Supplemental Figures Related to

Assessing evidence accumulation and rule learning in humans with an online game

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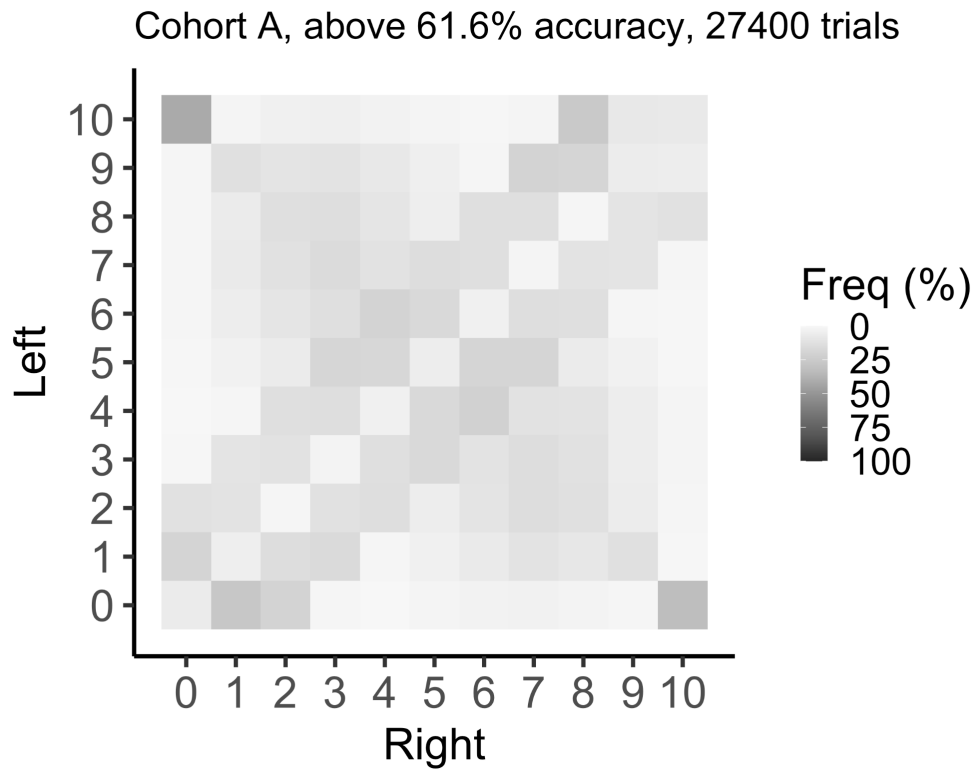
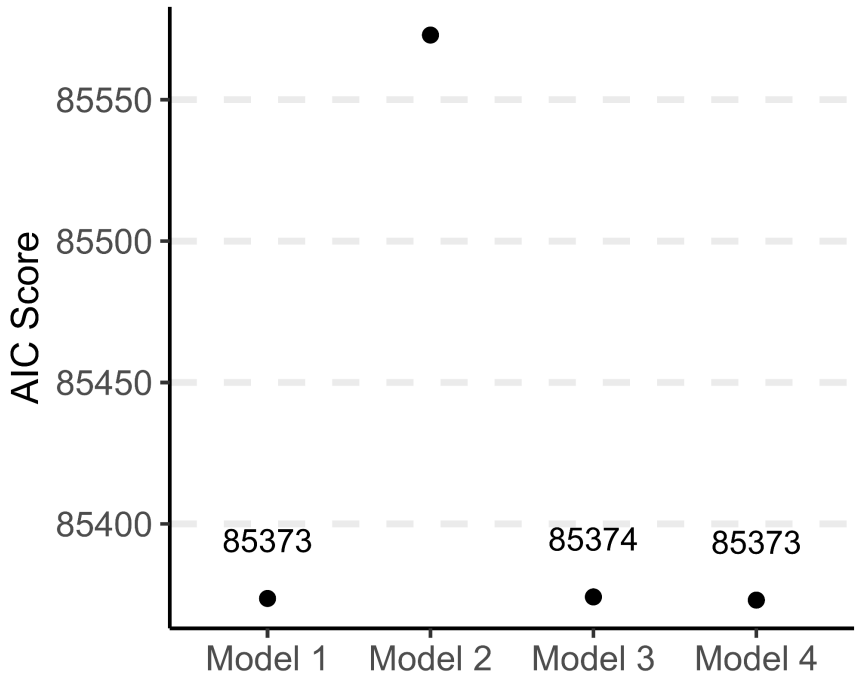


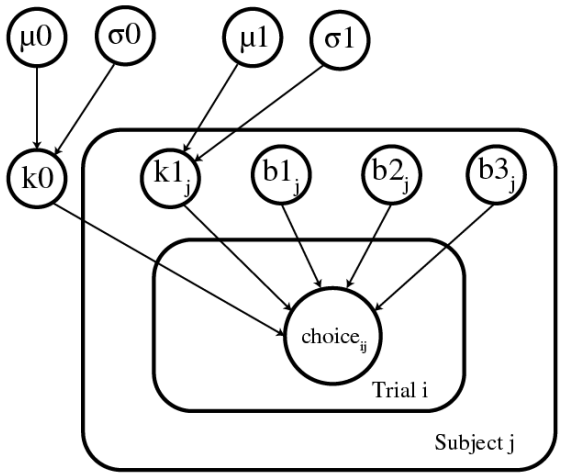
Supplementary Figure 1 - Related to Figure 1
Heatmap showing frequency of flashes pairings reflecting a Poisson sampling process as well as upsampling of difficult pairings (flash difference of 1 and 2).



