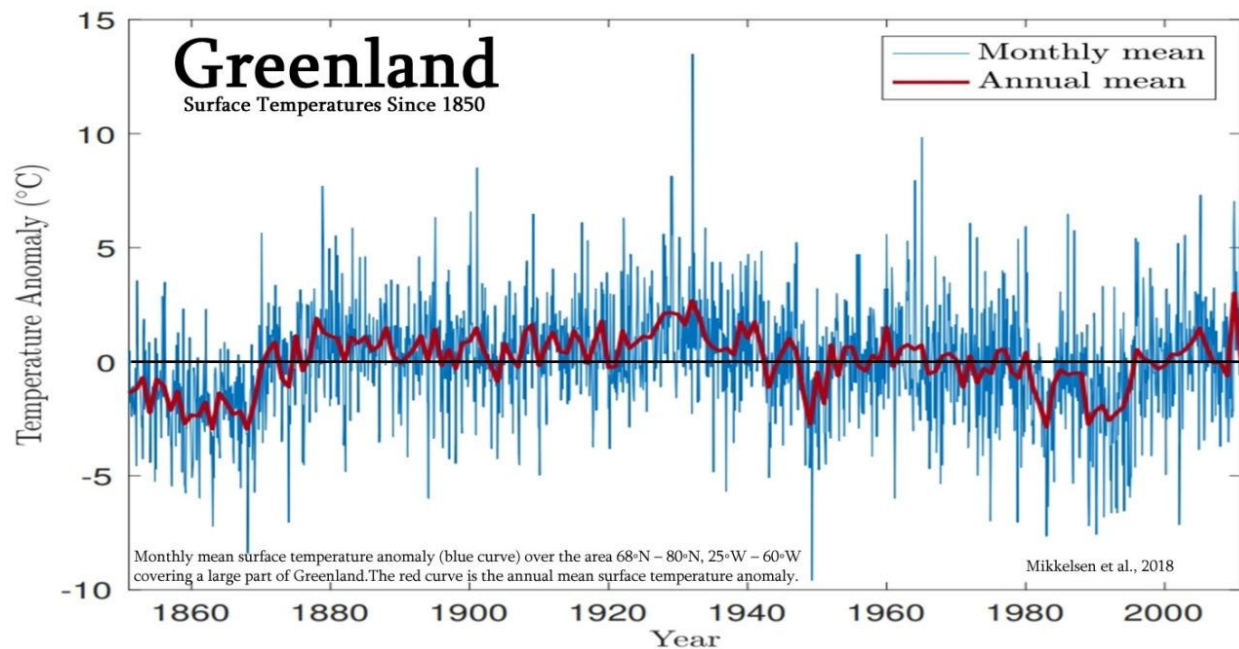


Communicating about Climate Change--attempt 1

For this project, I chose to present my participants with a graph from a Breitbart article entitled “Nothing Unusual Happening in Climate Change, Over 40 New Scientific Papers Confirm.”¹ The graph, which originally comes from a scientific study of the “Influence of temperature fluctuations on equilibrium ice sheet volume,” presents an accurate representation of raw data, but is twisted in the context of the article, which primes readers to expect to see mean annual and monthly temperatures, when, in fact, the graph focuses on monthly and yearly temperature anomalies.²



When designing this “experiment,” I made the decision to present the graph to the participants in the context of the Breitbart article, and not on its own. In presenting the graph with the accompanying article, I hoped to investigate the ways in which the context in which data is presented can influence how individuals interpret it. While the graph itself has some issues that make it harder for a layperson to interpret, it is only when placed in the context of the article that the data becomes twisted.

¹Delingpole, James. “Nothing Unusual Happening in Climate Change, Over 40 New Scientific Papers Confirm.” *Breitbart*, 26 Mar. 2018, www.breitbart.com/politics/2018/03/26/nothing-unusual-happening-in-climate-change-over-40-new-scientific-paper-s-confirm/.

