

Neighborhood bully: no difference in territorial response towards neighbors or strangers in marmots

Mariona Ferrandiz-Rovira, Timothée Zidat, Pierre Dupont, Vérane Berger, Célia Rézouki and

Aurélie Cohas

Supplementary Material - *R-NIMBLE* scripts for the models including an interaction between the modalities and the sex of the focal individual as fixed factors and individual-level random effects.

NIMBLE model code for the difference in smelling time and marking time (same model)

```
TimeModel <- nimbleCode({
  ## Priors
  sd ~ dunif(0,25)          # residual standard deviation
  sd.random ~ dunif(0,25)  # individual random effect standard deviation

  ## mean smelling/marketing time per sex/test
  mu[1,1] ~ dnorm(0,0.001)
  mu[1,2] ~ dnorm(0,0.001)
  mu[1,3] ~ dnorm(0,0.001)
  mu[2,1] ~ dnorm(0,0.001)
  mu[2,2] ~ dnorm(0,0.001)
  mu[2,3] ~ dnorm(0,0.001)

  ## sex difference for each test
  delta.sex[1] <- mu[1,1]-mu[2,1]
  delta.sex[2] <- mu[1,2]-mu[2,2]
  delta.sex[3] <- mu[1,3]-mu[2,3]

  ## individual random effects
  for(i in 1:n.ID){
    epsilon[i] ~ dnorm(0, sd = sd.random)
```

```

}#i

## for each test
for(t in 1:n.tests){
  thisMean[t] <- mu[sex[t],test[t]] + epsilon[ID[t]]
  time[t] ~ dnorm(thisMean[t], sd = sd)
  #residuals[t] <- (time[t] - mu[test[t]])/sqrt(sd)
}#t
})

## NIMBLE model code for the difference in number of marks
CountModel <- nimbleCode({
  sd.random ~ dunif(0,25)

  ## mean number of counts (on the log-scale)
  log.lambda[1,1] ~ dnorm(0.0,0.001)
  log.lambda[1,2] ~ dnorm(0.0,0.001)
  log.lambda[1,3] ~ dnorm(0.0,0.001)
  log.lambda[2,1] ~ dnorm(0.0,0.001)
  log.lambda[2,2] ~ dnorm(0.0,0.001)
  log.lambda[2,3] ~ dnorm(0.0,0.001)

  ## mean number of counts (on the natural scale)
  lambda[1,1] <- exp(log.lambda[1,1]) + minCount
  lambda[1,2] <- exp(log.lambda[1,2]) + minCount
  lambda[1,3] <- exp(log.lambda[1,3]) + minCount
  lambda[2,1] <- exp(log.lambda[2,1]) + minCount
  lambda[2,2] <- exp(log.lambda[2,2]) + minCount
  lambda[2,3] <- exp(log.lambda[2,3]) + minCount

  ## sex difference for each test
  delta.sex[1] <- lambda[1,1] - lambda[2,1]
  delta.sex[2] <- lambda[1,2] - lambda[2,2]

```

```
delta.sex[3] <- lambda[1,3] - lambda[2,3]
```

```
## Individual random effects
```

```
for(i in 1:n.ID){  
  epsilon[i] ~ dnorm(0, sd = sd.random)  
}#i
```

```
# for each experiment
```

```
for(t in 1:n.tests){  
  log(lambda0[t]) <- log.lambda[sex[t],test[t]] + epsilon[ID[t]]  
  count[t] ~ dpois(lambda0[t])  
  #residuals[t] <- (count[t] - lambda[t])/sqrt(lambda[t])  
}#t  
})
```