

Table Number: _____

Group Name: _____

Group Members: _____

Reese's Pieces Parts 2 & 3

Part 2: Compare Sample Statistics to the Population Parameter

Discuss the following *Things to Consider* questions with your group. Be prepared to report back to the class. Jot your answers in the space below each question. Be sure every member of your group participates and that each understands and agrees with the final comments written.

Things to Consider

The proportions you have calculated are the **sample statistics**. For example, the proportion of orange candies in your sample is the statistic that summarizes your sample.

1. Did everyone in the class have the same number of orange candies?
2. Did everyone have the same proportion of orange candies?
3. Describe the variability of the **distribution of sample proportions** on the board in terms of shape, center, and spread. **This is the most important question so far!!!! Be sure to be thorough and concise. I'll be grading this one strictly.**
4. Do you know the proportion of orange candies in the population?
In the sample?
5. Which one can we always calculate?
Which one do we have to estimate?
6. Does the value of the **parameter** change, each time you take a sample?
7. Does the value of the **statistic** change each time you take a sample?

Part 3 : Simulate the Sampling Process

You will now simulate additional data and tie this activity to the *Simulation Process Model (SPM)*.

- Go to our Blackboard course homepage, then to the “Classroom Materials” folder, then “Chapter 7.”
- In the “Reese’s Pieces Simulation” folder, click on “Reese’s Pieces Sampling App.”

You will see a big container of colored candies that represents the POPULATION of Reese’s Pieces candies.

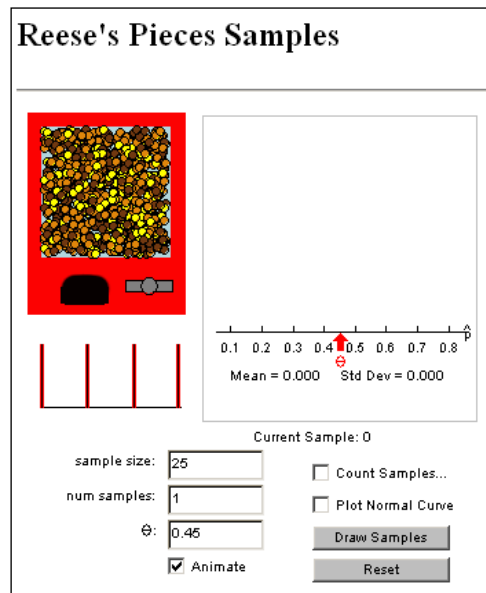


Figure 3: Reese's Pieces Samples Web applet

1. The simulation uses a Greek letter, π (pi) or Θ (theta), to represent the population proportion. What is the proportion of orange candies in the given population? _____ (Note: Normally, we didn't know the parameter value but one catch in running a computer simulation is that we have to assume a value for the simulation to work.)

Please reset the proportion of orange candies to be 0.45. This is the **population parameter**. (People who have counted lots of Reese's Pieces candies came up with this number.)

2. How does 0.45 compare to the proportion of orange candies in your sample? Explain.
3. How does it compare to the center of the class' distribution? Does it seem like a plausible value for the population proportion of orange candies? Explain.

9. Where does the value of 0.2 (i.e., 5 orange candies) fall in the distribution of sample proportions? Is it in the tail or near the middle? Does this seem like a rare or unusual result?

10. a) Are the conditions met in order to conclude that the sampling distribution is approximately Normal? (Use the value for p given in the simulation.)

Condition 1:

Condition 2:

Condition 3:

b) Find the mean and standard deviation for the sampling distribution:

mean =

standard deviation =

c) Find the probability that the proportion of orange candies in a random sample of 25 Reese's pieces will be less than .2

When we generate sample statistics and graph them, we are generating an estimated **sampling distribution**, or a distribution of the sample statistics. It looks like other distributions we have seen of raw data.

Reference

Rossmann, A., & Chance, B. (2002). A data-oriented, active-learning, post-calculus introduction to statistical concepts, applications, and theory. In B. Phillips (Ed.), *Proceedings of the Sixth International Conference on Teaching of Statistics*, Cape Town. Voorburg, The Netherlands: International Statistical Institute. Retrieved September 28, 2007, from http://www.stat.auckland.ac.nz/~iase/publications/1/3i2_ross.pdf