The correlation coefficient:

These data are crime-related and demographic statistics for 47 US states in 1960. The data were collected from the FBI's Uniform Crime Report and other government agencies to determine how the variable crime rate depends on the other variables measured in the study.

1.R: Crime rate: # of offenses reported to police per million population
5.Ex0: 1960 per capita expenditure on police by state and local government

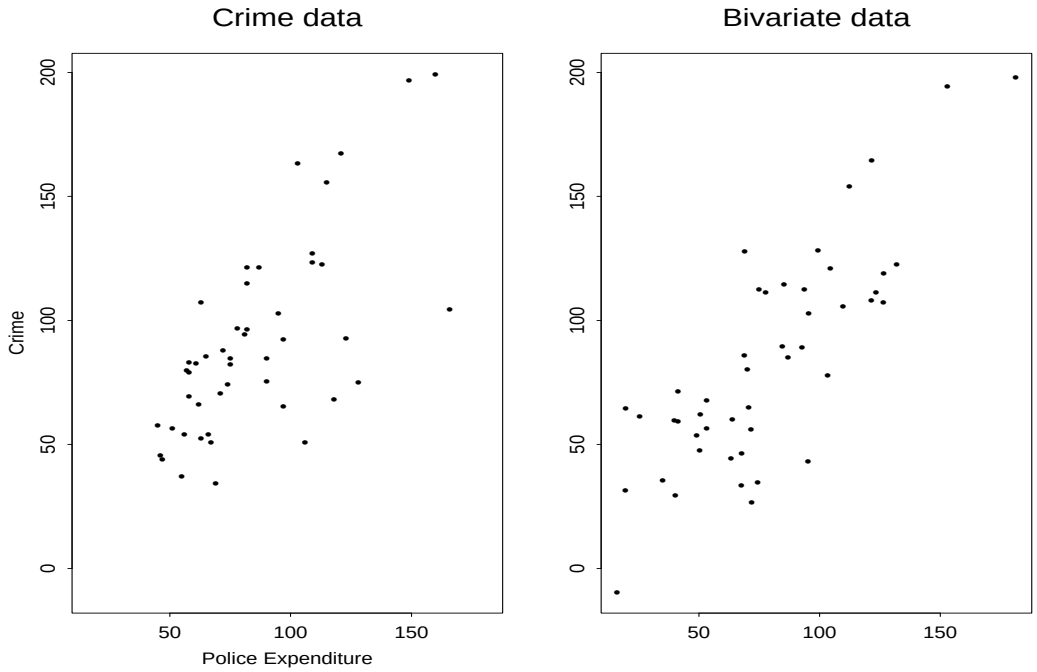

Figure 1: The data

Correlation coefficient:

```
> cor(R,Ex0)
[1] 0.6876044
```

Random sample:

```
> my.sample<-sample(1:47,15)
> my.data<-crime[my.sample,c(1,5)]

> # Sample correlation coefficient
> cor(R[my.sample],Ex0[my.sample])
[1] 0.8497738
```

Bootstrap standard error.

