Supplementary Information

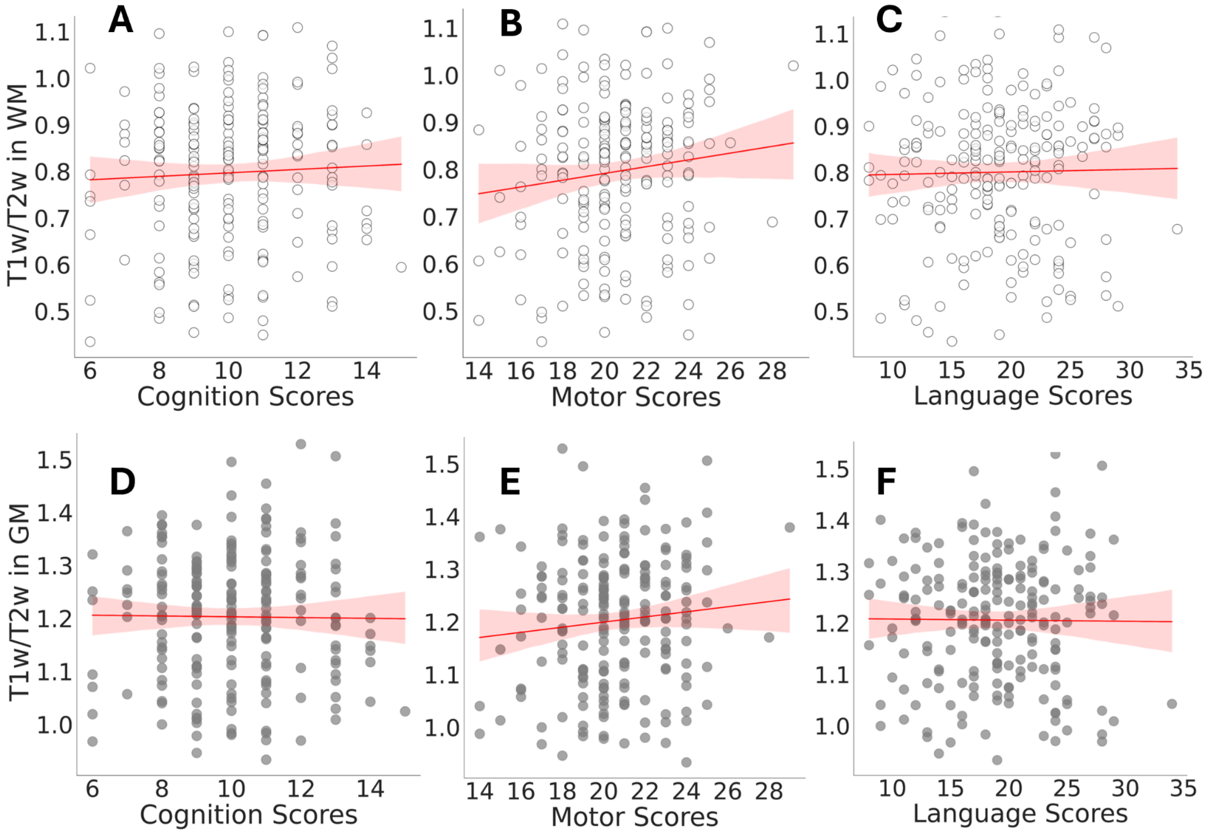

Figure S1: Relationship between T1w/T2w and cognition, motor and language performance. A-C: Relationship between T1w/T2w in the white matter and cognition (A; r^2=0.002, p-value=0.50), motor (B; r^2=0.02, p-value=0.08) and language (C; r^2=0.0003, p-value=0.79) subscales of the Bayley-III. D-F: Relationship between T1w/T2w in the gray matter and cognition (D; r^2=-0.0001, p-value=0.87), motor (E; r^2=0.01, p-value=0.14) and language (F; r^2=0.0008, p-value=0.89) subscales of the Bayley-III.

