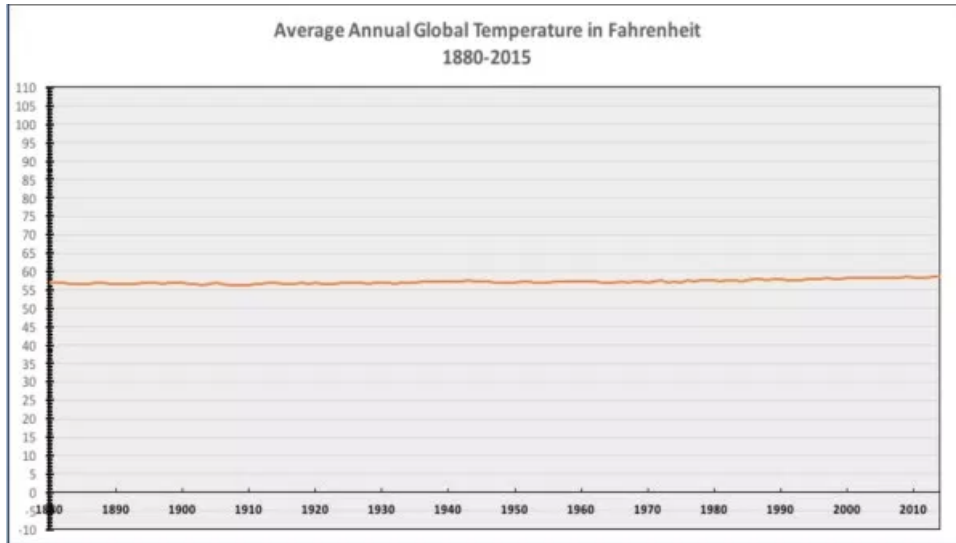


Communicating about Climate Change--attempt 3

Introduction

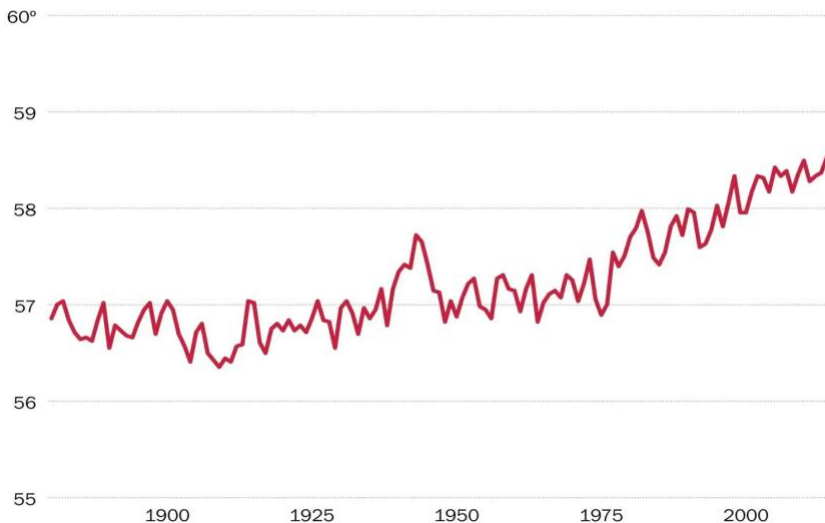
My chosen misleading piece of data is an example from "Data Visualizations that Mislead," a graph tweeted by the National Review, originally from *Powerline* concerning climate change. The graph (inserted below) shows the average annual global temperature in Fahrenheit over the past 130 years.



The graph shows little fluctuation of temperature over time, which supposedly debunks the claim that the earth is getting warmer. However, the scale of the y-axis is misleading because it is 50x the scale of the temperature increase of the earth, which is 2 degrees Fahrenheit. This increase may not seem substantial when compared to a scale across 120 degrees, but it is still a significant and concerning change. I presented this data to two people in order to gauge their reactions to a misleading graph; then, I showed them a graph that reflects the change in temperature properly (inserted below).

Average global temperature by year

Data from NASA/GISS.



Subject One

I emailed the graph to Subject One while on a Facetime call with her. I told her that the data from the graph was derived from NASA; when asked what she could conclude from the graph, she said that it seems like the graph does not support climate change, which surprised her because she thought that it was scientifically proven, yet this data from NASA disproves it. She admitted that the data seems wrong to her. She asked me if the numbers were really from NASA and if NASA made the graph; I responded yes then no; she followed up by asking who made the graph because "something seems wrong with the axis; wait, why doesn't it start from 0?" Throughout the whole interaction, she seemed puzzled, like she was trying to find a reason for why this graph contradicts her previous beliefs about climate change. She was able to discern a problem with the axis; however, she concluded the issue incorrectly.

