VR5-KET Image Data ANOVA Mean Cell ns

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```
library(ggplot2)
library(ggpubr)
library(car) # For levene.test() function
```

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

```
library(emmeans)
```

Stats in Python were weird

Yesterday I did all the ANOVAs and post hoc tests for the standard stain types (normalized intensity, mean cell counts). I spot checked a few in prism and found that all the main effect F values were slightly different. The interaction effects all agree. Looking into this issue a little deeper, it seems that R agrees with SPSS which agrees with Prism and so I will just have to repeat these in R.

EDA and ANOVA function

This function performs the same type of ANOVA as performed in graphpad prism. In addition, performs some exploratory data analysis to assess normality and homogeneity of variances (both quantitatively and qualitatively)

```
Sidak <- function(pvals)
  # takes a vector of p-values and corrects p-values according to
  # Sidaks method for multiple comparisons (1967)
  #
  # Jonathan Ramos 3/12/2024
  {
  adjusted <- c()
  j <- length(pvals)

  for (i in 1:j){
    adj_p <- 1-(1-pvals[i])^j
    adjusted <- c(adjusted, adj_p)
  }
  return(adjusted)

}

eda_anova <- function(fname)
  # takes a filname, loads data from csv; data 4 columns:
  # react_treat, react, treat, and mean_cell_n (response var)
  # react_treat is just react and treat in one string separated by "_"
```

```
# builds factor cols for categorical cols (mean_cell_n is numeric, all others are categorical)
# then performs the following tasks:
# checks assumptions of normality with qqplot and shapiro wilk tests
# checks assumptions of equal variances with box plot and levene test
# performs 2way ANOVA (2 by 2, react by treat)
# performs post hoc pairwise comparisons (emmeans of levels of react by treat
# and emmeans of levels of treat by react)
# prints out all statistical test results and returns plot objects
# for the two plots: the qqplots and the box plots
#
# Jonathan Ramos 3/12/2024

{
df <- read.csv(fname, header=TRUE, sep=",")
df$react_treat_factor <- as.factor(df$react_treat)
df$react_factor <- as.factor(df$react)
df$treat_factor <- as.factor(df$treat)

### check assumption of normality
# quantitative assessment
# print(tapply(df$mean_cell_n, df$react_treat_factor, shapiro.test))

# qualitative assessment
g <- ggqqplot(df, x="mean_cell_n", facet.by=c("treat_factor", "react_factor"))

### check assumption of equal variances
# quantitative assessment
# print(leveneTest(y = df$mean_cell_n, group=df$react_treat_factor, center='mean'))

# qualitative assessment
f <- ggplot(df, aes(x=treat_factor, y=mean_cell_n)) + geom_boxplot(aes(fill=treat_factor), alpha=0.5)
  #geom_dotplot(binaxis = "y", stackdir = "center", dotsize=0.5) +
  facet_wrap(~react_factor) +
  theme(axis.text.x = element_text(angle = 45, vjust = 1, hjust=1))

# run the ANOVA, display summary
df.lm <- lm(mean_cell_n ~ treat_factor + react_factor + treat_factor*react_factor, contrasts=list(trea
df.III.aov <- car::Anova(df.lm, type = 3)
print(df.III.aov)

# post hoc pairwise comparisons
emm <- emmeans(df.lm, ~ treat_factor * react_factor)
p1 <- pairs(emm, simple="treat_factor", adjust="tukey")
p2 <- pairs(emm, simple="react_factor", adjust="tukey")

# add col to summary dataframe containing sidak adjusted p-values
adjusted_p.value1 <- Sidak(summary(p1, adjust="tukey")$p.value)
s1 <- summary(p1)
s1['adjusted_p.value'] <- adjusted_p.value1

adjusted_p.value2 <- Sidak(summary(p2, adjust="tukey")$p.value)
s2 <- summary(p2)
s2['adjusted_p.value'] <- adjusted_p.value2
```

```
  # display results
  print(s1)
  print(s2)

  return(list(g, f))
}
```

pulling out filenames

```
singles = list.files(pattern="KET-VR5_single")
quads = list.files(pattern="KET-VR5_quad")
pv = list.files(pattern="PV_coloc")
cfos = list.files(pattern="cFos_coloc")
npas4 = list.files(pattern="Npas4_coloc")
wfa = list.files(pattern="WFA_coloc")
```

Single cFos

