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Climate change communication in the post-truth era: How partisanship, media, and
psychological biases challenge messaging interventions among Republicans

DISSERTATION

submitted in partial satisfaction of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

in Social Ecology

by

Maureen Jenné Purcell

Dissertation Committee:
Associate Dean and Professor Richard A. Matthew, Chair
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2022

DEDICATION

To

My family and friends,
And especially Uncle Bobby.

For

The Changemakers.

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ABSTRACT OF THE DISSERTATION

Climate change communication in the post-truth era: How partisanship, media, and psychological biases challenge messaging interventions among Republicans

by

Maureen Jenné Purcell

Doctor of Philosophy in Social Ecology

University of California, Irvine, 2022

Associate Dean and Professor Richard A. Matthew, Chair

Partisan bias in media, together with psychological biases, sets the stage for and perpetuates polarization around climate change in America. Passing and implementing a successful national climate action plan necessitates bridging the gap between Republicans and Democrats on this topic. I present two complementary studies investigating potential messaging interventions that leverage positive affect and novelty to overcome negative snap judgments of climate policy. First, a content analysis of conservative media coverage of climate change and climate policy indicated that negatively framed content is more common and that connections are rarely made between health and climate topics- indicating potential novelty for both positive valence and health frames. Informed by this, I investigated the effects of a climate message's valence (positive, neutral, negative) and emphasis frames (health, energy, climate) on measures of Republican support in an experimental survey. Results indicate that neither positive framing, health framing, nor their interaction increase support as expected based on their novelty and association with positive affect. However, analyses identified trust as a crucial model component. Against the backdrop of declining trust in science at the societal level, I discuss the implications of trust's crucial role in climate policy decisions.

Chapter 1- Introduction

The political ideologies of liberal/Left and conservative/Right should, in principle, not be at odds with scientific facts. Yet, even to the casual observer, there seem to be “objective facts” and “partisan facts”. Some scholars refer to our current era as the “post-truth era” where not only science-supported facts but also the scientific endeavor itself is being called into question. There are some claims which grapple primarily with the historic biases of the scientific endeavor and seek to correct these moving forward. There are others, though, which call into question facts and processes simply for not aligning with their own beliefs or some ulterior motives. In a democracy, it is disconcerting to say the least, if citizens do not know what information or experts to trust.

Within the U.S. and rather uniquely in the global context, climate science is often debated. It is not only the policy agenda which is debated, but the science which has identified the global climatic changes and pointed to anthropogenic causes. Rejection of climate science in the United States could have drastic consequences not just within America but around the world. Some studies concede that in the right (or wrong) hands conspiracist climate science rejectors can have considerable persuasive power (Lewandowsky, Oberauer, & Gignac, 2013). Paired with the apparent emboldening of extremism and support for conspiracies in the U.S., the battle for climate science legitimacy and consequential climate mitigation efforts could face increasing obstacles. As such, strategies to increase support or at least decrease polarization of climate science and regulation is critical. And, while the believers of conspiracies are unlikely to be swayed (Lewandowsky, Oberauer, & Gignac, 2013), there remains opportunity among less extreme populations to increase support for climate mitigation if we can connect with them (e.g. Feygina, Jost, & Goldsmith, 2009; Zhou 2016a, and 2016b; Detenber, Ho, Ong, & Lim, 2018;

Hazboun et al, 2018).

In their snapshot of Americans' views of climate change, Ballew et al (2019) describe a populace with low understanding (though it has increased in last decade) that a) climate change is human caused and b) that there is scientific *consensus* that climate change is both 1) happening and 2) human caused. Americans typically perceive low levels of risk related to climate change and instead ascribe greater risk to populations that are distant from themselves in space and time. In general, they found conservative Republicans to be least convinced and that there is less polarization within Democratic party than in the Republican party. If climate policy is to be supported in the U.S., it is fair to say that support must be built up among the Republicans.

The challenge of political polarization around climate change policy is due in part to the multiple scales at which polarization is established and reinforced. External information environments such as the news media or social media shape and bias information. The tendency for people to engage with media that aligns with their own attitudes and beliefs then reinforces those same attitudes. Furthermore, media preference tends to follow political party affiliation and media outlets themselves align content with political party positions. This echoing information then filters through an individual's internal information processing systems. These system of attitudes and memories themselves are shaped in part by the information environment in which people are situated and their political affiliations (Howe, Mildemberger, Marlon, & Leiserowitz, 2015). Given the above, a social ecological framework is ideal for this research question. Briefly, social ecology uses a multi-level, systems perspective to understand how situational or environmental factors influence behavior at various scales of society (Stokols, 2018). Zooming out, as it were, helps us to understand the outcome of messaging interventions by understanding how they are shaped and reinforced by the other contexts in which they are situated. This

dissertation contributes to the scholarship on climate communication by approaching it with a social ecological lens.

With critical and complex problems such as climate change (IPCC, 2022) and the detrimental health outcomes it can have on American and global citizens, how we make progress will depend on how we talk about these issues. The goal of the research at hand was two-fold. First it aims to characterize the current conservative news coverage of climate change and climate policy in the U.S. Knowing this and building on prior research on how this might shape conservative attitudes and decision making related to climate policy, it investigates the efficacy of strategically manipulated messaging to overcome opposition and increase support for climate policy among U.S. Republicans.

In the next chapter, I will review and synthesize past scholarship. This will include existing findings on the influence of media, particularly partisan media, on political decision making. Historically important models of behavior and decision prediction will be introduced as will the model upon which this project is based. Finally, the importance and implications of communication strategies to decision making will be reviewed, with particular attention paid to message framing. Chapter 3 presents the methodology, results, and discussion of a content analysis investigating how often in conservative media coverage of climate change and climate policy are said topics presented using framing which either a) highlights health impacts or b) as opportunities to obtain some benefit (positive framing). Chapter 4 will present the methodology, results, and some discussion of an experimental survey which tests the influence of message frames within the John Q Public framework (e.g. Kraft, Taber, & Lodge 2015). This chapter will discuss the potential implication of the results found in the media analysis for the results of the experimental survey, possibly offering some explanation of patterns. Following said discussion,

conclusions will be presented as to the potential success of positive and health message framing in increasing support for climate change policy in the U.S. among Republicans. Chapter 5 tries to synthesize the results of both studies and contextualize them within the post-truth challenge facing democracies. Chapter 6 discusses both limitations of the current work and introduces future avenues of research. Through this dissertation, I hope to illuminate the detrimental effects of political polarization on democratic policy making around issues of grand importance. I hope also to add to the discussions on political decision-making and communication solutions which may guide us through such threatening problems.

Chapter 2 – Literature Review

“We are all beholden to our sources of information. But we are especially vulnerable when they tell us exactly what we want to hear,” (Lee McIntyre, *Post-truth*, 2018, p. 62).

Landscape of Climate Policy Polarization

Officially, there are five well-known political parties with which American citizens may register with: Republican, Democrat, Independent, Green, or Libertarian. There are, of course, various other political parties seeking to qualify or who are qualified but have quite small numbers. Regardless, the arena of American politics is dominated by the Democratic and Republican parties. It is the policy stances of these two parties and, when possible, their convergence which direct the individual behaviors and policy choices of Americans. This dissertation’s primary interest is climate change policy in the U.S. On this topic, official positions of Republican and Democratic parties differ greatly:

Information concerning a changing climate, especially projections into the long-range future, must be based on dispassionate analysis of hard data. We will enforce that standard throughout the executive branch, among civil servants and presidential appointees alike. The United Nations’ Intergovernmental Panel on Climate Change is a political mechanism, not an unbiased scientific institution. Its unreliability is reflected in its intolerance toward scientists and others who dissent from its orthodoxy. We will evaluate its recommendations accordingly. We reject the agendas of both the Kyoto Protocol and the Paris Agreement, which represent only the personal commitments of their signatories; no such agreement can be binding upon the United States until it is submitted to and ratified by the Senate. [...] We firmly believe environmental problems are best solved by giving incentives for human ingenuity and the development of new technologies, not through top-down, command-and-control regulations that stifle economic growth and cost thousands of jobs. (Republican National Committee, 2020, p. 22; for more on the Kyoto Protocol, see UNFCC, n.d.a.; for more on the Paris Agreement, see UNFCC, n.d.b).

As Democrats, we believe the scientists: the window for unprecedented and necessary action is closing, and closing fast. Democrats reject the false choice between growing our economy and combating climate change; we can and must do both at the same time. We will use federal resources and authorities across all agencies to deploy proven clean energy solutions; create millions of family-supporting and union jobs; upgrade and make resilient our energy, water, wastewater, and transportation infrastructure; and develop and

manufacture next-generation technologies to address the climate crisis right here in the United States. And we will do all this with an eye to equity, access, benefits, and ownership opportunities for frontline communities—because Democrats believe we must embed environmental justice, economic justice, and climate justice at the heart of our policy and governing agenda. (Democratic National Committee, 2020, p. 50).

Two prominent points of contention between the parties' positions stand out. First, the acceptance of current climate science: Democrats “believe” it and Republicans find it “unreliable”. Second, the disagreement over the level at which solutions should be initiated, with Democrats promising federal action and Republicans leaving it in the hands of individual innovators in the market; “it” for Republicans refers to environmental problems broadly, and not specifically to climate change which they appear to question the validity of.

Party platforms, in theory, influence the political opinions of their followers, providing a sort of rallying point (particularly in election years). Platforms and members' opinions don't always align perfectly, as a platform as a whole cannot be all things to every person and must balance achievable agendas with broader goals (Marland & Giasson, 2020). Some research on political opinions as they relate to climate change finds that other factors are also at play in their formation such as certain demographic variables, one's knowledge of the issue, level of education (e.g. Erikson & Tedin, 2016; Hornsey et al, 2016), frequency of engaging in discussions about climate change (Ballew et al, 2019) or seeking to remain consistent with a peer group (McIntyre, 2018), so there is always an opening for inconsistency between party-level and personal-level opinions. However, and in the context of climate change, these other influences have been “overshadowed in predictive power by values, ideologies and political affiliation” (Hornsey et al., 2016).

One can, therefore, reasonably expect that supporters of one such party hold political beliefs which align with the platform of the party. At worst, if not aligned they are not opposed

enough to cause separation from the party. One who identifies as a Republican in America would likely not support national or international climate policy interventions, and consider the science supporting climate change unreliable, while one who identifies as a Democrat in America likely trusts the science behind climate change and supports federal intervention to mitigate it.

Research has found that the pattern of political polarization does extend from the national party level to the American public, even if total alignment is not always achieved. In their snapshot of Americans' views of climate change, Ballew et al (2019) describe a populace with low understanding (though it has increased in last decade) that a) climate change is human caused and b) that there is scientific consensus that climate change is both 1) ongoing and 2) human caused. In general, they found conservative Republicans to be least convinced and that there is less polarization within the Democratic party than in the Republican party. There is, of course, some variation within parties around this topic. For example, Ballew, et al (2019) also found that opinions and beliefs around global warming differed between Millennial Republicans and older generations of Republicans and that this generational gap is much wider in the Republican party than in the Democratic party. The gap between “believers” and deniers within the Republican party is far outweighed by the gap at the societal scale between the Republican and Democratic parties. The close relationship of political party identification and climate change belief (Hornsey et al, 2016) sets up a major challenge for the polarized political system in America.

Development & Perpetuation of Climate Change Polarization

How did the U.S. get so polarized? The answer is simple on the surface but complex underneath. In their book *Merchants of Doubt* (2010), Naomi Oreskes and Erik Conway contend that the polarization around climate change, is partly (a large part, arguably), manufactured for economic and political gain. Lee McIntyre in *Post-Truth* (2018) furthers this argument and posits

that it is a reflection of broader science denial which has roots in economic or ideological agendas and is espoused by people who have something to lose.

The sections that follow delineate how both external factors (Hornsey et al, 2016; Slothuus & Bisgaard, 2020; Dunlap & McCright, 2008; Dunlap, McCright, & Yarosh, 2016; Dunlap, Xiao, & McCright, 2001; McCright & Dunlap, 2011; Lewandowsky & Oberauer, 2016; Lewandowsky, Oberauer, & Gignac, 2013; Chinn et al, 2020; Rode & Ditto, 2020; Hmielowski et al, 2014; Gustafson et al, 2019) and internal factors (Carmichael et al, 2017; Nisbet et al., 2015; Cotter, Lodge, & Vidigal, 2020; Lodge & Hamill, 1986; van Stekelenburg et al, 2021; Rosenberg & Abelson, 1960; Rosenberg, 1956; Lodge & Taber, 2013; Kraft, Lodge, & Taber, 2015; Lodge & Taber, 2007; Lodge & Taber, 2005) created and continue to perpetuate polarized climate change positions in America and present a significant challenge to designing interventions (Rode et al, 2021). These factors operate individually and interact with each other to create the complex web of variables that jointly influence an individual's evaluation of climate change and of climate change policy. This necessitates accounting for both the broader social context and psychological factors to understand climate policy polarization.

Employing social-ecological systems thinking can help elucidate behavioral and policy challenges situated at multiple levels and scales of influence, such as political polarization around climate change. This multi-level systems-oriented approach is particularly useful for understanding and developing solutions to social and environmental problems: Boessen and Hipp (2015) apply it to neighborhoods and crime; Silver, Holman, and Garfin (2021) take on collective trauma and coping; and Houston et al (2017) employ it to understand influences of flood risk perception. These are just three of many social ecological research projects that have been completed or are underway. Their commonality resides not in the specific topics they

address but rather the ways in which they account for relationships between the psychological, social, cultural, and institutional contexts in which people are situated. Considering the different levels at which each context's influence operates offers a more complete picture of major challenges like political polarization around climate change and how to reduce it.

In a social ecological perspective of political polarization of climate policy, people are assumed to be embedded within broader external sociocultural and virtual structures such as political party and the media environment. The human mind and its processing systems are also an element of the broader system which influences behavior. These element or spheres of influence are interdependent. There are interactions between each element of this nested structure that can be studied from macro to micro levels (Stokols, 2018). Taking a multi-level, contextualized approach is essential to more completely understand how these interactions influence behavior such as voting for a climate policy in a polarized society. It is within this broader framework of social ecology that I investigate the role of strategic communication in reducing political polarization around climate change mitigation policy in the United States. While I enumerate several specific contexts below, it should be noted that they are inherently inter-connected with each other and jointly influence people's climate-related beliefs and behavior.

External Factors: Information Environment

We receive information in various forms essentially all day, from family, friends, the internet, in newspaper, or on the television. For the research project at hand, the essential external forces to consider operate at the societal scale: the media environment and the American political party system. Drilling down into these factors of the broader social context and their influences, illustrates how external factors interacts with our cognitive and emotional processing

systems at the individual level (to be discussed in the following section) and influence decisions about climate change and climate policy (e.g. Lodge & Taber, 2013; Kraft, Lodge, & Taber, 2015; Lodge & Taber, 2007; Lodge & Taber, 2005; Rodriguez, Moskowitz, Salem, & Ditto, 2017).

Political Parties. The association between political party and public opinion and decision making, particularly around climate change policy is relatively robust in the literature. Hornsey et al (2016) find values, ideologies, and political orientation to have more predictive power over variables which have held researchers' attention in the past, namely education, knowledge, and experience, when predicting climate change belief. Slothuus and Bisgaard (2020) offer some explanation for this. They have found rather stark evidence that the party with which one aligns themselves *shapes* positions on public issues, even bringing once misaligned stances to heel with the party's current moves which reverse the party's prior positions. In a fortuitous natural experiment in Denmark, they illustrated that the political parties with which their research participants were affiliated *shape rather than reflect* public opinion. Participants who had once expressed little support for certain hypothetical social-welfare program changes *changed* their positions when their parties unexpectedly changed their platform to pass almost identical program changes. The idea, then, that political party platforms merely represent the "will of the people", constructed from the ground up, cannot be entirely true. Slothuus and Bisgaard's (2020) findings indicate that parties are major forces in their own right, constructing public thought themselves.

These same societal forces are at play in American climate politics, sometimes even to great detriment. The relationship of primary import to the project at hand, and perhaps the most easily visible, is the prediction by political party of belief in climate change. Even after

controlling for demographic variance, party affiliation predicts global warming beliefs with Republicans most often dismissing and denying the existence, cause, associated risks, and scientific consensus around climate change (Dunlap & McCright, 2008; Dunlap, McCright, & Yarosh, 2016; Dunlap, Xiao, & McCright, 2001). Some analyses find further segmented effects with conservative white males contributing significantly to climate denial (McCright & Dunlap, 2011). Endorsement of free-market economics and of clusters of conspiracy theories (not all climate related) significantly predict rejection of climate science. Primarily, those qualities coalesce on the Right (Lewandowsky & Oberauer, 2016), though not exclusively. Some studies concede that in the right (or wrong) hands conspiracist climate science rejectors can have considerable persuasive power (Lewandowsky, Oberauer, & Gignac, 2013).

The pattern? As one might predict having been informed of each Party's platforms: Republicans reject and Democrats support climate change science and the climate change mitigation policies that might limit the severity of climate change impacts.

Media Environment. As purveyors of information, the media has long played a critical role in shaping decision making. The role of media has evolved as both technology and funding streams have evolved, becoming both more proliferate in our lives (increasingly as entertainment) and more partisan and opinion based (McIntyre, 2018). The *mechanisms* by which the media holds sway over the human psyche will be outlined in the subsequent sections. This section, though, highlights the *outcomes* of that association are highlighted. Outside of overtly politically polarized topics, Fischhoff's long term research on risk analysis and human behavior also highlights the influence of our media on behavior. He accumulated evidence: "[...] that both location and the media strongly influence decision making with either recommendation" of behavior in the face of some hazard (i.e. evacuation for fire or flood)

(Fischhoff, 2012, p. 125). Specifically, he found a 10% reduction in compliance with recommended action when the media is skeptical instead of supportive (p. 130). Fischhoff (2012) emphasizes that the media influences our availability heuristics: “[a]lthough more available events are often more likely, media coverage (among other things) can make events disproportionately available, inducing biased judgments” (p. 6).

In the U.S., and arguably in many places around the world, the media environment is politically polarized. While liberals tend to consume news from an assortment of sources, conservatives primarily consume media from Fox News (Pew Research Center, 2014). The same Pew project found that “those with the most consistent ideological views on the left and right have information streams that are distinct from those of individuals with more mixed political views – and very distinct from each other”. Chinn et al (2020) also find evidence that news coverage (in major newspapers) of climate change in the U.S. has become both more politicized and more polarized and suggests that *politicization* of media coverage has increased the *polarization* of public opinion. This suggestion fits in line with Slothuus and Bisgaard’s (2020) findings that political parties shape public opinion, and thus offers a suggestion for a driver of this influence.

Politically polarized media matters for shaping opinions and experiences (e.g. Feldman, 2016; Rode & Ditto, 2020). Partisan media networks provide ever more tailored coverage of world happenings. Coverage tends to reflect interpretations that align with political ideological values and stances. Coverage of climate change and policies addressing it are no different-partisan perceptions and beliefs are lenses for interpretation and the variations in public responses to climate change are highly variable when viewed through these different interpretive lenses (Howe, Mildemberger, Marlon, & Leiserowitz, 2015). Consuming conservative news has

been shown to decrease trust in scientists and thereby reduce certainty in climate change as a real phenomenon, while consuming non-conservative news has been shown to increase trust in scientists and perceived certainty that climate change is even happening (Hmielowski et al, 2014). People tend to interact with media of the same political leaning as themselves—thus, the content one is then exposed to reinforces those leanings. The idea has been furthered by Bolin and Hamilton (2018) whose findings suggest, additionally, that partisan media not only strengthens climate change beliefs but also influences future choices of media. Arendt, Northup, & Camaj (2019) find empirical evidence of such media echo chambers and positive feedback loops.

Take for example Gustafson’s et al (2019) analysis. From the time the idea of the Green New Deal (GND) first began entering the political discourse to just four months later, it went from being relatively unfamiliar among registered voters yet supported across the Republican (64%) and Democratic (92%) parties, to being a much more contentious proposal (Gustafon et al, 2019). By the end of four months, of those who indicated hearing “a lot” about the GND, 96% of Democrats supported it while only 4% of Republicans did. Polarization drastically increased as voters heard more about the resolution in the media, with only a four-percentage point difference in support among those who had not heard anything at all to a 92-percentage point difference among those who had heard a lot. Gustafson (2019) suggests that this striking correlation is likely attributable to what some researchers call the “Fox News effect,” or the exposure to partisan media, since Republicans seemed more open to supporting the GND principles prior to substantial exposure to partisan media.

Internal Factors: Decision-Making Models

The external environment in which we are each situated is influential, but there is more to

the story. Writing on what they consider over-blaming of the internet for expanding the accessibility of extremist content and thereby radicalizing and spreading terrorist messages, Archetti (2014) notes “[e]ven if extremist messages are accessed, the key issue is the individual appropriation of those contents through the interpretative prism of the beliefs and worldview resulting from the individual’s stance in the social world” (p. 219). Archetti therefore highlights the importance of not viewing the impacts of media messaging in isolation but rather through the broader-gauged social ecological lens described previously. This suggestion tracks with behavioral models that emphasize the complexity of decision making. The internal processes through which information and experiences pass play significant roles in the establishment and development of our attitudes, beliefs, and actions. External messages, such as what we encounter in the media, are mediated by these internal processes and this interconnectedness is why both internal and external factors must be studied in-tandem to derive a fuller understanding of not only the current state of American climate policy potential but also on how the climate policy landscape might be altered in ways that promote greater societal and global sustainability.

When attempting to build support for an idea, in this case for mitigative climate policies at the national level, we are dealing in established beliefs, attitudes, opinions, and behaviors. Some of these are favorable towards our desired outcomes (e.g., supporting, voting for, passing environmentally supportive policies) whereas others are contrary to them. The goal, then, is to persuade the opposition. But this task is not simple. The fields of behavioral economics, psychology, and political science all have documented certain phenomena that make persuasion challenging.

Cognitive Models. Past research has investigated cognitive interpretation of stimuli, or how we mentally process the information we receive. The rational choice model, aptly named,

suggests actors will behave in the most rational way. A traditional understanding of how citizens make decisions for political behavior (voting) is based on a simplistic one-way model whereby an event or idea (stimulus) triggers conscious cognitive processes, memory and information retrieval, that after deliberation, leads to a decision. This is a model of rational choice. But humans often behave irrationally, a simple truth that plagues this model.

The deficit model of behavior also falls into the category of cognitive models and suggests increasing knowledge will direct behavior in the desired way. While more recent literature has uncovered the failings or incompleteness of the knowledge deficit model of behavior change, that does not preclude all influence of objective topical knowledge on decision-making and behavior. In some research, the influence of this variable is vis-a-vis either mediation or effects on some latent variable. Frey's (2021) study on individual differences in risk perception identified objective knowledge as an inverse predictor of risk perception, while the latent risk perception variable played a significant role in predicting voting behavior. Additionally, over time, intraindividual changes to objective behavior were positively associated with changes to perceived benefits- another significant predictor of voting behavior- and negatively associated with perceived risk. However, on the whole, the literature demonstrates that an information deficit model is not adequate for explaining behavior as pro-environmental behavior beyond intentions does not reliably follow after increases in objective knowledge (Burgess et al, 1998; Kollmuss & Agyeman, 2002; Finger, 1994; Jordan et al., 2011; Hornsey et al, 2016; Nolan, 2010).

In particular, conservatives' belief, or rather disbelief, in climate change has been shown to be resistant to new information (Carmichael et al, 2017; Nisbet et al., 2015). Furthermore, as demonstrated by Gustafson, et al (2019) above, the reception of more information, especially

information passed through politically biased news media, further polarizes positions on climate change in the U.S. Information that is congruent with existing beliefs and attitudes is favored, both consciously and unconsciously (Cotter, Lodge, & Vidigal, 2020). Moreover, information that is counter to existing beliefs and attitudes is denied and actively negated. Lodge and Hamill (1986) found that describing a hypothetical congressperson as Republican or Democrat systematically influenced what information was remembered and retained over time for informing one's subsequent evaluations. These biases, confirmation bias and disconfirmation bias, often work in tandem and serve to perpetuate polarization when a balanced (pro and con) set of information is presented.

Communication research, particularly within the field of climate communication, grapples with this challenge in a wide array of studies. A recent study conducted by van Stekelenburg et al. (2021) highlights the influence that internal processes have on one's interpretation of information about climate change. In trying to correct misperceptions of human-caused climate change by empowering participants to recognize the value of and indicators of scientific consensus, they did not find evidence that boosting consensus reasoning increased belief in human-caused climate change. Their analysis indicated that their strategy did not have an effect on changes in perceived scientific consensus. However, their strategy did have the desired effect when applied in the context of genetically engineered food. The researchers point to particularities of the U.S. context (low trust in climate scientists) and of associated stronger anti-science views among those holding misperceptions of human-caused climate change. Van Stekelenburg et al argue that this anti-science mindset "hindered them from accepting the science-based boosting strategy for claim evaluation" (pp. 1554-1555). That is to say, internal, pre-existing anti-science attitudes formed a filter through which external information was

rejected. This also offers some evidence for the seemingly impervious nature of anti-climate science attitudes in the U.S. as filters to correction. These examples present a significant barrier to persuasion, and I suggest that such a challenge is reason enough to investigate alternative communication strategies that work *alongside* existing beliefs and attitudes.

Morley (1987) identifies various mechanisms of persuasion and posits that receivers of a persuasive message attend to (interpret) the degree of novelty, importance, and plausibility of the information presented before deciding their degree of belief. This is known as the subjective message construct theory which seeks to explain the persuasiveness of messages. This model is similar to others in the communications field in that it considers both elements of the message and elements of the receiver as important to the outcome. However, Morley concedes that this model does not indicate which variables determine the extent to which information is considered novel, important, or plausible. This process also seems to be founded on an assumption that a receiver is motivated to think critically about persuasive information. Lodge, Taber (2016), however, argue that political decision making is primarily based on snap judgments and rationalizing rather than though more objective, conscious deliberation (this will be discussed in more detail below).

Affective Models. Some researchers emphasize the importance of affect over and above rational thought (e.g. Rode & Ditto, 2021; Nabi, Gustafson, & Jensen, 2018) for predicting behavior. In affective models, attitudes are assumed to be strongly tied to emotion. Specifically, the way people *feel* about the environment directly influences their attitudes and beliefs about the environment (Pooley & O'Connor, 2000; Stern, 2000; Luebke et al, 2016). Such models, like their cognition-only counterparts, do not capture the full story.

Consider Leventhal's work in fear appeals. An essential argument in this work is that it is

about more than making someone feel fear. There isn't a serial relationship. A behavioral and an emotional response can happen simultaneously but are independent of each other and instead are in response to one's interpretation of the stimulus, the trigger. The intervention used has to carefully balance these two reactions; otherwise, the outcome won't necessarily align with the desired behavior. If too much fear is triggered, the internal environment (how bad you are feeling) must be attended to first. Related to this idea is Weber's (1997; see also Shome et al., 2009) single-action bias explanation for why effective or rational responses to climate risk aren't taken. If concern is raised, people will take one action to reduce the risk associated with what they are worried about. Once that one action is taken, even if it is not the most effective, the actor's perception of risk is reduced sufficiently such that no further action is taken. Weber says, "A single solution seems to provide sufficient assurance that a problem has been dealt with, and the resulting peace of mind seems to prevent the generation of additional solutions or adaptations" (p. 339). So, this suggests that increasing negative affect, particularly fear, around climate change will not lead to efficient or effective action, particularly as climate mitigation and adaptation will require continuing behavioral efforts over many years.

