

GPA

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GPA

reference:

- Cannon, et al., Stat2, chapter 04, example 4.9

Import the data.

```
data <- read.csv("SATGPA.csv", header=TRUE)
head(data)
```

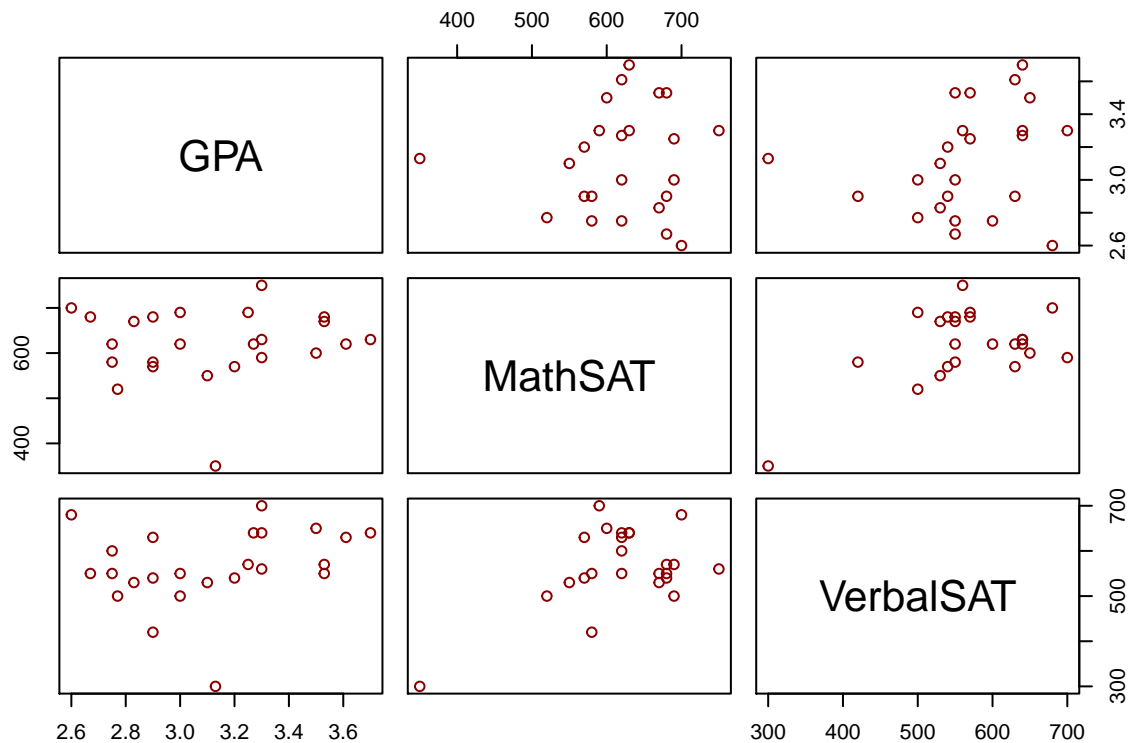
```
##   MathSAT VerbalSAT  GPA
## 1     580      420 2.90
## 2     670      530 2.83
## 3     680      540 2.90
## 4     630      640 3.30
## 5     620      630 3.61
## 6     580      550 2.75
```

```
dim(data)
```

```
## [1] 24  3
```

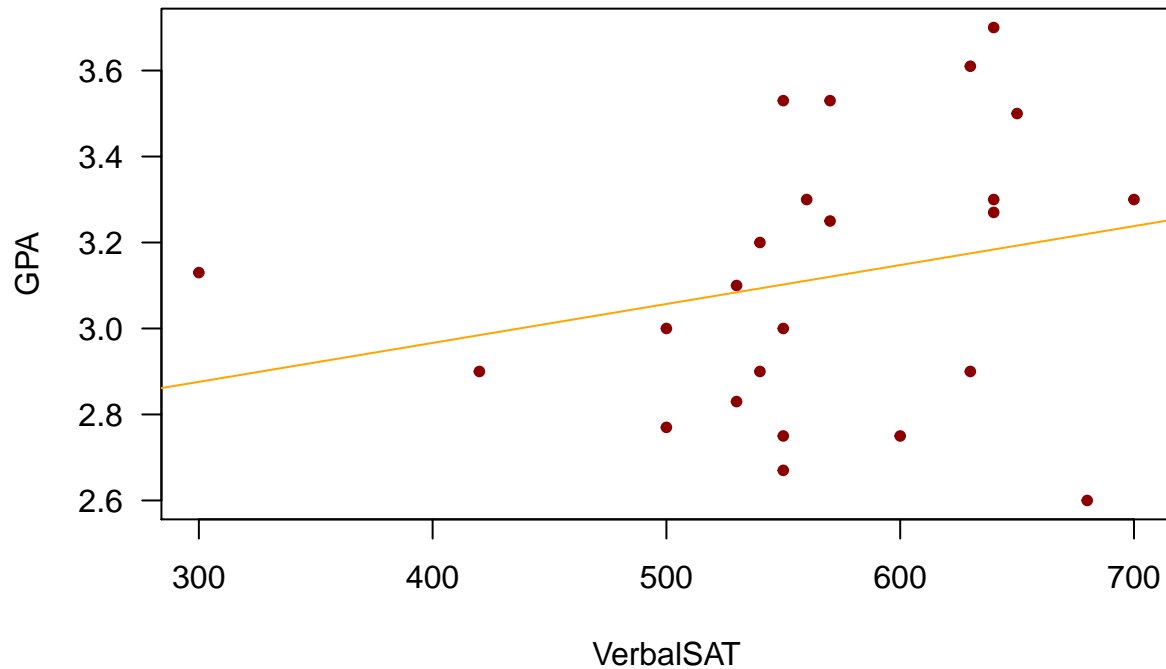
Scatterplot matrix.

```
pairs(~ GPA + MathSAT + VerbalSAT, data=data, col="darkred")
```



