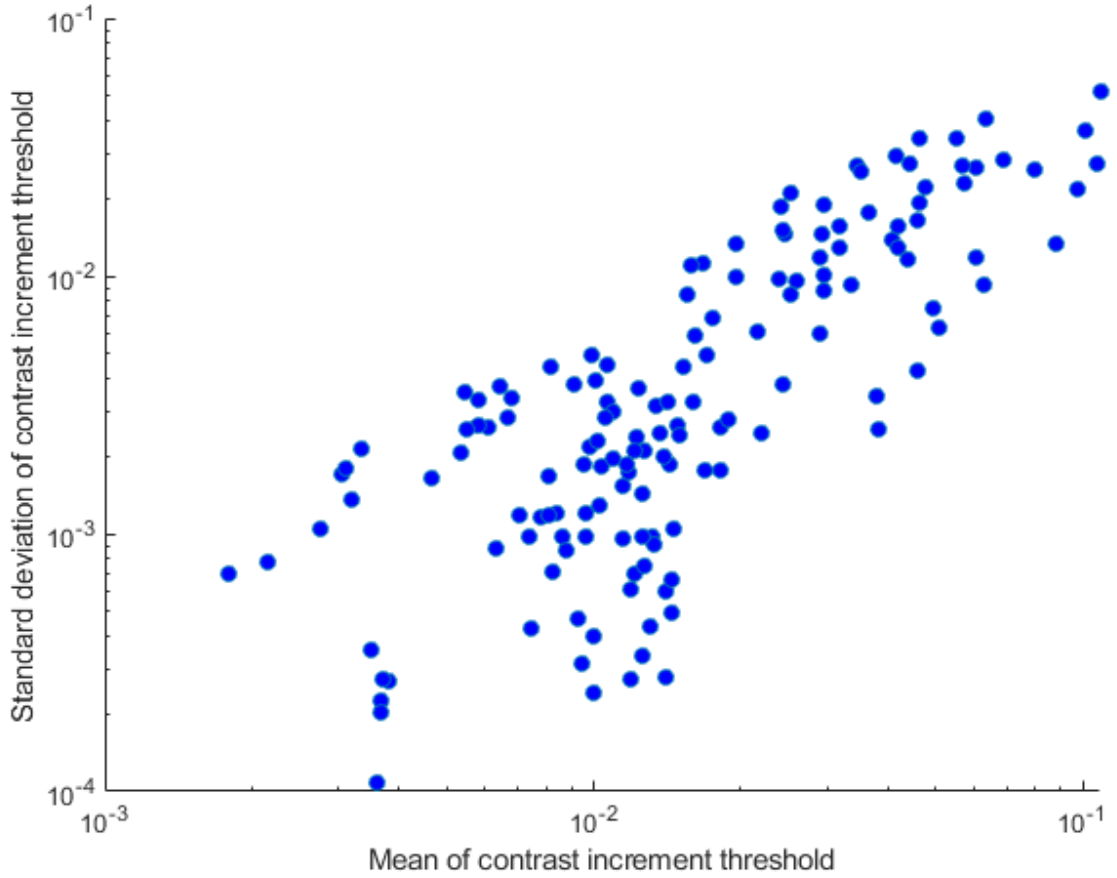
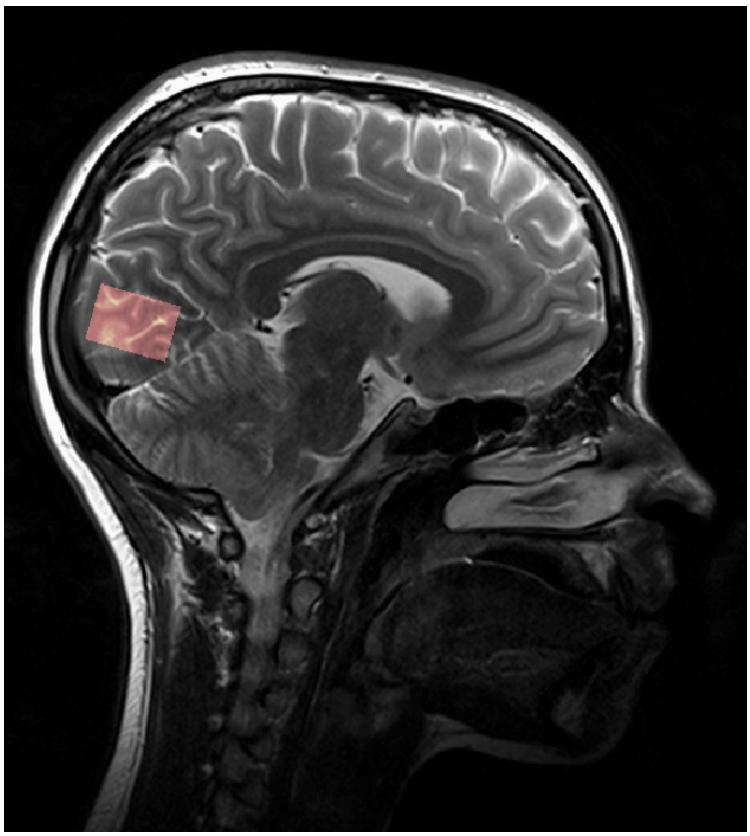
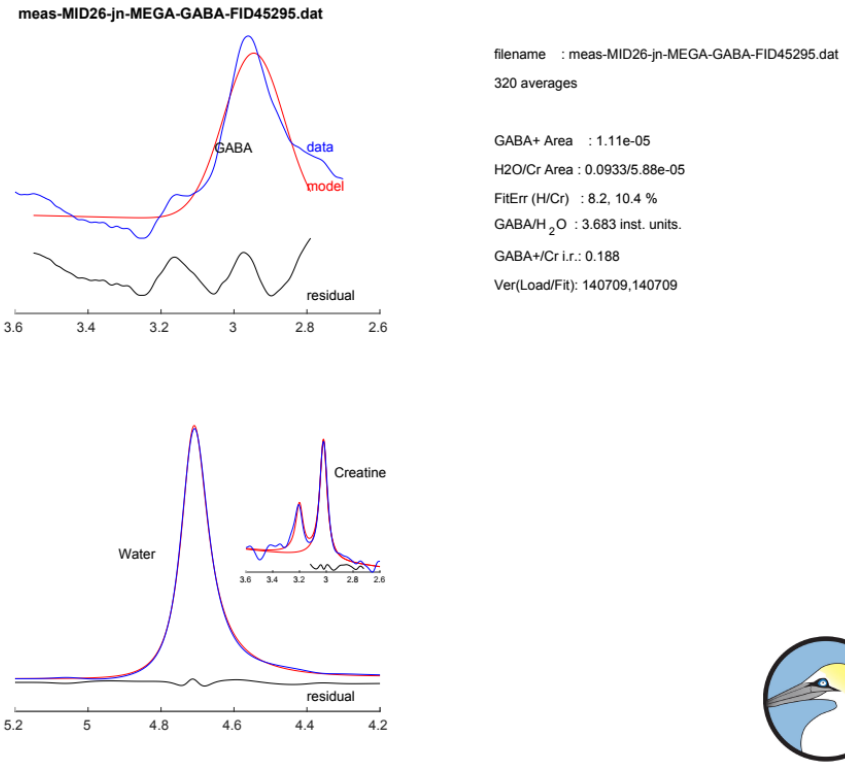


