

## Highway Exmample #3: Bigger Data (For Illustration)

This example is for illustration. We return to the highway data once more, but this time we “pretend” the sample size is four times the original sample size. We want to mimic a data set that has the same properties as the highway data, but is bigger.

```
library(MuMIn)
highway <- read.csv("~/Dropbox/STAT512/Lectures/MultReg3/MR3_Highway.csv")
nrow(highway)
```

```
## [1] 39
```

```
highway <- highway[,-1]
Model1 <- lm(rate ~ acpt + len + slim + sigs + pa, data = highway)
summary(Model1)
```

```
##
## Call:
## lm(formula = rate ~ acpt + len + slim + sigs + pa, data = highway)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.93807 -0.80142 -0.00392  0.80743  2.44918
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   9.94408    2.58209   3.851 0.000512 ***
## acpt          0.06428    0.03026   2.124 0.041256 *
## len         -0.07405    0.02451  -3.021 0.004840 **
## slim        -0.10510    0.04132  -2.543 0.015851 *
## sigs         0.79736    0.36868   2.163 0.037907 *
## pa          -0.77443    0.41067  -1.886 0.068156 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.076 on 33 degrees of freedom
## Multiple R-squared:  0.745, Adjusted R-squared:  0.7064
## F-statistic: 19.29 on 5 and 33 DF, p-value: 5.996e-09
```

```
BigHighway <- rbind(highway, highway, highway, highway)
nrow(BigHighway)
```

```
## [1] 156
```

```
rm(highway)
Model2 <- lm(rate ~ acpt + len + slim + sigs + pa, data = BigHighway)
summary(Model2)
```

```
##
## Call:
## lm(formula = rate ~ acpt + len + slim + sigs + pa, data = BigHighway)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.93807 -0.81548 -0.00392  0.85818  2.44918
```

Call  
model from  
Hw #2

x 4 larger

```
##
## Coefficients:
##           Estimate Std. Error t value Pr(>|t|)
## (Intercept)  9.94408    1.21111   8.211 9.36e-14 ***
## acpt         0.06428    0.01419   4.528 1.20e-05 ***
## len        -0.07405    0.01150  -6.441 1.52e-09 ***
## slim       -0.10510    0.01938  -5.422 2.30e-07 ***
## sigs        0.79736    0.17293   4.611 8.52e-06 ***
## pa         -0.77443    0.19262  -4.020 9.17e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.009 on 150 degrees of freedom
## Multiple R-squared:  0.745, Adjusted R-squared:  0.7365
## F-statistic: 87.66 on 5 and 150 DF, p-value: < 2.2e-16
```

```
FullModel <- lm(rate ~ ., data = BigHighway)
options(na.action = "na.fail")
AllSubsets <- dredge(FullModel, rank = "AIC")
```

```
## Fixed term is "(Intercept)"
head(AllSubsets)
```

```
## Global model call: lm(formula = rate ~ ., data = BigHighway)
## ---
## Model selection table
```

	(Intrc)	acpt	adt	itg	len	lwid	ma	pa
## 7586	11.37	0.06963			-0.05861		-0.4698	-0.9859
## 7458	10.57	0.06277			-0.06345			-0.7432
## 7594	11.73	0.06716		-0.285	-0.06185		-0.6693	-1.1810
## 7650	13.30	0.07100			-0.06105	-0.1629	-0.5076	-0.9715
## 7588	11.64	0.06786	-0.004514		-0.06075		-0.6138	-1.1020
## 7970	11.24	0.06000			-0.06145			-0.8390

```
##           shld    sigs    slim    trks df  logLik    AIC delta weight
## 7586           0.6477 -0.1135 -0.09773  9 -216.286 450.6  0.00  0.261
## 7458           0.7013 -0.1031 -0.08852  8 -217.563 451.2  0.59  0.194
## 7594           0.6961 -0.1144 -0.09915 10 -215.727 451.5  0.88  0.168
## 7650           0.6281 -0.1120 -0.10080 10 -215.919 451.8  1.27  0.138
## 7588           0.6868 -0.1140 -0.09942 10 -215.997 452.0  1.42  0.128
## 7970 0.04161 0.7231 -0.1210 -0.08124  9 -217.138 452.3  1.70  0.111
## Models ranked by AIC(x)
```