```
fname = singles[1]

print(fname)
```

```
## [1] "KET-VR5_single_cFos_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                            Sum Sq Df  F value    Pr(>F)
## (Intercept)                113775  1 223.4353 5.852e-12 ***
## treat_factor                  419  1   0.8224    0.3758
## react_factor                   75  1   0.1468    0.7059
## treat_factor:react_factor       1  1   0.0018    0.9670
## Residuals                    9675 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL     9.02 13.2 19   0.682  0.5032            0.753
##
## react_factor = VR5:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL     8.22 13.7 19   0.602  0.5546            0.802
##
## treat_factor = KET:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5     4.04 14.3 19   0.283  0.7802            0.952
##
## treat_factor = SAL:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5     3.24 12.6 19   0.258  0.7989            0.960
```

```
print(fname)
```

```
## [1] "KET-VR5_single_cFos_mean_cell_ns_Rsubset.csv"
```

Single Npas4

```
fname = singles[2]

print(fname)
```

```
## [1] "KET-VR5_single_Npas4_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                            Sum Sq Df  F value   Pr(>F)
## (Intercept)                125444  1 281.3566 7.59e-13 ***
## treat_factor                   37  1   0.0841   0.7750
## react_factor                   43  1   0.0973   0.7584
## treat_factor:react_factor      93  1   0.2080   0.6535
## Residuals                    8471 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL    -6.63 12.4 19  -0.537  0.5978            0.838
##
## react_factor = VR5:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL     1.48 12.8 19   0.115  0.9093            0.992
##
## treat_factor = KET:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5    -6.83 13.4 19  -0.511  0.6149            0.852
##
## treat_factor = SAL:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5     1.28 11.7 19   0.109  0.9143            0.993
```

```
print(fname)
```

```
## [1] "KET-VR5_single_Npas4_mean_cell_ns_Rsubset.csv"
```

Single PV

```
fname = singles[3]

print(fname)
```

```
## [1] "KET-VR5_single_PV_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                            Sum Sq Df  F value    Pr(>F)
## (Intercept)              2905.17  1 140.3793 3.212e-10 ***
## treat_factor               0.09  1   0.0046    0.9469
## react_factor              27.02  1   1.3057    0.2674
## treat_factor:react_factor  0.01  1   0.0004    0.9839
## Residuals                393.21 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.169 2.66 19   0.063  0.9502            0.998
##
## react_factor = VR5:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.090 2.75 19   0.033  0.9743            0.999
##
## treat_factor = KET:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5    -2.15 2.88 19  -0.747  0.4641            0.713
##
## treat_factor = SAL:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5    -2.23 2.53 19  -0.881  0.3896            0.627
```

```
print(fname)
```

```
## [1] "KET-VR5_single_PV_mean_cell_ns_Rsubset.csv"
```

Single WFA

```
fname = singles[4]

print(fname)
```

```
## [1] "KET-VR5_single_WFA_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                             Sum Sq Df  F value    Pr(>F)
## (Intercept)               1434.17  1 410.7737 2.501e-14 ***
## treat_factor                 0.73  1   0.2090    0.6527
## react_factor                 6.06  1   1.7361    0.2033
## treat_factor:react_factor    0.26  1   0.0733    0.7895
## Residuals                   66.34 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL   -0.573 1.09 19  -0.524  0.6066            0.845
##
## react_factor = VR5:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL   -0.147 1.13 19  -0.130  0.8982            0.990
##
## treat_factor = KET:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5   -1.250 1.18 19  -1.058  0.3034            0.515
##
## treat_factor = SAL:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5   -0.824 1.04 19  -0.792  0.4379            0.684
```

```
print(fname)
```

```
## [1] "KET-VR5_single_WFA_mean_cell_ns_Rsubset.csv"
```

PV coloc w cFos

```
fname = pv[1]

print(fname)
```

```
## [1] "KET-VR5_PV_coloc_w_cFos_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                            Sum Sq Df F value    Pr(>F)
## (Intercept)                600.50  1 69.6328 8.908e-08 ***
## treat_factor                 0.69  1  0.0798    0.7807
## react_factor                 2.23  1  0.2589    0.6168
## treat_factor:react_factor    0.23  1  0.0263    0.8728
## Residuals                  163.85 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.149 1.72 19   0.086  0.9321            0.995
##
## react_factor = VR5:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.550 1.78 19   0.309  0.7605            0.943
##
## treat_factor = KET:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5   -0.830 1.86 19  -0.447  0.6600            0.884
##
## treat_factor = SAL:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5   -0.429 1.63 19  -0.262  0.7959            0.958
```

```
print(fname)
```

```
## [1] "KET-VR5_PV_coloc_w_cFos_mean_cell_ns_Rsubset.csv"
```

PV coloc w cFos, Npas4

