Supplemental Material

Motion Correction. The supplemental Figures S1 and S2 show motion and time series data of two sample subjects with failed and successful motion correction, respectively. The motion and time series data of both original and preprocessed (i.e., after motion correction) signals are shown in these figures.

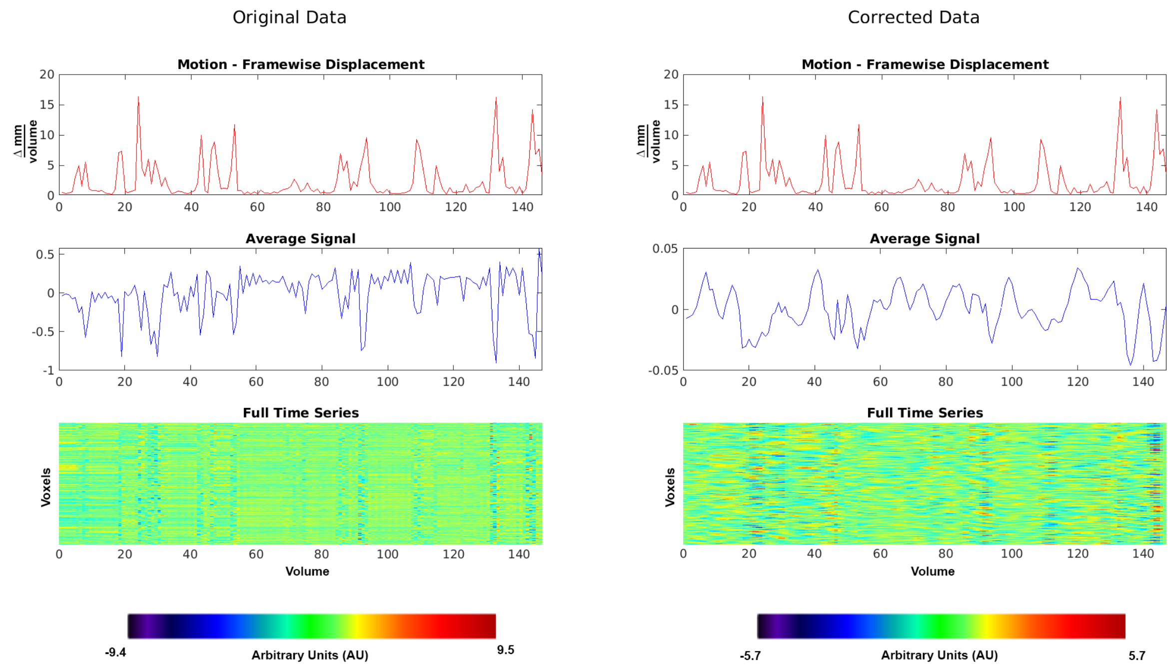

Figure S1. Motion and time series data of a sample subject that was removed after unsuccessful motion correction. The top row shows the summed derivative of the 3-D head motion (y-axis) across the 147 volume scan period (x-axis) with time noted by image volume number. The middle row shows global BOLD brain signal (y-axis) in arbitrary units across the scan. The bottom row shows the BOLD signal from individual image voxels across time. The voxels ordered along the y-axis have automatically been down sampled in Matlab for visualization. The color represent the BOLD signal in arbitrary units scaled appropriately as shown by the color bar. The signal artifact associated with head motion is clearly visible in the bottom figure where prominent stripes indicated that large portions of the image voxels exhibit signal change at the same time that head motion occurred. The figure demonstrates that the motion-induced BOLD signal changes are still present in the corrected signals (right).

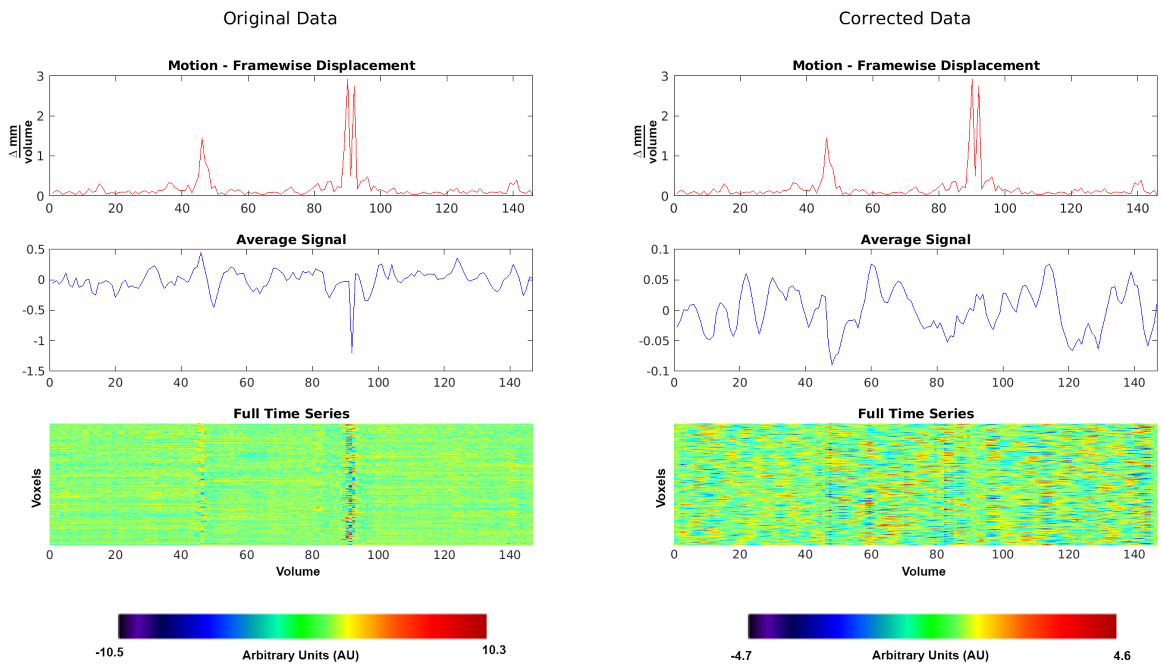

Figure S2. Motion and time series data of a sample subject that was maintained after successful motion correction. The figure format is the same as Figure S1. The original data shows two time periods that exhibit clear motion-induced BOLD signal (~volume 48 and more noticeably ~volume 90). The motion-induced BOLD signal has been nicely corrected after preprocessing (right). The corrected data continues to exhibit global fluctuations that can even be identified in the voxel figure (bottom). However, the global changes are no longer associated with head motion. It should be noted that the motion amplitude in this participant was much lower than the excessive motion of the sample subject shown in Figure S1.

DMN Mask. We used the mask shown in Figure S3 to extract the DMN ROIs.

