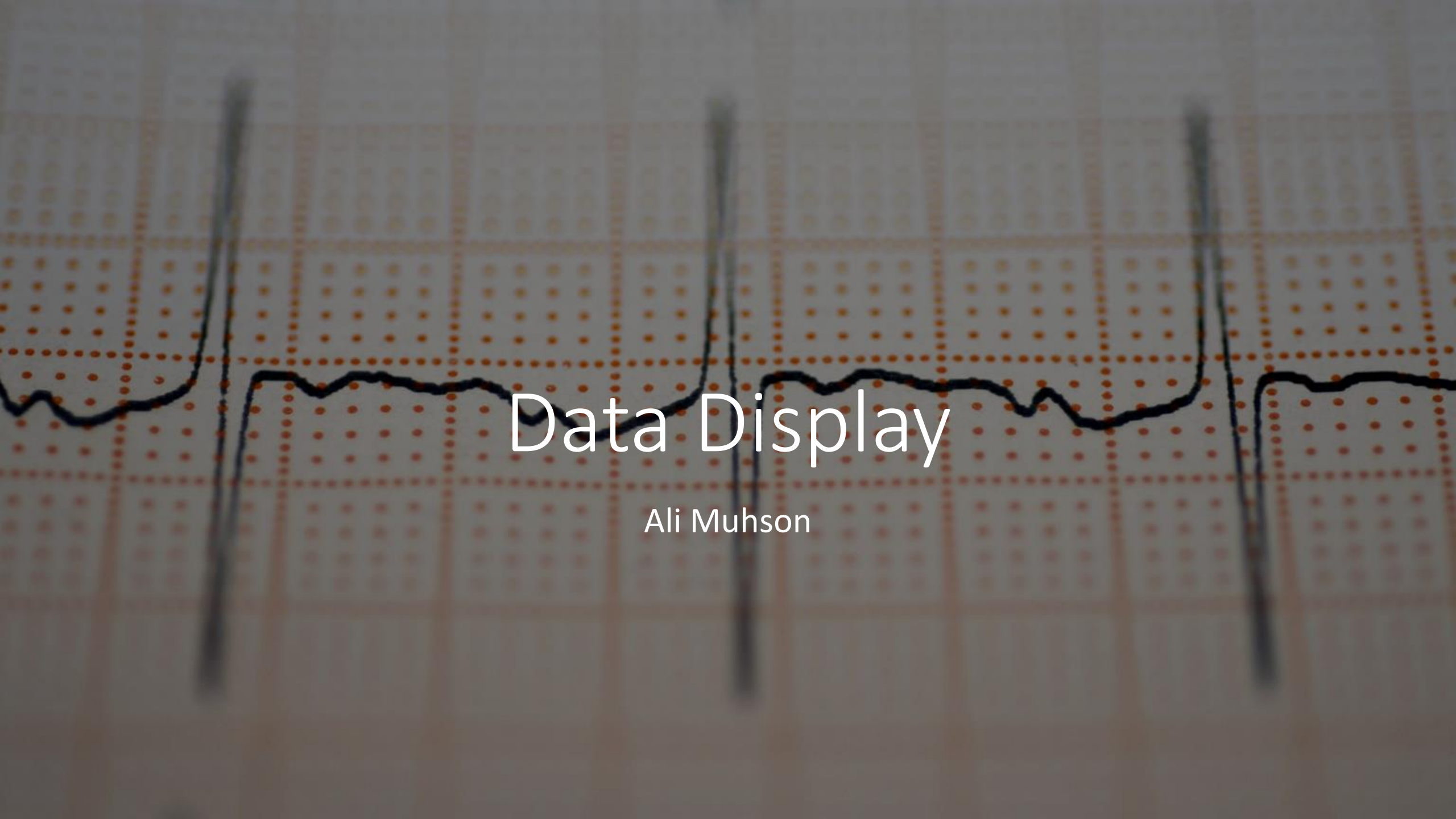


The background of the slide is a blurred image of an ECG (heart rate) monitor. It features a grid of orange dots and lines on a light gray background. A black line representing the heart rate trace is visible, with three prominent peaks. The text "Data Display" is centered over the middle of the image.

