SECTION 4.3 Exercises

102. **Random sampling versus random assignment** Explain the difference between the types of inference that can be made as a result of random sampling and random assignment.

103. **Foster care versus orphanages** Do abandoned children placed in foster homes do better than similar children placed in an institution? The Bucharest Early Intervention Project found that the answer is a clear "Yes." The subjects were 136 young children abandoned at birth and living in orphanages in Bucharest, Romania. Half of the children, chosen at random, were placed in foster homes. The other half remained in the orphanages.[55] (Foster care was not easily available in Romania at the time and so was paid for by the study.) What conclusion can we draw from this study? Explain.

104. **Frozen batteries** Will storing batteries in a freezer make them last longer? To find out, a company that produces batteries takes a random sample of 100 AA batteries from its warehouse. The company statistician randomly assigns 50 batteries to be stored in the freezer and the other 50 to be stored at room temperature for 3 years. At the end of that time period, each battery's charge is tested. *Result:* Batteries stored in the freezer had a higher average charge, and the difference between the groups was statistically significant. What conclusion can we draw from this study? Explain.

105. **Who talks more—women or men?** According to Louann Brizendine, author of *The Female Brain*, women say nearly three times as many words per day as men. Skeptical researchers devised a study to test this claim. They used electronic devices to record the talking patterns of 396 university students who volunteered to participate in the study. The device was programmed to record 30 seconds of sound every 12.5 minutes without the carrier's knowledge. According to a published report of the study in *Scientific American*, "Men showed a slightly wider variability in words uttered.... But in the end, the sexes came out just about even in the daily averages: women at 16,215 words and men at 15,669."[56] This difference was not statistically significant. What conclusion can we draw from this study? Explain.

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106. **Attend church, live longer?** One of the better studies of the effect of regular attendance at religious services gathered data from a random sample of 3617 adults. The researchers then measured lots of variables, not just the explanatory variable (religious activities) and the response variable (length of life). A news article said: "Churchgoers were more likely to be nonsmokers, physically active, and at their right weight. But even after health behaviors were taken into account, those not attending religious services regularly still were about 25% more likely to have died."[57] What conclusion can we draw from this study? Explain.

107. **Daytime running lights** Canada requires that cars be equipped with "daytime running lights," headlights that automatically come on at a low level when the car is started. Some manufacturers are now equipping cars sold in the United States with running lights. Will running lights reduce accidents by making cars more visible? An experiment conducted in a driving simulator suggests that the answer may be "Yes." What concerns would you have about generalizing the results of such an experiment?

108. **Studying frustration** A psychologist wants to study the effects of failure and frustration on the relationships among members of a work team. She forms a team of students, brings them to the psychology lab, and has them play a game that requires teamwork. The game is rigged so that they lose regularly. The psychologist observes the students through a one-way window and notes the changes in their behavior during an evening of game playing. Can the psychologist generalize the results of her study to a team of employees that spends months developing a new product that never works right and is finally abandoned by their company? Explain.

109.* **Minimal risk?** You have been invited to serve on a college's institutional review board. You must decide whether several research proposals qualify for lighter review because they involve only minimal risk to subjects. Federal regulations say that "minimal risk" means the risks are no greater than "those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests." That's vague. Which of these do you think qualifies as "minimal risk"?

*Exercises 109 to 116: This is an important topic, but it is not required for the AP Statistics exam.