Altering Attitudes on Climate Change: Testing the Effect of Time Orientation and Motivation Framing

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Climate change has become a defining issue of the 21st century. According to a Pew Research (2020) survey, for the first time in its two-decade history, a majority of Americans now believe that dealing with climate change should be a top priority for the President and Congress, which is a 14% rise from four years prior. Nonetheless, this rise is accompanied by a deep partisan divide amongst citizens of the United States (U.S.) and Republicans are far less likely to consider climate change a top public priority with a roughly 50% partisan gap on the issue (Popovich, 2020). Thus, this partisan gap raises an important question: what are the effects of political orientation, time orientation, and motivation orientation on climate change attitudes and behavioral intention? The goal of this research is to examine this question by testing the influence of these factors on eight outcome variables.

Related Research

Before discussing the study and its results, this paper provides background information that informs our experimental design. First, this review outlines a brief description of Agenda Setting and Framing as a lens that guides our study's manipulation. Following this review, we describe the independent variables tested: (1) political orientation; (2) time orientation; and (3) motivation orientation.

Agenda Setting and Framing

Agenda Setting Theory (AST) broadly claims that news media sources tell people what to think about (McCombs & Shaw, 1972). According to West and Turner (2018), when media sources show some news stories frequently and other stories are filtered out, people over time come to think that the stories shown frequently are the most important. This theory has also evolved to claim that not only do media sources tell viewers what to think about, but that media sources also inform how viewers evaluate people

and objects within stories (Wilber, 2017). Guber and Bosso (2012) sought to connect issue framing and agenda setting in relation to environmental discourse. They found that the definition of "the environment" is critical to perceptions, and that in politics, whoever can define "the environment" has the advantage. Pralle (2009) used Kingdon's multiple streams model of AST to explore strategies for making climate change a political priority. Pralle found that raising climate change's salience with the public pressured policymakers to prioritize the issue and that it was important to frame solutions in ways that garnered maximum support.

Relatedly, Framing Theory also describes and explains how people may be influenced by media stories. Framing Theory claims that the information that is selected to be included in a message and the degree that different parts of that message are treated as "more or less" salient will impact the audience's understanding of that message (Entman, 1993). Therefore, Agenda Setting and Framing are related theories that both tell us how news media stories may impact attitudes and beliefs of audience members. Although, it is worth mentioning that while agenda setting effects are

more likely to occur due to frequent exposure to a message, framing effects occur simply based on the perspective to which information is presented with less of an emphasis on the frequency to which a message is shown (Wilber, 2017).

Taken altogether, Agenda Setting and Framing both help us understand how a message is presented can influence viewers. Although an extensive review of both theories is beyond the scope of this paper, these theories provide a lens for the manipulation in our research. In this study, we change the framing of a message according to the "motivation" frame and the "time" frame of the message to see if this has any specific impact on attitudes related to climate change.

Political Orientation

One variable that can influence outcomes associated with climate change is a person's political orientation. Political orientation, or where an individual falls on a spectrum between conservative and liberal, has been identified by multiple studies as a factor that affects a person's likelihood to believe in and act against climate change. In this area, McCright and Dunlap (2011) analyzed 10 Gallup polls from 2001 to 2010 and demonstrated that liberals and Democrats were more likely to express beliefs consistent with scientific consensus (climate change is occurring and human-caused) while conservatives and Republicans were less likely.

In addition, Wolsko, Ariceaga, and Seiden (2016) conducted a series of three experiments to examine whether the framing of a climate change message impacted a person's perceptions toward conservation intentions, climate change attitudes, and donations when comparing liberal and conservative political affiliations. While liberals did not significantly differ across conditions, conservatives demonstrated significant shifts in the pro-environmental direction after exposure to a binding moral frame in which environmental protection was framed as a matter of obeying authority, defending the purity of nature, and demonstrating one's patriotism to the United States. In related research, Hart and Nisbet (2012) found that when participants read about public health threats to distal victims, Democrats demonstrated increased support for climate policy while this support decreased in Republicans. Gregersen et al. (2020) studied the role of climate change beliefs and political orientation in explaining worry about climate change across 23 countries. They found that right-leaning individuals expressed less worry in most countries, and while increased belief in climate change and its impacts was associated with increased worry across the political spectrum, this relationship was weaker among right-leaning individuals.