Data Display

Ali Muhson



Descriptive and Inferential Statistics

Two branches of statistics:

- Descriptive statistics
 - Collecting, summarizing, and processing data to transform data into information
- Inferential statistics
 - provide the basis for predictions, forecasts, and estimates that are used to transform information about samples into inferences about populations

Descriptive Statistics



Collect data

e.g., Survey



Present data

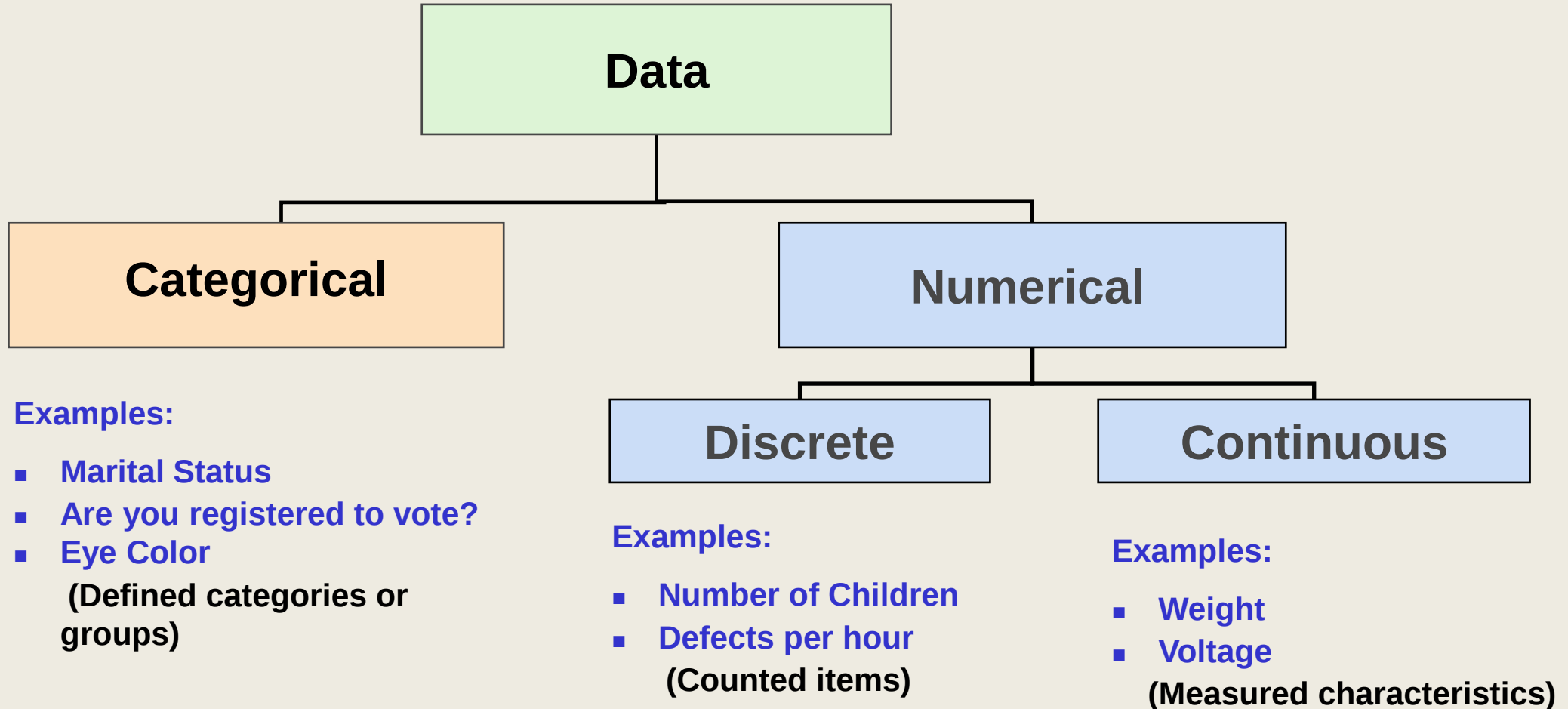
e.g., Tables and graphs



Summarize data

e.g., Sample mean

Types of Data



Graphical Presentation of Data



Data in raw form are usually not easy to use for decision making



