PSYC 2317: Statistical Methods for Psychology

1. A random sample of $N = 25$ individuals is selected from a population with $\mu = 20$, and a treatment is administered to each individual in the sample. After treatment, the sample mean is found to be $\overline{X} = 22.2$ with $SS = 384$. Based on the sample data, does the treatment result in a significant increase?

2. To evaluate the effect of a treatment, a sample is obtained from a population with a mean of $\mu = 30$ and the treatment is administered to the individuals in the sample. After treatment, the sample mean is found to be $\overline{X} = 31.3$ with a standard deviation of $\hat{\sigma} = 3$.

   (a) If the sample consists of $N = 16$ individuals, are the data sufficient to conclude that the treatment results in a significant increase?

   (b) If the sample consists of $N = 36$ individuals, are the data sufficient to conclude that the treatment results in a significant increase?

   (c) Comparing your answers for parts (a) and (b), how does the size of the sample influence the outcome of a hypothesis test?

3. Standardized measures seem to indicate that the average level of anxiety has increased gradually over the past 50 years (Twenge, 2000). In the 1950s, the average score on the Child Manifest Anxiety Scale was $\mu = 15.1$. A sample of $N = 16$ of today's children produces a mean score of $\overline{X} = 23.3$ with $SS = 240$. Based on this sample, has there been a significant change in the average level of anxiety since the 1950s?

4. A sample of $N = 9$ individuals participates in a repeated measures study that produces a sample mean difference of $\overline{X} = 4.25$ with $SS = 128$ for the difference scores. Is this mean difference large enough to be considered a significant increase?