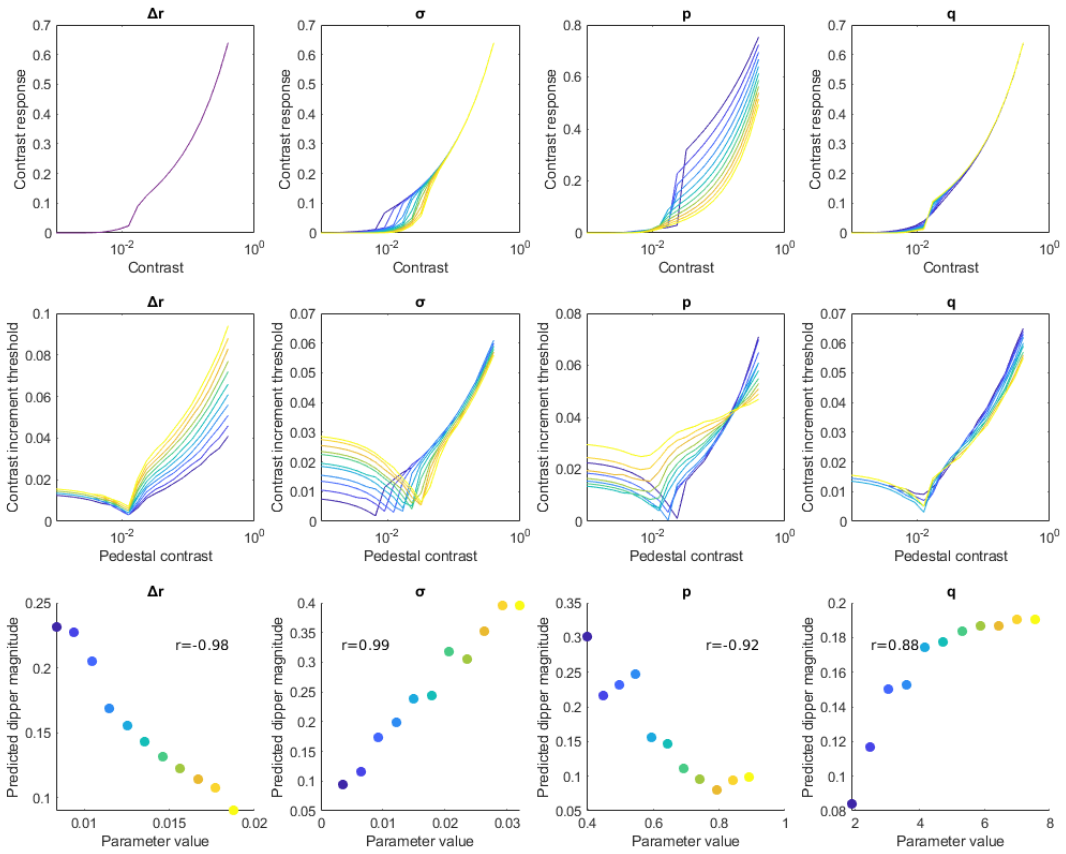
Supplementary Figure 1. Standard deviation of contrast increment thresholds scales with the mean of the threshold.



