PRE VR5-KET Last 3 Days Acquisition

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```
library(ggplot2)
library(ggpubr)
library(car)
```

```
## Loading required package: carData
```

```
library(emmeans)
library(stringr)
library(rstatix)
```

```
##
## Attaching package: 'rstatix'
```

```
## The following object is masked from 'package:stats':
##
##     filter
```

Acquisition 3way Repeated Measures ANOVA

I took these data from the prism file called "KETAMINE_BEHAVIOR_ALL.prism". In particular I created an aggregated csv with the data in long form (rather than wide form) from the following sheets:

- 6 mg/kg Acquisition Last 3 days (ALPs)
- 6 mg/kg Acquisition Last 3 days (ILPs)
- 6 mg/kg Acquisition Last 3 days (Rewards)

In this markdown file I will perform three reactivation by treatment by day (2 x 2 x 3) repeated measures 3way ANOVAs; one each for active lever presses (ALP), inactive lever presses (ILP), and rewards. The Greenhouse Geisser correction is applied in all cases.

(None of the ANOVAs have any significant main or interaction effects)

```
l3d <- read.csv('PRE-VR5_Last3Days_Acquisition.csv', sep = ',', header = TRUE)
l3d$day_factor <- as.factor(l3d$Day)
l3d$react_factor <- as.factor(l3d$React)
l3d$treat_factor <- as.factor(l3d$Treat)
l3d$rat_factor <- as.factor(l3d$Rat_n)
str(l3d)
```

```
## 'data.frame':    90 obs. of  11 variables:
##  $ Rat_n       : num  11.1 11.1 11.1 11.2 11.2 11.2 11.3 11.3 11.3 12.1 ...
##  $ Day         : int  1 2 3 1 2 3 1 2 3 1 ...
##  $ ALP         : int  20 41 22 54 45 38 39 46 49 39 ...
##  $ ILP         : int  0 0 0 1 0 0 0 0 0 12 ...
##  $ Rewards     : int  20 37 20 49 39 38 39 43 43 39 ...
##  $ React       : chr  "FR1" "FR1" "FR1" "FR1" ...
```

```
## $ Treat       : chr  "KET" "KET" "KET" "KET" ...
## $ day_factor  : Factor w/ 3 levels "1","2","3": 1 2 3 1 2 3 1 2 3 1 ...
## $ react_factor: Factor w/ 2 levels "FR1","VR5": 1 1 1 1 1 1 1 1 1 1 1 1 ...
## $ treat_factor: Factor w/ 2 levels "KET","SAL": 1 1 1 1 1 1 1 1 1 1 1 1 ...
## $ rat_factor  : Factor w/ 30 levels "8.5","8.7","9.1",..: 15 15 15 16 16 16 17 17 17 22 ...
```

Active Lever Preses (ALP)

```
res.aov <- anova_test(
  data = l3d, dv = ALP, wid = rat_factor,
  within = c(day_factor), between = c(treat_factor, react_factor)
  )
get_anova_table(res.aov, correction = 'GG')
```

```
## ANOVA Table (type III tests)
##
##                                  Effect DFn   DFd     F     p p<.05   ges
## 1                          treat_factor 1.0 26.00 1.696 0.204        0.056
## 2                          react_factor 1.0 26.00 1.510 0.230        0.050
## 3                            day_factor 1.2 31.07 1.523 0.230        0.006
## 4           treat_factor:react_factor 1.0 26.00 0.969 0.334        0.032
## 5             treat_factor:day_factor 1.2 31.07 0.830 0.390        0.003
## 6             react_factor:day_factor 1.2 31.07 2.099 0.155        0.008
## 7 treat_factor:react_factor:day_factor 1.2 31.07 1.748 0.197        0.007
```

```
res.aov
```

```
## ANOVA Table (type III tests)
##
## $ANOVA
##                                  Effect DFn DFd     F     p p<.05   ges
## 1                          treat_factor   1  26 1.696 0.204        0.056
## 2                          react_factor   1  26 1.510 0.230        0.050
## 3                            day_factor   2  52 1.523 0.228        0.006
## 4           treat_factor:react_factor   1  26 0.969 0.334        0.032
## 5             treat_factor:day_factor   2  52 0.830 0.442        0.003
## 6             react_factor:day_factor   2  52 2.099 0.133        0.008
## 7 treat_factor:react_factor:day_factor   2  52 1.748 0.184        0.007
##
## $`Mauchly's Test for Sphericity`
##                                  Effect     W       p p<.05
## 1                            day_factor 0.327 8.4e-07     *
## 2             treat_factor:day_factor 0.327 8.4e-07     *
## 3             react_factor:day_factor 0.327 8.4e-07     *
## 4 treat_factor:react_factor:day_factor 0.327 8.4e-07     *
##
## $`Sphericity Corrections`
##                                  Effect   GGe      DF[GG] p[GG] p[GG]<.05  HFe
## 1                            day_factor 0.598 1.2, 31.07 0.230             0.61
## 2             treat_factor:day_factor 0.598 1.2, 31.07 0.390             0.61
## 3             react_factor:day_factor 0.598 1.2, 31.07 0.155             0.61
## 4 treat_factor:react_factor:day_factor 0.598 1.2, 31.07 0.197             0.61
##        DF[HF] p[HF] p[HF]<.05
## 1 1.22, 31.73 0.231
## 2 1.22, 31.73 0.392
```

```
## 3 1.22, 31.73 0.154
## 4 1.22, 31.73 0.196
```

Inactive Lever Preses (ILP)

