Midterm Review
and
Variable Comparisons
We do statistics when we want to understand something.

We have questions that we want to answer.
We design a study to provide data to answer our questions.

Such a study may be an experiment or an observational study.
Example: Class Survey

What are we trying to understand here? Which questions do we want to answer?
Step 1: Ask Questions

Step 2: Collect Data
To obtain data we filled out hard copies of a survey in class.

How else could we have obtained data from Bi-Co students?
Online survey tools such as SurveyMonkey are convenient.
Step 1: Ask Questions

Step 2: Collect Data

Step 3: Explore Data (Descriptive Statistics)

Step 4: Extrapolate Data (Inferential Statistics)
Descriptive Statistics

First consider variables individually, then look at relationships among variables.
Individual Quantitative Variables

Symmetric Data: Average, SD

Skewed Data: 5-Number Summary
Example: About how many hours per week do you plan to spend exercising or playing sports this semester?
Individual Quantitative Variables

Symmetric Data: Average, SD

Skewed Data: 5-Number Summary

Graphs: Histograms, Boxplots
We can also use boxplots to compare either multiple quantitative variables that have the same scale, or one quantitative and one qualitative variable.
Pairs of Quantitative Variables

Scatterplot, Correlation Coefficient
Individual Qualitative Variables

Bar Chart, Frequency Table
Example: Which category best describes your major?
Pairs of Qualitative Variables

Two-Way Tables
Example: Compare Major by College
Example: Compare the variables “college” and “schoolwork" with boxplots and 5-number summaries.

Example: Compare the variables “college” and “degree” with a two-way table.
Step 1: Ask Questions

Step 2: Collect Data

Step 3: Explore Data (Descriptive Statistics)

Step 4: Extrapolate Data (Inferential Statistics)