


Chapter 4

Displaying Quantitative Data



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Frequency Table

State Populations (2000 Census)

Population	Frequency	Relative Frequency (%)	Cumulative Frequency (%)
0 - 4,999,999	31	60.8	60.8
5,000,000 - 9,999,999	13	25.5	86.3
10,000,000 - 14,999,999	3	5.9	92.2
15,000,000 - 19,999,999	2	3.9	96.1
20,000,000 - 24,999,999	1	2.0	98.0
25,000,000 - 29,999,999	0	0.0	98.0
30,000,000 - 34,999,999	1	2.0	100.0
Total	51	100.0	100

of classes = 7 class width = 5,000,000

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Today's Objectives

- Display the distribution of quantitative data with a histogram, a stem-and-leaf display, and a dotplot
- Learn how to describe a distribution by talking about shape, center, spread and any unusual features
- Compare the distributions of a quantitative variable for two different groups
- Examine trends using timeplots

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Steps for Constructing a Frequency Table

- 1. Decide on the number of classes** (should be between 5 and 20)
- 2. Calculate** (round up).

$$\text{Class width} = \frac{\text{[Highest value - Lowest value]}}{\text{Number of classes}}$$
- 3. Starting point: begin by choosing a lower limit of the first class.**

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Let's Take a Look at Some Data

Population Estimates by State (2000 Census)

Alabama	4,447,100	Montana	902,195
Alaska	626,932	Nebraska	1,711,263
Arizona	5,130,632	Nevada	1,988,257
Arkansas	2,973,400	New Hampshire	1,255,785
California	33,871,648	New Jersey	8,414,350
Colorado	4,301,261	New Mexico	1,819,046
Connecticut	3,405,525	New York	18,976,457
Delaware	783,600	North Carolina	8,049,313
DC	572,059	North Dakota	642,200
Florida	15,982,378	Ohio	11,353,140
Georgia	8,186,453	Oklahoma	3,450,654
Hawaii	1,211,537	Oregon	3,421,399
Idaho	1,293,953	Pennsylvania	12,281,054
Illinois	12,419,293	Rhode Island	1,048,319
Indiana	6,080,485	South Carolina	4,012,012
Iowa	2,926,324	South Dakota	754,844
Kansas	2,668,418	Tennessee	5,689,293
Kentucky	4,041,769	Texas	20,851,820
Louisiana	4,468,976	Utah	2,233,169
Maine	1,274,923	Vermont	608,827
Maryland	5,296,486	Virginia	7,078,515
Massachusetts	6,349,097	Washington	5,894,121
Michigan	9,938,444	West Virginia	1,808,344
Minnesota	4,919,479	Wisconsin	5,363,675
Mississippi	2,844,658	Wyoming	493,782
Missouri	5,595,211	U.S. Total	281,421,906

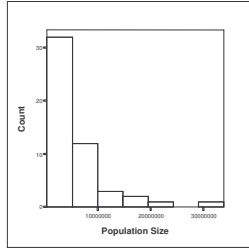
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Steps for Constructing a Frequency Table (cont.)

- 4. Using the lower limit of the first class and class width, proceed to list the lower class limits.**
- 5. List the Lower class limits in a vertical column and proceed to enter the upper class limits.**
- 6. Go through the data set putting a tally in the appropriate class for each data value**

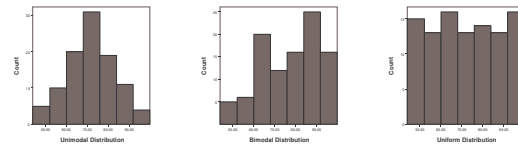
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Histogram State Populations (2000 Census)



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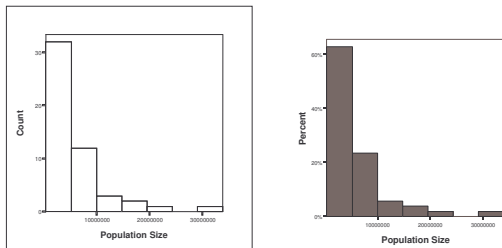
Describing a Distribution: Shape



Is the distribution unimodal, bimodal, or multimodal?

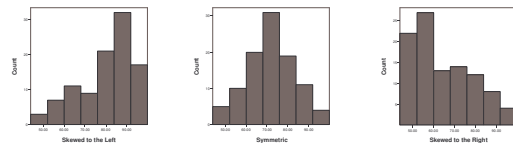
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Histogram and Relative Frequency Histogram



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Describing a Distribution: Shape (con't)



Is the distribution symmetric, or is it skewed in one direction?

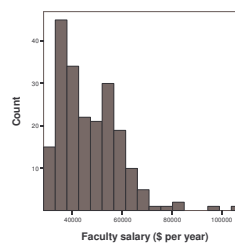
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Characteristics Used to Describe a Distribution

- Shape
 - Does the histogram have a single, central hump or several separated bumps?
 - Is the histogram symmetric?
- Center
 - If you had to pick a single number to describe all the data, what would you pick?
- Spread
 - Are the data values tightly clustered around the center or spread out?
- Unusual Features
 - Do any unusual features such as gaps or outliers stick out?

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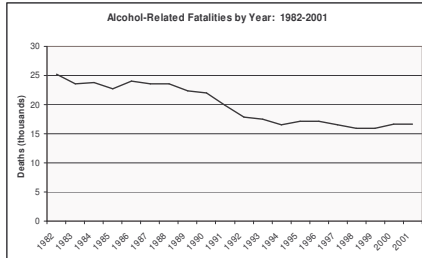
Putting It All Together



You should be able to describe this distribution by commenting on its shape, center, spread and any unusual features.

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Exploring Time Trends



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Assignment

- Review Chapters 3 and 4 in preparation for SPSS work
- Complete the practice problem on the slide that follows.
- Try the following exercises from Chapter 4:
 - #3, 5, 7, 11, 23, 36

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Practice problem

Commerce Bank selected a sample of 40 student checking accounts. Below are their end-of-the month balances

\$404	\$74	\$234	\$149	\$279	\$215	\$123	\$55	\$43	\$321
87	234	66	489	57	182	141	758	72	863
703	125	350	440	37	252	27	521	302	127
998	712	503	489	327	608	358	425	303	203

1. Tally the data into a frequency table using a class width of \$100 and \$0 as the starting point.
2. Draw the corresponding histogram and describe the shape, center, spread and any unusual features of the distribution.
3. The bank considers any student with an ending balance of \$400 or more a "preferred customer." Estimate the percentage of preferred customers.
4. The bank is also considering a service charge to the lowest 10 percent of the ending balances. What would you recommend as the cutoff point between those who have to pay a service charge and those who do not?

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