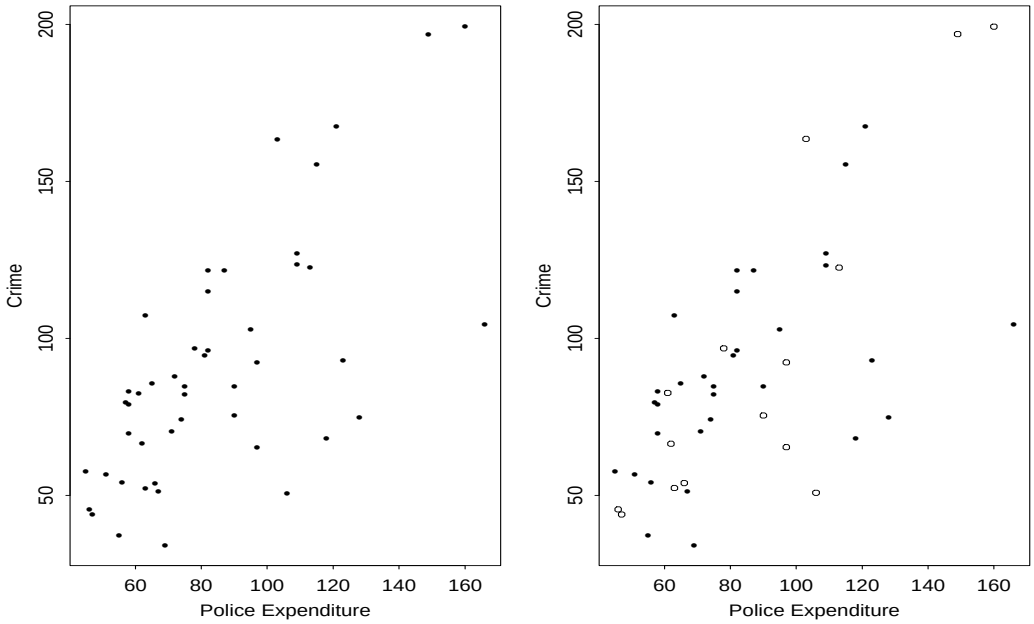

Figure 2: Sampled data

100 replications (B = 100) se.boot = 0.1446122 1000 replications (B = 1000) se.boot = 0.1126816

Details

```
> theta<-
function(x, xdata)
{
        cor(xdata[x, 1], xdata[x, 2])
}

> boot1<-bootstrap(1:15,nboot=100,theta,my.data)
> sqrt(var(boot1$thetastar))
[1] 0.1446122
> boot2<-bootstrap(1:15,nboot=1000,theta,my.data)
> sqrt(var(boot2$thetastar))
[1] 0.1126816
```

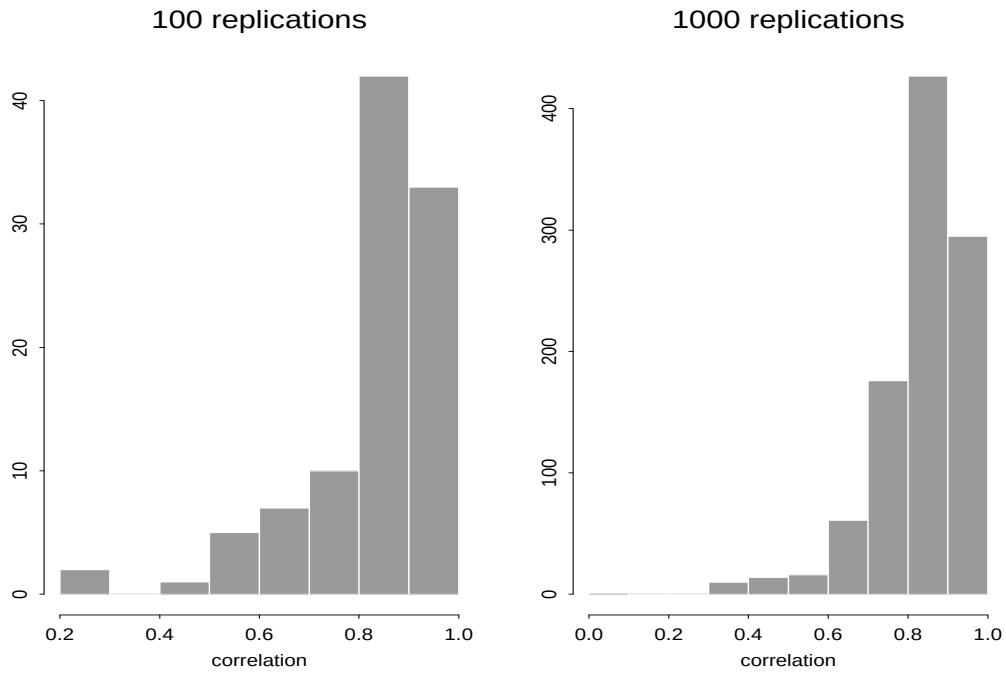

Figure 3: Bootstrap histograms