



Introduction to Statistics

This will be painless - *really!*




Calculation vs. literacy

- ★ Class emphasizes statistical literacy *not* calculation
- ★ Goal to be intelligent consumers of statistics
- ★ Used in everyday life
 - Reading newspaper accounts
 - Polling results
 - Surveys
 - Reporting trends




Getting to Know You

- ★ Complete question 1 on “Getting to Know You” handout




Definitions

- ★ “The mathematics of the collection, organization, and interpretation of numerical data, especially the analysis of population characteristics by inference from sampling.” American Heritage
- ★ “n : a branch of applied mathematics concerned with the collection and interpretation of quantitative data and the use of probability theory to estimate population parameters” from WordNet



Becky’s definition

- ★ Collecting, organizing, and interpreting reasonable amounts of data in an attempt to understand the bigger picture



Statistics - a bad reputation?

- ★ Figures don’t lie, liars figure.
 - attributed to Mark Twain
- ★ There are three kinds of lies: lies, damn lies, and statistics. - Benjamin Disraeli
- ★ There are two kinds of statistics: the kind you look up and the kind you make up.
 - Rex Stout



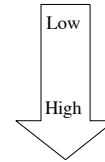
Statistics - not so bad after all?

- ★ Statistical thinking will one day be as necessary a qualification for efficient citizenship as the ability to read and write.
 - H.G. Wells
- ★ A judicious man uses statistics, not to get knowledge, but to save himself from having ignorance foisted upon him.
 - Thomas Carlyle



Measurement scales - four types

- ★ Nominal
- ★ Ordinal
- ★ Interval
- ★ Ratio



Why are these differences important?

- ★ Different scales of measures
 - Convey different amounts of information
 - Require different statistical analyses; what works for one may be inappropriate for another.



Nominal scales

- ★ “naming” data
- ★ Think of labels
- ★ Numbers, if used at all, are only for coding
- ★ Examples:
 - Ethnicity
 - Religion
 - Political affiliation
 - Method - whole language vs. phonics



Ordinal scales

- ★ Ordered in some way
 - High to low
 - Least to most
- ★ Relative standing, but not necessarily equal distances between any two
- ★ Examples:
 - Winners in a race
 - Class ranking
 - Test scores



Interval scales

- ★ Distances between points are equal, or at least assumed to be equal
- ★ Examples:
 - Temperature
 - Standardized test scores
 - IQ scores



Ratio scales

- ★ Equal intervals *plus* absolute zero that makes sense
- ★ Examples:
 - Measures of distance
 - Weight
 - Income
- ★ Non-examples: temperature & test scores



Summary of Scales

- ★ Nominal - naming
- ★ Ordinal - order
- ★ Interval - equal distances
- ★ Ratio - equal distances plus true zero

- ★ Interval and ratio are treated the same for statistical analysis



Getting to Know You handout

- ★ Collect data from 5 others over break
- ★ Turn in your handout at the end of class