Week #7 Reading Questions Responses

For Questions 1 - 4, assume you are working with a population that is normally distributed with mean μ and standard deviation σ. Note that although these population parameters exist, you cannot know their exact values and you must estimate them through sampling.

1. Q1 (1 pt.): Explain the effect, if any, of the population mean on the width of CIs for a population that is normally distributed. If population mean does not affect the widths of CIs explain why not.

The population mean does not affect the width of CIs. CI is the sample mean± CI radius(sample standard error multiplied by critical z-value). Critical z-values are calculated for the standardized sampling distribution.

1. Q2 (1 pt.): Explain the effect, if any, of the population standard deviation on the width of CIs. If population standard deviation does not affect the widths of CIs explain why not.

Population standard deviation does affect width of CIs. SSD estimates PSD. SSD is used in calculations of standard error and therefore CI. The larger the PSD, the larger SSD and width of CI(greater uncertainty) , the lower the PSD, the lower SSD and width of CI(lesser uncertainty).

1. Q3 (1 pt.): Explain the effect, if any, of the population size on the width of CIs. If population size does not affect the widths of CIs explain why not.

Population size does not affect the width of CIs because population size is large and unknowable because we cannot observe every individual of the population and so it can only be estimated.

1. Q4 (1 pt.): Explain the effect, if any, of the sample size on the width of CIs. If sample size does not affect the widths of CIs explain why not.

As the sample size increases, the sample standard error decreases which decreases the width of CIs(lower uncertainty).

1. Q5 (4 pts.): Interpreting a CI. Use a narrative example of a real (or made up) dataset to describe what a Frequentist 95% confidence interval really means.

Make sure you cover any relevant assumptions of the Frequentist paradigm.

You answer must be in non-technical language.

Imagine you were explaining confidence intervals to an audience of teenagers, or perhaps a family member who doesn’t have training in statistics.

A frequentist 95% confidence interval really means that if we for example would like to know the average weight of all Chinstrap Penguins on the Antarctic peninsula which we will consider large and unknowable, **by taking a large number** ofmeasurements of the average weight of random groups of Chinstrap Penguins belonging to this population, we could determine a corresponding range around each average weight, a range we believe contains the average weight of this population and 95% of the time the average weight of the population will be contained in these ranges.