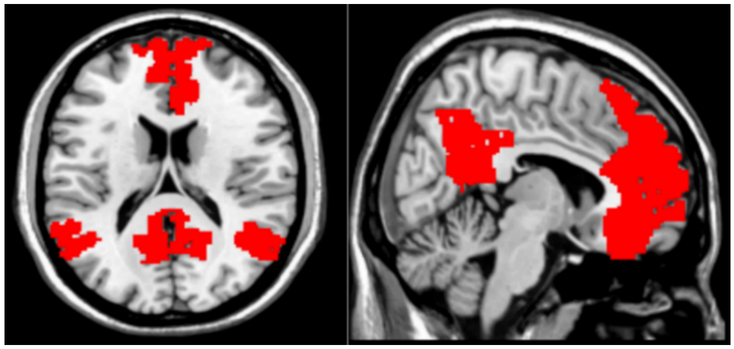

Figure S3. DMN Mask. 37 ROIs were selected as the ROIs located within DMN according to the Shen atlas (employed functional parcellation) and the mask shown in this figure. The Region ID and MNI coordinates of these 37 ROIs have been listed in a separately uploaded excel file named DMN_ROIs_Info.

Summary of Important Interaction Covariates. Below, we have provided a summarized description of what each important interaction in this study (i.e., the interactions that include network metrics and the COI) presents using the DMN regions defined in Figure S4. This figure has been adapted from [3] made available under a Creative Commons Attribution 4.0 International License and is only for illustrative purposes in describing the interaction covariates. Tables S1-S3 describe the important interaction covariates from Tables 3 and S6, and Table S4 describes the important interaction covariates from Tables 4 and S7. We have also shown how the contrast statements are obtained from the interaction covariates.

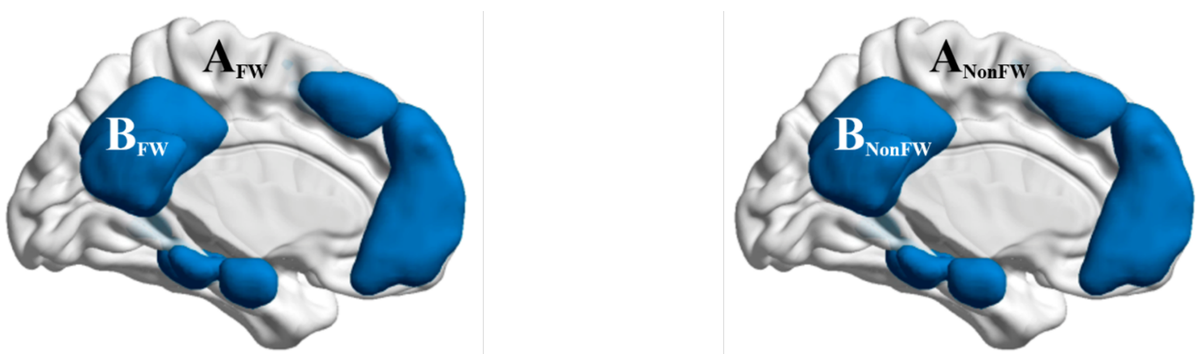

Figure S4. Global and Local (DMN) Regions. The brain networks shown here are identical between the two brains with only different labels for simplicity in describing the interaction covariates in the following tables. A_{FW} , A_{NonFW} show the brain regions excluding the DMN in FW children (left) and NFW children (right), respectively – i.e., all regions shown by the white color in both figures. A_{FW}, A_{NonFW} show the exact same regions in both groups. B_{FW} , B_{NFW} show the regions within the DMN in FW children (left) and NFW children (right), respectively – i.e., regions shown by the blue color in both figures. B_{FW} , B_{NonFW} show the exact same regions in both groups.

Table S1. Parameters from Table 3 and S6 relating network metrics to brain connectivity across the entire brain excluding the DMN.

$\beta_{r,COI\times Clust}$	Is the relationship between connection probability and clustering coefficient different in A_{FW} and A_{NonFW} . $(\boldsymbol{\beta_{r,COI\times Clust} \sim A_{FW} - A_{NonFW}})$
$\beta_{s,COI\times Clust}$	Is the relationship between connection strength and clustering coefficient different in A_{FW} and A_{NonFW} . $(\boldsymbol{\beta_{s,COI\times Clust} \sim A_{FW} - A_{NonFW}})$
$\beta_{r,COI\times Eglobe}$	Is the relationship between connection probability and global efficiency different in A_{FW} and A_{NonFW} . $(\boldsymbol{\beta_{r,COI\times Eglob} \sim A_{FW} - A_{NonFW}})$
$\beta_{s,COI\times Eglobe}$	Is the relationship between connection strength and global efficiency different in A_{FW} and A_{NonFW} . $(\boldsymbol{\beta_{s,COI\times Eglob} \sim A_{FW} - A_{NonFW}})$

According to this table:

$$(A_{FW} - A_{NonFW}) \sim \beta_{r,COI\times Clust}\ , \beta_{s,COI\times Clust}\ , \beta_{r,COI\times Eglobe}\ , \beta_{s,COI\times Eglobe}$$

Table S2. Parameters from Table 3 and S6 relating network metrics to brain connectivity in the DMN when compared to all other brain regions.

$\beta_{r,COI\times DMN\times Clust}$	Is the relationship between connection probability and clustering coefficient in B_{FW} when compared to the same relationship in A_{FW} [i.e., the relationship in (B_{FW} - A_{FW})] different than the relationship between connection probability and clustering coefficient in B_{NonFW} when compared to the same relationship in A_{NonFW} [i.e., the relationship in (B_{NonFW} - A_{NonFW})]. $\left(\boldsymbol{\beta_{r,COI\times DMN\times Clust}} \sim [(\boldsymbol{B_{FW}} - \boldsymbol{A_{FW}}) - (\boldsymbol{B_{NonFW}} - \boldsymbol{A_{NonFW}})]\right)$
$\beta_{s,COI\times DMN\times Clust}$	Is the relationship between connection strength and clustering coefficient in B_{FW} when compared to the same relationship in A_{FW} [i.e., the relationship in (B_{FW} - A_{FW})] different than the relationship between connection strength and clustering coefficient in B_{NonFW} when compared to the same relationship in A_{NonFW} [i.e., the relationship in (B_{NonFW} - A_{NonFW})]. $\left(\boldsymbol{\beta_{s,COI\times DMN\times Clust}} \sim [(\boldsymbol{B_{FW}} - \boldsymbol{A_{FW}}) - (\boldsymbol{B_{NonFW}} - \boldsymbol{A_{NonFW}})]\right)$
$\beta_{r,COI\times DMN\times Eglobe}$	Is the relationship between connection probability and global efficiency in B_{FW} when compared to the same relationship in A_{FW} [i.e., the relationship in (B_{FW} - A_{FW})] different than the relationship between connection probability and global efficiency in B_{NonFW} when compared to the same relationship in A_{NonFW} [i.e., the relationship in (B_{NonFW} - A_{NonFW})]. $\left(\boldsymbol{\beta_{r,COI\times DMN\times Eglob}} \sim [(\boldsymbol{B_{FW}} - \boldsymbol{A_{FW}}) - (\boldsymbol{B_{NonFW}} - \boldsymbol{A_{NonFW}})]\right)$
$\beta_{s,COI\times DMN\times Eglobe}$	Is the relationship between connection strength and global efficiency in B_{FW} when compared to the same relationship in A_{FW} [i.e., the relationship in (B_{FW} - A_{FW})] different than the relationship between connection strength and global efficiency in B_{NonFW} when compared to the same relationship in A_{NonFW} [i.e., the relationship in (B_{NonFW} - A_{NonFW})]. $\left(\boldsymbol{\beta_{s,COI\times DMN\times Eglob}} \sim [(\boldsymbol{B_{FW}} - \boldsymbol{A_{FW}}) - (\boldsymbol{B_{NonFW}} - \boldsymbol{A_{NonFW}})]\right)$

According to this table:

$$[(B_{FW} - A_{FW}) - (B_{NonFW} - A_{NonFW})] \sim$$

$$\beta_{r,COI\times DMN\times Clust}, \beta_{r,COI\times DMN\times Clust}, \beta_{r,COI\times DMN\times Clust}, \beta_{r,COI\times DMN\times Clust}$$

Table S3. Parameters from Table 3 and S6 relating network metrics to brain connectivity within the DMN.

