

Supplementary Material

1 FOURTH BACKGROUND OSCILLATOR

A background population of neurons is added as a fourth oscillator with fixed 10 Hz frequency. The fourth oscillator is connected to the target and flanker oscillators with a coupling strength of $2/3L$ and L respectively to simulate differing proportions of background inputs received by the three (one target and two flanker) populations. Results are shown for $L=60$ and $L=100$ (Figure S1). Low-frequency background input causes a left shift of the facilitation-suppression switching point.

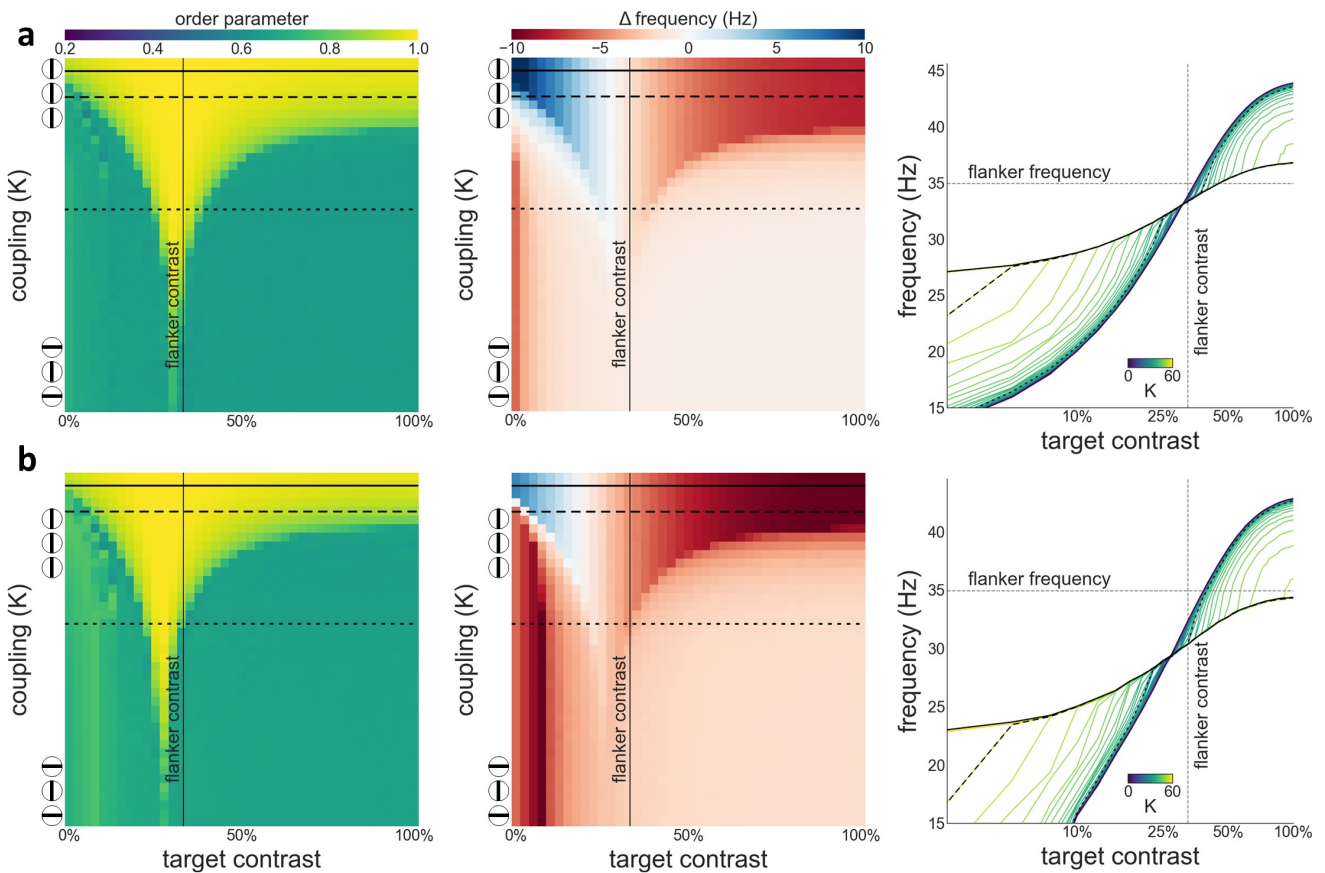


Figure S1. A fourth oscillator fixed at a frequency of 10Hz and a connection strength of $L=60$ (a) or $L=100$ (b) to the flankers and $2/3L$ to the target causes a left shift of the suppression-facilitation switching point.