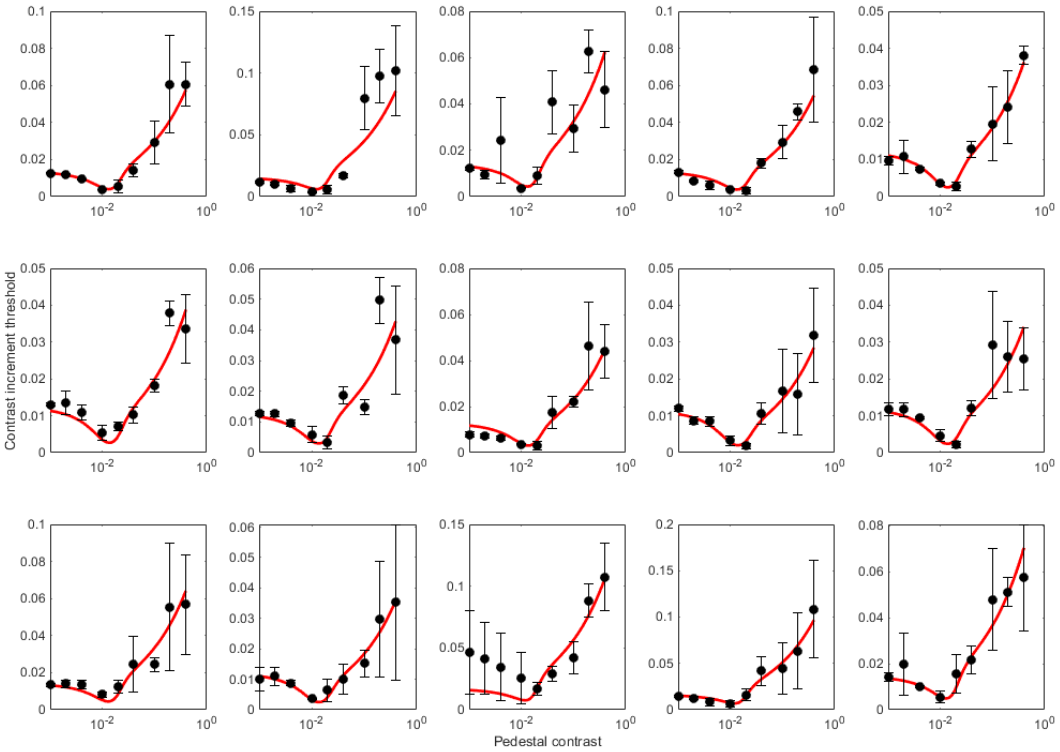
Supplementary Figure 2. Example of MRS voxel (pink) placement in a representative subject, overlaid on the sagittal localizer image.



