

## Spacek et al., 2021, Figure 4

### Figure 4a

#### Modulation of firing rate by feedback during movie or grating presentations

```
# Random intercept for neurons
lmer.4a = lmer(meanrate ~ stimtype + (1 | uid),
              data = t4a %>% drop_na(meanrate))

display(lmer.4a)

## lmer(formula = meanrate ~ stimtype + (1 | uid), data = t4a %>%
##   drop_na(meanrate))
##           coef.est coef.se
## (Intercept) 0.05      0.04
## stimtypemvi 0.09      0.04
##
## Error terms:
## Groups   Name          Std.Dev.
## uid      (Intercept) 0.16
## Residual                0.18
## ---
## number of obs: 78, groups: uid, 39
## AIC = 8.4, DIC = -18.7
## deviance = -9.2

anova(lmer.4a)

## Type III Analysis of Variance Table with Satterthwaite's method
##           Sum Sq Mean Sq NumDF DenDF F value Pr(>F)
## stimtype 0.17054 0.17054     1    38  5.2084 0.02816 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Grating: FMI = 0.053
Movie: FMI = 0.15
n = 39 neurons from 4 mice
```

## Figure 4b

### Modulation of firing rate by feedback during gray screen conditions

```
# Random intercept for neurons
lmer.4b = lmer(meanrate ~ blank_condition + (1 | uid),
              data = t4b %>% drop_na(meanrate))

display(lmer.4b)

## lmer(formula = meanrate ~ blank_condition + (1 | uid), data = t4b %>%
##   drop_na(meanrate))
##               coef.est coef.se
## (Intercept)      0.30    0.05
## blank_conditiongrt0c 0.06    0.05
## blank_conditionmvi -0.03    0.05
##
## Error terms:
## Groups   Name      Std.Dev.
## uid      (Intercept) 0.23
## Residual                0.21
## ---
## number of obs: 117, groups: uid, 39
## AIC = 45.7, DIC = 8.9
## deviance = 22.3

anova(lmer.4b)

## Type III Analysis of Variance Table with Satterthwaite's method
##               Sum Sq Mean Sq NumDF DenDF F value Pr(>F)
## blank_condition 0.14645 0.073226     2    76  1.6846 0.1924

Blank before movie: FMI = 0.27
Blank before grating: FMI = 0.30
Zero contrast grating: FMI = 0.36
n = 39 neurons from 4 mice
```

## (I) Pooling across blank conditions, and comparing against the FMI for movies

```
# Random intercept for neurons
lmer.I = lmer(meanrate ~ stim_condition + (1 | uid),
              data = t4_p1 %>% drop_na(meanrate))

display(lmer.I)

## lmer(formula = meanrate ~ stim_condition + (1 | uid), data = t4_p1 %>%
##   drop_na(meanrate))
##               coef.est coef.se
## (Intercept)      0.31    0.04
## stim_conditionmvi -0.16    0.04
##
## Error terms:
## Groups   Name          Std.Dev.
## uid      (Intercept)  0.18
## Residual                    0.23
## ---
## number of obs: 156, groups: uid, 39
## AIC = 47.9, DIC = 21.1
## deviance = 30.5

anova(lmer.I)

## Type III Analysis of Variance Table with Satterthwaite's method
##               Sum Sq Mean Sq NumDF DenDF F value    Pr(>F)
## stim_condition 0.79145 0.79145     1   116  15.108 0.0001695 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

n = 39 neurons from 4 mice
```

## (II) Pooling across blank conditions, and comparing against the FMI for gratings

```
# Random intercept for neurons
lmer.II = lmer(meanrate ~ stim_condition + (1 | uid), t4_p2)
display(lmer.II)

## lmer(formula = meanrate ~ stim_condition + (1 | uid), data = t4_p2)
##               coef.est coef.se
## (Intercept)      0.31    0.04
## stim_conditiongrt -0.26    0.04
##
## Error terms:
## Groups   Name          Std.Dev.
## uid      (Intercept)  0.18
## Residual                    0.24
## ---
## number of obs: 156, groups: uid, 39
## AIC = 55.6, DIC = 29
## deviance = 38.3

anova(lmer.II)

## Type III Analysis of Variance Table with Satterthwaite's method
##               Sum Sq Mean Sq NumDF DenDF F value    Pr(>F)
## stim_condition 1.9472  1.9472     1   116  34.876 3.581e-08 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

n = 39 neurons from 4 mice
```