2 NOISE

Simulations including a noise term in the Kuramoto function:

$$\dot{\theta}_i = \omega_i + \xi_{i,t} + \frac{K}{N} \sum_{j=1}^N \sin(\theta_j - \theta_i) \quad (\text{S1})$$

Pink noise with a scaling exponent of 1 is used similar to Lowet et al. (2015). Simulations with different noise levels are shown in Figure S2

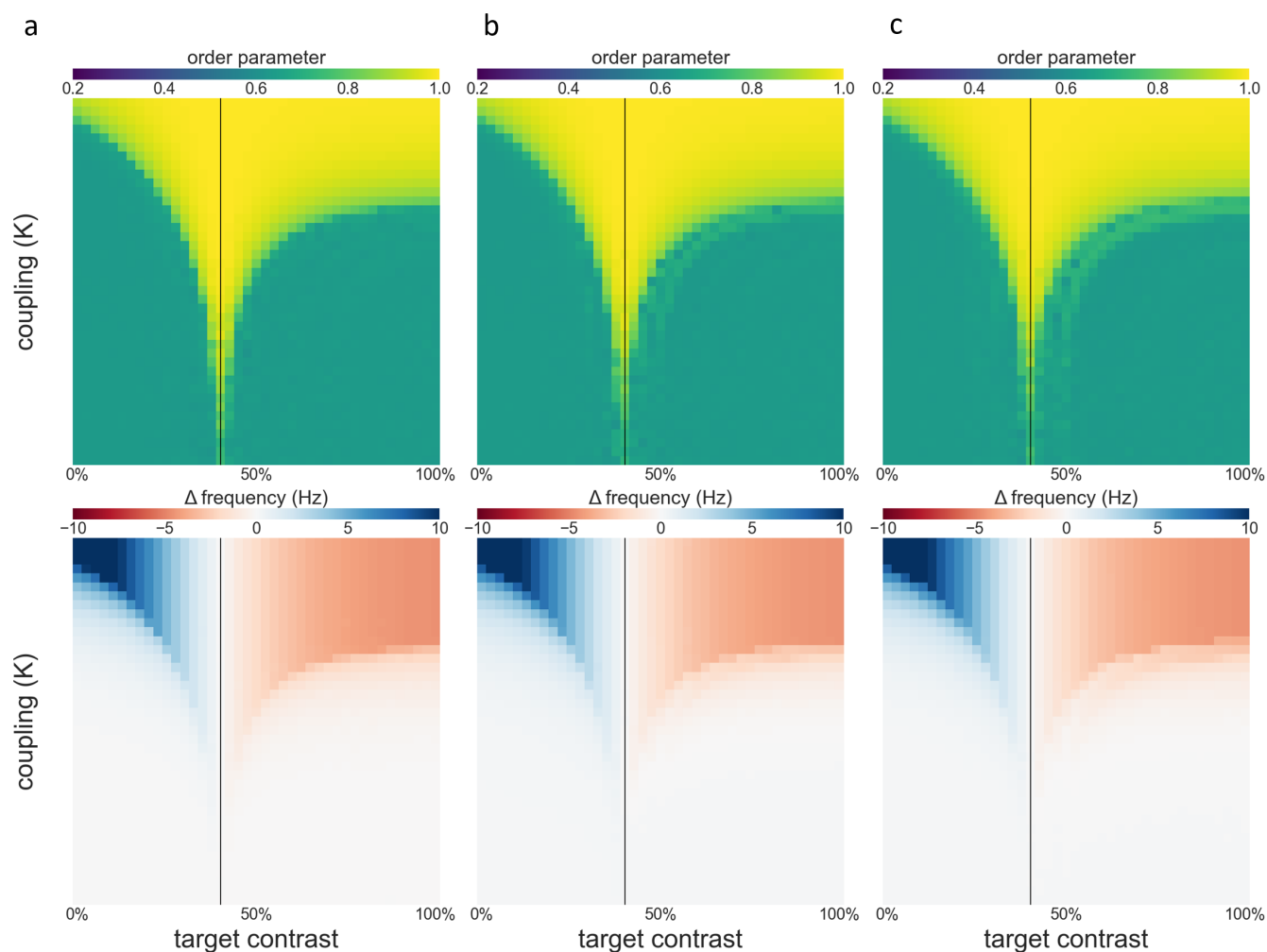


Figure S2. Model simulations with various noise levels; (a) no noise, (b) $0.5 * \xi$ and (c) $1 * \xi$ the noise term.

REFERENCES

Lowet E, Roberts M, Hadjipapas A, Peter A, van der Eerden J, De Weerd P. Input-dependent frequency modulation of cortical gamma oscillations shapes spatial synchronization and enables phase coding. *PLoS Computational Biology* **11** (2015). doi:10.1371/journal.pcbi.1004072.