Figure S1. Simulation of effects of the slice excitation pulse on the MP saturation in neighboring slices as function of T_2. Considered are the four equally spaced slice excitations one to four slices removed from the measurement slice (Δ=1 to 4). A small but significant effect is seen that is strongest in the nearest slice and diminishes quickly with increasing separation. The slices had a 5.4 mm center-to-center spacing, and a 2 mm thickness, resulting in 3.7 kHz frequency offset between slices. Some flexibility exists in minimizing these effects by judicially choosing slice selection parameters; in addition, since the same saturation effects are present in the reference scans without MT pulses, to first order approximation the small additional saturation from the excitation pulses will cancel out.
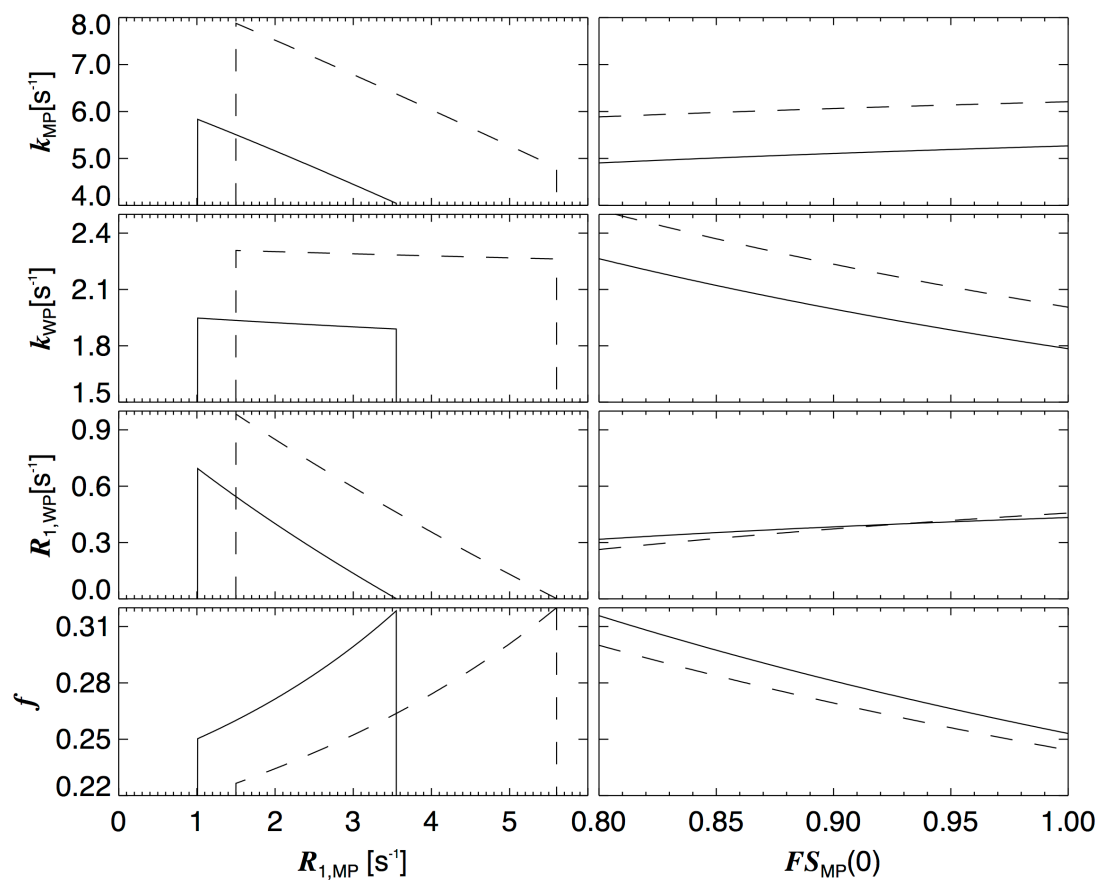
Figure S2. Simulated dependence of the extracted parameters (approach 2) on values assumed for $R_{1,MP}$ and $FS_{MP}(0)$, based on experimentally derived values for a, b, λ_1 and λ_2 (Eq. [1]). The dashed lines are for 3 T data, the solid lines for 7 T. Actual (experimental) values were: $R_{1,MP}=$ 4.0 s^{-1}, $FS_{MP}(0)=0.88$ for 3 T and $R_{1,MP}=$ 2.05 s^{-1}, $FS_{MP}(0)=0.93$ for 7 T.