Studies of climate change response have given extensive attention to emotion targeting with mixed results and recommendations. Some of these will be detailed more in a subsequent section. A recent meta-analysis by Rode and Ditto (2021) summarized experimental interventions targeting positive and negative affect and found mixed results.

Dual-Process Models. Dual-process models, on the other hand, account for the joint influence of both cognitive mechanisms and affective pathways. These seek to more fully account for how we make decisions and judgements. While certainly more complex, dual-process models aim to understand the nuances that influence decisions by investigating how

cognitive and affective paths work in tandem.

Prior research by Rosenberg and Abelson (1960) provides important evidence supporting the use of dual process models. They confirmed that stable affective response is associated with a cognitive structure of beliefs about whether an “object” prevents/helps attainment of some value. Rosenberg (1956) had also found evidence suggesting that the perception of value or instrumentality were manipulatable elements of the affect-cognitive structure. Further, the valence of the attitude is consistent with the content of that structure (Rosenberg & Abelson, 1960). So, a strong, stable positive affect toward something should be associated with beliefs that the object helps the person attain their values. Interestingly, they also posit that one could change someone’s attitude *without* modifying the associated cognitive structure by attending to affect—the affect valence is temporarily reversed, inducing modification of the cognitive structure.

In the 1980’s, Petty and Cacioppo introduced the dual process Elaboration Likelihood Model (ELM) consisting of central and peripheral processing. In the simplest of terms, this model looks at the substance of a message requiring thoughtful attention (central) and the suite of other potential influences like the appearance of a speaker that have affective associations (peripheral) and their differential influence on persuasion (Petty & Cacioppo, 1986). If people have the time and motivation, they will attend more to the substance of the message, otherwise, they are driven by the peripheral cues. They posit that each avenue is likely to operate when certain conditions are met, but they don’t elucidate what factors make central or peripheral “cues” strong.

Kahneman (2003) distinguishes the two systems as intuition and reasoning. Stanovich and West (2000) call them system 1 (unconscious, intuitive, contextualized) and system 2 (deliberative, decontextualizing). Across various conceptions of dual process models, the two

processes are often conceptualized thusly: one is slower, analytic, and deliberative while the second is based more on intuition and experience and operates much more quickly.

These categories of dual-process models make more intuitive sense. We likely each know from experience that we or others seem to rely on different processes at different times. In the context of political decision making (of central import to this dissertation), Lodge and Taber introduce a model that suggests some explanation of why this is the case. Their model is the central framework on which this dissertation is based.

John Q Public Model of Political Information Processing. This dual-process model depicts both unconscious and conscious cognitive and emotional processing pathways essential to understanding political behavior (Lodge & Taber, 2013; Kraft, Lodge, & Taber, 2015; Lodge & Taber, 2007; see Figure 2.1). In broad strokes, and moving left to right in Figure 1, a stimulus, for example a message about climate change policy, is encountered. Almost immediately but unconsciously and automatically, feelings are activated. Some of these feelings are attitudes that are connected directly to the stimulus while others are incidental. Any additionally activated information or concepts in memory that are called forward will be biased by that affect. This is the information that will be used to make cognitive and more conscious deliberations and evaluations. It is also possible, though, that the cognitive route is bypassed entirely and instead the affect activated automatically and unconsciously can directly lead to an evaluation of the same valence. Lodge and Taber (2013) posit that, with time and motivation one can engage in more conscious deliberative reasoning and question the affective response. Lodge and Taber (2013) therefore suggest that viewing the “conscious construction of arguments and reasoning as the foundations of public opinion and the guideposts to rational political behavior” is unlikely-not impossible, but rare (p. 21). Rather, they say, the reverse is more likely- we rationalize, we

base our deliberations on our affect-driven evaluations.

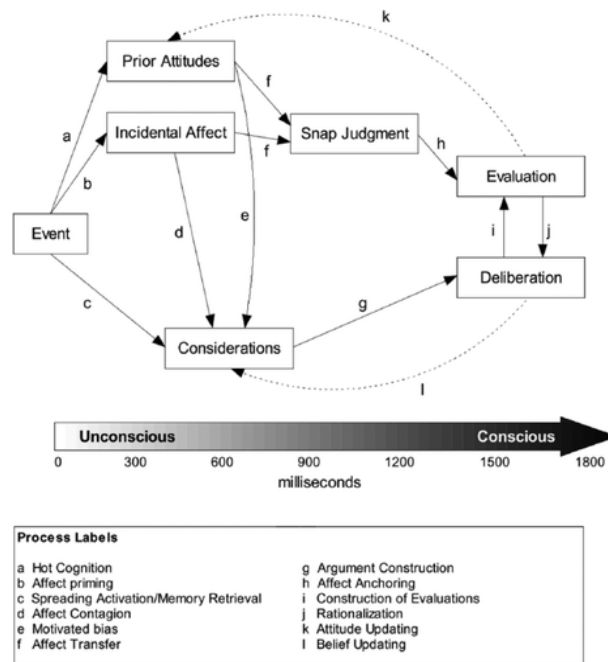
There are two postulates of this model that are essential to this dissertation project that will be discussed further. The first essential tenet of the aforementioned model is that all processing is affectively charged, either by prior attitudes that are activated or by some contextual priming. This, Lodge and Taber (2013) emphasize, is valence affect, and not specific emotions. The evaluative outcome of such processing can be rationally reevaluated, but affect is a powerful influencer of judgement. “Affect precedes and contextualizes cognition” (Lodge & Taber, 2013, p. 22).

A second key tenet of this model is that the affective processing described above is happening unconsciously, it is implicit. A vast majority of our conscious deliberation is really rationalizing the evaluations we have already made through affectively charged processing, not a rational deliberation of considerations leading to evaluation. Similar to the affective-cognitive structure concept of Rosenberg and Abelson (1960) and Rosenberg (1956), the JQP’s inclusion of a hot cognition pathway assumes that “[...] with repeated co-activation, socio-political concepts become positively or negatively charged and this affective charge becomes directly linked to the concepts in long-term memory” (Lodge & Taber, 2005). Therefore, when an object in long-term memory is activated, the associated affect too is activated. Concepts that are both substantively and affectively relevant to the stimulus enter working memory and dictate evaluation (Lodge & Taber, 2013). Experimental tests of the hot cognition pathway within this model demonstrate support for the existence within memory of an automatic link between positive or negative affect and political concepts (Lodge & Taber, 2005). The authors posit that their findings help explain the challenges faced by the rational actor model, illustrating not only the strength of affect as a heuristic device, but that the primacy and automaticity of affect “kick-

start the processes that spark motivated biases when citizens encounter attitudinally contrary motivation” (p. 475). The affective “filter” constrains not only the interpretation but also the processing and evaluation of new information and subsequent actions taken (Lodge & Taber, 2005). Furthermore, it is possible that this model helps illustrate why it is that people might “know better” but not act better. They are not *being* rational; they are *rationalizing* their behavior.

This model indicates that it is unconscious thought processes which lead to both snap judgments and are at play when we think harder about important issues. *Conscious* deliberations, on the other hand, are typically *rationalizations* rather than rational thinking (Lodge & Taber, 2005). And, since public opinion studies suggest that snap judgments not deliberative evaluations are the basis for political decisions among the public (Kraft, Lodge, & Taber, 2015), overcoming or influencing snap judgments about climate could potentially influence the acceptance and implementation in a politically divided atmosphere.

Figure 2.1
John Q Public Model (Source: Kraft, Lodge, & Taber, 2015)



Given what we do know about affective decision-making processes and how they interact with the cognitive processes and the external contexts in which these processes are situated, how might we leverage that knowledge to build support for climate change policy among groups who oppose it?

Messaging Matters

The art and technique of crafting a message has been recognized since early human history. What is said or the manner in which it is presented reflects, in part, the medium used (Deibert, 1997). In so doing, some scholars argue, certain “elements of social epistemology present in society [...] flourish or wither as a result of a fitness between those elements and the new media environment” (Deibert, 1997, p. 177). Consider, for example, Twitter’s prior character count and the constraints it placed on users to produce their message. Medium (re: platform), however, is not the sole determinant of the content of a message, particularly in messaging about things which have political import. Aristotle identified critical components of persuasion and rhetoric as *logos*, *pathos*, and *ethos*. In simplest terms, these reference the consideration of what is said, who says it and to whom it is said to, and how it said. A deep understanding of these components is not required for this dissertation, but an acknowledgement that the craft of messaging has long been appreciated is. This craft has played an incredibly important part in the theater of politics, particularly so in democracy. Political speeches, propaganda, information, misinformation can all be boiled down into messages. The project at hand focuses on interactions between audience and message framing.

Message framing is one element of communications and of political mobilization that influences our understanding. From Goffman’s (1974) influential work, frames are defined as “schemata of interpretation” (p 21). Applying this definition, Benford and Snow (2000) define

the purpose of framing as shaping understanding of what, if any, problem exists, the cause, and the solution to said problem- it helps shape how an audience thinks about a topic.

Strategic Messaging

Everyone likely has an intuitive sense of what framing is. When we have discussions with friends or arguments with family, when we try to get someone to “see our side”, or when we say “when you put it that way” we are framing our ideas, thoughts, and opinions and possibly being persuaded by the way others have framed theirs. Framing, as a tool, isn’t necessarily persuasive in nature but it can be wielded as a part of a broader persuasion strategy. Framing is not always applied consciously, but strategic communication employs intentional selection of certain elements with the hopes of achieving a particular effect. For example, politicians, activists, health care providers, and marketing agencies among many others try to manipulate messages to be persuasive. Message frames can be (a) diagnostic, meaning something is problematized and the cause of that problem is identified; (b) prognostic, in which a solution to the problem is put forward as are strategies for achieving the solution; or (c) motivational (Benford & Snow, 2000). Often, messages contain more than one of these types of frames. To use Aristotle's terms again, message frames establish the *logos*, *pathos*, and *ethos*.

The way topics are discussed on cable news networks, in newspaper articles, or in social media posts influences the audience’s interpretation. That is, the way climate change is framed in the media can shape a listener or reader’s understanding of the causes, the value and validity of proposed solutions, and the degree of personal motivation to take some kind of action. We can see this in Gustafson's, et al (2019) illustration of a “Fox News Effect”. The messaging is what differentiates the news networks participants were exposed to and such exposure drastically changed attitudes and opinions. Messaging matters.

Valence Framing. Of key interest to this project are the near instantaneous affective responses defined in the JQP Model and the degree to which targeted manipulation of message framing can, through an unconscious activation of emotions, lead to support for climate policy. To target the affective pathways of cognition suggested in the JQP, valence frames are a common tool. In this project, a valence frame is conceived of as the words or phrases which emphasize either positive benefits or negative consequences. Typically, this includes the use of words typically perceived as having positive (improvement) or negative (suffering) connotations. Valence frames set the tone of a message and can also be designed to prime suites of positive/negative emotions or more explicitly arouse specific singular emotions.

Negative. In both the climate change communication and the health communication fields, there is a long history of research into fear-arousal, in particular, to evoke behavior change. Favored explanations of the usefulness of negatively framed messages, for example, are that they increase individuals' perceived risk of climate change and its impacts, as well as their concern about global climate change (Nolan, 2010) and their intentions to act (Skurka et al, 2018). There are some differential benefits of negative emotion framing in messages depending on the political party of the receiver of that message. For example, Bloodhardt, Swim, and Diccio (2019) found that Democrats preferred (a) messages with emotions over those without and (b) that they preferred negative emotional messages possibly because they matched their negative feelings of concern towards climate change.

Some scholars recommend against the use of certain negative emotional appeals in messaging, specifically fear appeals, because of the challenges faced by compassion fatigue, a finite "pool" of worry/concern, disengagement, or by desensitization to negativity (O'Niell & Nicholson, 2009; Shome et al, 2009; Hansen et al., 2004; Weber, 2010). Cameron and Payne

(2011) suggest that people will become less concerned about climate change as a way to cope with the invocation of additional concern from negative messaging. The latter explanation is in line with findings of Leventhal (1971).

On balance, there are mixed results on the use of fear to decrease climate skepticism or increase support for climate policy for reasons that were also introduced the previous section on affective models.

Positive. While negative affect targeting messages primarily channels fear, most positive affect targeting interventions in the literature rely on the incitement of hope and efficacy. Positive framing of messages shows promise for increasing and maintaining attention and concern, and catalyzing behavioral change (Kim and Lee, 2018; McPhail-Bell et al, 2018). While there are complex mediating factors, the use of positive framing also shows promise for increasing support for policy. Positively framed messages can affect the message recipient's trust, however (Koch & Peter, 2017; Jaffé & Greifeneder, 2019). But, given the promise of influencing attention, empowerment, efficacy, or agreeability- other important elements for political action, the “trust- tradeoff” may be worth the use of positive frames.

Stakeholders and experts recommend positive framing in some cases because of how its novelty amidst so much negative framing would be attention catching and be processed differently (Palmer, 2018; Bohman et al, 2018), to avoid making audiences feel helpless (DeLorme, Stephens, & Hagen, 2017), and to make outcomes seem desirable (Howarth, 2017; Bohman et al, 2018; Schaller & Carius, 2019). Some studies, at least partially, attribute the differential success of intervention policy and campaigns to positive framing (Endaltseva & Morvinova, 2016).

Bain, Hornsey, Bongiorno, and Jeffries (2012) found that positive outcome frames of

climate mitigation, such as increased interpersonal warmth and increased societal development outcomes, rather than frames emphasizing decreased risks from climate change, increased intentions to act pro-environmentally. Further indicating potential for positive framing to elicit positive affect, Nabi, Gustafson, and Jensen (2018) found evidence that the sequencing, or flow, within a single message of first eliciting fear and then establishing hope enhances the persuasive power of messages, in line with Leventhal (1971). In their study, (positive) frames evoked significantly more hope in the secondary message than did loss (negative) frames.

Positive framing has promise for certain elements of communication essential for building and maintaining support for mitigative policy. For those areas in which it encounters more challenges (i.e., trust levels), it does not appear to have a negative effect on outcomes (e.g. Chai, 2015; Weist, Raymond, & Clawson, 2015). If a message recipient is unfamiliar with an with the positive outcome framing of climate change, my interpretation of the JQP model suggests that using positive frames could them avoid *unconscious* snap judgments. The reason being that the stimulus is novel and therefore has fewer unitized affect-object associations in one's mind and can be processed more *consciously*. As such, continued and expanded research into the use of positive framing is warranted.

Emphasis Frames. Emphasis frames refer to what one might think of as the “theme” of the message or the more topic-specific elements. One might talk about climate change and emphasize the economic aspects (an economics frame) or the health impacts (a health emphasis frame). My interpretation of the JQP model suggests that novelty or unfamiliarity with an emphasis frame may prevent snap judgments because the stimulus (message) could not be immediately passed through familiar, affectively-charged pathways. Therefore, it could lead to more objective, cognitive processing of the message, allowing for opportunities to consciously

deliberate and come to a decision.

Another important aspect of emphasis frames is that, in calling forward specific topics, they also arouse associated values. For example: while the specific health frame of climate change may be unfamiliar, the topic of health, generally, is not. Health may be a salient topic for message receivers that elicits positive (I feel positively improving health) or negative (I feel negatively about my health) affect. If the emphasis/topic can prime positive affect through the affect-cognitive tag, then emphasis frames provide a persuasive tool that can also be leveraged for the ability to align with a message recipient's existing values.

Bain et al (2012), suggest that, rather than trying to convert climate change deniers into believers, emphasizing alignment with existing values of Deniers, or including outcomes relevant to their willingness to act would do more to build consensus for climate policy. In their research, for example, they found that framing the effects of mitigative action on society as increasing warmth and benevolence within the community increased Deniers' intentions to engage in environmental citizenship. It gave them a reason to act in ways that aligned with values commonly held by their in-group without forcing them to first believe in anthropogenic climate change. Said another way, they were not forced to divorce themselves from their political identity to support climate policy. In another study, Bain et al (2016), deepened this reasoning. Hornsey et al (2016) also suggest that "pro-environmental behaviours can be coaxed out of people by working with their ideologies rather than against them; for example, by framing pro-environmental action as a form of patriotism" (p. 625). Similarly, research from applied fields like planning and environmental management reinforces the perspective that knowing and applying values is useful in the decision-making process. Such information can help tailor (frame) messages such that they are best received by the audience (Elliot, 2003; Ives & Kendall,

2014; Cravens et al, 2021). Climate policy advocacy, then, needs not try to get all voting citizens to want the same outcomes from a single policy; recognition of multiple outcomes and/or co-benefits of the same climate policy that align with a particular group's values could also be effective.

Climate Change and Health Co-benefits. Above, I used an example of a health frame to describe how emphasis framing can be useful within the JQP framework. The health frame, specifically, is also one of interest to this dissertation.

Given our rapidly changing global climate, humankind is already seeing and will continue to see new and exacerbated negative impacts on human health from known and developing links to climatic changes at both the individual and societal level. Health issues from climate changes stem from extreme heat, poor air quality, poor water quality, extreme weather events, changes in vector ecology, increasing allergens, water and food supply impacts, and environmental degradation (CDC, 2016; Watts et al, 2019). These climatic changes impact the mental and physical health of humans and exacerbate chronic illness, more so among health-vulnerable populations such as children or the elderly, and among communities disproportionately impacted by these risks (WHO, 2018).

With these direct and indirect hazards on the horizon if global climate change continues unabated, there may be opportunities to leverage this health-climate change connection as a persuasive tool. If climate change is mitigated, it follows that so too will health hazards be diminished. An improvement in global climate change is associated with improved health quality calling forth an opportunity to frame climate mitigation efforts with a health co-benefit frame. Several studies suggests promise for co-benefits framing of climate policy when they are relevant and particularly when they go beyond economic co-benefits. (Petrovic, Madrigano, &

Zaval, 2014; Walker, Kurz, Russel, 2017; Schaller & Carius, 2019; Mayrhofer & Gupta, 2016).

Researchers have found partisan differences in health behaviors. For example, Democrats were found to be 50% more likely than Republicans to indicate they would get the H1N1 vaccine (Schlesinger 2009a & 2009b in Baum, 2011). Baum suggests that this is because Republicans are more skeptical of “proactive government intervention in public life” (p. 1023) and of international institutions (i.e., WHO) to begin with, or because the current administration was Democratic. Another suggested explanation for the partisan differences is the tendency to selectively expose oneself to ideologically aligned media and, therefore, differing patterns of coverage which reflect the aforementioned skepticism. While this may suggest that a health frame of a regulatory climate policy would be met with two-fold skepticism, the approach taken in this dissertation differs from those that are covered in research on partisanship in health behaviors (e.g. Baum, 2011) because rather than recommending a government-endorsed behavior directly related to health (i.e. getting a flu shot) or the likelihood of doing so, or emphasizing a health risk (i.e. degree of danger presented by H1N1), this project will present health as a secondary co-benefit of choosing to take another action. That is to say that their primary consideration will not be the risk of performing a healthy behavior or not, but of a less risky (voting) behavior with a health benefit--a “two-for one”, or an opportunity gained (Bohman et al, 2018; Spence & Pidgeon, 2019; Graham et al, 2019).

Another important point raised by Baum (2011) is the attribution of attitudinal influence to the media coverage, suggesting that framing and selective coverage rather than innate values (caused) the differences, or more fully accounted for them. This further suggests that health co-benefit framing could still have potential for building support for climate policy.

Further reason to be hopeful for the potential of health framings comes from Myers,

Nisbet, Maibach and Leiserowitz (2012). They found that a public health frame of climate change, emphasizing the risks to public health from climate change, was most likely to generate feelings of hope and generated the least amount of anger among the Disengaged, Doubtful, and Dismissive groups (the group names being references to their level of belief and engagement with climate change).

Several studies have included disease prevention in their framing of the co-benefits of climate mitigation (e.g. Bain et al, 2016) with weak results. However, these frames emphasized the risk avoided, not the opportunities opened- a negative frame rather than a positive frame. The project conducted here combines a health co-benefit of climate policy frame with a positive valence, that is focusing on the health opportunities or healthfulness gains of climate policy, rather than on health risks avoided.

2.4 Conclusion

Our ever-modernizing lives are inundated with communication. Pictures, audio, video, text- they are constantly being exchanged along with the ideas they represent. This is how ideas are passed on, how information is shared, how beliefs are shaped and reshaped. Without communication there is no way to control a narrative because there is no way to pass on alternative ideas to those which individuals have formed on their own from observation or imagination. Changing opinions or actions must involve communication at some stage, then. In a polarized American society, the implementation and success of national climate change policy depends on changing opinions and motivating action. As such, investigating how we communicate about climate change policies in the U.S. has a critical role in safeguarding our future.

This is why it is important to approach climate change communication from a broad

range of perspectives. Looking at one individual component will not give us the full picture of the causes and effects of climate messaging. This dissertation adopts a social ecological approach and incorporates elements internal and external to an individual to make sense of her/his reactions to different frames used in messaging about climate change policy. It tries to account for the external information landscape through an analysis of news media which participants of a survey likely have been exposed to. It manipulates message frames, intending to tease apart cognitive processes and affective responses.

Cognitive or emotional mediation and novelty, two features that are repeatedly ascribed to both positive framing and health co-benefit framing have explanatory potential. Connecting back to the John Q Public model of Political Information Processing, each of these elements on their own are hypothesized to influence an individual's evaluation through one of two ways. Manipulating an emotional prime, as is the intention with using a positive message frame, may change the valence of recalled information is tinted with and thus bias the evaluation in a positive direction. The novelty of associating climate change policy with health co-benefits may slow the snap judgment process and kick the cognitive gears into a slower deliberation of information with the potential for an evaluation in favor of the policy. The question at hand then is whether certain message frames of climate policies can trigger prior attitudes that are (a) positively toned rather than negatively charged, and thereby start either a cascade of positive memory retrieval leading to a positively charged evaluation, or (b) be unfamiliar enough or *novel* enough to avoid snap judgements based on automatic affect-attitude pathways.

In short, can the use of positive valences or health-emphasis frames be employed as tools to reduce polarization around climate change policy by increasing support among Republicans?

Chapter 3 – Study 1: Conservative Media Analysis

Study 1, a content analysis of conservative media coverage had several research objectives: (1) determine how frequently positive outcome frames are used in conservative media coverage of climate change and climate policy; (2) determine how frequently connections are made between climate change and human health in conservative media coverage of climate change; and (3) determine how frequently the science behind climate change is discussed and in what manner. Together, these objectives will help characterize conservative media coverage of climate change and inform the results of Study 2 (Chapter 4).

Methods

To determine the novelty of (1) health emphasis framing and (2) positive outcomes framing of climate change policy, a combination of traditional news media, blogs, and social media were analyzed.

Document Identification & Selection

Documents published between January 1, 2017, to May 31, 2021, from five sources were analyzed. This time frame was selected for several reasons: (1) to capture the more recent frames and employed in the media, (2) to capture relative consistency of frames over time, and (3) during this time the Green New Deal was introduced as a potential national level policy to address climate change and impacts, bringing discussions of national policy to the fore.

Within each source for each of the five years, three searches were conducted. Search phrases were chosen to achieve a broad array of results around climate change and climate change policies of relevance in the U.S. The following search phrases were chosen:

1. “Climate change” OR “global warming”
2. “Climate change policy” OR “climate change policies” OR “climate regulation” OR

“climate regulations”

3. “Green New Deal” OR “GND”

For each source, I recorded the number of documents returned for each combination of year and search terms. Up to 50 documents were identified for analysis per year. This number was selected in part to promote manageability but aligns with sampling methods from similar research (e.g. Bognar, Skogstad, & Mondou, 2020, who used between approx. 31-85 articles per year to investigate media frames in two countries; and Roehy, Arlt, Wolling, & Bräuer, 2019, who analyzed approximately 160 articles per country covering about two and a half years, equating to an average of about 64 articles per year per country). The proportion of each search results in its respective year was translated to that same proportion of 50 (ex. If search 1 returned 300, search 2 returned 150, and search 3 returned 60, totaling 510 results for a year, then 58.8% of 50 would be allocated to search 1 results or 29 documents and so on.). A random number generator in Excel was used to identify which specific documents to use for analysis.

Source Descriptions

Since the audience targeted in the next phase of my program of research are Republican or conservative in political ideology and since such audiences view and read media primarily in alignment with their own views (e.g. Gustafon et al, 2019), I focused my search on popular sources considered by Gentzkow and Shapiro (2011) and Flaxman, Goel, and Rao (2016) to be conservative leaning, right wing, or Republican media and which are accessible via UCI licensing agreements. To encompass a broad range of media outlets, and thereby capture content which could have been viewed by consumers of various old and new media platforms, an assortment of conservative-leaning media outlets was sampled. Each source is described below.

Fox News Network. Fox News Network is a nationally broadcasting television network

with web-based news, commentary, and reporting. The television broadcasts are the focus of this analysis. Pew Research Center (2014); Gentzkow and Shapiro (2011); and Flaxman, Goel, and Rao (2016), identify this network as both a conservative-leaning outlet and a popular source of news among American conservatives.

Media documents representing the Fox News Network sample were drawn from the Nexis Uni database using UCI licensing. The data are television broadcast transcripts which include information on the segment name, speakers, date, and content of broadcast in addition to the transcript of the broadcast. To identify the data to be used for this project, the source in the Nexis Uni search was first set to “Fox News Network”. Then the search terms were entered into the search bar. The appropriate time frame was selected.

To make the actual selections, once search results were returned, they were then sorted from oldest to newest. The results are automatically numbered by the system. Documents identified by the random number generator are selected and downloaded from Nexis Uni. Afterwards they were imported into Dedoose and labeled with the appropriate descriptors (i.e., Fox News Network, 2017, CC/GW) to differentiate source, year, and search terms used to identify the document.

Newsmax. Newsmax is a news and opinion focused web-based media outlet with cable access, as well. Pew Research Center (2014) and Flaxman, Goel, and Rao (2016) identify Newsmax as conservative-leaning and gaining in popularity among republicans in America. This analysis uses only their web-based, written articles.

Searches were conducted using Google’s “site:search” feature. This was selected over the website’s internal search feature for its ability to filter by year and look for exact phrases. Documents which met search criteria were counted and proportioned. A random number

generator was not used for this source due to the low numbers of results; all results returned were used.

Rush Limbaugh Show. This outlet showcases opinions and editorials by Rush Limbaugh (prior to his death in February 2021) in the form of podcast transcripts and written articles which are also available online. Rush Limbaugh was identified by Pew Research Center (2014) as a popular, conservative media outlet among American republicans. Documents were identified using the same process as was described for Newsmax.

Twitter. Twitter is a social media platform where individuals and organizations can post short text posts, videos, links, or photos. It is an interactive platform. For this analysis, text-posts from the following accounts were used under the assumption that, because of their high follower count and notoriety, these self-identified Republican and conservative politicians and thought leaders would have the influence regarding the framing of a topic on Twitter.

- Mike Pence, former Vice President of the United States. For Mike Pence, his personal account is used because the professional account associated with his position as VP primarily “Retweets” posts from his personal account. Handle: @Mike_Pence
- Ted Cruz, United States Senator- Texas (Republican). Handle: @SenTedCruz

Tweets were collected from twitter.com using R’s (version 11.21) “search_fullarchive” function from the “rtweet” package. The text of each Tweet was then compiled into PDFs with its identifying information for import into Dedoose. The searches returned both text and hashtags (#) that met criteria, but the searches were not specifically seeking to return hashtags (#).

