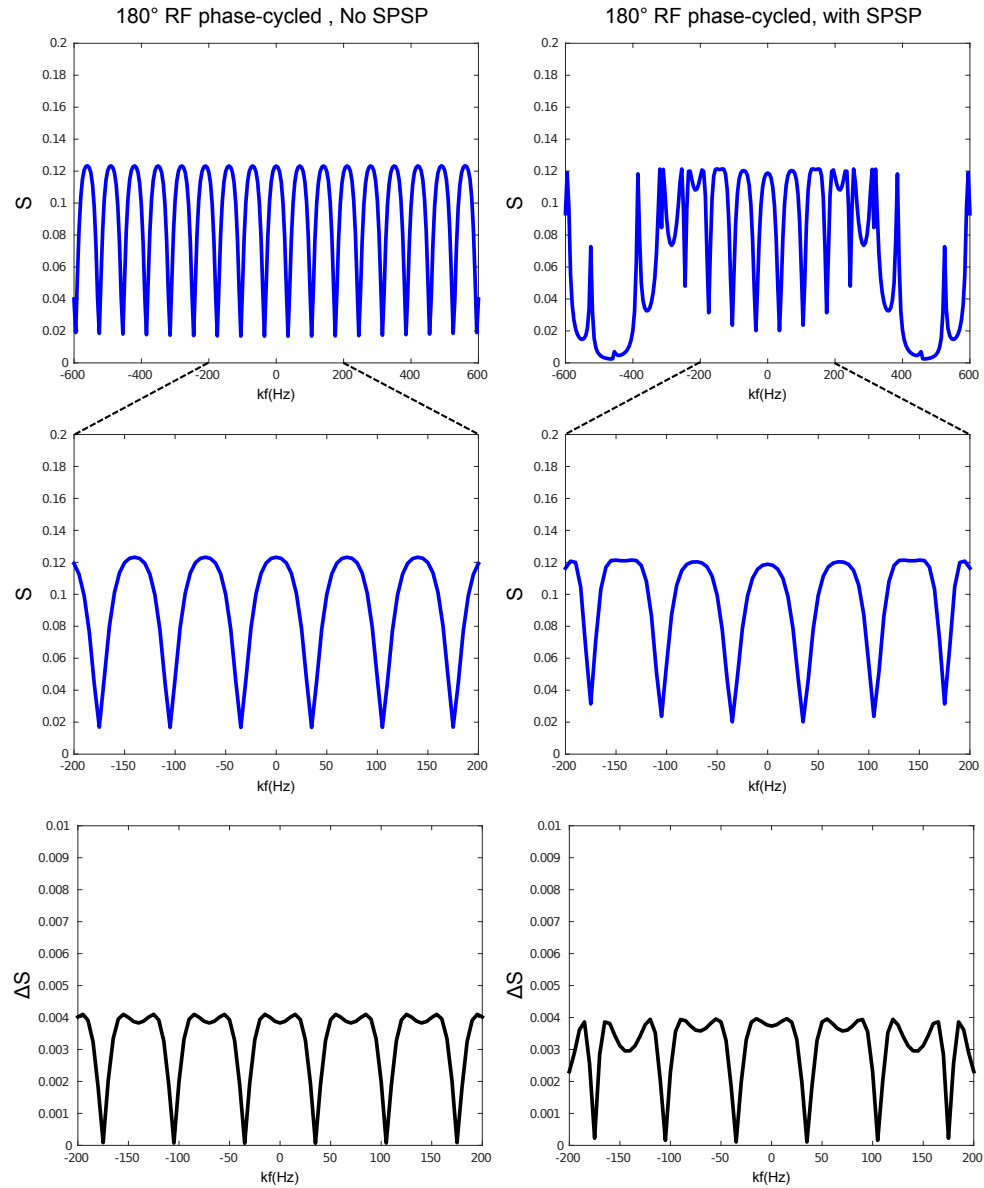


## List of Supporting Figures

- 1 Simulated signal vs. off-resonance frequency profiles (top and middle) and contrast vs. off-resonance frequency profiles (bottom) for  $180^\circ$  RF phase-cycled alt-SSFP without (left) and with (right) the SPSP RF pulse, with the same TR. The contrast vs. off-resonance profiles were computed from two different  $T_2$  values differed by 4 ms to simulate BOLD contrast. The similarity between the contrast vs. off-resonance profiles shows that although the alt-SSFP SPSP spectral profile is erratic outside of  $\pm 200$  Hz, normal pb-SSFP contrast still holds within the  $\pm 200$  Hz range. . . . . 2



SUP. FIG. S 1. Simulated signal vs. off-resonance frequency profiles (top and middle) and contrast vs. off-resonance frequency profiles (bottom) for  $180^\circ$  RF phase-cycled alt-SSFP without (left) and with (right) the SPSP RF pulse, with the same TR. The contrast vs. off-resonance profiles were computed from two different  $T_2$  values differed by 4 ms to simulate BOLD contrast. The similarity between the contrast vs. off-resonance profiles shows that although the alt-SSFP SPSP spectral profile is erratic outside of  $\pm 200$  Hz, normal pb-SSFP contrast still holds within the  $\pm 200$  Hz range.