

Point estimate and confidence intervals for proportions

The objective in this example is to estimate the **proportion** of individuals in a population that have some characteristic.

Recall that a **Bernoulli trial** is a probability experiment with two outcomes, usually labeled **success** and **failure**.

The likelihood model for a proportion is a vector of n independent Bernoulli trials with a common, but unknown, probability p that a randomly selected individual will have the characteristic.

The number of individuals in the sample who have the characteristic of interest is y .

The R function `prop.test` computes point and interval estimates for the proportion of individuals who have the characteristic.

Example: Estimating the proportion of people who identify as left-handed

Suppose a certain college has 3200 students, of whom 391 identify as left-handed.

```
n = 3200
y = 391

prop.test(y,n,conf.level=0.95)

##
## 1-sample proportions test with continuity correction
##
## data:  y out of n, null probability 0.5
## X-squared = 1825.6, df = 1, p-value < 2.2e-16
## alternative hypothesis: true p is not equal to 0.5
## 95 percent confidence interval:
##  0.1111413 0.1341522
## sample estimates:
##           p
## 0.1221875
```

By default, `prop.test` uses a confidence level of 95%, but you can change this with the `conf.level` parameter.

```
prop.test(y,n,conf.level=0.9)

##
## 1-sample proportions test with continuity correction
##
## data:  y out of n, null probability 0.5
## X-squared = 1825.6, df = 1, p-value < 2.2e-16
## alternative hypothesis: true p is not equal to 0.5
## 90 percent confidence interval:
##  0.1128316 0.1321922
## sample estimates:
##          p
## 0.1221875
```

The confidence level does not have any effect on the point estimate.