**Assignment5.R**

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###  
## Script name: Assignment 5.R  
## Author: Gibson Wirth  
## Date: December 2015  
####  
## Data set: RawSpoonData.xlsx  
## Pre-processing: Separated data and transformed to include ratings for appropriate variables to run ANOVA  
##  
####  
  
####  
## Experiment 1: Spoon weight vs. density  
##  
###  
**library**("ez")

## Warning: package 'ez' was built under R version 3.2.3

**library**("schoRsch")

## Warning: package 'schoRsch' was built under R version 3.2.3

DensitySpoons <- **read.csv**("Analysis 1.csv")  
  
## Running ANOVA to find F score and P-value (reported results: 4.28, 0.046)  
  
anova1 <- **ezANOVA**(data=DensitySpoons, dv=.(rating), wid=.(subject), within=.(spoonsize, spoonweight), detailed=TRUE, type=3)

## Warning: Converting "subject" to factor for ANOVA.

**print**(anova1)

## $ANOVA  
## Effect DFn DFd SSn SSd F  
## 1 (Intercept) 1 34 4548.6000000 233.90000 661.1902522  
## 2 spoonsize 1 34 0.2571429 53.24286 0.1642071  
## 3 spoonweight 1 34 6.4285714 51.07143 4.2797203  
## 4 spoonsize:spoonweight 1 34 1.4000000 57.10000 0.8336252  
## p p<.05 ges  
## 1 7.288819e-24 \* 0.9200402226  
## 2 6.878508e-01 0.0006500542  
## 3 4.624141e-02 \* 0.0160017068  
## 4 3.676556e-01 0.0035289881

## Using anova\_out to find eta-squared partial (reported result: 0.11)  
  
**anova\_out**(anova1, print=TRUE, etasq="partial")

## $`--- ANOVA RESULTS ------------------------------------`  
## Effect MSE df1 df2 F p petasq getasq  
## 1 (Intercept) 6.879412 1 34 661.19 0.000 0.95 0.92  
## 2 spoonsize 1.565966 1 34 0.16 0.688 0.00 0.00  
## 3 spoonweight 1.502101 1 34 4.28 0.046 0.11 0.02  
## 4 spoonsize:spoonweight 1.679412 1 34 0.83 0.368 0.02 0.00  
##   
## $`--- SPHERICITY TESTS ------------------------------------`  
## [1] "N/A"  
##   
## $`--- FORMATTED RESULTS ------------------------------------`  
## Effect Text  
## 1 (Intercept) F(1,34) = 661.19, p < .001, np2 = .95  
## 2 spoonsize F(1,34) = 0.16, p = .688, np2 < .01  
## 3 spoonweight F(1,34) = 4.28, p = .046, np2 = .11  
## 4 spoonsize:spoonweight F(1,34) = 0.83, p = .368, np2 = .02

####  
## Experiment 2: Spoon color vs. saltiness  
##   
###  
  
SaltySpoon <- **read.csv**("Analysis2.csv")  
  
## Running ANOVA to find F score and P-value (reported results: 3.645; 0.007)  
  
anova2 <- **ezANOVA**(data=SaltySpoon, dv=.(rating), wid=.(subject), within=.(yogurtcolor, spooncolor), detailed=TRUE, type=3)

## Warning: Converting "subject" to factor for ANOVA.

**print**(anova2)

## $ANOVA  
## Effect DFn DFd SSn SSd F  
## 1 (Intercept) 1 39 8253.7225 766.3775 420.02169623  
## 2 yogurtcolor 1 39 0.0625 65.2375 0.03736348  
## 3 spooncolor 4 156 6.2400 359.1600 0.67758102  
## 4 yogurtcolor:spooncolor 4 156 26.0000 278.2000 3.64485981  
## p p<.05 ges  
## 1 1.745576e-22 \* 8.489128e-01  
## 2 8.477301e-01 4.254486e-05  
## 3 6.084809e-01 4.229892e-03  
## 4 7.211806e-03 \* 1.739160e-02  
##   
## $`Mauchly's Test for Sphericity`  
## Effect W p p<.05  
## 3 spooncolor 0.6950130 0.1371471   
## 4 yogurtcolor:spooncolor 0.8301488 0.6411265   
##   
## $`Sphericity Corrections`  
## Effect GGe p[GG] p[GG]<.05 HFe  
## 3 spooncolor 0.8464178 0.584609846 0.9366093  
## 4 yogurtcolor:spooncolor 0.9193771 0.009076858 \* 1.0269684  
## p[HF] p[HF]<.05  
## 3 0.599069797   
## 4 0.007211806 \*

## Using anova\_out to find eta-squared partial (reported result: 0.084)  
  
**anova\_out**(anova2, print=TRUE, etasq="partial")

## $`--- ANOVA RESULTS ------------------------------------`  
## Effect MSE df1 df2 F p petasq getasq  
## 1 (Intercept) 19.650705 1 39 420.02 0.000 0.92 0.85  
## 2 yogurtcolor 1.672756 1 39 0.04 0.848 0.00 0.00  
## 3 spooncolor 2.302308 4 156 0.68 0.608 0.02 0.00  
## 4 yogurtcolor:spooncolor 1.783333 4 156 3.64 0.007 0.09 0.02  
##   
## $`--- SPHERICITY TESTS ------------------------------------`  
## Effect p\_Mauchly GGEpsilon p\_GG HFEpsilon p\_HF  
## 1 spooncolor 0.137 0.846 0.585 0.937 0.599  
## 2 yogurtcolor:spooncolor 0.641 0.919 0.009 1.027 0.007  
##   
## $`--- FORMATTED RESULTS ------------------------------------`  
## Effect Text  
## 1 (Intercept) F(1,39) = 420.02, p < .001, np2 = .92  
## 2 yogurtcolor F(1,39) = 0.04, p = .848, np2 < .01  
## 3 spooncolor F(4,156) = 0.68, p = .608, np2 = .02  
## 4 yogurtcolor:spooncolor F(4,156) = 3.64, p = .007, np2 = .09  
##   
## $`NOTE:`  
## [1] "No adjustments necessary (all p\_Mauchly > 0.05)."

