SUPPLEMENTAL MATERIAL

AI. Rich-club calculation

Given a weighted connectivity matrix W, regions belonging to the rich club can be determined by calculate the weighted RC parameter $\phi(k)$[1], where *k* denotes the degree of nodes. It is common practice to normalize the RC parameter $\phi(k)$ relative to a set of comparable random networks of equal size, while preserving weight, degree and strength distributions of W[2]. For each of these random realizations of the graph, the weighted RC parameter $\phi_{rand}(k)$ is calculated. Finally, the normalized weighted RC parameter is given by

$$\phi_{norm}(k) = \phi(k) / \phi_{rand}(k).$$

For this metric, $\phi_{norm}(k) > 1$ denotes the presence of a rich-club, which allows us to determine the RC members with a degree of at least *k*.

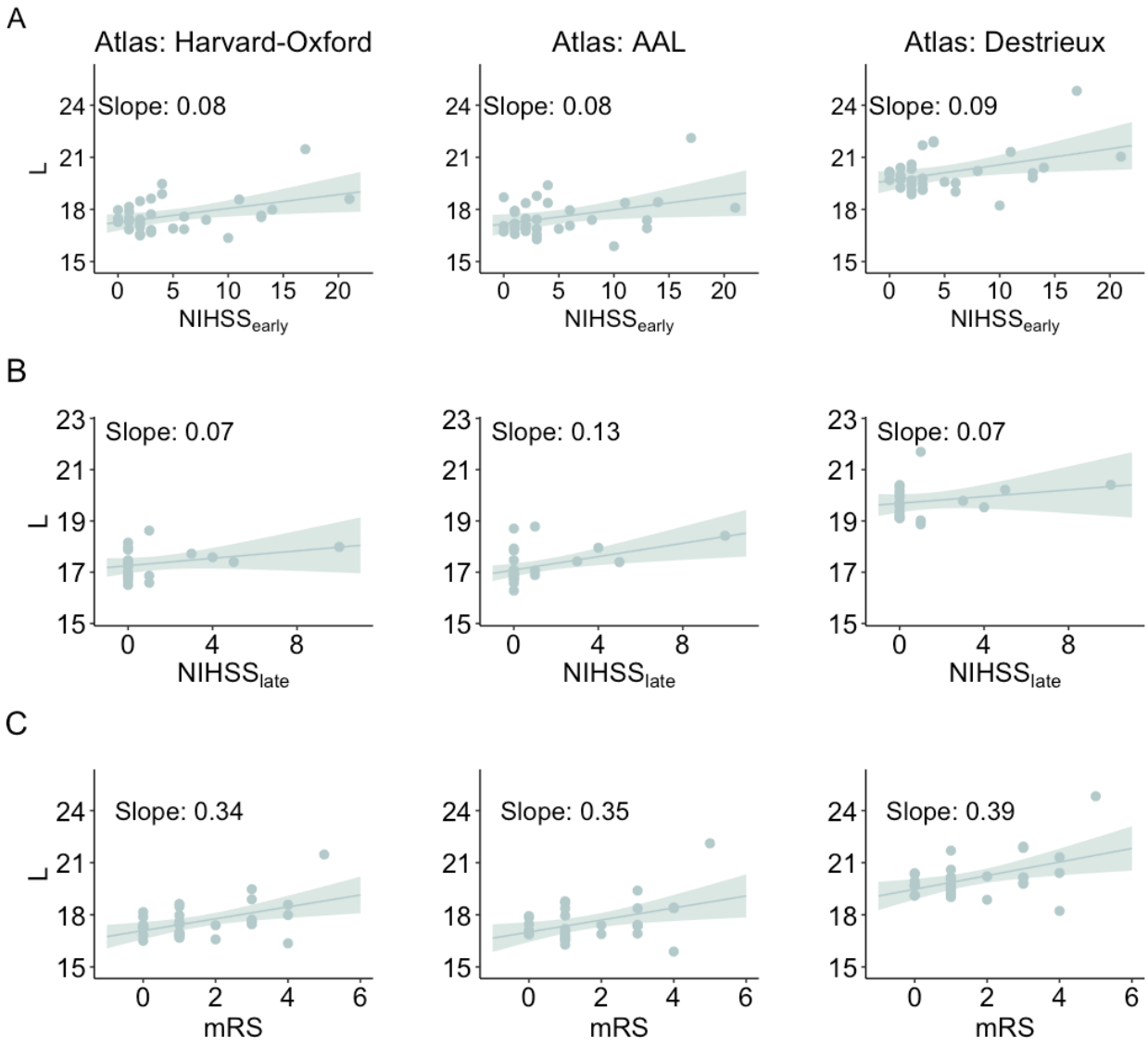

Figure I: Characteristic path length (L) for networks based on positive weights and (A) $NIHSS_{early}$, (B) $NIHSS_{late}$, and (C) mRS.

Table I: Summary of results for functional connectomes created retaining positive, negative, and absolute connectivity profiles for the Harvard-Oxford (HO), Automated Anatomical Labeling (AAL), and Destrieux (DES) atlases. Path-lengths *L* were calculated for each atlas and each connectome combination and assessed with respect to their Pearson's correlation coefficient with early and late outcome, measured by NIHSS and mRS. Additionally, the explained variance with and without adjustment for number of independent variables (R^2 and R^2_{adj}), and the Bayes information criterion (BIC) are reported for the outcome models in Table 3.

