Estimation and Confidence Intervals

Part II

Point and Interval Estimates

- **Confidence Interval Estimates of Population Parameter:**

Let μ_s and σ_s be the mean and standard deviation (standard error) of sampling distribution of statistics *S*. Then if sampling distribution of S is approximately normal, we can expect to find an actual sample statistics S lying in the intervals $\mu_s - \sigma_s$ to $\mu_s + \sigma_s$, $\mu_s - 2\sigma_s$ to $\mu_s + 2\sigma_s$, or $\mu_s - 3\sigma_s$ to $\mu_s + 3\sigma_s$, about 68.27%, 95.45% and 99.73% of the time respectively.

Point and Interval Estimates

- Equivalently, we can be 68.27%, 95.45% and 99.73% confident of finding μ_s in the intervals $\mu_s - \sigma_s$ to $\mu_s + \sigma_s$, $\mu_s - 2\sigma_s$ to $\mu_s + 2\sigma_s$, or $\mu_s - 3\sigma_s$ to $\mu_s + 3\sigma_s$. Because of this we call these respective intervals the be 68.27%, 95.45% and 99.73% confidence intervals for estimating μ_s.

Point and Interval Estimates

- Similarly, $S \pm 1.96\sigma_s$ and $S \pm 2.58\sigma_s$ are 95% and 99% (or 0.95 and 0.99) confidence limits for S. The percentage confidence is called confidence level. The numbers 1.96, 2.58 etc in the confidence limits are called confidence coefficients or critical values and are denoted by z or z_c.

Point and Interval Estimates

- **Factors Affecting Confidence Interval Estimates:**
- The factors that determine the width of a confidence interval are:

1. The sample size, *n*. *(Inversely related)*
2. The variability in the population, usually σ estimated by *s*. *(directly related)*
3. The desired level of confidence. (Directly related)

Point and Interval Estimates

To be continued -----------

THANK YOU