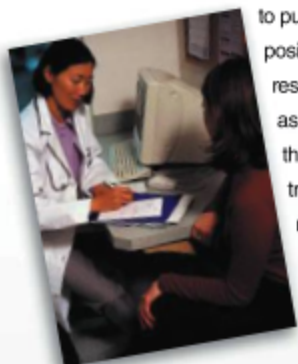


Publication Bias

There is a “publication bias” in professional journals. It is the tendency

to publish positive results (such as showing that some treatment is effective) much more often



than negative results (such as showing that some treatment has no effect). In the article “Registering Clinical Trials” (*Journal of the American Medical Association*, Vol. 290, No. 4), authors Kay Dickersin and Drummond Rennie state that “the result of not knowing who has performed what (clinical trial) is loss and distortion of the evidence, waste and duplication of trials, inability of funding agencies to plan, and a chaotic system from which only certain sponsors might benefit, and is invariably against the interest of those who offered to participate in trials and of patients in general.” They support a process in which all clinical trials are registered in one central system, so that future researchers have access to all previous studies, not just the studies that were published.

Example 1 Voluntary Response Sample

Literary Digest magazine conducted a poll for the 1936 presidential election by sending out 10 million ballots. The magazine received 2.3 million responses. The poll results suggested incorrectly that Alf Landon would win the presidency. In a much smaller poll of 50,000 people, George Gallup correctly predicted that Franklin D. Roosevelt would win. The lesson here is that it is not necessarily the *size* of the sample that makes it effective, but the *sampling method*. The *Literary Digest* ballots were sent to magazine subscribers as well as to registered car owners and those who used telephones. On the heels of the Great Depression, this group included disproportionately more wealthy people, who were Republicans. But the real flaw in the *Literary Digest* poll is that it resulted in a voluntary response sample. In contrast, Gallup used an approach in which he obtained a representative sample based on demographic factors. (Gallup modified his methods when he made a wrong prediction in the famous 1948 Dewey/Truman election. Gallup stopped polling too soon, and he failed to detect a late surge in support for Truman.) The *Literary Digest* poll is a classic illustration of the flaws inherent in basing conclusions on a voluntary response sample.

Example 2 Voluntary Response Sample

The ABC television show *Nightline* asked viewers to call with their opinion about whether the United Nations headquarters should remain in the United States. Viewers then decided themselves whether to call with their opinions, and 67% of 186,000 respondents said that the United Nations should be *moved out* of the United States. In a separate poll, 500 respondents were randomly selected and 72% of them wanted the United Nations to *stay* in the United States. The two polls produced dramatically different results. Even though the *Nightline* poll involved 186,000 volunteer respondents, the much smaller poll of 500 randomly selected respondents is more likely to provide better results because of the superior sampling method.

Analyze

Graph and Explore After carefully considering context, source of the data, and sampling method, we can proceed with an analysis that should begin with appropriate graphs and explorations of the data. Graphs are discussed in Chapter 2, and important statistics are discussed in Chapter 3.

Apply Statistical Methods Later chapters describe important statistical methods, but application of these methods is often made easy with calculators and/or statistical software packages. A good statistical analysis does not require strong computational skills. A good statistical analysis does require using common sense and paying careful attention to sound statistical methods.

Conclude

Statistical Significance *Statistical significance* is achieved in a study when we get a result that is very unlikely to occur by chance.

- Getting 98 girls in 100 random births is statistically significant because such an extreme event is not likely to be the result of random chance.
- Getting 52 girls in 100 births is not statistically significant, because that event could easily occur with random chance.