Connectome		**Pearson's Correlation Coefficient (L~outcome)**			**Outcome model after backward elimination**								
					$NIHSS_{early}$			**$NIHSS_{late}$**			**mRS**		
Atlas	**Weights**	**NIHSS**		**mRS**	**R^2**	**R^2_{adj}**	**BIC**	**R^2**	**R^2_{adj}**	**BIC**	**R^2**	**R^2_{adj}**	**BIC**
		Early	**Late**										
HO	**positive**	0.42*	0.32	0.49**	0.82	0.80	178.05	0.67	0.61	87.20	0.75	0.72	109.68
	negative	0.26	-0.03	0.34	0.81	0.79	179.79	0.67	0.61	87.47	0.73	0.70	111.86
	absolute	0.37*	0.15	0.43*	0.82	0.80	178.54	0.66	0.60	87.69	0.74	0.71	110.56
AAL	**positive**	0.38*	0.42	0.44*	0.81	0.79	179.42	0.75	0.71	81.53	0.75	0.73	108.77
	negative	0.19	-0.08	0.28	0.79	0.76	183.33	0.66	0.60	87.67	0.73	0.70	111.57
	absolute	0.30	0.16	0.38*	0.80	0.78	181.33	0.68	0.62	86.59	0.75	0.72	109.58
DES	**positive**	0.41*	0.25	0.47**	0.81	0.79	179.57	0.66	0.60	87.61	0.74	0.71	110.20
	negative	0.32	-0.07	0.38*	0.80	0.78	181.01	0.68	0.63	86.35	0.73	0.70	111.54
	absolute	0.39*	0.12	0.45*	0.81	0.79	179.35	0.67	0.61	87.56	0.74	0.71	110.59

Table II: Summary of univariate analysis for all variables used in the outcome models and L, calculated on connectomes for the Harvard-Oxford (HO), Automated Anatomical Labeling (AAL), and Destrieux (DES) atlases. (*: p<0.05; **: p<0.01; ***:p<0.001)

	$\mathbf{NIHSS_{early}}$	p	$\mathbf{NIHSS_{late}}$	p	mRS	p
age	0.071±0.011	***	0.019±0.006	**	0.023±0.003	***
DWIv	0.262±0.057	***	0.129±0.044	**	0.079±0.018	***
$\mathbf{N_{RC}}$	5.450±0.688	***	2.353±0.445	***	1.667±0.236	***
$\mathbf{NIHSS_{adm}}$	0.560±0.071	***	0.186±0.053	**	0.178±0.020	***
$\mathbf{mRS_{pre}}$	4.923±1.124	***	0.875±0.910		1.176±0.483	*
$\boldsymbol{L_{HO}^{+}}$	0.296±0.051	***	0.075±0.031	*	0.092±0.014	***
$\boldsymbol{L_{HO}^{-}}$	0.248±0.044	***	0.063±0.027	*	0.078±0.012	***
$\boldsymbol{L_{HO}^{abs}}$	0.343±0.060	***	0.087±0.036	*	0.107±0.016	***
$\boldsymbol{L_{AAL}^{+}}$	0.297±0.052	***	0.076±0.031	*	0.093±0.014	***
$\boldsymbol{L_{AAL}^{-}}$	0.253±0.045	***	0.063±0.027	*	0.079±0.012	***
$\boldsymbol{L_{AAL}^{abs}}$	0.347±0.061	***	0.088±0.036	*	0.108±0.017	***
$\boldsymbol{L_{Des}^{+}}$	0.260±0.045	***	0.066±0.027	*	0.081±0.012	***
$\boldsymbol{L_{Des}^{-}}$	0.216±0.038	***	0.054±0.023	*	0.068±0.010	***
$\boldsymbol{L_{Des}^{abs}}$	0.297±0.051	***	0.075±0.031	*	0.093±0.014	***

Table III: Summary of backward selection procedure. Each variable is removed at their respective iteration with corresponding p-values given in parentheses.

	Model	Iteration			
		1	**2**	**3**	**4**
$NIHSS_{early}$	**Baseline**	DWIv (0.6)	Age (0.3)	-	-
	Outcome	DWIv:N_{RC} (0.8)	DWIv (0.9)	L (0.4)	$NIHSS_{adm}$ (0.4)
$NIHSS_{late}$	**Baseline**	Age (1.0)	$NIHSS_{adm}$ (0.2)	-	-
	Outcome	DWIv:N_{RC} (0.9)	L (0.4)	$NIHSS_{adm}$ (0.3)	Age (0.5)
mRS	**Baseline**	mRS_{pre} (0.4)	DWIv (0.1)	-	-
	Outcome	DWIv (1.0)	mRS_{pre} (0.8)	DWIv:N_{RC} (0.6)	Age (0.4)

References

1. Opsahl T, Colizza V, Panzarasa P, Ramasco JJ. Prominence and control: the weighted rich-club effect. *Phys. Rev. Lett.* 2008;101:168702.

2. Rubinov M, Sporns O. Complex network measures of brain connectivity: uses and interpretations. *Neuroimage*. 2010;52:1059–1069.