```
fname = pv[2]

print(fname)
```

```
## [1] "KET-VR5_PV_coloc_w_cFos,Npas4_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                            Sum Sq Df F value    Pr(>F)
## (Intercept)               228.739  1 49.8807 1.013e-06 ***
## treat_factor                0.382  1  0.0833    0.7761
## react_factor                0.030  1  0.0066    0.9363
## treat_factor:react_factor   1.427  1  0.3112    0.5835
## Residuals                  87.128 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL   -0.243 1.25 19  -0.194  0.8485            0.977
##
## react_factor = VR5:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.763 1.30 19   0.589  0.5630            0.809
##
## treat_factor = KET:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5   -0.430 1.35 19  -0.317  0.7543            0.940
##
## treat_factor = SAL:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5    0.576 1.19 19   0.484  0.6342            0.866
```

```
print(fname)
```

```
## [1] "KET-VR5_PV_coloc_w_cFos,Npas4_mean_cell_ns_Rsubset.csv"
```

PV coloc w cFos, WFA

```
fname = pv[3]

print(fname)
```

```
## [1] "KET-VR5_PV_coloc_w_cFos,WFA_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                             Sum Sq Df  F value    Pr(>F)
## (Intercept)               132.897  1 158.9025 1.123e-10 ***
## treat_factor                0.750  1   0.8969    0.3555
## react_factor                0.010  1   0.0118    0.9145
## treat_factor:react_factor   0.002  1   0.0022    0.9630
## Residuals                  15.890 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.383 0.535 19   0.715  0.4833            0.733
##
## react_factor = VR5:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.347 0.554 19   0.626  0.5388            0.787
##
## treat_factor = KET:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5   0.0600 0.578 19   0.104  0.9185            0.993
##
## treat_factor = SAL:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5   0.0238 0.509 19   0.047  0.9632            0.999
```

```
print(fname)
```

```
## [1] "KET-VR5_PV_coloc_w_cFos,WFA_mean_cell_ns_Rsubset.csv"
```

PV coloc w Npas4

```
fname = pv[4]

print(fname)
```

```
## [1] "KET-VR5_PV_coloc_w_Npas4_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                            Sum Sq Df F value    Pr(>F)
## (Intercept)                488.34  1 69.6667 8.875e-08 ***
## treat_factor                 0.06  1  0.0092    0.9245
## react_factor                 0.17  1  0.0240    0.8784
## treat_factor:react_factor    0.20  1  0.0282    0.8685
## Residuals                  133.18 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL   -0.294 1.55 19  -0.190  0.8515            0.978
##
## react_factor = VR5:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.080 1.60 19   0.050  0.9607            0.998
##
## treat_factor = KET:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5  -0.3600 1.67 19  -0.215  0.8321            0.972
##
## treat_factor = SAL:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5   0.0143 1.47 19   0.010  0.9924            1.000
```

```
print(fname)
```

```
## [1] "KET-VR5_PV_coloc_w_Npas4_mean_cell_ns_Rsubset.csv"
```

PV coloc w Npas4, WFA

```
fname = pv[5]

print(fname)
```

```
## [1] "KET-VR5_PV_coloc_w_Npas4,WFA_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                             Sum Sq Df  F value    Pr(>F)
## (Intercept)               111.782  1 128.7762 6.617e-10 ***
## treat_factor                0.025  1   0.0293    0.8659
## react_factor                1.661  1   1.9139    0.1826
## treat_factor:react_factor   0.010  1   0.0119    0.9142
## Residuals                  16.493 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL   0.0243 0.546 19   0.045  0.9650            0.999
##
## react_factor = VR5:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL   0.1100 0.564 19   0.195  0.8475            0.977
##
## treat_factor = KET:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5    0.500 0.589 19   0.849  0.4067            0.648
##
## treat_factor = SAL:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5    0.586 0.518 19   1.130  0.2725            0.471
```

```
print(fname)
```

```
## [1] "KET-VR5_PV_coloc_w_Npas4,WFA_mean_cell_ns_Rsubset.csv"
```

PV coloc w WFA

```
fname = pv[6]

print(fname)
```

```
## [1] "KET-VR5_PV_coloc_w_WFA_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                            Sum Sq Df  F value    Pr(>F)
## (Intercept)               360.23  1 184.5461 3.104e-11 ***
## treat_factor                0.32  1   0.1614    0.6923
## react_factor                0.40  1   0.2050    0.6558
## treat_factor:react_factor   0.28  1   0.1444    0.7082
## Residuals                  37.09 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL   0.0129 0.818 19   0.016  0.9876            1.000
##
## react_factor = VR5:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL   0.4600 0.846 19   0.544  0.5929            0.834
##
## treat_factor = KET:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5  -0.4900 0.884 19  -0.555  0.5857            0.828
##
## treat_factor = SAL:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5  -0.0429 0.777 19  -0.055  0.9566            0.998
```

