***Section 3.3: Constructing Bootstrap***

***Confidence Intervals***

***Activity 1: Number of Text Messages in a Day***

Information for Instructors: Find a 95% confidence interval for the number of text messages sent/received in a day by students at your university by polling the class. Have the students write down the number of text messages they sent or received in the last 24 hours. Then collect the answers and enter the sample values into StatKey using the “Edit Data” option in a confidence interval for a mean (or use other technology). Generate lots of bootstrap samples, estimate the standard error from the bootstrap distribution, and use

Sample statistic ± 2 ⋅ SE

to find the 95% confidence interval. The goal is to help the students see how straightforward the process is. Be sure to interpret the interval in context at the end – and to discuss with your students what the appropriate population might be. See attached handout.

***Activity 2: Number of Laughs in a Day***

Information for Instructors: This activity requires some advanced planning. Bring some 3 × 5 cards to class (or cut some in half and bring the half-cards to class.) Give students the dataset in the table below (or use the attached handout) and have them use the cards to generate a bootstrap sample. Have them share the results with each other to get a sense of variability of the results. Then use StatKey (or other technology) to generate a full bootstrap distribution and find and interpret a 95% confidence interval using

Sample statistic ± 2 ⋅ SE.

See attached handout.

Number of laughs in a day for six adults:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 16 | 22 | 9 | 31 | 6 | 42 |

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***Activity: Number of Text Messages in a Day***

How many text messages have you sent or received in the last 24 hours? \_\_\_\_\_\_\_\_\_\_\_\_

Combine all the answers from the class to create a sample.

What is the mean of the sample values? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Use StatKey or other technology to create a bootstrap distribution using this sample.

What is the standard error of the bootstrap distribution? \_\_\_\_\_\_\_\_\_\_\_\_\_

Use the mean of the sample and the standard error from the bootstrap distribution to construct a 95% confidence interval for the number of text messages sent/received in a day by students at your university, using

Sample statistic ± 2 ⋅ SE.

Clearly interpret the result:

***Section 3.3: Constructing Bootstrap***

***Confidence Intervals***

***Activity: Number of Laughs in a Day***

How many times do you think you laugh in a day? \_\_\_\_\_\_\_\_\_\_\_\_

Suppose the following table gives the number of laughs in a day for six people:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 16 | 22 | 9 | 31 | 6 | 42 |

Using this sample, what is the mean number of laughs in a day? \_\_\_\_\_\_\_

**Use this data, and cards, to create three different bootstrap samples.**

* How many cards to you need?
* What do you put on the cards?
* What do you do with the cards to create a bootstrap sample?
* What statistic do you compute from the bootstrap sample?

Use your cards to find three bootstrap samples and give them below. Also, compute the bootstrap statistic for each:

1.

2.

3.

Compare answers with those around you to get a sense of the variability of the bootstrap statistics.