Reading Questions 7

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I worked alone

- **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 mean **does not** affect the width of the CI – it is the center of the distribution.

- **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.
    - The standard deviation **does** affect the width. The "margin of error" that is used to create the width is the standard deviation times the critical value. As standard deviation decreases, so does the width.

- **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. This calculation depends on sample statistics, not population parameters. The size of the sample will affect it, but not the population.

- **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.
    - Sample size **does** affect the width. As sample size increases, the width decreases.

- **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.

As sample cannot fully capture the reality of a population – but most often it's all we can get! If we wanted to know the mean number of ovules that *Achillea millefolium* produces in different habitats, it would be absolutely impossible to count the ovules of every flower on every plant (it would take several lifetimes). But, we can choose a few different habitats that represent our question, and select a plants, and select a few flowers from each plant, and count the ovules in those flowers. Then, we'd have some numbers that represent the means of ovules in different habitats – but they are still informed estimates (not the actual number!). Then, we create an interval around the means we've come up with that captures how much our sample varies from the populations – the more sampling we do, the more narrow the interval is. A CI of 95% or more means that if we continued to sample in Yarrow flowers in the same way and created confidence intervals for each of them, we are sure that 95% of those intervals contain the true mean of the ovules in yarrow.