```
print(fname)
```

```
## [1] "KET-VR5_PV_coloc_w_WFA_mean_cell_ns_Rsubset.csv"
```

cFos coloc w Npas4

```
fname = cfos[1]

print(fname)
```

```
## [1] "KET-VR5_cFos_coloc_w_Npas4_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                            Sum Sq Df  F value    Pr(>F)
## (Intercept)              25664.9  1 103.2835 4.055e-09 ***
## treat_factor                17.3  1   0.0696    0.7947
## react_factor                 0.5  1   0.0018    0.9662
## treat_factor:react_factor   65.4  1   0.2631    0.6139
## Residuals                 4721.3 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL    -5.16 9.23 19  -0.559  0.5829            0.826
##
## react_factor = VR5:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL     1.65 9.55 19   0.173  0.8643            0.982
##
## treat_factor = KET:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5    -3.12 9.97 19  -0.313  0.7577            0.941
##
## treat_factor = SAL:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5     3.69 8.77 19   0.421  0.6786            0.897
```

```
print(fname)
```

```
## [1] "KET-VR5_cFos_coloc_w_Npas4_mean_cell_ns_Rsubset.csv"
```

cFos coloc w Npas4, WFA

```
fname = cfos[2]

print(fname)
```

```
## [1] "KET-VR5_cFos_coloc_w_Npas4,WFA_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                            Sum Sq Df  F value   Pr(>F)
## (Intercept)                87.220  1 126.3347 7.76e-10 ***
## treat_factor                0.025  1   0.0363  0.85093
## react_factor                4.841  1   7.0121  0.01587 *
## treat_factor:react_factor   0.932  1   1.3504  0.25959
## Residuals                  13.117 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL   -0.340 0.487 19  -0.699  0.4931            0.743
##
## react_factor = VR5:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.473 0.503 19   0.941  0.3586            0.589
##
## treat_factor = KET:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5     0.52 0.526 19   0.990  0.3348           0.5576
##
## treat_factor = SAL:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5     1.33 0.462 19   2.884  0.0095           0.0189
```

```
print(fname)
```

```
## [1] "KET-VR5_cFos_coloc_w_Npas4,WFA_mean_cell_ns_Rsubset.csv"
```

cFos coloc w PV

```
fname = cfos[3]

print(fname)
```

```
## [1] "KET-VR5_cFos_coloc_w_PV_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                            Sum Sq Df F value    Pr(>F)
## (Intercept)                600.50  1 69.6328 8.908e-08 ***
## treat_factor                 0.69  1  0.0798    0.7807
## react_factor                 2.23  1  0.2589    0.6168
## treat_factor:react_factor    0.23  1  0.0263    0.8728
## Residuals                  163.85 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.149 1.72 19   0.086  0.9321            0.995
##
## react_factor = VR5:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.550 1.78 19   0.309  0.7605            0.943
##
## treat_factor = KET:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5   -0.830 1.86 19  -0.447  0.6600            0.884
##
## treat_factor = SAL:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5   -0.429 1.63 19  -0.262  0.7959            0.958
```

```
print(fname)
```

```
## [1] "KET-VR5_cFos_coloc_w_PV_mean_cell_ns_Rsubset.csv"
```

cFos coloc w PV, Npas4

```
fname = cfos[4]

print(fname)
```

```
## [1] "KET-VR5_cFos_coloc_w_PV,Npas4_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                             Sum Sq Df F value    Pr(>F)
## (Intercept)               228.739  1 49.8807 1.013e-06 ***
## treat_factor                0.382  1  0.0833    0.7761
## react_factor                0.030  1  0.0066    0.9363
## treat_factor:react_factor   1.427  1  0.3112    0.5835
## Residuals                  87.128 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL   -0.243 1.25 19  -0.194  0.8485            0.977
##
## react_factor = VR5:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.763 1.30 19   0.589  0.5630            0.809
##
## treat_factor = KET:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5   -0.430 1.35 19  -0.317  0.7543            0.940
##
## treat_factor = SAL:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5    0.576 1.19 19   0.484  0.6342            0.866
```

```
print(fname)
```

```
## [1] "KET-VR5_cFos_coloc_w_PV,Npas4_mean_cell_ns_Rsubset.csv"
```

cFos coloc w PV, WFA