All three studies suggest that there are additional factors that may impact a person's likelihood to support climate policy than just political orientation alone. In other words, despite the partisan divide that exists when it comes to climate change related topics, one's political orientation is not the only factor that influences attitudes and beliefs. Given this information, we examine two more independent variables: time and motivation orientation.

Time Orientation

A second variable that may influence outcomes associated with climate change is time orientation. Multiple studies have identified differences in participants' behavior based on changes to time orientation, or what "time frame" is appealed to in a study. For example, Rickard, Yang, and Schuldt (2016) manipulated the "departure date," or the hypothetical year after which the climate in a given location would be warmer than anything experienced in the meteorological record. In this study, three timeframes were examined with participants seeing a departure date of 2020, 2047, or 2066. Spatial distance was also studied with participants seeing either New York City or Singapore. Results found that the highest climate change policy support was shown for the New York 2066 condition and that lowest climate change policy support was shown for the Singapore 2047 condition. While few other differences were identified based on time orientation alone, the study found that the influence of departure dates was moderated by participants' political orientation with some of the largest effects of the manipulation observed on conservatives in the U.S. This suggests that the framing of a message may play an important role on conservative's viewpoints about climate change.

Relatedly, Baldwin and Lammers (2016) performed six studies to examine whether conservatives' unwillingness to act against climate change was possibly due to fundamental differences in conservatives' and liberals' temporal focus (focus relating to time). Through these studies, they demonstrated that conservatives were positively impacted by past-focused environmental comparisons and not by future-focused comparisons. In fact, past-focused comparisons nearly eliminated the divide between liberal and conservative attitudes toward climate change with both groups in the study reporting to be almost equally likely to fight climate change. Essentially, conservatives were shown to find a message about climate more compelling when the message was framed as a problem that was already happening (in our past) rather than framing it as problem that might happen in the future.

Motivation Orientation

A third variable that may influence outcomes associated with climate change is a person's motivation orientation. A person may find a message more compelling if it happens to align in some way with their value system or personal preferences. Several studies examined the impact of individual values and motivations on a person's likelihood to believe in anthropogenic climate change and support climate policy. For example, Li and Su (2018) conducted a meta-analysis and reviewed experimental studies to examine the effects of value framing on one's public engagement with climate change. Results suggest that messages that emphasize the environmental, moral, and economic aspects of climate change had a positive impact on a person's reported engagement with climate change topics.

Similarly, Bloodhart, Swim, and Dicicco (2019) conducted three studies to examine whether the emotional tone of a message related to climate change played a role in how people responded. In their study, they compared messages that were framed with negative emotions (fear, sadness, and anger) to climate change messages that were framed without emotion. Overall, they found that participants preferred messages without emotion, but that women and Democrats were more likely to prefer emotional messages than men and Republicans. As such, people may find messages that align with their personal preferences to be more motivating.

Lastly, Wolsko, Ariceaga, and Seiden (2016) tested the impact of value framing on conservatives' likelihood to believe in and act against climate change. In their study, they tested messages that were framed to appeal to the ideals of "tradition and patriotism" or the ideals of "compassion and egalitarianism." Their findings showed that appeals to tradition and patriotism did indeed impact conservatives to report being more likely to engage in pro-environmental action while appeals to compassion and egalitarianism did not. Taken together, this research suggests that when a message is framed to align with someone's personal preferences or values, they may be more motivated to support climate change policies.

Hypotheses

This literature review describes past studies on political orientation, time orientation, and motivation orientation. The current study extends this research and tests these variables together to further examine which variables will be more likely to impact attitudes and behaviors related to climate change. Based on the findings of the studies

discussed, the following three primary hypotheses (with eight sub-hypotheses) guide this study.

