**SUPPLEMENTARY INFORMATION**

*Neuropsychological Test Scores and DTI data*

Given the strong correlations between LCQ-OTHER scores and CVLT and WAIS-PSI, we decided to examine whether the association between white matter integrity and LCQ-OTHER scores could be fully explained by scores on one single neuropsychological index. We found no significant correlations between any of the lobar ROIs FA and CVLT scores (all *r*s<.56; all *p*s>.01) or WAIS PSI (all *r*s<.26; all *p*s>.05), with the exception of significant correlation between left parietal FA and CVLT-Immediate (*r*=.59, *p*<.0063), as well as CVLT-Short Delay (*r*=.59, *p*<.0063). CVLT and WAIS-PSI did not significantly correlate with Left Frontal FA (all *r*s<.41; all *p*s>.05) or with Left Temporal FA (all *r*s<.55; all *p*s>.01). These results suggest that although processing speed, verbal learning, and verbal memory abilities are highly related with communication abilities, when considered on their own they were not significantly related to white matter integrity of the frontal and temporal lobes.

*Lesion Location and DTI data*

Six participants with TBI for whom LCQ-OTHER data were available had frontal or temporal focal lesions visible on T1 images. In order to further examine whether visible temporal and frontal focal lesions were driving the correlations between temporal and frontal FA and LCQ-OTHER, we re-computed all partial correlations considering the presence of frontal-temporal focal lesions as a dummy covariate. We found that the negative correlation between LCQ-OTHER and left frontal FA remained significant (*r*=–.73; *p*<.001), as did the correlation between LCQ-OTHER and left temporal FA (*r*=–.7; *p*<.0063).

We repeated the same analysis, this time correcting only for focal lesions that were located in the left frontal or temporal lobe (i.e., which were in the proximity of the left frontal or left temporal lobar ROIs; 4 participants.). Again, we found that the negative correlation between LCQ-OTHER and left frontal FA remained significant (*r*=–.69; *p*<.0063), as did the correlation between LCQ-OTHER and left temporal FA (*r*=–.69; *p*<.0063). Indeed, patients with visible fronto-temporal lesions (which are indicated in red in Figure 4B), as a group, did not have lower FA or higher LCQ scores.

In addition, we examined whether the left temporal and frontal ROIs overlapped with focal lesions in the 6 participants who had visible focal lesions. Lesion masks were created to define regions of clearly lesioned matter, and then transformed into 1 mm MNI space using a non-linear transformation. In none of the participants there was overlap between lobar ROIs and lesions masks. This is likely due to the fact that lobar ROIs were relatively restricted, in order to avoid peripheral region with abundance of crossing fibers.

This analysis suggests that the presence of visible focal lesions in the frontal or temporal lobes did not account for the relationship between lobar white matter integrity and communication difficulties, indicating that DAI in the left frontal and temporal lobes is independently related to communication difficulties.

*Relationship between chronicity, LCQ and white matter*

There was no significant correlation between injury chronicity and LCQ-SELF (*r*=–.12, *p>*.05) or LCQ other (*r*=–.17; *p*>.05). Similarly, chronicity did not correlate with FA (–.32<all *r*s<.02; all *p*s>.05 ) or MD values(all *r*s<.37; all *p*s>.05 ) in any of the brain lobes. Lastly, when we recomputed the correlations between LCQ-OTHER and frontal and temporal lobar FA adding chronicity as a covariate, the correlations remained significant (FRONTAL: *r*=–.7; *p*<.0063; TEMPORAL: *r*=–.8; *p*<.0063).

*Relationship between cause of injury, LCQ and white matter*

The correlations between LCQ-OTHER and frontal and temporal lobar FA remained significant when correcting for cause of injury (FRONTAL: *r*=–.69; *p*<.0063; TEMPORAL: *r*=–.66; *p*<.0063).

*Exploratory Analysis on the relationship between LCQ and FA*

Exploratory analysis using LCQ-SELF as the regressor of interest and sex, age and education as covariates revealed no clusters showing lower FA as self reported communication problems increased within the TBI group or within the NC group. Similarly, the use of LCQ-OTHER as the regressor of interest and sex, age and education as covariates resulted in no clusters displaying FA values negatively correlating with LCQ-OTHER scores within the TBI or the NC group (all results are reported for FWE-corrected p-value < .05).

*Mean Diffusivity Analysis Results*

Group comparison revealed that participants with TBI did not have higher MD than NCs. In addition, exploratory analysis examining the relationship between whole-brain MD and LCQ-SELF or LCQ-OTHER revealed no clusters showing higher MD in participants with more communication problems (results are reported for FWE-corrected p-value < .05)

Similarly to FA data, LCQ-OTHER scores were significantly associated with left frontal MD (*r*=.61; *p*<.0063). This time the correlation was positive, indicating that participants with TBI with higher frontal MD (i.e., lower white matter integrity) also had more communication problems. However, LCQ-OTHER scores did not correlate with temporal MD (*r*=.5; *p*>.05) or other lobar MD values (all *r*s<.53, all *p*s>.01). Moreover, LCQ-SELF did not correlate with lobar MD in the TBI group (–.2<all *r*s<.23, all *p*s>.05), or in the NC group (–.05<all *r*s<.26, all *p*s>.05), nor did LCQ-OTHER within the NC group (–.12<all *r*s<.28, all *p*s>.05).