

# Optimal Parameters

**TR** = 1-2s. Shorter TR will have more high-frequency motion (likely breathing-related) that can now be seen and will also require a smaller flip angle. You get more data, better temporal resolution, and better estimation of HRF.

**TE** = 30-35ms. If you are focusing on subcortical structures or OFC/MPFC, consider using a shorter TE (e.g., 30 ms) to reduce susceptibility artifact. Long TE increases BOLD contrast, but decreases overall signal level and increases signal dropout in areas of B0 inhomogeneity. There is no best TE value, and researchers also don't seem to converge on a specific value. Depending on the lab and researchers, there seems to be a fairly even sampling of TE values between 30 and 35ms. I have previously used 35ms. Kalanit's lab uses 30ms. Again, those two values seem equally used in the literature. I might want to switch to a TE of 30ms to deal with inhomogeneities when imaging the temporal lobe near the ear canal.

**Voxel size** = 3mm, can possibly use 2.5mm if you can manage to keep Grappa off with an SMS of 2 and still get slice coverage of all regions you are interested in. Never use 2mm or smaller voxels; you lose way too much signal. A smaller voxel size will likely increase accuracy of MVPC and RSA. Kalanit's lab uses 2.4mm voxels.

**SMS** = 2 is best. 4 is okay, but it comes at a noticeable cost.

**GRAPPA** = Keep it off. Cost is way too great (worse than SMS 4).

**Fat Suppression** = Keep it on.

**Flip Angle** = Calculate using Ernst angle. For 1s TR and T1 of 1500ms, the optimal flip angle is 59 degrees. If anything, err on the side of a smaller flip angle.

**Phase-encoding direction** = Blip up / blip down is useful. Either collect a short reverse direction scan at the start (only need a few measurements, not a full scan length) or alternate directions throughout all the runs. Use A → P phase encoding direction. HCP uses L → R, but they do not recommend others use this.

**T1 relaxation time** (for Ernst angle calculation) = 1300-1800 ms, but maybe < 1000 ms in subcortical structures; 1500 ms is a happy medium; Gomez finds 1400-1600 (mean 1450?) for pFus-faces and about 1450-1650 (mean 1525?) for CoS-places