Stat 350 Lab: Week 2
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Section 19: Monday 5:30-7:00 pm, 444-B MH
Section 49: Monday 8:00-9:30 pm, 444-B MH

Agenda

Observational vs Experimental Studies:
• In-class discussion

Time Series:
• Activity #1 – More Time Dependent Data
  – Background #1: deathrate
  – Background #2: Open up the airline.sav

Checking for Normality:
• Activity #3 – Checking Normality
  – Task 1
  – Task 2

Clicker Review

Observational vs Experimental Studies
• Observational Studies: The researchers simply observe or question the participants about opinions, behaviors, or outcomes. Participants are not asked to do anything differently.
• Experiments: The researchers manipulate something and measure the effect of the manipulation on some outcome of interest. Often participants are randomly assigned to the various conditions or treatments.
• Most studies, either observational or experimental, are interested in learning of the effect of one variable (called the explanatory variable) on another variable (called the response or outcome variable).

Time Plots
• Also called Sequence Plots
• Refer to “Historic Data”
• To view data collected over time (time series)
• Graph observations as a function of time
  – Horizontal axis: Time unit (years, months, days, hours, minutes,...)
  – Vertical axis: Observations

Examples of Time Series:
• Stock Prices:

  ![Graph of Stock Prices](image)

  • Time unit is
Examples of Time Series:

- Unemployment Rates in Michigan:

Overall Patterns to watch for:

- Trend:

- Seasonal Variation:

- Long-term change in variation

Random Samples

- Independent and Identically Distributed (i.i.d)
  - All come from same parent population
  - Identically Distributed: Check for stability in Time Plot
    - Constant Mean (no trend)
    - Constant Variation

Module 3: Activity 2

To make time plots on SPSS:

\textit{Analyze} > \textit{Time Series} > \textit{Sequence Charts}

\textbf{Note:} This option is not available in the student version.

- Background 1: Death rates in accidents
  - Enter data
  - Answer questions (#5 very important!)
- Background 2: Passenger flow on airlines

Check for Normality

- Histograms
  - Graphs should look bell-shaped
- Q-Q Plots
  - Graph should be a straight line that passes the origin with a 45 degree angle (should look like the graph $y=x$)
  - Graph of Q-Q Plots
    - Horizontal Axis: Percentiles of observed data
    - Vertical Axis: Percentiles of normal distribution

Module 3: Activity 3

\textbf{Task 1:}

- iq.sav dataset:
  - Data drawn from a normal distribution?

\textbf{Task 2:}

- employee.sav dataset:
  - Salary variable
    - Create Histogram and describe shape
    - Create QQ plot and explain
    - Create Histogram and QQ plot for each gender and elaborate