

Identifying Misleading Statistics and Graphics

Directions:

After watching the videos "3 Ways to Spot a Bad Statistic", "How to Spot a Misleading Graph" and "How Statistics can be Misleading" answer the following questions.

1. What are 3 questions we should ask ourselves when differentiating good statistics and visualizations from bad ones?

Is the scale consistent on both X and Y axes?

Is the graph labelled?

Has the data been cherrypicked/what is the context?

2. Why are statistics from the government often more reliable than statistics from private organizations?

Because corporations can pay off private organizations to sway the data a lot easier than they can the government (cough, the Wakefield study, cough.) They are also more likely to be impartial and can talk to a larger sample size.

3. What are 3 things we should look for to identify misleading statistical graphics?

- a. Inconsistent scale or no scale at all
- b. Lurking variables/Simpson's Paradox
- c. Source or bias. The graph we were shown of job loss was from Fox News, which has a storied reputation of a strong right lean. It would have behooved them to make job loss look much larger than it was in order to speak to their base and affirm their likely pre-existing belief that the then president Obama (a Democrat) was doing a bad job.

4. The following graphic was used in one of the 3 videos and is an example of a misleading graphic. What were the components identified as misleading for this graphic? **Explain in complete sentences.**



The fact that the x axis does not have uniform increments, making it look like the six month span between September 2008 and March 2009 is the same as the 15 month span between March '09 and June '10.

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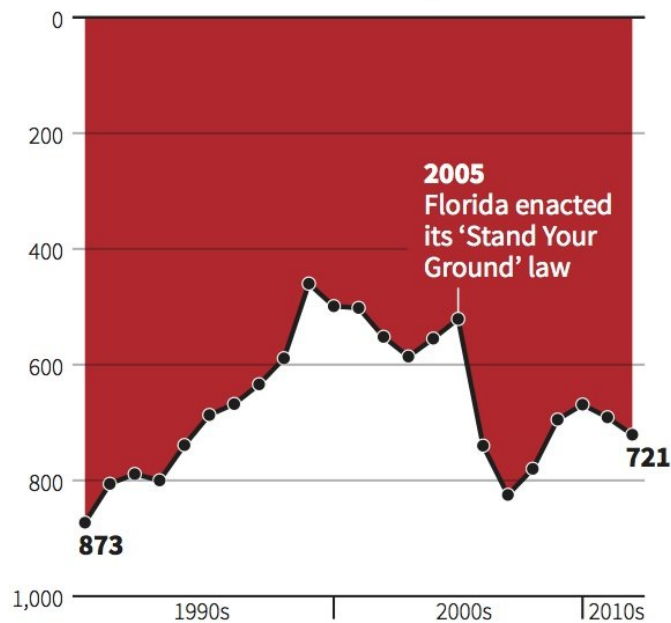
There are also no labels on the axes; presumably the Y is people who have lost their jobs, but we don't know because they didn't say.

Also, the context! The biggest financial crash in US history since the Depression would have just happened in-between the first and second interval.

5. What is wrong with the vertical scale in the graphic below and how would you fix this? **Explain in complete sentences.**

Gun deaths in Florida

Number of murders committed using firearms



Source: Florida Department of Law Enforcement

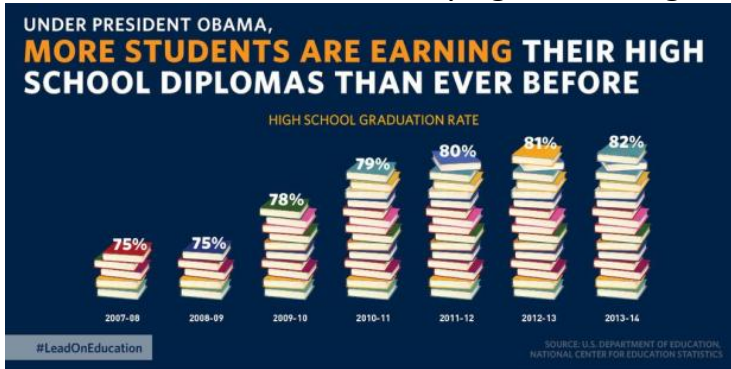
C. Chan 16/02/2014

REUTERS

It's upside down- most graphs have zero at the lowest point of the graph, but this one has it at the highest, making the data look as if deaths are going down, when in reality, they're the highest they've been since the mid 90's. By flipping it so that zero is at the lowest point it would better reflect reality.

