

Psychology 465A SDT Simulation Lab Assignment

The purpose of this assignment is to simulate a person making decisions in a signal detection experiment. You are to assume that the person's internal state is described by the assumptions of signal detection theory (see, e.g., Coren, Ward & Enns, *Sensation and Perception*, 6e), including the making of decisions by referring observations to the value of a criterion whose location may vary across situations. There are two major objectives. First, you will "verify" by simulation that the location of the criterion has no effect on d' (calculated from the data - the measure of sensory sensitivity), but that changes in "(simulated) signal strength" do change d' . Second, you will investigate the effect on d' and β (calculated from the data) of varying one of the assumptions of the theory. Examples are making the standard deviations of the noise alone and signal plus noise distributions different, varying the location of the criterion from trial to trial according to some probability distribution, etc. Thinking about what people might actually do in this situation might give you some ideas or you can use one of the above suggestions. Further investigation of this model is a candidate for a final project.

Some hints: (1) The noise trials should be considered to be samples from a normal distribution with mean = 0 and sd = 1; the signal trials could be samples from a normal distribution with mean = d' and sd = 1. (2) The decision criterion should be converted to a value on the z axis; for the conditions of this simulation $\beta = 1$ would correspond to a value of $z = 0.5$; other similar values can be derived for other conditions and values of β . (3) Varying the criterion from trial to trial could be done by sampling from a uniform or normal (or other) distribution with mean at the "nominal" value of the criterion on the z axis. (4) Equations for approximating d' and β will be supplied in class, along with other hints.

The final material turned in for marking should be a running program that produces the relevant simulations, printout(s) that summarize a number of runs of your simulation that bear on the two problems described above, and between one and two pages of text describing the overall results of your runs and your conclusions from them.

Marks for this lab will be based upon (1) your selection of simulation runs (30%), and (2) your use of these runs to arrive at conclusions about the two problems you are to address (70%). Remember this project is worth 20% of your final mark.