

Figure 1-Supplement 4e

Effect of suppression on firing rate - movies

```
# Random intercept, random slope for neurons,  
# random intercept for experiments  
lmer.1_S4e = lmer(rates ~ feedback + (1 + feedback | uid) + (1 | eid),  
                data = tb %>% drop_na(rates))  
  
display(lmer.1_S4e)  
  
## lmer(formula = rates ~ feedback + (1 + feedback | uid) + (1 |  
##     eid), data = tb %>% drop_na(rates))  
##           coef.est coef.se  
## (Intercept) 8.65      0.99  
## feedback    1.35      0.36  
##  
## Error terms:  
## Groups   Name          Std.Dev. Corr  
## uid      (Intercept) 6.58  
##          feedback    2.80      0.43  
## eid      (Intercept) 1.49  
## Residual                5.27  
## ---  
## number of obs: 23200, groups: uid, 62; eid, 9  
## AIC = 143598, DIC = 143587.2  
## deviance = 143585.7  
  
anova(lmer.1_S4e)  
  
## Type III Analysis of Variance Table with Satterthwaite's method  
##           Sum Sq Mean Sq NumDF  DenDF F value    Pr(>F)  
## feedback 386.47  386.47     1 60.566  13.891 0.0004281 ***  
## ---  
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1  
  
Feedback: 10.00 spikes/s  
Suppression: 8.65 spikes/s  
n = 62 neurons from 3 mice
```

Figure 1-Supplement 4f

Effect of suppression on burst ratio - movies

```
# Random intercept, random slope for neurons,  
# random intercept for experiments, nested in series  
lmer.1_S4f = lmer(burstratios ~ feedback + (1 + feedback | uid) + (1 | sid/eid),  
                data = tb %>% drop_na(burstratios))
```

```
display(lmer.1_S4f)
```

```
## lmer(formula = burstratios ~ feedback + (1 + feedback | uid) +  
##      (1 | sid/eid), data = tb %>% drop_na(burstratios))  
##              coef.est coef.se  
## (Intercept)  0.13      0.02  
## feedback    -0.04      0.01  
##  
## Error terms:  
## Groups   Name          Std.Dev. Corr  
## uid      (Intercept)  0.09  
##          feedback     0.04    -0.80  
## eid:sid  (Intercept)  0.01  
## sid      (Intercept)  0.06  
## Residual                0.17  
## ---  
## number of obs: 22270, groups: uid, 62; eid:sid, 9; sid, 8  
## AIC = -15214.7, DIC = -15259.4  
## deviance = -15245.1
```

```
anova(lmer.1_S4f)
```

```
## Type III Analysis of Variance Table with Satterthwaite's method  
##           Sum Sq Mean Sq NumDF  DenDF F value    Pr(>F)  
## feedback  1.4252  1.4252     1 62.669  49.051 2.017e-09 ***  
## ---  
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Feedback: 0.086

Suppression: 0.13

n = 62 neurons from 3 mice

Figure 1-Supplement 4g

Effect of suppression on sparseness - movies

```
# Random intercept, random slope for single neurons,  
# random intercept for series  
lmer.1_S4g = lmer(spars ~ feedback + (1 + feedback | uid) + (1 | sid),  
                 data = tbgh %>% drop_na(spars))  
  
display(lmer.1_S4g)
```

```
## lmer(formula = spars ~ feedback + (1 + feedback | uid) + (1 |  
##   sid), data = tbgh %>% drop_na(spars))  
##           coef.est coef.se  
## (Intercept)  0.36    0.03  
## feedback    -0.05    0.01  
##  
## Error terms:  
## Groups   Name      Std.Dev. Corr  
## uid      (Intercept) 0.16  
##          feedback    0.04   -0.27  
## sid      (Intercept) 0.04  
## Residual                0.04  
## ---  
## number of obs: 136, groups: uid, 62; sid, 8  
## AIC = -222.3, DIC = -262.9  
## deviance = -249.6
```

```
anova(lmer.1_S4g)
```

```
## Type III Analysis of Variance Table with Satterthwaite's method  
##           Sum Sq Mean Sq NumDF DenDF F value  Pr(>F)  
## feedback 0.058814 0.058814     1 57.742  39.861 4.189e-08 ***  
## ---  
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Feedback: 0.31

Suppression: 0.36

n = 62 neurons from 3 mice

Figure 1-Supplement 4h

Effect of suppression on reliability - movies

```
# Random intercept, random slope for neurons,  
# random intercept for experiments, nested in mice  
lmer.1_S4h = lmer(rel ~ feedback + (1 + feedback | uid) + (1 | mid/eid),  
                data = tbgh %>% drop_na(rel))  
  
display(lmer.1_S4h)  
  
## lmer(formula = rel ~ feedback + (1 + feedback | uid) + (1 | mid/eid),  
##      data = tbgh %>% drop_na(rel))  
##              coef.est coef.se  
## (Intercept)  0.11      0.01  
## feedback    -0.01      0.00  
##  
## Error terms:  
## Groups   Name          Std.Dev. Corr  
## uid      (Intercept)  0.08  
##          feedback     0.02    -0.54  
## eid:mid  (Intercept)  0.01  
## mid      (Intercept)  0.00  
## Residual                0.02  
## ---  
## number of obs: 136, groups: uid, 62; eid:mid, 9; mid, 3  
## AIC = -416.2, DIC = -465.4  
## deviance = -448.8  
  
anova(lmer.1_S4h)  
  
## Type III Analysis of Variance Table with Satterthwaite's method  
##              Sum Sq  Mean Sq NumDF DenDF F value  Pr(>F)  
## feedback  0.0020995  0.0020995     1  47.93  5.0766  0.02886 *  
## ---  
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1  
  
Feedback: 0.10  
Suppression: 0.11  
n = 62 neurons from 3 mice
```

