

## Cuddling Preferences



A recent poll of British pet owners shed light on the extent to which pet owners like to cuddle with their pets. In many cases, pet owners appear to prefer cuddling with their pets more than with their partners. In this activity, you will be exploring the following research question:

What percentage of women prefer cuddling with their dog rather than with their partner after accounting for sampling uncertainty?

### Examine the Observed Data

1. Use the data in the file *women-cuddle-20.tp* to provide an answer to the research question based on the observed data.

### Bootstrapping an Interval Estimate

2. Carry out 500 bootstrap trials. Plot the results from the 500 trials and sketch the plot below. Make sure to label the axis.

### Evaluating the Bootstrap Distribution

3. Find the mean of the bootstrap distribution. Explain why you could expect the bootstrap distribution to be centered at this value by referring to the model from your TinkerPlots™ sampler.
4. Compute the standard error (use the `stdDev()` function) based on this simulation.
5. Using the standard error, compute the margin of error.

6. Compute the compatibility interval for the percentage of women who prefer to cuddle with their dog rather than their partner.

### Exploring the Effect of Sample Size

The compatibility intervals you computed were both based on a sample size of 20 women. What happens to the uncertainty in the compatibility interval if you have a different sample size? You will explore this by computing compatibility intervals using two other sample sizes.

7. Fill in the first row of the table below with the information from the compatibility interval for women based on the sample size of 20.

Sample Size	Observed Percentage	Standard Error	Compatibility Interval

8. Open the file *women-cuddle-100.tp*. Use these data to provide an answer to the research question: What percentage of women prefer cuddling with their dog rather than with their partner after accounting for sampling uncertainty? To do this, estimate the percentage from the observed data, and then carry out 500 bootstrap trials to estimate the uncertainty in the estimate. Fill in the information from this analysis in the second row of the table.

9. Open the file *women-cuddle-500.tp*. Use these data to provide an answer to the research question: What percentage of women prefer cuddling with their dog rather than with their partner after accounting for sampling uncertainty? To do this, estimate the percentage from the observed data, and then carry out 500 bootstrap trials to estimate the uncertainty in the estimate. Fill in the information from this analysis in the second row of the table.
10. Use the information in the table to explain the relationship between sample size and the uncertainty expressed in the compatibility interval.
11. Why do you think that sample size and uncertainty are related in this way? Explain.