Measures of bivariate association

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STAT 423

Applied Regression and Analysis of Variance

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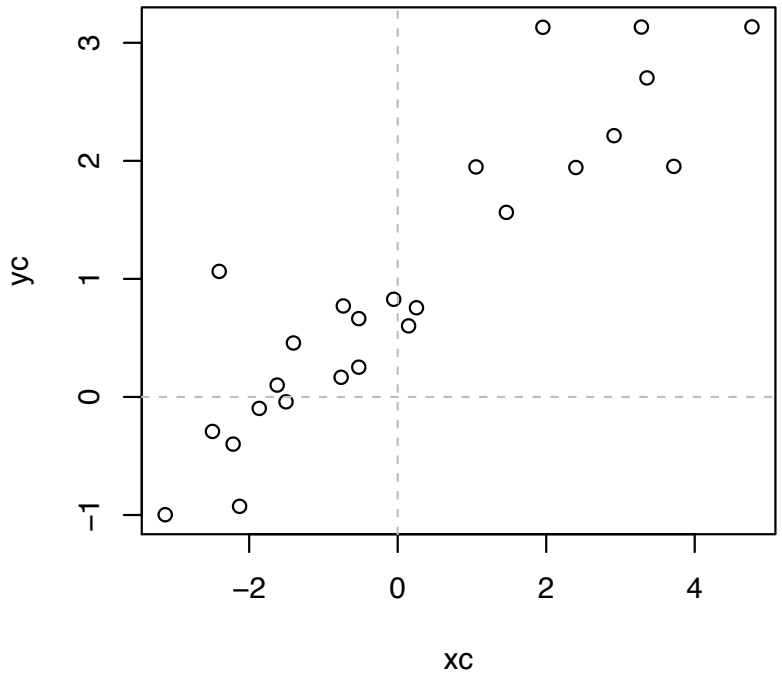
$x_c =$ today's low temp in Minneapolis (in celsius)

$y_c =$ tomorrow's low temp in Green Bay (in celsius)

```
mean(xc*yc)
```

```
## [1] 2.632433
```

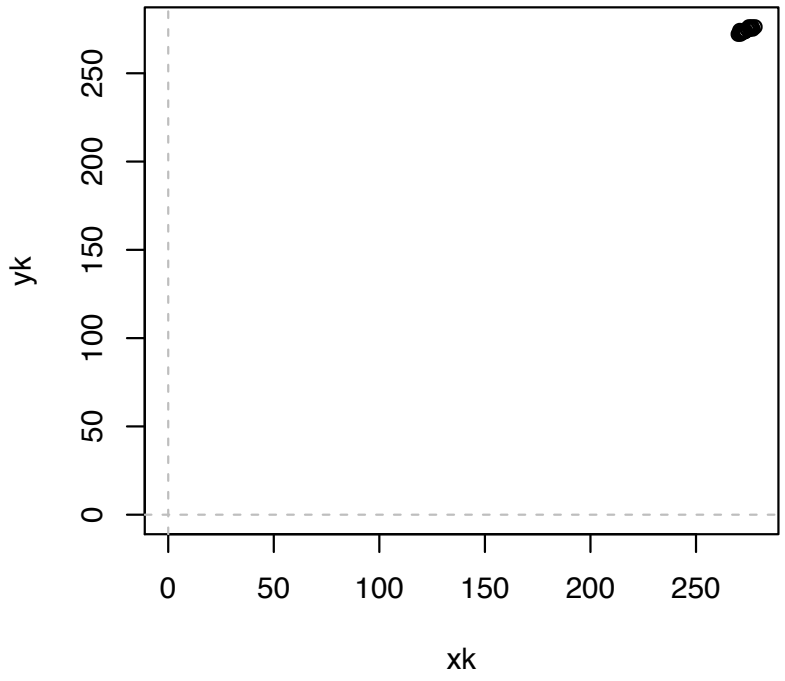


$x_k =$ today's low temp in Minneapolis (in kelvins)