```
fname = cfos[5]

print(fname)
```

```
## [1] "KET-VR5_cFos_coloc_w_PV,WFA_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                             Sum Sq Df  F value    Pr(>F)
## (Intercept)               132.897  1 158.9025 1.123e-10 ***
## treat_factor                0.750  1   0.8969    0.3555
## react_factor                0.010  1   0.0118    0.9145
## treat_factor:react_factor   0.002  1   0.0022    0.9630
## Residuals                  15.890 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.383 0.535 19   0.715  0.4833            0.733
##
## react_factor = VR5:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.347 0.554 19   0.626  0.5388            0.787
##
## treat_factor = KET:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5   0.0600 0.578 19   0.104  0.9185            0.993
##
## treat_factor = SAL:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5   0.0238 0.509 19   0.047  0.9632            0.999
```

```
print(fname)
```

```
## [1] "KET-VR5_cFos_coloc_w_PV,WFA_mean_cell_ns_Rsubset.csv"
```

cFos coloc w WFA

```
fname = cfos[6]

print(fname)
```

```
## [1] "KET-VR5_cFos_coloc_w_WFA_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                             Sum Sq Df  F value    Pr(>F)
## (Intercept)               300.976  1 336.1211 1.539e-13 ***
## treat_factor                0.169  1   0.1892    0.6685
## react_factor                0.963  1   1.0756    0.3127
## treat_factor:react_factor   1.159  1   1.2939    0.2695
## Residuals                  17.013 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL   -0.280 0.554 19  -0.505  0.6191            0.855
##
## react_factor = VR5:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.627 0.573 19   1.094  0.2878            0.493
##
## treat_factor = KET:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5   -0.040 0.598 19  -0.067  0.9474            0.997
##
## treat_factor = SAL:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5    0.867 0.526 19   1.646  0.1162            0.219
```

```
print(fname)
```

```
## [1] "KET-VR5_cFos_coloc_w_WFA_mean_cell_ns_Rsubset.csv"
```

Npas4 coloc w cFos

```
fname = npas4[1]

print(fname)
```

```
## [1] "KET-VR5_Npas4_coloc_w_cFos_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                            Sum Sq Df  F value    Pr(>F)
## (Intercept)              25664.9  1 103.2835 4.055e-09 ***
## treat_factor                17.3  1   0.0696    0.7947
## react_factor                 0.5  1   0.0018    0.9662
## treat_factor:react_factor   65.4  1   0.2631    0.6139
## Residuals                 4721.3 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL    -5.16 9.23 19  -0.559  0.5829            0.826
##
## react_factor = VR5:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL     1.65 9.55 19   0.173  0.8643            0.982
##
## treat_factor = KET:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5    -3.12 9.97 19  -0.313  0.7577            0.941
##
## treat_factor = SAL:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5     3.69 8.77 19   0.421  0.6786            0.897
```

```
print(fname)
```

```
## [1] "KET-VR5_Npas4_coloc_w_cFos_mean_cell_ns_Rsubset.csv"
```

Npas4 coloc w cFos, WFA

```
fname = npas4[2]

print(fname)
```

```
## [1] "KET-VR5_Npas4_coloc_w_cFos,WFA_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                            Sum Sq Df  F value   Pr(>F)
## (Intercept)                87.220  1 126.3347 7.76e-10 ***
## treat_factor                0.025  1   0.0363  0.85093
## react_factor                4.841  1   7.0121  0.01587 *
## treat_factor:react_factor   0.932  1   1.3504  0.25959
## Residuals                  13.117 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL   -0.340 0.487 19  -0.699  0.4931            0.743
##
## react_factor = VR5:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.473 0.503 19   0.941  0.3586            0.589
##
## treat_factor = KET:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5     0.52 0.526 19   0.990  0.3348           0.5576
##
## treat_factor = SAL:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5     1.33 0.462 19   2.884  0.0095           0.0189
```

```
print(fname)
```

```
## [1] "KET-VR5_Npas4_coloc_w_cFos,WFA_mean_cell_ns_Rsubset.csv"
```

Npas4 coloc w PV

```
fname = npas4[3]

print(fname)
```

```
## [1] "KET-VR5_Npas4_coloc_w_PV_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                            Sum Sq Df F value    Pr(>F)
## (Intercept)                488.34  1 69.6667 8.875e-08 ***
## treat_factor                 0.06  1  0.0092    0.9245
## react_factor                 0.17  1  0.0240    0.8784
## treat_factor:react_factor    0.20  1  0.0282    0.8685
## Residuals                  133.18 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL   -0.294 1.55 19  -0.190  0.8515            0.978
##
## react_factor = VR5:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.080 1.60 19   0.050  0.9607            0.998
##
## treat_factor = KET:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5  -0.3600 1.67 19  -0.215  0.8321            0.972
##
## treat_factor = SAL:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5   0.0143 1.47 19   0.010  0.9924            1.000
```

