R Notebook

```r
installed.packages("QuantPsyc")
```

```
     Package LibPath Version Priority Depends Imports LinkingTo Suggests Enhances License License_is_FOSS
     License_restricts_use OS_type Archs MD5sum NeedsCompilation Built
```

```r
library(QuantPsyc)
set.seed(33)
y=rnorm(500,10,1)
x1=rnorm(500,2,.3)
x2=rnorm(500,0,.3)
x3=rnorm(500,3,12)
x4=rnorm(500,100,3)
x5=rnorm(500,14,20)
x6=rnorm(500,30,2)
x7=rnorm(500,-5,100)
x8=rnorm(500,3,1)
x9=rnorm(500,4,1)
x10=rnorm(500,10,.1)
lm_first=lm(y~x1+x2+x3+x4+x5+x6+x7+x8+x9+x10)
summary(lm_first)
```

```

Call:
lm(formula = y ~ x1 + x2 + x3 + x4 + x5 + x6 + x7 + x8 + x9 + 
    x10)

Residuals:
    Min      1Q  Median      3Q     Max 
-2.8628 -0.6736 -0.0120  0.6360  3.6734 

Coefficients:
              Estimate Std. Error t value Pr(>|t|)  
(Intercept) 12.6725850  5.1458085   2.463   0.0141 *
x1          -0.2085451  0.1541998  -1.352   0.1769  
x2           0.0528397  0.1456276   0.363   0.7169  
x3           0.0017442  0.0040759   0.428   0.6689  
x4          -0.0198291  0.0161209  -1.230   0.2193  
x5           0.0040108  0.0022295   1.799   0.0726 .
x6           0.0077256  0.0238615   0.324   0.7463  
x7           0.0002227  0.0004654   0.479   0.6325  
x8           0.0295072  0.0483938   0.610   0.5423  
x9           0.0476270  0.0457880   1.040   0.2988  
x10         -0.0845812  0.4745397  -0.178   0.8586  
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 1.009 on 489 degrees of freedom
Multiple R-squared:  0.01512,	Adjusted R-squared:  -0.00502 
F-statistic: 0.7508 on 10 and 489 DF,  p-value: 0.6764
```

```r
print("------- standardized coefficients -------")
```

```
[1] "------- standardized coefficients -------"
```

```r
summary(lm.beta(lm_first))
```

```
     Min.   1st Qu.    Median      Mean   3rd Qu.      Max. 
-0.061877 -0.002377  0.017977  0.010282  0.026085  0.081591 
```

```r
print("------- reandom interaction terms -------")
```

```
[1] "------- reandom interaction terms -------"
```

```r
summary(lm(y~x1+x2+x1*x2+x1*x3+x1*x4++x1*x2*x3+x3+x4+x5+x6+x7+x8+x9+x10))
```

```

Call:
lm(formula = y ~ x1 + x2 + x1 * x2 + x1 * x3 + x1 * x4 + +x1 * 
    x2 * x3 + x3 + x4 + x5 + x6 + x7 + x8 + x9 + x10)

Residuals:
    Min      1Q  Median      3Q     Max 
-2.8674 -0.6605 -0.0277  0.6418  3.6982 

Coefficients:
              Estimate Std. Error t value Pr(>|t|)  
(Intercept) -9.1744936 12.9024407  -0.711   0.4774  
x1          10.6409462  5.7814700   1.841   0.0663 .
x2          -0.8560482  1.0493440  -0.816   0.4150  
x3           0.0500382  0.0294214   1.701   0.0896 .
x4           0.1953147  0.1178098   1.658   0.0980 .
x5           0.0045357  0.0022328   2.031   0.0428 *
x6           0.0096210  0.0238661   0.403   0.6870  
x7           0.0002771  0.0004669   0.594   0.5531  
x8           0.0304572  0.0483759   0.630   0.5293  
x9           0.0497093  0.0458775   1.084   0.2791  
x10         -0.0707217  0.4737926  -0.149   0.8814  
x1:x2        0.4463618  0.5213109   0.856   0.3923  
x1:x3       -0.0239404  0.0144309  -1.659   0.0978 .
