

DEBATING CLIMATE RISK MANAGEMENT ON TWITTER: DOES THE WAY POLITICIANS TWEET CHANGE RISK PERCEPTIONS OF CLIMATE POLICY?

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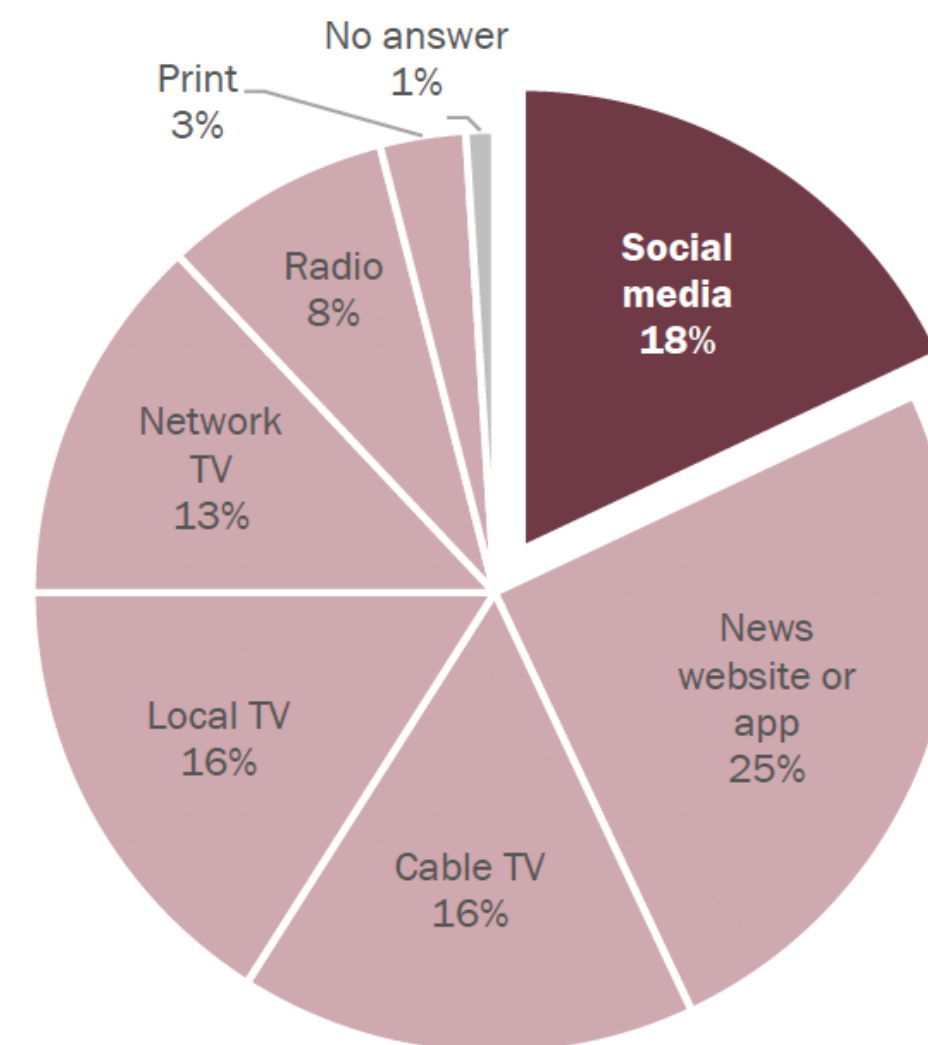


THE VERY REAL RISK OF CLIMATE CHANGE

- The IPCC report from October 2018 states that a 1.5°C warming is almost certain within 20 years without major cuts in GHG emissions.
- There are many consequences of climate change, for example, sea level rise, extreme weather events, global temperature rise etc.
- To address climate change, we need policies intervention

IMPLICATIONS OF SOCIAL MEDIA AS A NEWS OUTLET

- One in every five Americans get their political news primarily from Social Media
- Twitter has been rebranding as a news source
- Political discourse is becoming more polarized as extreme perspectives are being shared



Source: Survey of U.S. adults conducted Oct. 29-Nov. 11, 2019. "Americans Who Mainly Get Their News on Social Media Are Less Engaged, Less Knowledgeable"

PEW RESEARCH CENTER



CLIMATE DISCOURSE ON SOCIAL MEDIA



NBC News just called it the great freeze - coldest weather in years. Is our country still spending money on the GLOBAL WARMING HOAX?



Ninety-seven percent of scientists agree: [#climate](#) change is real, man-made and dangerous. Read more: [OFA.BO/gJsdFp](#)

INDEPENDENT VARIABLES

We manufactured a Twitter conversation and varied the following factors:

- TONE

We defined tone as the level of congeniality displayed between the two politicians.

How would you characterize the overall tone of the Twitter exchange?

Very impolite 1 Somewhat impolite 2 3 Neutral 4 Somewhat polite 5 6 Very polite 7



- EXPLANATORY DEPTH (E.D.)

We defined explanatory depth as the level of detail with which each politician provided reasons for supporting or opposing the policy

In your opinion, how detailed were the arguments presented by the individual who was *opposed to* a carbon tax?