²Mikkelsen, Troels Bøgeholm. "Influence of Temperature Fluctuations on Equilibrium Ice Sheet Volume." 2018. <https://www.the-cryosphere.net/12/39/2018/tc-12-39-2018-supplement.pdf>

First Participant

Reaction to Article

The first participant I asked to read the article and evaluate the graphs was a Science, Technology, and International Affairs (STIA) major. As a result, the running commentary she provided throughout her reading of the article indicated a high degree of skepticism. As someone with a strong background in environmental issues, she was immediately wary of an article arguing against climate change. A transcription of her commentary regarding the article is:

- *The article seems incredible, due to some of the phrasing “it’s global stupid” does not convey impression of scientific analysis*
- *Surprised but convinced that Greenland and the South pole are cooling and not warming.*
- *Good sources to support that Greenland is cooling, like that there is more than one source*
- *What are climate modes?*
- *Credible sources do not use two question marks*
- *Places chosen e.g. South Korea, Greenland and Alaska seem like a non-representative sample*
- *Are Greenland and the south pole the same place?*

Reaction to Graph

As seen in her bulleted analysis of the article, this participant did not initially find any issue with the graph or the way in which the data in the article was used. In fact, she initially mentioned that the “sources” provided by the article made it seem more trustworthy, undermining her initial skepticism. Her mention that there are “good sources to support that Greenland is cooling” indicates that she initially found the graph to compellingly support the article’s argument. This trend held true in her more detailed analysis of the graph, but she did notice the issue of temperature anomaly being on on the Y-Axis. Her observations were:

- *Monthly is more volatile than annual*
- *The graph is telling you that there is pretty consistent temperature levels*
- *Why is it so much colder in the late 1800s than the present*
- *Monthly mean fluctuations greater than annual mean temperature*
- *The two lines represent monthly and annual means*
- *Graph supports what the article is saying, provides evidence of neutral/cooling trend in average temperature*
- *Agrees that the graph shows surface temperature in Greenland since 1850*
- *Realizes independently that it is showing temperature anomaly*

My Debunking

This participant entered into the article with a fairly strong feeling of distrust. As someone with some knowledge of climate science, her initial reaction to the article was negative, but she grew to trust it through its “convincing” use of sources and supplementary data. She did,

however identify the fact that the graph presents “temperature anomaly” on the Y-Axis, and not mean annual temperature means as the article suggests it would. The first piece of “debunking” information I revealed to this subject was that the article came from Breitbart. She immediately took this information to mean that the article was invalid. In offering this information, I prompted her to commit the genetic fallacy– assuming that a piece of information is incorrect based solely on the reputation of its source. I explained how the graph came from a legitimate scientific study, but was being twisted by the article itself and used to prove a point the scientific study it comes from does not corroborate. In doing so, I referenced the fact that the data is presented as raw data in a study evaluating the “Influence of temperature fluctuations on equilibrium ice sheet volume,” and not presented as making claims against the existence of climate change. Using the graphical analysis learned in the course, I also mentioned how the temperature anomaly being mentioned only on the Y-Axis is misleading, since the article and the graph title prime the reader to think they are seeing mean monthly and annual temperatures.

Reaction to Debunking

This participant’s distrust of the article mean that she quickly accepted my premises that data was being misused and that the graph presents information in a way that is difficult for a lay person to understand based on the surrounding article. As stated previously, this participant eagerly committed the genetic fallacy, and was quick to reverse her opinion that the article was convincing/accurate. In reflecting on the new information I gave her about the graph and the way the article twists it this participant focused on her own feelings of being deceived. Her thoughts following the debunking were:

- *I trusted the source blindly because it seemed legitimate, which I guess it technically is*
- *I feel fooled and deceived*
- *The graph looks legitimate*
- *Looks consistent with scientific journals-- is seemingly credible*
- *Use of credible sources in the article, leads me to believe the author’s later points*
- *Still unsure of the facts*
- *Would have never caught it in a normal paper assigned for class reading*
- *Scary that I didn’t catch it*

Second Participant

Reaction to Article

While the main focus of this project was not to identify how people’s backgrounds influence the way in which they react to and process information, the second participant did approach the article differently than the first as a result of her background. Unlike the first participant, the second does not have a great degree of knowledge regarding climate change, nor does she have as strong of a scientific foundation. Thus, she approached the article with more

intellectual humility and open mindedness than the first participant did– freely admitting her lack of knowledge on the subject. Her response was:

