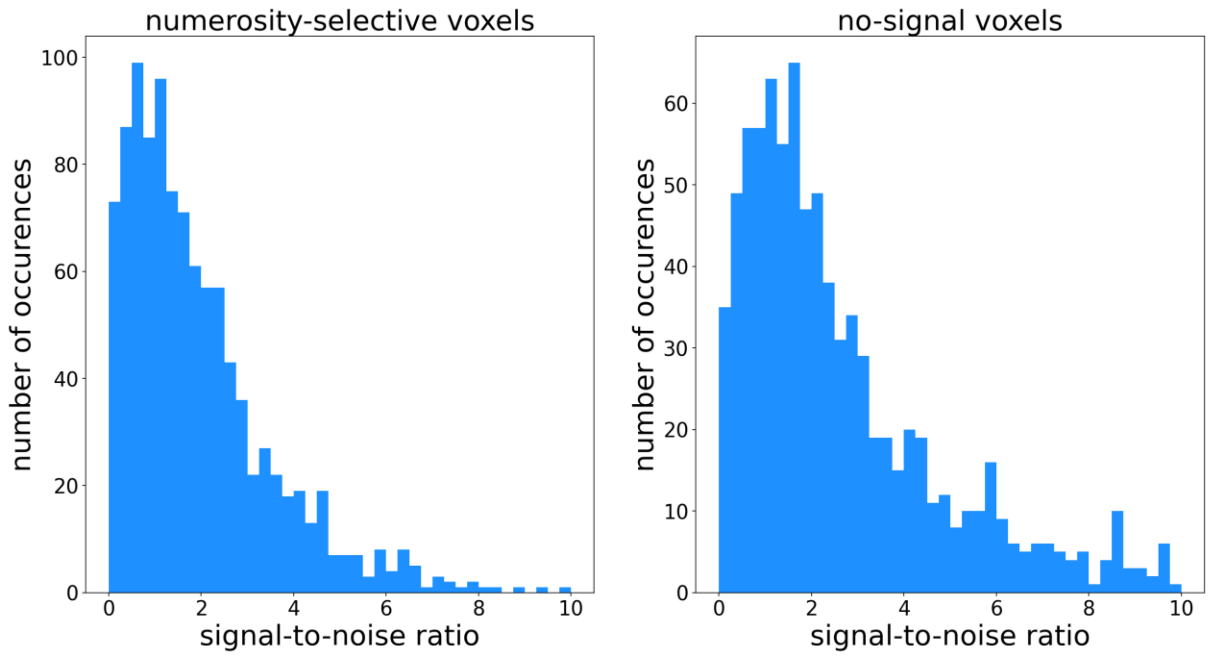
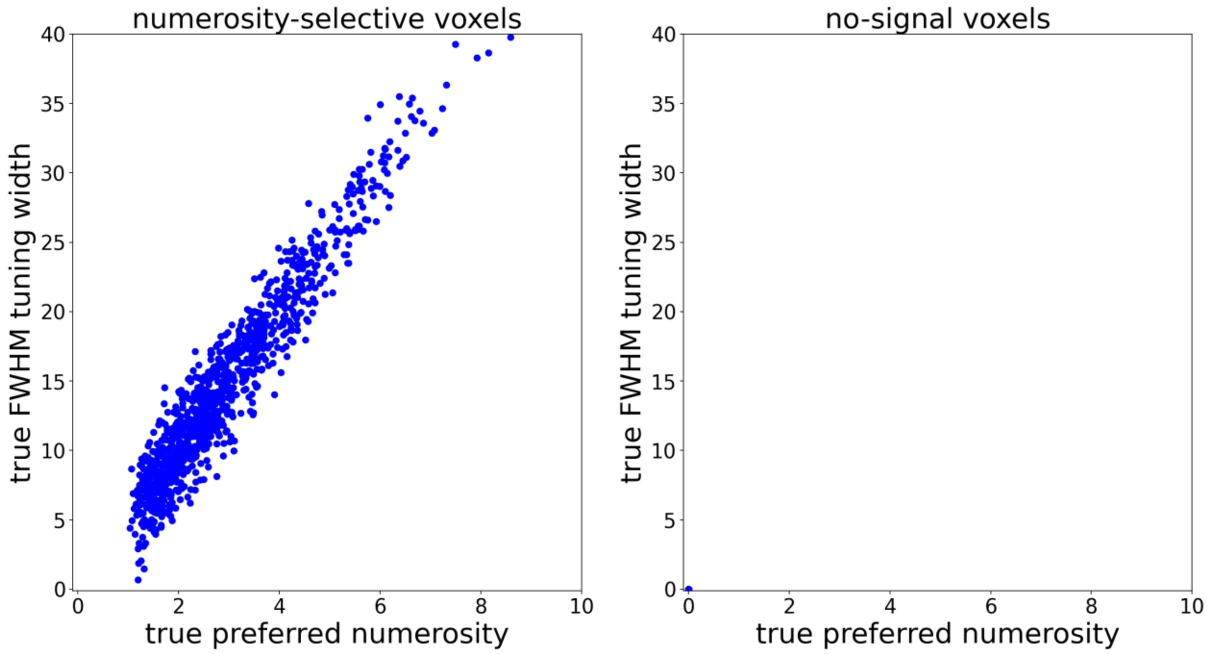
Expected output of `EMPRISE-analysis/code/Python/Demo.py`:

Sanity checks – same for all simulations and analyses

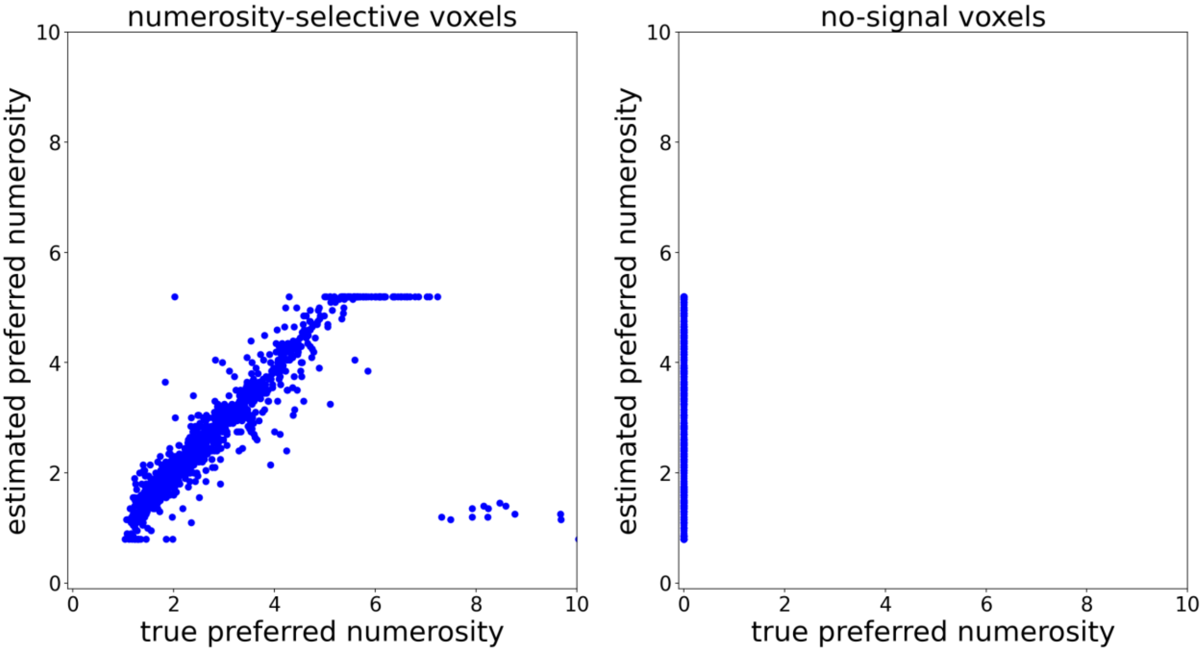


Distribution of signal-to-noise ratio in numerosity-selective and no-signal voxels.

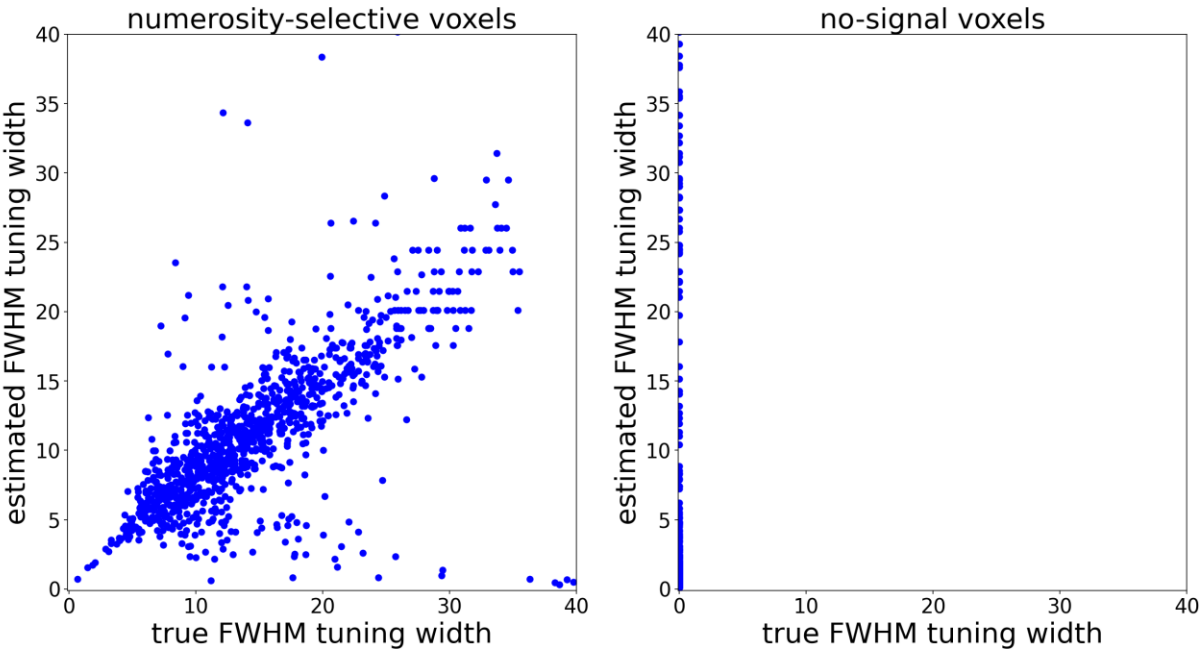


Sampled tuning parameters (mu, fwhm) in numerosity-selective and no-signal voxels.