```
print(fname)
```

```
## [1] "KET-VR5_Npas4_coloc_w_PV_mean_cell_ns_Rsubset.csv"
```

Npas4 coloc w PV, cFos

```
fname = npas4[4]

print(fname)
```

```
## [1] "KET-VR5_Npas4_coloc_w_PV,cFos_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                             Sum Sq Df F value    Pr(>F)
```

```
## (Intercept)               228.739  1 49.8807 1.013e-06 ***
## treat_factor                0.382  1  0.0833    0.7761
## react_factor                0.030  1  0.0066    0.9363
## treat_factor:react_factor   1.427  1  0.3112    0.5835
## Residuals                  87.128 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL   -0.243 1.25 19  -0.194  0.8485            0.977
##
## react_factor = VR5:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.763 1.30 19   0.589  0.5630            0.809
##
## treat_factor = KET:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5   -0.430 1.35 19  -0.317  0.7543            0.940
##
## treat_factor = SAL:
##  contrast  estimate   SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5    0.576 1.19 19   0.484  0.6342            0.866
```

```
print(fname)
```

```
## [1] "KET-VR5_Npas4_coloc_w_PV,cFos_mean_cell_ns_Rsubset.csv"
```

Npas4 coloc w PV, WFA

```
fname = npas4[5]

print(fname)
```

```
## [1] "KET-VR5_Npas4_coloc_w_PV,WFA_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                             Sum Sq Df  F value    Pr(>F)
## (Intercept)               111.782  1 128.7762 6.617e-10 ***
## treat_factor                0.025  1   0.0293    0.8659
## react_factor                1.661  1   1.9139    0.1826
## treat_factor:react_factor   0.010  1   0.0119    0.9142
## Residuals                  16.493 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL   0.0243 0.546 19   0.045  0.9650            0.999
##
## react_factor = VR5:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL   0.1100 0.564 19   0.195  0.8475            0.977
##
## treat_factor = KET:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5    0.500 0.589 19   0.849  0.4067            0.648
##
## treat_factor = SAL:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5    0.586 0.518 19   1.130  0.2725            0.471
```

```
print(fname)
```

```
## [1] "KET-VR5_Npas4_coloc_w_PV,WFA_mean_cell_ns_Rsubset.csv"
```

Npas4 coloc w WFA

```
fname = npas4[6]

print(fname)
```

```
## [1] "KET-VR5_Npas4_coloc_w_WFA_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                             Sum Sq Df  F value    Pr(>F)
## (Intercept)               188.575  1 203.3085 1.338e-11 ***
## treat_factor                0.004  1   0.0042   0.94873
## react_factor                4.603  1   4.9624   0.03819 *
## treat_factor:react_factor   0.362  1   0.3908   0.53931
## Residuals                  17.623 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL   -0.227 0.564 19  -0.403  0.6916            0.905
##
## react_factor = VR5:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.280 0.583 19   0.480  0.6366            0.868
##
## treat_factor = KET:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5     0.65 0.609 19   1.067  0.2993           0.5090
##
## treat_factor = SAL:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5     1.16 0.536 19   2.160  0.0438           0.0857
```

```
print(fname)
```

```
## [1] "KET-VR5_Npas4_coloc_w_WFA_mean_cell_ns_Rsubset.csv"
```

WFA coloc w cFos

```
fname = wfa[1]

print(fname)
```

```
## [1] "KET-VR5_WFA_coloc_w_cFos_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                             Sum Sq Df  F value    Pr(>F)
## (Intercept)               300.976  1 336.1211 1.539e-13 ***
## treat_factor                0.169  1   0.1892    0.6685
## react_factor                0.963  1   1.0756    0.3127
## treat_factor:react_factor   1.159  1   1.2939    0.2695
## Residuals                  17.013 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL   -0.280 0.554 19  -0.505  0.6191            0.855
##
## react_factor = VR5:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.627 0.573 19   1.094  0.2878            0.493
##
## treat_factor = KET:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5   -0.040 0.598 19  -0.067  0.9474            0.997
##
## treat_factor = SAL:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5    0.867 0.526 19   1.646  0.1162            0.219
```

```
print(fname)
```

```
## [1] "KET-VR5_WFA_coloc_w_cFos_mean_cell_ns_Rsubset.csv"
```

WFA coloc w cFos, Npas4