H$_1$: A person's **political orientation** influences outcomes related to climate change, such that **liberals** will indicate more:
   a.   Concern for climate change.
   b.   Support for climate change policies.
   c.   Belief in climate change.
   d.   Belief that humans cause climate change.
   e.   Value in stopping climate change.
   f.   Behavioral intention to stop climate change.
   g.   Impact of a climate change FB post.
   h.   Self-efficacy to respond.

H$_2$: **Time orientation** influences outcomes related to climate change **for non-liberals,** such that **a past-to-present** message will produce more:
   a.   Concern for climate change.
   b.   Support for climate change policies.
   c.   Belief in climate change.
   d.   Belief that humans cause climate change.
   e.   Value in stopping climate change.
   f.   Behavioral intention to stop climate change.
   g.   Impact of a climate change FB post.
   h.   Self-efficacy to respond.

H$_3$: **Motivation orientation** influences outcomes related to climate change **for non-liberals,** such that a **patriotic** message will produce more:
   a.   Concern for climate change.
   b.   Support for climate change policies.
   c.   Belief in climate change.
   d.   Belief that humans cause climate change.
   e.   Value in stopping climate change.
   f.   Behavioral intention to stop climate change.
   g.   Impact of a climate change FB post.
   h.   Self-efficacy to respond.

Method

This study utilized a posttest-only experimental design to manipulate the time orientation (past-present or present-future) and the motivation orientation (patriotism or compassion) displayed in a fabricated social media post on the topic of climate change. The goal was to examine whether altering the framing of a message would impact an individual's

perceptions and their likelihood to take pro-climate action. Following the experiment, differences between groups were compared.

Participants

Two hundred and sixty-six participants were recruited from a large Western University and consisted of both students and parents. Some students were offered a nominal amount of extra credit as incentive. Participants reported their gender as 70.7% females, 27.4% males, and 1.9% preferred not to say with a mean age of 28.58 years (SD = 14.18). In terms of ethnicity, 72.2% identified as White, 9.4% as Asian or Pacific Islander, 6.8% as Hispanic/Latinx, 5.3% as Multiracial, 1.9% as Middle Eastern, and 4.5% preferred not to say.

To measure political-orientation, participants were asked "which of the following best matches your political ideology?" Participants responded as 1.1% very conservative, 10.9% conservative, 30.8% as neutral, 44% as liberal, and 12.8% as very liberal. Due to less conservatives participating in our study, we collapsed the categories of "very conservative, conservative, and neutral" into a category we are labeling as "not liberal" (42.9%) to compare them with liberal (56.8%) participants. This likely skewed the results to some degree, as "neutral" could have been included in either category, and "neutral" may take on very different meanings depending on geographic location. Although this was not the most ideal way to compare participants by political ideology, it provided a starting point to compare people who identify as more liberal and those who identify as less liberal.

Procedures

Participants were recruited using both convenience and volunteer sampling. The researchers posted the questionnaire on student and parent online group pages (e.g., Facebook and GroupMe) and asked university professors to share the link with students. Upon self-selecting to participate, respondents clicked on the link and were directed to an online Qualtrics questionnaire. The questionnaire began with a consent form notifying respondents that participation was voluntary and confidential.

Second, random assignment sorted respondents into one of four manipulated stimulus conditions in which participants viewed a fabricated social media post that contained an image with a comparison of the "past to the present" or the "present to the future" and a caption with an appeal to "patriotism" or an appeal to "compassion" (totaling four possible conditions). Following the manipulation, participants answered 28 questions to assess perceptions about climate change and behavioral intentions. Lastly, participants completed a measure of demographics.

Stimulus Materials

Participants were randomly assigned to view one of four possible social media posts. Depending on the condition, participants saw a post that either appealed to the values of patriotism (n = 145) or compassion (n = 121). For the appeal to patriotism or compassion, the social media post's caption was either directed at patriotism and related values (purity of the natural environment, tradition, respect) or compassion and related values (caring for the vulnerable environment, fairness, preventing suffering). These captions were drawn from a study on the effects of moral framing on climate change attitudes and conservation behaviors (Wolsko, Ariceaga, & Seiden, 2016; manipulation materials available upon request).