Hashtags (#) are a central feature of Tweets, making content around certain topics easily searchable, but for the purposes of this research they are considered more as categorizing tags than content which contributed to the development of a message frame.

Former President Trump’s Remarks. Originally, President Trump’s Twitter was planned to be one of three accounts for the Twitter sample as his communication on the platform was a significant outlet for his policy opinions and thoughts on a variety of topics. However, his account was banned from the Twitter platform following the January 6, 2021, insurrection. As such, all of President Trump’s Tweets are inaccessible via Twitter.com. The Tweets are slated to become available as part of the National Archives, however they are still unavailable as of this writing (April 2022). In place of President Trump’s social media mentions of the search terms, I collected an adjusted number¹ of documents from alternative documents available in the archives to supplement this absence. These documents have been sourced from trumpwhitehouse.archives.gov and include transcripts of direct speeches of President Trump published as “Remarks”.

Documents appear in search results as newest to oldest in an un-sortable format. The search bar does not support Boolean inputs (e.g., AND, OR) to sort results. To make the actual selections, once search results were returned, I navigated to the last page (oldest results) and established the final result as “number 1”. From that starting point, I used a random number generator to identify which Remarks would be selected. To account for inability to use Boolean operators, I conducted one search per single phrase and divided documents by number of phrases for that category. For example, for the year 2017 I could have a total of 16 documents across all three categories. Each category is described by several search terms, a total of eight. A search for “climate change” Remarks returned 115 while “global warming” returned 11. These are part of a single search category.

¹ Donald Trump’s content was originally part of the social media group along with Mike Pence’s Twitter, Ted Cruz’s Twitter. Therefore, I decided to split the 50 per year maximum among the three sources, meaning all categories of searches in Trump’s “Remarks” could make up a maximum of one-third of each year, the remaining two-thirds of 50 per year were split evenly between the two Twitter accounts.

Software

All media were imported into Dedoose for analysis. Dedoose is a cloud-based application accessible through a desktop application which facilitates collaborative research of both qualitative and quantitative nature. Version 9.0.17 was used for this project.

Coding

More detailed definitions and examples of when each code should be applied can be found in Table 3.1 below. The following categories were analyzed within each excerpt.

Outcomes of Climate Policy. If an excerpt did not mention possible or actual outcomes of a climate policy, they would be coded as “absent” for this category. When such mentions did exist, they would be coded as referring to positive or negative outcomes of the policy.

Valence of Positive Policy Outcomes. If excerpts were coded as containing reference to positive outcomes of climate policy, they were further coded for the valence of that reference. Valence could be (1) positive: benefit of acting, (2) negative: consequence of not acting, or (3) neutral. It was also possible for valences to co-occur or be mixed.

Connection to Human Health. Excerpts were also analyzed for the presence of some connection between climate change and human health or between climate policy and human health. These were not coded for positive or negative outcomes, only presence or absence.

Judgement of Climate Science. If an excerpt did not mention or discuss the science behind climate change in any fashion, they were coded as “absent” for this category. When such mentions did exist, they were coded as being skeptical (negative) or supportive (positive) of the science behind climate change reports and policy proposals.

Table 3.1
Code Application Criteria and Examples

Code	Definition	Example
Climate Policy Outcomes		
No Outcomes	Outcomes of a policy are not discussed.	“Universities excuse themselves for shunning history by citing the need to address contemporary subjects such as emotions, food and climate change.”
Positive Outcomes	Opportunity, potential gains, protective	“The orders are aimed at “revitalizing the U.S. energy sector, conserving our natural resources and leveraging them to help drive our nation toward a clean energy future,” the White House said in a statement before Biden signed the orders.”
Negative Outcomes	Risks, potential losses, destructive	“I’m also not for ending an era in which we can drive cars or fly on airplanes. I’m not for regulating cows out of existence. So there’s a lot of absurdities here that the left -- and the left has gone farther and farther to the left with this climate change alarmism. “
Health-Climate Change/Climate Policy Connection		
Connection Absent	No connection made between climate change and health impacts or between climate policy and health outcomes	“And so we started a series of eerily similar wars, all with entirely predictable results. Nobody learned anything. We learn anything from the Russia collusion hoax, or the same cast of liars and buffoons simply move on to the next game -- climate change, the Green New Deal -- we can’t give you details. It’s too important. Obey or else.”
Connection Present	Connections made between climate change and health impacts or between climate policy and health outcomes-- no differentiation between positive/negative associations	“I don’t think you would ever make a proposal that’s going to guarantee that’ll eliminate all healthcare, 70 percent marginal tax rate that eventually will eliminate airplanes and cows, one that will guarantee healthy government food, a place to stay, retirement, healthcare, and a takeover of industry, and the rebuilding of pretty much every building in the country. Why do I suspect all these years I’ve known you and I know you slant left, you’re not going to support that? Are you? The New Green Deal?”
Judgement of Climate Science		
No Judgement	If mentioned at all, neither skepticism nor support for climate science is indicated.	“You look at things like the green deal. You look at extreme stances on abortion. So the party is certainly going to the left.”
Positive Judgement	Support for climate science and explanations (i.e., climate change exists, humans have caused, diverse impacts)	“I don’t think there’s any -- any sort of debate that there is climate change. “
Negative Judgement	Oppose, disbelieve, skeptical of climate science and explanations (i.e., humans have no role, climate change is a hoax, lowering emissions will have no influence.	“But the way that we’re going to address it, how much we’re going to spend, how vociferously we’re going to fight that problem, that’s all going to come into play.”

Analysis

Media were imported reviewed by one of four coders and assigned codes from each

category described above. Codes were assigned based on a literal, “words on page” approach, meaning coders were instructed not to “read between the lines” or fill in any assumptions.

Codes were applied on an instance or excerpt basis rather than on a document basis. For television broadcast transcripts (i.e., Fox News data), excerpts in this project were defined as discrete conversations that included mention or discussion of the designated search terms. This allowed for more detailed coding of multiple frames used within a single document.

To quantitatively determine the prevalence and therefore degree of novelty of health frames, positive outcomes, and positive health outcomes (i.e., a combined frame), I used Dedoose’s suite of analyses to quantitatively describe prevalence. These analyses are based on how often codes from each category co-occurrences, in which documents codes are present and the frequency with which codes occur².

I determined the raw and relative prevalence of each frame coded for in the data, breaking some down further by year, search term, and/or source, as necessary. To establish prevalence of positive outcomes that also had a positive valence, documents coded with “Climate Policy Outcomes-Positive” were further divided into those that used a positive valence, those which used a negative valence, and those which used a neutral valence.

Inter-Coder Reliability. The author and three undergraduate assistants analyzed the media. Undergraduate coders were trained in the definition of codes, the source and type of data used, and how to apply codes in Dedoose. Once the team was in agreement about the application of codes in practice, undergraduate coders were assigned data to code individually. I then reviewed the first 20 documents coded individually by each undergraduate coder, making corrections and offering feedback to the group as a whole, as needed. Random document reviews

² Specific reports used were: “Descriptor x Code Case Count Table”, “Code Count x Media”, and “Code Co-Occurrence”

were conducted by myself through the remainder of the analysis period and corrections made as needed.

Tests of inter-coder reliability were carried out during training and during the analysis period. This was to ensure that reliability could be monitored both between and within coders over time. Test excerpts were taken from documents that had not been coded. Each coder analyzed excerpts individually. The team discussed differences in analysis until accurate code application was reaffirmed.

Two methods of inter-rater reliability were used: percent agreeability and pooled Cohen's Kappa. Based on results of each analysis taken together, coding agreement among raters is sufficient.

Percent Agreement. Several tests of agreement were conducted outside of Dedoose- one in Google Survey at the beginning of the project and two via email towards the middle and end of the coding period. I have manually calculated percent agreement to derive a convergent index of agreement as one measure of reliability. Reliability was calculated as an overall value (across all codes). The frequency of agreement on code applications between each pair of coders was totaled. The percent of pairs agreeing on a particular code was calculated. These percentages were then averaged by the number of possible codes.

The first test of agreement consisted of each coder coding five sample excerpts. For this test, I averaged the rate of agreement across the five samples to establish one overall indicator of agreement at the beginning of the project. This came to a value of 70.4% agreement. This is a relatively high level of agreement; nonetheless, the team discussed differences and ultimately came to complete agreement after said discussion. At this point coding began in earnest. The second test of agreement consisted of one sample excerpt. The rate of agreement at this point

was 83.3%. Some discussion was had over disagreements, but overall, the team was in sync. The third test of agreement consisted of a two sample excerpts. At this point, there were only three coders working on the project and calculations were adjusted to reflect this. The rate of agreement at this stage was 91.6% - indicating very close agreement.

Table 3.2
Percent Agreeability

Rating Test	
#	%
1	70.4
2	83.3
3	91.6

Pooled Cohen’s Kappa. Percent agreement does not account for chance agreement among coders or guessing. While I am confident that coders were well trained and did not guess, as our in depth discussions after each test would indicate, I additionally include a measure of reliability which does account for chance agreement. Dedoose provides a measure of a *pooled* Cohen’s kappa (de Vries et al, 2008) as a summary measure of overall reliability across multiple items. Each of the three undergraduate coders’ code applications was compared to my code application in a series of excerpts. Table 3.3 summarizes the results below and indicates overall, an acceptable level of agreement.

Table 3.3
Pooled Cohen’s Kappa

	Time 1		Time 2	
Rater 1	0.4	Fair	0.5	Moderate
Rater 2	0.72	Good	N/A	NA
Rater 3	0.42	Moderate	0.5	Moderate

Note: Each rater’s application of codes was compared against that of the author for analysis. Agreement with author’s code application was sought.

Summary of Final Sample

A total of 450 documents was analyzed, yielding a total of 743 unique excerpts. Tables

3.3 and 3.4 below summarize documents and excerpts by source, year, and search term used to identify the document. While the document identification phase allowed the possibility of equal quantities across all sources, final quantities of documents that met search criteria varied greatly across sources. Table 1 illustrates that Fox News Network makes up just over half of the sample of documents, yielding almost two-thirds of the excerpts.

Table 3.3
Proportions of Data by Source

Source	Proportion of Documents	Proportion of Excerpts
Fox	55.78%	62.05%
Newsmax	17.78%	12.11%
Rush Limbaugh	13.33%	16.82%
Trump Remarks (National Archives)	2.89%	2.83%
Twitter	10.22%	6.19%

Table 3.4
Total Document and Excerpt Counts

	2017			2018			2019		
	CC/GW	Policy	GND	CC/GW	Policy	GND	CC/GW	Policy	GND
Fox News Network	49/83	1/4	0	47/69	1/2	2/8	25/51	1/3	24/46
Newsmax	31/35	2/5	0	15/17	0	0	6/7	0	5/5
Rush Limbaugh	13/23	0	0	13/22	0	0	13/42	0	7/22
Trump	0	0	0	0	0	0	4/5	0	1/2
Twitter	0	0	0	0	0	0	3/3	0	17/17
	2020			2021					
	CC/GW	Policy	GND	CC/GW	Policy	GND			
Fox News Network	24/51	14	25/46	31/78	2/3	18/28			
Newsmax	12/12	0	3/3	6/6	0	0			
Rush Limbaugh	4/5	0	3/4	7/7	0	0			
Trump	6/10	0	2/4	0	0	0			
Twitter	3/3	0	10/10	2	0	11/11			

Note: Cells are formatted such that each cell contains No. Documents/ No. excerpts. Abbreviations reference the respective search strings for climate change/global warming, policy/regulation, or Green New Deal.

Results

The analyses of conservative media coverage of climate change and climate change

policy in this project sought to establish the existing frequency and therefore presumed novelty of positive framing and health framing of climate policy.

Table 3.5 below details the final frequencies of the frames coded for in this project. It was possible for codes within the same category to co-occur, with the exceptions of the health connection category and when a category was marked “absent”. For example, it is possible that both positive and negative outcomes of climate change policies have been addressed in the same excerpt (See Table 3.6 for code co-occurrence counts).

Table 3.5
Frame Frequencies

Code	No Outcomes	Negative Outcomes	Positive Outcomes	No Health Connection	Health Connection Present	Positive Judgment	No Judgment	Negative Judgment
Application Count	388	298	97	683	60	225	393	194
Proportion of Excerpts with Code	52.22%	40.11%	13.06%	91.92%	8.08%	30.28%	52.89%	26.11%

Note: Frequency refers to the total number of times a code was applied in the sample.

Table 3.6
Frame Co-Occurrence

Frame/ Code	No Outcomes	Negative Outcomes	Positive Outcomes	No Health Connection	Health Connection Present	Positive Judgment	No Judgment	Negative Judgment
No Outcomes				357	30	120	191	121
Negative Outcomes			40	273	25	62	190	65
Positive Outcomes				86	11	66	23	18
No Health Connection						191	379	172
Health Connection Present						33	14	22
Positive Judgment								69

No Judgment

Negative
Judgment

Note: Co-occurrence refers to simultaneous application of more than one code.

Policy Outcomes

It was most common that the outcomes of climate policies were not discussed (388; 52.22% of excerpts), compared to how often they were discussed. When present, negative outcomes were overwhelmingly more frequent (298; 40.11% of excerpts) than positive outcomes (97; 13.06% of excerpts). Positive and negative outcome frames co-occurred in 40 excerpts (5.38% of excerpts).

Valence Framing of Positive Outcomes. A total of 97 excerpts (13.06% of excerpts) indicated that climate policy had some protective effect, coded as having positive climate policy outcomes. Among those, valence was also coded. It was possible for there to be multiple valences present within an excerpt, for example if the same speaker expressed multiple statements each with a different valence but all which indicated positive outcomes of climate policy. I classify these as “mixed valence” and this scenario occurred in 12 excerpts.

Of those 97 excerpts, 33 (34% of the subsample) excerpts used a positive valence when discussing the positive outcomes of climate policy. This is about half as common when compared to the 63 excerpts using a negative valence and 14 excerpts using a neutral valence. That is to say only 33 excerpts of the total 743 (4.44%) can be classified as using wholly “positive framing”.

Further co-occurrence analyses (Table 3.7) indicated that these positive statements most often occurred in excerpts which did not discuss any connection between climate change or climate policy to human health (26 excerpts), but which expressed support for climate science (18 excerpts).

Table 3.7
Co-Occurrence Among Positively Framed* Excerpts

Code	# of Co-occurrences
No Outcomes	0
Negative Outcomes	20
No Health Connection	26
Health Connection Present	7
Positive Judgment	18
No Judgment	10
Negative Judgment	7
Negative Valence	12
Neutral valence	1

Note: Co-occurrence refers to simultaneous application of more than one code.

*Positively framed in this chart refers to having both positive policy outcomes and a positive valence.

Health Connection

A connection between climate change itself or climate change policies, specifically, and human health was rarely present. This connection was made in only 60 excerpts (8.08% of excerpts) compared to 683 excerpts (91.92% of excerpts) without it. These excerpts occurred slightly more often alongside excerpts coded as not discussing outcomes of climate policy (30 excerpts), though it co-occurred with negatively framed climate policy outcomes in 25 excerpts, and with positively framed climate policy outcomes in 11 excerpts (see Table 3.8).

Table 3.8
Health Frame Co-Occurrences

Code	# of Co-occurrences
No Outcomes	30
Negative Outcomes	25
Positive Outcomes	11
Positive Judgment	33

No Judgment	14
Negative Judgment	22

Note: Note: Co-occurrence refers to simultaneous application of more than one code.

Judgment of Climate Science

Regarding whether the science behind climate change was discussed, overall it was slightly more common for there to be no discussion (393; 52.89% of excerpts). When it was discussed, support for (225; 30.28% of excerpts) and casting doubt on (194; 26.11% of excerpts) were relatively close. Both judgments were present simultaneously in 69 excerpts (9.29% of excerpts).

Positive Framing and Health Connection

One co-occurrence of particular interest to this project is that of positive policy outcomes and the presence of a connection to health. This occurred only 11 times in the sample, but over half of these were also coded with positive valence (7 excerpts).

Source Comparisons

Table 3.3, above, illustrates that this sample was biased in favor of Fox News coverage because of the sheer amount of material they produce. It is therefore important to investigate the pattern of relative coverage across sources. The bubble plots below illustrate relative pooled ratios of code application across sources. While not a perfect analysis, it offers insight into how similar coverage is across sources.

Regarding the handling of climate policy outcomes, across sources the pattern is that coverage is substantially more negative if outcomes are addressed. The pattern of covering outcomes vs not covering outcomes is a bit more mixed.

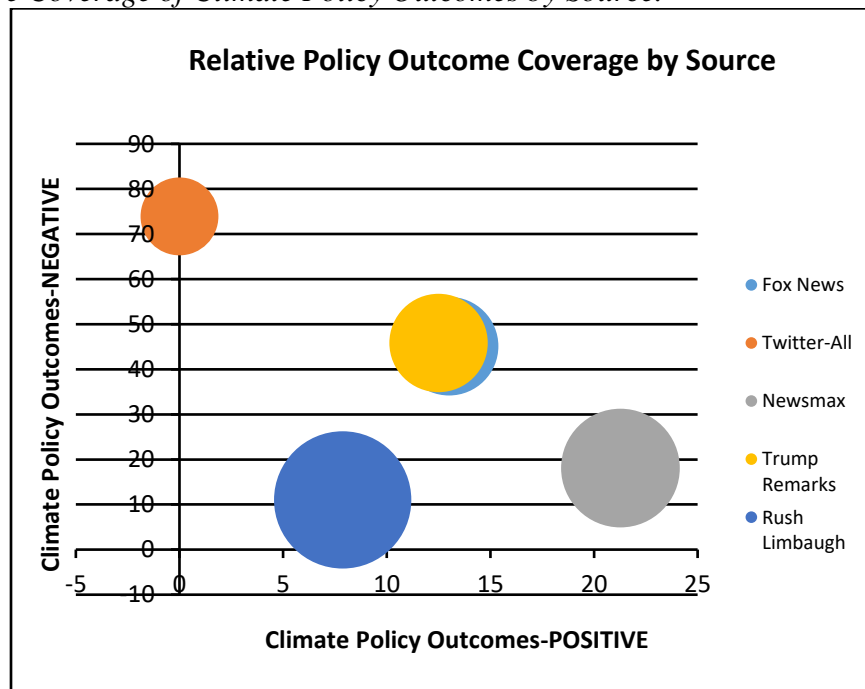
Regarding how and whether climate science is discussed, this category appears to be more variable between sources. Within Newsmax, Trump, and Limbaugh sub-samples, it was

more common to comment on climate science than not; however, while judgements were slightly more positive within the Newsmax and Trump subsamples, there was more doubt cast in the Limbaugh sample.

Among the excerpts with positive climate policy outcomes, the pattern of coverage across sources is also mixed. Proportions of negative and positive valence within both the Fox News and Newsmax subsamples are similar, with about double the use of negative valence. The Trump subsample uses exclusively negative valence, while the Limbaugh subsample is more evenly divided.

Figure 3.1

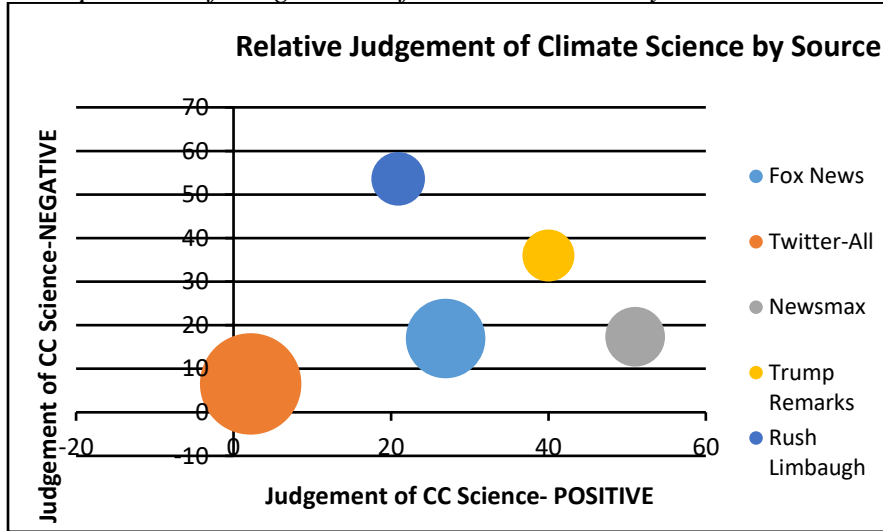
Plot of Relative Coverage of Climate Policy Outcomes by Source.



Note: Bubble sizes reflect proportion of excerpts coded as not having policy outcomes (“absent”).

Figure 3.2

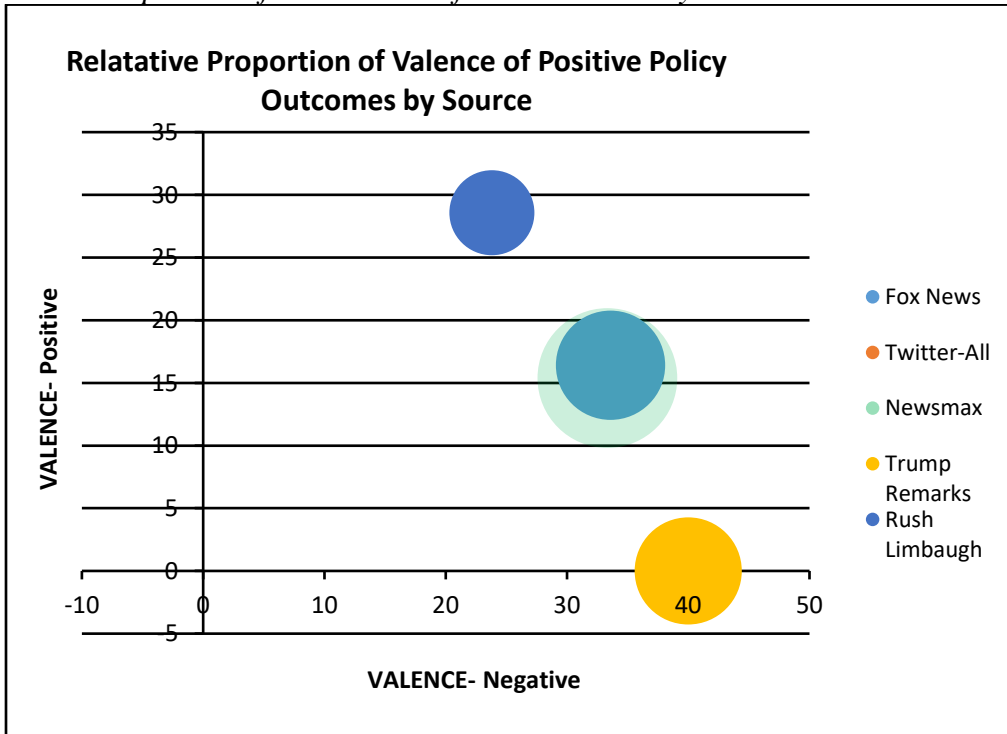
Plot of Relative Proportions of Judgements of Climate Science by Source



Note: Bubble sizes reflect proportion of excerpts coded as not having judgements (“absent”).

Figure 3.3

Plot of Relative Proportion of Valence used for Positive Policy Outcomes



Note: Bubble size is the relative proportion of positive outcome excerpts.

Discussion

The results of this media analysis help to characterize the conservative media coverage of

climate change and climate change policy. As this sample represents the information environment to which participants in Study 2 likely have been exposed, these results will provide insight into the analysis of Study 2 results. The latter discussion will be presented in Chapter 4, whereas here I focus on the former objective of characterizing the content and valence of climate-related messaging by conservative media sources.

It is important to point out again that a majority of this media sample was made up of content from Fox News Network (about 55% of all documents analyzed and 62% of all excerpts). It makes sense that a cable television news network that typically operates on 24/7 cycles of shows would cover similar content over the course of a day or week and would accordingly produce more content. However, the minimal coverage of climate change and climate policy among the remaining media sources was unexpected; almost no other source approached the predetermined stopping point for data collection (for each source--50 documents per year per search string). Because Fox News is a popular source which also produces a massive amount of content, it behooves scholars to further investigate and monitor their influence on public opinion.

The comparison of coverage across sources demonstrated that there is some variability at the subsample level. Other scholars have identified and illustrated within-party polarization, (Ballew et al, 2019) which is quite possibly related to patterns of coverage by specific media sources one engages with. Even within conservatively biased media there is a challenge of universal attitudes and perfectly shared understandings. The differences in coverage frames among conservative sources seen in this study are less dramatic than those between Democrats and Republicans and arguably less urgent. Conservative news in this sample still casts doubt on climate science and emphasizes negative outcomes of climate policies at rates that suggest there

is more opposition to climate policy. If the findings of Gustafson et al (2019) and of Bhatti, Jones, Uppalapati, and Kristiansen (2021) regarding the Green New Deal, specifically, apply to media influences on other climate related policy, and there is no clear indication that this would not be the case, there is likely little common ground between opposing partisan media at the aggregate level. In terms of a broader societal challenge of coming to some shared understanding of climate change science or the potential outcomes of climate change policy, this differentiation at the media source level illustrates the potential for further polarization of opinions on climate change and climate science even between conservative viewers if viewers tend to source information from a single source (e.g. Bolin & Hamilton, 2018; Arendt, Northup, & Camaj, 2019). Furthermore, the findings from this study highlight the scope of the challenge we face as a society in trying to bridge the gap between opposing parties, particularly as media reinforces partisan values and ideologies (Bolin & Hamilton, 2018).

The results of this media analysis suggest strongly that negative outcomes of climate policy are emphasized in the conservative media. Those excerpts that indicate some positive outcome of climate policy *and* which do so with a positive valence are rare. Connections between climate change or climate policy and health also rarely occur. Therefore, it is likely that these message frames, when encountered by conservative media consumers, would be rather novel and unfamiliar.

While not central to the question of how novel positive and health frames are in conservative coverage of climate change, I did find it surprising that doubt was cast on climate science so *infrequently* overall. More often, the underlying science was not discussed and when it was, it leaned towards more supportive judgment. Perhaps it is more advantageous to criticize and denigrate proposed *policies* and prevent support growing for them than it is to denounce the

scientific endeavor of climate science. The policy arena can almost always be one of opinion and preference for certain values over others. This may provide a safer playing field for polarized decision makers and opinion shapers than one where facts are pitted against each other. Another perspective could be that conservative media and conservative decision-makers have a different motive, one that is less about critically examining climate change and climate policy because it *itself* is of central interest, and more about having found a “wedge issue” that supports a base of people. In this scenario, rallying opposition to climate policy is a tool rather than the end goal³. This idea seems to be supported by the higher frequency with which politicians rather than scientists were invited as people of interest (re: experts) when discussing climate change, its impacts, and proposed policies, as well as the overwhelming amount of pure commentary provided by show hosts in relation to such conversations with experts. This aspect of climate policy coverage could be a promising avenue for future research. Similarly, it would be worth investigating further the framing of non-climate-specific policy and non-policy solutions to problems of interest in the U.S. Such research could determine whether is it regulation in general, regulation proposed by Democrats or liberal administrations, federal regulation (following historical descriptions of conservative values), or something else which Republicans and conservative media are building opposition to and to what end. For example, Pew Research Center has previously found Republicans to be in favor of certain tax credits to encourage development of carbon storage technology by the private sector, suggesting there may be supportive frames for some climate solutions that are not federal or regulatory (Pew Research Center, 2021).

To return to the central discussion, given the generally unsupportive position of the

³ Thank you to James Roberts, PhD, of Towson University for this insightful take on motives.