View the data.

```
plot(GPA ~ VerbalSAT, data=data,  
     pch=20, col="darkred", las=1)  
GPA.lm <- lm(GPA ~ VerbalSAT, data=data)  
abline(GPA.lm, col="orange")
```



Correlation coefficient.

```
r.original <- with(data,  
                  cor(GPA, VerbalSAT))  
r.original
```

```
## [1] 0.2444543
```

Randomization.

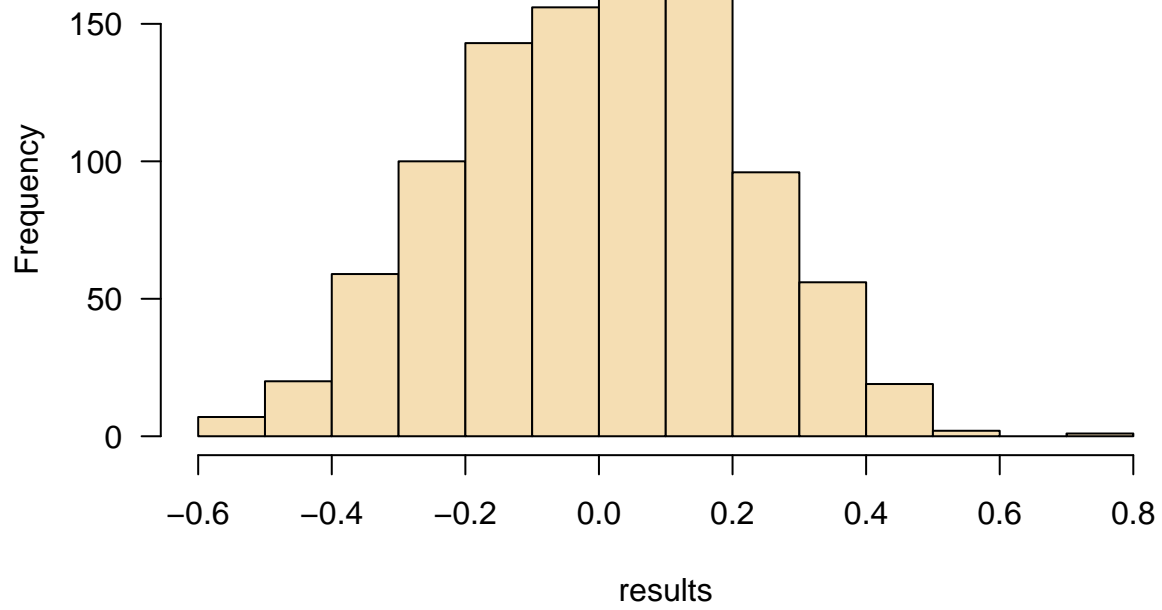
```
SAT.sample <- sample(data$VerbalSAT)  
cor(data$GPA, SAT.sample)
```

```
## [1] 0.2204207
```

Randomization test (= permutation test).

```
n.trials <- 1000  
results <- rep(NA, n.trials)  
for (i in 1:n.trials){  
  SAT.sample <- sample(data$VerbalSAT)  
  results[i] <- cor(data$GPA, SAT.sample)  
}  
hist(results,  
     las=1, col="wheat")
```

Histogram of results



```
upr <- sum(results >= abs(r.original))  
lwr <- sum(results <= -abs(r.original))  
p.value <- (upr + lwr) / n.trials  
p.value
```

```
## [1] 0.249
```