```
fname = wfa[2]

print(fname)
```

```
## [1] "KET-VR5_WFA_coloc_w_cFos,Npas4_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                            Sum Sq Df  F value   Pr(>F)
## (Intercept)                87.220  1 126.3347 7.76e-10 ***
## treat_factor                0.025  1   0.0363  0.85093
## react_factor                4.841  1   7.0121  0.01587 *
## treat_factor:react_factor   0.932  1   1.3504  0.25959
## Residuals                  13.117 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL   -0.340 0.487 19  -0.699  0.4931            0.743
##
## react_factor = VR5:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.473 0.503 19   0.941  0.3586            0.589
##
## treat_factor = KET:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5     0.52 0.526 19   0.990  0.3348           0.5576
##
## treat_factor = SAL:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5     1.33 0.462 19   2.884  0.0095           0.0189
```

```
print(fname)
```

```
## [1] "KET-VR5_WFA_coloc_w_cFos,Npas4_mean_cell_ns_Rsubset.csv"
```

WFA coloc w Npas4

```
fname = wfa[3]

print(fname)
```

```
## [1] "KET-VR5_WFA_coloc_w_Npas4_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                             Sum Sq Df  F value    Pr(>F)
## (Intercept)               188.575  1 203.3085 1.338e-11 ***
## treat_factor                0.004  1   0.0042   0.94873
## react_factor                4.603  1   4.9624   0.03819 *
## treat_factor:react_factor   0.362  1   0.3908   0.53931
## Residuals                  17.623 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL   -0.227 0.564 19  -0.403  0.6916            0.905
##
## react_factor = VR5:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.280 0.583 19   0.480  0.6366            0.868
##
## treat_factor = KET:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5     0.65 0.609 19   1.067  0.2993           0.5090
##
## treat_factor = SAL:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5     1.16 0.536 19   2.160  0.0438           0.0857
```

```
print(fname)
```

```
## [1] "KET-VR5_WFA_coloc_w_Npas4_mean_cell_ns_Rsubset.csv"
```

WFA coloc w PV

```
fname = wfa[4]

print(fname)
```

```
## [1] "KET-VR5_WFA_coloc_w_PV_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                            Sum Sq Df  F value    Pr(>F)
## (Intercept)               360.23  1 184.5461 3.104e-11 ***
## treat_factor                0.32  1   0.1614    0.6923
## react_factor                0.40  1   0.2050    0.6558
## treat_factor:react_factor   0.28  1   0.1444    0.7082
## Residuals                  37.09 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL   0.0129 0.818 19   0.016  0.9876            1.000
##
## react_factor = VR5:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL   0.4600 0.846 19   0.544  0.5929            0.834
##
## treat_factor = KET:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5  -0.4900 0.884 19  -0.555  0.5857            0.828
##
## treat_factor = SAL:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5  -0.0429 0.777 19  -0.055  0.9566            0.998
```

```
print(fname)
```

```
## [1] "KET-VR5_WFA_coloc_w_PV_mean_cell_ns_Rsubset.csv"
```

WFA coloc w PV, cFos

```
fname = wfa[5]

print(fname)
```

```
## [1] "KET-VR5_WFA_coloc_w_PV,cFos_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                             Sum Sq Df  F value    Pr(>F)
## (Intercept)               132.897  1 158.9025 1.123e-10 ***
## treat_factor                0.750  1   0.8969    0.3555
## react_factor                0.010  1   0.0118    0.9145
## treat_factor:react_factor   0.002  1   0.0022    0.9630
## Residuals                  15.890 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.383 0.535 19   0.715  0.4833            0.733
##
## react_factor = VR5:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.347 0.554 19   0.626  0.5388            0.787
##
## treat_factor = KET:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5   0.0600 0.578 19   0.104  0.9185            0.993
##
## treat_factor = SAL:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5   0.0238 0.509 19   0.047  0.9632            0.999
```

```
print(fname)
```

```
## [1] "KET-VR5_WFA_coloc_w_PV,cFos_mean_cell_ns_Rsubset.csv"
```

WFA coloc w PV, Npas4

```
fname = wfa[6]

print(fname)
```

```
## [1] "KET-VR5_WFA_coloc_w_PV,Npas4_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                             Sum Sq Df  F value    Pr(>F)
## (Intercept)               111.782  1 128.7762 6.617e-10 ***
## treat_factor                0.025  1   0.0293    0.8659
## react_factor                1.661  1   1.9139    0.1826
## treat_factor:react_factor   0.010  1   0.0119    0.9142
## Residuals                  16.493 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL   0.0243 0.546 19   0.045  0.9650            0.999
##
## react_factor = VR5:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL   0.1100 0.564 19   0.195  0.8475            0.977
##
## treat_factor = KET:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5    0.500 0.589 19   0.849  0.4067            0.648
##
## treat_factor = SAL:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5    0.586 0.518 19   1.130  0.2725            0.471
```