Some type of organization is needed

Table
Graph

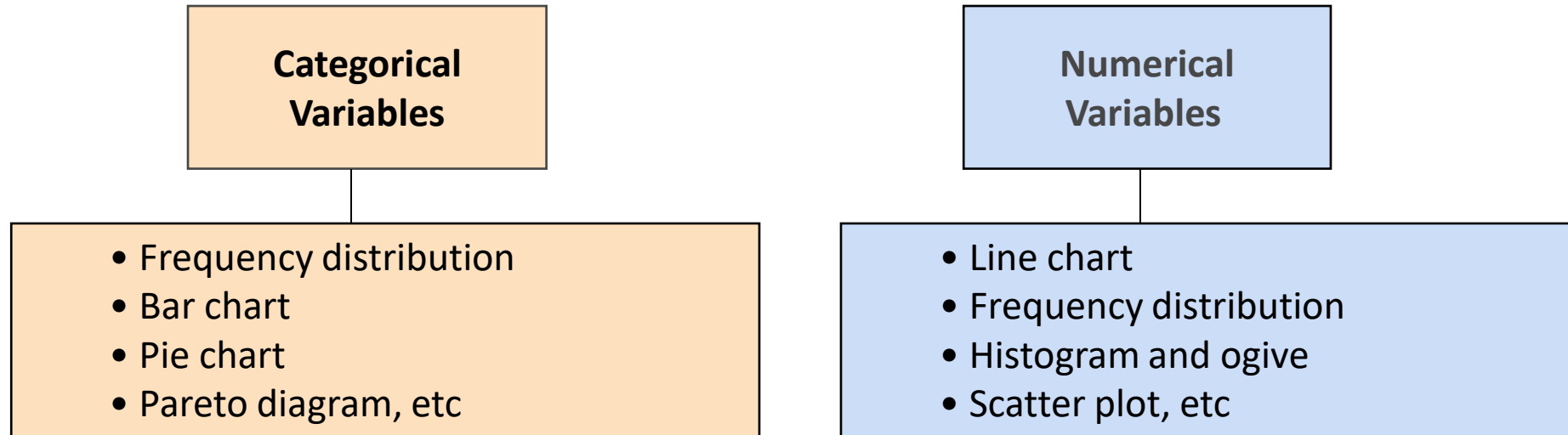


The type of graph to use depends on the variable being summarized

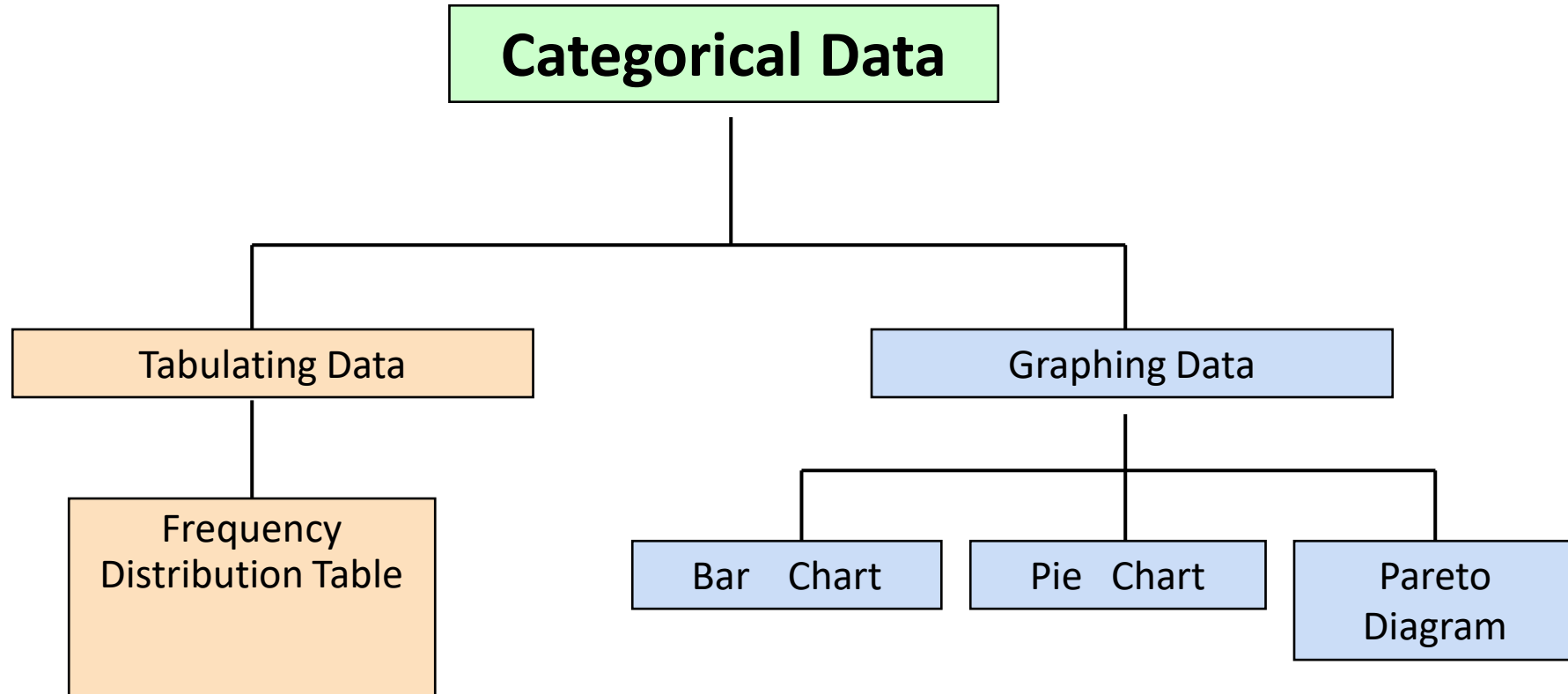
Graphical Presentation of Data

(continued)

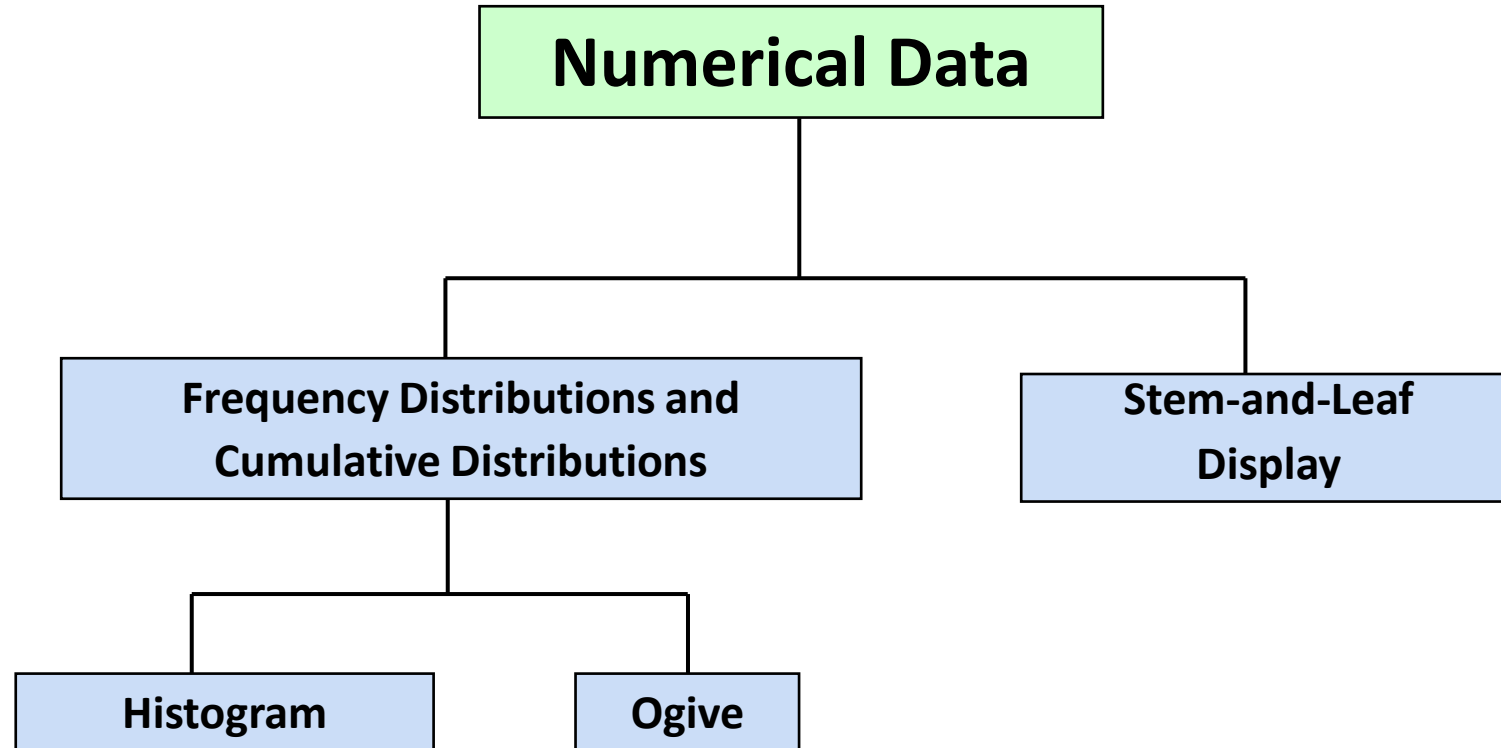
- Techniques reviewed in this topic:



