

Sleep

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```
summary(sleep)
```

```
##      Reaction      Days      Subject
## Min.   :194.3   Min.   :0.0   Min.   :308.0
## 1st Qu.:255.4   1st Qu.:2.0   1st Qu.:331.0
## Median :288.7   Median :4.5   Median :336.0
## Mean   :298.5   Mean   :4.5   Mean   :341.3
## 3rd Qu.:336.8   3rd Qu.:7.0   3rd Qu.:352.0
## Max.   :466.4   Max.   :9.0   Max.   :372.0
```

```
var(sleep)
```

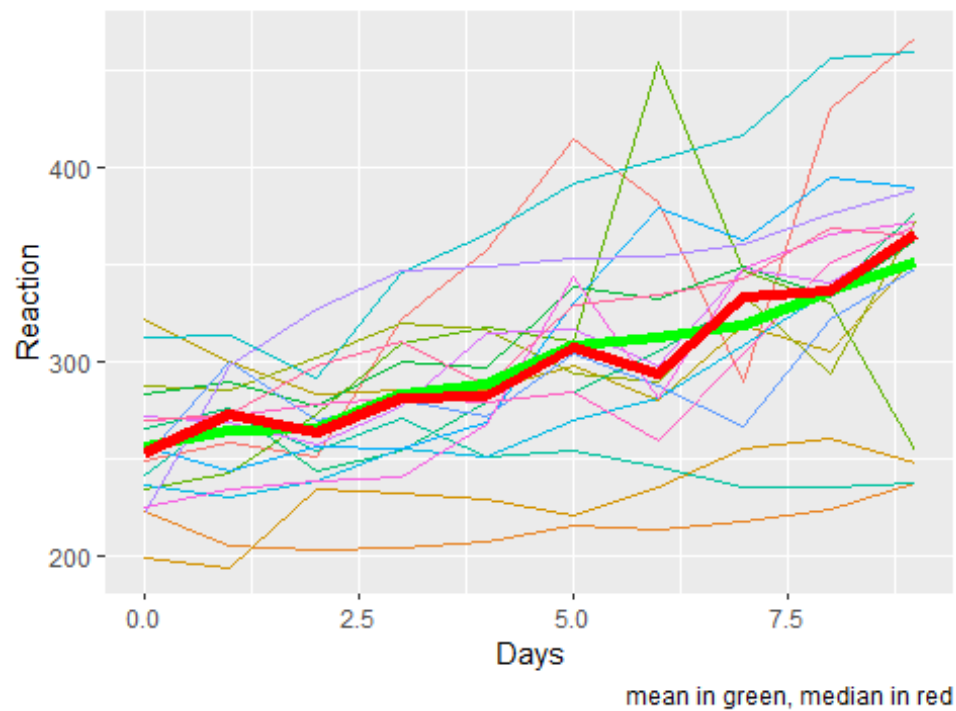
```
##      Reaction      Days      Subject
## Reaction 3172.92888 86.837540 209.3506
## Days      86.83754  8.296089  0.0000
## Subject   209.35063 0.000000 412.9392
```

```
sd_sleep<-sd(sleep$Reaction)
```

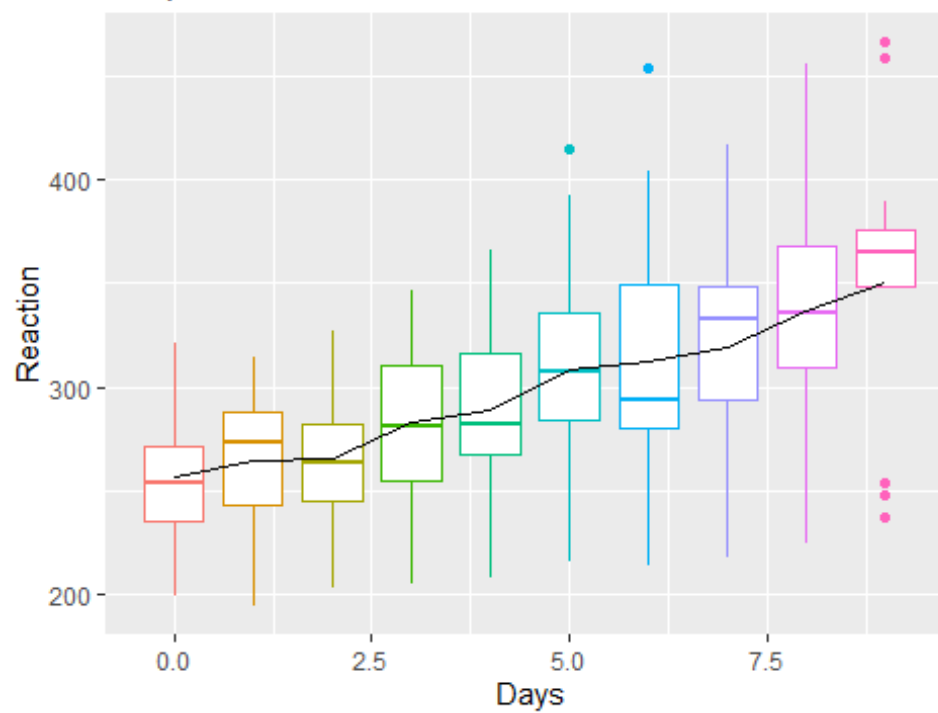
```
sleep_resaped <- reshape(sleep,timevar="Days", idvar=c("Subject"),
direction="wide")
cor(sleep_resaped[,3:11])
```

