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ECo 602: Michael France Nelson

Week 7 Reading Questions

1. The population mean does not have any effect on the width of confidence intervals because mean is a single value used to centralize the data but not to determine the confidence of values around itself nor the width.
2. The population standard deviation effects the width of the confidence interval because it is used to calculate the sample standard deviation. The sample standard deviation is then used to calculate the sample standard error which is multiplied by the critical z-value to get the CI radius. Therefore, if the population standard deviation is greater, the width of the confidence interval width will be wider. Reversely, if population S.D. is smaller, the confidence interval width will be narrower. If we look at a real-life example of a population of wild boars in Southern California and their tusk size, the influence of population standard deviation on confidence interval width can be demonstrated. If there is minute variation in tusk size, the population standard deviation will be lower. Thus, the confidence interval will not be as wide because there is much less variation in tusk size compared to a population with a very large variation.
3. The population size does not have any effect on the confidence interval width because population size is considered unknowable in frequentism. Since it is considered unknowable, it isn't used in the calculation of CI. If we think about a wild boar population for an invasive species project in Southern California, the best we can do is estimate the population size through sampling efforts, but it would be impossible to know the exact population due to birth/death rates and inability to capture and tag every individual. For this reason, population size cannot influence confidence interval width.
4. The sample size also has a great effect on the width of CI's. In general, a larger sample size means that there is a smaller standard error because it is more descriptive of the true population size. Therefore, CIs get narrower with larger sample sizes.
5. A 95% confidence interval of wild boar tusk size in Southern California tells us that if we were to repeat the experiment many times, approximately 95% of the confidence

intervals I construct would contain the true population parameters. In this instance, the confidence interval is the sample mean of tusk size plus or minus the confidence interval radius. The radius is calculated to draw the upper and lower bounds beyond which only 5% of the total probability of tusk size lies (2.5% below and 2.5% above). We determine our confidence interval using sampling distribution, and the key to sampling distribution is standard error. Standard error describes how we feel about the wild boar population of possible samples we could collect. This is important because the exact population parameters of wild populations are unknowable, so standard error quantifies the accuracy of our estimate compared to the population. Once we calculate this value, the confidence interval can be modeled to depict the most accurate analysis of tusk size based on the data we have available.

I did not work with anyone.