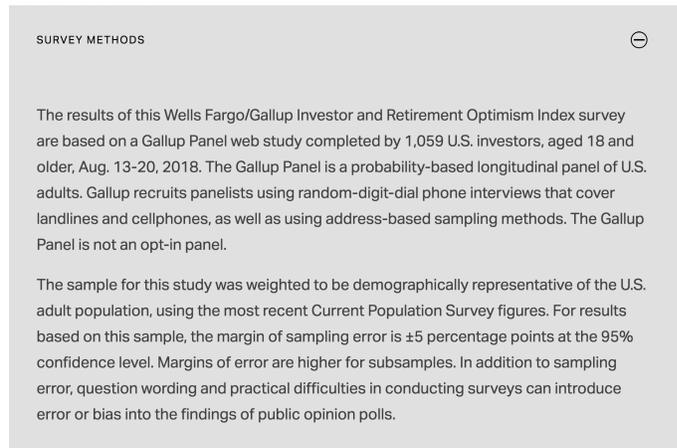# case studies lab
Dr. Sarah's 1010: Introduction to Mathematics
Consumer Statistics and Probability: To recognize misrepresentations of studies and statistical data in the real world by applying statistical techniques and understanding the role of chance and probability

goals:
- critically analyze the role of probability and chance in real world situations
- develop problem solving and analysis skills to work towards becoming logical, flexible, critical thinkers and problem solvers who consider the reasonableness of media and policies.
- communicate statistics and probability information in written documents

Gallup Poll: Go to `news.gallup.com`, which is a webpage also available from this assignment on ASULearn. Choose a recent poll that interests you which also has a **Survey Methods** section that includes a **margin of sampling error** %. This is typically found at the end of the article but not all Gallup articles have this—for example, articles that are tagged in Green with Report, Gallup Vault, Polling Matters, Gallup Blog, Gallup Podcast and more do not typically. Many articles that are tagged in Green with topic headers like Economy, Education, Politics, Social & Policy Issues, Well Being, and World are more likely to. So you may need to look around some...

SURVEY METHODS ⊖

The results of this Wells Fargo/Gallup Investor and Retirement Optimism Index survey are based on a Gallup Panel web study completed by 1,059 U.S. investors, aged 18 and older, Aug. 13-20, 2018. The Gallup Panel is a probability-based longitudinal panel of U.S. adults. Gallup recruits panelists using random-digit-dial phone interviews that cover landlines and cellphones, as well as using address-based sampling methods. The Gallup Panel is not an opt-in panel.

The sample for this study was weighted to be demographically representative of the U.S. adult population, using the most recent Current Population Survey figures. For results based on this sample, the margin of sampling error is ±5 percentage points at the 95% confidence level. Margins of error are higher for subsamples. In addition to sampling error, question wording and practical difficulties in conducting surveys can introduce error or bias into the findings of public opinion polls.

SURVEY METHODS ⊕

Survey Information and Methods:

1) What is the headline or title of the poll?

2) What is the overall margin of sampling error Gallup gives? (choose another poll if you can't find one)

3) What is the confidence level for the margin of error? (choose another poll if you can't find one)

4) What is the total sample size for this poll, if Gallup lists it?

5) On what date(s) did Gallup conduct this poll?

6) What method did Gallup use to collect the data (face-to-face interviews, phone...)?

7) What is the publication date?

Critical Analysis:

8) Based on who Gallup surveyed, what do you think is the larger "population" this poll is meant to represent?

9) Given the way Gallup chose its sample and collected its data for this poll, do you think they actually managed to get a reasonably representative sample of this population of interest? If yes, why do you think so? If not, what subgroups do you think might not be well-represented?

10) If Gallup had taken a completely unbiased simple random sample from the population for this poll, what would be the overall 95% confident margin of error, given the poll's sample size n as above in 4) and using the conservative estimate of $\dfrac{1}{\sqrt{n}}$? Show the computation and then convert to an approximate percentage.

11) Is Gallup's margin of error in 2) larger, smaller, or the same as the one you just computed?

12) If Gallup's margin of error is different than your computation, does it generate a wider interval or narrower interval than yours would?

13) Does the title of your poll make any definitive-sounding statements about changes in opinions over time, majority opinion, or differences between groups (e.g., "Record-High Support for Legalizing Marijuana Use in US," "Slim Majority against Government Pushing Traditional Values," or "Women Lead Men on Key Workplace Engagement Measures")? If so, list them. Also look for these kinds of statements inside the article and list them. If you can't find any, what are the major claims?

14) Assume for this question that Gallup's sample is indeed representative of the population (e.g., little to no bias and a random sample). If you take into account Gallup's margin of error when you interpret the poll results, is it statistically valid for the author of the article to make the claims it did? **Try to find at least one that is not supported, if it exists**. Specifically, look for data up in the article and take any overlaps into consideration—show them and explain why or why not. For instance, arguments might look something like:

53%-4% = 49% but the headline makes it sound like a majority

or

45%-5%=40% is the lower boundary and may not be highest since 1969 because 38%+3%=41% from the upper boundary of 1982 may be higher

or other critical analysis. Show your full intervals and analysis here and why the conclusions are supported or why they are not.

15) Create a visual representation of at least 2 related interval(s) from 14) on a number line. Label with numbers the endpoints of each interval, and list the contextualization of what each interval stands for (i.e. specific year, political party...), and geometrically showcase whether there are overlaps:

overlaps

or no overlaps:
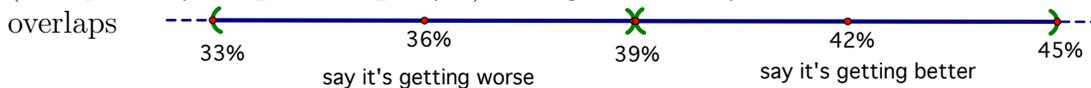
Sketch, label and list the contextualization of yours here:

16) Collate your handwritten responses, preferably on this handout, into one full size multipage PDF for submission in the ASULearn assignment.