

## 10.1: Introduction to Estimation

### Learning Objectives

- Define statistic
- Define parameter
- Define point estimate
- Define interval estimate
- Define margin of error

One of the major applications of statistics is estimating population parameters from sample statistics. For example, a poll may seek to estimate the proportion of adult residents of a city that support a proposition to build a new sports stadium. Out of a random sample of 200 people, 106 say they support the proposition. Thus in the sample, 0.53 of the people supported the proposition. This value of 0.53 is called a point estimate of the population proportion. It is called a point estimate because the estimate consists of a single value or point.

Point estimates are usually supplemented by interval estimates called confidence intervals. Confidence intervals are intervals constructed using a method that contains the population parameter a specified proportion of the time. For example, if the pollster used a method that contains the parameter 95% of the time it is used, he or she would arrive at the following 95% confidence interval:  $0.46 < \pi < 0.60$ . The pollster would then conclude that somewhere between 0.46 and 0.60 of the population supports the proposal. The media usually reports this type of result by saying that 53% favor the proposition with a margin of error of 7%.

In an experiment on memory for chess positions, the mean recall for tournament players was 63.8 and the mean for non-players was 33.1. Therefore a point estimate of the difference between population means is 30.7. The 95% confidence interval on the difference between means extends from 19.05 to 42.35. You will see how to compute this kind of interval in another section.

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