The Theory of Polls

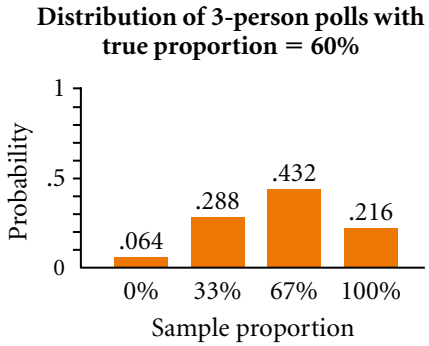
In *The Theory of Three-Person Polls,* you found the theoretical probability for each possible outcome of a three-person poll. As the person in charge of polls for Coretta Collins, you need to study the theory of polling more fully in order to better understand the reliability of polls.

For larger polls, there are more possible outcomes, each with a theoretical probability. The main focus of this activity is on how the probabilities change as the poll size changes.

For the sake of making comparisons, assume throughout this activity that the true proportion is .6. That is, assume 60% of the population favors the candidate.

continued

Once a poll is taken, the pollster can compute the sample proportion, which is the fraction of those polled who favor the candidate. For the case of a three-person poll, the theoretical distribution for the sample proportion is shown in the graph. Notice that roughly 35% of such polls (.064 + .288) would show the candidate is trailing, even though the candidate has the support of 60% of the overall population.



1. Consider the case of a five-person poll. The number of voters in the poll who support the candidate could be 0, 1, 2, 3, 4, or 5, so the sample proportion could be 0%, 20%, 40%, 60%, 80%, or 100%.
   a. Find the probability of each of these possible results. (*Reminder:* Assume the true proportion is .60.)
   b. Make a probability bar graph of your results.
   c. What percentage of five-person polls correctly show the candidate leading?
2. Now consider the case of a nine-person poll.
   a. Find the probability of each possible outcome.
   b. Make a probability bar graph of your results.
   c. What percentage of nine-person polls correctly show the candidate leading?