Not at all detailed 1 2 3 Somewhat detailed 4 5 6 Very detailed 7



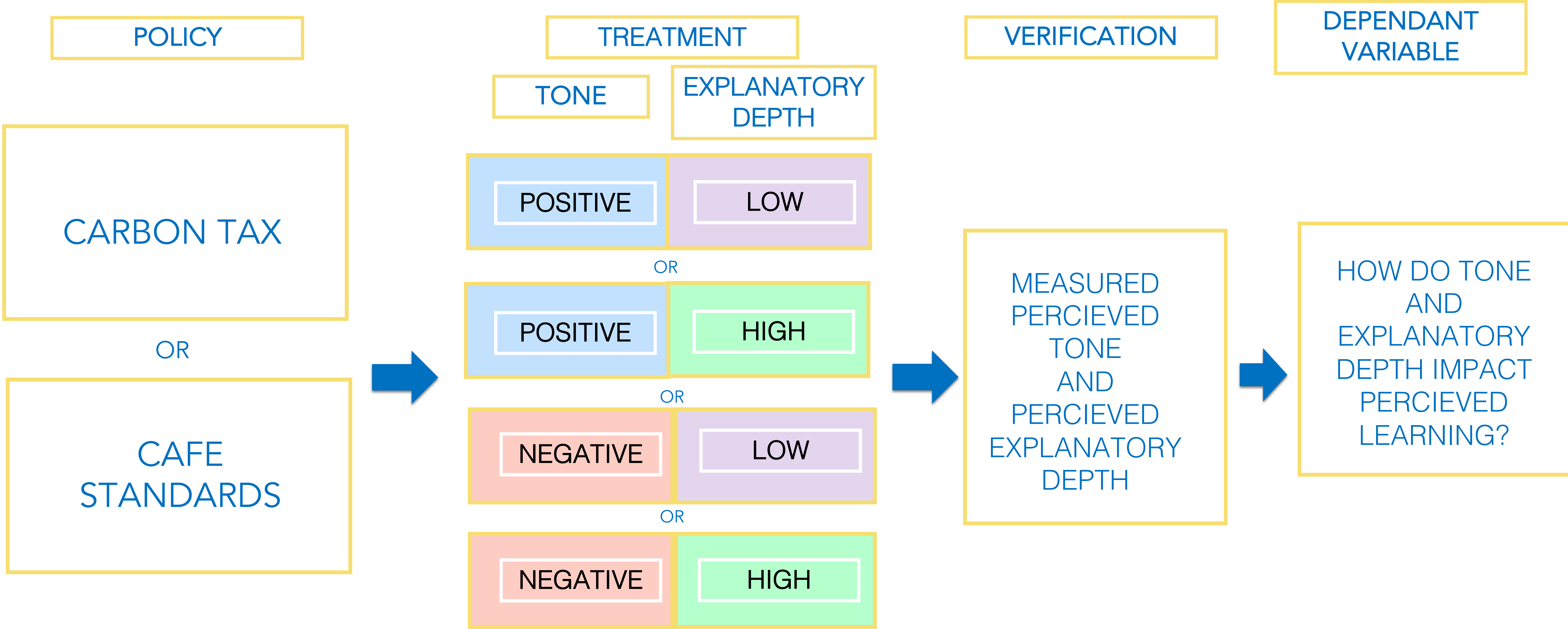
RESEARCH QUESTION

**HOW DO TONE AND EXPLANATORY DEPTH AFFECT
LEARNING ABOUT CLIMATE POLICIES?**

SAMPLING

- Online experiment (Deployed in Lucid)
- Sampled adults in the U.S. over 18
- Excluded non-Twitter users
- Quotas for gender, political orientation, education
- Data collected in September 2020
- N = 446 across 8 treatments
 - ~56 participants per treatment

EXPERIMENTAL DESIGN



Republican_Representative @Rep_Republican · Jul 24

I just read an article about a federal carbon tax. My opinion? It's a STUPID idea. It will hurt the American economy, especially people and businesses that are already struggling to get by. America doesn't need more taxes. I hate taxes. They are terrible for everybody!

12:22 PM · Jul 24, 2020 · [Twitter Web App](#)

Democrat_Representative @Rep_Democrat · Jul 24
Replying to @Rep_Republican

You're being ridiculous! High greenhouse gas (GHG) emissions cause environmental and social damages that we all pay for. My dad used to say when something is bad for you, you've got to do something about it. If you don't do something, things will go from bad to worse.

Republican_Representative @Rep_Republican · Jul 24

You're out of touch with reality! GET REAL! Environmental and social costs are hypothetical. Higher taxes, on the other hand, cost people real money. I think having extra money in their purses and wallets is important to pretty much everybody in this country. It is to me.

Democrat_Representative @Rep_Democrat · Jul 24

Duh! That's the point! The price of energy from burning coal and gas will rise because both lead to high GHG emissions. But motivating people to move away from things and habits that cause problems for them, and for the world we live in, is exactly the point of disincentives.

Republican_Representative @Rep_Republican · Jul 24

You're such a jerk! The benefits we might see from the tax are too far in the future while the problems it causes will hurt the economy and people today. We all know that it is really hard to wait for good things that might come one day while living through hard times now.

Democrat_Representative @Rep_Democrat · Jul 24

Your concerns are stupid. We can make the tax gradual. When you do something gradually, it just seems easier and it feels better for people. That's because people don't feel a shock from something just suddenly happening. I always feel better when things happen gradually.

Republican_Representative @Rep_Republican · Jul 24

You're a crazy socialist! Higher taxes are un-American. I get really upset when people think they can just come along and turn this great country into the next Canada or the next Sweden. I'm proud to be an American because the United States is the best country in the world!


Democrat_Representative @Rep_Democrat · Jul 24

How can you be so stupid? Climate change is serious. Whenever people are faced with a serious problem, it's important that they take it really seriously. Otherwise, the problem will just get worse. We can't just hope big problems will go away on their own. They won't.





EXAMPLE OF MANUFACTURED TWITTER CONVERSATION


(CARBON TAX, NEGATIVE TONE, LOW ED)

tone variation






 **Republican_Representative** ✓ @Rep_Republican · Jul 23


I hear you. But the benefits we might see from the tax are too far in the future while the problems it causes will hurt the economy and people today. Some economists think that a carbon tax could lead to job losses, struggling families, and more businesses going bankrupt.