```
##      Reaction.1 Reaction.2 Reaction.3 Reaction.4 Reaction.5
## Reaction.1  1.0000000  0.7704196  0.7414557  0.6510015  0.5289910
## Reaction.2  0.7704196  1.0000000  0.8750718  0.6940106  0.4921226
## Reaction.3  0.7414557  0.8750718  1.0000000  0.9136854  0.7220647
## Reaction.4  0.6510015  0.6940106  0.9136854  1.0000000  0.8541181
## Reaction.5  0.5289910  0.4921226  0.7220647  0.8541181  1.0000000
## Reaction.6  0.3149630  0.4543265  0.6748239  0.7493110  0.7431791
## Reaction.7  0.4762225  0.5903260  0.5995546  0.6948864  0.6903115
## Reaction.8  0.3951707  0.4063653  0.5958373  0.7445692  0.9009653
## Reaction.9  0.5464951  0.4232455  0.5657073  0.7155773  0.8377065
##      Reaction.6 Reaction.7 Reaction.8 Reaction.9
## Reaction.1  0.3149630  0.4762225  0.3951707  0.5464951
## Reaction.2  0.4543265  0.5903260  0.4063653  0.4232455
## Reaction.3  0.6748239  0.5995546  0.5958373  0.5657073
## Reaction.4  0.7493110  0.6948864  0.7445692  0.7155773
## Reaction.5  0.7431791  0.6903115  0.9009653  0.8377065
## Reaction.6  1.0000000  0.7034522  0.7287104  0.4601183
## Reaction.7  0.7034522  1.0000000  0.7616930  0.6586754
## Reaction.8  0.7287104  0.7616930  1.0000000  0.8813894
## Reaction.9  0.4601183  0.6586754  0.8813894  1.0000000
```

Spaghetti Plot



Boxplot



```
# linear regression per individual
individual_lm<-sapply(sleep$Subject, function(x) coef(lm(Reaction~Days,
data=subset(sleep, Subject==x))))
```

```

#order<-reorder(sleep$Subject, individual_lm[1,])
#xyplot(Reaction~Subject|order,data=sleep, type=c('p', 'r'), auto.key=T,
aspect="xy")

## sleep$Subject: 308
## (Intercept)      Days
##   244.1927      21.7647
## -----
## sleep$Subject: 309
## (Intercept)      Days
##   205.054945     2.261785
## -----
## sleep$Subject: 310
## (Intercept)      Days
##   203.484225     6.114899
## -----
## sleep$Subject: 330
## (Intercept)      Days
##   289.685093     3.008073
## -----
## sleep$Subject: 331
## (Intercept)      Days
##   285.738965     5.266019
## -----
## sleep$Subject: 332
## (Intercept)      Days
##   264.251615     9.566768
## -----
## sleep$Subject: 333
## (Intercept)      Days
##   275.019105     9.142045
## -----
## sleep$Subject: 334
## (Intercept)      Days
##   240.16291     12.25314
## -----
## sleep$Subject: 335
## (Intercept)      Days
##   263.034693    -2.881034
## -----
## sleep$Subject: 337
## (Intercept)      Days
##   290.10413     19.02597
## -----
## sleep$Subject: 349
## (Intercept)      Days
##   215.11177     13.49393
## -----
## sleep$Subject: 350
## (Intercept)      Days

```