$\beta_{r,Clust\_Within\_DMN}$	Is the relationship between connection probability and clustering coefficient different in B_{FW} and B_{NonFW} . $(\boldsymbol{\beta_{r,Clust\_Within\_DMN}} \sim \boldsymbol{B_{FW}} - \boldsymbol{B_{NonFW}})$
$\beta_{s,Clust\_Within\_DMN}$	Is the relationship between connection strength and clustering coefficient different in B_{FW} and B_{NonFW} . $(\boldsymbol{\beta_{s,Clust\_Within\_DMN}} \sim \boldsymbol{B_{FW}} - \boldsymbol{B_{NonFW}})$
$\beta_{r,Eglobe\_Within\_DMN}$	Is the relationship between connection probability and global efficiency different in B_{FW} and B_{NonFW} . $(\boldsymbol{\beta_{r,Eglob\_Within\_DMN}} \sim \boldsymbol{B_{FW}} - \boldsymbol{B_{NonFW}})$
$\beta_{s,Eglobe\_Within\_DMN}$	Is the relationship between connection probability and global efficiency different in B_{FW} and B_{NonFW} . $(\boldsymbol{\beta_{s,Eglob\_Within\_DMN}} \sim \boldsymbol{B_{FW}} - \boldsymbol{B_{NonFW}})$

According to this table:

$$(B_{FW} - B_{NonFW}) \sim \beta_{r,Clust\_Within\_DMN} , \beta_{s,Clust\_Within\_DMN} , \beta_{r,\mathbf{Eglob\_Wit}hin\_DMN} , \beta_{s,\mathbf{Eglob\_Within\_DMN}}$$

These four parameters were estimated using the contrast statements (linear combination) of the 8 parameters described in table S1 and S2. See below.

$$(B_{FW} - B_{NonFW}) = (\,(A_{FW} - A_{NonFW}) + [(B_{FW} - A_{FW}) - (B_{NonFW} - A_{NonFW})]\,)$$

$$\beta_{r,Clust\_Within\_DMN} = (\beta_{r,COI\times Clust} + \beta_{r,COI\times DMN\times Clust})$$

$$\beta_{s,Clust\_Within\_DMN} = (\beta_{s,COI\times Clust} + \beta_{s,COI\times DMN\times Clust})$$

$$\beta_{r,Eglobe\_Within\_DMN} = (\beta_{r,COI\times Eglobe} + \beta_{r,COI\times DMN\times Eglobe})$$

$$\beta_{s,Eglobe\_Within\_DMN} = (\beta_{s,COI\times Eglobe} + \beta_{s,COI\times DMN\times Eglobe})$$

Table S4. Parameters from Tables 4 and S9-S11 relating network metrics to brain connectivity in the DMN and across other brain regions.

$\beta_{r,COI\times Clust}$	Is the relationship between connection probability and clustering coefficient in A_{FW} affected by childhood exposure to pesticides. $(\boldsymbol{\beta_{r,COI\times Clust}} \sim \boldsymbol{A_{FW}})$
$\beta_{r,COI\times Eglobe}$	Is the relationship between connection probability and global efficiency in A_{FW} affected by childhood exposure to pesticides. $(\boldsymbol{\beta_{r,COI\times Eglob}} \sim \boldsymbol{A_{FW}})$
$\beta_{r,COI\times DMN\times Clust}$	Is the relationship between connection probability and clustering coefficient in B_{FW} when compared to the same relationship in A_{FW} [i.e., the relationship in $(B_{FW} - A_{FW})$] affected by childhood exposure to pesticides. $(\boldsymbol{\beta_{r,COI\times DMN\times Clust}} \sim \boldsymbol{B_{FW} - A_{FW}})$
$\beta_{r,COI\times DMN\times Eglobe}$	Is the relationship between connection probability and global efficiency in B_{FW} when compared to the same relationship in A_{FW} [i.e., the relationship in $(B_{FW} - A_{FW})$] affected by childhood exposure to pesticides. $(\boldsymbol{\beta_{r,COI\times DMN\times Eglob}} \sim \boldsymbol{B_{FW} - A_{FW}})$
$\beta_{r,Clust\_Within\_DMN}$	Is the relationship between connection probability and clustering coefficient in B_{FW} affected by childhood exposure to pesticides. $(\boldsymbol{\beta_{r,Clust\_Within\_DMN}} \sim \boldsymbol{B_{FW}})$
$\beta_{r,Eglobe\_Within\_DMN}$	Is the relationship between connection probability and global efficiency in B_{FW} affected by childhood exposure to pesticides. $(\boldsymbol{\beta_{r,Eglob\_Within\_DMN}} \sim \boldsymbol{B_{FW}})$

According to this table:

$$A_{FW} \sim \beta_{r,COI\times Clust}\,,\beta_{r,COI\times Eglobe}$$

$$(B_{FW} - A_{FW}) \sim \beta_{r,COI\times DMN\times Clust}\,,\beta_{r,COI\times DMN\times Eglobe}$$

$$B_{FW} \sim \beta_{r,Clust\_Within\_DMN}\,,\beta_{r,Eglobe\_Within\_DMN}$$

The last two parameters were estimated using the contrast statements (linear combination) of the first four parameters described in this table. See below.

$$B_{FW} = (\,A_{FW} + (B_{FW} - A_{FW})\,)$$

$$\beta_{r,Clust\_Within\_DMN} = (\beta_{r,COI\times Clust} + \beta_{r,COI\times DMN\times Clust})$$

$$\beta_{r,Eglobe\_Within\_DMN} = (\beta_{r,COI\times Eglobe} + \beta_{r,COI\times DMN\times Eglobe})$$