Estimation accuracy – logarithmic signals, logarithmic model

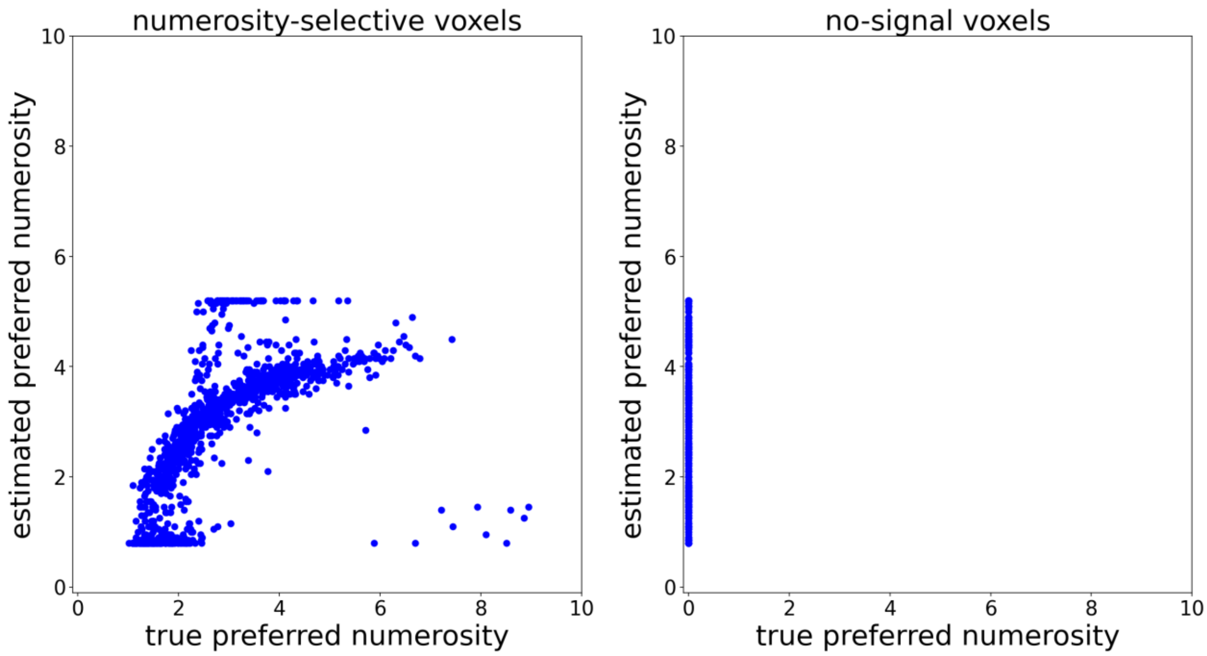


Estimated vs. true preferred numerosity in numerosity-selective and no-signal voxels.

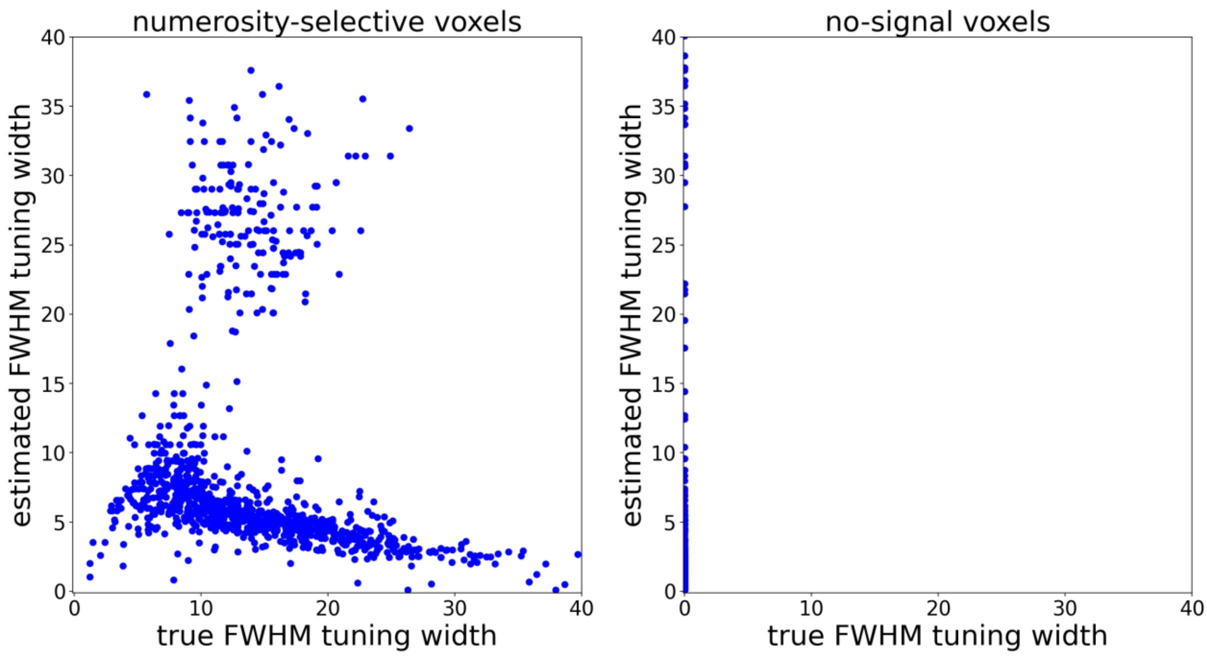


Estimated vs. true FWHM tuning width in numerosity-selective and no-signal voxels.