Tables and Graphs for **Categorical** Variables



Graphs to Describe Numerical Variables



The most common types of data displays:

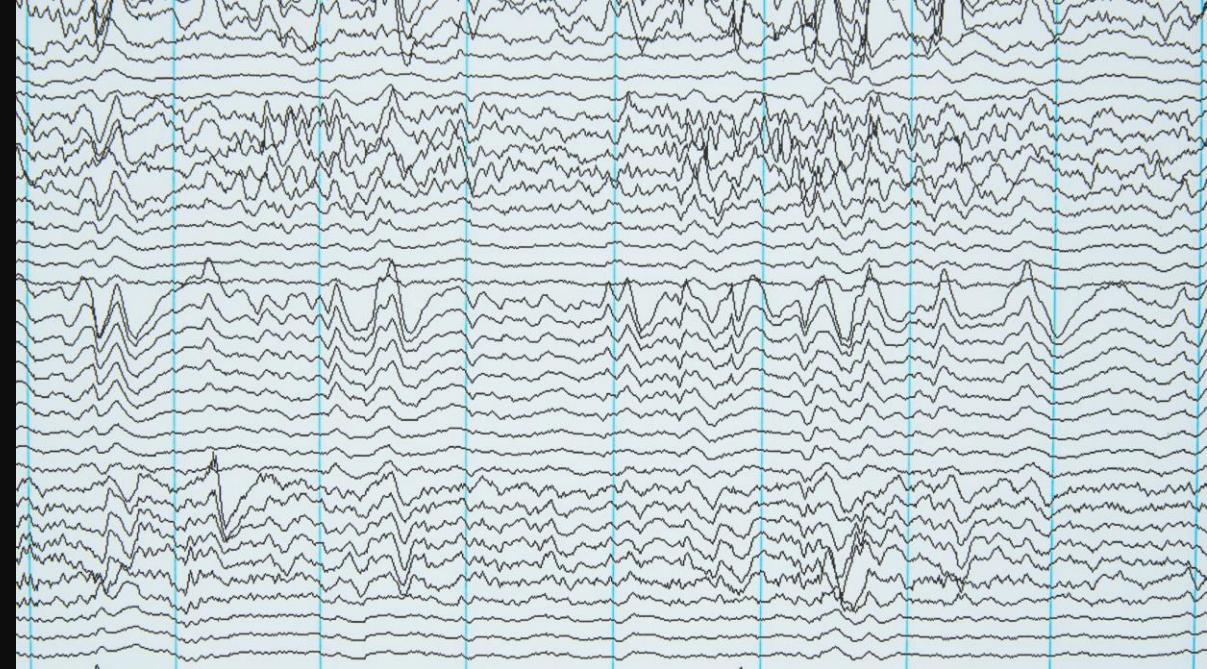
- bar charts,
- column charts,
- stacked bar charts,
- tree maps,
- line graphs,
- area charts,
- stacked area charts,
- unstacked area charts,
- combo bar-and-line charts,
- waterfall charts,
- tree diagrams,
- bullet graphs,
- scatter plots,
- histograms,
- heat maps,
- packed bubble charts, and
- box & whisker plots.

See: <https://analystanswers.com/what-is-a-data-display-definition-types-examples/>