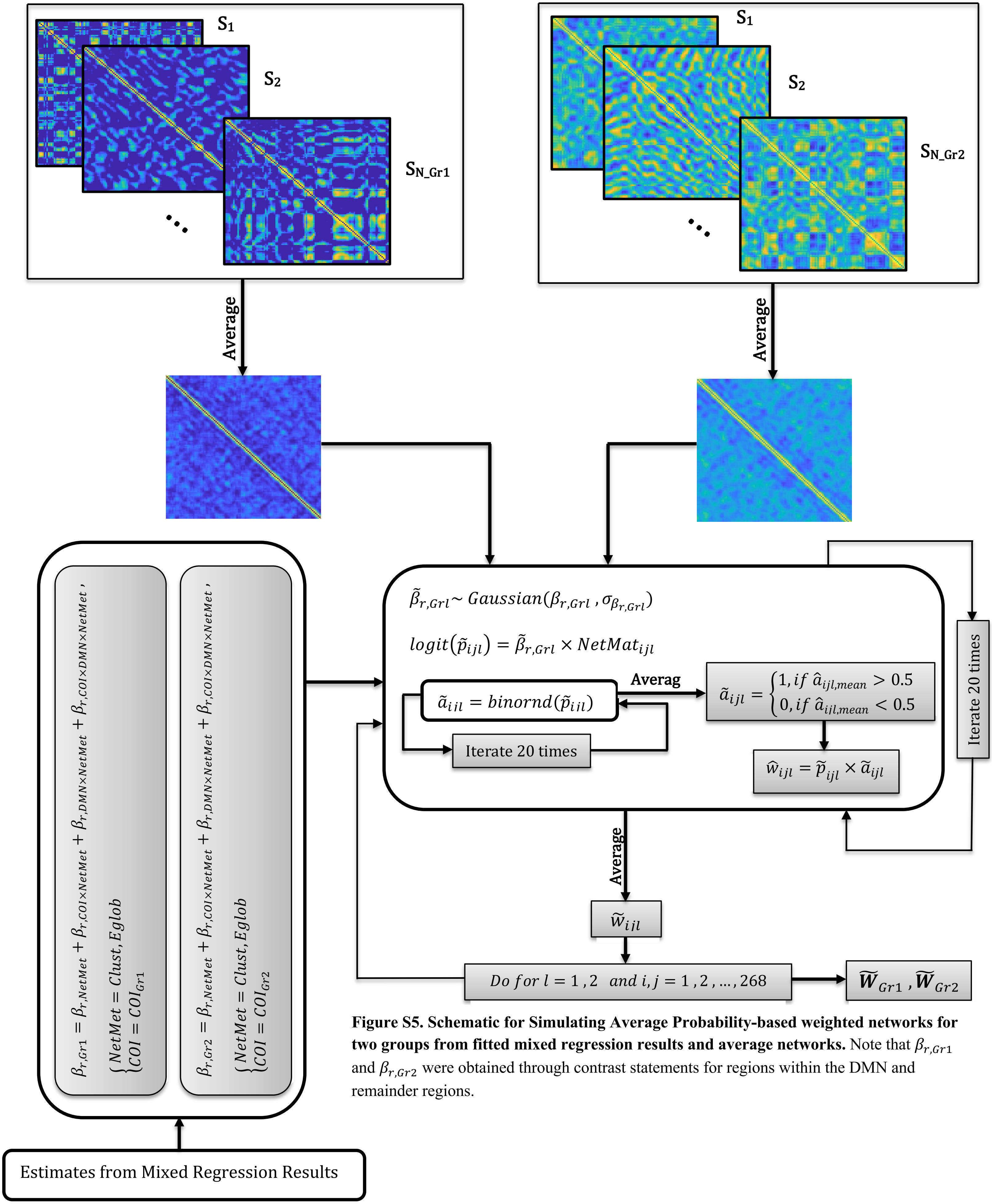

Figure S5. Schematic for Simulating Average Probability-based weighted networks for two groups from fitted mixed regression results and average networks. Note that $\beta_{r,Gr1}$ and $\beta_{r,Gr2}$ were obtained through contrast statements for regions within the DMN and remainder regions.

Comparing MRI Sample with Parent Study. We compared the demographic information of the 78 children used in the MRI sample with those of the 141 children from the parent study population using one-sample t-test for continuous variables and chi-square test for categorical variables. The average of the continuous variables and ratio of the categorical variables from the parent study variables were used as the expected values in our tests. As presented in Table S5 (last column), the sample used in this study represents the parent study population in every demographic variable. There are no differences between the MRI sample used in this study and the parent study sample.

Table S5. Study Cohort versus Parent Study Population

Variable		MRI Sample (n = 78)	Parent Study (n = 141)	p-Value
Child Age		8.38±0.32	8.41±0.33	0.3588
Child Birth Weight (lbs)		6.89±1.47	6.95±1.33	0.7437
Child Gender				0.7725
	Male	38	71	
	Female	40	70	
Childhood Preschool Education				0.7750
	Yes	27	51	
	No	51	90	
Child Learning Disability				0.1927
	Yes	3	11	
	No	75	130	
Childhood Blood Lead Levels				0.2471
	< 1 ug/dl	27	39	
	= 1 & < 2 ug/dl	40	64	
	≥ 2 ug/dl	5	16	
Child Birth Country				0.7191
	United States	70	130	
	Mexico	5	7	
	Other	3	4	
Child Language				0.9292
	English	78	137	
	English & other	76	139	
Maternal Education (yrs)				0.9459
	0 – 6	28	49	
	7 – 12	42	76	
	≥ 13	8	16	
Maternal Birth Country				0.3295
	United States	6	9	
	Mexico	65	107	
	Other	7	25	
Maternal Race				0.0932
	White	43	62	
	Mixed	18	34	

	Other	17	45	
Maternal Language				0.3921
	Spanish	78	141	
	Spanish & other	48	80	
Maternal Alcohol Consumption				0.9189
	Yes	1	2	
	No	77	139	
Maternal Tobacco Consumption				0.6817
	Yes	0	1	
	No	78	140	
Maternal Marijuana Consumption				1.0000
	Yes	0	0	
	No	78	141	
Parent's Occupation				0.2658
	Farm work	22	31	
	Construction	21	44	
	Cleaning	8	9	
	Two of above	14	24	
	Other	13	33	

