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No other students involved.

1. One dichotomy of a model's scope identified by Bolker is qualitative versus quantitative. This allows one to measure the quality of data and how it can be used or interpreted. Qualitative models and data sets will provide a better understanding of a system relative to another, but it does not quantitatively compare the two. You cannot make calculations to compare outcomes because the type of data collected is not detailed enough and can only make relative comparisons.

   In my own research, this can easily be observed with elemental analyses using ICP-MS. It is common to collect some qualitative results from a subgroup of samples to get the concentration range, before spending time creating a calibration curve and standards for quantitative analysis. The qualitative results are enough to say whether the concentration of iron is 1 ppb or 1,000 ppb, but cannot provide accurate results because there is no calibration curve to quantify the elemental intensities. Once a calibration curve is run, quantitative data can be collected, following some basic statistics to calculate limit of detection and limit of quantitation to understand the limits of my model.

2. One source of bias might come from the authors own viewpoints on environmental conservation, where you can gather from the reading that they are more inclined toward those feelings. Most of the examples used were in favor of conservation, which had a clear bias against the politicians used as an example. If one's argument becomes entirely focused on one viewpoint without considering the other party's argument, then you alienate the viewers listening. With the example of climate change, the argument is biased toward the climate change activists, appealing to their views. It did not seem to consider the viewpoints of the other side and did not address their concerns. The author instead continued to argue that statistical analysis and representation would be able to overcome their concerns. This assumes that they value this type of data and understand it, however this is a result of assumptions the author made that other people need statistical analyses and models to be convinced. The same type of argument does not work for everyone; therefore, the evidence should be adjusted based on the audience.

3. A dual model paradigm allows one to measure the variable they are interested in against the noise and variability that is inherently part of an experiment. One model is then the focus of the experiment while the other accounts for error, which is unavoidable. For example, my work is focused on quantifying the amount of microplastics as a function of student population. That would be one model, while the error model would encompass the variability of student activities on a day-day basis or the variability from my sampling and extraction techniques. This allows me to understand with confidence

the quality of my data by modeling the error and variability against the actual results of microplastics.

4. A statistical population is the population of interest, usually limited by the experimental design. A biological/ecological population is the entire population, so the statistical population may be within this larger biological population. The statistical population will vary based on temporal or spatial limitations, defined by the research question. This is the population of study, which may be representative of the larger biological population. It may also not be related to the larger population if the group at study is not representative.

5. Our group used the cattail example in class. One continuous variable on a ratio scale that could be extrapolated is the amount of cattail relative to native plants or relative to the cattail quantity in previous years. This is continuous because it is constantly being updated and a ratio scale because we are comparing to the quantity of other plants putting it on a scale out of 100%.

   A categorical and nominal variable would be the number of each species. This could be on a larger grouping such as between cattails and other wetlands species or it could be further subdivided into just looking at the number of each species of cattails. We are categorizing by species, but instead of looking at it in a ratio scale of %, this will be purely numerical which provides more flexibility when working with data later.