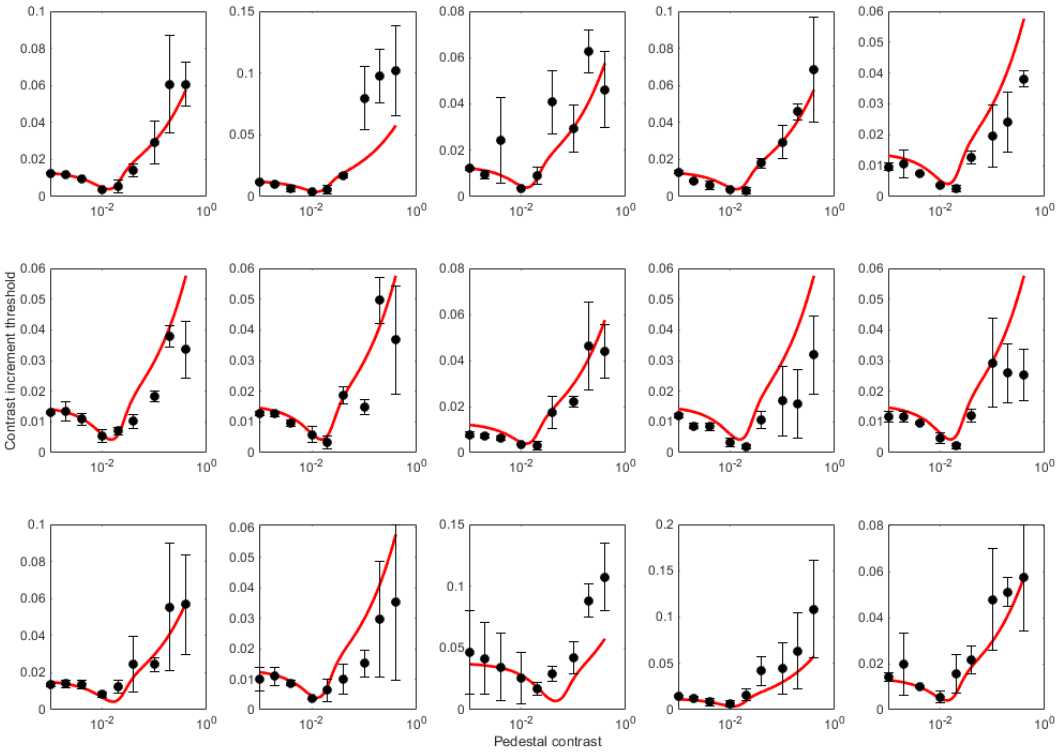
Supplementary Figure 3. Output of Gannet toolbox analysis of MRS spectra acquired from voxel and subject shown in supplementary figure 1.



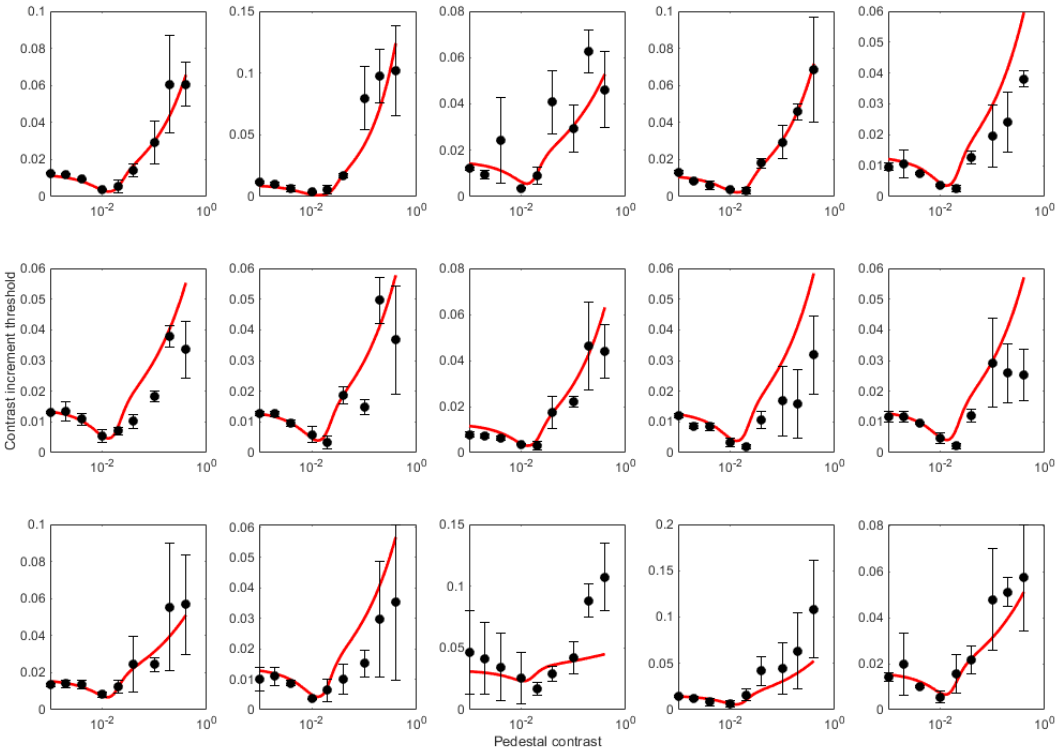
Supplementary Figure 4. Effect of varying CRF model parameter values (*Δr* , *σ*, *p*, *q)* on shape of contrast-response functions and corresponding dipper functions. **Top row:** Predicted contrast response as a function of pedestal contrast. Each panel represents the range of contrast-response functions obtained by varying the parameter indicated above the panel over a +/-50% range (for q: +/-100%) around the fitted parameter value (derived from fitting mean dipper with Wilson-Cowan model: *Δr*=0.0125, *σ=0.*0107, *p=0.*5932, *q*=3.7854), while holding the remaining parameters fixed. Yellow hues indicate higher parameter values, blue hues lower values. Note that the criterion *Δr* does not affect the shape of the contrast-response function. **Middle row:** Predicted dipper functions (contrast increment threshold as a function of pedestal contrast). Each panel shows the range of dipper functions for the same range of parameter values as in the corresponding panel in the top row. **Bottom row:** Predicted dipper magnitude as a function of parameter value. Each data point corresponds to the dipper function with the same colour in the corresponding panel in the middle row. r, Pearson correlation between parameter and predicted dipper magnitude.