Comparing FW and NFW Children. Full Results

Table S6. Full results for the analysis comparing FW and NFW children

Probability Model Outputs				Strength Model Outputs			
Parameter	Estimate	SE	*p-value	Parameter	Estimate	SE	*p-value
$\beta_{r,0}$	-0.2770	0.0446	<0.0001	$\beta_{s,0}$	0.2449	0.0199	<0.0001
$\beta_{r,COI}$	0.0475	0.0281	0.0909	$\beta_{s,COI}$	-0.0029	0.0123	0.8151
$\beta_{r,DMN}$	1.2004	0.0178	<0.0001	$\beta_{s,DMN}$	0.0875	0.0019	<0.0001
$\beta_{r,Clust}$	-0.3999	0.0247	<0.0001	$\beta_{s,Clust}$	0.0708	0.0026	<0.0001
$\beta_{r,Eglob}$	0.3312	0.0231	<0.0001	$\beta_{s,Eglob}$	0.0257	0.0026	<0.0001
$\beta_{r,COI\times DMN}$	-0.0945	0.0229	<0.0001	$\beta_{s,COI\times DMN}$	-0.0062	0.0025	0.0308
$\beta_{r,COI\times Clust}$	0.0435	0.0309	0.1600	$\beta_{s,COI\times Clust}$	-0.0017	0.0033	0.7501
$\beta_{r,COI\times Eglob}$	-0.0265	0.0289	0.3588	$\beta_{s,COI\times Eglob}$	0.0042	0.0033	0.4375
$\beta_{r,DMN\times Clust}$	0.4215	0.0352	<0.0001	$\beta_{s,DMN\times Clust}$	0.0348	0.0031	<0.0001
$\beta_{r,DMN\times Eglob}$	0.1380	0.0377	0.0003	$\beta_{s,DMN\times Eglob}$	0.0311	0.0035	<0.0001
$\beta_{r,COI\times DMN\times Clust}$	0.4790	0.0446	<0.0001	$\beta_{s,COI\times DMN\times Clust}$	0.0003	0.0039	0.9422
$\beta_{r,\ COI\times DMN\times Eglob}$	-0.4793	0.0477	<0.0001	$\beta_{s,\ COI\times DMN\times Eglob}$	0.0001	0.0045	0.9945
$\beta_{r,Dist}$	-0.2388	0.0079	<0.0001	$\beta_{s,Dist}$	-0.0419	0.0008	<0.0001
$\beta_{r,Dist2}$	0.1339	0.0047	<0.0001	$\beta_{s,Dist2}$	0.0271	0.0004	<0.0001
$\beta_{r,MatRace\_Mixed}$	0.0090	0.0191	0.6369	$\beta_{s,MatRace\_Mixed}$	0.0005	0.0087	0.9579
$\beta_{r,MatRace\_Other}$	0.0289	0.0238	0.2252	$\beta_{s,MatRace\_Other}$	0.0034	0.0108	0.7752
$\beta_{r,PreEdu}$	0.0097	0.0168	0.5638	$\beta_{s,PreEdu}$	-0.0067	0.0077	0.6167
$\beta_{r,MatEdu\_Lev1}$	0.0202	0.0283	0.4744	$\beta_{s,MatEdu\_Lev1}$	0.0038	0.0129	0.7752
$\beta_{r,MatEdu\_Lev2}$	-0.0003	0.0262	0.9907	$\beta_{s,MatEdu\_Lev2}$	0.0074	0.0119	0.6991
$\beta_{r,ParOccu\_Farm}$	0.0148	0.0303	0.6254	$\beta_{s,ParOccu\_Farm}$	0.0117	0.0138	0.6167
$\beta_{r,ParOccu\_Cons}$	0.0435	0.0291	0.1355	$\beta_{s,ParOccu\_Cons}$	-0.0047	0.0133	0.7752
$\beta_{r,ParOccu\_Clean}$	0.0117	0.0220	0.5952	$\beta_{s,ParOccu\_Clean}$	-0.0078	0.0100	0.6167
$\beta_{r,ParOccu\_Other}$	0.0406	0.0307	0.1857	$\beta_{s,ParOccu\_Other}$	0.0112	0.0140	0.6167
$\beta_{r,COI\times Clust} + \beta_{r,COI\times DMN\times Clust}$	0.5226	0.0537	**<0.0001**	$\beta_{s,COI\times Clust} + \beta_{s,COI\times DMN\times Clust}$	-0.0014	0.0050	0.7752
$\beta_{r,COI\times Eglob} + \beta_{r,\ COI\times DMN\times Eglob}$	-0.5058	0.05524	**<0.0001**	$\beta_{s,COI\times Eglob} + \beta_{s,\ COI\times DMN\times Eglob}$	0.0042	0.0055	0.6167

COI: A binary variable separating FW and NFW children. *Adjusted using the adaptive FDR procedure described in [4]. Bold values show significant COI – related inferential results discussed in the paper.

The estimates for the remaining parameters of Table S6 are explained below.

1) $\beta_{r,COI}$ and $\beta_{s,COI}$: the connection probability/strength across the entire brain excluding the DMN is not significantly different between FW and NFW children.

2) $\beta_{r,DMN}$: the connection probability/strength within the DMN is significantly higher than other brain regions.

3) $\beta_{r,Clust}$ and $\beta_{s,Clust}$: Clustering coefficient is significantly related to connection probability/strength across the entire brain excluding the DMN.

4) $\beta_{r,Eglobe}$ and $\beta_{s,Eglobe}$: Global efficiency is significantly related to connection probability/strength across the entire brain excluding the DMN.

5) $\beta_{r,COI\times DMN}$, $\beta_{s, COI\times DMN}$: The connection probability/strength within the DMN when compared to other brain regions is significantly different between FW and NFW (i.e., the difference of connection probability/strength between the DMN and other brain regions significantly differs between FW and NFW children).

6) $\beta_{r,DMN\times Clust}$, $\beta_{s, DMN\times Clust}$: The relationship between the clustering coefficient and connection probability/strength is significantly different between the DMN and other regions of the brain.

7) $\beta_{r,DMN\times Eglobe}$, $\beta_{s, DMN\times Eglobe}$: The relationship between the global efficiency and connection probability/strength is significantly different between the DMN and other regions of the brain.

8) $\beta_{r,COI\times DMN\times Clust}$, $\beta_{s, COI\times DMN\times Clust}$: The relationship between the clustering coefficient and connection probability within the DMN when compared to other brain regions is significantly different between FW and NFW children. However, the same relationship between the clustering coefficient and connection strength is not significantly different.

9) $\beta_{r,COI\times DMN\times Eglobe}$, $\beta_{s, COI\times DMN\times Eglobe}$: The relationship between the global efficiency and connection probability within the DMN when compared to other brain regions is significantly different between FW and NFW children. However, the same relationship between the global efficiency and the connection strength is not significantly different.

10) $\beta_{r,Dist}$, $\beta_{s,Dist}$, $\beta_{r,Dist2}$, $\beta_{s,Dist2}$: spatial distance and square of spatial distance are both significantly related to the connection probability/strength.

11) $\beta_{r,MatRace\_Mixed}$, $\beta_{r,MatRace\_Other}$, $\beta_{s,MatRace\_Mixed}$, $\beta_{s,MatRace\_Other}$: Maternal race is not related to connection probability/strength. More specifically, children with mixed or other (e.g., American-African) maternal races don't have different connection probability/strength when compared to children with white maternal race (the reference category in our mixed-effects regression model).

12) $\beta_{r,PreEdu}$, $\beta_{s,PreEdu}$: Childhood preschool education is not related to connection probability/strength.

13) $\beta_{r,MatEdu\_Lev1}$, $\beta_{r,MatEdu\_Lev2}$, $\beta_{s,MatEdu\_Lev1}$, $\beta_{s,MatEdu\_Lev2}$: Maternal education is not related to connection probability/strength. More specifically, children with maternal education level 1 (0-6 yrs) or level 2 (7-12 yrs) don't have different connection probability/strength

when compared to children with maternal education level 3 ($\geq$13 yrs - the reference category in our mixed-effects regression model).

14) $\beta_{r,ParOccu\_Farm}$, $\beta_{r,ParOccu\_Cons}$, $\beta_{r,ParOccu\_Clean}$, $\beta_{r,ParOccu\_Other}$, $\beta_{s,ParOccu\_Farm}$, $\beta_{s,ParOccu\_Cons}$, $\beta_{s,ParOccu\_Clean}$, $\beta_{s,ParOccu\_Other}$: Parental occupation is not related to connection probability/strength. More specifically, children with parental occupations farm work, construction, cleaning, or other (i.e., none of these three) don't have different connection probability/strength when compared to children whose parents have two of the first three occupations (the reference category in our mixed-effects regression model).