Figure 1-Supplement 4l

Effect of suppression on firing rate - gratings

```
# Random intercept, random slope for neurons,  
# random intercept for experiments nested in series  
lmer.1_S4l = lmer(rates ~ feedback + (1 + feedback | uid) + (1 | sid/eid),  
                data = tb %>% drop_na(rates))  
  
display(lmer.1_S4l)
```

```
## lmer(formula = rates ~ feedback + (1 + feedback | uid) + (1 |  
##   sid/eid), data = tb %>% drop_na(rates))  
##           coef.est coef.se  
## (Intercept) 11.26      1.77  
## feedback      0.18      0.66  
##  
## Error terms:  
## Groups   Name          Std.Dev. Corr  
## uid      (Intercept)  9.54  
##          feedback     5.58      0.11  
## eid:sid  (Intercept)  2.83  
## sid      (Intercept)  2.86  
## Residual                6.91  
## ---  
## number of obs: 25960, groups: uid, 73; eid:sid, 13; sid, 8  
## AIC = 174839, DIC = 174830.4  
## deviance = 174826.5
```

```
anova(lmer.1_S4l)
```

```
## Type III Analysis of Variance Table with Satterthwaite's method  
##           Sum Sq Mean Sq NumDF DenDF F value Pr(>F)  
## feedback 3.5764  3.5764     1 71.41  0.0749 0.7851
```

Feedback: 11.44 spikes/s

Suppression: 11.26 spikes/s

n = 73 neurons from 3 mice

Figure 1-Supplement 4m

Effect of suppression on burst ratio - gratings

```
# Random intercept, random slope for neurons,  
# random intercept for experiments  
lmer.1_S4m = lmer(burstratios ~ feedback + (1 + feedback | uid) + (1 | eid),  
                 data = tb %>% drop_na(burstratios))  
  
display(lmer.1_S4m)
```

```
## lmer(formula = burstratios ~ feedback + (1 + feedback | uid) +  
##      (1 | eid), data = tb %>% drop_na(burstratios))  
##              coef.est coef.se  
## (Intercept)  0.11      0.02  
## feedback    -0.08      0.01  
##  
## Error terms:  
## Groups   Name          Std.Dev. Corr  
## uid      (Intercept)  0.13  
##          feedback     0.11    -0.98  
## eid      (Intercept)  0.04  
## Residual                0.15  
## ---  
## number of obs: 22885, groups: uid, 73; eid, 13  
## AIC = -21429.4, DIC = -21471.6  
## deviance = -21457.5
```

```
anova(lmer.1_S4m)
```

```
## Type III Analysis of Variance Table with Satterthwaite's method  
##              Sum Sq Mean Sq NumDF  DenDF F value    Pr(>F)  
## feedback  0.81475  0.81475     1  72.076  36.294 6.532e-08 ***  
## ---  
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Feedback: 0.031

Suppression: 0.11

n = 73 neurons from 3 mice

Figure 1-Supplement 4n

Effect of suppression on F1/F0 - gratings

```
# Random intercept for neurons,  
# random intercept for experiments, nested in series  
lmer.1_S4n = lmer(f1f0 ~ feedback + (1 | uid) + (1 | sid/eid),  
                data = tbn %>% drop_na(f1f0))  
  
display(lmer.1_S4n)  
  
## lmer(formula = f1f0 ~ feedback + (1 | uid) + (1 | sid/eid), data = tbn %>%  
##   drop_na(f1f0))  
##           coef.est coef.se  
## (Intercept)  1.33    0.07  
## feedback    -0.13    0.03  
##  
## Error terms:  
## Groups   Name      Std.Dev.  
## uid      (Intercept) 0.33  
## eid:sid  (Intercept) 0.09  
## sid      (Intercept) 0.11  
## Residual                0.25  
## ---  
## number of obs: 220, groups: uid, 73; eid:sid, 13; sid, 8  
## AIC = 170.8, DIC = 141.4  
## deviance = 150.1  
  
anova(lmer.1_S4n)  
  
## Type III Analysis of Variance Table with Satterthwaite's method  
##           Sum Sq Mean Sq NumDF  DenDF F value  Pr(>F)  
## feedback 0.86189 0.86189     1 136.41  14.156 0.000249 ***  
## ---  
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1  
  
Feedback: 1.20  
Suppression: 1.33  
n = 73 neurons from 3 mice
```