In addition, the post showed two pictures side-by-side. Picture 1 depicted a landscape of a full reservoir of water and picture 2 was a dried-up reservoir basin. These two pictures were either framed as past-to-present (n = 138) or present-to-future (n = 128). Both emphasized negative environmental damage over time; but the past-to-present frame depicted this issue as "already occurring" (it has happened in the past) and the present-to-future frame depicted this issue as something that might happen someday (it has not happened yet). These images were provided by researchers who successfully used them in related published work (Baldwin & Lammers, 2016). The four posts were identical in appearance, with only the changes to the captions and images differing between them.

Measures

Eight outcome variables were examined to test attitudes and behavioral intention in relation to climate change after exposure to the manipulation: (1) Concern about climate change; (2) Support for government intervention; (3) Belief that climate change is real; (4) Belief that climate change is human caused; (5) Value in the environment; (6) Behavioral intention to combat climate change; (7) Impact of the information from the post; and (8) Self-efficacy to make a positive environmental impact. For each outcome, composite measures were used (Likert scales from 1 – 7 indicating "strongly disagree to strongly agree") in which multiple questions were asked for each variable and the average of each measure was obtained (a full list of questions is available upon request). The reliability of each measure was acceptable (see table 1 for reliabilities).

Results

SPSS 26.0 was utilized to analyze experimental data. Given the hypotheses, statistical analyses were performed to examine the impact of political, motivation, and time orientation on the eight dependent variables. In order to have a large enough sample size, non-liberals were categorized as those who considered themselves very conservative, conservative, or neutral ($n = 114$) and liberals were those who considered themselves liberal or very liberal ($n = 151$). Results and conclusions are subsequently discussed.

Political Orientation

Hypothesis one predicted that political orientation would influence outcomes related to climate change. Independent t-tests were conducted for each outcome. Findings indicated that this hypothesis was generally correct as liberals tended to score significantly higher for each variable in comparison to non-liberals. The only variable that did not produce a significant difference between groups was "the impact of the Facebook post." Therefore, hypothesis one was mostly supported with this one exception. For a summary of the differences between groups reported for each outcome, see table 2.

Time Orientation

Hypothesis two predicted that time orientation would influence outcomes related to climate change for non-liberals. Independent t-tests were again conducted to examine difference between groups. Significant findings were found for three of the dependent variables: (1) belief that climate change is real; (2) belief that climate change is human caused;

and (3) behavioral intention. For all three of the significant findings, non-liberal participants were more likely to favor pro-climate perspectives when shown the "past to present" comparison than the "present to future" comparison. For a summary of data for hypothesis two, see table 3.

Motivation Orientation

Hypothesis three predicted that motivation orientation would influence outcomes related to climate change for non-liberals. Independent t-tests were conducted once again to examine differences between groups. The differences did not yield significant results for any of the dependent variables tested under this hypothesis. Therefore, hypothesis three was not supported. For a summary of data for hypothesis three, see table 4.

Discussion

The goal of this research was to test the influence of political orientation, time orientation, and motivation orientation on eight outcome variables associated with climate change attitudes and behavioral intention. Although aspects of our hypotheses and the literature review were not confirmed, the results indicate several findings worth highlighting. First, liberals were more likely to be in favor of believing in and working to stop human-caused climate change as they consistently scored higher on all outcome variables (except for the "influence of the Facebook post itself") in comparison to non-liberals. While this finding is not surprising, it is worth noting that the "non-liberals" in this study were largely made up of participants who described themselves as politically "neutral." In related research, such as that of McCright and

