EXAMPLE 8.1 The Current Population Survey

The most important government sample survey in the United States is the monthly Current Population Survey (CPS) conducted by the Bureau of the Census for the Bureau of Labor Statistics. The CPS contacts about 60,000 households each month. It produces the monthly unemployment rate and much other economic and social information. (See Figure 8.1.) To measure unemployment, we must first specify the population we want to describe. Which age groups will we include? Will we include illegal immigrants or people in prisons? The CPS defines its population as all U.S. residents (legal or not) 16 years of age and over who are civilians and are not in an institution such as a prison. The unemployment rate announced in the news refers to this specific population.

The second question is harder: what does it mean to be “unemployed”? Someone who is not looking for work—for example, a full-time student—should not be called unemployed just because she is not working for pay. If you are chosen for the CPS sample, the interviewer first asks whether you are available to work and whether you actually looked for work in the past four weeks. If not, you are neither employed nor unemployed—you are not in the labor force. So discouraged workers who haven’t looked for a job in four weeks are excluded from the count.

If you are in the labor force, the interviewer goes on to ask about employment. If you did any work for pay or in your own business during the week of the survey, you are employed. If you worked at least 15 hours in a family business without pay, you are employed. You are also employed if you have a job but didn’t work because of vacation, being on strike, or other good reason. An unemployment rate of 6.7% means that 6.7% of the sample was unemployed, using the exact CPS definitions of both “labor force” and “unemployed.”
Figure 8.1  The home page of the Current Population Survey at the Bureau of Labor Statistics.
EXAMPLE 8.2 Sampling at the mall

A sample of mall shoppers is fast and cheap. But people at shopping malls tend to be more prosperous than typical Americans. They are also more likely to be teenagers or retired. Moreover, unless interviewers are carefully trained, they tend to question well-dressed, respectable-looking people and avoid poorly dressed or tough-looking individuals. The type of people at the mall will also vary by time of day and day of week. In short, mall interviews will not contact a sample that is representative of the entire population.
EXAMPLE 8.3 Online polls

Former CNN evening commentator Lou Dobbs doesn’t like illegal immigration. One of his broadcasts in 2007 was largely devoted to attacking a proposal by the governor of New York State to offer drivers’ licenses to illegal immigrants as a public safety measure. During the show, Mr. Dobbs invited his viewers to go to loudobbs.com to vote on the question “Would you be more or less likely to vote for a presidential candidate who supports giving drivers’ licenses to illegal aliens?” We aren’t surprised that 97% of the 7350 people who voted by the end of the broadcast said, “Less likely.” ■
**EXAMPLE 8.4** Sampling spring break resorts

A campus newspaper plans a major article on spring break destinations. The authors intend to call 4 randomly chosen resorts at each destination to ask about their attitudes toward groups of students as guests. Here are the resorts listed in one city:

| 01 | Aloha Kai | 08 | Captiva | 15 | Palm Tree | 22 | Sea Shell |
| 02 | Anchor Down | 09 | Casa del Mar | 16 | Radisson | 23 | Silver Beach |
| 03 | Banana Bay | 10 | Coconuts | 17 | Ramada | 24 | Sunset Beach |
| 04 | Banyan Tree | 11 | Diplomat | 18 | Sandpiper | 25 | Tradewinds |
| 05 | Beach Castle | 12 | Holiday Inn | 19 | Sea Castle | 26 | Tropical Breeze |
| 06 | Best Western | 13 | Lime Tree | 20 | Sea Club | 27 | Tropical Shores |
| 07 | Cabana | 14 | Outrigger | 21 | Sea Grape | 28 | Veranda |

**Label:** Because two digits are needed to label the 28 resorts, all labels will have two digits. We have added labels 01 to 28 in the list of resorts. Always say how you labeled the members of the population. To sample from the 1240 resorts in a major vacation area, you would label the resorts 0001, 0002, ..., 1239, 1240.

**Table:** To use the *Simple Random Sample* applet, just enter 28 in the “Population =” box and 4 in the “Select a sample” box, click “Reset,” and click “Sample.” Figure 8.2 shows the result of one sample.

To use Table B, read two-digit groups until you have chosen four resorts. Starting at line 130 (any line will do), we find

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69051 64817 87174 09517 84534 06489 87201 97245
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Because the labels are two digits long, read successive two-digit groups from the table; so the first three two-digit groups here are 69, 05, and 16. Ignore groups not used as labels, like the initial 69. Also ignore any repeated labels, like the second and third 17s in this row, because you can’t choose the same resort twice. Your sample contains the resorts labeled 05, 16, 17, and 20. These are Beach Castle, Radisson, Ramada, and Sea Club.
Figure 8.2 The Simple Random Sample applet used to choose an SRS of size $n = 4$ from a population of size 28.
EXAMPLE 8.5 Texting while driving

“Do you think sending a text message while driving, either on a cell phone or other electronic device, should be legal or illegal?” When the New York Times and CBS News asked this question of 829 adults in October 2009, 97% said “illegal” and just 1% said “legal.” Can we trust the opinions of this sample to fairly represent the opinions of all adults? Here’s part of the statement by the Times on how the poll was conducted:

The latest New York Times/CBS News poll is based on telephone interviews conducted October 5 through October 8 with 829 adults throughout the United States. The sample of land line telephone exchanges called was randomly selected by a computer from a complete list of more than 69,000 active residential exchanges across the country. The exchanges were chosen so as to ensure that each region of the country was represented in proportion to its population.