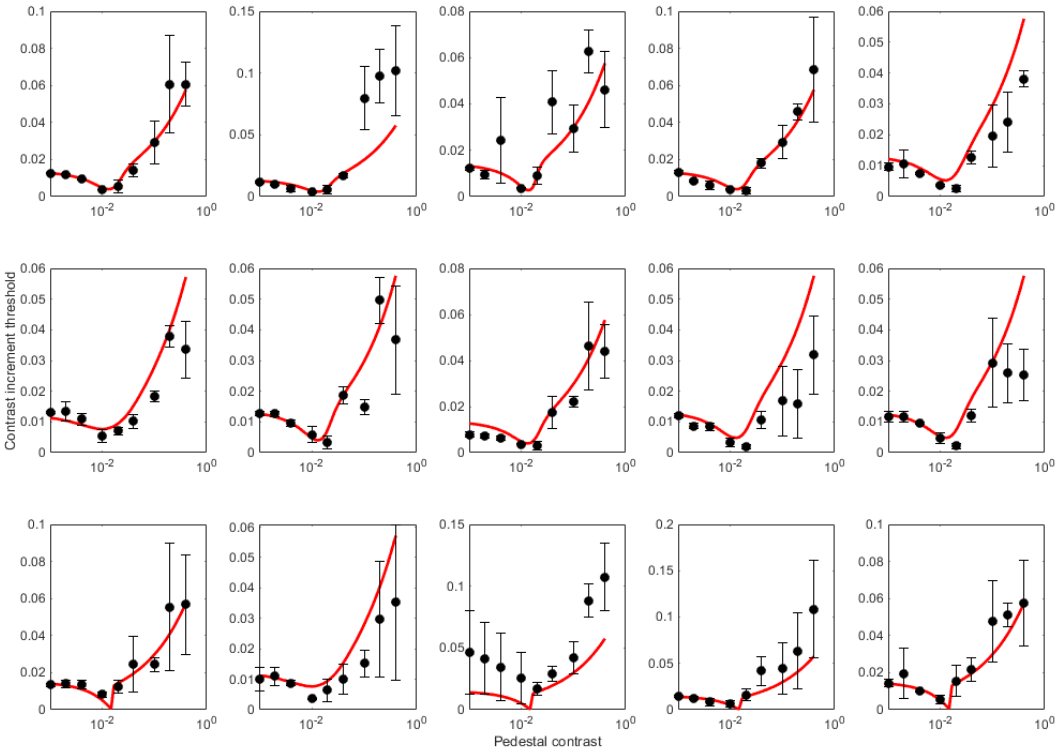
Supplementary Figure 5. Individual dipper functions fitted with CRF model, with *Δr* (criterion) as free parameter. Fixed parameters (derived by fitting model with all parameters to mean dipper function): *a*=1, *σ=0*.0152, *p=0*.5019, *q*=4.6572. Black markers, contrast increment threshold (error bars: standard deviation). Red curves, model fitted to individual data points. Initial parameters set by fitting to mean dipper function (averaged across subjects). Each panel shows data from one subject. Data from subject 13 (bottom row, centre panel) was discarded from the group analysis (see Methods).



