

PS2 syntax

```
setwd("/Users/tomionia/Documents/PSY508 Stats/PS2")

# Installing packages
list.of.packages <- c("xlsx", "ggplot2", "nlme", "foreign", "gplots",
"stats", "psych", "ISwR", "ggm", "car", "ppcor", "StatDA",
"plyr", "DescTools")
new.packages <- list.of.packages[!(list.of.packages %in%
installed.packages()[, "Package"])]
if(length(new.packages)) install.packages(new.packages)
# Loading packages
lapply(list.of.packages, require, character.only = TRUE)

## Loading required package: xlsx
## Loading required package: rJava
## Loading required package: xlsxjars
## Loading required package: ggplot2
## Loading required package: nlme
## Loading required package: foreign
## Loading required package: gplots

##
## Attaching package: 'gplots'

## The following object is masked from 'package:stats':
##
##     lowess

## Loading required package: psych

##
## Attaching package: 'psych'

## The following objects are masked from 'package:ggplot2':
##
##     %+%, alpha

## Loading required package: ISwR
## Loading required package: ggm
## Loading required package: igraph
```

```

##
## Attaching package: 'igraph'

## The following objects are masked from 'package:stats':
##
##      decompose, spectrum

## The following object is masked from 'package:base':
##
##      union

##
## Attaching package: 'ggm'

## The following object is masked from 'package:igraph':
##
##      pa

## Loading required package: car

##
## Attaching package: 'car'

## The following object is masked from 'package:psych':
##
##      logit

## Loading required package: ppcor

## Loading required package: MASS

##
## Attaching package: 'ppcor'

## The following objects are masked from 'package:ggm':
##
##      pcor, pcor.test

## Loading required package: StatDA

## Loading required package: geoR

## -----
## Analysis of Geostatistical Data
## For an Introduction to geoR go to http://www.leg.ufpr.br/geoR
## geoR version 1.7-5.2 (built on 2016-05-02) is now loaded
## -----

## Loading required package: sgeostat

##
## Attaching package: 'StatDA'

```

```
## The following object is masked from 'package:igraph':  
##  
##     tree  
  
## Loading required package: plyr  
## Loading required package: DescTools  
  
##  
## Attaching package: 'DescTools'  
  
## The following object is masked from 'package:car':  
##  
##     Recode  
  
## The following object is masked from 'package:igraph':  
##  
##     %c%  
  
## The following objects are masked from 'package:psych':  
##  
##     ICC, SD  
  
## [[1]]  
## [1] TRUE  
##  
## [[2]]  
## [1] TRUE  
##  
## [[3]]  
## [1] TRUE  
##  
## [[4]]  
## [1] TRUE  
##  
## [[5]]  
## [1] TRUE  
##  
## [[6]]  
## [1] TRUE  
##  
## [[7]]  
## [1] TRUE  
##  
## [[8]]  
## [1] TRUE  
##  
## [[9]]  
## [1] TRUE  
##  
## [[10]]
```

```

## [1] TRUE
##
## [[11]]
## [1] TRUE
##
## [[12]]
## [1] TRUE
##
## [[13]]
## [1] TRUE
##
## [[14]]
## [1] TRUE

path = "/Users/tomionia/Documents/PSY508 Stats/PS2"

#For a CSV file:
ps2 <- read.csv(file="cities_data_set.csv", header=TRUE)

#running model for comparing contrast
model1 <- lm(formula = CRIME ~ SIZE + POV , data=ps2)
summary(model1)

##
## Call:
## lm(formula = CRIME ~ SIZE + POV, data = ps2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -137.227  -28.806    0.462   26.280  129.287
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -5.7057     15.2072  -0.375   0.708
## SIZE           1.3200      0.2092   6.309 2.32e-09 ***
## POV           3.3104      0.6386   5.184 6.09e-07 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 41.83 on 171 degrees of freedom
## Multiple R-squared:  0.3323, Adjusted R-squared:  0.3244
## F-statistic: 42.54 on 2 and 171 DF,  p-value: 1.009e-15

anova(model1)

## Analysis of Variance Table
##
## Response: CRIME
##              Df Sum Sq Mean Sq F value    Pr(>F)
## SIZE           1 101877  101877   58.218 1.567e-12 ***
## POV            1  47018   47018   26.869 6.089e-07 ***