Republican party of mitigative climate policies, these findings are perhaps unsurprising. In terms of developing messages that are novel (and as such, more persuasive) to a Republican or conservative-media-consuming Americans, these findings suggest that the two frames of interest (i.e., positive and health-related) are an appropriate starting point. Conservative individuals have had minimal opportunities of exposure to either health connections or to positive framing when consuming conservative media. Being presented with messages about climate policy that have been framed in one of these ways, or a combination of the two, would be a novel experience. The JQP model suggests that novelty could change the information processing pathway from a snap judgment to more deliberative processing. This makes these framings good candidates for experimental testing of the effects of novelty on decision making around climate policy among Republicans. Whether this more deliberative process of so-framed messages can decrease polarization of attitudes toward climate policy is the motivation of the experimental survey presented in this dissertation.

Conclusion

The results of this media analysis paint a picture of negative climate policy coverage by the conservative media with little connection made to the health impacts of climate change or climate policies. This means that citizens who consume conservative media will face a barrage of reasons to oppose climate change policy. Furthermore, because citizens' policy attitudes are influenced by the information environment, and citizens tune into media that aligns with their own values and political opinions (biases), these television broadcasts, podcasts, or Tweets have considerable potential to be taken up as a viewer's own opinions.

The specific arguments against climate change policy may differ across content produced by smaller, more extreme media sources and more mainstream sources. However, the tenor of

that content, on the whole, is negative. So, the facts that consumers may develop varying beliefs and rationale to oppose proposed climate solutions is perhaps less critical than the overarching fact that they oppose the policies overall. As scholars, activists, or politicians seek to garner more support for climate policies, it would therefore behoove them to not focus myopically on correcting or overcoming a variety of negative judgments but rather to develop strategies that emphasize some commonality, something unifying among opponents of climate policy which does not ask opponents to divorce themselves from part of their personal identity to support climate policy.

When considering the prevalence of political polarization in the United States and the potential for severe climate impacts in the face of non-action, these results may also provide a bit of hope. There may be ways of bringing public opinion closer together. Tapping into audience members' own values and strategically priming positive emotions or presenting a new take on climate policy could help to at least gain climate policy some reconsideration. The JQP model suggests that novelty, as opposed to familiarity, of messaging might play a role in our evaluative processing by switching our processing to a slower, conscious deliberation rather than relying on unconscious affective processes like snap judgements which are built around schema we have developed based on our previous media exposures.

Chapter 4 – Study 2: Experimental Survey

Study 2, an experimental survey, had several research objectives: (1) investigate the influence of a positive outcome frame of climate change policy on Republican policy support, (2) investigate the influence of a novel emphasis frame of climate change policy on Republican support, and (3) investigate potential interaction effects of positive outcomes with novel emphasis frames on Republican support for climate change policy.

Methods

Software

The survey was created and distributed using Qualtrics CoreXM. Data was analyzed using Stata MP 16.1, R version 4.1.2 (2021), and Microsoft Excel version 2205.

Pilot Studies

For the purposes of conducting a manipulation check for the nine different conditions of the survey, I conducted two pilot studies. The first indicated stronger wording was needed for the proper valence and emphasis frame detection. The second pilot study indicated that the revised instrument improved issues of frame detection from the first pilot and that only minor revisions to neutral valence frames were needed before the instrument was launched. See Appendix A for details on these analyses.

Participant Recruitment

To recruit a purposive sample of pre-screened participants and easily incentivize participants to complete the survey, I used an online participant recruitment service called Prolific (Prolific.co). For this sample, I requested only participants who were over 18 years old, living in either California, Texas, or Florida; and who identified with the Republican party. The rationale for the aforementioned residency criteria is to capture and represent potential variation

in attitudes among Republicans residing in different sociodemographic contexts.

To ensure that participants taking the study met these criteria presently and not only when they filled out their Prolific account information, I asked these screening questions within the survey. Participants are paid for their time. I allotted \$1.75 per participant for an approximate 15-minute completion time.

Procedure

Prolific users who met eligibility criteria were randomly assigned into conditions by Qualtrics (see Table 4.1 for a simple representation of the conditions). After consenting to participate in the study, participants answered several socioeconomic status (SES) and demographic questions. Next, participants were presented with a message consisting of two central pieces: an introduction which all participants read, and an experimental section that varied by condition. The introduction briefly introduces carbon dioxide as a greenhouse gas and described the different sources and the corresponding ways that regulation might reduce CO2. The experimental messages highlighted the possible decisions about the policy in terms of each condition’s respective valence and emphasis frames. Directly after reading the message, items measuring various elements of policy and politician support were presented, followed by a series of questions not part of this particular paper⁴. The last section had participants complete the New Environmental Paradigm (NEP) scale (Dunlap et al, 2000).

Table 4.1
Experimental Conditions

Valence/Emphasis Variable Level	Health	Energy Independence	Climate Change Only
Negative	Negative Health	Negative Energy Ind.	Negative Climate

⁴ Additional survey questions probed support for the Green New Deal, specifically, and how participants perceived the COVID-19 pandemic had affected their decision-making processes around policies.

Neutral
Positive

Neutral Health
Positive Health

Neutral Energy Ind
Positive Energy Ind

Neutral Climate
Positive Climate

Instrument

A detailed version of the survey instrument including the experimental message and the scales for each item can be found in Appendix B.

Policy Message

After answering several demographic questions, participants began the experimental portion of the survey in which they were asked to read a short message about carbon dioxide, its sources, and the ways policy can be applied to reduce emissions. This was followed by a message about the outcomes of action or inaction. Depending on which emphasis condition participants were in, this message used examples related to human health, energy independence, or impacts on climate change, broadly, to highlight the impacts. These impacts would be framed as benefits of acting, as negative consequences of not acting, or from a neutral perspective depending on which valence condition participants were assigned.

Variables

Independent Variables.

Emphasis Frame. This is an experimental variable with three conditions: (1) health co-benefit frame, (2) energy independence frame⁵, (3) climate change frame.

⁵ A small random subsample of media from the media analysis project (described in Chapter 3) cutting across years, sources, and search terms used, was analyzed by myself. These documents were analyzed with inductive coding and emergent patterns identified. Several emphasis frames occurred frequently: energy independence, and American Conservative values (i.e., anti-socialism, freedom, less government involvement). I selected energy independence as the third emphasis condition frame to use as it was more discretely defined. This frame is non-novel among a Republican audience making it a useful comparison to the alternative frames as it represents a frame aligned with known values (alignment with existing value frames may improve accurate reception, e.g. Ives and Kendall, 2014).

Valence Frame. This is an experimental variable with three levels: (1) positive valence (benefits of acting), (2) negative valence (risks of not acting), and (3) neutral valence (objective information about a relationship between acting and what is affected).

Novelty of Health Frame. Participants will indicate how often they have previously (before taking the survey) encountered an association between climate change and human health.

News Platform. Participants indicated which type of *platform* they received their news from (i.e., television or social media).

Hours of News Consumption. Participants indicated how many hours, on average, they spent consuming news from the platform indicated per week.

Covariates.

Trust. After exposure to the experimental survey, participants indicated on a scale how much they trusted the information in the stimulus message. This was a measurement of general, overall trust to identify differential influence of valence frame on perceived trustworthiness as has sometimes been found in the literature. This question was presented to participants after they responded to both the Support and Representation measures to avoid activating potentially confounding affective responses.

New Ecological Paradigm Scale. At the end of the survey, participants were asked to respond to the 15 indicator questions of endorsement of the various ecological attitudes, namely about human relationships with the natural environment, measured by the NEP (Dunlap et al, 2000; Dunlap, 2008).

Dependent Variables.

General Support. The first question participants were asked after exposure to the message measures support for the policy idea presented in the message, broadly speaking.

Likelihood of Electing a Congressperson. After exposure, participants indicate the likelihood that they would elect either a Representative or Senator to the U.S. Congress who is supportive of the policy idea presented.

Likelihood of Supporting a Ballot Measure. After exposure to the experimental message, participants indicate how likely they would be to vote for the policy presented “right now” should it appear on their own ballot as a ballot measure.

Likelihood of Learning. Participants indicated on a binary scale whether they learned something from the message they read. This measure is used as a proxy for perceived novelty.

Perception of Valence. After responding to measures of support, participants answered two questions indicating how they perceived the valence of the overall message and of the outcomes specifically. Participants could indicate that the tone of the message was positive, negative, or neutral to both questions.

Analysis

The goal of my analyses was not to test for mechanisms at this stage but rather to determine whether the effects were present as predicted by the JQP theory. To address the central research questions, I conducted a series of hierarchical analyses within the broader Structural Equation Model (SEM) framework to allow inclusion of a latent construct (NEP) (Bollen, 1989; Kline, 2016; Field, 2013). The first-level model for each outcome includes emphasis and valence framing variables and their interactions. The second model includes the addition of the measure of trust. The third level model includes the latent NEP factor variable and its indicators. Trust and NEP are not central to the experimental manipulations but have been shown to be related to policy support and are included to help account for additional variance.

Trust was mean-centered before being included so that the intercept was more

meaningful (outcome expected at average levels of trust in the reference condition) (Field, 2013). The emphasis frame and valence frame variables were dummy coded with climate change emphasis and neutral valence used as reference levels.

I conducted a confirmatory factor analysis for the NEP survey items to confirm that they loaded onto a single factor as described by Dunlap (2008) rather than three separate factors as found by Albrecht et al (1982). This predictor was then included in the model as a latent variable and the model analyzed within the SEM framework.

I evaluated goodness of fit for each model using R-Squared values, when available, chi-squared goodness of fit for SEM and logistic regression (see below), RMSEA, TLI, and CFI.

Research Objective [RO] 1a: Influence of Positive Framing on Policy Support

The main effects of valence on each respective outcome were analyzed to determine the degree of influence on measures of policy support.

Additionally, a multinomial logistic regression was used to predict the perception of valence (outcome valence and overall valence) from the experimental variables and their interaction.

RO 2: Influence of Health Framing on Policy Support

The main effects of emphasis frames on each respective outcome were analyzed to determine the degree of influence on measures of policy support. An additional fourth-level analysis was conducted for each outcome that accounted for self-reports of previous exposure to a health frame of climate change when predicting measures of policy support. I was particularly interested in whether there was a differential effect of prior exposure on the outcome in the health frame conditions compared to the other emphases.

To further investigate the novelty of the health emphasis frame, I also assess whether the

likelihood of “learning” something (as a proxy for being exposed to something novel) was higher in the health frames than in the energy or climate emphasis frames. Hierarchical logistic regression was used for this analysis. In the first level, the emphasis frame variable was the only predictor. To account for participants’ typical information sources, in the second model I included the type of news platform and weekly hours spent engaging with said platform as predictors. This analysis is intended as a starting point for better understanding possible mechanisms underlying differences in policy support measures.

RO 3: Interaction of Positive Valence and Health Framing Emphasis on Policy Support

The influence of the interaction between valence and emphasis conditions on outcome measures of policy support was analyzed with particular interest in the positive valence and health emphasis interaction (owing to the relative novelty of the health frame as compared to the other emphasis frames).

Sample Summary

A total of 563 participants responded to the survey. Prior to analysis, responses were filtered based on completion time. Average completion time was 884 seconds, or about 15 minutes, while the median completion time was 470 seconds, or about 8 minutes. To allow for variation in reading speeds and use of keyboard shortcuts, the minimum completion time for the survey was set to 5 minutes; faster times were indicative of non-attention and/or quick completion to receive survey incentive payment. This filtering reduced the total to $N = 495$.

After determining there was no systematic missingness pattern among participants of this subset who did not answer every question, those who did not progress beyond the demographic questions in the beginning of the survey were filtered out. Those who did not answer the first question in the section following demographics (measuring support of the general idea of the

policy presented in the experimental message) also were removed. This further reduced the total to N= 492. One outlier case was removed (only one participant indicated a gender identification other than male or female). These 491 participants make up the sample which was analyzed to address the research questions. When using structural equation modeling (SEM), as I have for this study, a “large enough” sample size is commonly determined by the ratio of parameters to N such that the more complex the model, the greater sample size you need, where samples of at least $N > 100$ are recommended though there is “no hard and fast rule” (Bollen, 1989; Kline, 2016) for determining adequate sample size.

Table 4.2 and 4.3 present the demographic breakdown for the pooled samples and by condition. Overall, these illustrate a relatively equal breakdown among experimental conditions indicating that random assignment was effective. Note that several variables are categorical variables labeled with integers and therefore numeric means and standard deviations should only be used to understand the spread of the data.

Table 4.2
Demographics of Pooled Sample

Pooled Sample	Mean	Median	Mode (%)	SD
Gender	1.61	2	2 (60.7%)	0.49
Age	3.77	3	3 (29%)	1.57
Income	5.91	6	1 (14%)	3.43
Ethnicity	2.27	1	1 (74%)	2.34
Voter Registration Status	0.94	1	1 (94%)	0.23
State of Residence	1.98	2	2 (40%)	0.77
Education Level	3.92	4	5 (30%)	1.38

Note: Gender (1:Man; 2:Woman), Age(1:<18; 2:18-24; 3:25-34; 4: 35-44; 5:45-54; 6: 55-64; 7: 65-74; 8: 75-84; 9: >85), Income(<10k; 10-19k; 20-29k; 30-39; 40-49k; 50-59k; 60-69k; 70-79k; 80-89k; 90-99k; 100-150k; >150k), Ethnicity(1: White; 2: Black; 3: American Indian or Alaska Native; 4: Asian; 5:Native Hawaiian or Pacific Islander; 6: Middle Easter; 7: Hispanic or Latino; 8: None of these/Prefer not to state), Registration (0: No 1: Yes), State (1:CA; 2:TX; 3:FL), Education (1: less than high school; 2: high school diploma; 3: some college; 4: 2 year college; 5: 4 year college; 6: professional degree or Masters; 7: doctorate)

Table 4.3
Demographics by Condition

Condition (Valence x Emphasis)	Gender				Age				Income			
	Mean	SD	Med	Mode (%)	Mean	SD	Med	Mode (%)	Mean	SD	Med	Mode (%)
Negative Climate Change (n=5)	1.66	0.5	2	2 (66%)	3.53	1.4	3	2 and 3	5.43	3.3	5	8 (17%)
Neutral Climate Change (n=49)	1.72	0.5	2	2 (51%)	4.18	1.8	4	2 (22%)	6.49	3.2	6	11 (16%)
Positive Climate Change (n=52)	1.54	0.5	2	2 (54%)	3.85	1.6	3	3 (31%)	6.46	3.5	6.5	1 (15%)
Negative Energy Ind. (n=57)	1.61	0.5	2	2 (61%)	3.54	1.4	3	3 (37%)	6.21	3.5	6	6 (21%)
Neutral Energy Ind. (n=53)	1.72	0.5	2	2 (72%)	3.83	1.7	3	2 (28%)	5.6	3.5	5	1 & 11
Positive Energy End. (n=59)	1.64	0.5	2	2 (64%)	3.75	1.7	3	3 (31%)	6.15	3.2	6	6 (19%)
Negative Health (n=59)	1.63	0.5	2	2 (63%)	3.54	1.6	3	3 (34%)	4.71	3.3	4	1 (24%)
Neutral Health (n= 54)	1.6	0.5	2	2 (59%)	3.83	1.6	3.5	3 (26%)	5.67	3.5	5.5	1 (20%)
Positive Health (n=55)	1.55	0.5	2	2 (55%)	3.95	1.4	4	3 (25%)	6.62	3.6	6	5 (15%)
Condition (Valence Emphasis)	Ethnicity				Voter Registration Status				State of Residence			
Condition (Valence Emphasis)	Mean	SD	Med	Mode (%)	Mean	SD	Med	Mode (%)	Mean	SD	Med	Mode (%)
Negative Climate Change (n=5)	2.55	2.5	1	1 (70%)	0.94	0.2	1	1 (94%)	1.85	0.7	2	2 (43%)
Neutral Climate Change (n=49)	2.02	2.2	1	1 (73%)	0.92	0.3	1	1 (92%)	1.96	0.8	2	1 & 2 (35%)
Positive Climate Change (n=52)	1.88	2	1	1 (73%)	0.94	0.2	1	1 (94%)	2	0.7	2	2 (46%)
Negative Energy Ind. (n=57)	2.28	2.4	1	1 (73%)	0.91	0.3	1	1 (91%)	1.96	0.8	2	2 (40%)
Neutral Energy Ind. (n=53)	2.81	2.8	1	1 (70%)	0.96	0.2	1	1 (96%)	2.06	0.8	2	2 (42%)
Positive Energy End. (n=59)	2.15	2.2	1	1 (76%)	0.95	0.2	1	1 (95%)	2.03	0.8	2	2 (42%)
Negative Health (n=59)	2.17	2.3	1	1 (46%)	0.98	0.1	1	1 (98%)	1.92	0.8	2	2 (37%)
Neutral Health (n= 54)	2.02	2.3	1	1 (74%)	0.91	0.8	1	1 (91%)	2.11	0.8	2	2 & 3 (37%)
Positive Health (n=55)	2.21	2.3	1	1 (71%)	0.96	0.2	1	1 (96%)	2	0.8	2	2 (38%)
Condition (Valence Emphasis)	Education Level											
Condition (Valence Emphasis)	Mean	SD	Med	Mode (%)								
Negative Climate Change (n=5)	3.92	1.4	4	5 (30%)								
Neutral Climate Change (n=49)	3.94	1.3	4	3 (31%)								
Positive Climate Change (n=52)	4.08	1.4	4	5 (31%)								
Negative Energy Ind. (n=57)	4.18	1.4	4	5 (28%)								
Neutral Energy Ind. (n=53)	3.55	1.2	3	3 (38%)								
Positive Energy End. (n=59)	4.01	1.3	4	5 (29%)								
Negative Health (n=59)	3.88	1.4	4	5 (37%)								
Neutral Health (n= 54)	3.63	1.5	3	2 & 5 (28%)								
Positive Health (n=55)	4.07	1.4	4	5 (33%)								

Results

The technical results of each statistical model predicting general policy support, likelihood of electing an official, and likelihood of voting for this policy if it appeared on a ballot will be presented in turn. Following this, results from the models predicting perceived novelty and perceived valence will be presented. Afterwards, a summary of results framed in terms of the previously stated research objectives will be presented.

General Support for Policy Idea

Model 1- Experimental Frames as Predictors

In this first-level model predicting how much support respondents had for the general idea of the policy presented in the messages, one variable reached significance (see Table 4.4), all else held constant. Compared to those in the climate change emphasis frames, being in the energy independence emphasis conditions significantly increased general support by 0.44 units ($p = 0.0411$).

As this is a non-recursive regression equation, it is just-identified⁶. As such, no chi-square value of model fit can be reported, and thus I am not able to comment on any hypothesis of overall model fit within the SEM framework. The model explains only 2.56% of the variance in the measure of general support. This indicator of poor model fit suggests that more than the experimental manipulation of framing variables is required to predict the level of support participants had for the policy idea presented in the stimulus.

⁶ An SEM model is said to be identified if there exists a unique solution for all of the model's parameters. When an SEM model is just-identified, the number of known parameters and free parameters in the model are the same; there are zero degrees of freedom. If the model is saturated or just-identified, then most (but not all) fit indices cannot be computed, because the model is able to reproduce the data. If a model is over-identified, number of knowns is greater than number of free parameters and model fit indices can be calculated.

Model 2- Addition of Trust Measure as Predictor

This model includes the addition of a measure of general trust participants had in the information provided in the message (see Table 4.4). This measure was grand mean-centered before being added to the model. At average levels of trust, and all else held constant, compared to those in the climate change emphasis conditions, those in the energy independence conditions report an increased measure of general support by 0.38 units ($p = 0.014$). There is also a significant interaction of negative valence and energy emphasis such that, compared to those in the neutral climate condition, measures of general support for those in this condition are lower by 0.58 units ($p = 0.007$), holding all else constant. The effect of being in the energy emphasis therefore differs by valence. The covariate also has a significant positive influence on general support, increasing scores by 0.30 units ($p < 0.000$) for every unit increase in trust. The main effect of the negative valence framing approaches significance ($p = 0.068$) and indicates that being in this condition may increase measures of general support by 0.28 units, compared to being in the neutral valence condition, holding the covariate constant at the average.

As this is a non-recursive regression equation, it is just-identified. As such, no chi-square value of model fit can be reported, and thus I am not able to comment on any hypothesis of overall model fit within the SEM framework. This model explains an impressive 47.9% of the variance in the measure of general support. This measure of goodness-of-fit suggests that this model is an improvement over the first, and therefore that including trust along with the experimental manipulation better accounts for variation in measures of support. While the framing variables of interest did not significantly influence support, this model indicates that 1) participants who were in the negative-energy condition had lower support for the policy, all else held constant, and 2) higher levels of trust increase general support all else held constant.

Model 3 - Inclusion of Latent Variable: NEP⁷

Identification. The regression in this structural equation model is non-recursive (i.e. no feedback paths within the model) and just-identified. The relationship between the latent construct “block” and the regression “block” is also non-recursive and the latent variable meets the three-indicator rule⁸. The full model is therefore identified.

Estimation & Fit. The null hypothesis that this is a perfect fitting model is rejected, indicated by $\chi^2(230) = 745.82, p < 0.000$. So, I turn to the approximate fit. The RMSEA⁹ (0.068), CFI (0.832), and TLI¹⁰ (0.807) point towards a reasonably- to well-fitting model. Overall, this model explains 60.27% of the variance in the ‘general support’ variable.

All indicators of NEP are significantly influenced by the NEP factor, and the measurement portion of the model estimation can be found in Appendix D as I was primarily interested in how the latent factor improved model fit.

In the structural portion of the model (Table 4.4), the main effect of the energy emphasis increases scores by 0.32 units ($p = 0.047$), holding all else constant, compared to those in the climate change emphasis reference condition. The interaction between the negative valence and energy emphasis frames, compared to those in the neutral climate change condition and holding all else constant, decreases scores by 0.42 units ($p = 0.03$). Therefore, the effect of being in the energy emphasis compared to the climate emphasis differs by valence condition. Trust is also a significant predictor such that a one unit increase in ‘trust’ increases scores for ‘general support’

⁷ Results from the corresponding confirmatory factor analysis can be found in Appendix C.

⁸ The single latent factor (NEP) in the model has at least three indicators (Kenny, 2011).

⁹ “If the lower bound is below 0.05, then they would not reject the hypothesis that the fit is close. If the upper bound is above 0.10, they would not reject the hypothesis that the fit is poor.” (stata.com, n.d.)

¹⁰ CFI and TLI closer to 1 indicates good fit.

by 0.20 units ($p < 0.000$), all else being constant.

This model accounts for a fair amount more of the variance in support than the previous model that excludes NEP. The same variables, however, are significant and in the same direction as in the previous model: being in the negative-energy condition decreases support, all else held constant, and higher levels of trust increase support, all else held constant.

Model 4- Inclusion of Prior Exposure to Health Frame

Identification. The regression in this structural equation model is non-recursive) and just-identified. The relationship between the latent construct “block” and the regression “block” is also non-recursive and the latent variable meets the three-indicator rule. The full model is therefore identified.

Estimation & Fit. The null hypothesis that this is a perfect fitting model is rejected, indicated by $\chi^2(244) = 776.34$, $p < 0.000$. So, I turn to the approximate fit indices. The RMSEA (0.067), CFI (0.828), and TLI (0.802) point towards a reasonably- to well-fitting model. Overall, this model explains 60.37% of the variance in the ‘general support’ variable. This is only a tenth of a percent increase over the level-3 model. I therefore suggest that Model 3 is the more parsimonious model to predict measures of general support for the climate policy. As such, the interpretation of model parameters will not be detailed but can be reviewed in Table 4.4. The pattern of significant parameters is identical to Model 3 and the magnitudes of these relationships are identical, within rounding differences.

Table 4.4
Models Predicting General Support
General Support Models

Causal Pathway	Model 1		Model 2		Model 3		Model 4	
	Path Coef	SE	Path Coef	SE	Path Coef	SE	Path Coef	SE
Negative Valence --> General Support	0.17	0.21	0.28	0.16	0.15	0.14	0.15	0.14
Positive Valence --> General Support	-0.08	0.21	-0.06	0.16	-0.07	0.14	-0.08	0.14
Energy Emphasis --> General Support	0.44*	0.21	0.38	0.15	0.32*	0.14	0.3*	0.14
Health Emphasis --> General Support	0.12	0.21	0.19	0.15	0.1	0.14	0.1	0.14
Negative x Energy --> General Support	-0.43	0.29	-0.58**	0.22	-0.42*	0.19	-0.4*	0.19
Negative x Health --> General Support	0.15	0.29	-0.16	0.21	0.03	0.19	0.03	0.19
Positive x Energy --> General Support	-0.29	0.29	-0.1	0.21	-0.13	0.19	-0.11	0.19
Positive x Health --> General Support	-0.03	0.3	-0.02	0.22	0.07	0.19	0.07	0.19
Trust (Grand Mean-Centered) --> General Support	--	--	0.3***	0.01	0.19***	0.02	0.2***	0.02
NEP (Latent Variable) --> General Support	--	--	--	--	1 (constrained)	--	1 (constrained)	--
Prior Health-Climate Frame Exposure --> General Support	--	--	--	--	--	--	0.04	0.03
% Variance Explained (Equation R-sq)	2.56%		47.90%		60.27%		60.37%	
Chi-sq	0		0		745.82***		776.34***	
df	0		0		230		244	
RMSEA	0		0		0.068		0.067	
CFI	1		1		0.832		0.828	
TLI	1		1		0.807		0.802	
N	491		491		491		491	

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; Model 1 and Model 2 are just-identified. Estimates from the unstandardized structural portion are shown. For complete results, including measurement portion (indicator-latent construct relationships), see Appendix D.

Likelihood of Electing a Congressperson

Model 1 - Experimental Frames as Predictors

In this first-level analysis predicting the likelihood that someone would elect a U.S. Senator or Representative who supported the policy presented in the survey (variable ‘elect’), no predictors reached significance (see Table 4.5).

As this is a non-recursive regression equation, it is just-identified. As such, no chi-square value of model fit can be reported, and thus I am not able to comment on any hypothesis of overall model fit. Only 1.4% of the variance in ‘elect’ is explained by this simple model, making this a rather poor model that explains little of the data. As with ‘general support’ more than the experimental manipulation is needed to predict the likelihood of electing an official.

Model 2 - Addition of Trust Measure as Predictor

This model includes the addition of a mean-centered measure of trust in the message that was read by participants. Negative valence, the interaction of negative valence with the health emphasis, and ‘trust’ are all significant predictors in this model (see Table 4.5). At average levels of trust, compared to those in the neutral valence conditions, being in a negative valence-framed condition increases¹¹ the likelihood of electing an official to Congress by 0.38 units ($p = 0.041$). At average levels of trust, compared to the neutrally framed climate emphasis condition (the reference group), being in the negatively framed health emphasis condition decreases the likelihood of electing an official by 0.55 units ($p = 0.033$). Therefore, the effect of the negative valence differs by emphasis. Finally, a one unit increase in ‘trust’ increases ‘elect’ by 0.21 units ($p < 0.000$).

¹¹ The ‘elect’ variable was reverse-coded on a scale of 1 (extremely likely) to 5 (extremely unlikely). Parameter interpretations reflect the bottom-line, actual change in the outcome.

As this is a non-recursive regression equation, it is just-identified. As such, no chi-square value of model fit can be reported, and thus I am not able to comment on any hypothesis of overall model fit. This model explains 24.2% of the variance in ‘elect,’ which is a relatively good amount of variance. This measure of goodness-of-fit suggests that this model is an improvement over the first, and therefore that including trust along with the experimental manipulation better accounts for variation in the likelihood of electing an official. When paired with a negative valence, the health frame decreases the likelihood, all else held constant. While health framing was predicted to increase support, generally, the interaction with the negative valence suggests this is not always the case.

