Simple Statistics and Graphics in Excel

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Clinical and Translational Science Institute (CTSI)

&

Division of Biostatistics

Simple Statistics and Graphics in Excel

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CME Evaluations

- Please help us by fill out an evaluation, even if you are not eligible for CME credit.

Structure of the Data

- Data should always be entered in the form of a list
  - Color should not contain additional information
  - Each row should contain information on only one subject
- Nothing but data should be on the spreadsheet
- No special codes for missing data

Bad Data Entry

Treatment Group	Control Group	Treatment Group	Control Group
Age			

Correct Data Entry

Group	Age	Height
1	23	71
1	28	67
1	42	63
1	45	74
2	68	61
2	62	71
2	78	64

- One row for each subject
- Variables clearly labeled
- No additional analysis

Descriptive Statistics

- Can use built in Excel functions to calculate descriptive statistics
  - AVERAGE
  - MEDIAN
  - STDEV
- More are available in the Data Analysis add-in
- Notes
  - Make sure to output results to a separate worksheet
  - Results do not change if data is altered
- Example

Cross Classification Tables

- Pivot tables
- Pan

Correlation

- Available in Data Analysis add-in
- Only gives estimate of the correlation coefficient
- Can also use CORREL function available in Excel
  - CORREL(array1,array2)
- Example

Statistical Tests

- Very limited options in Excel for inference
- LittTJ 0t0oA6to no suppor(s)16 -051 DcattialnferenI
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Independent T Test

- Found in data analysis add-in
- Available for equal and unequal variances
- TTEST function also performs the analysis
- TTEST(group 1, group 2, tails, type)
  - Type=2 equal variances
  - Type=3 unequal variances
- Preferable to perform using the add in
  - Function provides only the p-value
- Example

Paired T-Test

- Available in either the data analysis add-in or using the TTEST function
- If using the TTEST function, setting type equal to 1 produces the p-value for the paired t-test
- Example

Regression

- Available in data analysis add in
- Produces several statistics in output
  - R squared
  - ANOVA table
  - Regression coefficients

Types of Graphs

-

Pie Charts

- Displays qualitative variable with a small number of categories
- Divides a circle into slices based on the relative frequency of each category
- Insert Charts Pie
- Example

Bar Charts

- Also used to display qualitative data
- Easier to visualize data with a bar chart than a pie chart
- Able to display data with more categories
- Insert Charts Column 2D Column
- Example

Line Graphs

- Also referred to as trend plots or frequency polygons
- Often used to display trends in data over time
- Data must be in the form of a frequency distribution
- Select only the data from the frequency column
- Insert Charts Line
- Example

Scatterplots

- Graphical view of pairs of measurements on two variables
- Insert Chart Scatter
- Regression analysis
- Overlay the fitted regression line on top of the scatterplot
- Procedure in Excel
  - Right click on the points on the scatterplot
  - Select

Limitations

- Several options for graphs in the Chart Wizard
- Many common statistical graphs that are not available in Excel
  - Dot plots
  - Box plots
  - Stem and leaf plots
- Many of these graphs can be produced by manipulating the available charts

Qualities of Good Graphs

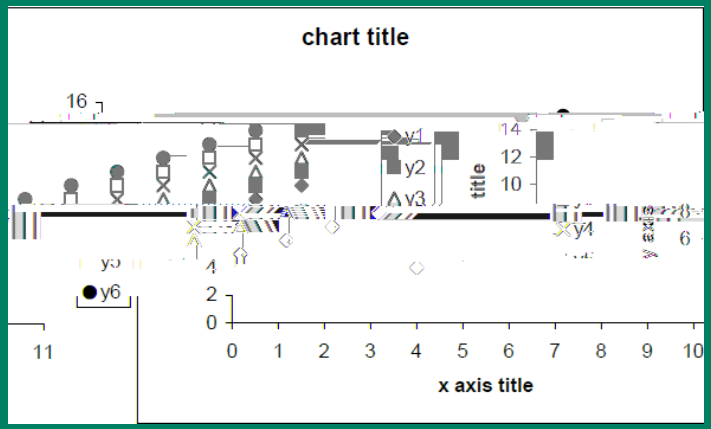
- Portray information without distortion
- No distracting elements
- Axes should contain the correct range
- Axes should be labeled appropriately
- Descriptive titles, captions, and legends
- The default graphs in Excel meet very few of these criteria

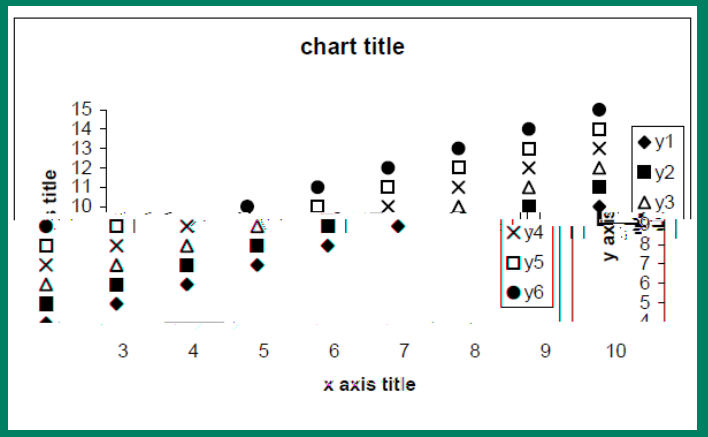
Third Dimension

- There is an option in Excel for a 3D line graph
- Data display is not optimal
- Third dimension is meaningless

Axis Ranges

- Default in Excel can leave blank space
- Variation is often concealed in the default plot





Modifying the Graphs

- Visual aspects of the default graphs are often not optimal
- Not appropriate for publication or presentation
- Aspects that can be modified
  - Background
  - Gridlines
  - Colors
  - Legends
  - Titles and captions

Modifying the Graphs

- Background
  - Default background color is dark grey
  - Distracting and can often hide features of the graph
  - Solution: Right click on graph and select ‘Clear’

- Gridlines Solution

Modifying the Graphs

- Colors
  - Default colors are often difficult to distinguish
  - Think carefully about what colors can add to the graph
  - Different colors may not be necessary
  - Solution: Tools Options Color Chart lines

- Legends
  - Often necessary to identify different 1 Tw -0.0097](6 Tc -0.001 Tw 0.2

Modifying the Graphs

- Titles
  - Graphs should always have titles and axes labels
  - Excel does not automatically add these labels
  - Solution
    - Double click on the graph
    - Layout Axis Title
    - Layout Chart Title

Resources

- The Clinical and Translation Science Institute (CTSI) supports education, collaboration, and research in clinical and translational science: www.ctsi.mcw.edu
- The Biostatistics Consulting Service provides comprehensive statistical support www.mcw.edu/biostatistics.htm

Free Drop-In Consulting

- MCW/ Froedtert: 1 – 3 PM
  - Monday, Wednesday, Friday @ CTSI Administrative offices (LL772A- TRU offices)
  - Tuesday, Thursday 1 – 3 PM @ Health Research Center, H2400
- VA: Every Monday, 9:30-10:30 am
  - VA Medical Center, Room 70-A 314-A
- Marquette: Every Tuesday, 8:30-10:30 am
  - School of Nursing, Clark Hall, Office of Research & Scholarship

References

- Pace, L.A. (2007). *The*