```
print(fname)
```

```
## [1] "KET-VR5_WFA_coloc_w_PV,Npas4_mean_cell_ns_Rsubset.csv"
```

quad cFos

```
fname = quads[1]

print(fname)
```

```
## [1] "KET-VR5_quad_cFos_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                            Sum Sq Df  F value    Pr(>F)
## (Intercept)               53.299  1 144.9477 2.451e-10 ***
## treat_factor               0.154  1   0.4186   0.52537
## react_factor               1.632  1   4.4392   0.04864 *
## treat_factor:react_factor  0.008  1   0.0222   0.88300
## Residuals                  6.986 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.127 0.355 19   0.358  0.7242            0.924
##
## react_factor = VR5:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.203 0.367 19   0.554  0.5862            0.829
##
## treat_factor = KET:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5    0.500 0.384 19   1.304  0.2079            0.373
##
## treat_factor = SAL:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5    0.576 0.337 19   1.708  0.1039            0.197
```

```
print(fname)
```

```
## [1] "KET-VR5_quad_cFos_mean_cell_ns_Rsubset.csv"
```

quad Npas4

```
fname = quads[2]

print(fname)
```

```
## [1] "KET-VR5_quad_Npas4_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                            Sum Sq Df  F value    Pr(>F)
## (Intercept)               53.299  1 144.9477 2.451e-10 ***
## treat_factor               0.154  1   0.4186   0.52537
## react_factor               1.632  1   4.4392   0.04864 *
## treat_factor:react_factor  0.008  1   0.0222   0.88300
## Residuals                  6.986 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.127 0.355 19   0.358  0.7242            0.924
##
## react_factor = VR5:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.203 0.367 19   0.554  0.5862            0.829
##
## treat_factor = KET:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5    0.500 0.384 19   1.304  0.2079            0.373
##
## treat_factor = SAL:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5    0.576 0.337 19   1.708  0.1039            0.197
```

```
print(fname)
```

```
## [1] "KET-VR5_quad_Npas4_mean_cell_ns_Rsubset.csv"
```

quad PV

```
fname = quads[3]

print(fname)
```

```
## [1] "KET-VR5_quad_PV_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                            Sum Sq Df  F value    Pr(>F)
## (Intercept)               53.299  1 144.9477 2.451e-10 ***
## treat_factor               0.154  1   0.4186   0.52537
## react_factor               1.632  1   4.4392   0.04864 *
## treat_factor:react_factor  0.008  1   0.0222   0.88300
## Residuals                  6.986 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.127 0.355 19   0.358  0.7242            0.924
##
## react_factor = VR5:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.203 0.367 19   0.554  0.5862            0.829
##
## treat_factor = KET:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5    0.500 0.384 19   1.304  0.2079            0.373
##
## treat_factor = SAL:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5    0.576 0.337 19   1.708  0.1039            0.197
```

```
print(fname)
```

```
## [1] "KET-VR5_quad_PV_mean_cell_ns_Rsubset.csv"
```

quad WFA

```
fname = quads[4]

print(fname)
```

```
## [1] "KET-VR5_quad_WFA_mean_cell_ns_Rsubset.csv"
```

```
figs = eda_anova(fname)
```

```
## Anova Table (Type III tests)
##
## Response: mean_cell_n
##                            Sum Sq Df  F value    Pr(>F)
## (Intercept)               53.299  1 144.9477 2.451e-10 ***
## treat_factor               0.154  1   0.4186   0.52537
## react_factor               1.632  1   4.4392   0.04864 *
## treat_factor:react_factor  0.008  1   0.0222   0.88300
## Residuals                  6.986 19
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## react_factor = FR1:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.127 0.355 19   0.358  0.7242            0.924
##
## react_factor = VR5:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  KET - SAL    0.203 0.367 19   0.554  0.5862            0.829
##
## treat_factor = KET:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5    0.500 0.384 19   1.304  0.2079            0.373
##
## treat_factor = SAL:
##  contrast  estimate    SE df t.ratio p.value adjusted_p.value
##  FR1 - VR5    0.576 0.337 19   1.708  0.1039            0.197
```

```
print(fname)
```

```
## [1] "KET-VR5_quad_WFA_mean_cell_ns_Rsubset.csv"
```