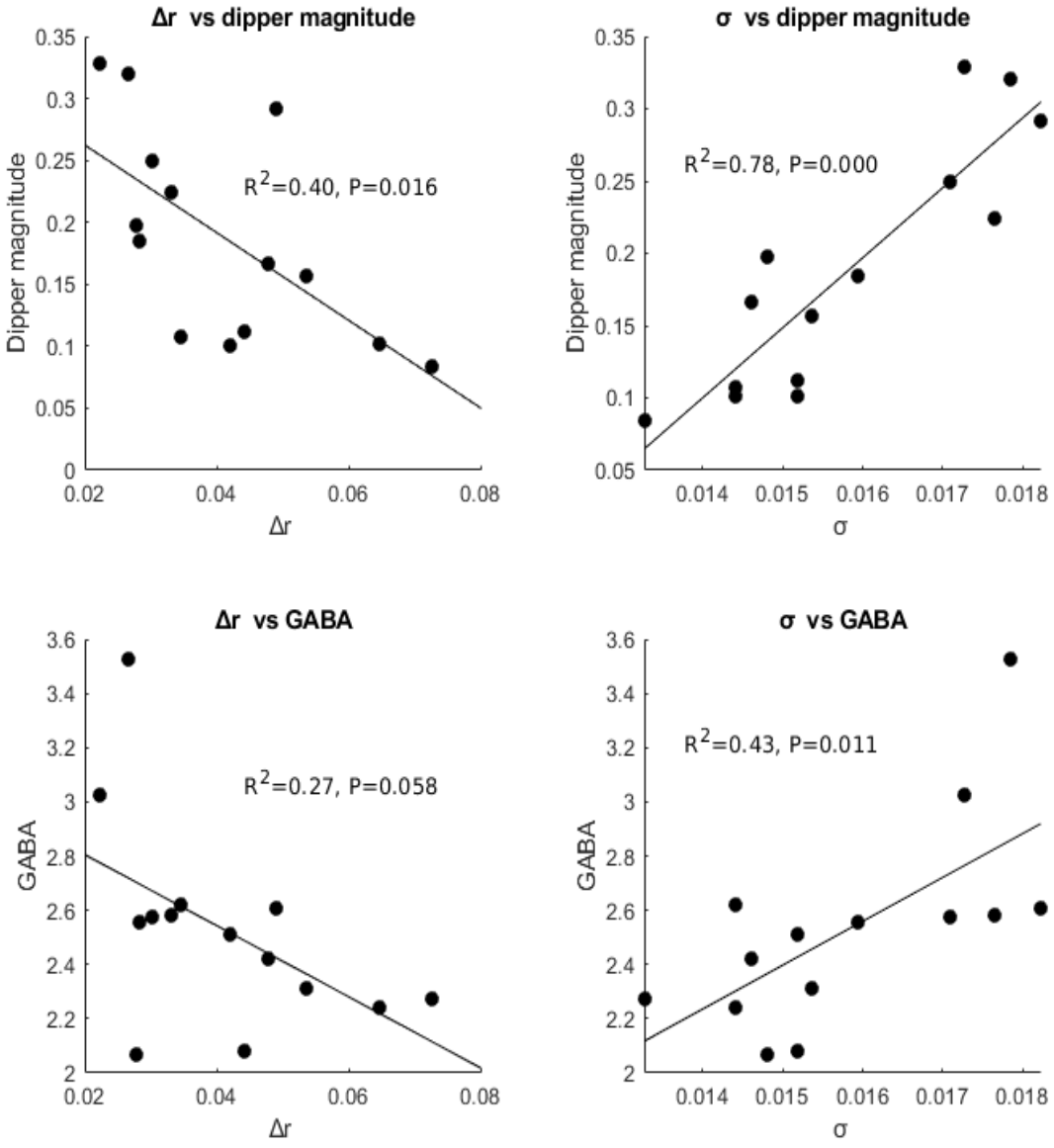
Supplementary Figure 6. Individual dipper functions fitted with CRF model, with σ as free parameter. Fixed parameters (derived by fitting model with all parameters to mean dipper function): a=1, Δr=0.0441, p=0.5019, q=4.6572. Data and symbols as in Supplementary Figure 5.



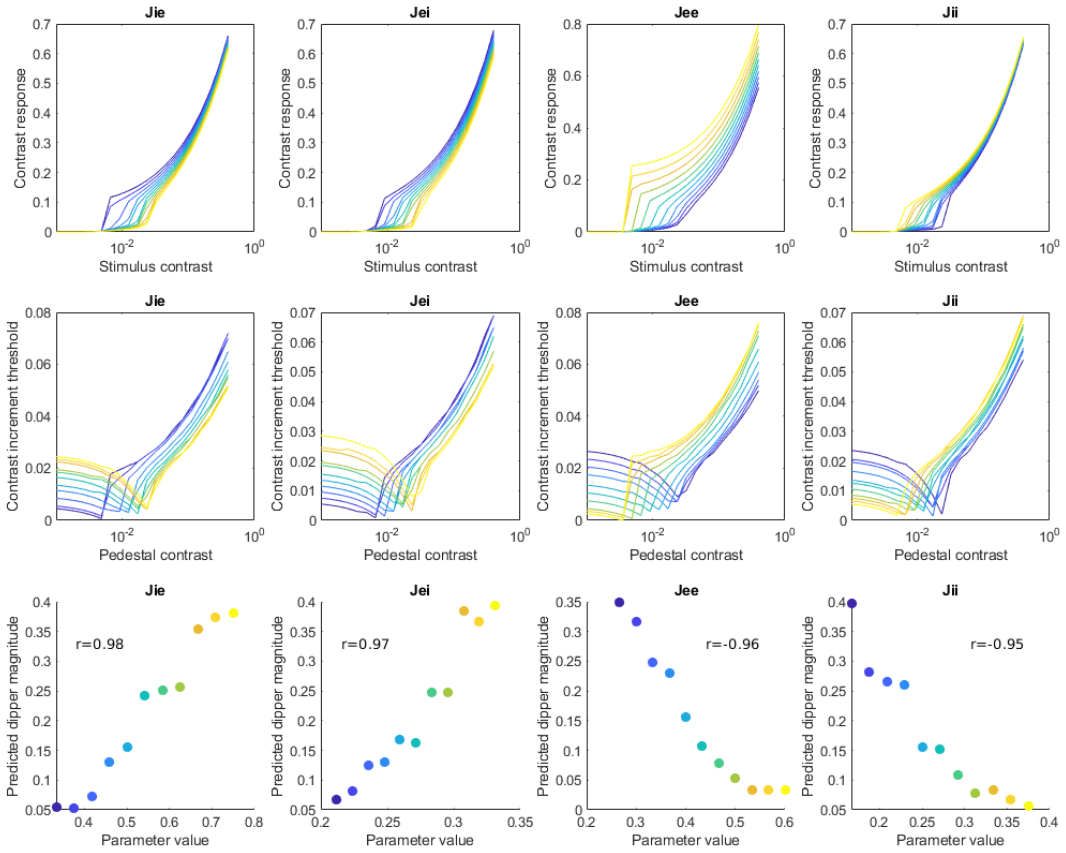
Supplementary Figure 7. Individual dipper functions fitted with CRF model, with *p* as free parameter. Fixed parameters (derived by fitting model with all parameters to mean dipper function): *a*=1, *Δr*=0.0441, *σ=0*.0152, *q*=4.6572. Data and symbols as in Supplementary Figure 5.



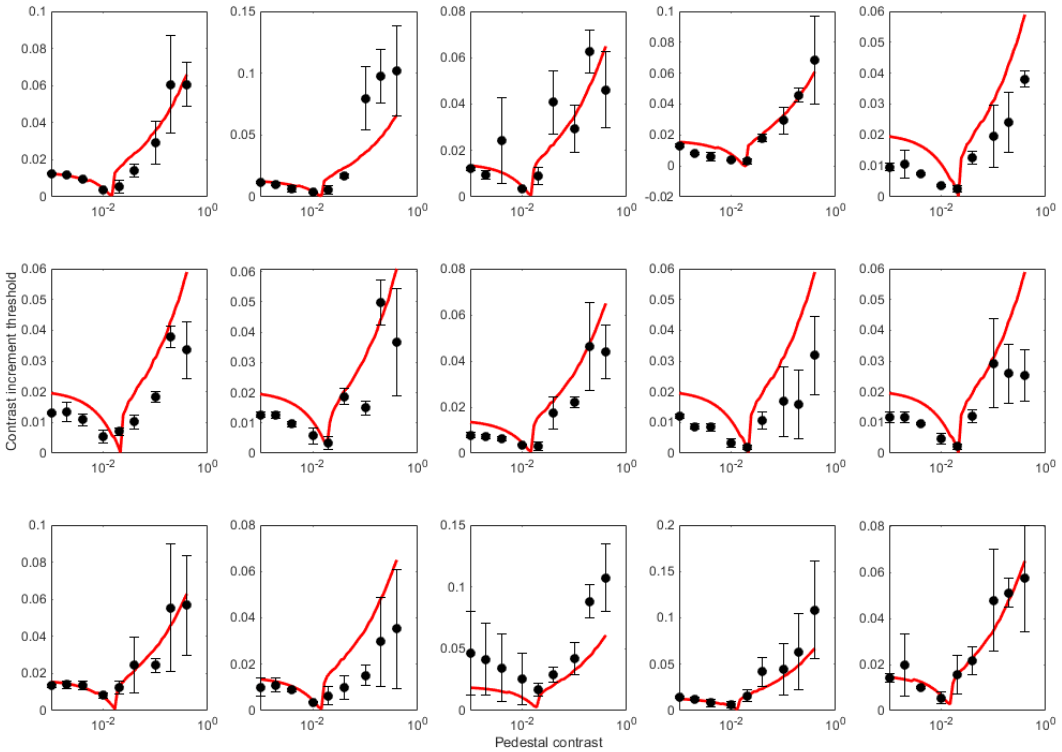
Supplementary Figure 8. Individual dipper functions fitted with CRF model, with *q* as free parameter. Fixed parameters (derived by fitting model with all parameters to mean dipper function): a=1, Δr=0.0441, σ=0.0152, p=0.5019. Data and symbols as in Supplementary Figure 5.



