

# AP Stats

## Chapter 1 1.2 (day 2) Notes Outline

Some of the most interesting statistics questions involve comparing two or more groups. You should always discuss Center, Unusuals, Shape and Spread when comparing the two distributions of quantitative variables!

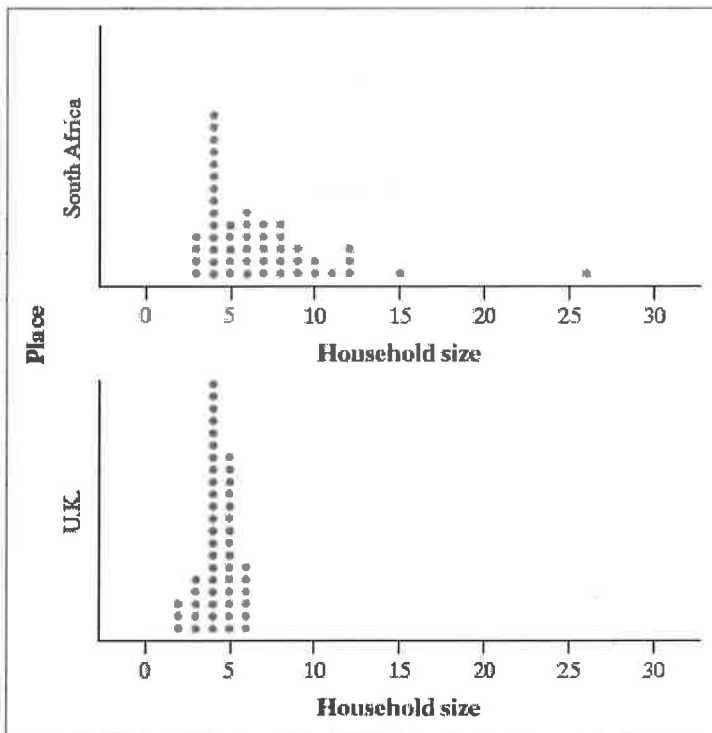
### Household Size: U.K. versus South Africa

#### Comparing distributions

How do the numbers of people living in households in the United Kingdom (U.K.) and South Africa compare? To help answer this question, we used CensusAtSchool's "Random Data Selector" to choose 50 students from each country. Figure 1.12 is a dotplot of the household sizes reported by the survey respondents.

**PROBLEM:** Compare the distributions of household size for these two countries.

**AP® EXAM TIP** When comparing distributions of quantitative data, it's not enough just to list values for the center and spread of each distribution. You have to explicitly compare these values, using words like "greater than," "less than," or "about the same as."



Don't say "center of UK" say "center of the distribution of household size in the UK"

C: HH size for the SA students tended to be larger than for the UK students. The midpoint of the household sizes for the 2 groups are 6 people & 4 people respectively

U: There do not appear to be any out in the UK dist. The SA dist. seems to have 2 outliers in the right tail of the dist. - students who reported living in h.h. w/ 15 & 26 people

Shape: The dist. of hsize for the UK sample is roughly symmetric & unimodal, while the distribution for the SA sample is skewed to the right & unimodal

Spread: The hh size for SA students vary more (from 3 to 26 people) than for the UK students (from 2 to 6 people).

Another simple graphical display for fairly small data sets is a **stemplot** (also called stem and leaf plot). They give us a quick picture of the shape of a distribution while including the actual numerical values in the graph. We will learn how to create and read a stemplot.

# How Many Shoes?

## Making a stemplot

How many pairs of shoes does a typical teenager have? To find out, a group of AP<sup>®</sup> Statistics students conducted a survey. They selected a random sample of 20 female students from their school. Then they recorded the number of pairs of shoes that each respondent reported having. Here are the data:

50 26 26 31 57 19 24 22 23 38  
13 50 13 34 23 30 49 13 15 51

Following are the steps to make a stemplot:

1. Separate each observation into a **stem**, consisting of all but the final digit, and a **leaf**, the final digit. Write the stems in a vertical column with the smallest at the top and draw a vertical line at the right of this column. Do not skip any stems, even if there is no data value for a particular stem.
2. Write each leaf in the row to the right of its stem.

```

1 | 9 3 3 3 5
2 | 6 6 4 2 3 3
3 | 1 8 4 0
4 | 9
5 | 0 7 0 1
  
```

Stem

3. Arrange the leaves in increasing order OUT from the stem.

```

1 | 3 3 3 5 9
2 | 2 3 3 4 6 6
3 | 0 1 4 8
4 | 9
5 | 0 0 1 7
  
```

Key: 4|9 represents a female student who reported having 49 pair of shoes.

4. Provide a key that explains in context what the stems and leaves represent.

Data on male students:

14 7 6 5 12 38 8 7 10 10  
10 11 4 5 22 7 5 10 35 7

```

0 | 4 5 5 5 6 7 7 7 7 8
1 | 0 0 0 0 1 2 4
2 | 2
3 | 5 8
  
```

(a)

Key: 2|2 represents a male student with 22 pairs of shoes.

Split Stem

```

0 | 4
1 | 5 5 5 6 7 7 7 7 8
2 | 0 0 0 1 2 4
3 | 5 8
  
```

(b)

Notice that we include this stem even though it contains no data.

Back to Back

Females		Males
	0	4
	1	5 5 5 6 7 7 7 7 8
3 3 3	2	0 0 0 1 2 4
9 5	3	
4 3 3 2	4	
6 6	5	
4 1 0	6	
8	7	
	8	
	9	
	10	
	11	

Key: 2|2 represents a male student with 22 pairs of shoes.

FIGURE 1.14 Two stemplots showing the male shoe data. Figure 1.14(b) improves on the stemplot of Figure 1.14(a) by splitting stems.

FIGURE 1.15 Back-to-back stemplot comparing numbers of pairs of shoes for male and female students at a school.