.334	.798	2.231
ANGLO	R	.	.	.	.	.		R	.	.	.	.	.
PARTISANSHIP													
HARD DEMOCRAT	.920 **	.273	.001	2.509	1.469	4.287		1.205 ***	.207	.000	3.338	2.227	5.004
SOFT DEMOCRAT	.839 **	.323	.009	2.315	1.229	4.358		1.265 ***	.262	.000	3.543	2.119	5.924
INDEPENDENT	.591 *	.292	.043	1.806	1.020	3.199		.724 **	.210	.001	2.063	1.367	3.114
SOFT REPUBLICAN	-.101	.215	.637	.904	.593	1.376		-.012	.157	.938	.988	.726	1.344
HARD REPUBLICAN	R	.	.	.	.	.		R	.	.	.	.	.
IDEOLOGY													
(MORE CONSERVATIVE)	-.283 ***	.051	.000	.754	.681	.833		-.226 ***	.040	.000	.798	.738	.862
RELIGION													
CATHOLIC	.243	.293	.407	1.275	.718	2.267		.062	.211	.771	1.064	.703	1.610
JEW	.235	.198	.234	1.265	.858	1.865		.149	.150	.322	1.161	.864	1.558
OTHER	-.801	.727	.270	.449	.108	1.865		-.576	.574	.316	.562	.183	1.733
NONE	.647	.472	.170	1.910	.758	4.813		.596 †	.336	.076	1.815	.939	3.506
PROTESTANT	R	.	.	.	.	.		R	.	.	.	.	.
CHRISTIAN TRADITION													
FUNDAMENTALIST	-.155	.168	.355	.856	.616	1.190		-.361 **	.127	.004	.697	.544	.893
NON FUNDAMENTALIST	R	.	.	.	.	.		R	.	.	.	.	.

*p < .05 **p < .01 ***p < .001 (two-tailed).

R = Reference Group

TABLE 7: MULTINOMIAL LOGISTIC REGRESSION ON WARMING VARIABLE FOR SURVEY 2016 AND 2018 FOR VERY SERIOUS

	Not Very Serious' relative to 'Very Serious'												
	Survey Year 2016							Survey year 2018				
	B	S.E.	Sig.	Exp(B)	95% Confidence Interval			B	S.E.	Sig.	Exp(B)	95% Confidence Interval	
					Lower	Upper						Lower	Upper
Intercept	.567	.499	.256					.647	.354	.068			
AGE (LAST BIRTHDAY)	-.010 †	.005	.078	.991	.980	1.001		-.008 *	.004	.029	.992	.984	.999
GENDER													
FEMALE	.591 ***	.165	.000	1.806	1.307	2.496		.611 ***	.121	.000	1.842	1.452	2.336
MALE	R	.	.	.	.	.		R	.	.	.	.	.
NATIVITY													
FOREIGN BORN	.280	.248	.261	1.322	.813	2.152		.290	.185	.118	1.336	.929	1.921
NATIVE	R	.	.	.	.	.		R	.	.	.	.	.
EDUCATION													
COLLEGE DEGREE	.260	.172	.131	1.297	.925	1.818		.232 †	.124	.062	1.261	.988	1.609
NO COLLEGE DEGREE	R	.	.	.	.	.		R	.	.	.	.	.
RACE / ETHNICITY													
BLACK	.186	.291	.523	1.204	.681	2.130		.497 *	.213	.019	1.643	1.083	2.493
HISPANIC / LATINO	.502 †	.267	.060	1.652	.979	2.789		.587 **	.193	.002	1.798	1.231	2.627
ASIAN / OTHER	-.087	.403	.829	.916	.416	2.019		.245	.269	.363	1.278	.754	2.167
ANGLO	R	.	.	.	.	.		R	.	.	.	.	.
PARTISANSHIP													
HARD DEMOCRAT	2.527 ***	.272	.000	12.513	7.349	21.308		2.506 ***	.203	.000	12.255	8.236	18.237
SOFT DEMOCRAT	1.691 ***	.326	.000	5.426	2.862	10.285		2.319 ***	.255	.000	10.164	6.167	16.751
INDEPENDENT	1.540 ***	.293	.000	4.663	2.628	8.275		1.222 ***	.213	.000	3.395	2.238	5.150
SOFT REPUBLICAN	.106	.251	.672	1.112	.679	1.820		.013	.180	.941	1.013	.712	1.443
HARD REPUBLICAN	R	.	.	.	.	.		R	.	.	.	.	.
IDEOLOGY													
(MORE LIBERAL)	-.298 ***	.052	.000	.742	.671	.821		-.309 ***	.039	.000	.734	.680	.793
RELIGION													
CATHOLIC	.686 *	.288	.017	1.986	1.128	3.495		.455 *	.205	.027	1.576	1.054	2.356
JEW	.129	.209	.537	1.138	.756	1.713		.116	.156	.459	1.123	.827	1.525
OTHER	-.265	.620	.670	.767	.227	2.589		.394	.478	.409	1.484	.582	3.783
NONE	.112	.559	.842	1.118	.374	3.346		.369	.360	.304	1.447	.715	2.928
PROTESTANT	R	.	.	.	.	.		R	.	.	.	.	.
CHRISTIAN TRADITION													
FUNDAMENTALIST	-.480 **	.179	.007	.619	.435	.879		-.535 ***	.132	.000	.586	.452	.759
NON FUNDAMENTALIST	R	.	.	.	.	.		R	.	.	.	.	.

