Median and Mean

Prerequisites
What is Central Tendency, Measures of Central Tendency

In the section "What is central tendency, we saw that the center of a distribution could be defined three ways: (1) the point on which a distribution would balance, (2) the value whose average *absolute deviation* from all the other values is minimized, and (3) the value whose squared difference from all the other values is minimized. From the simulation in this chapter, you discovered (we hope) that the mean is the point on which a distribution would balance, the median is the value that minimizes the sum of absolute deviations, and the mean is the value that minimizes the sum of the squared values.

Table 1 shows the absolute and squared deviations of the numbers 2, 3, 4, 9, and 16 from their median of 4 and their mean of 6.8. You can see that the sum of absolute deviations from the median (20) is smaller than the sum of absolute deviations from the mean (22.8). On the other hand, the sum of squared deviations from the median (174) is larger than the sum of squared deviations from the mean (134.8).

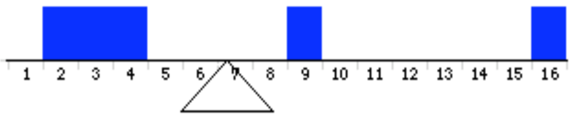
Table 1. Absolute and squared deviations from them median of 4 and the mean of 6.8.

Value	Absolute Deviation from Median	Absolute Deviation from Mean	Squared Deviation from Median	Squared Deviation from Mean
2	2	4.8	4	23.04
3	1	3.8	1	14.44
4	0	2.8	0	7.84
9	5	2.2	25	4.84
16	12	9.2	144	84.64
Total	20	22.8	174	134.80

Figure 1 shows that the distribution balances at the mean of 6.8 and not at the median of 4. The relative advantages and disadvantages of the mean and median are discussed in the section "Comparing Measures" later in this chapter.

Figure 1. The distribution balances at the mean of 6.8 and not at the

median of 4.0.



When a distribution is symmetric, then the mean, and the median are the same. Consider the following distribution: 1, 3, 4, 5, 6, 7, 9. The mean and median are both 5. The mean, median, and mode are identical in the bell-shaped normal distribution.