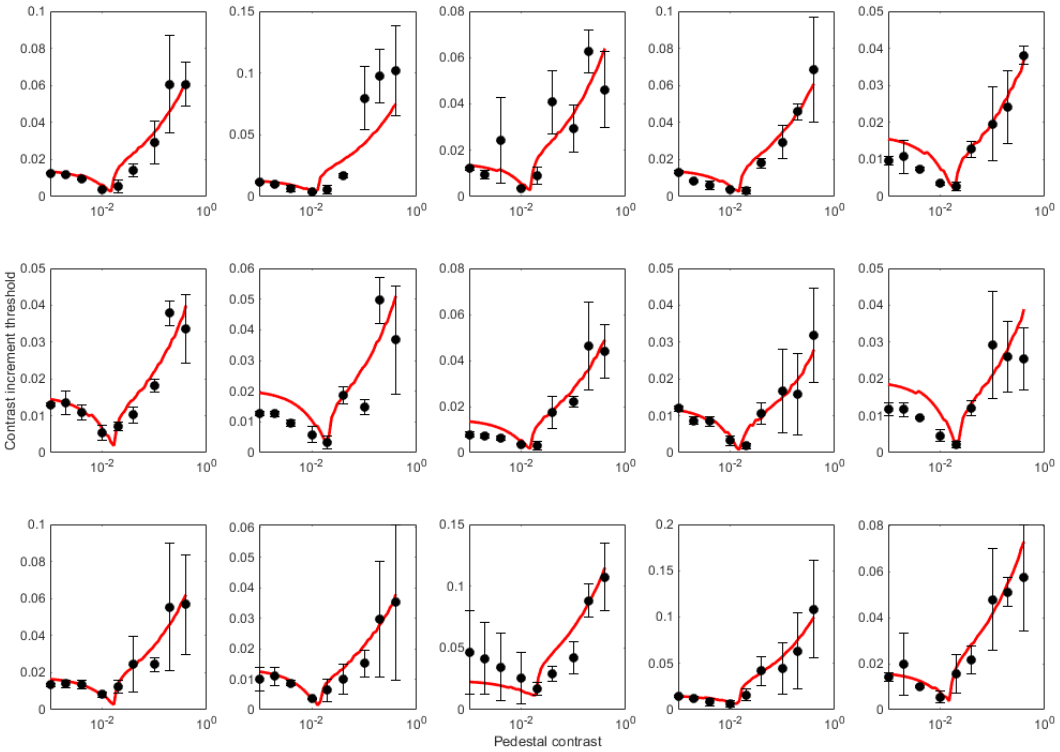
Supplementary Figure 9. CRF model parameters *Δr* and *σ* from the fits shown in supplementary figures 5-6 plotted against dipper magnitude and GABA. Solid lines, least squares regression fits. P-values shown are uncorrected for multiple comparisons (corresponding corrected values are 0.031, 0.0004, 0.12, and 0.043).



Supplementary Figure 10. Effect of varying Wilson-Cowan model parameter values (J_{ie}, J_{ei}, J_{ee}, J_{ii}) on shape of contrast-response functions and corresponding dipper functions. **Top row:** Predicted contrast response as a function of pedestal contrast. Each panel represents the range of contrast-response functions obtained by varying the parameter indicated above the panel over a +/-50% range (for q: +/-100%) around the fitted parameter value (derived from fitting mean dipper with Wilson-Cowan model: Δr=0.0125, σ=0.0107, p=0.5932, q=3.7854, , J_{ie}=0.5, J_{ei}=0.2649, J_{ee}=0.4, J_{ii}=0.25), while holding the remaining parameters fixed. Yellow hues indicate higher parameter values, blue hues lower values. **Middle row:** Predicted dipper functions (contrast increment threshold as a function of pedestal contrast). Each panel shows the range of dipper functions for the same range of parameter values as in the corresponding panel in the top row. **Bottom row:** Predicted dipper magnitude as a function of parameter value. Each data point corresponds to the dipper function with the same colour in the corresponding panel in the middle row. r, Pearson correlation coefficient.



Supplementary Figure 11. Individual dipper functions fitted with Wilson-Cowan model, with J_{ei} as free parameter. Fixed parameters (derived by fitting model with all parameters to mean dipper function): a=1, Δr=0.0125, σ=0.0107, p=0.5932, q=3.7854, J_{ie}=0.5, J_{ee}=0.4, J_{ii}=0.25.Data and symbols as in Supplementary Figure 5.



Supplementary Figure 12. Individual dipper functions fitted with Wilson-Cowan model, with J_{ei} and Δr as free parameters. Fixed parameters (derived by fitting model with all parameters to mean dipper function): a=1, σ=0.0107, p=0.5932, q=3.7854, J_{ie}=0.5, J_{ee}=0.4, J_{ii}=0.25. Data and symbols as in Supplementary Figure 5.