*Supplementary S10. Movement correction*

Movement in the scanner could influence the diffusion tensor model in such a way that it may attenuate or exaggerate FA values depending on the tissue measured1. Therefore, to rule out possible confounding effects of motion artefacts we have run additional regression analyses with motion parameters as added nuisance regressors. Specifically, we used FSL’s <subject>.eddy\_parameters output file which contains (amongst others) six motion parameters per volume in the diffusion weighted data (62 volumes in this sample). The motion parameters consist of three rotation values in radians (x,y,z) and three translations in millimeters (x,y,z). The groups did not differ in the degree of movement in any of the three translations or of the three rotations (see supplementary S10.1). We have created two absolute cumulative variables by adding the absolute values over the three directions for both translation and rotation values. This resulted in two cumulative variables indicating the degree of rotation or translation per individual during the whole diffusion weighted scan. Subsequently we compared the effect of decline in verbal IQ on FA values after the effects of gender, age and motion (translation and rotation), were regressed out. All the original effects remained significant (p<.03, *uncorrected*), where FA is higher in decline compared to no-decline (see S10.2).

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| Supplementary S10.1. Motion Parameters in VIQ | | | |
| Variable | t | df | Sig |
| TranX | -,011 | 32 | ,991 |
| TranY | ,861 | 32 | ,396 |
| TranZ | ,625 | 32 | ,536 |
| RotX | ,796 | 32 | ,432 |
| RotY | -1,339 | 32 | ,190 |
| RotZ | -,532 | 32 | ,598 |
| Tran = translations; Rot = rotations ; x,y,z = different directions; t = t-statistic; df = degrees of freedom; Sig. = p-value (2-tailed) | | | |

|  |  |  |
| --- | --- | --- |
| Supplemtary S10.2. Motion correction FA in VIQ decline > no decline | | |
| Area | t(df) | Sig |
| ALIC L | -3.0(32) | .005 |
| PLIC L | -3.3(32) | .002 |
| RLIC L  CGC R | -3.8(32)  -2.3(32) | .0005  .030 |
| CGC L  SLF R  SLF L  SFO L | -2.7(32)  -2.8(32)  -3.5(32)  -2.9(32) | .009  .009  .0015  .005 |
| Sig= significant value; ALIC\_L= anterior limb of the internal capsule, left; PLIC\_L= posterior limb of the internal capsule, left; RLIC\_L= rentrolenticular part of the internal capsule, left; CGC\_R; cingulum bundle, around cingulate gyrus, right; CGC\_L= cingulum bundle, around cingulate gyrus, left; SLF\_R= superior longitudinal fasciculus, right; SLF\_L= superior longitudinal fasciculus, left; SFO\_L= superior fronto-occipital gyrus, left; ; df = degrees of freedom | | |

**Reference**

1. Ling J, Merideth F, Caprihan A, Pena A, Teshiba T, Mayer AR. Head injury or head motion? Assessment and quantification of motion artifacts in diffusion tensor imaging studies. *Hum Brain Mapp*. 2012;33(1):50-62. doi:10.1002/hbm.21192.