we note that the value of $n = 945$ is greater than 25, so the test statistic $x = 66$ is converted (using a correction for continuity) to the test statistic z as follows:

$$z = \frac{(x + 0.5) - \left(\frac{n}{2}\right)}{\frac{\sqrt{n}}{2}}$$

$$= \frac{(66 + 0.5) - \left(\frac{945}{2}\right)}{\frac{\sqrt{945}}{2}} = -26.41$$

With $\alpha = 0.05$ in a left-tailed test, the critical value is $z = -1.645$. Figure 13-2 shows that the test statistic $z = -26.41$ is in the critical region bounded by $z = -1.645$, so we reject the null hypothesis that the proportion of girls is equal to 0.5. There is sufficient sample evidence to support the claim that girls are more likely with the XSORT method.

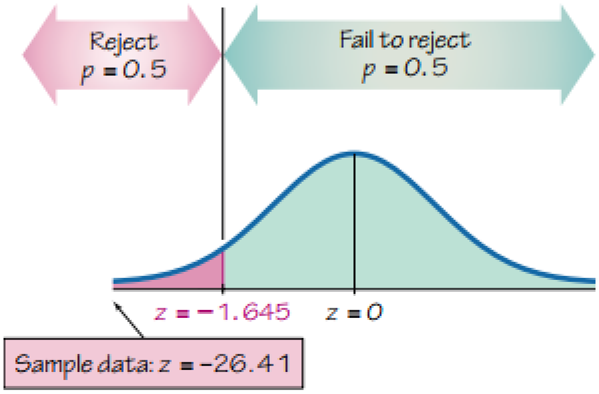

Figure 13-2 Testing Effectiveness of the XSORT Gender Selection Method

Interpretation

The XSORT method of gender selection does appear to be associated with an increase in the likelihood of a girl. The XSORT method does appear to be effective in increasing the likelihood of a girl (but this hypothesis test does not prove that the XSORT method is the *cause* of the increase).

Claims about the Median of a Single Population

The next example illustrates the procedure for using the sign test in testing a claim about the median of a single population. See how the negative and positive signs are based on the claimed value of the median.

Example 4 Body Temperatures

Data Set 3 in Appendix B includes measured body temperatures of adults. Use the 106 temperatures listed for 12 A.M. on Day 2 with the sign test to test the claim that the median is less than 98.6°F. Of the 106 subjects, 68 had temperatures below 98.6°F, 23 had temperatures above 98.6°F, and 15 had temperatures equal to 98.6°F.