Within each exchange, random digits were added to form a complete telephone number, thus permitting access to listed and unlisted numbers alike. Within each household, one adult was designated by a random procedure to be the respondent for the survey.¹

This is a good description of the most common method for choosing national samples, called random digit dialing. We’ll come back to random digit dialing and its problems later (see Exercise 8.16), but this statement is a good start toward gaining our confidence. We know the size of the sample, when the poll was taken, and the comforting word “random” appears three times. ■
EXAMPLE 8.6 Seat belt use in Hawaii

Each state conducts an annual survey of seat belt use by drivers, following guidelines set by the federal government. The guidelines require random sampling. Seat belt use is observed at randomly chosen road locations at random times during daylight hours. The locations are not an SRS of all locations in the state but rather a stratified sample using the state’s counties as strata.

In Hawaii, the counties are the islands that make up the state’s territory. The seat belt survey sample consists of 135 road locations in the four most populated islands: 66 in Oahu, 24 in Maui, 23 in Hawaii, and 22 in Kauai. The sample sizes on the islands are proportional to the amount of road traffic.\(^4\)
EXAMPLE 8.7 How bad is nonresponse?

The U.S. Census Bureau’s American Community Survey (ACS) has the lowest non-response rate of any poll we know: only about 1% of the households in the sample refuse to respond; the overall nonresponse rate, including “never at home” and other causes, is just 2.5%. This monthly survey of about 250,000 households replaces the “long form” that in the past was sent to some households in the every-ten-years national census. Participation in the ACS is mandatory, and the U.S. Census Bureau follows up by telephone and then in person if a household fails to return the mail questionnaire.

The University of Chicago’s General Social Survey (GSS) is the nation’s most important social science survey. (See Figure 8.3.) The GSS contacts its sample in person, and it is run by a university. Despite these advantages, a recent survey had a 30% rate of nonresponse.

What about opinion polls by news media and opinion-polling firms? We don’t know their rates of nonresponse because they won’t say. That itself is a bad sign. The Pew Research Center for the People and the Press imitated a careful random digit dialing survey and published the results: over 5 days, the survey reached 76% of the households in its chosen sample, but “because of busy schedules, skepticism and outright refusals, interviews were completed in just 38% of households that were reached.” Combining households that could not be contacted with those who did not complete the interview gave a nonresponse rate of 73%.
Figure 8.3  The home page of the General Social Survey at the University of Chicago’s National Opinion Research Center. The GSS has tracked opinions about a wide variety of issues since 1972.
EXAMPLE 8.8 What was that question?

How do Americans feel about illegal immigrants? “Should illegal immigrants be prosecuted and deported for being in the U.S. illegally, or shouldn’t they?” Asked this question in an opinion poll, 69% favored deportation. But when the very same sample was asked whether illegal immigrants who have worked in the United States for two years “should be given a chance to keep their jobs and eventually apply for legal status,” 62% said that they should. Different questions give quite different impressions of attitudes toward illegal immigrants.

What about government help for the poor? Only 13% think we are spending too much on “assistance to the poor,” but 44% think we are spending too much on “welfare.”
EXAMPLE 8.9 Are you happy?

Ask a sample of college students these two questions:

“How happy are you with your life in general?” (Answers on a scale of 1 to 5)
“How many dates did you have last month?”

The correlation between answers is $r = -0.012$ when asked in this order. It appears that dating has little to do with happiness. Reverse the order of the questions, however, and $r = 0.66$. Asking a question that brings dating to mind makes dating success a big factor in happiness.
EXAMPLE 8.10 Doctors and placebos

A placebo is a dummy treatment such as a pill that has no direct effect on a patient but may bring about a response because patients expect it to. Do academic physicians who maintain private practices sometimes give their patients placebos? A Web survey of doctors in internal medicine departments at Chicago-area medical schools was possible because almost all the doctors had listed email addresses.

Send an email to each doctor explaining the purpose of the study, promising anonymity, and giving an individual Web link for response. In all, 231 of 443 doctors responded. The response rate was helped by the fact that the email came from a team at a medical school. Result: 45% said they sometimes used placebos in their clinical practice.\[14\]