Estimation accuracy – logarithmic signals, linear model

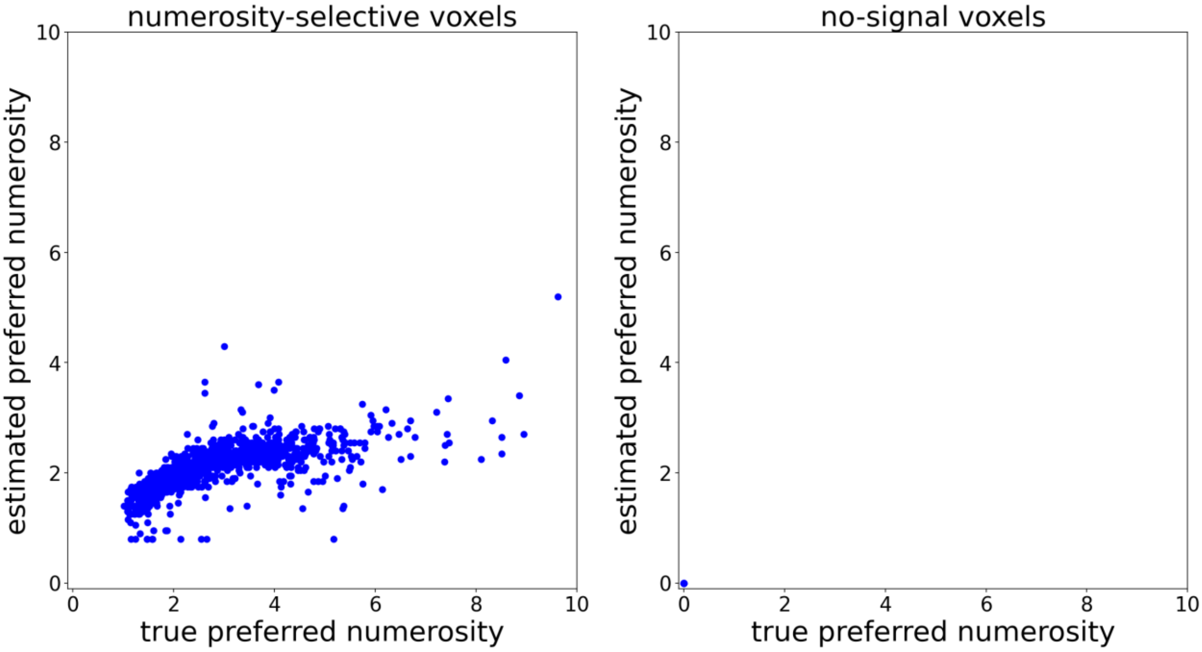


Estimated vs. true preferred numerosity in numerosity-selective and no-signal voxels.

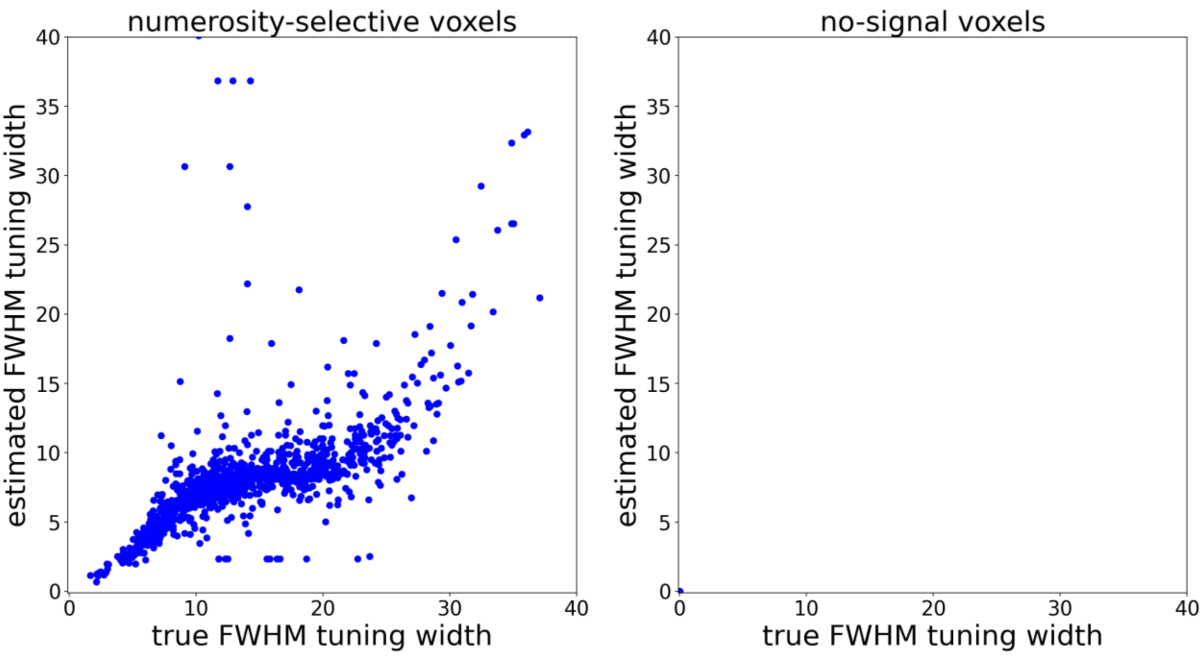


Estimated vs. true FWHM tuning width in numerosity-selective and no-signal voxels.