Frequency Distributions

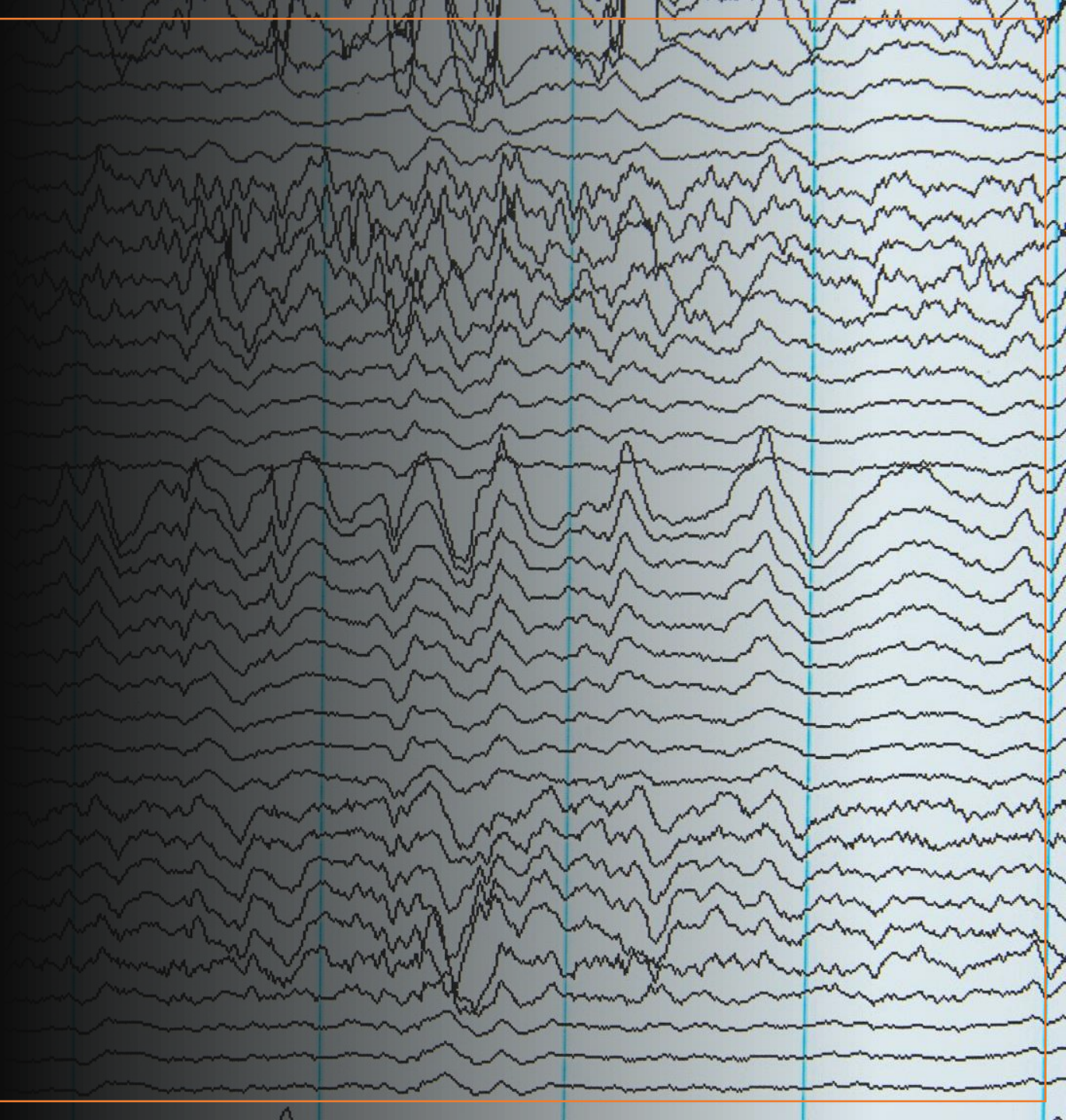
What is a Frequency Distribution?

- A frequency distribution is a list or a table ...
 - containing class groupings (categories or ranges within which the data fall) ...
 - and the corresponding frequencies with which data fall within each class or category
-



Why Use Frequency Distributions?

- A frequency distribution is a way to summarize data
- The distribution condenses the raw data into a more useful form...
- and allows for a quick visual interpretation of the data



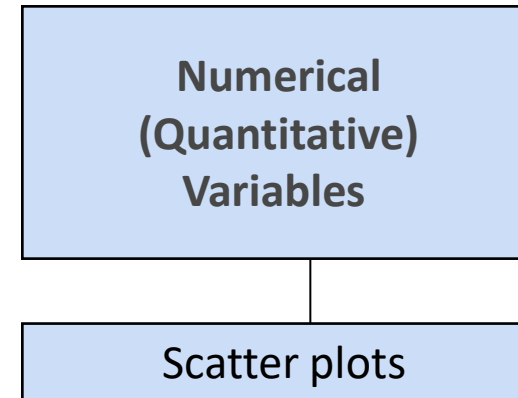
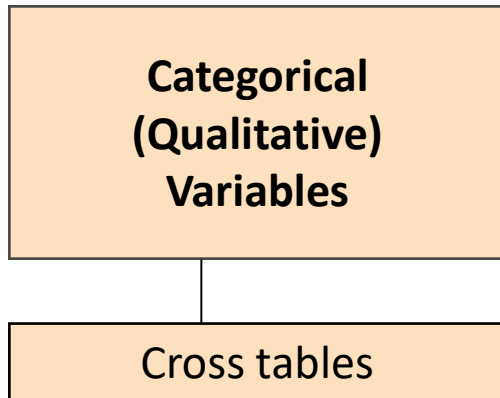
Class Intervals and Class Boundaries