I explained that line graphs do not have to start from zero; in fact, in many cases line graphs should not start from zero. I then showed her the second graph and explained the problem with the first, and she conceded that the second graph was more coherent with her beliefs. She seemed relieved that the conclusion aligned with her previous beliefs. I showed her the original *Powerline* source, eliciting the response, "I knew something seemed suspiciously conservative about this graph." I responded that her reasoning for why the graph was faulty was actually due to appeal to the person and belief perseverance--her reasoning was based on bias and heuristics. These biases led her to scrutinize the graph more carefully, but after learning the objective reasoning for why the data is misleading, she should have acknowledged that the graph was wrong because of the axis, not because it was "conservative." Suspecting that a creator is conservative is not a reason to assume that the information given is wrong. Ultimately, political parties can affect a creator's biases, as is most likely the case in this graph, but they are not the reason the graph is misleading. She agreed, but defended herself saying that she was merely pointing out the bias, not saying the conservative viewpoint is the reason the graph is wrong.

Subject Two

I showed the graph to Subject Two in person. I told him that the data from the graph was derived from NASA then asked him what he concludes from the graph: "it's clear from this graph that the temperature has been pretty consistent over the past century, so this data debunks your liberal claims that the earth is heating up and that climate change exists." I inquired if this data causes him to shift his view on climate change; he responded that the data confirmed what he already knew. When asked to look at the graph again, he inquired, "is it supposed to start from zero or something?" I told him no, then proceeded to my explanation.

I gave the same explanation as before. I showed him the second graph, and he claimed that it would make more sense for the y-axis to be on the first scale because global temperatures ranged over the 120 degrees. He told me, "the liberal graph is just as misleading as this graph because the 5 degree scale overemphasizes the change." I explained that the average global temperature will typically rest within those five degrees, but there is a clear increase over the past 25 years. He countered that increases like that occur naturally at different points in history and that it is not substantial evidence to prove climate change.

I tried to relate the misleading graph to an economic graph, explaining “if there was a graph relating financial data, like the increase of the total amount of taxes collected by a state with a scale in millions that shows an increase of two million dollars, but then I put it on a scale 50x greater, so that it goes from 0-100 million dollars, making the change almost invisible, does that make sense?” He snapped back “it’s two million dollars not two dollars.” I decided to not further pursue the analogy so that I did not escalate the tension.

When asked if any data would cause him to change his viewpoint, he replied that it would if the data came from a reputable source. I asked him to define reputable, and he said, “those without obvious biases.” I showed him the original sources of the two graphs then proceeded, “why do you determine that *Powerline* is less biased than *The Washington Post*?” He inquired, “why do you think that *The Washington Post* is less biased than *Powerline*?” I showed him the readings on heuristics and biases, as well as the written explanation for why the graph is misleading. He told me that if he was guilty of them, then I was too. I replied that I was aware of this, and that I am attempting to become cognizant of my biases and heuristics. He told me I was not doing a very good job. I terminated the interview, and he had a look of triumph on his face.

Reflection

For this experiment, I purposely chose one subject who believed climate change is real and another subject who is skeptical of the claim; the subjects are left-leaning moderate and conservative, respectively. The results turned out as I predicted, with Subject One trying to find faults within the graph and Subject Two confirming his belief using the graph; however, both used similar cognitive biases and heuristics in order to reach their conclusions. I predict that if the positions had been flipped, Subject One would have defended her previous beliefs just as much as Subject Two. I attempted to utilize some techniques from *The Debunking Handbook* on Subject Two (relating the climate graph to a similar graph concerning an issue he cared more about), but to no avail. Even presenting him with the descriptions of his cognitive biases caused him to become even more defensive. From my conversation with Subject Two, I could tell that my political leaning caused him to discredit my explanations; this is most likely because we have previously argued (and failed to reach conclusions) about other politically charged issues. To further establish the effects of confirmation bias, I would have to repeat this experiment on a variety of other people, preferably people who I am less acquainted with. This experiment elucidated the difficulty of convincing people of opposite beliefs to the ones they already hold.

*quotes are from note taking within the conversations, paraphrases are mostly from memory

https://www.washingtonpost.com/news/the-fix/wp/2015/12/14/why-the-national-reviews-global-temperature-graph-is-so-misleading/?utm_term=.3c2e97a7fd76