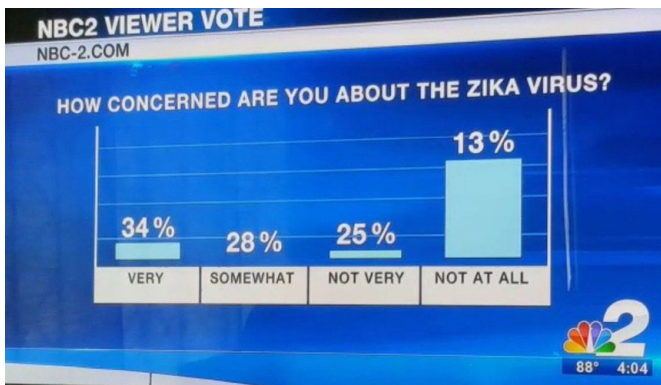
6. Below is an example of a bar graph, showing the percentage of students who earned their high school diploma by school year. What key feature makes this graphic misleading? **Explain in complete sentences.**

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The Y axis scale is inconsistent, making it look as if 82% is twice as big as 75%. Also, no labels.

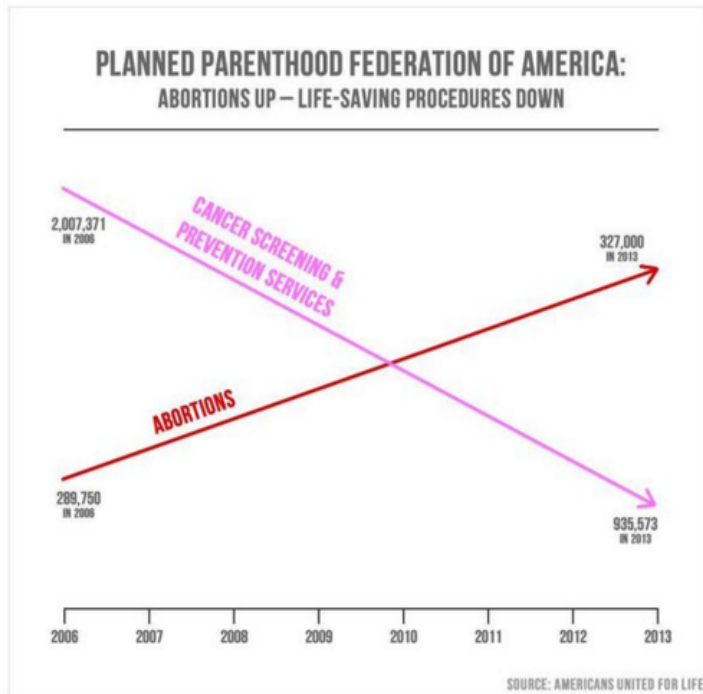
7. In the misleading graphic below, what do you notice about the percentages and bar heights? How does this make the graphic misleading? **Explain in complete sentences.**



13% is not bigger than 25%, let alone 8 times bigger! 28 percent is not even given a bar when 25 percent and 13 percent get one, and again, no Y axis and no labels.

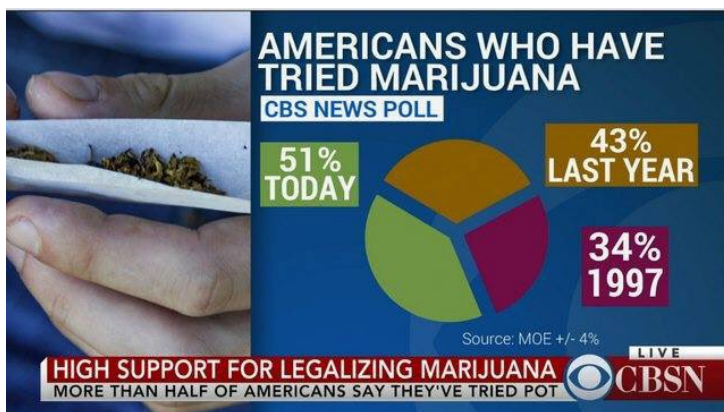
8. What key element is misleading about the graphic below? Hint, focus on the values for the endpoints of each line. **Explain in complete sentences.**

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Cancer screening and prevention services goes down by over one million, and the slope of the line appears to be somewhere around 45 degrees. Abortions go up by about 30,000, and the slope goes up by around 45 degrees. What gives? If you assume that the convergence point in 2010 means there were the same amount of abortions as screenings, then either over a million abortions were preformed that year or only 300,000 cancer screenings were preformed, neither of which makes sense. No Y axis and no labels plus extreme bias = problems!

9. The graphic below is supposed to be an example of a pie graph. What is the major flaw making this graphic misleading? **Explain in complete sentences.**



I'm pretty sure a stoner made this graph. One, $51 + 43 + 34 = 128\%$. You can't have more than 100% of a surveyed group. Two, the title implies the graph is trying to discern how much of the US population has consumed marijuana. But all three of the options presented all assume you have tried pot. There is no option for "I've never smoked pot". Three, unless yellow actually means "within the last year excluding yesterday" (whenever yesterday is) then the 364 days in the year before the year before are unaccounted for as well as every other year besides 1997. Lot of stoners that year, apparently.