```
epg = read.table(file.path(pfadu, "epg.txt"))
head(epg)


# Abbildung COG x F2, COG x F1, EPGSUM1278 x F1
par(mfrow=c(1,3))
with(epg, plot(F2, COG))
with(epg, plot(F1, COG))
temp = with(epg, V %in% c("i", "I", "E", "a"))
with(epg, plot(F1[temp], SUM1278[temp]))

# Kovarianz
y = epg$F2
x = epg$COG
n = length(y)
mx = mean(x)
my = mean(y)
dx = x - mean(x)
dy = y - mean(y)
covxy = sum(dx * dy)/(n-1)
cov(x,y)

# Korrelation
xgross = x * 1000
cov(x,y); cov(xgross,y)
r = cov(x,y)/(sd(x) * sd(y))
cor(x,y); cor(xgross,y)

# Regression
b = r * sd(y)/sd(x)
b = cov(x,y)/var(x)
k = my - b*mx
yhut = b*x + k
par(mfrow=c(1,1))
plot(x,y)
abline(k, b)

# Residuals
error =  y - yhut
SSE = sum(error^2)

# die lm() Funktion
reg = lm(y ~ x)
abline(reg)
coef(reg)
yhut = predict(reg)
residuals(reg)
deviance(reg)
sum(error^2)


# SSY, SSR, SSE
SSY = sum( (y - my)^2)
```

```
SSR = sum((yhut - my)^2)

# R-squared
SSR/SSY
cor(x, y)^2

# Signifikanz-test
rsb = sqrt( (1 - r^2) / (n - 2) )
tstat = r/rsb
2 * (1 - pt(tstat, n-2))

fstat = tstat^2
1 - pf(fstat, 1, n-2)

# summary()
summary(reg)
```