Table S 1: Model summary. Parameter values are given in Table S2.

A	**Model Summary**
Populations	Four
Topology	One module
Connectivity	Full connectivity, no synaptic delay
Neuron model	Leaky integrate-and-fire neurons, fixed voltage threshold, fixed absolute refractory periods
Channel models	-
Synapse models	Conductance-based synapses, AMPA and $GABA_A$ receptors (instantaneous rise, exponential decay), voltage-dependent NMDA receptors (exponential rise and decay)
Plasticity	-
Input	Independent fixed-rate poisson spike trains to all neurons
Measurements	Spike activity

B	**Populations**		
Total number of neurons	$N = 1000$	Excitatory neurons	$N_E = 0.8 \cdot N$
		Inhibitory neurons	$N_I = 0.2 \cdot N$
Name	**Size**	**Name**	**Size**
Selective pool 1 (right)	$N_{S1} = f \cdot N_E$	Nonselective	$(1-2f) \cdot N_E$
Selective pool 2 (left)	$N_{S2} = f \cdot N_E$	Inhibitory	$0.2 \cdot N$

C			**Connectivity**				
Source		**Target**	**Weight**	**Source**		**Target**	**Weight**
inhibitory	$\mapsto$	all	$\omega_I = 1.125$	nonselective	$\mapsto$	selective	$\omega_- = 0.8725$
excitatory	$\mapsto$	inhibitory	$\omega = 1$	selective i	$\mapsto$	selective j	$\omega_- = 0.8725$
excitatory	$\mapsto$	nonselective	$\omega = 1$	selective i	$\mapsto$	selective i	$\omega_+ = 1.51$

D	**Neuron and Synapse Model**
Type	Leaky integrate-and-fire neurons, conductance-based synapses
Subthreshold dynamics	$C_{\mathrm{m}}\dot{V}(t) = -g_{\mathrm{m}}(V(t)-V_{\mathrm{L}}) - I_{\mathrm{syn}}(t)$
Synaptic currents	$I_{\mathrm{syn}}(t) = I_{\mathrm{AMPA,rec}}(t) + I_{\mathrm{NMDA,rec}}(t) + I_{\mathrm{GABA}}(t) + I_{\mathrm{AMPA,ext}}(t)$
	$I_{\mathrm{AMPA,ext}}(t) = g_{\mathrm{AMPA,ext}}(V(t)-V_{\mathrm{E}})\sum_{j=1}^{N_{\mathrm{ext}}} s_j^{\mathrm{AMPA,ext}}(t)$
	$I_{\mathrm{AMPA,rec}}(t) = g_{\mathrm{AMPA,rec}}(V(t)-V_{\mathrm{E}})\sum_{j=1}^{N_{\mathrm{E}}} \omega_j s_j^{\mathrm{AMPA,rec}}(t)$
	$I_{\mathrm{NMDA,rec}}(t) = \frac{g_{\mathrm{NMDA}}(V(t)-V_{\mathrm{E}})}{1+[\mathrm{Mg}^{2+}]exp(-0.062V(t))/3.57} \times \sum_{j=1}^{N_{\mathrm{E}}} \omega_j s_j^{\mathrm{NMDA}}(t)$
	$I_{\mathrm{GABA}}(t) = g_{\mathrm{GABA}}(V(t)-V_{\mathrm{I}})\sum_{j=1}^{N_{\mathrm{I}}} \omega_j s_j^{\mathrm{GABA}}(t)$
Fraction of open channels	$\frac{ds_j^{\mathrm{X}}(t)}{dt} = -\frac{s_j^{\mathrm{X}}(t)}{\tau_{\mathrm{X,decay}}} + \sum_k \delta(t-t_j^k), \quad \mathrm{X} = \mathrm{AMPA, GABA}$
	$\frac{ds_j^{\mathrm{NMDA}}(t)}{dt} = -\frac{s_j^{\mathrm{NMDA}}(t)}{\tau_{\mathrm{NMDA,decay}}} + \alpha x_j(t)(1-s_j^{\mathrm{NMDA}}(t))$
	$\frac{dx_j(t)}{dt} = -\frac{x_j(t)}{\tau_{\mathrm{NMDA,rise}}} + \sum_k \delta(t-t_j^k)$
Spiking	if $V(t) \geq V_{\mathrm{th}} \wedge t > t^\star + \tau_{\mathrm{ref}}$ 1. set $t^\star = t$ 2. emit spike at time $t^\star$ 3. set $V(t) = V_{\mathrm{reset}}$

E	**Input**
Type	**Description**
Poisson generator	Fixed rate $\nu = \nu_{ext} + \nu_{1,2}$, with ν_{ext} = 2.4 kHz, $\nu_{1,2}$ = sel. inputs, one generator per neuron

F	**Measurements**
Spike activity: firing-rates were calculated using the spike count in a 50 ms time window shifted by 5 ms steps and dividing by the number of neurons in the population and by the window size.	