**How to Lie with Statistics**

**How to Talk Back to Statistics: Important questions to remember**

1. **Who says so?**
   1. This involves looking for any bias and keep in mind the source that the statistics are coming from
      1. Biases can occur if the source has something to prove, saving a reputation, or some monetary motive
      2. Other examples are deliberately ambiguous statements and selection or suppression of certain data
      3. Purposefully only using favorable data such as only one year rather than the full history
      4. Taking stats as fact or rejecting others because of its source
2. **How does he/she know?**
   1. Keep the full context in mind such as % of what and compared to what?
   2. Is the sample specifically selected by the tester to get an intended result
   3. Be just as careful if the sample also select themselves
   4. Gold standard is random sample
3. **What’s missing? (Is this the full story/both sides?)**
   1. Cherry-picked stats such as the showing the mean but not the median, no standard error
   2. The absence of some important figures to put the larger picture into context can be cause for suspicion
   3. Any study where mean and median differ substantially are cause for concern
   4. Comparison to other key figures and understanding the full context is key
4. **Did somebody change the subject?**
   1. Intentional misleading wording designed to confuse the reader or have the audience take away a desired conclusion
   2. Number of cases is vastly different from number of REPORTED cases
   3. No longer collecting data is not an indication that the issue or topic of interest is declining such as no longer collecting crime data does not mean crime is going down
   4. Be skeptical of self reported data such as how many times someone bathes vs how many times they SAY they bathe
   5. Changing definitions need to be remembered too - such as if someone reports x number of mass shootings year over year could be misleading if ‘mass’ has changed from 7 people shot to 3 resulting in a wild misleading increase
5. **Does it make sense?**
   1. Common sense should not be overlooked and can often find misleading stats