Model 3 - Inclusion of Latent Variable: NEP¹²

Identification. The regression in this structural equation model is non-recursive and just-identified. The relationship between the latent construct “block” and the regression “block” is also non-recursive and the latent variable meets the three -indicator rule. The full model is therefore identified.

Estimation & Fit. The null hypothesis that this is a perfect fitting model is rejected, indicated by $\chi^2(230) = 749.19, p < 0.000$. So, I turn to the approximate fit indices. The RMSEA (0.068), TLI (0.789), and CFI (0.816) all points towards a fair fitting model. At the equation level, 31.3% of the variance in ‘elect’ is explained by this model.

All 15 indicators are significantly predicted by the NEP latent factor, and the measurement portion of the model estimation can be found in Appendix D as I was primarily interested in how the latent factor improved model fit. At the structural level, only ‘trust’

¹² Results from the corresponding confirmatory factor analysis can be found in the Appendix C

achieves significance (see Table 4.5). All else held constant, a one unit increase in ‘trust’ increases the score of ‘elect’ by 0.14 units ($p < 0.000$).

This model accounts for an additional 7% of the variance in support than the previous model that excludes NEP. However, with the addition of this variable, all relationships lose significance except for that of ‘trust’ with the outcome, all else held constant.

Model 4 - Inclusion of Prior Exposure to Health Frame

Identification. The regression in this structural equation model is non-recursive and just-identified. The relationship between the latent construct “block” and the regression “block” is also non-recursive and the latent variable meets the three-indicator rule. The full model is therefore identified.

Estimation & Fit. The null hypothesis that this is a perfect fitting model is rejected, indicated by $\chi^2(244) = 780.15$, $p < 0.000$. As such, I turn to the approximate fit. The RMSEA (0.067), TLI (0.783), and CFI (0.811) indicate that this model is also a fair fitting model. Overall, this model explains 31.3% of the variance in ‘elect.’ This is only a tenth of a percent increase over the level-3 model. I therefore suggest that level 3 is the most parsimonious model to predict the likelihood of electing an official. As such, the interpretation of model parameters will not be detailed but can be reviewed in Table 4.11. The pattern of significant parameters is identical to level-3 and the magnitudes of these relationships are identical, within rounding differences.

Table 4.5
Models Predicting Likelihood of Electing a Congressperson

Causal Pathway	Model 1		Model 2		Model 3		Model 4	
	Path Coef	SE	Path Coef	SE	Path Coef	SE	Path Coef	SE
Negative Valence --> Likelihood of Electing	-0.30	0.21	-0.38*	0.19	-0.28	0.18	-0.28	0.18
Positive Valence --> Likelihood of Electing	0.07	0.21	0.06	0.19	0.07	0.18	0.07	0.18
Energy Emphasis --> Likelihood of Electing	-0.25	0.21	-0.21	0.19	-0.16	0.18	-0.15	0.18
Health Emphasis --> Likelihood of Electing	-0.21	0.21	-0.26	0.19	-0.19	0.18	-0.19	0.18
Negative x Energy --> Likelihood of Electing	0.28	0.30	0.39	0.26	0.27	0.25	0.26	0.25
Negative x Health --> Likelihood of Electing	0.34	0.29	0.55*	0.26	0.41	0.25	0.41	0.25
Positive x Energy --> Likelihood of Electing	0.07	0.30	-0.07	0.26	-0.04	0.25	-0.05	0.25
Positive x Health --> Likelihood of Electing	0.15	0.30	0.14	0.26	0.08	0.25	0.07	0.25
Trust (Grand Mean-Centered) --> Likelihood of Electing	--	--	-0.21***	0.01	-0.14***	0.02	-0.14***	0.2
NEP (Latent Variable) --> Likelihood of Electing	--	--	--	--	1 (constrained)	--	1 (constrained)	--
Prior Health-Climate Frame Exposure --> Likelihood of Electing	--	--	--	--	--	--	-0.02	0.04
% Variance Explained (Equation R-sq)	1.39%		24.20%		31.27%		31.3%	
Chi-sq	0		0		749.19***		780.15***	
df	0		0		230		244	
RMSEA	0		0		0.068		0.067	
CFI	1		1		0.816		0.811	
TLI	1		1		0.789		0.783	
N	491		491		491		491	

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; Model 1 and Model 2 are just-identified. Elect was reverse coded so negative relationship indicates and increase in likelihood. Estimates from the unstandardized structural portion are shown. For complete results, including measurement portion (indicator-latent construct relationships), see Appendix D.

Likelihood of Voting for Policy if Posed on Ballot

Model 1- Experimental Frames as Predictors

In this first-level model predicting the likelihood that participants would vote in favor of the policy idea presented in the message should it appear on a ballot ('votetoday'), no predictors reach significance (see Table 4.6). As this is a non-recursive regression equation, it is just-identified. As such, no chi-square value of model fit can be reported, and thus I am not able to comment on any hypothesis of overall model fit. Only 2.0% of the variance in 'votetoday' is explained by this simple model, making this a rather poor model. As was the case with Model 1 for both of the previous two outcome variables, more than the experimental manipulation is needed to predict the likelihood of voting for the policy on a ballot.

Model 2- Addition of Trust Measure as Predictor

The second-level model includes the addition of a mean-centered measure of trust in the message that was read by participants. Four predictors in this model achieve significance (see Table 4.6). Compared to the neutral valence, there is a significant main effect of negative valence such that exposure to the negative valence increases likelihood by 0.41 units ($p = 0.024$), all else held constant. Compared to the climate change emphasis, being in a health emphasis increased likelihood of voting by 0.34 units ($p = 0.058$), all else held constant. This is in alignment with predictions based on the JQP model. Holding all else constant, compared to the neutral climate change reference, being in the negatively framed energy emphasis condition decreased likelihood of voting by 0.57 units ($p = 0.024$). Therefore, the effect of the negative valence relative to a neutral valence differs by emphasis. A one unit increase in 'trust' increases the likelihood of voting by 0.34 units ($p < 0.000$), holding all else constant.

As this is a non-recursive regression equation, it is just-identified. As such, no chi-square

value of model fit can be reported, and thus I am not able to comment on any hypothesis of overall model fit within the SEM framework. This model explains 47.0% of the variance in the ‘votetoday’ variable. This measure of goodness-of-fit suggests that this model is an improvement over the first, and therefore that including trust along with the experimental manipulation better accounts for variation in the likelihood of supporting on a ballot.

Model 3 - Inclusion of Latent Variable: NEP¹³

Identification. The regression in this structural equation model is non-recursive and just-identified. The relationship between the latent construct “block” and the regression “block” is also non-recursive and the latent variable meets the three-indicator rule. The full model is therefore identified.

Estimation & Fit. The null hypothesis that this is a perfect fitting model is rejected, indicated by $\chi^2(230) = 752.88, p < 0.000$. As such, I turn to the approximate fit. The RMSEA (0.068), TLI (0.806), and CFI (0.831) indicate that this is a reasonably-fitting model. Overall, the model explains 62.0% of the variance in the ‘votetoday’ variable.

Of the 15 indicators, all are significantly predicted by the NEP latent factor, and the measurement portion of the model estimation can be found in Appendix D as I was primarily interested in how the latent factor improved model fit. In the structural portion of the model, only one predictor achieves significance (see Table 4.6). All else held constant, a one unit increase in ‘trust’ increased the likelihood of voting for the policy on a ballot by 0.22 units ($p < 0.000$).

Model 4- Inclusion of Prior Exposure to Health Frame

¹³ Results from the corresponding confirmatory factor analysis can be found in Appendix C

Identification. The regression in this structural equation model is non-recursive and just-identified. The relationship between the latent construct “block” and the regression “block” is also non-recursive and the latent variable meets the three-indicator rule. The full model is therefore identified.

Estimation & Fit. The null hypothesis that this is a perfect fitting model is rejected, indicated by $\chi^2(244) = 784.57, p < 0.000$. As such, I turn to the approximate fit. The RMSEA (0.067), TLI (0.801), and CFI (0.826) indicate that this is a reasonably well-fitting model. Overall, this model explains 62.1% of the variance in the ‘votetoday’ variable. This is only a tenth of a percent increase over the level-3 model. I therefore suggest that level 3 is the most parsimonious model to predict likelihood of voting for the climate policy. As such, the interpretation of model parameters will not be detailed but can be reviewed in Table 4.6. The pattern of significant parameters is identical to level-3 and the magnitudes of these relationships are identical, within rounding differences.

Table 4.6
Models Predicting Likelihood of Support for Ballot Measure

Causal Pathway	Model 1		Model 2		Model 3		Model 4	
	Path Coef	SE	Path Coef	SE	Path Coef	SE	Path Coef	SE
Negative Valence --> Likelihood of Ballot Support	0.28	0.25	0.41*	0.18	0.24	0.16	0.24	0.16
Positive Valence --> Likelihood of Ballot Support	0.06	0.25	0.08	0.18	0.07	0.16	0.08	0.16
Energy Emphasis --> Likelihood of Ballot Support	0.40	0.25	0.33	0.18	0.25	0.16	0.27	0.16
Health Emphasis --> Likelihood of Ballot Support	0.26	0.25	0.34*	0.18	0.23	0.16	0.24	0.16
Negative x Energy --> Likelihood of Ballot Support	-0.40	0.34	-0.57*	0.25	-0.37	0.22	-0.39	0.22
Negative x Health --> Likelihood of Ballot Support	0.07	0.34	-0.29	0.25	-0.05	0.22	-0.05	0.22
Positive x Energy --> Likelihood of Ballot Support	-0.28	0.34	-0.06	0.25	-0.10	0.22	-0.13	0.22
Positive x Health --> Likelihood of Ballot Support	-0.21	0.35	-0.19	0.25	-0.08	0.22	-0.09	0.22
Trust (Grand Mean-Centered) --> Likelihood of Ballot Support	--	--	0.34***	0.02	0.217***	0.02	0.22***	0.02
NEP (Latent Variable) --> Likelihood of Ballot Support	--	--	--	--	1 (constrained)	--	1 (constrained)	--
Prior Health-Climate Frame Exposure --> Likelihood of Ballot Support	--	--	--	--	--	--	-0.04	0.04
% Variance Explained (Equation R-sq)	1.97%		46.90%		61.99%			
Chi-sq	0		0		752.88***		784.57***	
df	0		0		230		244	
RMSEA	0		0		0.068		0.067	
CFI	1		1		0.831		0.826	
TLI	1		1		0.806		0.801	
N	491		491		491		491	

Note: * p < 0.05, ** p < 0.01, *** p < 0.001; Model 1 and Model 2 are just-identified. Estimates from the unstandardized structural portion are shown. For complete results, including measurement portion (indicator-latent construct relationships), see Appendix D.

Novelty

In the first-level model predicting likelihood of having learned something from the message encountered in the survey from only the emphasis framing variable, the predictor did not achieve significance (see Table 4.7). When including additional predictors related to media consumption (platform and weekly hours spent consuming media from that platform), there was only a significant relationship with the “other” category of media platform. Compared to not following the news and holding all else constant, sourcing news from the “other” category lowers the odds of having learned something (OR = 0.24, $p = 0.026$). There was no significant relationship between the emphasis framing condition and the outcome. The Hosmer-Lemshow goodness of fit test does not indicate evidence of poor fit ($\chi^2(8) = 8.32$, $p = 0.403$).

Table 4.7
Logistic Regression Models Predicting ‘Learn’

Variable	Model 1 (N = 491)		Model 2 (N = 490)	
	0	SE	Odds Ratio	SE
Constant (baseline odds)	0.9	0.15	0.61	0.29
Energy Emphasis	1.18	0.26	1.23	0.29
Health Emphasis	0.92	0.21	0.93	0.22
Hours Consuming Media (Weekly)	--	--		
News Platform				
TV	--	--	2.02	1.02
Newspaper	--	--	0.84	0.45
Social Media	--	--	1.9	0.95
Radio/Podcast	--	--	0.99	0.53
Family/Friends	--	--	1.82	1.02
Other	--	--	0.24*	0.15

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Perception of Valence

Main interpretations of the multinomial logistic regressions predicting perception of valence from experimental condition will be briefly discussed here (see Appendix D for estimate tables). The “neutral” response was used as the baseline outcome, climate emphasis and neutral

valence were used as reference levels for their respective dummy variables.

Overall Valence

For ‘overall valence,’ there were no significant relationships between conditions and perception of ‘negative’ over ‘neutral’ or of ‘positive’ over ‘neutral.’

Outcome Valence

For ‘outcome valence,’ the odds of selecting ‘negative’ over ‘neutral’ were significantly increased if participants were in the negative valence conditions (OR = 7.36, $p = 0.002$) compared to the neutral condition. The odds of selecting ‘positive’ over ‘neutral’ were not significantly more likely for participants in the positive valence conditions compared to the neutral conditions. Interestingly, being in the positive health condition (compared to neutral climate), specifically, significantly *decreased* odds of selecting ‘positive’ compared to ‘neutral’ (OR = 3.59, $p = 0.043$). This analysis does not indicate whether participants in the positive conditions, for example, perceived the outcomes of the policy themselves to be positive or not, but rather how the stylistic presentation of the outcomes was perceived. While this analysis assumes conscious perception and unconscious perception are aligned, absent a survey item measuring unconscious affect, this measure is an acceptable proxy. The results of this analysis suggest that, overall, being exposed to the positive valence conditions did not reliably lead participants to perceive a positive tone from how outcomes were presented in the message, while being in the negative valence condition reliably predicts the perception of negative tone. Given these results, some caution should be advised in extrapolating from the main or interaction effects of positive valence framing variable, specifically, in the main analysis. However, given that models with only the framing variables accounted for so little of the variance in the outcome variables compared to models with ‘trust’ and NEP, overcoming this challenge of valence

perception may provide little improvement.

Additional Analyses of Trust Variable

In each model, the measure of general trust ('trust') has a significant relationship with the respective outcome variable. The inclusion of 'trust' in the models also significantly improves the amount of variance in the outcome that can be explained by the model. As such, additional analyses of the relationship between 'trust' and other observed variables were conducted to better understand the function of the 'trust' variable in determining policy support. In order to identify other potential drivers of 'trust' not originally included in the models above, I conducted simple correlations with continuous variables and logistic regressions with categorical variables. These, respectively, would indicate the existence of strong relationships which could inform future studies. Analyses were done with variables not originally included in the model as well, to identify potential relationships of import.

First, as has been mentioned previously, there was no significant influence of condition on the measure of trust (see Figure 4.1); the manipulation of framing variables did not significantly affect how much participants trusted the information they read in the stimulus message. Table 4.8 summarizes the strength of demographic variables' relationships with 'trust'. The measure of general trust operationalized in this study did not significantly correlate with, income, age, nor with the number of hours consuming media. When using regression to determine if there is a significant association between 'trust' and categorical demographic variables, only political ideology had significant influence such that identifying as "conservative" compared to liberal decreased 'trust' by 1.78 units (see Table 4.9). This association suggests that trusting communications related to climate change policy may be a function of not merely political party, but more specifically of ideological identification within

that political party. This potential group effect should be further explored in future research on differential effects of framing on building policy support.

Additional simple correlations between the ‘trust’ variable and individual indicators of the NEP latent factor indicate several moderately strong relationships exist. At the aggregate level, the more strongly participants agreed with the statement, “The so-called ‘ecological crisis’ facing humankind has been greatly exaggerated”, the less they trust the information in the message. At the aggregate level, the more strongly participants agreed with the statement “If things continue on their present course, we will soon experience a major ecological catastrophe”, the more they trusted the information in the message. This suggests that something outside of the models in the above section is influencing both the indicators of NEP and trust. It may also speak to the ideas presented in the literature review regarding the importance of the alignment of existing values or beliefs about climate change for trust and reliability. These two statements noted previously can be thought of as two ends on the same spectrum: agreement or belief in the threat posed by climate change. As such, further grouping participants based on responses to these two indicator questions, specifically, could offer additional insight into the differential effect of the message frames used in this dissertation.

Figure 4.1
Boxplots of ‘Trust’ Across Conditions

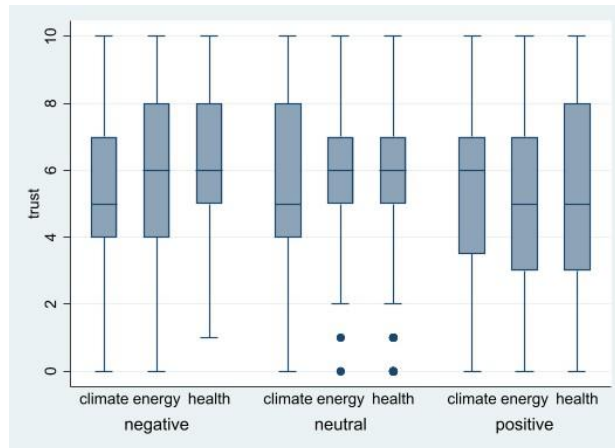


Table 4.8
Correlation Table for ‘Trust’

Variable	Pearson’s Correlation Coefficient
Age	-0.10
Hours per Week Consuming Media	0.09
Income	0.01
NEP Indicator Statement	
The so-called “ecological crisis” facing humankind has been greatly exaggerated	-0.54
If things continue on their present course, we will soon experience a major ecological catastrophe	0.47
Humans are severely abusing the environment	0.44
The balance of nature is very delicate and easily upset	0.33
The earth is like a spaceship with very limited room and resources	0.30
When humans interfere with nature it often produces disastrous consequences	0.28
We are approaching the limit of the number of people the earth can support	0.28
The balance of nature is strong enough to cope with the impacts of modern industrial nations	-0.28
Plants and animals have as much right as humans to exist	0.22
Humans were meant to rule over the rest of nature	-0.22
Humans have the right to modify the natural environment to suit their needs	-0.15
The earth has plenty of natural resources if we just learn how to develop them	-0.13
Human ingenuity will ensure that we do NOT make the earth unlivable	-0.08
Despite our special abilities humans are still subject to the laws of nature	0.02
Humans will eventually learn enough about how nature works to be able to control it	-0.01

Table 4.9
Regression Predicting ‘Trust’ from Political Ideology

Source	SS	df	MS			
Model	138.82	2	69.41	N =	491	
Residual	2913.91	488	5.97	F(2, 488) =	11.62	
Total	3052.73	490	6.23	Prob > F =	0	
				R-Squared =	0.046	
				Adj R-Squared =	0.042	
				Root MSE =	2.44	

	Coef.	SE	t	P>t	[95% CI]	
Ideology						
Conservative	-1.78	0.56	-3.17	0.00	-2.89	-0.68
Moderate	-0.79	0.59	-1.34	0.18	-1.94	0.37
_cons	7.00	0.55	12.81	0.00	5.93	8.07

Summary

The objectives of this experimental survey were to investigate the influence of positive valence frames, novel health emphasis frames, and the interaction of the latter two on Republican support for climate change policy when used in a message about climate change policy. Summarizing the results of the models which account for existing environmental/ecological attitudes (measured by the NEP scale; Level 3 models for each outcome) in terms of these objectives indicates: These frames and their interactions, overall, did not significantly increase Republican support for mitigative climate change policy as measured by (a) general support, (b) likelihood of electing an official who supports the policy, or (c) likelihood of voting for the policy as a ballot measure. In some cases, the energy independence emphasis frame, the negative valence frame, and/or their interaction significantly influenced support or approached significance, but in each case the ultimate outcome was lower support. These results, potential explanations, and their implications are discussed in the next section.

Discussion

The results of the models predicting various measures of Republicans’ climate change

policy support from emphasis and valence framing of messages offer several important insights.

As for the primary research questions this project sought to address, results suggest that positive valence and health emphasis, generally, do not increase support. Across all models predicting the various measures of support for a mitigative climate policy, positive valence framing did not reach significance as a main effect or in an interaction. The JQP model suggested that priming positive emotions might positively bias evaluations of a policy, or that a novel stimulus (health framing) might also avoid negative snap judgments.

Why did we not see the expected effects on policy support, then? First, let's address the novelty argument. Additional analyses (see the Appendix E) indicate that there may be a history effect of the COVID-19 pandemic such that a health frame is no longer, or not currently, a novel frame. Additionally, the logistic regression analysis indicated that there was no effect of condition on whether or not participants felt they had learned something from the message. While not a perfect measure of novelty, it serves as a fair proxy indicating that, on the whole, these messages were not perceived as novel stimuli. As such, the JQP model suggests that such messages would be processed very quickly and dependent on affect (primed or implicit).

The valence manipulation check does indicate that while the negative valence framing was perceived as designed, there was less certainty when comparing perception of positive and neutral frames. This hints at the possibility that, like the *explicit* detection of positive valence, there may be no discernable difference in the *implicit* or unconscious detection of the positive prime over a neutral prime. This, in turn, indicates that the positive prime may not have been strong enough to subconsciously arouse positive affect, and tentatively explains the lack of significant influence of the positive frames on policy support measures.

Another possibility is, similar to the findings of van Stekelenburg et al. (2021), the

attitudes Republicans hold towards climate science and climate change may be too strong to be influenced by a single exposure to a message priming positive affect regardless of the degree of novelty. Work by some scholars such as Gustafson et al (2019; discussed previously), as well as Eisenberg and Silver's (2011) and Gershoff's et al (2010) investigations into post- 9/11 attitudes; or Rupa, Holman, and Silver's (2021) examination of media exposure and gun regulation attitudes after the 2016 Pulse nightclub shooting, does suggest that repetition or frequent exposure plays a role in attitude development and change. Considering the survey results within the JQP model framework and the very limited effects despite novelty of framing, it seems plausible that novelty may behave differently across political topics, possibly as a function of the strength of an attitude, such that repetition is key for stronger attitudes rather than "rerouting" affective processing. A third possibility follows Slothuus and Bisgaard's (2020) research. Party positions strongly influence members' attitudes towards policy. In the U.S., the Republican position on climate change has been essentially disbelief and opposition to regulatory policy. These positions may be too strong to overcome with a single exposure to positive framing. A fourth explanation related to the previous two, is that additional exposure to similar supportive messages framed positively may shift political decisions that may otherwise not have been shifted by a single exposure.

Although the expected effects were not found, it is worth noting that unlike the negative framing conditions which, on the whole, decreased support, positive framing *did not* decrease support (compared to a neutral valence). This is consistent with previous research (e.g. Chai, 2015) which found that, while positive framing may not have significantly increased support, it did not decrease support. This would suggest that there is at least no detrimental or boomerang effect and that positive or neutral framing may still be more promising than the more common

negative framing.

As for, perhaps, the most critical insight, we must further consider the concept of trust. In this study, the amount of trust participants had in information about the climate change policy was highly influential for their ultimate degree of support for said policy. This tracks with contemporary research, particularly in situations involving science such as the very recent challenge to COVID-19 vaccine uptake (Zimand-Sheiner, Kol, Frydman, & Levy, 2021), but also more generally speaking (e.g. Gauchat, 2012). In the present study, trust had a significant positive association with each measure of support. More importantly, models that do not include this important variable account for very little of the variance in measures of support. While an improvement in model fit was expected with the addition of this covariate, the magnitude of improvement was surprising. Positive frames have been found on occasion to negatively influence the perception of trustworthiness and increase the perception among audiences that they are actively being persuaded (Koch & Peter, 2017; Jaffé & Greifeneder, 2019). In this project, I measured only a general overall degree of trust. Survey items did not ask participants for their reasons for trusting/distrusting the message. Analyses conducted to ensure ‘trust’ met parameters for a covariate indicated that the experimental conditions did not themselves influence values of ‘trust.’ ‘Trust’ was, on average, in the middle of the scale (mean = 5.56 on 10pt scale). In various literatures (i.e., risk analysis or political psychology), trust is measured in a myriad of ways and at various levels. For example, in the source of the information, in the intentions of the messenger, in specific elements of a message. In research on certain science informed policy, more specific elements like trusting the scientific process which supports a policy, trusting the institutions trying to pass the policy, trusting the institutions which inform the public of those processes, as well as trust that all parties are transparent, and the planned policy

is efficacious are all influential (e.g., Daly, Jones, & Robinson, 2021; Latkin et al, 2020; Earle, 2010). So, not only is trust a many-layered construct, but trust has been measured at broad and granular levels which presents a challenge to synthesizing the effects of trust on outcomes such as policy decisions. An important implication of the significance of general trust in this dissertation is that, first, a more granular measure could be useful, and second that a more standardized operationalization of trust if necessary to have an improved understanding of differential influence of trust in various studies.

The importance of trust to political decision making, over and above the influence of implicit emotional priming, should not be understated. Identifying the exogenous influences of trust in messages about mitigative climate policy and the mechanisms through which it influences support is critical to support building. In the broader literature on trust in science within the U.S., levels have been found to be decreasing at an aggregate level but this appears to be significantly influenced by political party, with Republicans often citing lower levels than Democrats (e.g. Gauchat, 2012, on general trust in science; Agle, 2020, and Latkin et al, 2020, on trust in science during the COVID-19 pandemic). This pattern of decreased trust among Republicans is particularly true when referencing climate science specifically (e.g. Myres et al, 2017). Others find that trust in science varies by issue and is influenced by attitudes toward government (Pechar, Bernaur, & Mayer, 2018). Climate change mitigation and adaptation effort rely heavily on science and the public's trust in science (Cologna & Siegrist, 2020). These patterns, combined with the strength of the relationship between trust and policy support shown in this study, does not bode well for science-informed policy such as climate policy. This study, therefore, adds to the growing body of literature raising a metaphorical red flag in response to decreasing trust in science.

Conclusion

The results of this experimental test of the influence of strategic message framing on Republican support for mitigative climate policy offer, at most, no reason to discontinue research into the effects of positive affect on increasing support. Tentatively, these results also indicate that using a health frame for impacts of climate change policy fares no better than using a climate change emphasis. The reasons for this could be related to the explosion of health-related news coverage during the COVID-19 pandemic which may have rendered this specific frame not novel enough in this moment (see history effect analysis in Appendix E)--despite the prior study (Chapter 3) indicating that this frame is rarely used to discuss climate change in the highly influential media. Participants, potentially now well-practiced in connecting current events to health, may be making the connection between health and climate policy themselves rather than being externally exposed to this connection.

Attending to trust appears to be a critical aspect for increasing support for climate change policy among Republicans. While perhaps not a novel or unexpected finding, the results of this survey indicate that models which do not account for trust will not perform as well as those that do. Therefore, future research on climate change communication should commit to including measures of trust, at a minimum, and to including interventions designed to increase trust, at best. This will be no easy feat. Scholars from the risk and health communication fields, particularly, grapple with this as well. Their research has developed several suggestions for increasing trust in messages such as increasing reasoned transparency (Loefstedt & Boudier, 2013), being empathetic and engaging with an audience genuinely (e.g. Earle, 2010). But, as we enter what some scholars refer to as the “post-truth” era, the legitimacy of the scientific endeavor broadly and climate science specifically will likely face continued scrutiny and resistance by

conservative opponents (e.g. McIntyre, 2018) and this will surely exacerbate the public's confusion over whom to trust. While the media analysis in Chapter 3 didn't find science skepticism to be the majority frame in media, it was still very common and there are platforms and voices not included in that analysis whose influence shouldn't be discounted in the coming years. Slovic (1993) and Cvetkovich et al (2002) emphasize how difficult it is to form trust and how relatively easy it is for that trust to be lost. That finding, titled the "asymmetry principle" in the rich communication literature, together with the significant influence of trust as seen in this dissertation highlight how critical it is to not only establish but to *maintain* trust between the climate scientists, political decisionmakers, communicators and the public.