History of Pesticide Exposure in FW Children – Full Results

Table S7. Full results for the analysis on the history of pesticide exposure in FW children

Probability Model Outputs				Strength Model Outputs			
Parameter	Estimate	SE	*p-value	Parameter	Estimate	SE	*p-value
$\beta_{r,0}$	-0.2453	0.0430	<0.0001	$\beta_{s,0}$	0.2460	0.0195	<0.0001
$\beta_{r,COI}$	-0.0040	0.0106	0.7032	$\beta_{s,COI}$	0.0040	0.0045	0.4330
$\beta_{r,DMN}$	1.2004	0.0144	<0.0001	$\beta_{s,DMN}$	0.0843	0.0016	<0.0001
$\beta_{r,Clust}$	-0.3625	0.0199	<0.0001	$\beta_{s,Clust}$	0.0695	0.0022	<0.0001
$\beta_{r,Eglob}$	0.3124	0.0202	<0.0001	$\beta_{s,Eglob}$	0.0304	0.0022	<0.0001
$\beta_{r,COI\times DMN}$	-0.1042	0.0162	<0.0001	$\beta_{s,COI\times DMN}$	-0.0065	0.0017	0.0002
$\beta_{r,COI\times Clust}$	-0.0160	0.0189	0.3956	$\beta_{s,COI\times Clust}$	0.0019	0.0021	0.4330
$\beta_{r,COI\times Eglob}$	-0.0009	0.0184	0.9598	$\beta_{s,COI\times Eglob}$	-0.0005	0.0021	0.8009
$\beta_{r,DMN\times Clust}$	0.9160	0.0277	<0.0001	$\beta_{s,DMN\times Clust}$	0.0358	0.0024	<0.0001
$\beta_{r,DMN\times Eglob}$	-0.3544	0.0298	<0.0001	$\beta_{s,DMN\times Eglob}$	0.0307	0.0029	<0.0001
$\beta_{r,COI\times DMN\times Clust}$	0.1444	0.02978	<0.0001	$\beta_{s,COI\times DMN\times Clust}$	-0.0030	0.0026	0.3566
$\beta_{r,COI\times DMN\times Eglob}$	-0.0750	0.0338	0.0304	$\beta_{s,COI\times DMN\times Eglob}$	0.0009	0.0032	0.7818
$\beta_{r,Dist}$	-0.2306	0.0081	<0.0001	$\beta_{s,Dist}$	-0.0409	0.0008	<0.0001
$\beta_{r,Dist2}$	0.1369	0.0064	<0.0001	$\beta_{s,Dist2}$	0.0271	0.0006	<0.0001
$\beta_{r,MatRace\_Mixed}$	0.0264	0.0404	0.7576	$\beta_{s,MatRace\_Mixed}$	0.0021	0.0093	0.8214
$\beta_{r,PreEdu}$	0.0127	0.0232	0.5829	$\beta_{s,PreEdu}$	-0.0114	0.0108	0.3841
$\beta_{r,MatEdu\_Lev1}$	0.0264	0.0404	0.5139	$\beta_{s,MatEdu\_Lev1}$	0.0106	0.0188	0.5712
$\beta_{r,MatEdu\_Lev2}$	0.0206	0.0384	0.5907	$\beta_{s,MatEdu\_Lev2}$	0.0019	0.0178	0.9144
$\beta_{r,ParOccu\_Farm}$	0.0070	0.0213	0.7429	$\beta_{s,ParOccu\_Farm}$	-0.0060	0.0099	0.5706
$\beta_{r,ParOccu\_Cons}$	0.0262	0.0349	0.4534	$\beta_{s,ParOccu\_Cons}$	0.0080	0.0163	0.6221
$\beta_{r,ParOccu\_Clean}$	0.0191	0.0352	0.5864	$\beta_{s,ParOccu\_Clean}$	-0.0049	0.0163	0.7621
$\beta_{r,ParOccu\_Other}$	0.0288	0.0391	0.4609	$\beta_{s,ParOccu\_Other}$	0.0157	0.0183	0.4330
$\beta_{r,COI\times Clust} + \beta_{r,COI\times DMN\times Clust}$	0.1284	0.0349	**0.0003**	$\beta_{s,COI\times Clust} + \beta_{s,COI\times DMN\times Clust}$	-0.0010	0.0033	0.7504
$\beta_{r,COI\times Eglob} + \beta_{r,COI\times DMN\times Eglob}$	-0.0759	0.0382	**0.0466**	$\beta_{s,COI\times Eglob} + \beta_{s,COI\times DMN\times Eglob}$	0.0003	0.0038	0.9269

COI: A continuous variable representing months of exposure. *Adjusted using the adaptive FDR procedure described in [4]. Bold values show significant COI – related inferential results discussed in the paper.

The estimates for the remaining parameters of Table S7 are explained below.

1) $\beta_{r,COI}$, $\beta_{s,COI,}$: The connection probability/strength across the entire brain excluding the DMN is not affected by a history of childhood exposure to pesticides in FW children.

2) $\beta_{r,DMN}$, $\beta_{s,DMN}$: the connection probability/strength within the DMN is significantly higher than other regions of the brain for any exposure value in FW children.

3) $\beta_{r,Clust}$, $\beta_{s,Clust}$: Clustering coefficient is significantly related to the connection probability/strength across the entire brain excluding the DMN for any exposure value in FW children.

4) $\beta_{r,Eglobe}$, $\beta_{s,Eglobe}$: Global efficiency is significantly related to the connection probability/strength across the entire brain excluding the DMN for any exposure value in FW children.

5) $\beta_{r,COI\times DMN}$, $\beta_{s,COI\times DMN}$: The connection probability/strength within the DMN when compared to other brain regions is significantly affected by a history of childhood exposure to pesticides in FW children.

6) $\beta_{r,DMN\times Clust}$, $\beta_{s,DMN\times Clust}$: The relationship between the clustering coefficient and connection probability/strength is significantly different between the DMN and other regions of the brain for any exposure value in FW children.

7) $\beta_{r,DMN\times Eglobe}$, $\beta_{s,DMN\times Eglobe}$: The relationship between the global efficiency and connection probability/strength is significantly different between the DMN and other regions of the brain for any exposure value in FW children.

8) $\beta_{r,COI\times DMN\times Clust}$, $\beta_{s,COI\times DMN\times Clust}$; The relationship between the clustering coefficient and connection probability when comparing the DMN with other brain regions is significantly affected by a history of childhood exposure to pesticides in FW children, but the same relationship between clustering coefficient and connection strength is not affected by a history of childhood exposure to pesticides.

9) $\beta_{r,COI\times DMN\times Eglobe}$, $\beta_{s,COI\times DMN\times Eglobe}$; The relationship between the global efficiency and connection probability when comparing the DMN with other brain regions is significantly affected by a history of childhood exposure to pesticides in FW children, but the same relationship between global efficiency and connection strength is not affected by a history of childhood exposure to pesticides.

10) $\beta_{r,Dist}$, $\beta_{r,Dist2}$, $\beta_{s,Dist}$, $\beta_{s,Dist2}$: spatial distance and square of spatial distance are both significantly related to the connection probability for any exposure value in FW children.

