Using the Wilcoxon Test with a Quantitative Response

In Examples 1 and 2, the response was a rank. When the response variable is quantitative, the Wilcoxon test is applied by converting the observations to ranks. For the combined sample, the observations are ordered from smallest to largest. The smallest observation gets rank 1, the second smallest gets rank 2, and so forth. The test compares the mean ranks for the two samples. Software can implement the test.

Wilcoxon test: finding ranks (large sample)

Example 3

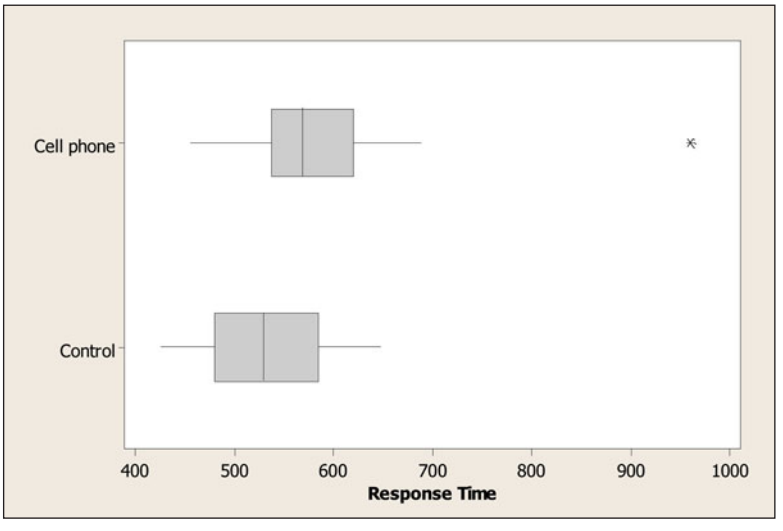
Driving Reaction Times

Picture the Scenario

Example 9 in Chapter 10 discussed an experiment investigating whether or not cell phone use impairs drivers' reaction times. A sample of 64 college students was randomly assigned to a cell phone group or a control group, 32 to each. On a machine that simulated driving situations, participants were instructed to press a "brake button" as soon as possible when they detected a red light. The control group listened to a radio broadcast or to books-on-tape while they performed the simulated driving. The cell phone group carried out a conversation on a cell phone with someone in a separate room.

A subject's reaction time observation is defined to be his or her response time to the red lights (in milliseconds), averaged over all the trials. Figure 15.2 shows box plots of the data for the two groups. Here's some of the data showing the four smallest observations and the four largest observations for each treatment.

Cell phone:	456	468	482	501	. . . . .	672	679	688	960
Control:	426	436	444	449	. . . . .	626	626	642	648



▲ **Figure 15.2** Box Plots of Response Times for Cell Phone Study. Question Does either box plot show any irregularities that suggest it's safer to use a nonparametric test than a two-sample *t* test?