 **Democrat_Representative** ✓ @Rep_Democrat · Jul 23


Your concerns are valid. But we can make the tax gradual. For example, Sweden used their carbon tax to slowly reduce emissions by 23% over 25 years. Over that same time, their economy grew by 55%. A growing economy means more jobs, less struggling, and healthier businesses.






 **Republican_Representative** ✓ @Rep_Republican · Jul 24

You're such a jerk! The benefits we might see from the tax are too far in the future while the problems it causes will hurt the economy and people today. We all know that it is really hard to wait for good things that might come one day while living through hard times now.


   


 **Democrat_Representative** ✓ @Rep_Democrat · Jul 24

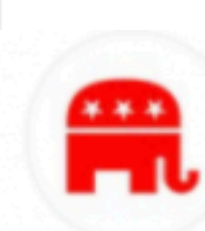
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EXPLANATORY DEPTH VARIATION

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RESULTS – VERIFICATION FOR EXPLANATORY DEPTH (E.D)

CAFE STANDARDS

	Perceived Explanatory Depth	
	Mean	Standard Deviation
High E.D.	5.32	1.14
Low E.D.	4.82	1.44
Mean Difference	0.50**	

CARBON TAX

	Perceived Explanatory Depth	
	Mean	Standard Deviation
High E.D.	5.15	1.03
Low E.D.	4.77	1.21
Mean Difference	0.38**	

RESULTS – VERIFICATION FOR TONE

CAFE STANDARDS

	Perceived Tone	
	Mean	Standard Deviation
Positive Tone	5.97	1.08
Negative Tone	2.98	1.77
Mean Difference	2.99**	

CARBON TAX

	Perceived Tone	
	Mean	Standard Deviation
Positive Tone	5.7	1.21
Negative Tone	3.41	1.78
Mean Difference	2.29**	

RESULTS – PERCEIVED LEARNING

- Main Effect found for Tone
 $F(1,153) = 5.26, p\text{-value} = 0.02^*$
- Main Effect found for E.D.
 $F(1, 153) = 5.404, p\text{-value} = 0.02^*$
- No significant interaction effect found

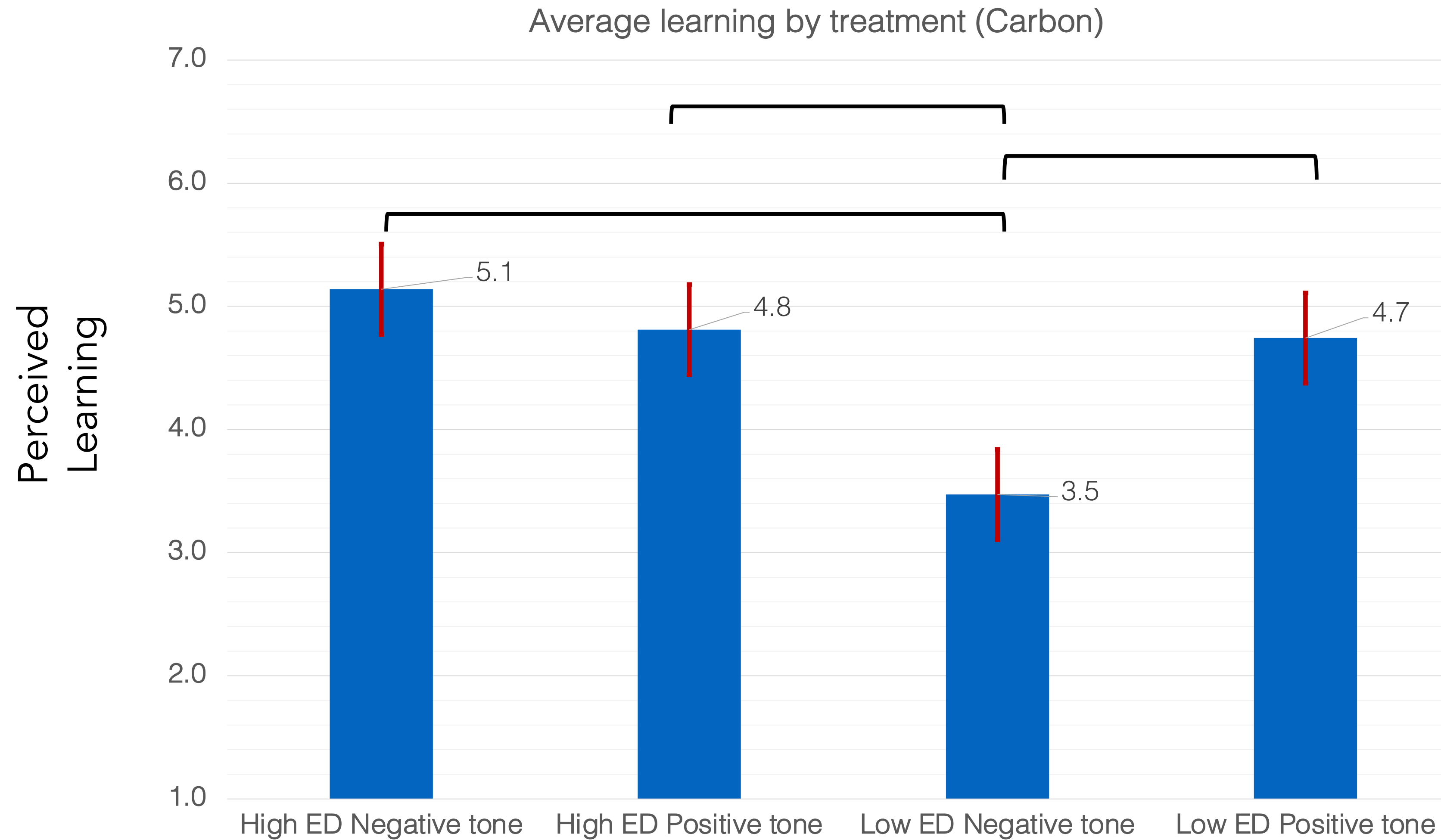
	CAFE Standards			
	High ED		Low ED	
	M	SD	M	SD
Positive Tone	5.26	1.24	5.18	1.72
Negative Tone	3.61	1.78	3.67	1.84