$y_k =$ tomorrow's low temp in Green Bay (in kelvins)

```
xk<-xc+273.15 ; yk<-yc+273.15
mean(xk*yk)

## [1] 74925.89
```

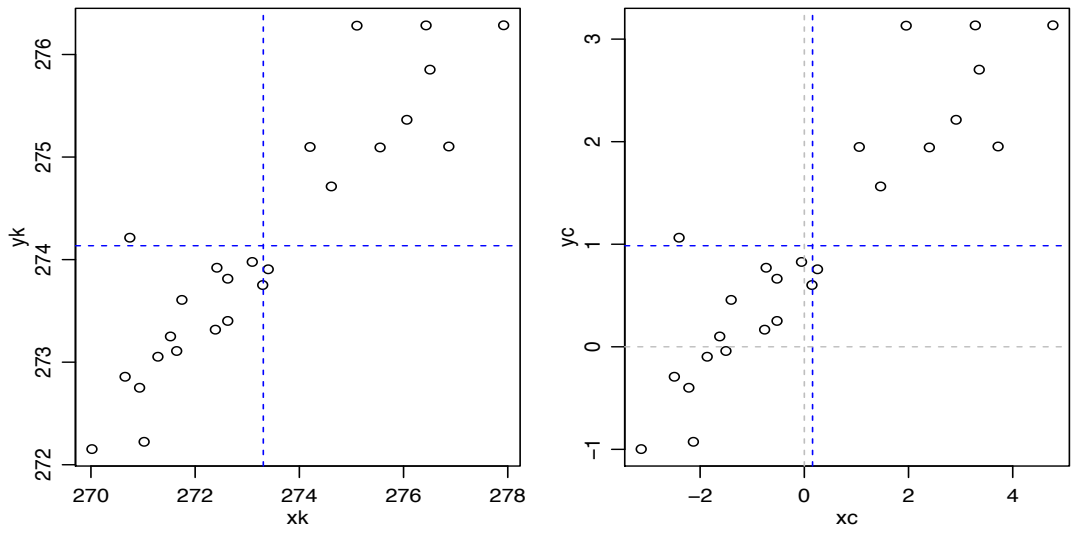


```r
mean( (xk-mean(xk)) * (yk-mean(yk)) )
```

```
## [1] 2.476611
```

```r
mean( (xc-mean(xc)) * (yc-mean(yc)) )
```

```
## [1] 2.476611
```



```r
mean( (xk-mean(xk)) * (yk-mean(yk)) )
```

```
## [1] 2.476611
```

```r
mean( (xc-mean(xc)) * (yc-mean(yc)) )
```

```
## [1] 2.476611
```

```r
cov(xk,yk)
```

```
## [1] 2.579803
```

```r
cov(xc,yc)
```

```
## [1] 2.579803
```

```r
n<-length(xc)
n/(n-1)
```

```
## [1] 1.041667
```

```r
cov(xc,yc) / mean( (xc-mean(xc)) * (yc-mean(yc)) )
```

