

BEYOND THE NUMBERS 4.4

Get MOE Out of the Way

Name: Matthew Massey

Section Number: _____

To be graded, all assignments must be completed and submitted on the original book page.

EXHIBIT 1

Texting Error



Title: Poll Finds Support for Ban on Texting at the Wheel

Author: Marjorie Connelly

Source: *New York Times*, September 27, 2009, <http://www.nytimes.com/2009/09/28/technology/28truckerside.html>

Read the following extract from the above article and answer the related questions to see if you understand the data.

The public overwhelmingly supports the prohibition of text messaging while driving, the latest *New York Times*/CBS News Poll finds. Ninety percent of adults say sending a text message while driving should be illegal, and only 8% disagree.

...

The *Times*/CBS News telephone poll was conducted September 19–23 with 1,042 adults nationwide and has a margin of sampling error of plus or minus three percentage points.

Questions

1. How was the sample taken and what was the result of the survey?

2. Suppose someone said to you, "Sure, of the 1,042 surveyed by the poll, 90% agreed, but I bet if you interviewed all American adults you would likely find only 50% agreeing!" Is 50% a plausible value for the entire population? Why or why not?

No, 50% would not be a plausible value for the entire population according to the information given above that states that the margin of sampling error is 3 percentage points (although we are not given the confidence interval). This suggests that the population parameter should be between 87% to 93%...so 50% is not a plausible answer.

BEYOND THE NUMBERS 4.5

ME in Practice

Name: _____

Section Number: _____

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EXHIBIT 1

Is It Warm in Here?

Title: Americans Do Care About Climate Change
Author: Annie Leonard
Source: *New York Times* May 8, 2014. <http://www.nytimes.com/roomfordebate/2014/05/08/climate-debate-isnt-so-heated-in-the-us/americans-do-care-about-climate-change>.



The following is an excerpt from the *New York Times* article:

Americans do care about climate change. Polls showing lower levels of concern than in some countries don't tell the whole story. I travel widely around the U.S., attending meetings at schools, churches and community gatherings. Everywhere I go, I see people who are not only concerned about climate change, but are actively working on solutions.

Nearly two-thirds (67%) of Americans accept the scientific evidence of global warming; fewer than one in six remain in denial. Two-thirds of Americans, including a majority of Republicans, want stricter limits on air pollution from power plants.

The full report referenced by Leonard's article tells us that the original survey was conducted by the Pew Research Center in October 2013. There was a (95%) margin of sampling error of about 2.9% associated with the entire sample.

Questions

1. What are the Pew Center poll's sample and statistic?

The poll was conducted on a sample of Americans about whether they accept scientific evidence about climate change AND if they support stricter limits on air pollution...so the population is all Americans, but we are not told the sample size.

The statistic here is the proportion of Americans that accept climate change = $\hat{p} = 0.67 \pm 0.029$

2. What are the population and the parameter?

The population is all Americans

the parameter is the proportion who accept climate change...which is estimated to be $p = 0.67 \pm 0.029$

3. Using the ME given in the article, construct a confidence interval for the true proportion of all Americans who accept the scientific evidence of global warming.

The 95% confidence interval of the proportion of Americans that accept scientific evidence of climate change is between 0.641 - 0.699

4. When the data were broken down into subgroups, such as Republicans and Democrats, the associated MEs increased. Explain why that makes sense.

The margin of error would be expected to increase if the data were broken down into Republican and Democrat subgroups because you would have a smaller sample size. Smaller sample sizes lead to a larger variability in sample statistics, which leads to a larger standard error, and that leads to a larger margin of error

5. Polls often select something equivalent to an SRS (for example, likely voters) and then break that selection down into smaller subgroups, (for example, men and women). Margins of error are then computed for the smaller subgroups using the same formula as for the original sample, only with a different sample size. Argue that these smaller subgroups can be considered simple random samples.

BEYOND THE NUMBERS 4.6

Practicing What You Know

Name: _____

Section Number: _____

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Read *The Times* excerpt below. Then, answer the questions that follow.

Americans and Their Guns

Title: Poll: Majority of Americans Back Stricter Gun Laws
Authors: Sarah Dutton, Jennifer De Pinto, Anthony Salvanto, Fred Backus and Leigh Ann Caldwell
Source: CBS News January 17, 2013. http://www.cbsnews.com/8301-250_162-57564597/poll-majority-of-americans-back-stricter-gun-laws/.

As the president outlined sweeping new proposals aimed to reduce gun violence, a new CBS News/*New York Times* poll found that Americans back the central components of the president's proposals, including background checks, a national gun sale database, limits on high capacity magazines and a ban on semi-automatic weapons. Asked if they generally back stricter gun laws, more than half of respondents—54%—support stricter gun laws ... That is a jump from April—before the Newtown and Aurora shootings—when only 39% backed stricter gun laws but about the same as ten years ago.

...

This poll was conducted by telephone from January 11–15, 2013 among 1,110 adults nationwide. Phone numbers were dialed from samples of both standard land-line and cell phones. The error due to sampling for results based on the entire sample could be plus or minus three percentage points.



Questions

1. What are the sample and the statistic for the CBS News poll?

The sample is 1,110 American adults

The statistic is the proportion of American adults who support stricter gun laws in 2013 = $\hat{p} = 0.67$

The margin of error is ± 0.03

2. What are the population and the parameter?

The population is all American adults.

The parameter is the proportion of American adults that support stricter gun laws in 2013, which is estimated to be $p = 0.54 \pm 0.03$

3. This survey reports a margin of sampling error of about 3%. Follow your instructor's instructions to confirm the margin of error.
4. Find an 80% confidence interval for the true proportion of Americans who "generally back stricter gun laws." What percent decrease in width is this interval from a 95% interval?
5. The headline on this article refers to the "Majority of Americans." Carefully explain if the reference is to the population or the sample. Is the headline statistically defensible? Be sure to offer a clear defense of your answer by citing appropriate statistical evidence from the article.