*p < .05   **p < .01   ***p < .001 (two-tailed).

R = Reference Group

TABLE 8: BINOMIAL LOGISTIC REGRESSION ON THE DICHOTOMOUS CO2STORMS VARIABLE

	B	S.E.	Sig.	Exp(B)	95% C.I.for EXP(B)	
					Lower	Upper
Constant	-.879	.378	.020	.415		
AGE (AT LAST BIRTHDAY)	-.013 **	.005	.006	.987	.978	.996
GENDER						
FEMALE	.412 **	.144	.004	1.511	1.140	2.002
EDUCATION						
COLLEGE DEGREE	.079	.148	.595	1.082	.810	1.446
NATIVITY						
FOREIGN BORN	.282	.220	.200	1.326	.862	2.041
RACE / ETHNICITY						
ANGLO	R		.061			
BLACK	.467 *	.219	.033	1.595	1.037	2.452
HISPANIC / LATINO	.593 **	.227	.009	1.809	1.160	2.823
ASIAN / OTHER	.473	.305	.121	1.604	.883	2.916
PARTISANSHIP						
HARD REPUBLICAN	R					
SOFT REPUBLICAN	-.232	.222	.296	.793	.514	1.225
INDEPENDENT	.851 **	.254	.001	2.341	1.422	3.854
SOFT DEMOCRAT	1.547 ***	.260	.000	4.696	2.823	7.813
HARD DEMOCRAT	1.594 ***	.227	.000	4.924	3.154	7.687
IDEOLOGY (MORE LIBERAL)	.194 ***	.045	.000	1.215	1.111	1.328
RELIGION						
PROTESTANT	R					
CATHOLIC	.083	.194	.668	1.087	.742	1.591
JEW	1.034	.628	.100	2.812	.821	9.634
OTHER	.923 *	.417	.027	2.517	1.111	5.699
NONES	-.180	.229	.430	.835	.533	1.307
CHRISTIAN TRADITION						
FUNDAMENTALIST	-.563 **	.163	.001	.569	.413	.784
STORM DAMAGE						
HOME	.148	.163	.361	1.160	.843	1.595
CAR	-.216	.153	.156	.805	.597	1.086
ECONOMY	.256 †	.147	.082	1.292	.968	1.725