Table 1.
Outcome Measure Reliabilities

Dependent Variable	α	M
1. Concern	.90	5.60
2. Support for government intervention	.94	5.89
3. Believe climate change is real	.92	6.28
4. Believe climate change is human caused	.84	6.01
5. Values	.89	6.22
6. Behavioral intention	.82	5.55
7. Impact of post	.85	4.22
8. Self efficiacy	.78	5.61

Table 2.
Political Orientation t-tests

Depedendent	P.O.	M	SD	t	df	p
1. Concern	Not Liberal Liberal	4.92 6.11	1.40 .82	-8.61	263	.000***
2. Support for gov.	Not Liberal Liberal	5.15 6.45	1.50 .69	-9.45	263	.000***
3. Belief climate change	Not Liberal Liberal	5.83 6.62	1.25 .58	-6.81	263	.000***
4. Belief human-caused	Not Liberal Liberal	5.55 6.33	1.18 .72	-6.63	263	.000***
5. Values	Not Liberal Liberal	5.81 6.53	1.10 .69	-6.59	263	.000***
6. Behavioral intention	Not Liberal Liberal	4.93 6.02	1.38 .88	-7.84	263	.000***
7. Impact of post	Not Liberal Liberal	4.10 4.33	1.29 1.06	-1.56	263	.121
8. Self-efficiacy	Not Liberal Liberal	5.27 5.88	1.17 .90	-4.83	263	.000***

Note. *p < .05, **p < .01, ***p < .001

Table 3.
Time Orientation t-tests (Non-Liberals)

Depedendent	T.O.	M	SD	t	df	p
1. Concern	Present-Future Past-Present	4.71 5.14	1.50 1.25	-1.68	113	.096
2. Support for gov.	Present-Future Past-Present	4.92 5.37	1.62 1.33	-1.63	113	.105
3. Belief climate change	Present-Future Past-Present	5.52 6.15	1.46 0.92	-2.80	113	.006**
4. Belief human-caused	Present-Future Past-Present	5.29 5.83	1.38 0.91	-2.47	113	.015*
5. Values	Present-Future Past-Present	5.61 5.99	1.12 1.05	-1.85	113	.066
6. Behavioral intention	Present-Future Past-Present	4.60 5.23	1.45 1.25	-2.48	113	.014*
7. Impact of post	Present-Future Past-Present	3.99 4.18	1.42 1.17	-.79	113	.429
8. Self-efficiacy	Present-Future Past-Present	5.15 5.36	1.23 1.11	-.94	113	.346

Note. *p < .05, **p < .01, ***p < .001

Table 4.
Motivation Orientation t-tests (Non-Liberals)

Depedendent	M.O.	M	SD	t	df	p
1. Concern	Compassion Patriotism	4.93 4.93	1.43 1.37	.00	113	.999
2. Support for gov.	Compassion Patriotism	5.10 5.19	1.58 1.43	-.30	113	.765
3. Belief climate change	Compassion Patriotism	5.91 5.79	1.35 1.18	.53	113	.597
4. Belief human-caused	Compassion Patriotism	5.60 5.54	1.37 1.05	.26	113	.793
5. Values	Compassion Patriotism	5.74 5.85	1.10 1.10	-.52	113	.606
6. Behavioral intention	Compassion Patriotism	4.91 4.93	1.47 1.32	-.08	113	.937
7. Impact of post	Compassion Patriotism	4.03 4.12	1.35 1.27	-.36	113	.717
8. Self-efficiacy	Compassion Patriotism	5.31 5.22	1.20 1.15	-.40	113	.691

Note. *p < .05, **p < .01, ***p < .001

Dunlap (2011) and Hart and Nisbet (2012), self-proclaimed neutral groups are a population that is not commonly studied, as research instead tends to focus on those who fall strongly on either side of the political spectrum.

Still, in most measures in our study, these politically "neutral" participants were considered significantly less likely to demonstrate pro-climate attitudes and behavioral intentions. This suggests that climate change research must more clearly examine groups that are politically neutral as this population may be less likely to favor pro-environmental attitudes in relation to climate change. In other words, it is not simply a matter of liberals versus conservatives; groups that are more neutral in political affiliation also tend to be less likely to support fighting against climate change.

