Simple Conditions

• Seldom true in practice
• Important guide to concepts
• Discuss later how to generalize
• Now review points and discuss practical difficulties.

SC1: SRS

• SRS is an ideal seldom achieved in practice.
• Alternate formulas for other kinds of sampling.
• Situation-specific examination required.
  – Psychology — Optical illusion: Subject pool probably typical of larger pop.
  – Sociology — Economic issues: Students probably not typical of larger pop.

SC2: Perfectly Normal Population

• Seldom true in practice.
• Approx. normal OK.
  – Skewness a serious difficulty in small samples.
  – Outliers serious even in large samples.
• CLT helps when the sample mean is the statistic used for inference.

SC3: Population SD Known

• Usually, at best, we have only an educated guess as to the value of $\sigma$.
• If the sample size $n$ is large enough (30?), then we may be able to use sample SD $s$ in place of population SD $\sigma$ in formulas.
• “Student’s $t$” distribution (to be studied later) helps when $n$ is small.

3-Way “Contest” Among Desirable Properties of a CI.

• Small Margin of Error $M$.
• Small Sample Size $n$.
• High Degree of Confidence $C$.
• Can’t improve any one of these without damaging one or both of the others.
• Common strategy: Set $C = 95\%$ and balance $n$ and $M$ against each other.

Use of Sample Size Formula

• Calculation of $n$ occurs before we take data.
• Must have an advance guess as to $\sigma$.
  – Past experience
  – Guess of expert in the area
  – Small pilot study
• Usually set $C = 95\%$ so $z = 1.96 = 2$.
• Consider carefully what $M$ is really needed.
• Use formula to get $n$.
• Often: Recover from the shock, try again.