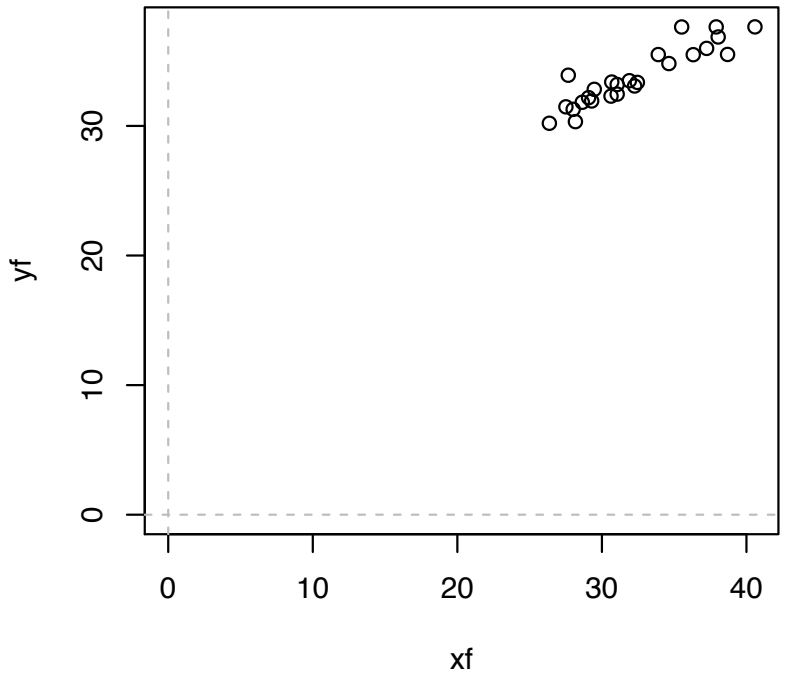
```
## [1] 1.041667
```

$x_f =$ today's low temp in Minneapolis (in fahrenheit)

$y_f =$ tomorrow's low temp in Green Bay (in fahrenheit)

```
xf<-xc*9/5+32 ; yf<-yc*9/5+32
mean(xf*yf)

## [1] 1098.393
```

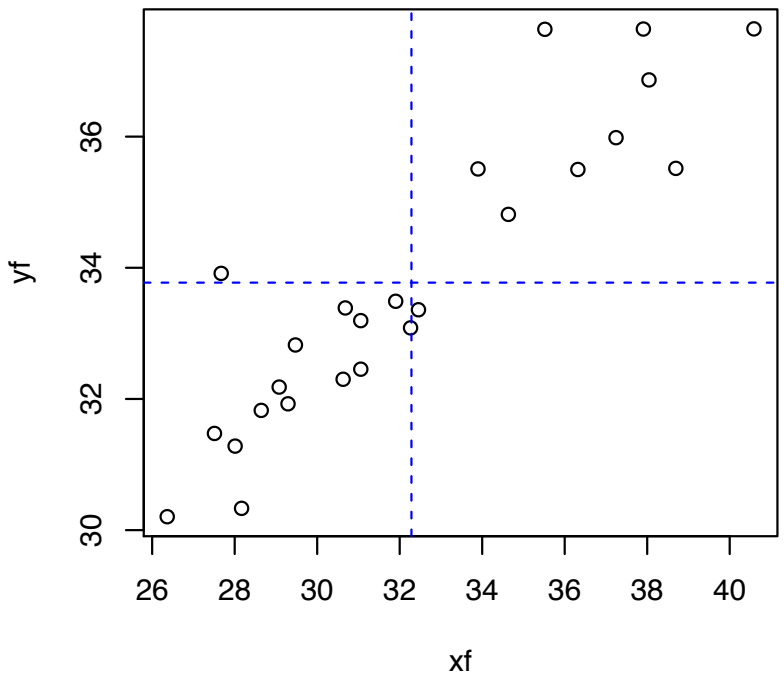


$x_f =$ today's low temp in Minneapolis (in fahrenheit)

$y_f =$ tomorrow's low temp in Green Bay (in fahrenheit)

```
mean( (xf-mean(xf)) * (yf-mean(yf)) )

## [1] 8.024218
```



```r
cor(xc,yc)
```

```
## [1] 0.9138004
```

```r
cor(xk,yk)
```

```
## [1] 0.9138004
```

```r
cor(xf,yf)
```

```
## [1] 0.9138004
```

```r
cor( xc*3.275+1.324 , yc*5.234-6.219)
```

```
## [1] 0.9138004
```

```r
cor(pop,gdp)
```

```
## [1] 0.5577147
```

```r
cor(log(pop),log(gdp))
```

```
## [1] 0.803626
```