x1:x4       -0.1079226  0.0578014  -1.867   0.0625 .
x2:x3        0.1117818  0.0838584   1.333   0.1832  
x1:x2:x3    -0.0488967  0.0420468  -1.163   0.2454  
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 1.005 on 484 degrees of freedom
Multiple R-squared:  0.0323,	Adjusted R-squared:  0.00231 
F-statistic: 1.077 on 15 and 484 DF,  p-value: 0.3752
```

```r
#these coefficients are incorrect. Does modeling one Xn work?
print("---------------")
```

```
[1] "---------------"
```

```r
summary(lm(y~x1))
```

```

Call:
lm(formula = y ~ x1)

Residuals:
    Min      1Q  Median      3Q     Max 
-2.9899 -0.6625  0.0057  0.6502  3.4949 

Coefficients:
            Estimate Std. Error t value Pr(>|t|)    
(Intercept)  10.2910     0.3071  33.511   <2e-16 ***
x1           -0.1470     0.1509  -0.975     0.33    
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 1.006 on 498 degrees of freedom
Multiple R-squared:  0.001904,	Adjusted R-squared:  -0.0001007 
F-statistic: 0.9498 on 1 and 498 DF,  p-value: 0.3303
```

```r
print("---------------")
```

```
[1] "---------------"
```

```r
summary(lm(y~x2))
```

```

Call:
lm(formula = y ~ x2)

Residuals:
    Min      1Q  Median      3Q     Max 
-2.9953 -0.6706  0.0111  0.6423  3.4707 

Coefficients:
            Estimate Std. Error t value Pr(>|t|)    
(Intercept)  9.99394    0.04508 221.690   <2e-16 ***
x2           0.07016    0.14379   0.488    0.626    
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 1.007 on 498 degrees of freedom
Multiple R-squared:  0.0004778,	Adjusted R-squared:  -0.001529 
F-statistic: 0.2381 on 1 and 498 DF,  p-value: 0.6258
```

```r
print("---------------")
```

```
[1] "---------------"
```

```r
summary(lm(y~x3))
```

```

Call:
lm(formula = y ~ x3)

Residuals:
    Min      1Q  Median      3Q     Max 
-3.0018 -0.6609  0.0131  0.6349  3.5339 

Coefficients:
            Estimate Std. Error t value Pr(>|t|)    
(Intercept) 9.990694   0.046363 215.490   <2e-16 ***
x3          0.001549   0.004009   0.386    0.699    
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 1.007 on 498 degrees of freedom
Multiple R-squared:  0.0002997,	Adjusted R-squared:  -0.001708 
F-statistic: 0.1493 on 1 and 498 DF,  p-value: 0.6994
```

```r
print("---------------")
```

```
[1] "---------------"
```

```r
summary(lm(y~x4))
```

```

Call:
lm(formula = y ~ x4)

Residuals:
    Min      1Q  Median      3Q     Max 
-3.0474 -0.6574  0.0228  0.6331  3.4585 

Coefficients:
            Estimate Std. Error t value Pr(>|t|)    
(Intercept) 11.62038    1.59648   7.279 1.32e-12 ***
x4          -0.01624    0.01595  -1.019    0.309    
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 1.006 on 498 degrees of freedom
Multiple R-squared:  0.002079,	Adjusted R-squared:  7.501e-05 
F-statistic: 1.037 on 1 and 498 DF,  p-value: 0.3089
```

```r
print("---------------")
```

```
[1] "---------------"
```

```r
summary(lm(y~x5))
```

```

Call:
lm(formula = y ~ x5)

Residuals:
    Min      1Q  Median      3Q     Max 
-2.9498 -0.6591  0.0013  0.6547  3.6134 

Coefficients:
            Estimate Std. Error t value Pr(>|t|)    
(Intercept) 9.944627   0.054472 182.563   <2e-16 ***
x5          0.003588   0.002197   1.633    0.103    