11) $\beta_{r,MatRace}$, $\beta_{s,MatRace}$: Maternal race is not related to connection probability/strength for any exposure value in FW children. Note that in these three analyses, we only used children from farmworker families and all children had either white or mixed maternal race (i.e., no child had other maternal race).

12) $\beta_{r,PreEdu}$, $\beta_{s,PreEdu}$: Childhood preschool education is not related to connection probability/strength for any exposure value in FW children.

13) $\beta_{r,MatEdu\_Lev1}$, $\beta_{r,MatEdu\_Lev2}$, $\beta_{s,MatEdu\_Lev1}$, $\beta_{s,MatEdu\_Lev2}$: Maternal education is not related to connection probability/strength for any exposure value. More specifically, among

children from farmworker families, those with maternal education level 1 (0-6 yrs) or level 2 (7-12 yrs) don't have different connection probability/strength when compared to those with maternal education level 3 (≥13 yrs - the reference category in our mixed-effects regression model).

14) $\beta_{r,ParOccu\_Farm}$, $\beta_{r,ParOccu\_Cons}$, $\beta_{r,ParOccu\_Clean}$, $\beta_{r,ParOccu\_Other}$, $\beta_{s,ParOccu\_Farm}$, $\beta_{s,ParOccu\_Cons}$, $\beta_{s,ParOccu\_Clean}$, $\beta_{s,ParOccu\_Other}$: Parental occupation is not related to connection probability/strength for any exposure value. More specifically, among children from farmworker families, those with parental occupations farm work, construction, cleaning, or other (i.e., none of these three) don't have different connection probability/strength when compared to children whose parents have two of the first three occupations (the reference category in our mixed-effects regression model).

History of Pesticide Exposure for Prenatal, Early Childhood, and Late Childhood Periods. We additionally ran three separate analyses to examine the effects of exposure to pesticides in prenatal, early childhood, and late childhood periods. Since the observed differences from the main group comparison between FW and NFW children was only present in the Probability model and not the strength model, these additional analyses were restricted to the Probability models only. The results are shown in Tables S8-S10.

Table S8. Prenatal exposure to pesticides

Probability Model Outputs			
Parameter	Estimate	SE	*p-value
$\beta_{r,0}$	-0.2404	0.0425	<0.0001
$\beta_{r,COI}$	0.0011	0.0106	0.9177
$\beta_{r,DMN}$	1.1285	0.0144	<0.0001
$\beta_{r,Clust}$	-0.3625	0.0198	<0.0001
$\beta_{r,Eglob}$	0.3125	0.0203	<0.0001
$\beta_{r,COI\times DMN}$	-0.1301	0.0151	<0.0001
$\beta_{r,COI\times Clust}$	-0.3625	0.0198	**0.3635**
$\beta_{r,COI\times Eglob}$	0.3125	0.0202	**0.9620**
$\beta_{r,DMN\times Clust}$	0.9378	0.0279	<0.0001
$\beta_{r,DMN\times Eglob}$	-0.3721	0.0299	<0.0001
$\beta_{r,COI\times DMN\times Clust}$	0.0849	0.0278	0.0041
$\beta_{r,COI\times DMN\times Eglob}$	-0.0013	0.0308	0.9663
$\beta_{r,Dist}$	-0.2306	0.0081	<0.0001
$\beta_{r,Dist2}$	0.1369	0.0064	<0.0001
$\beta_{r,MatRace}$	0.0082	0.0195	0.6740
$\beta_{r,PreEdu}$	0.0084	0.0229	0.7130
$\beta_{r,MatEdu\_Lev1}$	0.0192	0.0399	0.6417
$\beta_{r,MatEdu\_Lev2}$	0.0143	0.0379	0.7061
$\beta_{r,ParOccu\_Farm}$	0.0171	0.0347	0.6417
$\beta_{r,ParOccu\_Cons}$	0.0262	0.0343	0.5881
$\beta_{r,ParOccu\_Clean}$	0.0114	0.0214	0.6417
$\beta_{r,ParOccu\_Other}$	0.0287	0.0386	0.5881
$\beta_{r,COI\times Clust} + \beta_{r,COI\times DMN\times Clust}$	0.0644	0.0332	**0.0857**
$\beta_{r,COI\times Eglob} + \beta_{r,COI\times DMN\times Eglob}$	-0.0004	0.0356	**0.9919**

COI: A continuous variable representing months of exposure. *Adjusted using the adaptive FDR procedure described in [4]. Bold values show COI – related inferential results.

Table S9. Early childhood exposure to pesticides

Probability Model Outputs			
Parameter	Estimate	SE	*p-value
$\beta_{r,0}$	-0.2448	0.0430	<0.0001
$\beta_{r,COI}$	-0.0061	0.0106	0.5880
$\beta_{r,DMN}$	1.1354	0.0144	<0.0001
$\beta_{r,Clust}$	-0.3625	0.0199	<0.0001
$\beta_{r,Eglob}$	0.3123	0.0202	<0.0001
$\beta_{r,COI\times DMN}$	-0.1116	0.0156	<0.0001
$\beta_{r,COI\times Clust}$	-0.0069	0.0190	0.7179
$\beta_{r,COI\times Eglob}$	-0.0042	0.0184	0.8184
$\beta_{r,DMN\times Clust}$	0.9187	0.0277	<0.0001
$\beta_{r,DMN\times Eglob}$	-0.3612	0.0299	<0.0001
$\beta_{r,COI\times DMN\times Clust}$	0.1273	0.0286	<0.0001
$\beta_{r,\ COI\times DMN\times Eglob}$	-0.0571	0.0305	0.1028
$\beta_{r,Dist}$	-0.2306	0.0081	<0.0001
$\beta_{r,Dist2}$	0.1369	0.0064	<0.0001
$\beta_{r,MatRace}$	0.0028	0.0203	0.8897
$\beta_{r,PreEdu}$	0.0166	0.0233	0.5880
$\beta_{r,MatEdu\_Lev1}$	0.0271	0.0404	0.5880
$\beta_{r,MatEdu\_Lev2}$	0.0208	0.0384	0.5880
$\beta_{r,ParOccu\_Farm}$	0.0216	0.0351	0.5880
$\beta_{r,ParOccu\_Cons}$	0.0241	0.0348	0.5880
$\beta_{r,ParOccu\_Clean}$	0.0057	0.0213	0.7901
$\beta_{r,ParOccu\_Other}$	0.0297	0.0391	0.5880
$\beta_{r,COI\times Clust} + \beta_{r,COI\times DMN\times Clust}$	0.1204	0.0339	**0.0007**
$\beta_{r,COI\times Eglob} + \beta_{r,\ COI\times DMN\times Eglob}$	-0.0613	0.0353	**0.1273**

COI: A continuous variable representing months of exposure. *Adjusted using the adaptive FDR procedure described in [4]. Bold values show COI – related inferential results.