RESULTS – PERCEIVED LEARNING

- No Main Effect found for Tone
 - Main Effect found for E.D.
 $F(1, 152) = 10.79, p\text{-value} = 0.001^{**}$
- Interaction effect found for Tone:E.D.
 - $F(1, 152) = 9.82, p\text{-value} = 0.002^{**}$

	Carbon Tax			
	High ED		Low ED	
	M	SD	M	SD
Positive Tone	5.26	1.53	5.18	1.67
Negative Tone	3.61	1.46	3.67	1.67

RESULTS – TUKEY RESULTS



DISCUSSION

- Explanatory Depth, as we expected, appears to influence perceived learning throughout all the conditions
- Interestingly, tone also seems to have an impact on perceived learning as evidenced by the main effect in the CAFE standards treatment ANOVA and the almost significant effect on the Carbon Tax treatment ANOVA
- We speculate that using a positive tone may create a halo effect that leads to higher perceived learning even in situations of low explanatory depth

NEXT STEPS

We hope to further investigate the role of tone on learning about policies on platforms like Twitter, where it's difficult to provide adequate amount of detail for complex policies

Moreover, we hope to explore the role of both these variables on policy support.

THANKYOU

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Sanghamitra Sen's Thesis Document

Literature Review

Annotated Bibliography

Political Polarization and Social Media

Explanatory Depth

1. *Lord et al (1979): Biased Assimilation and Attitude Polarization: The effects of prior theories on subsequently considered evidence.*

This paper explores the phenomenon of biased assimilation and its effect on polarization. The authors look into the consequences of presenting people from opposing factions to relevant and objective data. Particularly, the authors intended to explore if presenting more objective and empirically based data in social sciences would lead to more level-headed decision making. Given considerable evidence to support the idea that people tend to interpret subsequent information to maintain their initial belief, the authors proffer a “polarization hypothesis,” wherein they hypothesize that belief polarization would increase, rather than decrease or remain unchanged, when mixed or inconclusive findings are presented to proponents of opposing viewpoints.

To ascertain whether this “polarization hypothesis” was indeed correct, the researchers set up an experiment where they presented participants with information about the contentious topic of capital punishment as a deterrent to murder. In the experiment, both proponents and opponents of capital punishment were first presented with results of a given study - half of the participants were shown pro-deterrence results and the other half were shown anti-deterrence results. After reading these results, participants answered questions about the change in their attitudes toward capital punishment by rating them on a 16-point scale. The participants were then presented with procedural details, critiques, and rebuttals for two studies addressing the efficacy of capital punishment - one to confirm their initial beliefs and one to oppose them. After reading, the participants were asked to judge how well/how poorly the study was conducted and rate its convincingness. They were then asked to write why they thought the study they had read supported or opposed capital punishment as a deterrent to murders. The study was repeated with a second fictitious study with the opposite view to the first study.

In terms of overall attitude polarization given biased assimilation, the results provided strong support for the main hypothesis that inconclusive or mixed data led to increased polarization rather than to moderation through uncertainty. The authors contend that the 'sin' did not lie in participants' inability to process new information but their eagerness to accept evidence that supported their existing position.

2. *Hirt et al (1995): Multiple Explanation: A consider an alternative strategy for debiasing judgements*

Given the presence of an explanation bias on likelihood estimates and future behaviors, this study explores three possible reasons for counter explanation to be used as a debiasing tactic. First, the authors propose that counter explanation is based on the availability heuristic - since both pro and con arguments are available to the participants, they are less likely to be prone to bias. The second explanation is that debiasing is a fallout of the increased uncertainty in participants' assurance regarding a certain position from considering an opposing viewpoint. The authors propose a third process - they hypothesize that when participants successfully counter explain a topic, they undo their prior explanation, leading them to realize that alternative outcomes are equally plausible. This realization may lead them to consider even more outcomes - creating a simulation heuristic, wherein participants engage in multiple simulations of potential outcomes.

This paper specifically proposes that counterexplanation tasks engage in the use of the simulation heuristic by conducting a three-part experiment. The first experiment is done to rule out two rival hypotheses - split-the-difference and uncertainty. Participants were presented with the responses of two firefighters - a one successful and one unsuccessful - to examine preferences for risky v. conservative actions. There were three main relationships between the two variables : success as a firefighter, failure (negative), or no relationship. In the single explanation condition, participants explained one relationship. Participants in the counter explanation condition were asked to explain one relationship and then explain an alternative relationship. As a control, a no-explanation condition was included. The participants then rated their own personal beliefs about the relationship between risk and success and provided an explanation for their choices. The results disproved the spit-the-difference hypothesis since participants exposed to positive and then negative conditions did not land in neutral territory. Study 2 examined the limits of the debiasing effect of multiple explanation tasks. Participants were told that they had to read a passage containing statistics and facts about two sports teams. After reading the passage, the participants in the single explanation task were told to imagine that a game had been played between two teams (Norwood and Medway) and there were four options for wins: convincing win for N, close win for N, convincing win for M, close win for M. The participants were then asked to list reasons to help explain the outcome. Participants in the multiple explanation task were then reminded that the previous task was a simulation and they were again asked to imagine a different outcome and enumerate reason for that. Participants then completed a judgement measure and a recall measure. The results from this experiment argued strongly against the recall based view of debiasing since the ability to recall data and

stats didn't relate to the debiasing, whereas explaining an alternative outcome (or another reason for the same outcome) caused debiasing.