Second, switching the motivation orientation between appeals to compassion and patriotism yielded no significant results. Our results did not confirm the findings of Wolsko, Ariceaga, and Seiden (2016), who found significant shifts in conservative attitudes toward climate change when given a patriotic binding moral frame. The goal of changing the motivation orientation of the post was to observe how it might influence non-liberal participants' perspectives toward climate change, but the lack of significant differences suggest that it did little to sway their climate change opinions. Given the divisiveness surrounding the topic (Popovich, 2020), this is to be expected. Therefore, it will

likely take more than a few carefully framed social media posts to impact people's attitudes toward climate change; at least when it comes to comparing the values of compassion to patriotism.

Third, for time orientation, although this variable did not have an impact on the majority of outcomes, our data show that the past-to-present frame (i.e., climate change effects have already been happening in the past) was more likely to influence non-liberals on three outcome variables: (1) belief that climate change is real; (2) belief that climate change is human-caused; and (3) behavioral intention. However, this is still a promising result, as it suggests that the framing of a message can indeed encourage non-liberals to demonstrate pro-environmental attitudes to some degree considering there was an effect on these variables.

This result fits within the context of past literature as Baldwin and Lammers (2016) also found that conservatives were more positively impacted by past-focused environmental comparisons and not by future-focused comparisons. This may be because priming non-liberals to think about the past could be an approach that aligns with conservative values. As such, the past-to-present framing may be a more successful route to pursue when considering how to design persuasive messages for non-liberals.

Another possible explanation for this finding is that in the past-to-present condition, the change in the picture may

be perceived as already occurring, while in the present-to-future condition, the change is merely expected. Participants may have been more persuaded by an event that has already occurred rather than one which cannot be guaranteed. This is a common problem in climate change communication: it is difficult to make people care about something that has not yet happened and which they do not perceive as guaranteed to happen. Overall, our results suggest that influencing climate change perceptions is a challenging endeavor and that climate change communicators should find ways to focus on the impacts of climate change we have already witnessed rather than those we have yet to experience in the future.

Limitations

This research had three main limitations. First, this study was demographically skewed. The sample was drawn from a predominantly White (72.2%) Western University. In addition, most participants were female (70.7%), which may have influenced results as women and people from diverse racial groupings may hold different climate change orientations. Furthermore, conducting this research on a CSU campus has implications on the results. California tremendously differs politically from other states. People who identify as "neutral" in California may be seen as "liberal" in other states. A demographic that was more representative of the U.S. would be more likely to contribute to data with higher external validity.

Second, participant motivation and survey length may have skewed results. While the amount of extra credit offered to some students was nominal, this does not mean it had no impact. The survey took seven to ten minutes to complete, which means the length of the survey may have selected for full participation by more engaged participants.

Third, the nature of a social media post as the manipulation presents several potential limitations. Some of the participants may not use social media and therefore could be less likely to be influenced by a social media post. Participants also may have overlooked the content of the post and simply responded to the measures. Additionally, the ability of a social media post to portray a message is limited and therefore some of the persuasive potential of time and motivation orientation may have gone untested. Therefore, more research is needed to verify the internal validity of these results.

Directions for Future Research

The current study sought to add to our existing body of research on climate change messaging. Future research should examine those who identify as politically "neutral." As was stated, this is an understudied population and results from this study indicate that it is equally necessary for climate activists to focus on this group. Rather than categorizing this group as "non-liberal," a future study should test conservatives, neutrals, and liberals separately to understand how they differ. Additionally, this study should test these factors in different parts of the country in order to get a more representative sample.

In summary, this research tested the impact of political orientation, time orientation, and motivation orientation through two shifts in the framing of a climate change message to examine the influence on attitudes and behavioral intentions. Although results showed that the motivation frame did not influence attitudes, changing the framing of a message to focus on a past-to-present orientation seemed to be the most effective framing technique that researchers should continue exploring in future studies.

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