eAppendix 4: Anterior Temporal Lobe Resection Sub-group Analysis

eMethod

To investigate whether the results were affected by the mixed cohort of ATLR and temporal lesionectomies, we repeated our analysis on a cohort of ATLR-only cases. We also removed ATLR cases which did not have a standard ATLR (e.g., abnormal resections). This resulted in 13 (20%) and 6 (10%) cases being removed from the language dominant and non-dominant group, respectively. This resulted in a final cohort of 51 and 57 language dominant and non-dominant ATLR cases, respectively.

eResults

Picture Naming

Language Dominant Hemisphere

Results were slightly different to the main paper. Backwards selection failed to select the best model, likely due to a smaller sample size. The model selected was included the orbital frontal (p = 0.729), inferior frontal (p = 0.579), and middle frontal (p = 0.829) sub-fasciculus of the IFOF, dorsal ($\beta = -3.663$, p < 0.001, 95CI: -4.979:-2.347) and ventral ($\beta = -4.050$, p < 0.001, 95CI: -5.774:-2.325) sub-fasciculus of the AF, epilepsy length at operation (p=0.089), confounds resection volume (p=0.323), and fMRI ($\beta = -0.535$, p = 0.046, 95CI: -1.019:-0.050): $\chi^2(6,16)=97.573$, p < 0.001, adjusted R² = 0.053. This model outperformed a confounds-only model (RFPE= 0.234) and other combinations (see eTable 10, eFigure 1).

Investigating if results from the main paper were still significant, we replicated the model from the main paper. The main results held stable. Surgical damage to the inferior frontal sub-fasciculus of the IFOF ($\beta = -1.493$, p = 0.015, 95CI: -2.627:-0.359) was a significant predictor of picture naming decline at 3 months even when accounting for confounds resection volume (p=0.727) and fMRI (p = 0.513): $\chi 2(1,29)=6.655$, p = 0.010, adjusted R² = 0.162.

Language Non-dominant Hemisphere

The best model (RFPE = 0.148, $\chi^2(1,45)=2.612$, p = 0.106, adjusted R² = 0.013) included surgical damage to the anterior sub-fasciculus of the MLF (p = 0.113) and confounds (resection volume (p = 0.424), and fMRI LI (p = 0.531)). This model outperformed a confounds-only model (RFPE= 0.151) and other combinations (see eTable 10, eFigure 2), however was insignificant overall.

Semantic and Phonemic Fluency

Results were the same to the main paper. There were no significant pre-operative or postoperative features associated with semantic or phonemic fluency outcome.

	Formula	RFPE
	GNT3 ~ AFd + AFv + IFG-IFOF + MFG-IFOF +	0.234
	OFC- $IFOF$ + $EpLength$ + RV + LI	
	$GNT3 \sim AFd + AFv + IFG - IFOF + MFG - IFOF +$	0.242
	OFC- $IFOF$ + RV + LI	
	$GNT3 \sim AFd + AFv + MFG-IFOF + OFC-IFOF + RV$	0.262
Language Dominant Hemisphere	+ LI	
Picture Naming 3 months	$GNT3 \sim AFd + AFv + MFG-IFOF + RV + LI$	0.312
	$GNT3 \sim AFd + MFG - IFOF + RV + LI$	0.380
	$GNT3 \sim AFd + RV + LI$	0.467
	$GNT3 \sim RV + LI$	0.446
	$GNT3 \sim +MLFa + MFLp + RV + LI$	0.153
Language Non-dominant Hemisphere	$GNT3 \sim MLFa + RV + LI$	0.148
Picture Naming 3 months	$GNT3 \sim RV + LI$	0.151

eTable 4. Summary of the backwards MM-estimate robust linear regression on the ATLR sub-cohort with variables selected based on the RFPE.

Abbreviations: ATLR: anterior temporal lobe resection; AF: arcuate fasciculus; AFd: dorsal sub-fasciculus of the AF; AFv: ventral sub-fasciculus of the AF; GNT3: Graded Naming Test at 3 month post-operative; IFG-IFOF inferior frontal sub-fasciculus of the IFOF; IFOF: inferior fronto-occipital fasciculus; OFC-IFOF: Orbital frontal sub-fasciculus of IFOF; MFG-IFOF: Middle frontal sub-fasciculus of IFOF; LI: lateralization index from language fMRI; MLF: middle longitudinal fasciculus; MLFa: anterior sub-fasciculus of the MLF; MLFp: posterior sub-fasciculus of the MLF; RFPE: robust final prediction error; RV: resection volume.



eFigure 1. Scatter plot of anterior temporal lobe resection sub-cohort for language dominant picture naming score change at 3 months and the percent of inferior frontal sub-fasciculus of the inferior fronto-occipital fasciculus resection. Patient outliers were identified by a robust linear regression with the open circles indicating outliers where their weighting in the model was reduced. The dotted horizontal red line indicates the level of significant decline indicated by the reliable change index.



Figure 2. Scatter plot of anterior temporal lobe resection sub-cohort for language non-dominant picture naming score change at 3 months and the percent of the anterior sub-fasciculus of the middle longitudinal fasciculus resection. Patient outliers were identified by a robust linear regression with the open circles indicating outliers where their weighting in the model was reduced. The dotted horizontal red line indicates the level of significant decline indicated by the reliable change index.