The final study was conducted to provide evidence that participants in multiple explanation conditions consider multiple alternative outcomes and to examine the moderating effect of event plausibility when counterexplanation tasks take place. Participants for this study were recruited based on their baseball knowledge - they were then asked to read information about real teams and asked to answer several questions about what they thought would be the outcome at the end of the regular baseball season - they were asked to anticipate the future.

Under the "explain Expos" condition, participants were asked to imagine that the Montreal Expos ended up at first place and then to explain any reason which might help to explain this outcome. Participants were then asked to complete the dependent measures. In the other condition, participants were asked to imagine that a different team won the season and provide evidence to explain this outcome. They then rated dependent measures - which included the probability of the Expos winning the season, predicted rankings of teams, their confidence level in the prediction. The result showed that participants asked to explain alternative outcomes or even alternative explanations for the same outcome showed higher judgement skills and were less prone to shortcomings that they control participants experienced. Moreover, participants asked to explain plausible alternative explanations showed higher debiasing than those asked to explain implausible outcomes. Overall, the experiments supported the simulation heuristic.

3. Rozenblit et al (2002): The misunderstood limits of folk science: an illusion of explanatory depth

This paper explores the illusion of explanatory depth (IOED). The authors argue that most people *feel* that they understand the world much better than they actually do. This illusion of explanatory knowledge is best demonstrated in knowledge that involves complex causal patterns; the authors suggest that the knowledge of complex causal relations is specifically susceptible to illusions of explanatory depth.

The illusion of understanding is embedded in the fact that 'laypeople' rarely have to offer full explanations for most of the phenomena they claim to understand. While there are several features that attribute to this inflated-confidence of understanding, the authors identify four main causes that support the illusion of explanatory depth. The first factor they bring up is the confusion between what is represented in our heads versus what can be recovered from a display in real time -- that is, people grossly overestimate their mental recall abilities for observations they have made.

The second factor contributing to IOED could be the confusion between higher and lower levels of analysis. Mechanistic explanations are often iterative in nature and may cause an illusion of understanding when a person gains insight into a higher, more superficial, level function and attributes that to complete knowledge of the matter without understanding further labels of causal mechanisms. For example, one might understand and be able to explain that the braking system in a car works because of brake pads and pistons and attribute that to the understanding of a braking system without really knowing how to describe the functions of subcomponents that lead to the braking itself.

A result of the complex, hierarchical structures of explanations makes it extremely difficult to self-test one's knowledge of the explanations - which is the third feature attributing to IOED. The fourth feature is called "rarity of production," which simply means that we rarely have to give such explanations in our day-to-day lives, so we have little information about how well we understand a certain subject.

To test their hypothesis that people are susceptible to believing that they understand a particular thing or mechanism without actually understanding it, the authors conducted a series of studies that relied on people explaining a certain mechanism (ex: how a quartz watch works) and rating their confidence of understanding on a scale of 1 through 7. The participants were then asked to produce a mechanistic explanation of the phenomenon. Then, they were exposed to an expert explanation of the mechanism and again asked to self-rate their confidence of understanding. Nearly all the participants showered drops in estimates of what they knew when confronted with having to provide an explanation and then having to compare it with that of an expert - supporting the existence of IOED.

4. Fernbach et al (2012): Political Extremism is Supported by an Illusion of Understanding

This paper investigates whether polarized political attitudes are based on simplistic causal models. The authors hypothesized that asking people to explain policies would undermine the IOED and subsequently de-polarize their political bias. The central question that was explored in the study was if people have an unjustified confidence in their understanding of complex political policies and whether IOED contributed to the attitude polarization of the participants. Rozenblit et al found that the attempt to explain makes the complexity of systems very apparent, and the authors of the present paper set out to test whether the IOED has downstream effects on decision making.

In order to investigate the effects of IOED on political polarization and decision making relating to policies, the authors conducted a three-fold study. First, they asked participants to rate their position on the policy on a 7-point scale, they would then rate how well they understood six unique policies, and finally the participants were asked to explain the mechanism underlying two of those six policies. It was demonstrated that requiring participants to explain the mechanisms of said policies exposed the illusion of explanatory depth and possibly made the participants feel unsure of the policies, leading people to express moderate views regarding the policies. This was called the "mechanism condition."

Second, the participants were exposed to the "reasons condition." Here, the participants were asked to enumerate reasons for their support of the policy. Since listing reasons for support of a policy doesn't entail explaining the policy or deeper engagement with the mechanisms of the policy, the authors didn't expect a decrease in polarization. In fact, prior research on the matter (Hirt and Markman, 1995), showed that asking people to justify their position on a topic increased their extremism regarding that topic. This led the authors to expect an increase in polarization after generating reasons for policy support. The study was conducted in a manner similar to the "mechanism condition," except that participants were asked to list reasons for

support of a given policy instead of the mechanism. Surprisingly, the results showed that reason generation did not increase attitude extremity about the policy or have a moderating effect. The third condition was decision-making. This part of the experiment was conducted to examine whether the moderating effects of mechanistic explanations on political attitudes would extend to political decisions. Participants rated their position on a given policy, provided a mechanistic explanation or reasons for support/opposition, and then they were asked about their likelihood of donating to the cause. The results suggested that among participants who initially held a strong position, attempting to explain the mechanism underlying the policy attenuated their positions and made them more likely to donate. On the other hand, since enumerating reasons had little effect on the participants' position extremity about the topic, the likelihood of donation in the reasons condition did not have the same moderating effect as the explanation condition.

