Interpretation

The mean number of girls in two births is 1.0 girl, the variance is 0.50 "girls squared," and the standard deviation is 0.7 girl. Also, the expected value for the number of girls in two births is 1.0 girl, which is the same value as the mean. If we were to collect data on a large number of couples with two children, we expect to get a mean of 1.0 girl.

Making Sense of Results: Identifying Unusual Values

We present the following two different approaches for determining whether a value of a random variable x is unusually low or unusually high.

Identifying Unusual Results with the Range Rule of Thumb

The range rule of thumb (introduced in Section 3-3) may be helpful in interpreting the value of a standard deviation. According to the range rule of thumb, the vast majority of values should lie within 2 standard deviations of the mean, so we can consider a value to be unusual if it is more than 2 standard deviations away from the mean. (The use of 2 standard deviations is not an absolutely rigid value, and other values such as 3 could be used instead.) We can therefore identify "unusual" values by determining that they lie outside of these limits:

Range Rule of Thumb

$$\textbf{maximum usual value} = \mu + 2\sigma$$
$$\textbf{minimum usual value} = \mu - 2\sigma$$

CAUTION Know that the use of the number 2 in the range rule of thumb is somewhat arbitrary, and this rule is a guideline, not an absolutely rigid rule.

Example 6 **Identifying Unusual Results with the Range Rule of Thumb**

In Example 5 we found that for families with two children, the mean number of girls is 1.0 and the standard deviation is 0.7 girl. Use those results and the range rule of thumb to find the maximum and minimum usual values for the number of girls. Based on the results, if a couple has two children, is 2 girls an unusually high number of girls?

Solution

Using the range rule of thumb, we can find the maximum and minimum usual values as follows:

maximum usual value: $\mu + 2\sigma = 1.0 + 2(0.7) = 2.4$

minimum usual value: $\mu - 2\sigma = 1.0 - 2(0.7) = -0.4$