Estimation accuracy – linear signals, logarithmic model

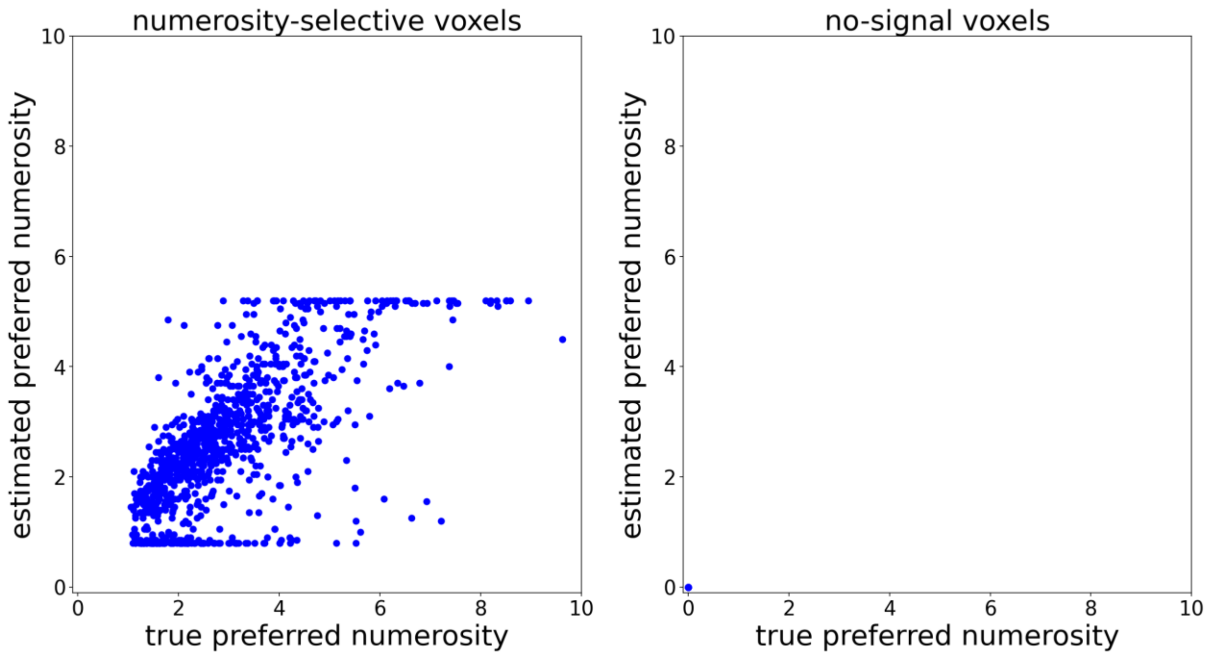


Estimated vs. true preferred numerosity in numerosity-selective and no-signal voxels.

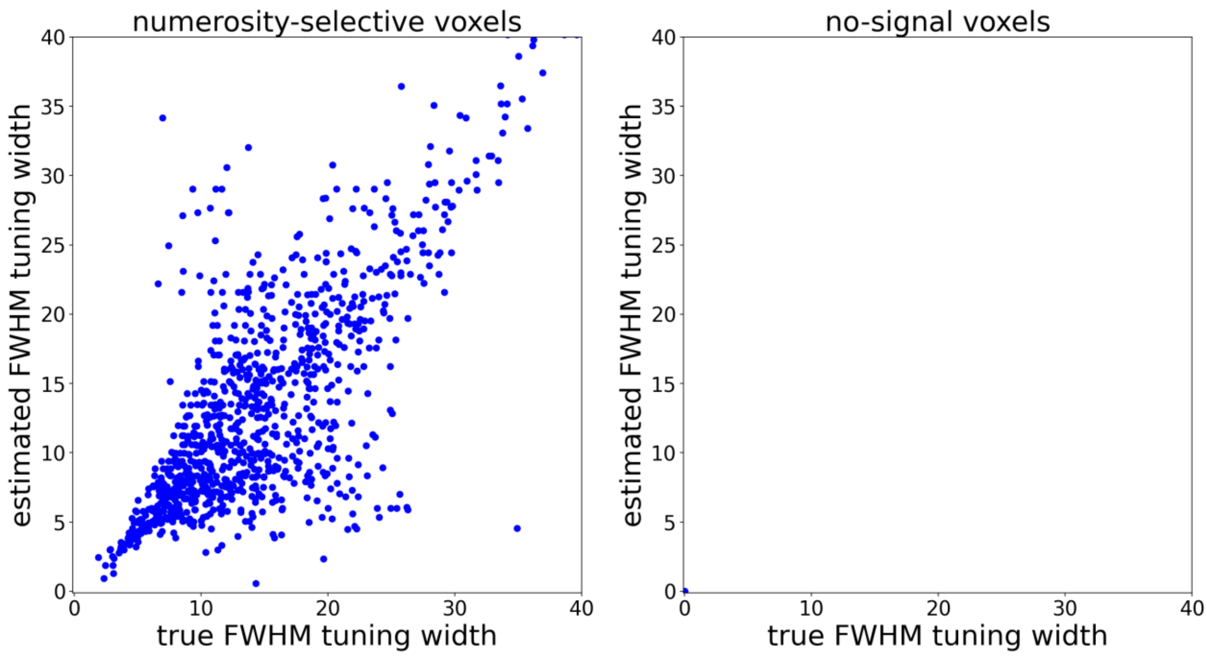


Estimated vs. true FWHM tuning width in numerosity-selective and no-signal voxels.

Estimation accuracy – linear signals, linear model

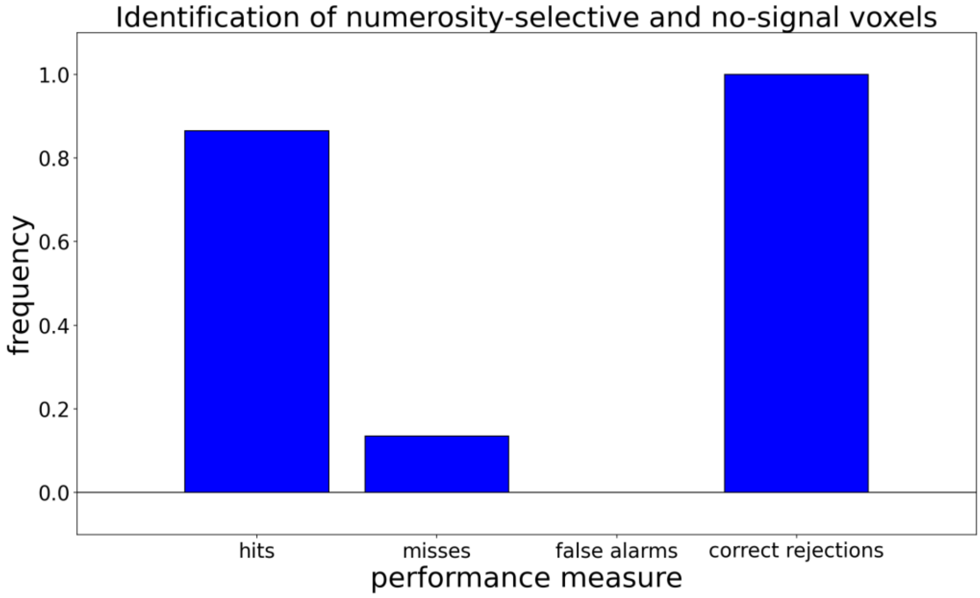


Estimated vs. true preferred numerosity in numerosity-selective and no-signal voxels.