5. *Campbell et al (2014): Solution Aversion: On the relation between ideology and motivated disbelief.*

There have been studies proposing different reasons for the motivation behind denial of many scientifically-proven problems (ex: climate change), yet there is a lack of consensus and acceptance among the public about the problem. Research in motivated reasoning proposes that psychological motivations often direct reasoning such that judgements of evidence are influenced by desires and motivations.

The authors of the current research propose that it is not the problem that the public is denying, but instead, when the solutions to the problems are incongruous with their beliefs, they are averse to the solution and thereby reject the problem itself.

To investigate the validity of this hypothesis, the authors conducted three experiments examining the agreement about anthropogenic climate change and environmental degradation. In the first study, a correlational design was used to examine how Republicans and Democrats feel about the economic impacts of climate change solutions and how it relates to their belief about climate change. The participants of the study were asked, "if nothing is done by humans with regard to the environment, how many degrees do you think global temperatures will rise?" They answered on an 8-point scale from no chance to completely. The participants then responded to how they felt climate change solutions would impact the economy. Then they were asked to indicate how much they agreed with the statement that "the Free Market makes a great country." As predicted, Republicans reported that climate solutions would be more negative on the economy as compared to Democrats.

In the second study, half of the participants read about a regulatory restrictive emissions policy - which is overwhelmingly unfriendly to the Republican ideology. The other participants read about a free market friendly solution entailing green tech from which the U.S. would profit. As expected, self-identified Republicans reported higher support for climate change when the policy was a free-market solution as compared to when it involved governmental regulations. The third study measured the denial of scientific statistics in a more direct manner. Participants read a blog post about a solution to air pollution problems. There was a free market friendly condition and one regulatory condition. Participants were told that the blog was in response to the American Lung Association estimating that 44 million people live in an area burdened with

year round pollution. Participants were then asked what they thought of the estimate and were to select between “probably not” “probably yes” and “probably an exaggeration.” The results depicted that when the solution was free-market friendly, those who supported the free market had greeted consensus and agreement with environmentalists. These findings provide solid evidence for the solution aversion theory. The same study was conducted with regards to gun ownership to reduce crime in areas as a test to see whether liberals too are prone to solution aversion, and the results indicate that both Republicans and Democrats are equally prone to solution aversion.

6. *Mellers et al (2018): Forecasting tournaments, epistemic humility and attitude depolarization*

While the relevance of this study to the one we intend to conduct is not very high - the study does touch on aspects we are interested in, including depolarization and the illusion of explanatory depth.

In this multi-year experiment, the authors simulate a political forecasting tournament among graduate students with polarized beliefs about political issues. They are expected to actively engage in predicted US domestic events.

The tournament style prediction built on three main theories: (1) The illusion of explanatory depth, wherein the participants are expected to examine the mechanistic reasoning behind their support or opposition for a given political issue. (2) Considering the opposite: the participants actively have to weigh both sides before predicting potential outcomes, which as past studies have shown (Lord et al) leads to depolarization. (3) Perspective taking in social interactions - people who respect opposing views and resist biases often are more “integratively complex thinkers.”

The main research question dealt with whether asking political opponents to participate in forecasting tournaments regarding the issue of the day would reduce their extremity in political attitudes. From the present results of the two-year study, the authors were able to demonstrate a new technique for moderating biased political attitudes.

Tone

1. *Forgas et al (1987) - Mood Effects on Person-Perception Judgements*

The authors of this study argue that the congruence between the emotional state of the perceiver and the emotional nature of the information received about others play a consequential effect in how person-perception judgments are made. The objective of this study was to learn about mood-consistent characteristics of others to show that people (a) spend more time to learn about mood-consistent characteristics, (b) will make mood-consistent judgements rather than inconsistent ones, (c) will make mood-consistent judgements faster than inconsistent ones, (d) will recall and recognize mood characteristics better than inconsistent ones.

To examine whether mood states bias person perception by selectively influencing what people learn about others, an experiment was set up wherein participants were influenced into a positive or negative mood by manipulated feedback on a bogus test. Next, in a “separate” experiment, four realistic person descriptions were presented, each consisting of equal positive and negative information about the person. Information-formations judgements of each character were also obtained. Then, the time taken by each participant to read each descriptive sentence and make judgements about it was recorded. Finally, subjects were tested on their recall ability.

Five dependent variables were tested. 1. Selective attention: the results demonstrated that subjects in a happy mood were almost 1 second faster in dealing with one unit of stimulus as compared to subjects in a bad mood. Also, there was a significant interaction between the participants' mood states and the evaluative valence of information - supporting that mood consistent information received more detailed attention. (2) Impression Formation - the results showed that happy subjects formed significantly more favorable impressions of targets as compared to their counterparts. (3) Judgment Latencies - The results showed a main effect indicating that all judgements took longer to make in a bad mood than a good mood. Moreover, negative judgements took longer to make than positive ones. (4) and (5) Recall and Recognition- The data indicated that participants in a good mood demonstrated slightly higher recall than the participants in a bad mood.

Overall, it appeared that positive mood effects appeared to be far more robust than negative moods in biasing judgement and memory.

2. *Hamilton et al (1990) - An Empirical Test of an Axiomatic Model of the Relationship between Language Intensity and Persuasion*

This study aimed to test six existing axioms regarding the effect of language intensity on receiver attitudes. The ones that concern our research were the following:

- (1) Language intensity of a non-obscene type in attitudinally discrepant messages is inversely related to postcommunication ratings of source competence, and
- (2) Language intensity and initial source credibility interact in the production of attitude change in such a way that intensity enhances the effect of credibility, but inhibits the effect of less credible, sources.

