

## 02458 Cognitive Modelling – Signal Detection Exercise

Simulate 100 trials from an equal variance observer with  $d' = 1$  in three experiments. The criterion of the observer varies between conservative, lax and moderate in the experiments. Estimate  $d'$  from the simulated data for each of the three experiments. Calculate  $d'$  from the data in each of the experiments. Do you get the correct  $d'$  for each of the three simulated data sets?

Plot the Receiver Operating Characteristics (ROC) in Gaussian coordinates. Fit the equal variance model to the data and plot that too. Do you get a reasonable fit? Find a single estimate of  $d'$  from your fit using the ROC. How does this estimate of  $d'$  compare to the estimates you calculated before?

Simulate 100 trials from an unequal variance observer with  $\mu_s = 2$  and  $\sigma_s = 1.5$  in three experiments in which the criteria ranges from very conservative to very lax. Assume that you did not know that the data came from an unequal variance observer and estimate  $d'$  from the simulated data for each of the experiments (just as you did in the first part of the exercise). Do you get the same  $d'$  for each experiment? What are the implications of this result? Fit the unequal variance observer to the simulated data. Can you recover  $\mu_s$  and  $\sigma_s$ ?