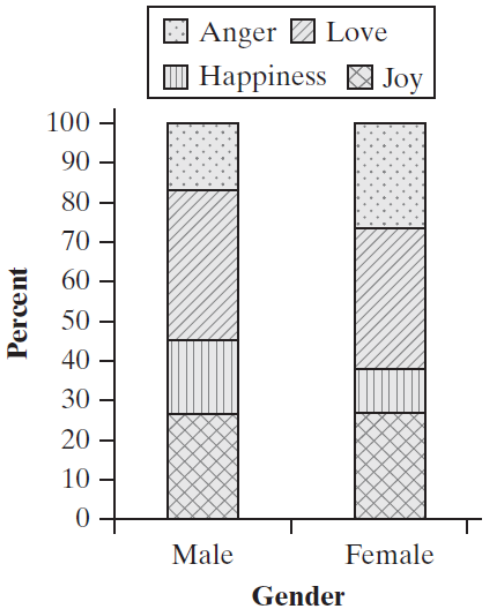
Chapter 1 Solutions

Quiz 1.1 Solutions

1. (a) The individuals are the monkeys.
(b) The variables recorded were how long they slept (quantitative continuous), how many bananas they ate (quantitative discrete), gender (categorical), age (quantitative continuous), and the specific breed of monkey (categorical).

2. There are only small differences in the satisfaction of owners for the three brands. By starting the vertical scale at 94% instead of 0%, it looks like the percent of people who drive a Chevrolet are 4 to 5 times more likely to be satisfied than those who drive a Ford or a Toyota. In truth, the percent of those who drive a Chevrolet that are satisfied (97%) is only slightly higher than the percent of Ford owners (about 94.5%) and Toyota owners (about 94.75%) who are satisfied.

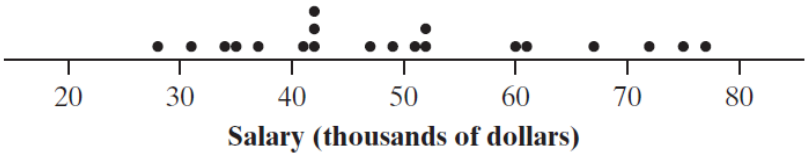
3. (a) The distribution of emotion for Males is: Joy: 28/106 = 26.4%, Happiness: 20/106 = 18.9%, 40/106 = 37.7%, and Anger: 18/106 = 17.0%.
The distribution of emotion for Females is: Joy: 61/226 = 27.0%, Happiness: 25/226 = 11.1%, Love: 80/226 = 35.4%, and Anger: 60/226 = 26.5%.
(b) A segmented bar graph is given here.



(c) There is an association between gender and the emotion that the individuals in the sample associate with the color red. Females were less likely to associate the color red with happiness and love and were more likely to associate it with anger than males.

Quiz 1.2 Solutions

1. (a) A dotplot is given here.



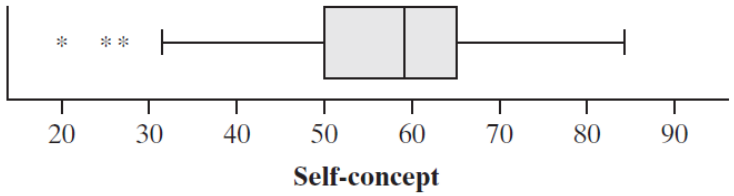
(b) Six of the 20 employees in the sample have a salary of at least \$60,000. 6/20 = 0.3 = 30%.

2. The distribution of the amount of money the students had in their possession is skewed to the right with one upper outlier (just over \$100). The median amount of money is between \$10-\$20 and the amount of money the students had in their possession varied from \$0 to about \$110.

3. The distribution of number of home runs hit for both players is skewed to the left. The year that Bonds hit 73 home runs is clearly an outlier. There are no obvious outliers in Aaron's distribution. The median for both distributions is the same, 34 home runs. The distribution of number of home runs hit is less variable for Aaron than Bonds. The number of home runs hit per year by Bonds vary from 5 to 73. The number of home runs hit per year by Aaron vary from 10 to 47.

Quiz 1.3 Solutions

1. (a) The *IQR* is 65 – 50 = 15. Any observation above $Q_3 + 1.5IQR = 65 + 1.5(15) = 87.5$ or below $Q_1 - 1.5IQR = 50 - 1.5(15) = 27.5$ is considered an outlier. Because the maximum of 84 is less than 87.5, there are no upper outliers. The values 22, 26, and 27 are all below the lower boundary so there are three lower outliers.
(b) The boxplot is given here.



(c) If the value 32 was mistakenly recorded as 22, the value of the mean would decrease and the value of the median would remain the same. The value of 22 is further below the mean than the value of 32, so this mistake would decrease the mean. The median value (59) remains unchanged as this mistake does not affect the middle value of the data set.

2. (a) The number of minutes the students spent studying typically varies about 10 minutes from the mean of 45 minutes.
(b) If the 6th student's reported number of minutes spent studying (50) is added to the data set the mean would increase and the standard deviation would decrease. The value, 50, is above the current mean, so it would increase the value of the mean. It is also closer to the mean (only 5 minutes away the mean) than the other values in the data set (which typically are about 10 minutes away from the mean), so it decreases spread about the mean, which decreases the value of the standard deviation.