Furthermore, the authors discuss an information processing model which claims that message intensity increases attitude change, either indirectly, through clarity, or directly through an interaction discrepancy. Interaction discrepancy is described as the difference between the valence of the source message and the receiver's initial attitude.

Another information processing model, elaboration likelihood model (ELM) is discussed, which suggests that message intensity increases persuasiveness. The authors of this model argue that message quality directly affects attitude change through what they call the central route to persuasion.

Essentially, the information processing model proposed that attitude change is a three-way interaction between intensity, discrepancy, and source credibility. The present study is conducted in order to test this model.

The experimental conditions were created by crossing three independent variables - message intensity, initial source credibility, and source gender (not entirely relevant to our study, so I don't discuss it here).

The message intensities were varied by inserting lexical items with varying intensities. The credibility of the source was manipulated to involve dimensions of competence, trustworthiness, and likeability. The dependent variables measured were perceived source competence, trustworthiness, and likeability.

The results showed that the interaction predicted by the information processing theory was present and that attitude change was a multiplicative function of manipulated intensity, message discrepancy and perceived source likeability. That is, intensity enhanced persuasion when the source has high credibility, whereas it inhibited persuasion when the source had low credibility, providing support for both the ELM and information processing theory.

3. *Wegener et al (1995): Positive mood can increase or decrease message scrutiny: the hedonic contingency view of mood and message processing*

Previous research has shown that positive affective states make people less able to process incoming information. A theory to support this claim hypothesized that people in happy states are less likely to engage with information for fear of losing their happy state. The hedonic contingency theory states that happy people might avoid message processing to maintain their pleasant state and not be hedonically punished for engaging with negative behavior. The present study evaluated the validity of this theory.

The experiment conducted in the study measured the effect of mood (happy v. neutral) and argument quality on participants' attitudes towards implementing a new foster care program. Participants were experimentally manipulated to be in a neutral mood by asking them to imagine neutral tasks such as going to the bank, whereas the participants who were manipulated to be in happy moods were done so by asking them to imagine being able to skip finals and go on an all expense paid trip to Hawaii. The participants were then exposed to strong and weak arguments about the adoption of a new foster care system in the state. The results revealed that participants who received strong arguments in support of the new program supported it more. Moreover, happy participants were more persuaded by the strong arguments than participants in neutral moods.

A second study was conducted to reveal whether the happy v. sad moods interacted with hedonic expectancy/ content (uplifting v. depressing) and argument quality (strong v. weak).

Participants had to listen to one of two soundtapes to induce the moods (Late night with David Letterman for happy moods and You don't have to die, the story of a child with cancer). The participants were then exposed to articles that matched the valence of the videotapes they received. Subsequently, participants were given two articles that were written by the experimenter and told to judge them on quality.

The results of the study indicated support for the hedonic contingency mood management view of mood effects on message processing. That is, the amount of scrutiny that the message (article, in this instance) received was affected by the hedonic consequences more for people in happy moods than in sad moods.

4. *Hwang et al (2008): Does civility matter in the blogosphere? Examining the interaction effects of incivility and disagreement on citizen attitudes*

Past research has suggested that exposure to conflicting views may produce negative attitudes towards those who hold these conflicting views and lead to intolerance toward the oppositional views because the counter attitudinal communication may induce a feeling of threat and lead to more extreme attitudes.

In light of increasing incivility on blog posts that have a polarizing effect on it's reader, the authors of this study examine how readers react to uncivil blog commentary based on whether or not they identify as a member of the party the partisan blogger is critiquing. For the purpose of this study, incivility is defined as attacks that go beyond facts and differences into name calling, contempt, and derision off the opposition.

The experiment was survey based, in which participants viewed a fictitious news story about global climate change. The study used tone and ideological congruence to measure participants' attitude polarization and willingness to talk to the other side. The civility of tone was manipulated in the article that the participants read, whereas the political congruence was measured based on participants' responses about how much the message they viewed matched their political beliefs.

Negative emotions were measured with responses from participants - they were asked to pick one of the following negative emotions: anger, disgust, contempt, frustration, and irritation. Open-mindedness to opposing information, attitude certainty, and willingness to talk to the other side were also measured.

The results showed that among individuals who were exposed to like-minded blogger commentary, uncivil attacks had little negative effect on their emotions or open-mindedness. In addition, findings showed that uncivil attack had a sort of boomerang effect, wherein it reinforced certainty of unlike minded participants' prior issue attitudes and made like minded participants less certain of their positions. It was also revealed that unlike-minded bloggers' uncivil attack decreased willingness to talk with the other side, whereas like minded bloggers uncivil attack increased the willingness.

Firstly, the authors suggest the possibility that polarization comes not just from people congregating with like-minded groups, but also from lack of civility. Secondly, the manner of communicating seemed to have a significant impact on the message receiver's attitude towards political disagreement, especially when individuals were presented with counterattitudinal messages.

5. *Thorson et al (2010): Credibility in context: how uncivil online commentary affects news credibility*

The goal of this study was to examine how judgements of news credibility change based on the surrounding opinion commentary and context. Prior research has evidenced that message social judgement evaluations are subject to context effects. The authors propose that these

considerations of context extend to the perception of credibility in news media - that is, the perceived credibility of a news article will change depending on the surrounding context. To test the effect of context on credibility, the authors conducted a 2 x 2 between subjects design. The authors manipulated the tone of the article (civil v. uncivil) and ideological congruence (politically similar v. opposing) to see the effect it will have on blog credibility and news credibility. Respondents read a news story about climate change policy providing a balanced summary of two positions on the policy. This story, which remained consistent across conditions, was then associated with a fictitious blog post, wherein the critique mirrored either a liberal or conservative position to manipulate ideological congruence. In addition, to produce civil/uncivil tone, the tone of the commentary was altered.