- *The article is interesting because I lack of knowledge of global warming*
- *Unfamiliar with previous climate cycles*
- *Struggle with the accusations about climate alarmists*
- *The article is diminishing the viewpoint that global warming is an issue*
- *I think it is an issue*
- *Does not know a lot about Greenland or the South Pole, or whether the trends there are relevant to global warming*
- *Interesting that those two places have cooled, but unsure of how representative they are*

Reaction to Graph

As seen in her bulleted analysis, this participant approached the article with a degree of open-mindedness that led her to easily accept its claims without trying to debunk them. In other words, meant that she viewed reading the article as more of an educational experience and less of an attempt to find holes in the argument. Similar to the first participant, she also accepted the graph as providing information that corroborates the points made in the article. Her interpretation of the graph was:

- *The temperatures now are cooler than they were in the 1930s*
- *The monthly mean is different than the annual mean*
- *The annual mean looks to be about the same over time*
- *Shows that Greenland is on a cooling trend, shown from the different sections of the graph*
- *Graph shows surface temperature means since 1850*

My Debunking

While this participant did seem to find the article more compelling than the first participant, debunking the use of data in the article was a similarly quick process. As shown earlier, this participant did accept the graph as proving the article’s point and providing crucial evidence in its support. She also identified the graph as showing the annual and monthly mean temperatures in Greenland. My initial “debunking” point, as with the first participant, was that the article came from Breitbart. Not knowing what Breitbart was, this revelation did not provoke her to commit a genetic fallacy and her reaction was neither positive nor negative. Next, I addressed the fact that the graph’s Y-Axis displays temperature anomaly, which is misleading given the context the article presents the data in. This revelation was enough to make the subject have an “ah ha moment” and completely accept my premise that the graph was misleading

I did, however, explain some more background information so that my participant would have a more complete view of how the data was being misused. Specifically, I pointed out that the graph itself is not actually misleading, but the way in which the article uses the data is misleading. Like with the previous subject I specifically referred to the initial study as evidence of the graph's credibility, but pointed out how the context the article placed it in made it misleading.

Reaction to Debunking

Unlike the first participant, the second's reaction was slightly broader. Rather than focusing only on her own feelings of betrayal, she looked at how the use of data in the article was able to fool her by appearing scientific. This participant also addressed the fact that the article's audience likely does not know enough to look into the graph deeply, and are primed to misinterpret it based on the way the article presents it. She also brought up the idea that the graph's presentation of results in degrees Celsius could be misleading to an American audience like herself.

- *Interesting because a lot of people don't know enough about the subject to understand or look into the graph*
- *I thought it was showing their point because I don't know a lot about what they're talking about*
- *Shows the importance of looking into information, just because something looks like data it isn't trustworthy*
- *Seems interesting that they use celsius because I grew up using Fahrenheit, makes the variation seem smaller than it is being portrayed*
- *The observation near 15 seems like its only 15 degrees Fahrenheit, but is actually much higher*
- *Not surprised that I misunderstood it*
- *Somewhat alarming that it was able to trick me so easily*
- *Shows how data can be twisted by people taking it at face value/ not understanding it*

Conclusion

This project provided an interesting window into the ways in which people process and analyze information. Specifically, the "experiment" showed the insidious nature of misleading representations of data. Both participants mentioned that they originally found the article to be compelling because it had strong support from scientific sources and graphical data. While both participants found elements of the article itself questionable, neither participant took issue with the data on their own accord. Both participants automatically viewed the graphs as completely supporting the article's claim, when, in fact, that could not be further from the truth.

In terms of the implications for critical thinking, this project shows the degree to which people have a blind trust of graphical representations of data. The fact that neither participant,

despite being educated and informed, mentioned the possible invalidity of the graphs in their initial reaction to the article shows the blindspot readers have when it comes to scientific data. Additionally, the fact that this artificial simulation created an environment in which both participants were already suspicious of the article, only adds to the gravity of their failure to identify the problematic use of data, emphasizing the sheer amount of trust people place in graphs. Just like with the logarithmic biases discussed earlier in the semester, people are startlingly unaware of the degree to which seemingly trustworthy data can be manipulated by confusing graphical representations or blatantly misused by authors, as it was in this case.