- Each class grouping has the same width
- Determine the width of each interval
- Use at least 5 but no more than 15-20 intervals
- Intervals never overlap
- Round up the interval width to get desirable interval endpoints



Relationships Between Variables

- Graphs illustrated so far have involved only a single variable
- When **two variables** exist other techniques are used:



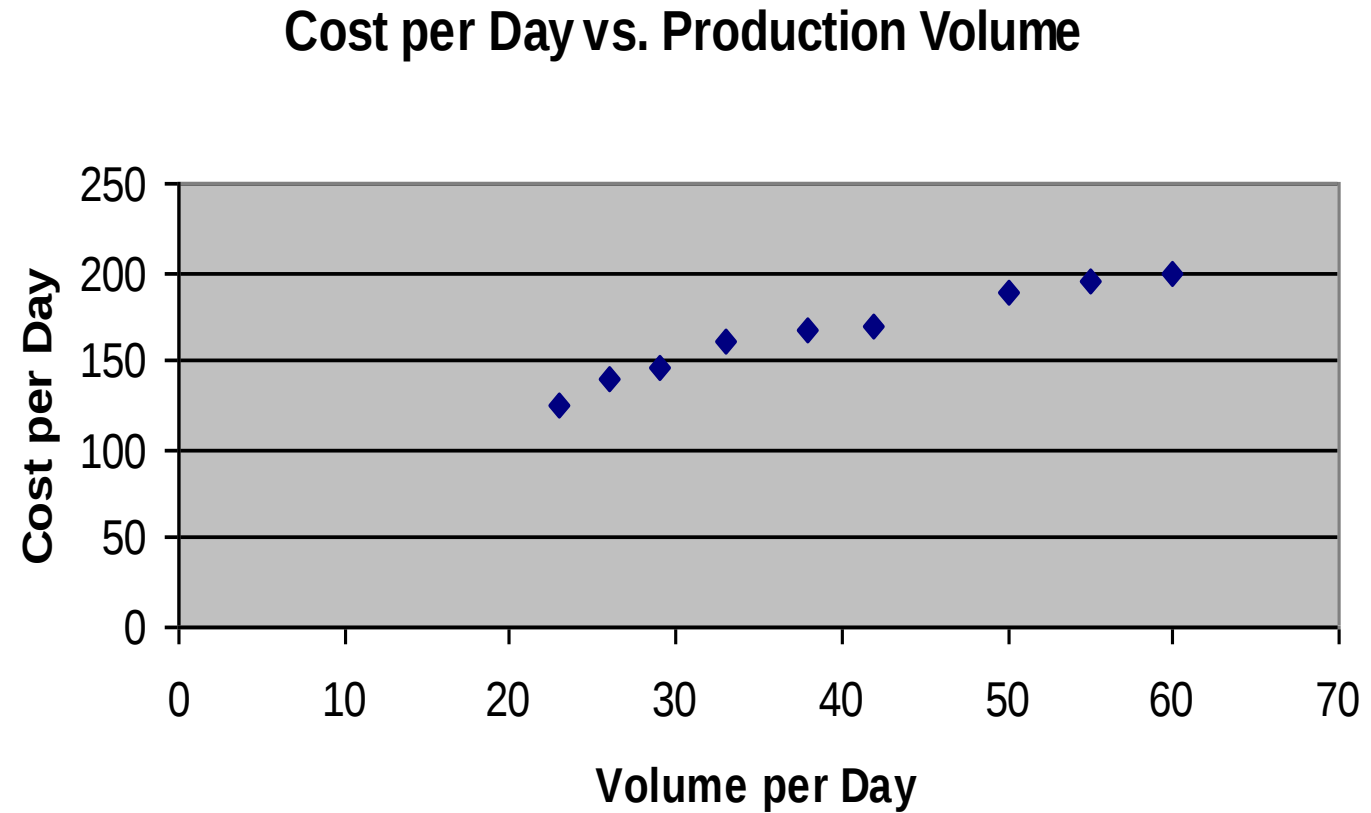


Scatter Diagrams

- Scatter Diagrams are used for paired observations taken from two numerical variables
- The Scatter Diagram:
 - one variable is measured on the vertical axis and the other variable is measured on the horizontal axis