```

```
## Residuals 171 299237      1750
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

EtaSq(model1)

##          eta.sq eta.sq.part
## SIZE 0.1554327   0.1888210
## POV  0.1049206   0.1357909

#running model for comparing contrast
model2 <- lm(formula = CRIME ~ POV + SIZE , data=ps2)
summary(model2)

##
## Call:
## lm(formula = CRIME ~ POV + SIZE, data = ps2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -137.227  -28.806    0.462   26.280  129.287
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -5.7057     15.2072  -0.375    0.708
## POV           3.3104      0.6386   5.184 6.09e-07 ***
## SIZE          1.3200      0.2092   6.309 2.32e-09 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 41.83 on 171 degrees of freedom
## Multiple R-squared:  0.3323, Adjusted R-squared:  0.3244
## F-statistic: 42.54 on 2 and 171 DF,  p-value: 1.009e-15

anova(model2)

## Analysis of Variance Table
##
## Response: CRIME
##              Df Sum Sq Mean Sq F value    Pr(>F)
## POV             1  79241   79241  45.283 2.467e-10 ***
## SIZE            1  69654   69654  39.804 2.323e-09 ***
## Residuals    171 299237    1750
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

EtaSq(model2)

##          eta.sq eta.sq.part
## POV  0.1049206   0.1357909
## SIZE 0.1554327   0.1888210
```

```
#creating an interaction term
```

```
ps2$interaction <- (ps2$SIZE*ps2$POV)
```

```
#running model for comparing contrast
```

```
model3 <- lm(formula = CRIME ~ POV + SIZE + interaction, data=ps2)  
summary(model3)
```

```
##
```

```
## Call:
```

```
## lm(formula = CRIME ~ POV + SIZE + interaction, data = ps2)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max  
## -123.146  -29.869    0.205   25.295  127.115
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)  
## (Intercept) 80.09036   43.47651   1.842  0.0672 .  
## POV         -0.38811    1.86844  -0.208  0.8357  
## SIZE        -0.94636    1.09714  -0.863  0.3896  
## interaction  0.09583    0.04555   2.104  0.0369 *
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

```
## Residual standard error: 41.42 on 170 degrees of freedom
```

```
## Multiple R-squared:  0.3492, Adjusted R-squared:  0.3377
```

```
## F-statistic: 30.41 on 3 and 170 DF, p-value: 8.678e-16
```

```
anova(model3)
```

```
## Analysis of Variance Table
```

```
##
```

```
## Response: CRIME
```

```
##              Df Sum Sq Mean Sq F value    Pr(>F)  
## POV              1  79241   79241   46.190 1.736e-10 ***  
## SIZE              1  69654   69654   40.602 1.688e-09 ***  
## interaction      1   7591    7591    4.425  0.03689 *  
## Residuals     170 291645    1716
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
EtaSq(model3)
```

```
##              eta.sq eta.sq.part  
## POV              0.0001651758 0.0002537391  
## SIZE              0.0028483081 0.0043575410  
## interaction      0.0169400782 0.0253691928
```

```
#get descriptives
```

```
describe(ps2)
```

```
##          vars    n   mean      sd median trimmed   mad    min
max
## SIZE          1 174  38.42  15.58  36.88   37.74  16.33  10.30
87.53
## POV           2 174  22.54   5.10  22.24   22.44   4.67   9.51
39.93
## UNEMP         3 174  14.53   4.42  14.57   14.48   4.61   4.89
24.39
## POLICE        4 174  34.45  14.58  35.54   34.09  14.18   0.30
76.57
## CRIME         5 174 119.65  50.90 117.54  118.35  52.51  23.86
243.49
## interaction   6 174 883.56 459.52 799.72  841.69 450.90 226.66
2508.54
##          range skew kurtosis    se
## SIZE       77.24 0.44   -0.10  1.18
## POV       30.42 0.24    0.36  0.39
## UNEMP     19.50 0.07   -0.54  0.34
## POLICE    76.27 0.21    0.04  1.11
## CRIME    219.63 0.20   -0.51  3.86
## interaction 2281.88 0.88    0.54 34.84

#making graph for high.Low level of poverty
#Low POV intercept
(80.09+(-.39*-5.10))

## [1] 82.079

#Low POV slope of CRIME
(-.95 + .10*-5.10)

## [1] -1.46

#High POV intercept
(80.09+(-.39*5.10))

## [1] 78.101

#High POV slope of CRIME
(-.95 + .10*5.10)

## [1] -0.44

plot(CRIME~SIZE, data=ps2, col="gray", xlab="SIZE", cex.lab=1.5,
      ylab="CRIME", cex.lab=1.5, cex=.5, xlim=c(0, 100), ylim=c(0, 250))
par(new=T)
abline(82.08, -1.46, col="aquamarine2", lwd=3)
abline(78.10, -0.44, col="purple1", lwd=3)
legend("bottomright", c("Low Poverty", "High Poverty"),
      fill=c("aquamarine2", "purple1"), cex=1)
```