###  
## Experiment 3: Experience and cheese vs. perceived expensiveness  
###  
  
ExpensiveCheese <- **read.csv**("Analysis 3.csv")  
## Running ANOVA to find F score and P-value (reported results: 5.77; 0.023 )  
  
anova3 <- **ezANOVA**(data=ExpensiveCheese, dv=.(rating), wid=.(subject), within=.(cheese, cutlery), between=.(experience), detailed=TRUE, type=3)

## Warning: Converting "subject" to factor for ANOVA.

## Warning: Data is unbalanced (unequal N per group). Make sure you specified  
## a well-considered value for the type argument to ezANOVA().

**print**(anova3)

## $ANOVA  
## Effect DFn DFd SSn SSd F  
## 1 (Intercept) 1 28 3779.0645963 213.0854 496.57933789  
## 2 experience 1 28 18.3479296 213.0854 2.41096772  
## 3 cheese 1 28 144.6298137 158.0202 25.62732570  
## 5 cutlery 3 84 0.5927536 189.4239 0.08761883  
## 4 experience:cheese 1 28 32.5798137 158.0202 5.77290031  
## 6 experience:cutlery 3 84 13.3760870 189.4239 1.97720778  
## 7 cheese:cutlery 3 84 3.5273292 131.1227 0.75322762  
## 8 experience:cheese:cutlery 3 84 4.0439959 131.1227 0.86355688  
## p p<.05 ges  
## 1 2.335816e-19 \* 0.8452927775  
## 2 1.317191e-01 0.0258421506  
## 3 2.338702e-05 \* 0.1729438345  
## 5 9.666505e-01 0.0008562773  
## 4 2.314880e-02 \* 0.0449853282  
## 6 1.236036e-01 0.0189724125  
## 7 5.235282e-01 0.0050739833  
## 8 4.633755e-01 0.0058128764  
##   
## $`Mauchly's Test for Sphericity`  
## Effect W p p<.05  
## 5 cutlery 0.8710010 0.5949972   
## 6 experience:cutlery 0.8710010 0.5949972   
## 7 cheese:cutlery 0.8456525 0.4828637   
## 8 experience:cheese:cutlery 0.8456525 0.4828637   
##   
## $`Sphericity Corrections`  
## Effect GGe p[GG] p[GG]<.05 HFe  
## 5 cutlery 0.9169232 0.9582589 1.026729  
## 6 experience:cutlery 0.9169232 0.1293857 1.026729  
## 7 cheese:cutlery 0.8971946 0.5106688 1.001721  
## 8 experience:cheese:cutlery 0.8971946 0.4538515 1.001721  
## p[HF] p[HF]<.05  
## 5 0.9666505   
## 6 0.1236036   
## 7 0.5235282   
## 8 0.4633755

## Using anova\_out to find eta-squared partial (reported result: 0.17)  
  
**anova\_out**(anova3, print=TRUE, etasq="partial")

## $`--- ANOVA RESULTS ------------------------------------`  
## Effect MSE df1 df2 F p petasq getasq  
## 1 (Intercept) 7.610193 1 28 496.58 0.000 0.95 0.85  
## 2 experience 7.610193 1 28 2.41 0.132 0.08 0.03  
## 3 cheese 5.643578 1 28 25.63 0.000 0.48 0.17  
## 4 cutlery 2.255047 3 84 0.09 0.967 0.00 0.00  
## 5 experience:cheese 5.643578 1 28 5.77 0.023 0.17 0.04  
## 6 experience:cutlery 2.255047 3 84 1.98 0.124 0.07 0.02  
## 7 cheese:cutlery 1.560984 3 84 0.75 0.524 0.03 0.01  
## 8 experience:cheese:cutlery 1.560984 3 84 0.86 0.463 0.03 0.01  
##   
## $`--- SPHERICITY TESTS ------------------------------------`  
## Effect p\_Mauchly GGEpsilon p\_GG HFEpsilon p\_HF  
## 1 cutlery 0.595 0.917 0.958 1.027 0.967  
## 2 experience:cutlery 0.595 0.917 0.129 1.027 0.124  
## 3 cheese:cutlery 0.483 0.897 0.511 1.002 0.524  
## 4 experience:cheese:cutlery 0.483 0.897 0.454 1.002 0.463  
##   
## $`--- FORMATTED RESULTS ------------------------------------`  
## Effect Text  
## 1 (Intercept) F(1,28) = 496.58, p < .001, np2 = .95  
## 2 experience F(1,28) = 2.41, p = .132, np2 = .08  
## 3 cheese F(1,28) = 25.63, p < .001, np2 = .48  
## 4 cutlery F(3,84) = 0.09, p = .967, np2 < .01  
## 5 experience:cheese F(1,28) = 5.77, p = .023, np2 = .17  
## 6 experience:cutlery F(3,84) = 1.98, p = .124, np2 = .07  
## 7 cheese:cutlery F(3,84) = 0.75, p = .524, np2 = .03  
## 8 experience:cheese:cutlery F(3,84) = 0.86, p = .463, np2 = .03  
##   
## $`NOTE:`  
## [1] "No adjustments necessary (all p\_Mauchly > 0.05)."