Introduction to Data Science *Bootstrap Confidence Intervals*

**Bootstrap Confidence Intervals: Extra Practice**

The VPR – Vermont PBS Poll is a survey of Vermonters. <http://projects.vpr.org/vpr-vermont-pbs-2020-polls-september> It was sponsored jointly by Vermont Public Radio (VPR) and Vermont PBS, Colchester, VT. Data were collected in September, 2020, by Braun Research, Inc., a market research, data collection, and data processing company headquartered in Princeton, New Jersey, with call centers in four locations, under the direction of Rich Clark, professor of political science at Castleton University and the former director of the Castleton Polling Institute. 604 interviews were conducted by phone with live interviewers.

***Q24. If you were to advise an 18-year-old considering where to build a successful life and career, would you recommend that he or she stay in Vermont or leave Vermont?***

47% Stay in Vermont  
36% Leave Vermont  
17% Not sure/It depends  
1% Refused  
*604 Total Respondents*

1. Based on the data collected, provide a single number estimate of the proportion of Vermonters who think 18-year olds should stay in Vermont.
2. Set up a bootstrap model in R based on the results in the observed data, and carry out about 10000 trials of the simulation. Create a histogram, and paste the plot of the bootstrapped proportions below, remembering to label axes.
3. Explain what each dot on the plot represents.
4. Where is the distribution centered? Explain why it makes sense that the distribution is centered at this value.
5. Write down the **standard error** . What does this value represent (interpret its value)?
6. Using the standard error, compute the margin of error.
7. Obtain the interval estimate for the true percentage. Use the interval estimate to provide an answer to the research question. (State the interval in a complete sentence in terms of the problem – I’m 95% sure that….)
8. The point estimate is below 50%, but the fact that it is a minority could be due to chance. Does our confidence interval suggest that the true proportion is a minority? If not, how can you tell? If so, how sure are you that the true proportion is a minority?