With the timeline for action quickly shrinking, attempts to democratically resolve to mitigate emissions will become ever more urgent. Despite this urgency and considering the results of this study, I would caution communicators to avoid negative frames of impending catastrophe from inaction. These messages tend to decrease support. Improving support for climate change policy at the national level is a major challenge faced in the U.S. Strategic communications targeting Republicans, the primary opponents of regulatory climate policy, will be vital. Finding means by which to decrease polarization on the topic should be a research priority.

Chapter 5 – General Conclusions: Relevance and Implications for a Post-Truth Society

General Summary

The overall goal of this project was to further investigate how communication of information about climate change policy, particularly through the partisan media, interacts with our affective and cognitive processing. I was particularly interested in how the use of positive or novel message framing might influence Republican support under the JQP framework for political decision making. Using a social ecological approach, accounting for influences at the societal and individual scale, this objective employed a content analysis of conservative media coverage of climate change to complement an experimental survey of Republicans.

The media analysis (Study 1) indicates that both positive frames and health frames are rarely used in media coverage of climate change and climate change policy. Past research tells us that most Republicans coalesce around the same media sources that were analyzed in Study 1, relying on them for their news (e.g. Pew Research Center, 2014; Gentzkow & Shapiro, 2011). If this holds true for the survey participants (Study 2), we should expect that the experimental conditions using these frames would be novel. However, when novelty was measured by proxy, there was no effect of either framing variable on the likelihood of having learned something. While it may be that detecting the novelty of valence framing is rather difficult, identifying a novel emphasis frame (health, climate, energy independence) is relatively simpler- if one has not considered the health effects of climate change before, it is more likely that they should select having learned something. This implies that participants may have encountered a health frame previously. However, the variable measuring prior exposure to health framing of climate policy failed to reach significance. As there was no significant effect of the frames of interest, it would seem fair to conclude that these frames were, at the very least, not novel *enough*. As discussed in

Chapter 4, a possible history effect is in play. This survey took place during the COVID-19 pandemic. As such, it is possible that generally a health emphasis of any policy may have lost its novelty and therefore influence.

Frequency of exposure to climate messaging is another important issue that warrants more explicit consideration in future research. The attitudes Republicans hold, on the whole, have are influenced and reinforced constantly by the external information environment which repeats anti-climate policy narratives in nearly every news segment and coverage instance. This project exposed participants a single time to a message which, while attempting to prime positive emotions and thereby positive bias, presented attitudinally non-congruent information. In any case, a single exposure intervention did not increase support over and above a neutral, familiar framing of climate policy.

Theoretical Implications

While the intervention did not have the expected effect based on the JQP model, it does not seem reasonable to conclude that this is evidence *against* the JQP model. I say this because the influence of negative framing, when controlling for ‘trust’, seems to follow the expectations of this model-- ultimately decreasing support for pro-environmental policies. This suggests that negative emotional primes worked in the expected way. This outcome, together with the major influence of trust, are also further support for dual process models, generally (e.g., Rosenberg & Abelson, 1960; Petty & Cacioppo, 1986; Kahneman, 2003; Stanovich & West, 2000; Kraft, Lodge, & Taber, 2015) —highlighting the complex interactions of affective and cognitive pathways for decision making.

While the increase in variance explained in each outcome by the addition of the NEP factor is accounted for in the JQP model’s inclusion of prior attitudes, trust seems more obliquely

included or even absent in the model. Based on the findings of this project, it is worth considering if and how the JQP model may require updating. If trusting information on a policy influences one's decision to support or oppose that policy, where is that evaluation of trustworthiness taking place relative to the other variables in the JQP model? One consideration could be that the snap judgement is more a judgement of trust, based on the same explicit and implicit information sources already described in the model from the stimulus, and that determination of trustworthiness is what influences an evaluation. In the example of a stimulus being a message about climate change policy, the snap judgement in the model would not be the decision to support or oppose the policy, but a decision to trust the information and the evaluation would be the decision to oppose/support. Rather than an addition of a variable, this update would be a reinterpretation of a variable already present in the model.

Further mediation analyses would be helpful in determining if and when trust behaves differently- giving rise to results such as those in this project where negative framing but not positive framing behaves as expected. However, as described in the manipulation analyses in Appendix A, positive frames were not reliably detected by respondents over neutral frames. As discussed, this may be due to either an inability to separate neutral from positive, or to a weaker than expected positive prime. Before suggesting specific updates to the JQP model, further valence frame perception experiments would be necessary.

The foundational literature and the primary theoretical framework (JQP) guiding this dissertation both are based on the hypothesis or assumption that behaviors and decisions *follow* or are guided by attitudes. There is another perspective which suggests the reverse—attitudes follow behavior, or that one infers attitudes from past behavior (e.g., Zanna, Olson, & Fazio, 1980). However, one could potentially interpret the existing model paths for belief and attitude

updating in the JQP model as this “reverse” perspective of understanding behavior. Attitude formation itself then is also part of rationalization of behavior. This interpretation does not hypothesize a mechanism by which behaviors change or develop attitudes but suggests the two perspectives may rather be looking at different points in the attitude-behavior interaction. Another interpretation could be that post behavior attitude change is less about a behavior *creating* an attitude which explains that behavior, but rather about *shifting* what attitude is driving that behavior in the future. The behavior was, in this case, always motivated by some prior attitude, as suggested by the JQP model, but the attitude updating process which takes place after action shifts the motivating attitude. Referring to the results of this dissertation, accounting for ecological attitudes increased the amount of variance explained across all three outcome variables. This indicates that, in the context of deciding whether to support a pro-environmental policy, existing attitudes influence decision making. For politically polarized topics such as climate change, one could argue that attitudes are salient enough to drive behavior beyond just the intentions measured in this study.

Practical Implications: The post-truth era and Democracy

Why search for scientific disagreement when it can be manufactured? Why bother with peer review when one’s opinions can be spread by intimidating the media or through public relations? And why wait for government officials to come to the “right” conclusion when you can influence them with industry money? (McIntyre, 2018, p. 25).

This dissertation offers important insights into the drivers of political polarization around climate change. Polarization on its own is a grand challenge for democracy. But, as scholars such as Lee McIntyre (2018) argue, it is the driver of the polarization that is more concerning to democracy as a whole-- the emergence of a post-truth society. In a post-truth society, truth exists but no longer matters (McIntyre, 2018). Such a designation presents an enormous challenge for climate change action and any science-informed policy problem. If partisan media blurs facts

with opinions, or if the media is motivated by economic or ideological considerations rather than truth; if partisan media outlets present opposing coverage, and if there are no consequences for misleading the public-- then how could confusion or apathy not follow? In a *Vox* interview (Illing, 2017), historian Timothy Snyder more cynically and alarmingly posits that post-truth is pre-fascism. If the “fake news” and polarized media environment is not yet classified as propaganda for an ideology seeking to rule (Stanley, 2015) then it is possibly just to “soften us up for what comes later” (McIntyre, 2018, p. 117).

My intention here is not to necessarily say that we are spiraling toward authoritarianism with each partisan broadcast, but I do think it is worth highlighting the gravity of the situation we find ourselves in. When considering that (1) trusted sources tend to be aligned with one’s political party affiliation, (2) those partisan sources are not necessarily motivated by truth, (3) exposure to partisan media further strengthens partisan attitudes, and (4) we filter information through pathways which favor attitude and belief-aligned information before making decisions (e.g. confirmation bias or hot cognition) (Kraft, Taber, Lodge, 2015; Tversky & Kahneman, 1974)-- then we must recognize that democracy faces a major challenge at the moment. This is particularly so considering what major events challenge the world at the moment, such as climate change and a deadly pandemic, whose resolutions depend on science, trust, and good policy.

This dissertation reaffirmed the importance of trust in making political decisions. But in the context of a post-truth society, future research and policy initiatives may need to be less about re-establishing trust in facts and more about first making those facts and the truth matter more than how those facts make one feel, even if it threatens our existing beliefs.

Chapter 6 – Limitations and Future Research

Limitations

There are certain limitations to this project that should be considered to improve future research into this topic.

The media analysis in Study 1 was bounded by search terms to promote manageability. It is possible that an expanded search included additional policy proposals or search phrases may alter patterns of coverage to some degree. However, the lack of positive framing or health framing was consistent to a large degree in this sample, and I expect that patten would continue even with the inclusion of additional search terms. Additionally, inclusion of more media commonly considered popular among the more extreme “alt-right” may illuminate more distinct coverage patterns at the between-source level.

In the positively framed messages, the type of benefit presented varied from gains (energy independence frame) to a combination of gains and reduced risk (illness prevention). This was done to impress upon participants as accurate a co-benefit as possible but could be more systematically employed (i.e., only present gains, or only present reduced risks) to avoid a potential confound in future work. Different *types* of benefits can be perceived differently and thereby have subtly varied influence on how risk evaluation.

Another limitation of this study is that it did not explicitly measure participants’ affective state after exposure to the message. It would enhance understanding if it were possible to measure this. However, the JQP model suggests that the effects of affective priming happen rapidly and may not be noticeable to an individual. It would be challenging to administer a survey item strategically to measure affective state without interrupting the chain of events that lead to an evaluation in line with the primed affect.

Some scholarship (e.g. Slothuus & Bisgaard, 2021) indicates that the sociopolitical context matters greatly for climate change policy interventions. The ability to generalize the results of this project, or similar future work, beyond the U.S. context may be limited because of how strongly polarized climate change and climate policy is in the U.S. compared to other countries. This isn't necessarily a serious limitation as the project set out to increase support specifically among U.S. Republicans, but it nonetheless warrants further consideration in future research.

The novelty of the health frame may be low for participants due to a potential history effect of COVID-19 (see discussion in Chapter 4 and Appendix E).

Finally, the survey in Study 2 was conducted among a purposive sample of U.S. Republicans. The results of the models run may differ among a sample of Democrats. Pilot study 2 did include primarily Democrat participants, but trust was not measured and the valence manipulation was not perceived properly, precluding an informative additional analysis to compare to the main study.

Future Research

In addition to addressing the limitations described above, there are several additional next steps that would contribute to a better understanding of the topic.

Several of the measures of support relate to taking a political action which can only be done if one is registered to vote. I did include a question about voter registration status in the survey, but it was not central to the hypotheses being tested at the time. However, if one were not registered to vote, then how likely they would be to elect an official or vote for a policy measure on a ballot could mean very little when applied in the real world. While increasing general support helps move policy along in the public agenda, if those who are supportive are not

registered to vote, then that support has little tangible impact on implementing climate policies. Conducting additional analyses to identify any group effects of voter registration or more nuanced political ideology on pro-environmental policy support could be interesting.

If I were to conduct this or a similar survey again, I would include an open-ended survey item asking participants to describe their reasoning for their support responses. This would add more context for understanding whether the intervention had any effect and whether that could be perceived in participants' written reasoning. I would also include a question asking about prior exposure to messages about the benefits of climate policy to help parse out the perceived novelty of the positive valence frame.

Survey participants were all self-identified Republicans. As the project sought specifically to increase support among this population, this was appropriate. To better understand whether and how these interventions operate in relation to political party identification, it would be useful in future research to expand the sample to include Democrats and Independents. Furthermore, as additional exploration of variables influencing 'trust', future work should focus on political ideology within these parties (moderate, liberal, conservative).

In broader strokes, future research on the topic of decreasing polarization around climate policy must account for trust. There is a sizable literature, particularly in the health communication field, which investigates trust and what aspects of communication strategies can play into or diminish trust in science, specifically (briefly discussed in Chapter 4). But as the trust measure in this particular study shows, the communication itself may not be influencing trust and so it is important to try to account for additional variables that may be indicators of a latent trust construct. Because of the importance of trust in the theoretical models guiding this dissertation, it seems reasonable to surmise that the popularity of and public support for future

climate policies will depend on increasing trust among message recipients. But as this project measured trust broadly, this research area would benefit from including more fine-grained trust measures to identify where trust needs to be tended to- whether in platform, supporting sources, efficacy or something else.

Further, assessing the impact of multiple messaging exposures on attitude change is an important issue to address in future climate communications research. A future project should employ a longitudinal intervention in which participants are exposed to the same framing condition multiple times over an extended period to determine whether support aligns with whatever is a more frequent message. Work by Milton, Taber, and Lodge (2015) suggest that political decisions are primarily built on snap judgments. Those snap judgments, though, are based on attitudes and beliefs that took time to form. More concrete political decisions such as deciding to elect an official or vote on a policy may require multiple interventions to achieve particular attitudinal and behavioral outcomes (e.g., voting in favor of pro-environmental policies).

Chapter 7 - References

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Appendix A: Study 2 – Experimental Survey Pilot Studies

Two pilot studies were conducted to test that the valence and emphasis frames in each of the experiment's conditions were interpreted as expected. The results and subsequent revisions are described below.

Methods

Procedure

Two pilot studies were conducted online. The survey instrument was created and distributed within Qualtrics. After consenting to participate, participants answered demographic questions. Then participants were randomly assigned to one of nine message conditions where they were presented with the experimental message. The introductory paragraph was the same across all conditions. The final portion of the message was manipulated dependent on the condition and expressed either benefits of passing climate policy or negative consequences of not passing policy. The type of benefits expressed depended on the condition (health, energy independence, or climate). The manipulation check questions immediately followed the condition statements with no distractor activities or questions.

Revisions were then to the survey instrument were made after each pilot study guided by the results of the respective analyses.

Participants

Pilot Study 1

Undergraduate students from two UC Irvine 2021 Summer Session 1 courses (UPPP 115 Global Poverty and Inequality; SocEcol E127 Nuclear Environments) took the survey in its entirety in exchange for extra credit, if desired. A total of 51 students completed the survey.

Pilot Study 2

Undergraduate students were recruited from UCI's Sona platform. Students received course credit for participating in research on this platform. A total of 131 students started the survey with 121 completing the survey. The addition of an (unseen to participants) embedded timer on the message page of the survey, allowed me to determine if participants likely read the message or not. Respondents who spent less than 30 seconds on the message (condition) were omitted from the analyses designed to check the validity of the manipulation as less than 30 seconds would not be enough time to read the message. After dropping these participants and those who did not answer the manipulation check questions, analyses were run with an N = 70.

Analyses

Manipulation Check 1: Valence Perception

Multinomial logistic regression is used to determine the likelihood of participants identifying a particular outcome valence and overall message valence. Both outcome variables are categorical with three discrete options making multinomial logistic regression an appropriate choice. Each outcome was predicted by condition using two sets of dummy variables and their interaction.

As a second type of analysis was run to determine if condition influences whether benefits or outcomes were perceived in the message. The valence condition determined whether outcomes or negative consequences were presented. So, this is a second layer of insight into the success of the manipulation. For this analysis, a series of logistic regressions were performed to determine whether experimental conditions significantly predicted whether participants indicated if the topics were present. Each individual topic outcome was predicted by main effects of emphasis and of valence and their interaction.

Participants were presented with a list of topics, some of which were potentially included

in their condition's message and some of which were there to assess their levels of attention.

Participants indicated whether a topic was present by selecting a box for each topic they thought was present ("check all that apply"). The following variables are the focus of these logistic regressions.

- Outcomes of supporting climate change (yessuppgenout) [Pilot Study 1 only]
- Outcomes of NOT supporting climate change (nosuppgenout) [Pilot Study 1 only]
- Benefits of passing climate policy (yepasscoben)
- Consequences of NOT passing climate policy (nopassconsq)
-

Manipulation Check 2: Emphasis Frame Perception

Participants were presented with a list of topics, some of which were potentially included in their condition's message and some of which were there to test attention. Participants indicated whether a topic was present by selecting a box for each topic they thought was present ("check all that apply").

A series of logistic regressions were performed to determine whether experimental conditions significantly predicted participants' identification of topics. Each individual topic outcome was predicted by condition using two sets of dummy variables and their interaction. The topics whose perceived presence or absence are central to the manipulations in the survey message are listed below. I was primarily interested in whether the two non-reference emphasis conditions were detected- an energy independence frame and a health frame. The logistic regressions presented focus on these variables.

- Health impacts of climate change (cch)
- Energy independence (engindp)
-

Additionally, in the second pilot study, participants were asked directly whether they perceived any "extra impacts from passing/not passing climate policy mentioned (besides addressing climate change)" in the message. A multinomial logistic regression was used to

predict the outcome of this question which could have been one of four, unordered, categories.

Results & Conclusions

Pilot Study 1

Manipulation Check 1a: Valence Perception

Table 5.2 shows how participants were distributed across the nine messaging conditions. Comparing these counts to the raw distribution of responses to both the question about valence of outcome (Table 5.3) and the question about valence of overall message (Table 5.3), I can determine that the manipulation was not successful. I expected responses pertaining to overall valence to be more neutral overall as a large portion of the message is intended to be neutral and objective. However, responses to outcome valence were expected to be evenly distributed as the outcomes of policy were manipulated in each condition.

The multinomial logistic regressions indicated that, for both outcomes, the valence of the condition in which a participant was randomly assigned did not significantly predict the likelihood of responses. The odds of selecting “positive” or “negative” responses over the reference “neutral” was not significantly influenced by the survey condition’s valence, emphasis, or their interaction (Tables 5.4 and 5.5). For both models, the model fit does not significantly account for the variance in outcomes.

Table 5.2
Distribution of Pilot Study 1 Participants Across Conditions (N=51)

Condition	n	% of N
Negative x Climate	7	13.73
Neutral x Climate	6	11.76
Positive x Climate	7	13.73
Negative x Health	4	7.84

Neutral x Health	5	9.80
Positive x Health	6	11.76
Negative x Energy	5	9.80
Neutral x Energy	5	9.80
Positive x Energy	6	11.76
<i>Total</i>	<i>51</i>	<i>100</i>

Table 5.3
Distribution of Responses to Valence Manipulation Check Items (N= 51)

Survey Item	“Negative”	“Neutral”	“Positive”	Total
Outcome Valence	7 (13.73%)	9 (17.65%)	35 (68.63%)	51
Overall Valence	3 (5.88%)	12 (23.53%)	36 (70.59%)	51

Table 5.4
Multinomial Logistic Regression Predicting Outcome Valence Perception - Pilot 1

Multinomial logistic regression Number of obs = 51
 LR chi2(16) = 18.90
 Prob > chi2 = 0.2741
 Log likelihood = -33.241946 Pseudo R2 = 0.2213

outval	RRR	Std. Err.	z	P>|z|	[95% Conf. Interval]	
-1						
emph_d2	.3299108	2990.72	-0.00	1.000	0	.
emph_d3	1.03e+15	8.26e+18	0.00	0.997	0	.
val_d1	.5677681	4450.309	-0.00	1.000	0	.
val_d3	1.64e+15	1.24e+19	0.00	0.996	0	.
pos_health	5.92e-31	6.54e-27	-0.01	0.995	0	.
pos_energy	3.02e-08	.0003132	-0.00	0.999	0	.
neg_health	2.29705	26606.19	0.00	1.000	0	.
neg_energy	3.49e+08	3.67e+12	0.00	0.999	0	.
_cons	3.06e-08	.000175	-0.00	0.998	0	.
0	(base outcome)					
1						
emph_d2	.2999766	.4277506	-0.84	0.398	.0183366	4.907442
emph_d3	2.52e+07	1.42e+11	0.00	0.998	0	.
val_d1	.4999878	.6891848	-0.50	0.615	.0335475	7.451753
val_d3	2.51e+07	1.25e+11	0.00	0.997	0	.
pos_health	1.58e-15	1.19e-11	-0.00	0.996	0	.
pos_energy	3.99e-08	.0001998	-0.00	0.997	0	.
neg_health	1.956288	16682.71	0.00	1.000	0	.
neg_energy	2.66697	5.487356	0.48	0.634	.0472771	150.4478
_cons	5.000015	5.477247	1.47	0.142	.5841519	42.79734

Note: _cons estimates baseline relative risk for each outcome.

Table 5.5**Multinomial Logistic Regression Predicting Overall Valence Perception - Pilot 1**

Multinomial logistic regression Number of obs = 51
 LR chi2(16) = 16.23
 Prob > chi2 = 0.4369
 Log likelihood = -30.285908 Pseudo R2 = 0.2113

overallval	RRR	Std. Err.	z	P>|z|	[95% Conf. Interval]	
-1						
emph_d2	.3928186	3926.921	-0.00	1.000	0	.
emph_d3	1.10e+07	1.22e+11	0.00	0.999	0	.
val_d1	1.47e+07	9.72e+10	0.00	0.998	0	.
val_d3	1.47e+07	9.72e+10	0.00	0.998	0	.
pos_health	6.21e-15	8.02e-11	-0.00	0.998	0	.
pos_energy	1.74e-07	.0020836	-0.00	0.999	0	.
neg_health	18.89625	261853.5	0.00	1.000	0	.
neg_energy	1.46e-07	.0018061	-0.00	0.999	0	.
_cons	2.27e-08	.0001508	-0.00	0.998	0	.
0	(base outcome)					
1						
emph_d2	.2999978	.4277815	-0.84	0.398	.0183378	4.907811
emph_d3	1.58e+07	6.26e+10	0.00	0.997	0	.
val_d1	.1999984	.2732497	-1.18	0.239	.0137425	2.910641
val_d3	.1999984	.2732497	-1.18	0.239	.0137425	2.910641
pos_health	3.17e-07	.0012592	-0.00	0.997	0	.
pos_energy	16.66692	32.91451	1.42	0.154	.3474307	799.5444
neg_health	13.17131	121428.1	0.00	1.000	0	.
neg_energy	13.33356	26.49992	1.30	0.192	.2711549	655.6545
_cons	4.999988	5.477208	1.47	0.142	.584151	42.79695

Note: _cons estimates baseline relative risk for each outcome.
 Note: 5 observations completely determined. Standard errors questionable.

Manipulation Check 1b: Perception of Outcomes and Substantively Present

Outcomes of supporting climate policy¹⁴. Being in a condition with an energy emphasis (compared to a climate change emphasis) or being in either negative or positive valence condition (compared to neutral conditions) significantly increased the odds of indicating that the message included mention of some outcome related to the passing of policy (see Table 5.6). Overall, this is a well fitting model (Hosmer-Lemeshow chi-sq(7) = 0.00, p = 1.00, indicating no evidence of poor fit).

By design, outcomes from supporting policy should have been perceived in all positive

¹⁴ In this logistic model predicting whether or not outcomes of passing policy were perceived, convergence was not achieved. Therefore, several parameters are not available, but this primarily affected interaction terms. Odds ratios are produced for main effects and are still valid.

valence conditions. These results indicate that this element was perceived as expected, at an increased odds compared to neutral valence conditions. However, being in the negative valence also increased odds when this was not intended.

Table 5.6
Logistic Regression Predicting Perception of Outcomes from Supporting Policy- Pilot 1

Logistic regression	Number of obs	=	51
	LR chi2(6)	=	13.32
	Prob > chi2	=	0.0382
Log likelihood = -25.062623	Pseudo R2	=	0.2100

yessuppgenout	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf. Interval]	
emph_d2	2.05e-08	2.29e-08	-15.83	0.000	2.29e-09	1.83e-07
emph_d3	.9999833	1.258285	-0.00	1.000	.0849026	11.77781
val_d1	1.02e-08	1.67e-08	-11.27	0.000	4.17e-10	2.51e-07
val_d3	1.82e-08	2.23e-08	-14.55	0.000	1.65e-09	2.01e-07
pos_health	3.750063	6.880795	0.72	0.471	.1028521	136.73
pos_energy	3.66e+07	.	.	.	.	.
neg_health	1.333356	.	.	.	.	.
neg_energy	2.60e+08	4.57e+08	11.04	0.000	8338339	8.14e+09
_cons	7.33e+07	1.06e+08	12.55	0.000	4327422	1.24e+09

Note: _cons estimates baseline odds.

Note: 0 failures and 11 successes completely determined.
convergence not achieved

Outcomes of not supporting climate policy. Both positive-health and positive-energy conditions perfectly predicting *not* indicating the presence of any outcomes related to not passing policy, as such these participants were not included in the model (see Table 5.7). No other parameter significantly influenced to odds of indicating that outcomes of not passing policy were present. A Hosmer-Lemeshow test of model fit did not find any evidence that this is a poor fitting model (chi-sq(5) = 0.00, p = 1.00).

By design, it was expected that participants in the negative valence conditions would have perceived such outcomes, and that those in positive valence conditions would not. These results indicate that this element of the survey message was not perceived entirely as expected.

Table 5.7**Logistic Regression Predicting Perception of Outcomes of Not Supporting Policy- Pilot 1**

Logistic regression	Number of obs	=	39
	LR chi2(6)	=	4.61
	Prob > chi2	=	0.5945
Log likelihood = -21.766786	Pseudo R2	=	0.0958

nosuppgenout	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf. Interval]
emph_d2	1.25	1.956559	0.14	0.887	.0581526 26.86898
emph_d3	3.333333	4.753167	0.84	0.398	.2037548 54.53177
val_d1	2	2.75681	0.50	0.615	.1341929 29.80783
val_d3	.8333333	1.281998	-0.12	0.906	.0408632 16.99437
pos_health	1	(omitted)			
pos_energy	1	(omitted)			
neg_health	.75	1.449138	-0.15	0.882	.0169974 33.09321
neg_energy	3	5.987487	0.55	0.582	.0600162 149.9595
_cons	.2	.219089	-1.47	0.142	.0233661 1.711885

Note: _cons estimates baseline odds.

Note: pos_health != 0 predicts failure perfectly, pos_health dropped and 6 obs not used;
pos_energy != 0 predicts failure perfectly, pos_energy dropped and 6 obs not used

Benefits of passing climate policy. There were no significant main or interaction effects influencing the odds of indicating that there were, specifically, benefits from passing climate policy (see Table 5.8). The Hosmer-Lemeshow test of model fit indicates no evidence of poor fit ($\chi^2(5) = 0, p = 0.000$).

By design, this element was expected to be selected at a higher rate in positive valence condition and lower rate in negative valence conditions, when compared to neutral conditions. These results indicate that this element was not perceived by participants as expected.

Table 5.8**Logistic Regression Predicting Perception of Benefits of Passing Policy**

Logistic regression	Number of obs	=	51
	LR chi2(8)	=	2.44
	Prob > chi2	=	0.9645
Log likelihood = -29.675533	Pseudo R2	=	0.0395

yespasscoben	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf. Interval]
emph_d2	2	2.828427	0.49	0.624	.1250977 31.97502
emph_d3	.75	.9437293	-0.23	0.819	.063678 8.833505
val_d1	1.25	1.505199	0.19	0.853	.1180124 13.24013
val_d3	1.25	1.505199	0.19	0.853	.1180124 13.24013
pos_health	2.666667	4.976984	0.53	0.599	.0687563 103.4249
pos_energy	.2	.3669696	-0.88	0.380	.0054854 7.292145
neg_health	1.6	3.042806	0.25	0.805	.0384897 66.51132
neg_energy	.8	1.589969	-0.11	0.911	.016269 39.33866
_cons	2	1.732051	0.80	0.423	.3663261 10.91923

Note: _cons estimates baseline odds.

Consequences of not passing climate policy. There were no significant main or interaction effects influencing the odds of indicating that there were, specifically, consequences of not passing climate policy (see Table 5.9). The Hosmer-Lemeshow test of model fit indicates no evidence of poor fit ($\chi^2(7) = 0$, $p = 0.000$).