```
res.aov <- anova_test(
  data = l3d, dv = ILP, wid = rat_factor,
  within = c(day_factor), between = c(treat_factor, react_factor)
  )
get_anova_table(res.aov, correction = 'GG')
```

```
## ANOVA Table (type III tests)
##
##                                          Effect  DFn   DFd     F     p p<.05      ges
## 1                                  treat_factor 1.00 26.00 0.008 0.931        0.000148
## 2                                  react_factor 1.00 26.00 2.258 0.145        0.042000
## 3                                    day_factor 1.51 39.33 1.487 0.238        0.028000
## 4                     treat_factor:react_factor 1.00 26.00 0.742 0.397        0.014000
## 5                       treat_factor:day_factor 1.51 39.33 0.091 0.862        0.002000
## 6                       react_factor:day_factor 1.51 39.33 0.386 0.625        0.007000
## 7 treat_factor:react_factor:day_factor 1.51 39.33 1.206 0.300        0.022000
```
```
res.aov
```

```
## ANOVA Table (type III tests)
##
## $ANOVA
##                                    Effect DFn DFd     F     p p<.05      ges
## 1                            treat_factor   1  26 0.008 0.931        0.000148
## 2                            react_factor   1  26 2.258 0.145        0.042000
## 3                              day_factor   2  52 1.487 0.236        0.028000
## 4               treat_factor:react_factor   1  26 0.742 0.397        0.014000
## 5                 treat_factor:day_factor   2  52 0.091 0.913        0.002000
## 6                 react_factor:day_factor   2  52 0.386 0.682        0.007000
## 7 treat_factor:react_factor:day_factor   2  52 1.206 0.308        0.022000
##
## $`Mauchly's Test for Sphericity`
##                                    Effect     W     p p<.05
## 1                              day_factor 0.678 0.008     *
## 2                 treat_factor:day_factor 0.678 0.008     *
## 3                 react_factor:day_factor 0.678 0.008     *
## 4 treat_factor:react_factor:day_factor 0.678 0.008     *
##
## $`Sphericity Corrections`
##                                    Effect   GGe       DF[GG] p[GG] p[GG]<.05   HFe
## 1                              day_factor 0.756 1.51, 39.33 0.238             0.793
## 2                 treat_factor:day_factor 0.756 1.51, 39.33 0.862             0.793
## 3                 react_factor:day_factor 0.756 1.51, 39.33 0.625             0.793
## 4 treat_factor:react_factor:day_factor 0.756 1.51, 39.33 0.300             0.793
##        DF[HF] p[HF] p[HF]<.05
## 1 1.59, 41.25 0.238
## 2 1.59, 41.25 0.871
## 3 1.59, 41.25 0.634
## 4 1.59, 41.25 0.301
```

Rewards

```r
res.aov <- anova_test(
  data = l3d, dv = Rewards, wid = rat_factor,
  within = c(day_factor), between = c(treat_factor, react_factor)
  )
get_anova_table(res.aov, correction = 'GG')
```

```
## ANOVA Table (type III tests)
##
##                                     Effect  DFn   DFd     F     p p<.05   ges
## 1                              treat_factor 1.00 26.00 0.461 0.503        0.015
## 2                              react_factor 1.00 26.00 2.459 0.129        0.077
## 3                                day_factor 1.64 42.71 1.633 0.210        0.008
## 4                 treat_factor:react_factor 1.00 26.00 0.118 0.734        0.004
## 5                   treat_factor:day_factor 1.64 42.71 0.418 0.621        0.002
## 6                   react_factor:day_factor 1.64 42.71 2.055 0.148        0.010
## 7 treat_factor:react_factor:day_factor 1.64 42.71 0.237 0.747        0.001
```

```r
res.aov
```

```
## ANOVA Table (type III tests)
##
## $ANOVA
##                                     Effect DFn DFd     F     p p<.05   ges
## 1                              treat_factor   1  26 0.461 0.503        0.015
## 2                              react_factor   1  26 2.459 0.129        0.077
## 3                                day_factor   2  52 1.633 0.205        0.008
## 4                 treat_factor:react_factor   1  26 0.118 0.734        0.004
## 5                   treat_factor:day_factor   2  52 0.418 0.661        0.002
## 6                   react_factor:day_factor   2  52 2.055 0.138        0.010
## 7 treat_factor:react_factor:day_factor   2  52 0.237 0.790        0.001
##
## $`Mauchly's Test for Sphericity`
##                                     Effect     W     p p<.05
## 1                                day_factor 0.782 0.047     *
## 2                   treat_factor:day_factor 0.782 0.047     *
## 3                   react_factor:day_factor 0.782 0.047     *
## 4 treat_factor:react_factor:day_factor 0.782 0.047     *
##
## $`Sphericity Corrections`
##                                     Effect   GGe       DF[GG] p[GG] p[GG]<.05   HFe
## 1                                day_factor 0.821 1.64, 42.71 0.210            0.869
## 2                   treat_factor:day_factor 0.821 1.64, 42.71 0.621            0.869
## 3                   react_factor:day_factor 0.821 1.64, 42.71 0.148            0.869
## 4 treat_factor:react_factor:day_factor 0.821 1.64, 42.71 0.747            0.869
##       DF[HF] p[HF] p[HF]<.05
## 1 1.74, 45.2 0.209
## 2 1.74, 45.2 0.633
## 3 1.74, 45.2 0.145
## 4 1.74, 45.2 0.759
```