In the Chapter Problem, for example, it was noted that 85% of 1007 surveyed adults know what Twitter is. The sample statistic of 85% can be expressed in decimal form as 0.85, so we will work with the sample proportion of $\hat{p} = 0.85$.

Point Estimate If we want to estimate a population proportion with a single value, the best estimate is the sample proportion $\hat{p}$. Because $\hat{p}$ consists of a single value, it is called a *point estimate*.

DEFINITION A **point estimate** is a single value (or point) used to approximate a population parameter.

The sample proportion $\hat{p}$ is the best *point estimate* of the population proportion p.

We use $\hat{p}$ as the point estimate of p because it is unbiased and it is the most consistent of the estimators that could be used. (Unbiased estimators are discussed in Section 6-4.) The sample proportion $\hat{p}$ is the most consistent estimator of p in the sense that the standard deviation of sample proportions tends to be smaller than the standard deviation of other unbiased estimators of p.

Example 1 Twitter Poll

The Pew Research Center conducted a survey of 1007 adults and found that 85% of them know what Twitter is. Based on that result, find the best point estimate of the proportion of *all* adults who know what Twitter is.

Solution

Because the sample proportion is the best point estimate of the population proportion, we conclude that the best point estimate of p is 0.85. (If using the sample results to estimate the *percentage* of all adults who know what Twitter is, the best estimate is 85%.)

Why do We Need Confidence Intervals?

In Example 1 we saw that 0.85 was our *best* point estimate of the population proportion p, but a point estimate is a single value that gives us no indication of how *good* that best estimate is. Statisticians have cleverly developed the *confidence interval* or *interval estimate,* which consists of a range (or an interval) of values instead of just a single value. A confidence interval gives us a much better sense of how good an estimate is.

DEFINITION A **confidence interval** (or **interval estimate**) is a range (or an interval) of values used to estimate the true value of a population parameter. A confidence interval is sometimes abbreviated as CI.

DEFINITION The **confidence level** is the probability $1 - \alpha$ (such as 0.95, or 95%) that the confidence interval actually does contain the population parameter, assuming that the estimation process is repeated a large number of times. (The confidence level is also called the **degree of confidence,** or the **confidence coefficient.**)