*$p < .05$ **$p < .01$ ***$p < .001$ (two-tailed).*

R = Reference Group

APPENDIX B

PREDICTED PROBABILITIES ON THE
WHYWARM VARIABLE

COMPARING RESULTS FROM SURVEY 2015 WITH SURVEY 2018 ON THE
WHYWARM VARIABLE

Predicted Probabilities for Catholics, Protestants and Nones

Predicted probabilities were calculated for the Catholic, Protestant and None categories

using the formula:

$$P_i = E(Y_i = 1 | X_{1i}, X_{2i}) = \frac{1}{1 + e^{-(b_0 + b_1 x_{1i} + b_2 x_{2i})}}$$

Coefficients were obtained from the regression results of the RELIG1 on the WHYWARM

dependent variable for survey years 2015 and 2018 as shown on Table 5.

Survey Year 2015:

$$P_{CATHOLIC\_2015} = \frac{1}{1 + e^{-(-.923 + -.64272 + .37195 + .112)}}$$

$$P_{PROTESTANT\_2015} = \frac{1}{1 + e^{-(-.923 + -.64272 + .37195 + 0)}}$$

$$P_{NONES\_2015} = \frac{1}{1 + e^{-(-.923 + -.64272 + .37195 + ..604)}}$$

Survey Year 2018:

$$P_{CATHOLIC\_2018} = \frac{1}{1 + e^{-(-.408 + -1.15437 + .44280 + .439)}}$$

$$P_{PROTESTANT\_2018} = \frac{1}{1 + e^{-(-.408 + -1.15437 + .44280 + .0)}}$$

$$P_{NONES\_2018} = \frac{1}{1 + e^{-(-..408 + -1.15437 + .44280 + .320)}}$$

Predicted probabilities for each group and for both years is displayed in Figure 9 below.
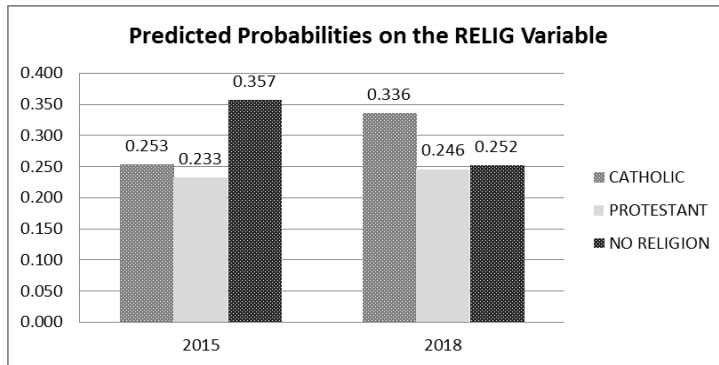
Figure 9: Predicted probabilities for Catholics, Protestants and Nones on the WHYWARM variable for survey years 2015 and 2018.

Difference in Proportions Z Test for 2015 and 2018 Surveys

A randomly selected sample of 444 Catholics in survey year 2015 showed a predicted probability of .253 for affirming anthropogenic climate change holding constant other variables. A randomly selected sample of 349 Catholics in survey year 2018 showed a predicted probability of .336. This suggests that the predicted probability for Catholics affirming anthropogenic climate change increased from 2015 before the Pope's Encyclical was released, to 2018 afterward.

A randomly selected sample of 881 Protestants in survey year 2015 showed a predicted probability of .233 for affirming anthropogenic climate change holding constant other variables. A randomly selected sample of 808 Protestants in survey year 2018 showed a predicted probability of .246. This suggests that the predicted probability for Protestants affirming anthropogenic climate change increased from 2015 to 2018.

A randomly selected sample of 157 Nones (no religious affiliation) in survey year 2015 showed a predicted probability of .357 for affirming anthropogenic climate change holding constant other variables. A randomly selected sample of 220 Nones in survey year 2018 showed

a predicted probability of .252. This suggests that the predicted probability for Nones affirming anthropogenic climate change decreased from 2015 to 2018.