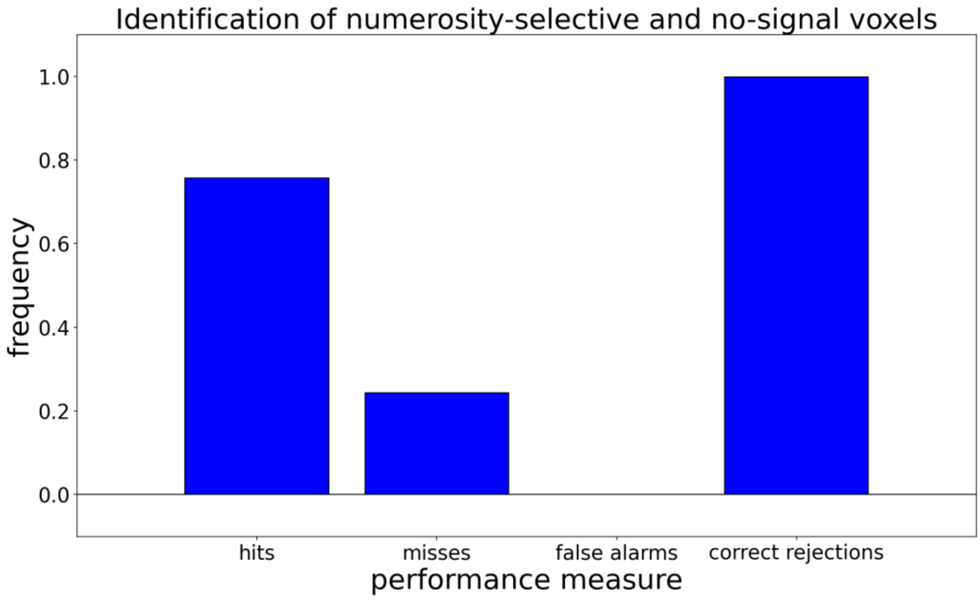
Estimated vs. true FWHM tuning width in numerosity-selective and no-signal voxels.

Voxel identification – logarithmic signals, logarithmic model



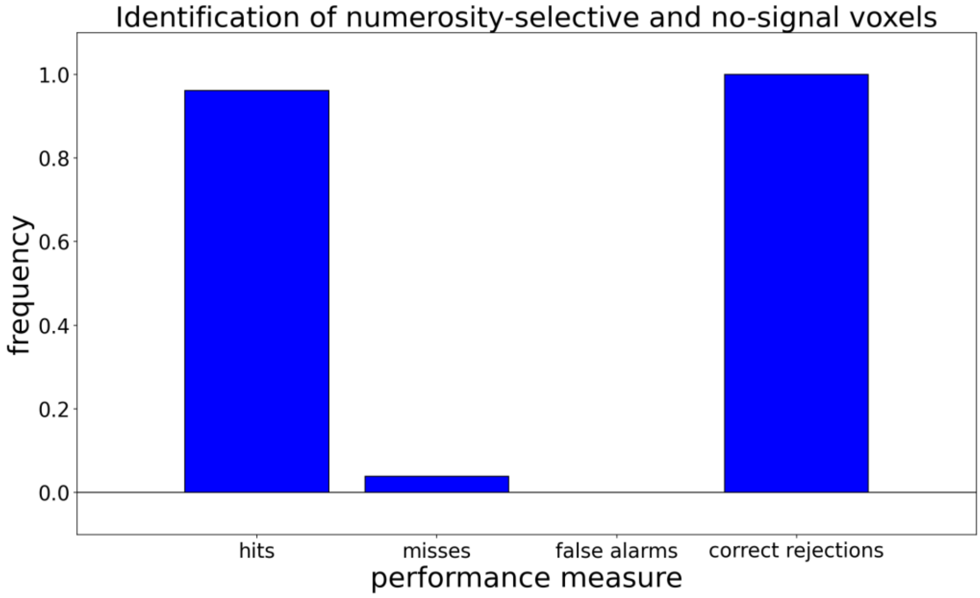
Identification of numerosity-selective voxels as responsive to numerosity (beta > 0; 1 ≤ mu ≤ 5; $p < 0.05$, Bonferroni-corrected; “hits”, rather than “misses”) and identification of no-signal voxels as not responsive to numerosity (“correct rejections”, rather than “false alarms”). This demonstrates that the technique has high sensitivity and specificity.