The study was set up such that the participant first read the balanced news story and corresponding blog post. The blog post was either politically congruent or politically incongruent with the respondent's political beliefs. The tone of the blog post was also manipulated to be either rude or civil. So essentially, the respondents either saw (a) a bloggers response that matched their political beliefs in a positive or negative tone or (b) a response that didn't match their political beliefs in a positive or negative tone.

The results of the experiment demonstrated that the uncivil, ideologically incongruent blog post received the lowest credibility rating and the highest rating was given to the politically congruent, civil condition. The authors also showed that when the blogger took an opposing stance to the article, but a politically similar stance to the participant, credibility ratings increased with increased incivility in tone.

6. *Carraro et al (2011): the automatic conservative: ideology-based attentional asymmetries in the processing of valenced information*

Studies from the past have shown that there are many differences between Republicans and Democrats, and not just ideological ones. For example, a structural MRI experiment's data showed that conservatives have an increased gray matter volume of the right amygdala, which is related to processing threat - meaning Republicans have a higher likelihood of processing threat as compared to Democrats.

The experiment discussed in this paper explored the reasons behind Republican's threat processing. The authors related this phenomena to conservatives having an automatic selective attention for negative stimulus.

Specifically, it was hypothesized that participants with conservative ideologies will have a stronger automatic selective attention toward negative stimulus. In order to test this, two experiments were conducted - An emotional Stroop task and a Dot-Probe task.

In the first experiment, participants were presented with 20 positive and 20 negative words.

Half the positive and negative words were printed in blue and the other half were red.

Participants were asked to quickly and accurately characterize the color in which the words were written while ignoring their meaning. If the valence of the word attracted attention, then the performance of the task would be impaired.

For the dot-probe task, on the other hand, participants were briefly shown two pictures next to one another, followed by a small gray dot on either the right or the left side of the

screen. The dot appeared in the same location in the negative image in half of the trials. Participants were asked to determine the location of the gray dot by pressing a key (for either left or right). It was expected that conservatives would be faster in responding to the dot appearing in the same spatial location of negative images as compared to positive ones. The results from both these experiments showed that conservatives had increased vigilance towards negative stimuli and were more likely to automatically direct their attention towards negative stimuli. Therefore, the study supported the existence of ideology-based differences in allocation of attention resources. Specifically, conservatives are more likely to have valenced responses towards negative information.

7. *Hart et al (2012): Boomerang effects in science communication: how motivated reasoning and identity cues amplify opinion polarization about climate mitigation policies*

This paper speaks to the problem of science communication - specifically when polarized topics such as climate change are discussed. It is often believed that scientists need to respond to the deficit model by increasing the volume of information available to the general public to make informed decisions regarding policies that directly affect them. This, however, has shown to be ineffective due to the effect of motivated reasoning, social identity, and persuasion on message receptiveness of controversial social issues.

In this study, the authors argue that not only does the nature of interaction between political partisanship and victim identity influence policy support, but also that Republican participants will be prone to a boomerang effect. The boomerang effect is what happens when a message is strategically constructed with a specific intent but it produces a completely opposite result. It was also hypothesized that the social distance from the participants to the subjects of climate injustices will have an influence on policy support.

To test their hypothesis, the experiment presented participants with a news story that discussed the potential for climate change to increase the likelihood of diseases in farmers. The experimental conditions were varied by manipulating the identity of the potential victim of climate change related health issues. After reading the story, participants were asked about their level of support for government action on climate mitigation.

The results demonstrated that the effects of the message exposure on support for climate mitigation policies were mediated by social identification with the victims of climate change. Surprisingly, party affiliation was a marginally significant moderator on policy support when compared to social distance to victims.

This study depicts the importance of increasing our understanding of audience predispositions when presenting informational science messages.

8. *Yuan et al (2019): Should scientists talk about GMOs nicely: exploring the effects of communication styles, source expertise, and preexisting attitude*

The goal of this paper was to test whether communication styles and expertise of the communicator effect writer likeability or message quality. The study was conducted regarding the contentious topic of GMOs.

The authors discuss the politeness theory, which states that 'positive face redress' refers to using informal language to present a group-accepted identity, whereas 'negative face redress' refers to attempting to minimize the autonomy of an individual. Prior research has suggested that using an appropriate level of politeness allows a communicator to be persuasive.

There is also a discussion of the Expectancy Violation Theory, which states that people have certain expectations of communication behavior and any violation of such expectations lead to changes in attitude and behavioral intentions. These theories are linked to the tone (communication style) used in the experiment. The second independent variable is source expertise, which is based on the level of knowledge that a communicator is perceived to possess. The authors propose that higher source expertise and positive attitudes towards GMOs lead to higher expectancy violation and therefore lowers perceived message quality and writer likeability.

The experiment was conducted as 3x2 factorial design with the communication style being either positive, negative or neutral and the source expertise being present or absent. In the experiment, participants were first introduced to the blogger with credentials. Then, the participants were asked to rate perceived level of expertise and subsequently assigned one of six random conditions. Then they were asked a series of questions regarding perceived aggressiveness and politeness, writer likeability, expectancy violation, quality of message, and quality of writer.

The results showed that when the communicator used a polite tone, source expertise had a stronger positive relationship to expectancy violation than when the communicator used an aggressive tone. Source expertise was found to be an important factor influencing the outcome of risk communication. Overall, it was demonstrated that the level of expectancy violation perceived during an interaction determines the reaction of individuals to communication styles.

EXTRAS:

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