Math 220 : Elementary Statistics — Kane Nashimoto
Exam 1 Solutions
Fall 2005

1. Standardized score.

   (a) The median income will be lower than \$42,000. If the distribution is positively skewed, the mean is larger than the median.

   (b) $z = \dfrac{x - \bar{x}}{s} = \dfrac{34000 - 42000}{7000} = -1.143$

2. Bias in scientific studies.

   An example of a study in which responses are not obtained from all participants.

3. See page 2.

4. Types of data.

   (a) Categorical

   (b) Categorical

   (c) Continuous numerical

   (d) Continuous numerical

5. Variability of data.

   (a) The mean and median are equal because the distribution of the data is symmetric.

   (b) $s_{\text{new}} = 1.581$. By adding 10 to each datum, the variability does not change.

6. Numerical summary of data.

   Note : $\sum x = 633$; $\sum x^2 = 50641$; $n = 8$

   (a) The distribution of the data is positively skewed.

   (b) $m = \dfrac{76 + 79}{2} = 77.500$

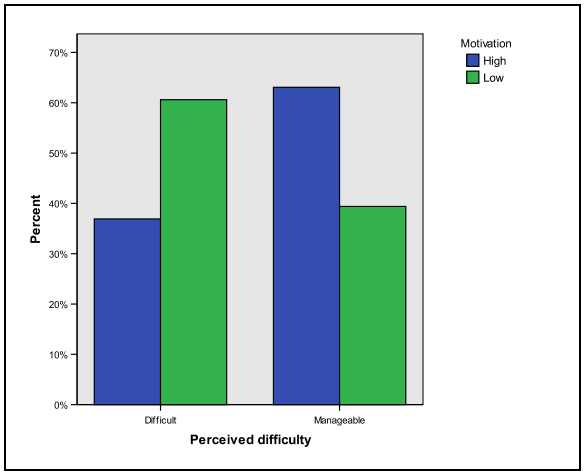
   (c) $\bar{x} = \dfrac{\sum x}{n} = \dfrac{633}{8} = 79.125$

   $s^2 = \dfrac{\sum x^2 - (\sum x)^2/n}{n - 1} = \dfrac{50641 - (633)^2/8}{8 - 1} = 79.268$

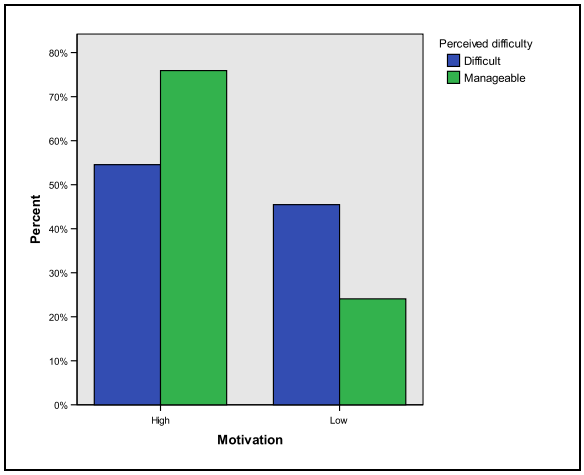
3. Graphical summary of data.

   (a) Comparative bar chart.

   Correct figure. This bar chart compares perceived difficulty levels for students with high levels of motivation and those with low levels of motivation.



   Incorrect figure. This bar chart compares motivational levels for students who perceive the class difficult and those who perceive the class manageable.



   (b) Pie chart for high-motivation group of students.