

Supplementary File 4

A: Model Summary		
Populations	Multiple modules, each one composed of 1 excitatory and 1 inhibitory sub-population	
Topology	None	
Connectivity	Sparse, random recurrent connectivity with modular topographic feed-forward projections (fixed in-degrees)	
Neuron Model	Rate neuron with shifted tanh gain function	
Synapse Model	Delayed rate connection	
Plasticity	None	
Input	Uniformly distributed input onto $d_0 N^E$ excitatory and $d_0 N^E$ inhibitory neurons in SSN_0	
Measurements	Unit output (rate)	
B: Populations		
Name	Elements	Size
E_i	rate neuron	2400
I_i	rate neuron	600
C: Neuron Models		
Name	Rate neuron	
Differential equation	$\tau_{\mathbf{x}} \frac{d\mathbf{x}}{dt} = -\mathbf{x} + W\mathbf{r} + W^{\text{in}}\mathbf{u} - \mathbf{b}^{\text{rec}} + \sqrt{2\tau_{\mathbf{x}}}\sigma_X\xi$ $\mathbf{r} = 0.5(1 + \tanh(\mathbf{x}))$	
D: Input		
Type	Target	Description
random uniform distribution	E_0, I_0	Step signal input to SSN_0 , changing every 200 ms, with amplitude 0.8
Gaussian white noise	E_i, I_i for $i \in \{0..5\}$	Intrinsic unit noise
E: Measurements		
Unit output (rate)		

Table 4: Description of the rate model.