Scatter Diagram Example

Volume per day	Cost per day
23	125
26	140
29	146
33	160
38	167
42	170
50	188
55	195
60	200





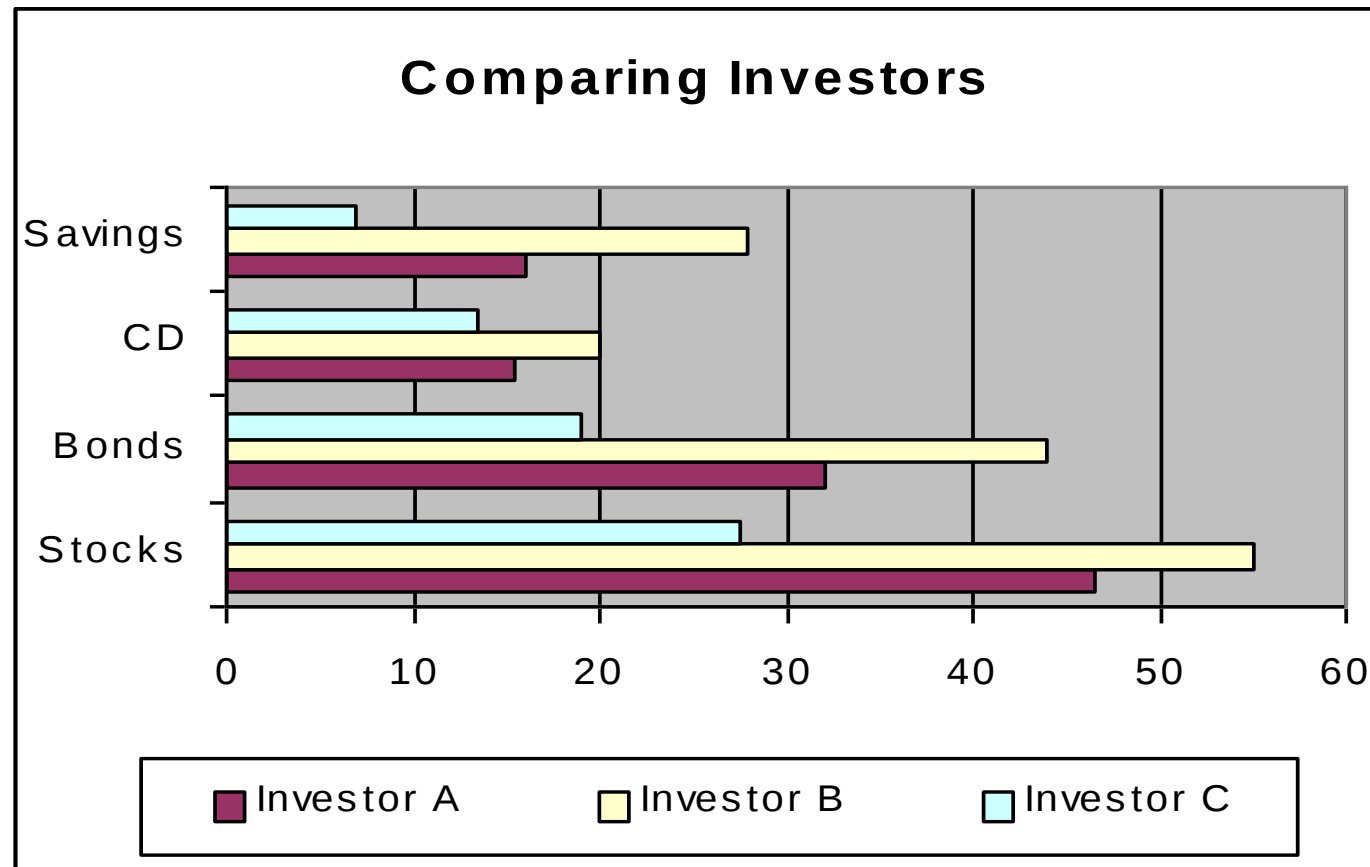
Cross Tables

- Cross Tables (or contingency tables) list the number of observations for every combination of values for two categorical or ordinal variables
- If there are r categories for the first variable (rows) and c categories for the second variable (columns), the table is called an $r \times c$ cross table

Graphing Multivariate Categorical Data

(continued)

- Side by side bar charts



Side-by-Side Chart Example

- Sales by quarter for three sales territories:

	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
East	20.4	27.4	59	20.4
West	30.6	38.6	34.6	31.6
North	45.9	46.9	45	43.9