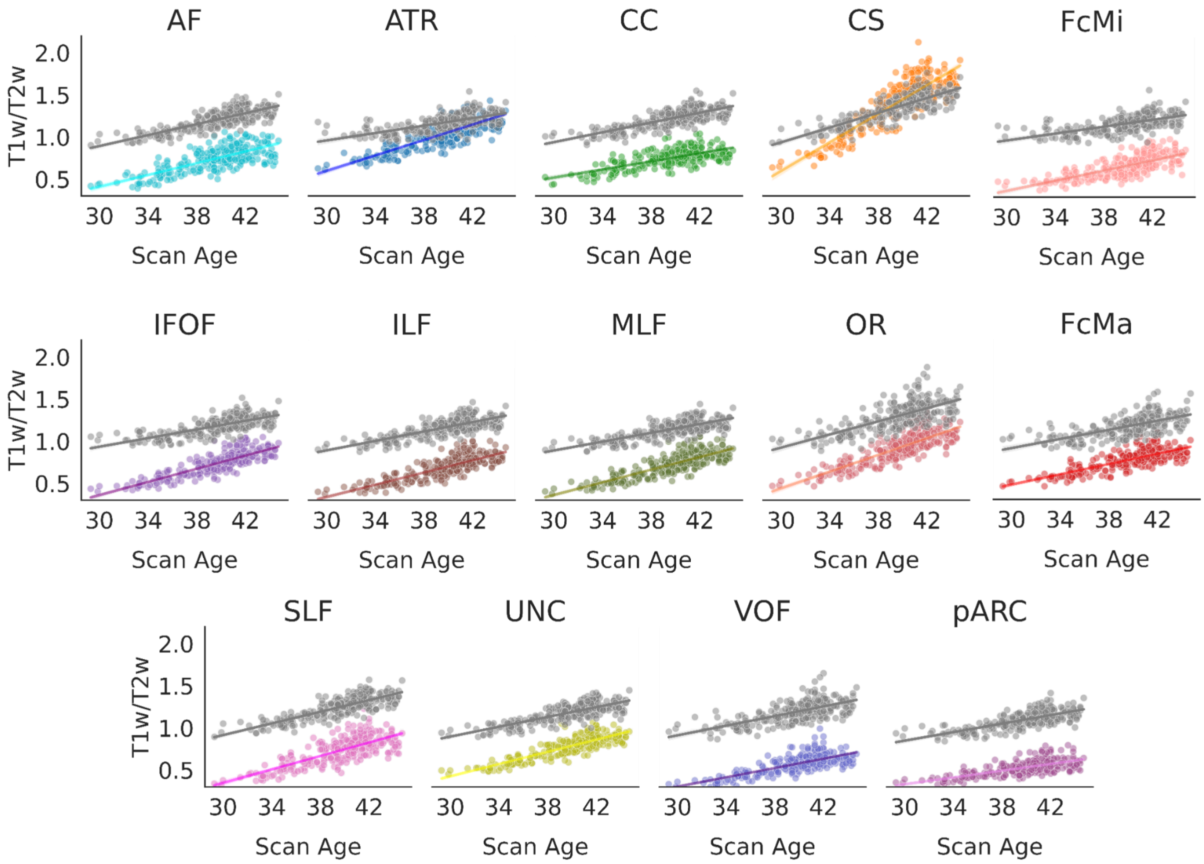

Figure S2: The rate of change of white and gray matter T1w/T2w across all of the bundles (bilateral bundles were averaged across hemispheres) identified with pyBabyAFQ. Gray and colored circles indicate gray and white matter T1w/T2w, respectively, in each subject. The steepness of the lines indicate slopes of T1w/T2w change with increasing age at measurement in each tissue.

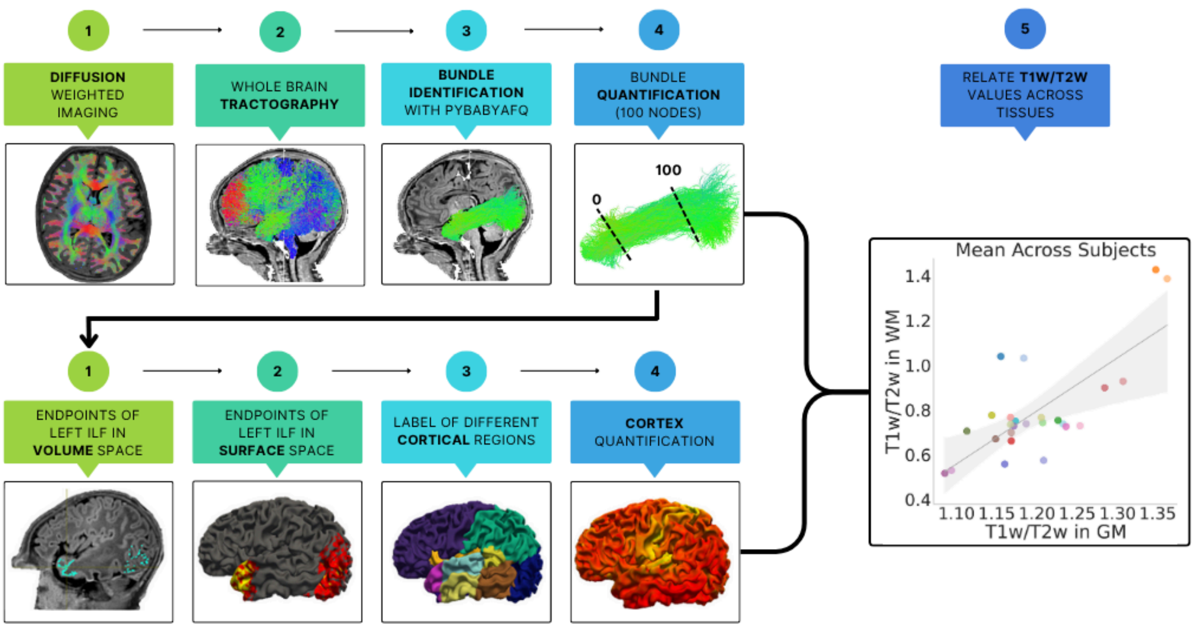

Figure S3: Workflow to obtain white matter (top) and cortical (bottom) T1w/T2w values, using the left inferior longitudinal fasciculus (ILF) as an example. White matter T1w/T2w values: A whole brain tractogram was created from dMRI data (steps 1 and 2). Bundle identification was done with pyBabyAFQ (step 3), which is a software to automatically identify white matter bundles in infant brains. Each bundle was divided into 100 equidistant nodes and T1w/T2w was calculated at each node by taking a weighted average of each streamline's properties at that node (step 4). Gray matter T1w/T2w values: After identifying the endpoints in volume (step 1) and surface space (step 2), two cortical endpoint ROIs were generated from an atlas (step 3) and served as anatomical boundaries to separate terminations at the start and end of cortical-to-cortical bundles. At each termination, a weighted average of T1w/T2w was computed based on endpoint density in each voxel (step 4). Finally, T1w/T2w in gray and white matter were related to each other (step 5).