Voxel identification – logarithmic signals, linear model



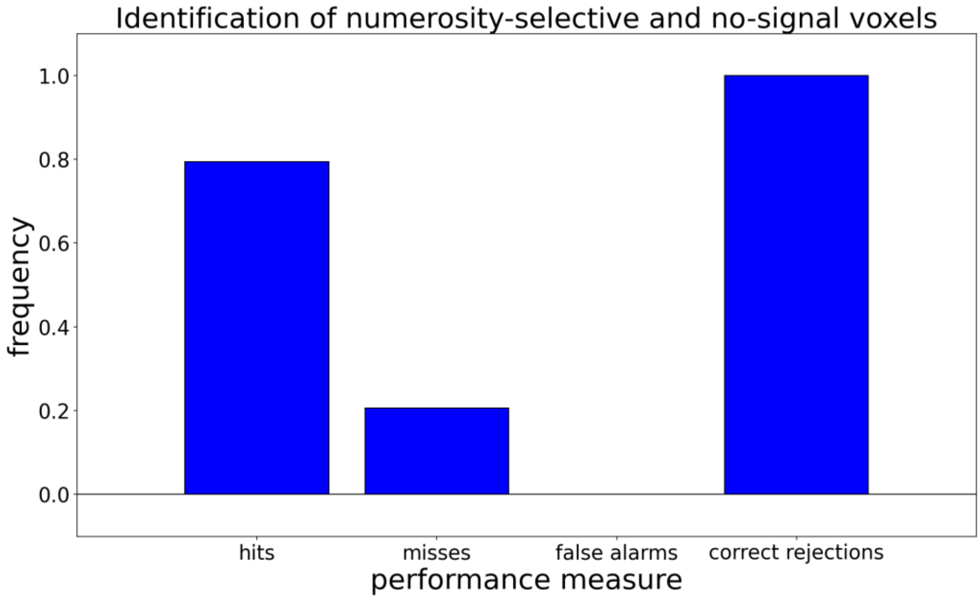
Identification of numerosity-selective voxels as responsive to numerosity (beta > 0; 1 ≤ mu ≤ 5; $p < 0.05$, Bonferroni-corrected; “hits”, rather than “misses”) and identification of no-signal voxels as not responsive to numerosity (“correct rejections”, rather than “false alarms”). This demonstrates that linear tuning models have the same specificity, but lower sensitivity than logarithmic tuning models when signals are characterized by logarithmic tuning functions.

Voxel identification – linear signals, logarithmic model



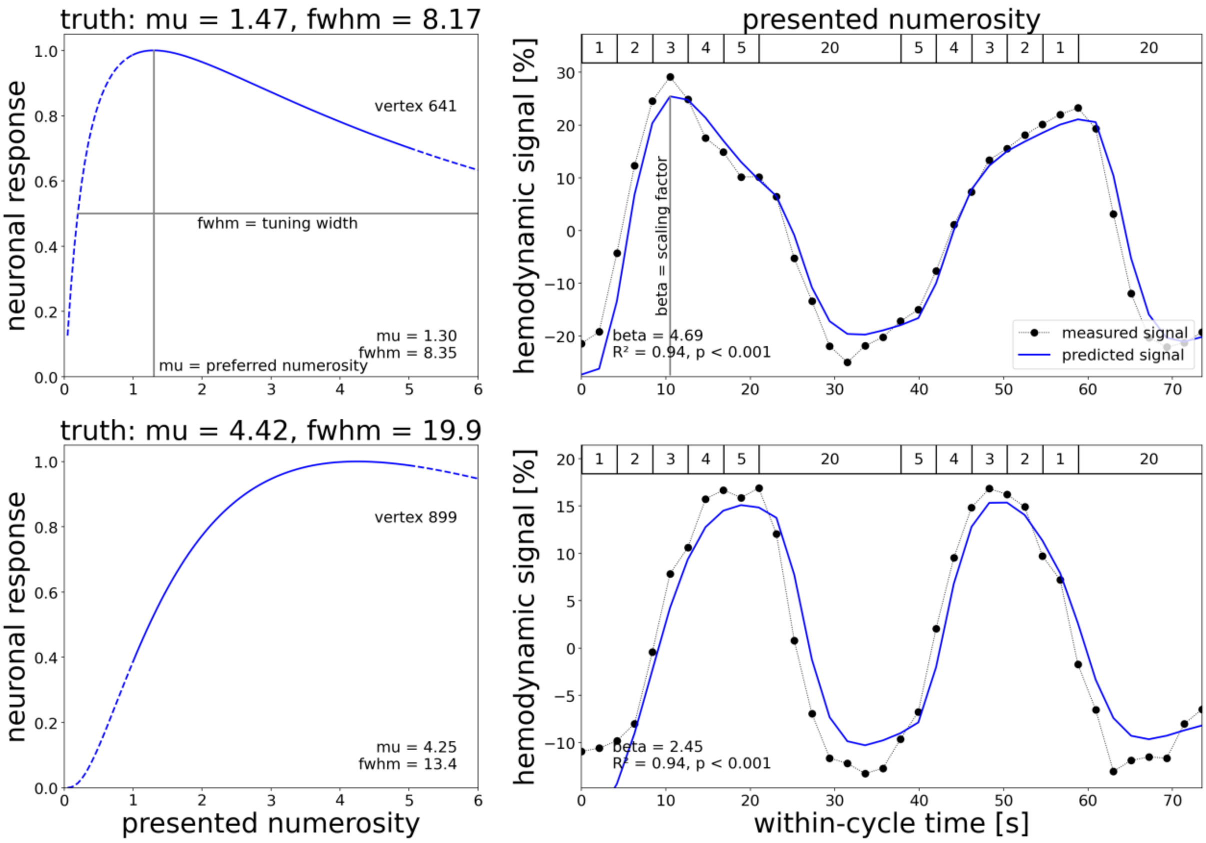
Identification of numerosity-selective voxels as responsive to numerosity (beta > 0; 1 ≤ mu ≤ 5; $p < 0.05$, Bonferroni-corrected; "hits", rather than "misses") and identification of no-signal voxels as not responsive to numerosity ("correct rejections", rather than "false alarms"). This demonstrates that the technique has high sensitivity and specificity.