Supplementary Figure 2 - Related to Figure 4

Model comparisons for participants in cohort A, B and C, ignoring the first 30 trials to remove any learning dynamics. Fitted parameters returned by Model 1 (k1 = 1.679, k0 = 0.284), Model 2 (k2=1.58e-05, k0 = 1.85), Model 4 (k1 = 1.328, k2 = 0.255, k0 = 0.209), Model 3 (k = 0.343, k0 = 1.498, ki = 1.903).

a

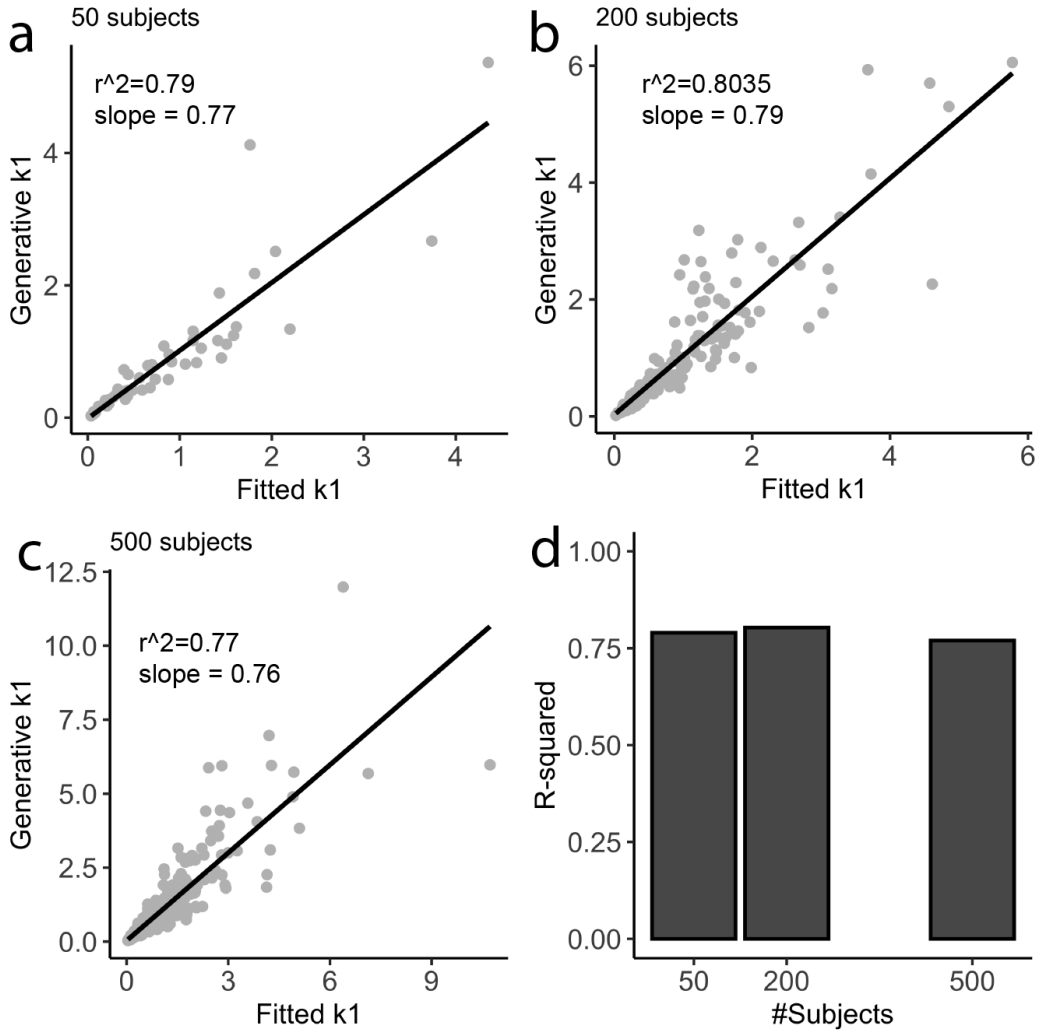


b

$\mu0 \sim Normal(-2.3, 0.1)$	
$\mu1 \sim Normal(-2.3, 0.1)$	
$\sigma0 \sim Normal(0.1, 0.1)$	
$\sigma1 \sim Normal(0.1, 0.1)$	
$k0 \sim LogNormal(\mu0, \sigma0)$	*Initial Noise*
$k1_j \sim LogNormal(\mu1, \sigma1)$	*Perceptual Noise*
$b1_j \sim Normal(0,1)$	*Win-stay*
$b2_j \sim Normal(0,1)$	*Lose-switch*
$b3_j \sim Normal(0,1)$	*Side Bias*
$\sigma_{ij} = k0 + k1_j[i]*(R_{ij}^2 + L_{ij}^2)$	
$\mu_{ij} = R_{ij} - L_{ij} + b1_j[i]*WS_{ij} + b2_j[i]*LS_{ij} + b3_j[i]$	
$\pi_{ij} = 1 - normal\_cdf(0, \mu_{ij}, \sigma_{ij})$	*Probability Went Right*
$choice_{ij} \sim Bernoulli(\pi_{ij})$	

Supplementary Figure 3 - Related to Figure 5

a. Schematic of the Bayesian hierarchical model - signal detection theory model of perceptual uncertainty.
b. Fitted parameters and prior distributions for each parameter in the model



Supplementary Figure 4 - Related to Figure 5.
Effect of the number of participants on the accuracy of the recovered parameter using the Bayesian Hierarchical Model. a-c) Fitted k1 from the Hierarchical Model versus Generative k1 for 50 participants, 200 participants and 500 participants doing 200 trials each. d) Comparison of R-squared score with the increasing number of participants.