By design, this element was expected to be more likely to be selected in negative valence conditions and less likely to be selected in positive valence conditions, when compared to neutral conditions. These results indicate that this element was not perceived by participants as expected.

Table 5.9
Logistic Regression Predicting Perception of Consequences of Not Supporting Policy


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Logistic regression          Number of obs   =       51
                             LR chi2(6)             =       16.50
                             Prob > chi2            =       0.0113
                             Pseudo R2              =       0.2670
Log likelihood = -22.645835

```

engindp	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf. Interval]	
emph_d2	8	11.31371	1.47	0.141	.5003907	127.9001
emph_d3	2.70e-08	3.72e-08	-12.64	0.000	1.81e-09	4.02e-07
val_d1	2.70e-08	4.26e-08	-11.02	0.000	1.22e-09	5.98e-07
val_d3	.8	.9633276	-0.19	0.853	.0755279	8.473686
pos_health	1.85e+07	.	.	.	.	.
pos_energy	.3125	.57339	-0.63	0.526	.0085709	11.39398
neg_health	2.75e+15	6.82e+15	14.34	0.000	2.13e+13	3.55e+17
neg_energy	2317957	.	.	.	.	.
_cons	.5	.4330127	-0.80	0.423	.0915815	2.729808

Note: _cons estimates baseline odds.
Note: 12 failures and 0 successes completely determined.

Conclusions

Based on the results of these series of manipulation checks in the first pilot study of the experimental survey, adjustments to the survey messages are needed to.

There was not a statistically significant difference across conditions in how they responded to questions asking whether the outcomes of climate policy, specifically, or the overall message was framed positively, negatively, or in a neutral manner. A majority of respondents (68%) indicated that outcomes were framed positively, regardless of condition, despite only 37% being placed in positively framed conditions. Additionally, proper detection of both energy independence and health impacts from climate change, in their respective conditions, needs addressing.

As such, wording of the message in each of the nine conditions was revised to make emphasis frame topics more obvious. To address the poor detection of valence in outcomes, specifically over the overall valence, more emphasis was placed on “benefits” and “consequences”. The introductory text, presented to every participant prior to the experimental text, was also edited to remove phrases which may possibly lead a participant to think of health connections (i.e. air pollution).

Pilot Study 2

After revisions, a second pilot study was conducted to test the manipulations with the goal of ensuring message frames were being interpreted as expected. For the purposes of the pilot, several questions' skip-logic was removed so that the survey would not end if the student did not meet target audience characteristics (i.e. Republican affiliation). This is not expected to affect the results of the manipulation check as the validity of the manipulation would be perceived regardless of demographic characteristics. The manipulation check questions immediately followed the condition statements with no distractor activities or questions.

Manipulation Check 1a: Valence Perception

Table 5.12 shows how participants were distributed across the nine messaging conditions. Comparing these counts to the raw distribution of responses to both the question about valence of outcome (Table 5.13) and the question about valence of overall message (Table 5.13), it appears that the manipulation was more successful than the first pilot, but still not entirely successful. Counts of responses by condition valence also demonstrate this (Table 5.13) I expected responses pertaining to overall valence to be more neutral overall as a large portion of the message is intended to be neutral and objective, but most participants indicated that they perceived it to be positive. Responses to outcome valence were expected to be evenly distributed as the outcomes of policy were manipulated in each condition. At first glance, it seems that the negative valence may have faced some challenges to perception.

The multinomial logistic regressions indicated that, for both outcomes, the valence of the condition in which a participant was randomly assigned did not significantly predict the likelihood of responses. The odds of selecting “positive” or “negative” responses over the reference “neutral” was not significantly influenced by the survey condition’s valence, emphasis,

or their interaction (Tables 5.14 and 5.15).

Table 5.12
Distribution of Pilot Study 2 Participants Across Conditions (N=73)

Condition	n	% of N	Emphasis	% of Participants Assigned
Negative x Climate	7	10.00	Climate Only	31.43
Neutral x Climate	7	10.00	Energy Independence	28.57
Positive x Climate	8	11.43	Health	40.00
Negative x Health	12	17.14		
Neutral x Health	8	11.43		
Positive x Health	8	11.43		
Negative x Energy	8	11.43		
Neutral x Energy	5	7.14		
Positive x Energy	7	10.00		
<i>Total</i>	<i>70</i>	<i>100</i>		

Table 5.13
Distribution of Responses to Valence Manipulation Check Items (N=70)*

Valence of Condition	Counts of Responses for Outcome Valence				Counts of Responses for Overall Valence			
	Neg	Neut	Pos	Total	Neg	Neut	Pos	Total
Negative	9	11	7	27	2	7	18	27
Neutral	1	7	12	20	0	6	14	20
Positive	1	7	15	23	1	5	17	23
Total (% of total)	11 (15.71%)	25 (35.71%)	34 (48.57%)	70	3 (4.29%)	18 (25.71%)	49 (70.0%)	70

indicate, though, that there was an effect of this condition such that they were more likely to have perceived benefits from passing the policy. The whole of the results seems to indicate, though, that this element was not perceived by participants entirely as expected.

Table 5.16

Logistic Regression Predicting Perception of Benefits of Supporting Policy- Pilot 2

Logistic regression		Number of obs	=	62
		LR chi2(7)	=	5.04
		Prob > chi2	=	0.6554
Log likelihood = -24.872979		Pseudo R2	=	0.0920

passben	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf. Interval]	
emph_d2	3.51e-08	.0000867	-0.01	0.994	0	.
emph_d3	1.64e-07	.0004046	-0.01	0.995	0	.
val_d1	1.40e-07	.0003468	-0.01	0.995	0	.
val_d3	1.64e-07	.0004046	-0.01	0.995	0	.
pos_health	1	(omitted)				
pos_energy	1.02e+07	2.52e+10	0.01	0.995	0	.
neg_health	5091884	1.26e+10	0.01	0.995	0	.
neg_energy	3.32e+07	8.22e+10	0.01	0.994	0	.
_cons	4.28e+07	1.06e+11	0.01	0.994	0	.

Note: _cons estimates baseline odds.

Note: pos_health != 0 predicts success perfectly, pos_health dropped and 8 obs not used

Consequences of not passing climate policy¹⁶. There were significant main and interaction effects influencing the odds of indicating that there were, specifically, consequences of not passing climate policy (see Table 5.17). In the presence of significant interactions, I do not interpret main effects. Being in the negative energy or positive health conditions lead to lower likelihood of perceiving consequences compared to the neutral climate reference condition. Being in the positive energy condition perfectly predicted not selecting that consequences were present. This indicates that there is some effect of this condition such that they were less likely to

¹⁶ In this multinomial logistic model predicting perception of the consequences of not passing policy, convergence was not achieved. Therefore, several parameters are not available. Odds ratios are produced remaining parameters and are still valid.

perceive negative consequences. The Hosmer-Lemeshow test of model fit indicates no evidence of poor fit ($\chi^2(6) = 0, p = 0.000$).

By design, this element was expected to be more likely to be selected in negative valence conditions and less likely to be selected in positive valence conditions, when compared to neutral conditions. These results indicate that this element was not perceived by participants as expected.

Table 5.17

Logistic Regression Predicting Perception of Consequences of Not Supporting Policy – Pilot 2

Logistic regression	Number of obs	=	63
	LR $\chi^2(5)$	=	36.41
	Prob > χ^2	=	0.0000
Log likelihood = -24.11112	Pseudo R2	=	0.4302

notpassconsq	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf. Interval]
emph_d2	7.26e+07	.	.	.	.
emph_d3	6.54e+07	7.64e+07	15.39	0.000	6609861 6.46e+08
val_d1	8.67e+15	1.11e+16	28.80	0.000	7.13e+14 1.05e+17
val_d3	3.27e+08	4.00e+08	16.01	0.000	2.96e+07 3.60e+09
pos_health	1.70e-09	2.79e-09	-12.29	0.000	6.79e-11 4.26e-08
pos_energy	1	(omitted)			
neg_health	2.11e-15	.	.	.	.
neg_energy	1.21e-15	2.30e-15	-18.10	0.000	2.94e-17 4.99e-14
_cons	9.18e-09	8.38e-09	-20.27	0.000	1.53e-09 5.49e-08

Note: _cons estimates baseline odds.

Note: 7 failures and 7 successes completely determined.
convergence not achieved

Note: pos_energy != 0 predicts failure perfectly; pos_energy dropped and 7 obs not used

Manipulation Check 2: Emphasis Frame Perception

Health impacts from climate change. Being in the health emphasis had a main effect that approaches significance ($p = 0.085$), such that being in a health emphasis compared to the climate emphasis increased odds of indicating that the message contained reference to health impacts from climate change. No other main or interaction effect significantly influenced the likelihood of identifying this topic in the message (Table 5.18). There is no evidence that this was a poor-fitting model (Hosmer-Lemeshow $\chi^2(4) = 0.00, p = 1.00$).

By design, this topic should only have been present and detected by participants in the health emphasis conditions. These results indicate that this element has improved since the first pilot study. Lack of significance at this stage may be due to a lack of statistical power.

Table 5.18
Logistic Regression Predicting Perception of Health Impacts -Pilot 2

Logistic regression	Number of obs	=	70
	LR chi2(8)	=	20.25
	Prob > chi2	=	0.0094
Log likelihood = -38.393121	Pseudo R2	=	0.2087

cch	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf. Interval]
emph_d2	1.666667	2.063797	0.41	0.680	.1471717 18.8744
emph_d3	7.5	8.767839	1.72	0.085	.758522 74.15737
val_d1	.4166667	.569275	-0.64	0.522	.0286303 6.063892
val_d3	1.5	1.665833	0.37	0.715	.1701315 13.22506
pos_health	1.555556	2.713478	0.25	0.800	.050941 47.50107
pos_energy	.1666667	.2996912	-1.00	0.319	.0049121 5.655024
neg_health	2.4	4.141497	0.51	0.612	.0815375 70.64232
neg_energy	3.6	6.439876	0.72	0.474	.1080505 119.9439
_cons	.4	.334664	-1.10	0.273	.0776057 2.061704

Note: _cons estimates baseline odds.

Energy independence¹⁷. Compared to being in the reference climate change emphasis conditions, the odds of indicating that energy independence was a topic present in the message significantly decreased when in the health framed conditions (main effect) or in the positive valence conditions (compared to the neutral conditions; main effect). Assignment to the negative valence conditions perfectly predicted not perceiving this topic and 27 observations were dropped. These dropped participants included those in the negative health and the negative energy conditions. The model output (Table 5.19) also indicates that 16 responses were

¹⁷ In this logistic model predicting perception of the energy independence topic, convergence was not achieved. therefore, several parameters are not available, but this primarily affected interaction terms. Odds ratios are produced for main effects and are still valid.

completely determined. While significance isn't determined, the odds of perceiving this topic seem to increase when in the positive energy condition and positive health condition. The Hosmer-Lemeshow test of model fit finds no evidence of poor fit ($\chi^2(4) = 0.00, p = 1.00$).

By design, this element should only have been perceived if participants were assigned to one of the energy emphasis conditions. Valence should not have necessarily led to the lack of perception of this topic but is primarily a problem for the negative energy condition. Overall, this element was not detected as expected over a neutral climate reference emphasis.

Table 5.19
Logistic Regression Predicting Perception of Energy Independence Frame- Pilot 2

Logistic regression		Number of obs	-	43		
Log likelihood = -14.754994		LR chi2(3)	-	19.39		
		Prob > chi2	-	0.0002		
		Pseudo R2	-	0.3966		
engindp	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf. Interval]	
emph_d2	3.75	4.643544	1.07	0.286	.3311363	42.46741
emph_d3	3.52e-08	6.47e-08	-9.34	0.000	9.61e-10	1.29e-06
val_d1	1 (omitted)					
val_d3	3.52e-08	4.36e-08	-13.86	0.000	3.11e-09	3.99e-07
pos_health	2.88e+14	.	.	.	.	.
pos_energy	4.73e+07	.	.	.	.	.
neg_health	1 (omitted)					
neg_energy	1 (omitted)					
_cons	.4	.334664	-1.10	0.273	.0776057	2.061704

Note: _cons estimated baseline odds. 16 failures and 0 successes completely determined. neg_health omitted because of collinearity; neg_energy omitted because of collinearity

Detection of co-effects/co-impacts. Table 5.20 contains the percentage of participants indicating whether and which co-effect they perceived was present in the survey message. Comparing these raw frequencies to the distribution of participants across the experimental conditions (Table 5.12), I can deduce that at a sample level the detection of the proper co-effect is not entirely perfect, but also not too poor. However, in the multinomial logistic regression, with “Unsure” as the reference outcome, the emphasis frame used in the survey message does not have a significant main effect on the selection of the outcome variable (Table 5.21).

Table 5.20
Perceptions of coeffects in survey message

Response	Percentage of Participants
No co-effects, only climate change	21.43
Energy independence co-effects	21.43
Health coeffects	31.43
Unsure	25.71
Total	100

Table 5.21
Model Parameters for Multinomial Logistic Regression Predicting Co-Effect Perception - Pilot 2

climate change and, therefore, health or energy independence respective of the condition. More specific wording is also included to emphasize the substantive topic of the emphasis frames.

It is possible that the positive and neutral frames are not easily differentiated by participants. It is also possible that the question itself was not well defined- being unclear in which portion of the message participants were meant to account for or in the definition of “neutral”. Participants may have interpreted the absence of negative language as “positive”, especially as the response option was “neither/neutral”. The definition of neutral for this question was not given, but was meant to mean factual without trying to evoke positive or negative emotions. The question’s wording was revised in the final version of the survey for clarity from “Would you say that the outcomes of whether or not the policy is passed were: positive, negative, or neither?” to “Were the outcomes of passing or not passing policy presented in a positive/good or negative/bad tone?” with an answer option of “neither/neutral”.

Appendix B: Study 2 – Experimental Survey: Instrument

Survey Flow

Standard: Study Information & Consent (1 Question)
Standard: Prolific ID (1 Question)
Block: Eligibility/Validation (6 Questions)

Branch: New Branch

If

If How old are you? Under 18 Is Selected

Or Are you a resident of Texas, California, or Florida? No Is Selected

Or Which American political party are you registered with? If you are not registered, in general, wh... Republican Is Not Selected

EndSurvey: Advanced

Standard: Demographics & SES (5 Questions)
Standard: Statement Instructions (1 Question)
Standard: Policy Options (12 Questions)
Standard: Support (6 Questions)
Standard: Manipulation Check (6 Questions)
Standard: Policy Considerations (8 Questions)
Standard: Media Interaction (2 Questions)
Standard: Personal Experience and Attribution (2 Questions)
Standard: NEP Scale (1 Question)

EmbeddedData

idValue will be set from Panel or URL.

Survey Items¹⁸

Study Information & Consent

Affect, Judgments, and Messaging in Politics

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¹⁸ Where applicable, scales assigned to item responses for analysis are included in brackets next to the respective question. Ex. [2: strongly agree; 1: mildly agree; 0: unsure; -1: mildly disagree; -2: strongly disagree]

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Please read the information below and ask questions about anything that you do not understand. If you have questions, contact Maureen Purcell at the email listed above. You are being asked to participate in a research study. Participation in this study is voluntary. You may choose to skip any question which is not required to determine your eligibility to take this survey. You may refuse to participate or discontinue your involvement at any time without penalty or loss of benefits. You are free to withdraw from this study at any time. If you decide to withdraw from this study just close your web browser. We would like you to complete a survey to learn more about the relationship between emotional processing, messaging, and political ideology and to study the mechanisms and processes by which people make political decisions. The survey will last 10-15 minutes. There are no anticipated risks in this study. There are no direct benefits from participation in the study. However, this study may help us learn about political psychology. Compensation for your participation in this study will be handled per Prolific terms, via Prolific.co. All research data collected will be stored securely and confidentially. Information will be maintained electronically. Any personal identifying information will be stripped out before analysis. The information you provide will not be linked back to you, and it will be reported only in aggregated form in academic publications. Future Research Use
Researchers will use your information to conduct this study. Once the study is done using your information, we may share them with other researchers so they can use them for other studies in the future. We will not share your name or any other private identifiable information that would let the researchers know who you are. We will not ask you for additional permission to share this de-identified information.

Questions? If you have any comments, concerns, or questions regarding this study please contact the researchers listed at the top of this form. If you have questions or concerns about your rights as a research participant, you can contact the UCI Institutional Review Board by phone, (949) 824-6662, by e-mail at IRB@research.uci.edu or at 160 Aldrich Hall, Irvine, CA 92697-7600. What is an IRB? An Institutional Review Board (IRB) is a committee made up of scientists and non-scientists. The IRB's role is to protect the rights and welfare of human subjects involved in research. The IRB also assures that the research complies with applicable regulations, laws, and institutional policies.

Do you agree and consent to participate according to these terms?

- I agree
 I do not agree

*Skip To: End of Survey If Affect, Judgments, and Messaging in Politics Lead
Researcher Maureen Purcell, M.A., PhD Candidat... != I agree*
End of Block: Study Information & Consent

Start of Block: Prolific ID

Survey Items & Response Options

Please enter your unique Prolific ID

End of Block: Prolific ID

Start of Block: Eligibility/Validation

How old are you? [1:<18; 2:18-24; 3:25-34; 4: 35-44; 5:45-54; 6: 55-64; 7: 65-74; 8: 75-84; 9: >85]

▼ Under 18 ... 85 or older

Skip To: End of Survey If How old are you? = Under 18

Are you a resident of Texas, California, or Florida? [1:yes; 0:no]

- Yes
 No

Skip To: End of Survey If Are you a resident of Texas, California, or Florida? = No

Which U.S. State do you currently live in? [1:CA; 2: TX; 3: FL]

- California
 Texas
 Florida

Which American political party are you registered with? If you are not registered, in general, what is your political affiliation? [1:Republican; 2: Democrat; 3:Independent ; 4:Green Party; 5: None/Other]

- Republican
 Democrat
 Independent
 Green Party
 None/Other

Skip To: End of Survey If Which American political party are you registered with? If you are not

registered, in general, wh... != Republican

Within that party, do you consider yourself to be Conservative, Moderate, or Liberal? [1: Conservative; 2: Moderate; 3: Liberal]

- Conservative
- Moderate
- Liberal

Are you a registered voter? [0:no; 1:yes]

- Yes
- No

End of Block: Eligibility/Validation

Start of Block: Demographics & SES

If 10 represents those who are the most "well-off" and 1 represents those who are the least "well-off", where would you place yourself on this scale compared to other Americans?

1 2 3 4 5 6 7 8 9 10

My relative standing:



Which gender do you identify as? [1:Man; 2:Woman; 3:non-binary or third gender; 4: Trans Man; 5: Trans Woman; 6: Prefer not to state]

- Man
- Woman
- Non-binary / third gender
- Transgender Man
- Transgender Woman
- Prefer not to say

Which ethnicity do you identify most with? [1:white, 2:Black/Af-Am; 3:American Indian or Alaska Native; 4: Asian; 5: Native Hawaiian or Pacific Islander; 6: Middle Eastern; 7: Hispanic or Latino; 8: None of these/prefer not to state]

▼ White ... None of these/ Prefer not to say

What is the highest level of formal education you have completed? [1:less than HS; 2:HS; 3:some college; 4: 2yr; 5:4yr; 6:prof/MA; 7:doctorate]

- Less than high school
- High school graduate
- Some college
- 2 year degree
- 4 year degree
- Professional or Masters degree
- Doctorate

Please indicate what your approximate annual income is in a normal year (after taxes). [options assigned 1-12, in increasing order]

▼ Less than \$10,000 ... More than \$150,000

End of Block: Demographics & SES

Start of Block: Statement Instructions

Please carefully read the statements on the next page. You will be asked several questions about them.

End of Block: Statement Instructions

Start of Block: Policy Options¹⁹

Carbon dioxide is a gas that comes from both natural cycles and human activities. Human activities like driving gasoline-powered vehicles, burning coal to create electricity, and chemical reactions used to make steel or cement all produce carbon dioxide. Higher levels of carbon dioxide are a major driver of climate change. It is called a greenhouse gas because it traps heat on Earth. Using more renewable energy instead of non-renewable energies like diesel, gasoline, natural gas, or coal, would decrease the amount of carbon dioxide and other greenhouse gases in the atmosphere over time.

National policy is one way to make this shift in energy sources. To increase renewable energy and meet all demand for energy with renewable sources, the U.S. could develop a national policy to invest time, effort, and money into promoting renewable energy. Some options include: more

¹⁹ Participants would see the introductory message plus one of the below messages about taking actions or not, depending on which valence and emphasis condition they were randomly assigned to.

research and development of renewable energy, upgrading and expanding existing renewable energy plants and infrastructure, building new renewable energy plants, or upgrading manufacturing processes so they run on renewable sources. The U.S. could also promote increasing both personal and industrial use of renewable sources for transportation and agriculture.

Passing a national climate policy to promote more renewable energy would help slow climate change. Plus, it would also have positive benefits for many people's health. The air we breathe would be cleaner and global average temperatures would be cooler, so certain heart diseases, asthma, and other respiratory illnesses would improve. The health of people living in neighborhoods close to oil refineries would, in particular, benefit.

Not passing a national climate policy to promote more renewable energy would make climate change worse. Plus, it would also have negative consequences for many people's health. The air we breathe would be more polluted and global average temperatures would be hotter, so certain heart diseases, asthma, and other respiratory illnesses would worsen. The health of people living in neighborhoods close to oil refineries would, in particular, suffer.

A national climate policy focused on promoting renewable energy would affect climate change. Plus, it is also connected to people's health. Global average temperatures and air quality are connected to heart disease, asthma, and other respiratory conditions. It would have implications for the health of people living close to oil refineries, in particular.

Passing a national climate policy to promote more renewable energy would help slow climate change. Levels of greenhouse gases would improve, so air would be cleaner and global average temperatures would be cooler.

Not passing a national climate policy to promote more renewable energy would make climate change worse. Levels of greenhouse gases would worsen, so air would be more polluted and global average temperatures would be hotter.

A national climate policy focused on promoting renewable energy would affect climate change. Levels of greenhouse gases affect air quality and global average temperatures.

Passing a national climate policy to promote more renewable energy would help slow climate change. Plus, it would also have positive benefits for America's energy independence. The renewables industry would grow, so we could rely on our own, domestic energy sources.

Not passing a national climate policy to promote more renewable energy would make climate change worse. Plus, it would also have negative consequences for America's energy independence. The renewables industry would not grow, so we would rely on other countries' energy sources.

A national climate policy focused on promoting renewable energy would affect climate change. Plus, it is also connected to the size of America's energy sector which has implications for

energy independence.
End of Block: Policy Options

Start of Block: Support

Please answer the following hypothetical questions based on the message you have just read. Pay careful attention to answer options. If you are not a registered voter, answer as if you were registered.

How much do you support this policy idea? [0:not at all; 1:a little; 2:a moderate amount; 3:a lot; 4:a great deal]

Not at all

- A little
- A moderate amount
- A lot
- A great deal

If this policy or a similar policy were on your own ballot right now, how likely is it that you would vote in favor of it? [1:ext **unlikely**, 2:somewhat unlikely, 3:neither likely nor unlikely, 4:somewhat likely, 5:extremeny likely]

- Extremely unlikely
- Somewhat unlikely
- Neither likely nor unlikely
- Somewhat likely
- Extremely likely

If someone running for U.S. Representative or Senator supported this policy or a similar policy, how likely is it that you would vote for that person?

[1:ext **likely**, 2:somewhat likely, 3:neither likely nor unlikely, 4:somewhat unlikely, 5:extremeny unlikely]

- Extremely likely
- Somewhat likely
- Neither likely nor unlikely
- Somewhat unlikely
- Extremely unlikely

If your current U.S. Representative or Senator supported this policy or a similar policy, how

likely is it that you would vote to keep them in office in the next election?
 [1:ext **likely**, 2:somewhat likely, 3:neither likely nor unlikely, 4:somewhat unlikely, 5:extremeny unlikely]

- Extremely likely
- Somewhat likely
- Neither likely nor unlikely
- Somewhat unlikely
- Extremely unlikely

How much do you agree with the following statements? [-2:strongly agree; -1: somewhat agree; 0: neither; 1: somewhat disagree; 2: strongly disagree]

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
In the past, I DID NOT support policy to increase renewable energy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Now, I DO support policy to increase renewable energy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

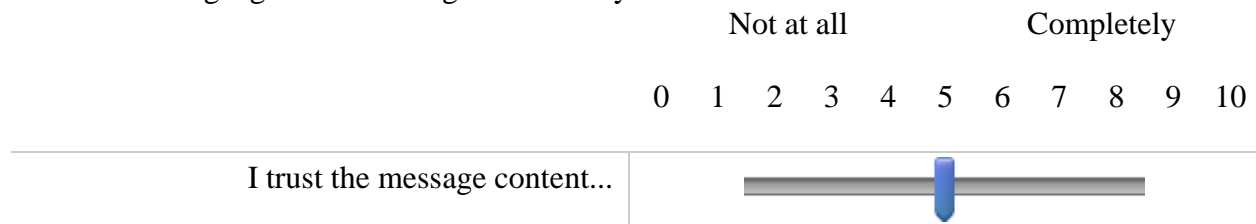
End of Block: Support

Start of Block: Manipulation Check

Did you learn something new from the message you read? [0:no; 1:yes]

- Yes
- No