Voxel identification – linear signals, linear model

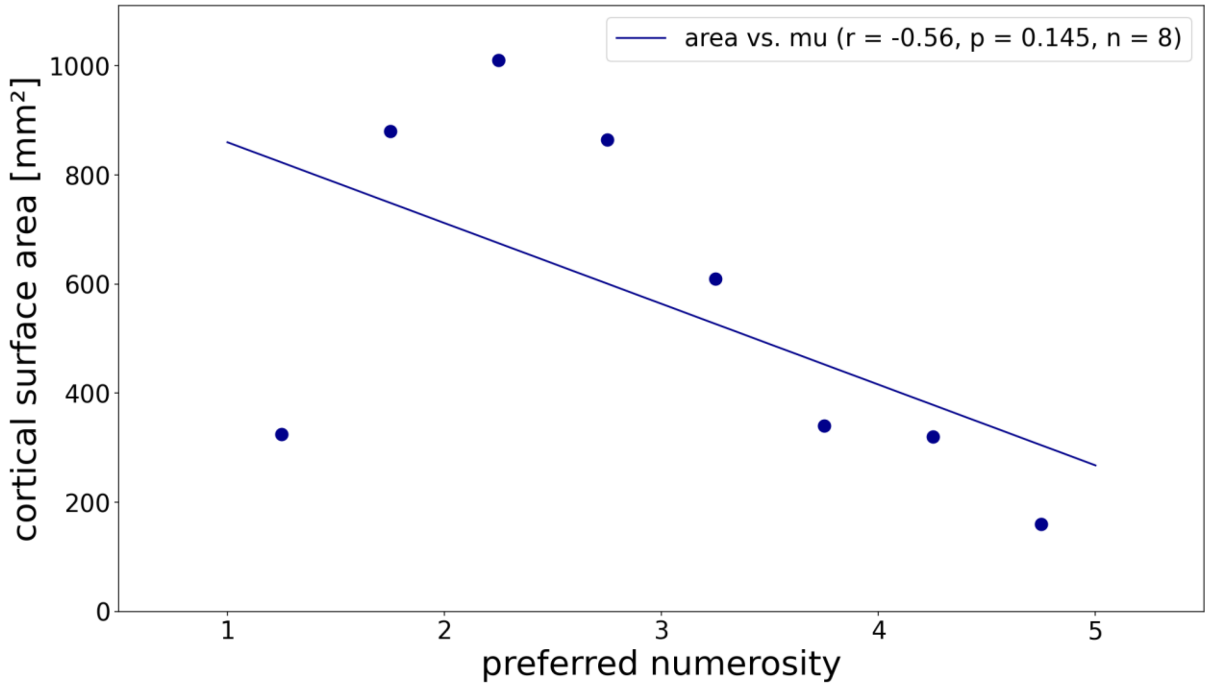


Identification of numerosity-selective voxels as responsive to numerosity (beta > 0; 1 ≤ mu ≤ 5; $p < 0.05$, Bonferroni-corrected; "hits", rather than "misses") and identification of no-signal voxels as not responsive to numerosity ("correct rejections", rather than "false alarms"). This demonstrates linear tuning models have the same specificity, but lower sensitivity than logarithmic tuning models when signals are characterized by linear tuning functions.

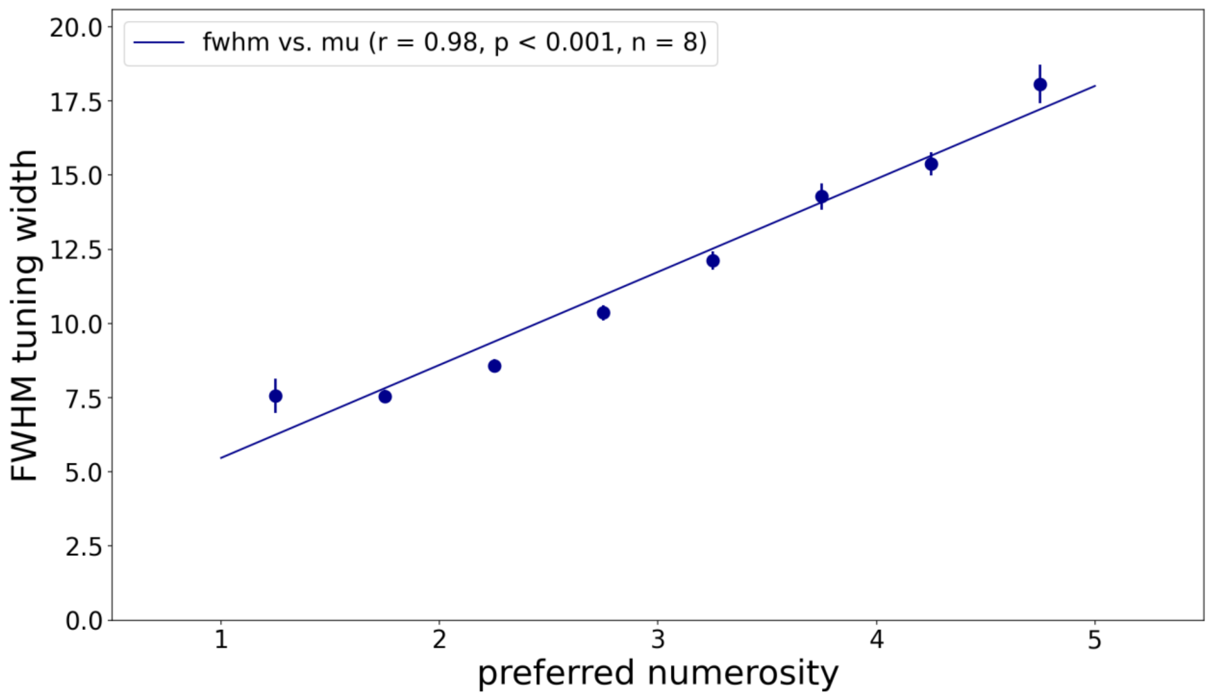
Figures analogous to manuscript – logarithmic signals, logarithmic model



Demo figure corresponding to Figure 2a-d (and Supplementary Figures S1).



Demo figure corresponding to Figure 5a (and Supplementary Figures S5).



Demo figure corresponding to Figure 5c (and Supplementary Figures S6).