In order to test whether the change was statistically significant for each of the religious group's point probability, a Z test for difference in proportions between two samples was performed. The null hypothesis is that probabilities are the same, while the research hypothesis (PP) is that the probabilities are different (p <. 05):

$$PP^1: P_{CATHOLIC\_2015} \neq P_{CATHOLIC\_2018}$$
$$\alpha = .05$$

$$PP^2: P_{PROTESTANT\_2015} \neq P_{PROTESTANT\_2018}$$
$$\alpha = .05$$

$$PP^3: P_{NONE\_2015} \neq P_{NONE\_2018}$$
$$\alpha = .05$$

The difference in proportions Z values were calculated for the Catholic, Protestant and None categories from both survey years using the formula:

$$Z = \frac{(\hat{p}_1 - \hat{p}_2) - 0}{\sqrt{\hat{p}(1-\hat{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

Figure 10: Calculation of Difference of Proportion Z test.

CATHOLICS		PROTESTANTS		NONES	
p1 =	0.253	p1 =	0.233	p1 =	0.357
p2 =	0.336	p2 =	0.246	p2 =	0.252
n1 =	444	n1 =	881	n1 =	157
n2 =	349	n2 =	808	n2 =	220
NUMERATOR:		**NUMERATOR:**		**NUMERATOR:**	
(p1 - p2) - 0	**-0.083**	(p1 - p2) - 0	**-0.013**	(p1 - p2) - 0	**0.105**
DENOMINATOR:		**DENOMINATOR:**		**DENOMINATOR:**	
sqrt{ p̂ (1 - p') * (1/n1 + 1/n2)		sqrt{ p̂ (1 - p') * (1/n1 + 1/n2)		sqrt{ p̂ (1 - p') * (1/n1 + 1/n2)	
p̂ = (p1 * n1 + p2 * n2) / (n1 + n2)		p̂ = (p1 * n1 + p2 * n2) / (n1 + n2)		p̂ = (p1 * n1 + p2 * n2) / (n1 + n2)	
p1 * n1 =	112.332	p1 * n1 =	205.273	p1 * n1 =	56.049
p2 * N2 =	117.264	p2 * N2 =	198.768	p2 * N2 =	55.44
n1 + n2 =	793	n1 + n2 =	1689	n1 + n2 =	377
p̂ =	0.290	p̂ =	0.239	p̂ =	0.296
p̂ *(1-p̂) =	0.206	p̂ *(1-p̂) =	0.182	p̂ *(1-p̂) =	0.208
1/n1 + 1/n2 =	0.005	1/n1 + 1/n2 =	0.002	1/n1 + 1/n2 =	0.011
p̂ (1 - p̂) * (1/n1 + 1/n2) =	0.001	p̂ (1 - p̂) * (1/n1 + 1/n2) =	0.000	p̂ (1 - p̂) * (1/n1 + 1/n2) =	0.002
sqrt{} =	**0.032**	**sqrt{} =**	**0.021**	**sqrt{} =**	**0.048**
Z =	**-2.558**	**Z =**	**-0.626**	**Z =**	**2.202**

Analysis of Z Test

The Z score for Catholics of -2.558 corresponds with a p value of .0049. Since this is a two-tailed test, the cumulative p value is .0098 which is less than the .05 alpha level stipulated by my hypothesis. I can therefore reject the null hypothesis and conclude that the predicted probability for Catholics in survey year 2018 is significantly higher than survey year 2015.

The Z score for Protestants of -.626 corresponds with a p value of .2676. Since this is a two tailed test, the cumulative p value is .5352 which is more than the .05 alpha level stipulated by my hypothesis. I cannot therefore reject the null hypothesis. I conclude that the predicted probability for Protestants in survey year 2018 likely did not change from survey year 2015

The Z score for Nones of -2.202 corresponds with a p value of .0139. Since this is a two-tailed test, the cumulative p value is .0278 which is less than the .05 alpha level stipulated by my hypothesis. I can therefore reject the null hypothesis and conclude that the predicted probability for Nones in survey year 2018 is significantly lower than survey year 2015.