How Abnormal Temperatures Affect Climate Change Attitudes and Behaviors

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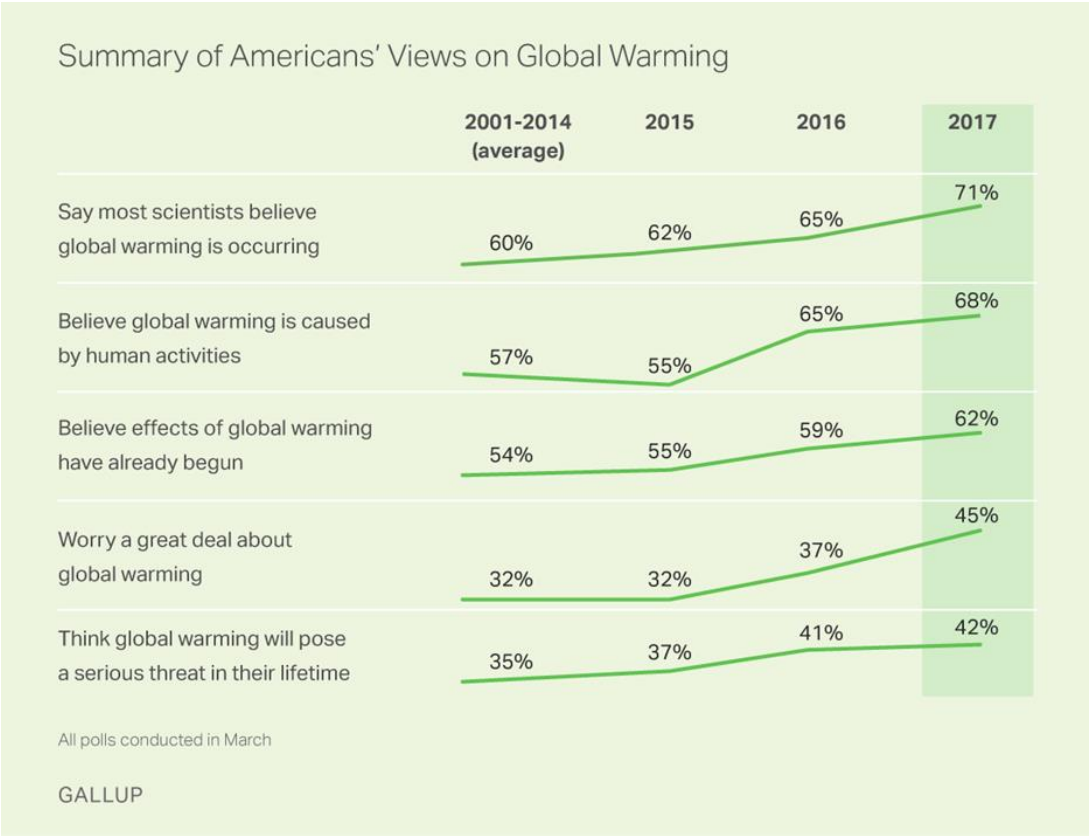
The Threat of Climate Change

- Polls indicate that Americans are increasingly concerned about climate change.
- Why is there a disconnect between the personal danger a person feels from climate change and the existential danger of climate change?



(Leiserowitz, Maibach, Roser-Renouf, Feinberg, & Rosenthal, 2015; Saad, 2017)

Perceived Low Risk of Personal Harm

- Research has indicated a number of potential cognitive biases that may be contributing to this such as skepticism in science, an identity protection mechanism, framing effects, and cognitive dissonance.

- To further investigate how individuals react when personally confronted with the effects of climate change, researchers have begun to investigate how individuals climate change attitudes may fluctuate with abnormal weather.

