

Displaying Data

Procedures for Displaying Data

- *The variable:* scores on a 60 question exam for 20 students

50, 46, 58, 49, 50, 57, 49, 48, 53, 45,
50, 55, 43, 49, 46, 48, 44, 56, 57, 44

Procedures for Displaying Data

- **First Step**

- **Order the Data**

43, 44, 44, 45, 46, 46, 48, 48, 49, 49,
49, 50, 50, 50, 53, 55, 56, 57, 57, 58

Ungrouped Frequency Distribution

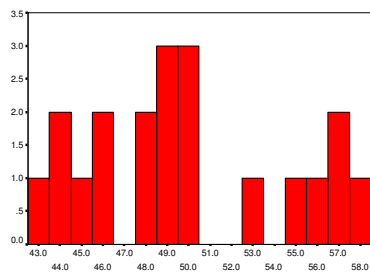
TESTSCOR

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 43	1	5.0	5.0	5.0
44	2	10.0	10.0	15.0
45	1	5.0	5.0	20.0
46	2	10.0	10.0	30.0
48	2	10.0	10.0	40.0
49	3	15.0	15.0	55.0
50	3	15.0	15.0	70.0
53	1	5.0	5.0	75.0
55	1	5.0	5.0	80.0
56	1	5.0	5.0	85.0
57	2	10.0	10.0	95.0
58	1	5.0	5.0	100.0
Total	20	100.0	100.0	

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Ungrouped Frequency Distribution



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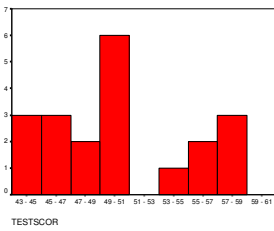
Grouped Distributions

- When sets of data become very large with a large number of response categories (e.g. continuous data) it is sometimes easier to see a clear pattern in the data by grouping them into class intervals.
- One can then form a Grouped Frequency Distribution, especially if the data are assumed to be continuous.

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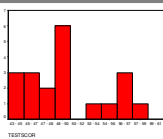
Histogram



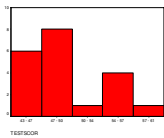
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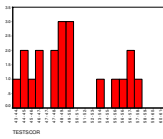
Shape of Histogram & Number of Classes



10 classes



5 Classes



20 classes

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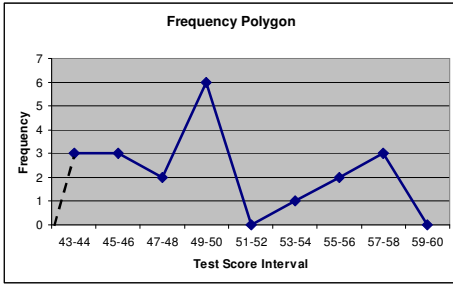
Histograms

- Height of bar = # of responses in the interval
- Width of bar = size of the interval
- Bars touch → representing grouped continuous data

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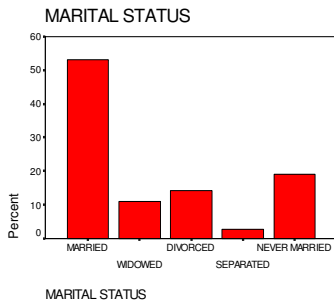
Frequency Polygon



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Qualitative Data & Bar Graphs



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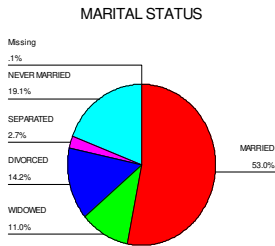
Bar Graphs

- Like Histograms
 - The height indicates the frequency
- Unlike Histograms
 - Bars represent categories
 - Width is Meaningless
 - Bars DO NOT touch → Discrete Data

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Pie-Charts



1. Pie-charts are especially good when showing distributions of a few qualitative classes and one wishes to emphasize the relative frequencies that fall into each class.
2. However, not as effective with
 - a) large number of classes.
 - b) with numerical data because the circle is confusing when ordered classes are represented.

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Stem and Leaf Displays

- A stem and leaf diagram provides a **visual summary** of your data. This diagram provides a **partial sorting** of the data and allows you to detect the **distributional pattern** of the data.
- There are three steps for drawing a stem and leaf diagram.
 1. Split the data into two pieces, the **stem** (left 1, 2, 3 digits, etc.) and the **leaf** (the right most digit).
 2. Arrange the stems from low to high.
 3. Attach each leaf to the appropriate stem.

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Stem and Leaf Displays

- Ordered Testscore Data
43, 44, 44, 45, 46, 46, 48, 48, 49, 49,
49, 50, 50, 50, 53, 55, 56, 57, 57, 58
- What are the stems?
- What are the leaves?

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Stem & Leaf Displays

TESTSCOR Stem-and-Leaf Plot

Frequency Stem & Leaf

3.00	4 . 344
8.00	4 . 56688999
4.00	5 . 0003
5.00	5 . 56778

Stem width: 10
Each leaf: 1 case(s)

Here the stem width is ten because the stems represent numbers in the 10s place numerically

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Advantages & Disadvantages of Stem & Leaf Diagrams

- Advantage:
 - Combines frequency distribution with histogram, thereby giving a pictorial description of data.
- Disadvantages:
 - Only works with numerical data.
 - Works best with small and compact data sets (e.g., will not work well with 1,000 cases & data in the range of 20-40).

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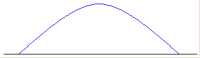
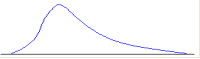

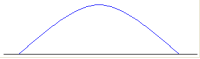
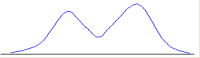
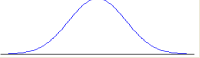
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Statistically Describing Distributions

- Modality ("How many peaks are there?")
 - Unimodal, bi-modal, multimodal
- Symmetric vs. Skewed
 - Skewed positive (floor effect)
 - Skewed negative (ceiling effect)
- Kurtosis ("How peaked is your data?")
 - Leptokurtic, Mesokurtic and Platykurtic

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Terms that Describe Distributions		
Term	Features	Example
"Symmetric"	left side is mirror image of right side	
"Positively skewed"	right tail is longer than the left	
"Negatively skewed"	left tail is longer than the right	
"Unimodal"	one highest point	
"Bimodal"	two high points	
"Normal"	unimodal, symmetric, asymptotic	

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