On a scale of 0 to 10, how much do you trust the information you read in the message? Move the slider until the gauge shows the right value for you.



Did you find the tone of the policy proposal to be positive/good or negative/bad? [-1:Negative; 0:

neither/neutral; 1: Positive]

- Positive
- Negative
- Neither/Neutral

Were the outcomes of passing or not passing policy presented in a positive/good or negative/bad tone? [-1:Negative; 0: neither/neutral; 1: Positive]

- Positive
- Negative
- Neither/ Neutral

Were any of the following topics covered in the statement you read? Please read carefully. Check all that apply. [0:no; 1:yes]

- Health impacts from climate change
- American Values (Freedom, Independence)
- Things the federal government can do to address climate change
- Energy independence
- Benefits of passing climate policy
- Benefits of NOT passing climate policy
- Negative consequences of passing climate policy
- Negative consequences of NOT passing climate policy
- None of these topics were covered

In the past, have you heard or read about the connection between climate change and human health? [0:never; 1: once or twice; 2: a few times; 3: many times]

- Never
- Once or twice
- A few times
- Many times

End of Block: Manipulation Check

Start of Block: Policy Considerations

How often do you think about how any given policy might impact the following:
 [4: always, 3: most of the time, 2: about half the time, 1: sometimes, 0: never]

	Always	Most of the time	About half the time	Sometimes	Never
Your own health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The health of someone in your family or friend group	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The health care system, generally	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public health, broadly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The health of people in other parts of the world	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

When you personally support any policy, how important is the connection between that policy and your own health to your decision? [0: not at all; 1: slightly important; 2: moderately important; 3: extremely important]

- Extremely important
- Moderately important
- Slightly important
- Not at all important

How often do you think about how climate change policies might impact the following:
 [4: always, 3: most of the time, 2: about half the time, 1: sometimes,0: never]

	Always	Most of the time	About half the time	Sometimes	Never
Your own health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The health of someone in your family or friend group	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The health care system, generally	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public health, broadly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The health of people in other parts of the world	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

When you personally support a climate change policy, how important is the connection between that policy and your own health to your decision? [0: not at all; 1: slightly important; 2: moderately important; 3: extremely important]

- Extremely important
- Moderately important
- Slightly important
- Not at all important

Has the COVID-19 Pandemic changed how often you consider potential health impacts (either good or bad) of a policy? [1: yes, more; -1: yes, less; 0: no, same; 2: unsure]

- Yes. I think about it more.
- Yes. I think about it less.
- No. I think about it the same amount.
- Unsure

The potential renewable energy policy options you read about are also part of the Green New Deal.

Have you been supportive of the Green New Deal in the past? [5:Yes, all; 4:yes, some; 3:no; 2: unsure; 1:I don't know what GND is]

- Yes, all of it.
- Yes, some parts of it.
- No
- Unsure
- I do not know what the Green New Deal is.

How much do you agree with the following statements? Which statement best describes you? [3:now all, 2: now energy, 1: now none, 0: no change]

- Now, I support all of the Green New Deal.
- Now, I support the renewable energy policy aspect of the Green New Deal.
- Now, I do not support any of the Green New Deal
- My support has not changed.

End of Block: Policy Considerations

Start of Block: Media Interaction

Where do you get most of your news from? [1:TV, 2:Newspaper, 3:SM, 4:radio/pod, 5:Fam/Frn, 6:other, 7:I don't follow]

- TV Networks (i.e. Fox, CNN)
- Newspapers (print or digital)
- Social Media (i.e. Twitter, Facebook)
- Radio or Podcasts
- Family or Friends
- Somewhere else
- I do not follow any news

Each week, how many hours do you spend watching, reading, or listening to the news? Slide the bar on the scale until it shows the right number for you.

0 10 20 30 40 50 60 70 80 90 100

Hours per week



End of Block: Media Interaction

Start of Block: Personal Experience and Attribution

In the last 10 years, have you been personally impacted by a drought, wildfire, or flood? [0:no; 1:yes]

- Yes
- No

Display This Question:

If In the last 10 years, have you been personally impacted by a drought, wildfire, or flood? = Yes

To what degree do you attribute the event(s) to climate change? [0:not at all; 1:a little; 2:a moderate amount; 3:a lot; 4:a great deal]

- Not at all
- A little
- A moderate amount
- A lot
- A great deal

End of Block: Personal Experience and Attribution

Start of Block: NEP Scale

Listed below are statements about the relationship between humans and the environment. For each one, please indicate whether you STRONGLY AGREE, MILDLY AGREE, are UNSURE,

MILDLY DISAGREE or STRONGLY DISAGREE with it.

[2: strongly agree; 1: mildly agree; 0: unsure; -1: mildly disagree; -2: strongly disagree]

	Strongly Agree	Mildly Agree	Unsure	Mildly Disagree	Strongly Disagree
We are approaching the limit of the number of people the earth can support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Humans have the right to modify the natural environment to suit their needs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When humans interfere with nature it often produces disastrous consequences	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Human ingenuity will ensure that we do NOT make the earth unlivable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Humans are severely abusing the environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The earth has plenty of natural resources if we just learn how to develop them	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Plants and animals have as much right as humans to exist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The balance of nature is strong enough to cope with the impacts of modern industrial nations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Despite our special abilities humans are still subject to the laws of nature	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The so-called "ecological crisis" facing humankind has been greatly exaggerated	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The earth is like a spaceship with very limited room and resources	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Humans were meant to rule over the rest of nature	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The balance of nature is very delicate and easily upset	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Humans will eventually learn enough about how nature works to be able to control it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If things continue on their present course, we will soon experience a major ecological catastrophe	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix C: Study 2 – Experimental Survey: Confirmatory Factor Analysis for NEP Scale

Model Specification

The model of the latent construct of support for the New Ecological paradigm is made up of a single latent factor with 15 indicators (Dunlap et al, 2000; Dunlap, 2008). Each indicator variable name and its associated survey item is listed in Table 5.22. Kline (2016) recommends against measuring all indicators with a common method to avoid situations where variance could be attributed to some measurement error rather than true variance in the factor. However, I follow suit of the scale’s developers and other researchers who implement this scale and measure each indicator on the same likert scale. In checking for error correlations among the indicators, I did not find evidence of highly correlated errors. Additionally, in the existing literature modeling NEP endorsement, there has been no indication that correlated error pathways are included in the model so I do not include them in this analysis.

Table 5.22
NEP Indicators

Variable Name	Survey Item
poplimit	We are approaching the limit of the number of people the earth can support
modifyright	Humans have the right to modify the natural environment to suit their needs
consequences	When humans interfere with nature it often produces disastrous consequences
ingenuity	Human ingenuity will ensure that we do NOT make the earth unlivable
abuseenv	Humans are severely abusing the environment
abundres	The earth has plenty of natural resources if we just learn how to develop them
animalright	Plants and animals have as much right as humans to exist
strongbalance	The balance of nature is strong enough to cope with the impacts of modern industrial nations
humanLawNature	Despite our special abilities humans are still subject to the laws of nature
exaggcrisis	The so-called “ecological crisis” facing humankind has been greatly exaggerated
spaceship	The earth is like a spaceship with very limited room and resources
humanrule	Humans were meant to rule over the rest of nature
balance	The balance of nature is very delicate and easily upset
learncontrol	Humans will eventually learn enough about how nature works to be able to control it
ecocat	If things continue on their present course, we will soon experience a major ecological catastrophe

Note: Participants indicated how much they agreed with each of the statements presented above.

Model Identification

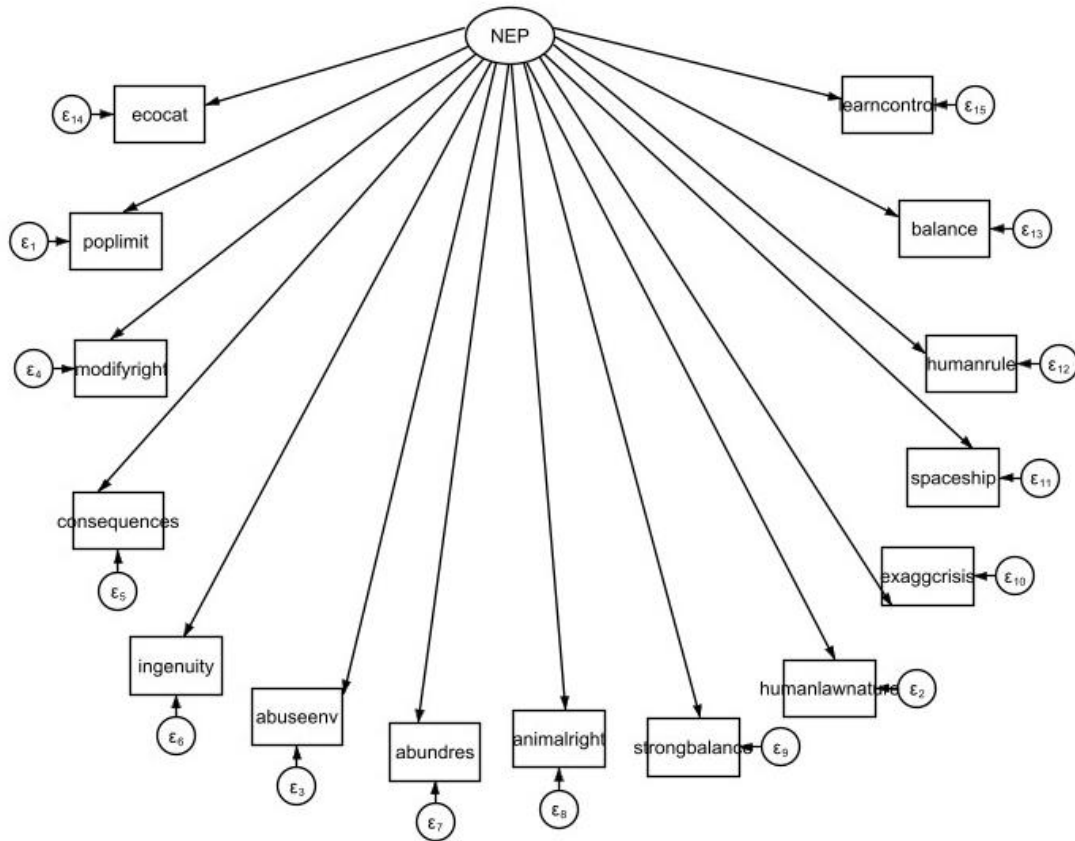
The latent factor described in this model specification has 15 unique indicators. Thus, following the three-indicator rule, this model is identified (Kline, 2016, p. 201). I allow Stata to impose a ULI constraint on the unstandardized pattern coefficient of a reference variable such that the pattern coefficient is equal to one, leaving the remaining parameter coefficients to be freely estimated. In this case, Stata scaled NEP to the indicator ‘poplimit’.

Model Estimation

Using maximum likelihood with missing values (MLMV)²⁰ as the estimation method (to account for missing data), the latent factor significantly predicts each of the 15 indicators. In an unstandardized model, a 1-unit increase in NEP leads to the following changes in its indicators, all else held constant: a 0.18 unit increase in ‘humanlawnature’; a 1.05 unit increase in ‘abuseenv’; a 0.71 unit decrease in ‘modifyright’; a 0.84 unit increase in ‘consequences’; a 0.48 unit decrease in ‘ingenuity’; a 0.53 unit decrease in ‘abundres’; a 0.74 unit increase in

Figure 5.1
Path diagram of NEP CFA

²⁰ MLMV uses as much information from observations with missing values as possible rather than deleting entire cases.



‘animalright’; a 0.90 unit decrease in ‘strongbalance’; a 1.13 unit decrease in ‘exaggcrisis’; a 1.00 unit increase in ‘spaceship’; a 0.90 unit decrease in ‘humanrule’; a 0.82 unit increase in ‘balance’; a 1.30 unit increase in ‘ecocat’; a 0.33 unit decrease in ‘learncontrol’; and a 1 unit increase in ‘poplimit’ (constrained indicator).

Model Fit

At the model level, the null hypothesis that this is a perfect fitting model is rejected given that $\chi^2(90) = 545.64$, $p = 0.000$. In such cases, the approximate fit indices can offer insight. The RMSEA (0.102), CFI (0.814), and TLI (0.784), give mixed results of overall fit. Generally, $RMSEA > 0.08$ is considered not well-fitting, while CFI and TLI closer to 1 are considered well-fitting.

At the equation level, the amount of variance in each indicator explained by the single

NEP factor varies. This model explains the following amount of variance in the respective indicator: 38.8% of 'poplimit'; 3.2% of 'humanLawNature'; 54.6% of 'abuseenv'; 24.1% of 'modifyright'; 41.1% of 'consequences'; 13.8% of 'ingenuity'; 15.5% of 'abundres', 23.1% of 'animalright'; 38.2% of 'strongbalance'; 51.4% of 'exaggcrisis'; 42.4% of 'spaceship'; 27.6% of 'humanrule'; 36.8% of 'balance'; 68.2% of 'ecocat'; and 5.7% of 'learncontrol'.

I examined the error covariances of indicators to determine if these may have affected the model fit. No pairs of indicators have correlated variances values at or above |0.6| (which would have indication that there may be some shared variance not due to the NEP factor). Given this and considering, as mentioned above, the scale's developers do not indicate that their model includes the addition of correlated errors, I continue with the model as is in the hierarchical SEMs to analyze survey results.

Cronbach's alpha test (with standardized items) results in a reliability coefficient of 0.8635. Even without considering that Cronbach's alpha can underestimate reliability, this value indicates high consistency.

Table 5.23
NEP CFA Coefficients

balance						
NEP	.8210146	.0718297	11.43	0.000	.680231	.9617983
_cons	.5163934	.0507712	10.17	0.000	.4168837	.6159032
ecocat						
NEP	1.291509	.0901536	14.33	0.000	1.114812	1.468207
_cons	.2868852	.0586736	4.89	0.000	.171887	.4018834
learncon~1						
NEP	-.3323246	.0679811	-4.89	0.000	-.465565	-.1990841
_cons	-.1229508	.0520275	-2.36	0.018	-.2249229	-.0209788
var(e.popl~t)	1.084342	.0750181			.9468416	1.241809
var(e.hum~re)	.6681366	.042934			.5890709	.7578146
var(e.abus~v)	.6269016	.0465857			.5419332	.7251919
var(e.modi~t)	1.104602	.0736623			.969264	1.258838
var(e.cons~s)	.6848493	.0477605			.5973562	.7851573
var(e.inge~y)	.9992408	.0651615			.8793513	1.135476
var(e.abun~s)	1.040413	.0681301			.9150941	1.182893
var(e.anim~t)	1.233611	.0818502			1.083181	1.404933
var(e.stro~e)	.8872847	.0611237			.77522	1.015549
var(e.exag~s)	.8298664	.0604165			.7195126	.9571455
var(e.spac~p)	.9294248	.0651898			.8100486	1.066394
var(e.hum~le)	1.436508	.0963102			1.25962	1.638237
var(e.bala~e)	.7947789	.0544601			.6948964	.9090182
var(e.ecocat)	.5339141	.0454569			.451857	.6308727
var(e.lear~1)	1.245066	.0803021			1.097218	1.412835
var(NEP)	.6870952	.0940764			.5253772	.8985922

LR test of model vs. saturated: $\chi^2(90) = 545.64$, Prob > $\chi^2 = 0.0000$

Appendix D: Study 2 – Experimental Survey: Expanded Results

SEM Assumption Testing

Model specification and sample size are outlined in the main text of Chapter 4. Variables of each model are also required to meet an assumption of normality.

Normality

In SEM, the normality assumption requires, essentially, that variables be not severely non-normal rather than perfectly normal: in Stata, values of skewness should be less than or equal to $|3|$ and kurtosis should be less than or equal to $|10|$. (Hipp, 2020, SEM Lecture 10). Some degree of skewness and kurtosis is allowable. Tests of skewness and kurtosis for variables included in each model of the primary analysis indicate that there is no severe non-normality.

Table 5.24
Measures of Skew and Kurtosis

Variable	Skewness	Kurtosis
trust	-0.40	2.63
elect	0.34	2.45
votetoday	-0.46	2.07
gensupp	0.08	2.44
exposedcch (categorical, coded)	-0.32	2.06

Estimation of Measurement Models/CFAs

Below are the results from the measurement portion of each model, describing the parameters of the latent variables included in the respective models. Each model's identification, fit, and structural parameters are described in the primary text of Chapter 4. For reference, Appendix C includes a description of each indicator.

General Support for Policy Idea

Model 3 - Inclusion of latent variable: NEP. In this unstandardized model, the NEP latent variable significantly influences each of its 15 indicators ($p = 0.000$ for each relationship). A one unit increase in NEP is associated with the following changes in the respective indicator: 1.81 unit increase in ‘poplimit’; 0.319 unit increase in ‘humanlawnature’; 1.95 unit increase in ‘abuseenv’; a 1.28 unit decrease in ‘modifyright’; a 1.52 unit increase in ‘consequences’; a 0.86 unit decrease in ‘ingenuity’; 0.94 unit decrease in ‘abundres’; a 1.33 unit increase in ‘animalright’; a 1.63 unit decrease in ‘strongbalance’; a 2.15 unit decrease in ‘exaggcrisis’; a 1.82 unit increase in ‘spaceship’; a 1.61 unit decrease in ‘humanrule’; a 1.51 unit increase in ‘balance’; a 2.4 unit increase in ‘ecocat’; and a 0.58 unit decrease in ‘learncontrol’.

The amount of variance of each indicator explained by the model varies from fair to over half, with the exception ‘humanlawnature’ and ‘learncontrol’ for which little variance is explained (see Table 5.25).

Model 4 - Inclusion of prior exposure to health frame. In this unstandardized model, the NEP latent variable significantly influences each of its 15 indicators ($p = 0.000$ for each relationship). A one unit increase in NEP is associated with the following changes in the respective indicator: 1.81 unit increase in ‘poplimit’; 0.320 unit increase in ‘humanlawnature’; 1.95 unit increase in ‘abuseenv’; a 1.28 unit decrease in ‘modifyright’; a 1.53 unit increase in ‘consequences’; a 0.86 unit decrease in ‘ingenuity’; 0.94 unit decrease in ‘abundres’; a 1.34 unit increase in ‘animalright’; a 1.63 unit decrease in ‘strongbalance’; a 2.16 unit decrease in ‘exaggcrisis’; a 1.82 unit increase in ‘spaceship’; a 1.62 unit decrease in ‘humanrule’; a 1.51 unit increase in ‘balance’; a 2.41 unit increase in ‘ecocat’; and a 0.58 unit decrease in ‘learncontrol’.

The amount of variance of each indicator explained by the model varies from fair to over half, with the exception ‘humanlawnature’ and ‘learncontrol’ for which little variance is

explained (see Table 5.25).

Table 5.25
Percentage of variance of indicators explained by NEP in General Support models

Indicator	% Variance Explained (from R-sq)		Indicator	% Variance Explained (from R-sq)	
	Model 3	Model 4		Model 3	Model 4
poplimit	37.5	37.5	strongbalance	37.6	37.6
humanlawnature	3.0	3.0	exaggcrisis	55.0	55.0
abuseenv	55.8	55.8	spaceship	41.3	41.3
modifyright	22.8	22.8	humanrule	26.6	26.6
consequences	40.5	40.5	balance	36.7	26.7
ingenuity	12.8	12.8	ecocat	69.6	69.6
abundres	14.5	14.5	learncontrol	5.2	5.2
animalright	22.5	22.5			

Likelihood of Electing a Congressperson

Model 3 - Inclusion of latent variable: NEP. In this unstandardized model, the NEP latent variable significantly influences each of its 15 indicators ($p = 0.000$ for each relationship, except for ‘humanlaw’ where $p = 0.001$). A one unit increase in NEP is associated with the following changes in the respective indicator: a 2.39 unit decrease ‘poplimit’; a 0.42 unit decrease in ‘humanlawnature’; a 2.57 unit decrease in ‘abuseenv’; a 1.7 unit increase in ‘modifyright’; a 2.01 unit decrease in ‘consequences’; a 1.14 unit increase in ‘ingenuity’; a 1.26 unit increase in ‘abundres’; a 1.76 unit decrease in ‘animalright’; a 2.16 unit increase in ‘strongbalance’; a 2.83 unit increase in ‘exaggcrisis’; a 2.4 unit decrease in ‘spaceship’; a 2.12 unit increase in ‘humanrule’; a 2.0 unit decrease in ‘balance’; a 3.17 unit decrease in ‘ecocat’; and a 0.77 unit increase in ‘learncontrol’.

The amount of variance of each indicator explained by the model varies from fair to over half, with the exception ‘humanlawnature’ and ‘learncontrol’ for which little variance is explained (see Table 5.26).

Model 4 - Inclusion of prior exposure to health frame. In this unstandardized model, the NEP latent variable significantly influences each of its 15 indicators ($p = 0.000$ for each relationship, except for ‘humanlaw’ where $p = 0.001$). A one unit increase in NEP is associated with the following changes in the respective indicator: a 2.40 unit decrease ‘poplimit’; a 0.42 unit decrease in ‘humanlawnature’; a 2.58 unit decrease in ‘abuseenv’; a 1.7 unit increase in ‘modifyright’; a 2.02 unit decrease in ‘consequences’; a 1.14 unit increase in ‘ingenuity’; a 1.26 unit increase in ‘abundres’; a 1.77 unit decrease in ‘animalright’; a 2.16 unit increase in ‘strongbalance’; a 2.83 unit increase in ‘exaggrcrisis’; a 2.4 unit decrease in ‘spaceship’; a 2.12 unit increase in ‘humanrule’; a 2.0 unit decrease in ‘balance’; a 3.17 unit decrease in ‘ecocat’; and a 0.77 unit increase in ‘learncontrol’.

The amount of variance of each indicator explained by the model varies from fair to over half, with the exception ‘humanlawnature’ and ‘learncontrol’ for which little variance is explained (see Table 5.26).

Table 5.26
Percentage of variance of indicators explained by NEP in Elect models

Indicator	% Variance Explained (from R-sq)		Indicator	% Variance Explained (from R-sq)	
	Model 3	Model 4		Model 3	Model 4
poplimit	37.7	37.6	strongbalance	37.7	37.7
humanlawnature	3.0	3.0	exaggrcrisis	54.5	54.5
abuseenv	55.7	55.8	spaceship	41.5	41.5
modifyright	23.0	23.0	humanrule	26.4	26.4

consequences	40.6	40.5	balance	36.7	36.7
ingenuity	13.1	13.1	ecocat	69.5	69.5
abundres	15.0	15.0	learncontrol	5.16	5.17
animalright	22.5	22.6			

Likelihood of Voting for Policy if Posed on Ballot

Model 3 - Inclusion of latent variable: NEP. In this unstandardized model, the NEP latent variable significantly influences each of its 15 indicators ($p = 0.000$ for each relationship, except for ‘humanlaw’ where $p = 0.001$). A one unit increase in NEP is associated with the following changes in the respective indicator: a 1.4 unit increase in ‘poplimit’; a 0.24 unit increase in ‘humanlawnature’; a 1.51 unit increase in ‘abuseenv’; a 0.98 unit decrease in ‘modifyright’; a 1.16 unit increase in ‘consequences’; a 0.67 unit decrease in ‘ingenuity’; a 0.74 unit decrease in ‘abundres’; a 1.02 unit increase in ‘animalright’; a 1.27 unit decrease in ‘strongbalance’; a 1.67 unit decrease in ‘exaggrcrisis’; a 1.41 unit increase in ‘spaceship’; a 1.25 unit decrease in ‘humanrule’; a 1.16 unit increase in ‘balance’; a 1.87 unit increase in ‘ecocat’; and a 0.45 unit decrease in ‘learncontrol’.

The amount of variance of each indicator explained by the model varies from fair to over half, with the exception ‘humanlawnature’ and ‘learncontrol’ for which little variance is explained (see Table 5.27).

Model 4 - Inclusion of prior exposure to health frame. In this unstandardized model, the NEP latent variable significantly influences each of its 15 indicators ($p = 0.000$ for each relationship, except for ‘humanlaw’ where $p = 0.001$). A one unit increase in NEP is associated with the following changes in the respective indicator: a 1.4 unit increase in ‘poplimit’; a 0.24 unit increase in ‘humanlawnature’; a 1.51 unit increase in ‘abuseenv’; a 0.98 unit decrease in ‘modifyright’; a 1.16 unit increase in ‘consequences’; a 0.67 unit decrease in ‘ingenuity’; a 0.74

unit decrease in ‘abundres’; a 1.02 unit increase in ‘animalright’; a 1.27 unit decrease in ‘strongbalance’; a 1.67 unit decrease in ‘exaggrcrisis’; a 1.40 unit increase in ‘spaceship’; a 1.25 unit decrease in ‘humanrule’; a 1.16 unit increase in ‘balance’; a 1.86 unit increase in ‘ecocat’; and a 0.45 unit decrease in ‘learncontrol’.

The amount of variance of each indicator explained by the model varies from fair to over half, with the exception ‘humanlawnature’ and ‘learncontrol’ for which little variance is explained (see Table 5.27).

Table 5.27
Percentage of variance of indicators explained by NEP in Vote Today models

Indicator	% Variance Explained (from R-sq)		Indicator	% Variance Explained (from R-sq)	
	Model 3	Model 4		Model 3	Model 4
poplimit	37.5	37.5	strongbalance	38.0	38.0
humanlawnature	28.1	28.3	exaggrcrisis	55.2	55.3
abuseenv	55.8	55.8	spaceship	41.5	41.5
modifyright	22.4	22.4	humanrule	26.8	26.8
consequences	39.3	39.3	balance	36.2	36.2
ingenuity	13.0	13.0	ecocat	70.4	70.3
abundres	15.0	15.0	learncontrol	5.1	5.1
animalright	22.2	22.2			

Valence Perception Analysis

Below is the table of parameter estimates for the multinomial logistic regression predicting perception of overall and outcome valence in the final experimental survey message. A discussion of results can be found in the corresponding section of Chapter 4.

Multinomial logistic regression

Number of obs = 491

LR chi2(16) = 84.12

Prob > chi2 = 0.0000

Log likelihood = -460.85735

Pseudo R2 = 0.0836

outval	RRR	Std. Err.	z	P>|z|	[95% Conf. Interval]	
-1						
emph_d2	.7111114	.5359608	-0.45	0.651	.1623274	3.115183
emph_d3	.7619048	.5441723	-0.38	0.703	.1879102	3.089236
val_d1	7.36	4.689529	3.13	0.002	2.111167	25.6586
val_d3	1.244444	.8448602	0.32	0.747	.3289199	4.708265
pos_health	1.35	1.388947	0.29	0.771	.1797113	10.14127
pos_energy	2.301135	2.301405	0.83	0.405	.3240715	16.33968
neg_health	.9273098	.8055109	-0.09	0.931	.1689762	5.088901
neg_energy	.8967387	.8138391	-0.12	0.904	.1514099	5.311016
_cons	.3125	.1601086	-2.27	0.023	.1144825	.8530236
0	(base outcome)					
1						
emph_d2	.984127	.4244633	-0.04	0.970	.4225906	2.29183
emph_d3	.7619048	.3246355	-0.64	0.523	.3305349	1.756241
val_d1	1.142857	.5693841	0.27	0.789	.4304413	3.03438
val_d3	.8571429	.3744124	-0.35	0.724	.3641129	2.017764
pos_health	3.5875	2.264763	2.02	0.043	1.040961	12.36372
pos_energy	2.524927	1.584721	1.48	0.140	.7379193	8.639501
neg_health	.6972656	.4692298	-0.54	0.592	.1864559	2.607476
neg_energy	.6774194	.4557852	-0.58	0.563	.1811954	2.532608
_cons	1.75	.5484353	1.79	0.074	.9468445	3.234428

Note: _cons estimates baseline relative risk for each outcome.

Appendix E: Study 2 – Experimental Survey: COVID-19 History Effect Analysis

This project was conducted during the COVID-19 pandemic. During this time, health and survival were in the news daily. While not directly related to climate change policy, the increased exposure to health considerations of policy may well have negated the potential novelty of a health framing of climate policy. Several simple analyses were conducted to characterize self-reports of the impacts of COVID-19 on policy decision making, specifically around climate policy.

Participants were asked a series of questions asking them to rate on a Likert scale how often they considered how climate change policies might impact: their own health, the health of family or friends, the health care system, public health (broadly), and the health of people in other parts of the world. Participants were also explicitly asked whether the pandemic changed how often they consider the potential health impacts of a policy.

Responses were tabulated at the sample level and are reported below. Self-reports indicate that the impact of the pandemic on how often participants consider the health impacts of a policy is split with 51.53% indicating that they make these considerations more often, and 44% making them the same amount. Overall, it seems that participants consider the health impacts of climate change policy, specifically, less than half of the time ('Sometimes'). About 40% of respondents consider the impacts of climate change policy on various health sectors more than half the time.

Taken together, it is possible that there is a history effect of the pandemic in that a health frame is no longer perceived as novel, even if, as the media analysis indicates, the specific application of a health frame to climate policy is rare in the external information environment. It is possible that they may be making those connections themselves rather than being externally

exposed to them.

Table 5.30
Consideration of climate change policy impacts

Category	Always	Most of the Time	About Half the Time	Sometimes	Never	Missing	Total
Own Health	49	78	68	164	131	1	491
Health of Family/Friends	50	83	74	159	124	1	491
Health of Others in the World	32	66	70	166	156	1	491
Public Health, Generally	42	80	90	150	127	2	491
The Health Care System	40	65	98	141	146	1	491

Table 5.31
Impact of COVID-19 pandemic on policy evaluation

Yes, I think about it less	Yes, I think about it more	No, I think about it the same amount	Unsure	Total
7	253	216	15	491