```

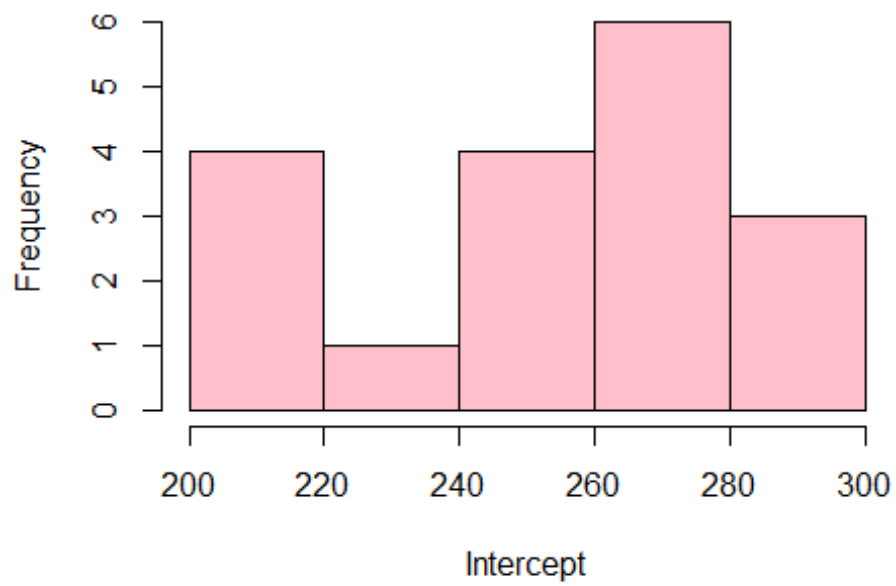
##      225.83460      19.50402
## -----
## sleep$Subject: 351
## (Intercept)      Days
##      261.147011      6.433498
## -----
## sleep$Subject: 352
## (Intercept)      Days
##      276.37207      13.56655
## -----
## sleep$Subject: 369
## (Intercept)      Days
##      254.96815      11.34811
## -----
## sleep$Subject: 370
## (Intercept)      Days
##      210.44909      18.05615
## -----
## sleep$Subject: 371
## (Intercept)      Days
##      253.636038      9.188445
## -----
## sleep$Subject: 372
## (Intercept)      Days
##      267.04480      11.29807

##           [,1]      [,2]
## [1,] 244.1927 21.764702
## [2,] 205.0549  2.261785
## [3,] 203.4842  6.114899
## [4,] 289.6851  3.008073
## [5,] 285.7390  5.266019
## [6,] 264.2516  9.566768
## [7,] 275.0191  9.142045
## [8,] 240.1629 12.253141
## [9,] 263.0347 -2.881034
## [10,] 290.1041 19.025974
## [11,] 215.1118 13.493933
## [12,] 225.8346 19.504017
## [13,] 261.1470  6.433498
## [14,] 276.3721 13.566549
## [15,] 254.9681 11.348109
## [16,] 210.4491 18.056151
## [17,] 253.6360  9.188445
## [18,] 267.0448 11.298073

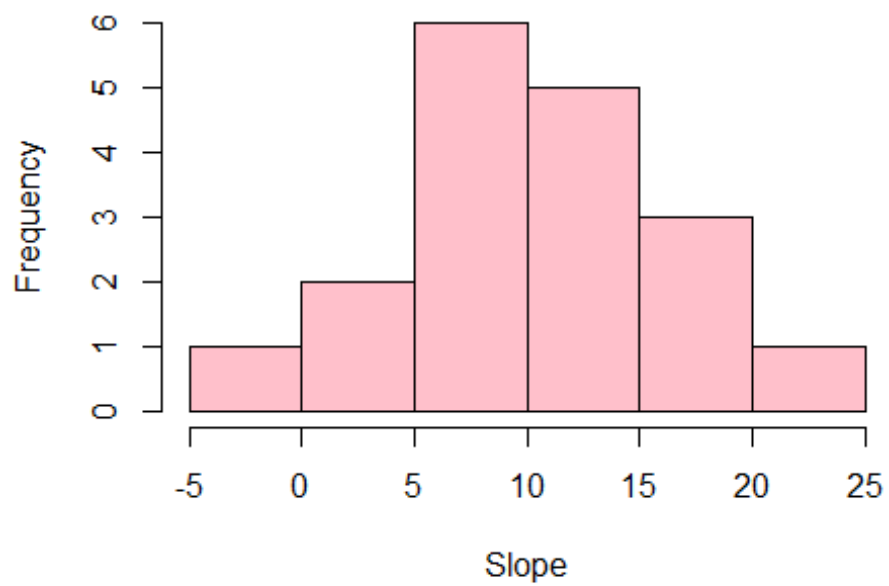
## [1] 0.6815132 0.4011314 0.7175444 0.1580405 0.3425145 0.2028791 0.8473896
## [8] 0.7855956 0.3975776 0.9333963 0.9053282 0.8686035 0.4517983 0.7445483
## [15] 0.8412265 0.8525069 0.5807206 0.9118031

```

Histogram of individual intercepts



Histogram of individual slopes



Histogram of individual R squared