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 1.005 on 498 degrees of freedom
Multiple R-squared:  0.005329,	Adjusted R-squared:  0.003331 
F-statistic: 2.668 on 1 and 498 DF,  p-value: 0.103
```

```r
print("---------------")
```

```
[1] "---------------"
```

```r
summary(lm(y~x6))
```

```

Call:
lm(formula = y ~ x6)

Residuals:
    Min      1Q  Median      3Q     Max 
-3.0351 -0.6637  0.0086  0.6502  3.5048 

Coefficients:
            Estimate Std. Error t value Pr(>|t|)    
(Intercept) 9.798946   0.710415  13.793   <2e-16 ***
x6          0.006518   0.023576   0.276    0.782    
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 1.007 on 498 degrees of freedom
Multiple R-squared:  0.0001534,	Adjusted R-squared:  -0.001854 
F-statistic: 0.07642 on 1 and 498 DF,  p-value: 0.7823
```

```r
print("---------------")
```

```
[1] "---------------"
```

```r
summary(lm(y~x7))
```

```

Call:
lm(formula = y ~ x7)

Residuals:
    Min      1Q  Median      3Q     Max 
-3.0301 -0.6488  0.0094  0.6592  3.4933 

Coefficients:
             Estimate Std. Error t value Pr(>|t|)    
(Intercept) 9.9947523  0.0450374 221.921   <2e-16 ***
x7          0.0002094  0.0004621   0.453    0.651    
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 1.007 on 498 degrees of freedom
Multiple R-squared:  0.0004122,	Adjusted R-squared:  -0.001595 
F-statistic: 0.2054 on 1 and 498 DF,  p-value: 0.6506
```

```r
print("---------------")
```

```
[1] "---------------"
```

```r
summary(lm(y~x8))
```

```

Call:
lm(formula = y ~ x8)

Residuals:
    Min      1Q  Median      3Q     Max 
-3.0418 -0.6707  0.0078  0.6418  3.5205 

Coefficients:
            Estimate Std. Error t value Pr(>|t|)    
(Intercept)  9.92226    0.15182  65.356   <2e-16 ***
x8           0.02403    0.04793   0.501    0.616    
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 1.007 on 498 degrees of freedom
Multiple R-squared:  0.0005044,	Adjusted R-squared:  -0.001503 
F-statistic: 0.2513 on 1 and 498 DF,  p-value: 0.6164
```

```r
print("---------------")
```

```
[1] "---------------"
```

```r
summary(lm(y~x9))
```

```

Call:
lm(formula = y ~ x9)

Residuals:
    Min      1Q  Median      3Q     Max 
-3.0149 -0.6666  0.0236  0.6456  3.4335 

Coefficients:
            Estimate Std. Error t value Pr(>|t|)    
(Intercept)  9.82874    0.18533  53.034   <2e-16 ***
x9           0.04194    0.04536   0.925    0.356    
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 1.006 on 498 degrees of freedom
Multiple R-squared:  0.001713,	Adjusted R-squared:  -0.0002912 
F-statistic: 0.8547 on 1 and 498 DF,  p-value: 0.3557
```

```r
print("---------------")
```

```
[1] "---------------"
```

```r
summary(lm(y~x10))
```

```

Call:
lm(formula = y ~ x10)

Residuals:
    Min      1Q  Median      3Q     Max 
-3.0136 -0.6684  0.0136  0.6423  3.4855 

Coefficients:
            Estimate Std. Error t value Pr(>|t|)  
(Intercept) 10.57736    4.70155   2.250   0.0249 *
x10         -0.05823    0.47003  -0.124   0.9015  
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 1.007 on 498 degrees of freedom
Multiple R-squared:  3.082e-05,	Adjusted R-squared:  -0.001977 
F-statistic: 0.01535 on 1 and 498 DF,  p-value: 0.9015
```

```r
print("---------------")
```

```
[1] "---------------"
```