(Brooks, Oxley, Vedlitz, Zahran, Lindsey, 2014; Poortinga, Spence, Whitmarsh, Capstick, & Pidgeon, 2011; Nerlich, Koteyko, & Brown, 2009; Spence, & Pidgeon, 2010)

Potential Problems in the Literature

- Methodological:
  - Non-response bias in national survey
  - Lack of precision in instruments
  - Observer-expectancy bias
- Content
  - What does concern really indicate?
    - Particularly in the face of proposed identity-protection mechanisms
  - Lack of insight into mechanisms
  - Introduces schism between behavior and attitudes.
    - Is a person who answers “Not Concerned” on a survey, but googles “climate change debunked” shortly after taking it really not concerned?

Proposed Project

- Investigate how abnormal temperatures affect number of Google searches for climate change cross Democratic, Republican, and swing states may alter climate change behavior as measured by Google search data.

  - Allow for greater clarity as to potential mechanisms
  - Allow for comparison between conservative and liberal states
  - Allow for greater ability to interpret concern

Google Search Data

- Arguably, Google search data at its best is data that represents true, unaltered behavior and motivation.
- If someone is concerned about climate change we should see higher activity for climate change Google searches.
- Those who are looking to affirm their disbelief in climate change will also be visible with this data.

Table 1
Signal-to-noise ratio in Google search terms.

Term	Underlying variable	t-Stat	R^2
God	Percent believe in god	8.45	0.65
Gun	Percent own gun	8.94	0.62
African American(s)	Percent Black	13.15	0.78
Hispanic	Percent Hispanic	8.71	0.61
Jewish	Percent Jewish	17.08	0.86

Notes: The t-stat and R^2 are from a regression with the normalized search volume of the word(s) in the first column as the independent variable and measures of the value in the second column as the dependent variable. The normalized search volume for all terms is from 2004 to 2007. All data are at the state level. Percent Black and Percent Hispanic are from the American Community Survey, for 2008; the Jewish population is from 2002, gun ownership from 2001, and belief in God from 2007. Jewish data are missing one observation (South Dakota); belief in God data are missing for 10 states. The data for belief in God, percent Jewish, and percent owning guns can be found at http://pewforum.org/how-religious-is-your-state-.aspx, http://www.jewishvirtuallibrary.org/jsource/US-Israel/usjewpop.html, and http://www.washingtonpost.com/wp-srv/health/interactives/guns/ownership.html, respectively.

Other Data

- I would also like to include the effect of ***media*** as a parameter in this project.
- No study to date has investigated the role of media in proliferating fears about climate change in the context of abnormal weather and this could be an important motivator of people's fears – or the lack thereof.
- This parameter will likely be realized through the scraping of articles on climate change and running sentiment analysis on these articles.

Model: ARIMA Models

- ARIMA models attempt to describe the movements in a stationary time series as a function of what are called "autoregressive and moving average" parameters
- AR: Autoregressive part of the model
    - Forecast the variable of interest using a linear combination of past values of the variable
- MA: Moving Average part of the model
    - A moving average model uses past forecast errors in a regression-like model
- I: Integrated or “Differencing”
    - Subtracting previous values d times
- ARIMAX
    - Allows for covariates

Proposed Models

- I will utilize three competing models for this project:
  - A Seasonal ARIMA model which maps Google searches for climate change onto a seasonal series.
  - A Seasonal ARIMAX model while will use Google searches for climate change “debunked” or other disproval terms as a covariate.
  - Finally, a Seasonal ARIMAX model which will use the media parameter as a covariate with the Google data to measure how the effect of media fits into this model.
- The ARIMA methodology will allow for analysis over a period of time while allowing for the flexibility of “Seasons” which capture the cyclic volatility of some seasons containing more abnormal weather than otbers.

Hypotheses

- Predict that regardless of political party, that states with high temperature discrepancies will have significantly more general Google searches regarding climate change and global warming.

- Furthermore, I predict that when Google searches for “climate change not real” or “global warming not real” are included in analyses that these data will control for the majority of variation in Republican states.

- This study will suggest both an identity-protective mechanism by which participants initially Google “climate change not real” to soothe their dissonance.