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Polls

Suggested grade levels: 7-10

Math skills: percents, sampling

Possible subject areas: social studies, civics, history, politics

Overview

Polling has become an increasingly common practice. Polls range from attempting to determine a group's favorite movie, soft drink, or music group to considering how they view a particular politician or how they will vote in an election. With the proliferation of the Internet, the ability to quickly conduct a poll and distribute its results have increased dramatically. How much credence should we put in the results of these polls? Are all polls equally accurate? What factors should be considered when determining the accuracy of a poll?

Polls

Gallup is one of the oldest and most respected polling organizations. During the summer of 2002, they conducted a poll to determine how Americans felt about the following question:

"President Bush will spend four weeks in August at his ranch in Crawford, Texas. Do you think this is -- or is not -- too much time to spend away from the White House?" (http://www.gallup.com/poll/releases/pr020807.asp)

The results show that 44% of Americans feel this is too much, 53% feel it is not too much, with 3% undecided. We must keep in mind that this poll is measuring public opinion regarding this matter rather than some absolute and definitive answer concerning the appropriate length of time the president should spend in Crawford. Interestingly, in a similar poll taken by Gallup the previous summer, 55% of Americans felt the vacation was too long, 42% felt it wasn't too long and 3% were undecided.

(http://www.gallup.com/poll/releases/pr020807.asp)

If these polls are reasonably accurate (a question we will address later) considerably more American adults feel this amount of time is appropriate this summer as compared to the number who felt it appropriate last summer.

Additional light can be shed on this poll by considering Bush's job approval rating polls at different times during his presidency. A sampling of Gallup Poll and CNN/USA Today/Gallup Poll results regarding Bush's job approval rating are shown below:

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"Do you approve or disapprove of the way George W. Bush is handling his job as president?"

	% Approve	% Disapprove.	% Don't Know	Sample Size
8/5-8/02	68	26	6	1,007
7/29-31/02	71	23	6	1,003
7/26-28/02	69	26	5	1,004
7/22-24/02	69	24	7	1,005
7/9-11/02	73	21	6	1,004
10/5-6/01	87	10	3	819
9/21-22/01 *	90	6	4	1,005
9/14-15/01	86	10	4	1,032
9/7-10/01	51	39	10	1,004
8/24-26/01	55	36	9	814
8/16-19/01	57	34	9	1,013
8/10-12/01	57	35	8	1,017
8/3-5/01	55	35	10	1,017
7/19-22/01	56	33	11	1,038
7/10-11/01	57	35	8	998

* The highest approval rating recorded for any president by the Gallup Organization, which began asking the question when Franklin D. Roosevelt was in the White House. (http://www.pollingreport.com/BushJob.htm)

During the summer of 2001, Bush's job approval rating hovered in the mid to high 50's. During the summer of 2002, his job approval ratings were considerably higher ranging from the high 60's to low 70's. As consumers of these polls it seems reasonable to assume that Bush's higher job approval ratings play a role in the public's improved view regarding the length of his stay in Crawford, Texas.

You may have noticed that each of the job approval ratings polls mentioned above includes approximately 1000 respondents. A natural question to ask is whether or not this sample size is big enough to give an accurate measure of the entire population.

1. Approximately 1 out of every how many American adults is included in a sample of size 1000? Use http://www.gallup.com/help/FAQs/poll1.asp to find helpful information.

2. What percent of the adult population of the United States is represented by a sample of approximately 1000?

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Gallup's statisticians are confident that a sample of 1000 American adults is large enough to provide a reasonably good estimate of how the population as a whole feels. Unfortunately, the mathematics behind their claim is beyond the scope of this module.

If you are surprised that such a small percentage of the population can yield a reasonably accurate poll, you are not alone. In fact, Gallup, in an attempt to determine how the general public feels about polls made an interesting discovery. They found that while Americans tend to believe the results of polls, they find the mathematical basis for them suspect. In particular, most people find it hard to believe that a poll of 1000 people can give an accurate measure of the beliefs of the entire population of American adults.

How accurate does Gallup claim their polls to be? For example, can we assume that more American adults approved of President Bush's job performance from July 29 to 31 as compared to July 26-28? The poll conducted from the 29th to the 31st indicated a job approval rating of 71% as compared to a job approval rating of 69% in the July 26th to 28th poll. Is a difference of 2% enough to be confident that an actual increase in the number of people who approve of Bush's job performance occurred in the overall population of American adults? How about a difference of 10%?

There is a mathematical explanation for the accuracy of this poll, which, as we have said, is beyond the scope of this module. But with a sample of 1000, the mathematical underpinning of Gallup's polling procedures tells us that 95% of the time the actual percent of American adults feeling a particular way is within 3% of the percent indicated by the sample. (http://www.gallup.com/help/FAQs/poll1.asp).

Given this criterion we can be quite confident that more American adults feel President Bush's time in Crawford is appropriate this summer as compared to the number of American adults who felt that way last summer. One way to explain why is to consider the interval determined by adding or subtracting 3% from the percents identified by the poll. We are 95% confident that during the summer of 2002 the percent of American adults feeling the time is not too long is between 50% and 56%. Similarly, we are 95% confident that during the summer of 2001 the percent of American adults feeling the time is not too long is between 39% and 45%. Since these intervals do not overlap we conclude that the differences indicated by these polls are significant.

3. Explain why the differences in Bush's job approval rating of 69% during the July 26th-28th poll and 71% during the July 29th-31st poll should NOT be considered significant.

Another equally important yet often less asked question is how the samples are selected. Gallup takes extreme care to select their sample as randomly as possible. This means that each member of the population has an equal chance of being chosen. Indeed it is the means by which the sample is selected that distinguishes between scientific polls like the Gallup Polls we have discussed so far and unscientific polls.

Most unscientific polls allow anyone to participate. In other words, the sample is self-selected. Phone-in polls and Internet surveys are examples of unscientific polls. While such polls may be entertaining, we must be extremely careful in interpreting their results.

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The mathematical principles applicable to scientific polls are no longer appropriate. Therefore, we cannot consider confidence intervals or make reasoned judgments regarding the entire population based on the results of such polls.

4. How accurate would you consider an Internet survey that asked whether or not you owned a computer?

5. Create a poll question and explain why an unscientific approach to sampling would probably yield inaccurate results.

For the Teacher

1. The adult population of the United States is approximately 187,000,000. 1000/187,000,000 can be reduced to 1/187,000. Therefore, approximately 1 in every 187,000 Americans adults is included in a sample of 1000.

2. 1/187,000 corresponds to approximately 0.00053%.

3. Rather than considering the 69% and 71% figures to be completely accurate, we should instead consider intervals ranging 3% above and below each of the reported values. The interval for the July 29th-31st poll is 68% to 74%. The interval for the July 26th-28th poll is 66% to 72%. Since these intervals overlap, we cannot say with confidence that the actual number of American adults who approved of Bush's job performance increased from one poll to the next.

4. We would not expect this survey to be very accurate. Clearly the sample would not be representative of the population as a whole. Although some people might lie and others might be answering on someone else's computer, we would nevertheless expect a very high percentage of respondents to indicate that they own a computer. Unfortunately, this would tell us very little about the percentage of people in the entire population who own a computer.

5. Answers vary.

References

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http://www.harrisinteractive.com/news/allnewsbydate.asp?NewsID=186

http://www.gallup.com/poll/releases/pr020807.asp

http://www.gallup.com/help/FAQs/poll1.asp

http://www.gallupjournal.com/GMJarchive/issue1/2001315f.asp

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http://www.usatoday.com/news/poll020.htm