Table S10. Late childhood exposure to pesticides

Probability Model Outputs			
Parameter	Estimate	SE	*p-value
$\beta_{r,0}$	-0.2459	0.0435	<.0001
$\beta_{r,COI}$	-0.0054	0.0106	0.6071
$\beta_{r,DMN}$	1.1386	0.0146	<0.0001
$\beta_{r,Clust}$	-0.3627	0.0199	<0.0001
$\beta_{r,Eglob}$	0.3123	0.0202	<0.0001
$\beta_{r,COI\times DMN}$	0.0160	0.0174	0.5218
$\beta_{r,COI\times Clust}$	-0.0145	0.0189	0.5492
$\beta_{r,COI\times Eglob}$	0.0009	0.0184	0.9581
$\beta_{r,DMN\times Clust}$	0.9054	0.0279	<0.0001
$\beta_{r,DMN\times Eglob}$	-0.3370	0.0301	<0.0001
$\beta_{r,COI\times DMN\times Clust}$	0.1224	0.0332	0.0005
$\beta_{r, COI\times DMN\times Eglob}$	-0.1136	0.0370	0.0041
$\beta_{r,Dist}$	-0.2306	0.0081	<0.0001
$\beta_{r,Dist2}$	0.1369	0.0064	<0.0001
$\beta_{r,MatRace}$	0.0045	0.0199	0.8224
$\beta_{r,PreEdu}$	0.0144	0.0228	0.5492
$\beta_{r,MatEdu\_Lev1}$	0.0278	0.0412	0.5492
$\beta_{r,MatEdu\_Lev2}$	0.0215	0.0389	0.5806
$\beta_{r,ParOccu\_Farm}$	0.0204	0.0352	0.5609
$\beta_{r,ParOccu\_Cons}$	0.0254	0.0355	0.5492
$\beta_{r,ParOccu\_Clean}$	0.0062	0.0213	0.7705
$\beta_{r,ParOccu\_Other}$	0.0292	0.0391	0.5492
$\beta_{r,COI\times Clust} + \beta_{r,COI\times DMN\times Clust}$	0.1079	0.0379	**0.0077**
$\beta_{r,COI\times Eglob} + \beta_{r, COI\times DMN\times Eglob}$	-0.1126	0.0411	**0.0097**

COI: A continuous variable representing months of exposure. *Adjusted using the adaptive FDR procedure described in [4]. Bold values show COI – related inferential results.

Below, we first explain the estimates for the important results with respect to the effects of childhood exposure to pesticides (1-4), and then estimates for remaining parameters will be explained (5-18).

1) $\beta_{r,COI\times Clust}$: The relationship between the *clustering coefficient* and *connection probability* across the entire brain excluding the DMN is not affected by a history of prenatal, early, or late childhood exposure to pesticides in FW children.

2) $\beta_{r,COI\times Eglob}$: The relationship between the *global efficiency* and *connection probability* across the entire brain excluding the DMN is not affected by a history of prenatal, early or late Childhood exposure to pesticides in children from farmworker families.

3) ($\beta_{r,COI\times Clust} + \beta_{r,COI\times DMN\times Clust}$): The prenatal exposure history is trending to affect the relationship between the *clustering coefficient* and *connection probability* within the

DMN, however, this effect doesn't reach a statistical significance level as indicated by the corrected p- value in Table S8. The relationship between *clustering coefficient* and *connection probability* within the DMN is significantly affected by both early and late childhood histories of exposure to pesticides in FW children (Tables S9, S10). Within the DMN, children from farmworker families with a higher history of early or late childhood exposure to pesticides are more likely (have higher probability) to have connections between regions with higher clustering coefficient (Figure S6).

4) ($\beta_{r,COI\times Eglob} + \beta_{r,COI\times DMN\times Eglob}$): The relationship between the *global efficiency* and *connection probability* within the DMN is not affected by a history of prenatal or early childhood exposure to pesticides (Tables S8, S9). However, this relationship is significantly affected by a history of late childhood exposure to pesticides (Table S10). Within the DMN, children from farmworker families with a higher late childhood history of exposure to pesticides are less likely (lower probability) to have connections between regions with higher global efficiency (Figure S7).

5) $\beta_{r,COI}$: The connection probability across the entire brain excluding the DMN is not affected by prenatal (Table S8), early childhood (Table S9), or late childhood (Table S10) exposure to pesticides among FW children.

6) $\beta_{r,DMN}$: the connection probability within the DMN is significantly higher than other regions of the brain in all three analyses examining the prenatal (Table S8), early childhood (Table S9), and late childhood (Table S10) pesticide exposure.

7) $\beta_{r,Clust}$: Clustering coefficient is significantly related to the connection probability across the entire brain excluding the DMN in all three analyses (Tables S8-S10).

8) $\beta_{r,Eglobe}$: Global efficiency is significantly related to the connection probability across the entire brain excluding the DMN in all three analyses (Tables S8-S10).

9) $\beta_{r,COI\times DMN}$: The connection probability within the DMN when compared to other brain regions is significantly affected by prenatal (Table S8) and early childhood (Table S9) exposure to pesticides, but not the late childhood exposure (Table S10).

10) $\beta_{r,DMN\times Clust}$: The relationship between the clustering coefficient and connection probability is significantly different between the DMN and other regions of the brain in all three analyses (Tables S8-S10).

11) $\beta_{r,DMN \times Eglobe}$: The relationship between the global efficiency and connection probability is significantly different between the DMN and other regions of the brain in all three analyses (Tables S8-S10).

12) $\beta_{r,COI \times DMN \times Clust}$; The relationship between the clustering coefficient and connection probability when comparing the DMN with other brain regions is significantly affected by prenatal (Table S8), early childhood (Table S9), and late childhood (Table S10) exposure to pesticides.

13) $\beta_{r,COI \times DMN \times Eglobe}$; The relationship between the global efficiency and connection probability when comparing the DMN with other brain regions is only affected by late childhood pesticide exposure (Table S10), and *not* by prenatal (table S8) or early childhood (Table S9) pesticide exposure.

14) $\beta_{r,Dist}$, $\beta_{r,Dist2}$: spatial distance and square of spatial distance are both significantly related to the connection probability in all three analyses.

15) $\beta_{r,MatRace}$: Maternal race is not related to connection probability (Tables S8-S10). Note that in these three analyses, we only used children from farmworker families and all children had either white or mixed maternal race (i.e., no child had other maternal race).

16) $\beta_{r,PreEdu}$, $\beta_{s,PreEdu}$: Childhood preschool education is not related to connection probability in all three analyses (Tables S8-S10).

17) $\beta_{r,MatEdu\_Lev1}$, $\beta_{r,MatEdu\_Lev2}$: Maternal education is not related to connection probability in all three analyses (Tables S8-S10). More specifically, among children from farmworker families, those with maternal education level 1 (0-6 yrs) or level 2 (7-12 yrs) don't have different connection probability when compared to those with maternal education level 3 (≥13 yrs - the reference category in our mixed-effects regression model).

18) $\beta_{r,ParOccu\_Farm}$, $\beta_{r,ParOccu\_Cons}$, $\beta_{r,ParOccu\_Clean}$, $\beta_{r,ParOccu\_Other}$: Parental occupation is not related to connection probability in all three analyses (Tables S8-S10). More specifically, among children from farmworker families, those with parental occupations farm work, construction, cleaning, or other (i.e., none of these three) don't have different connection probability when compared to children whose parents have two of the first three occupations (the reference category in our mixed-effects regression model).

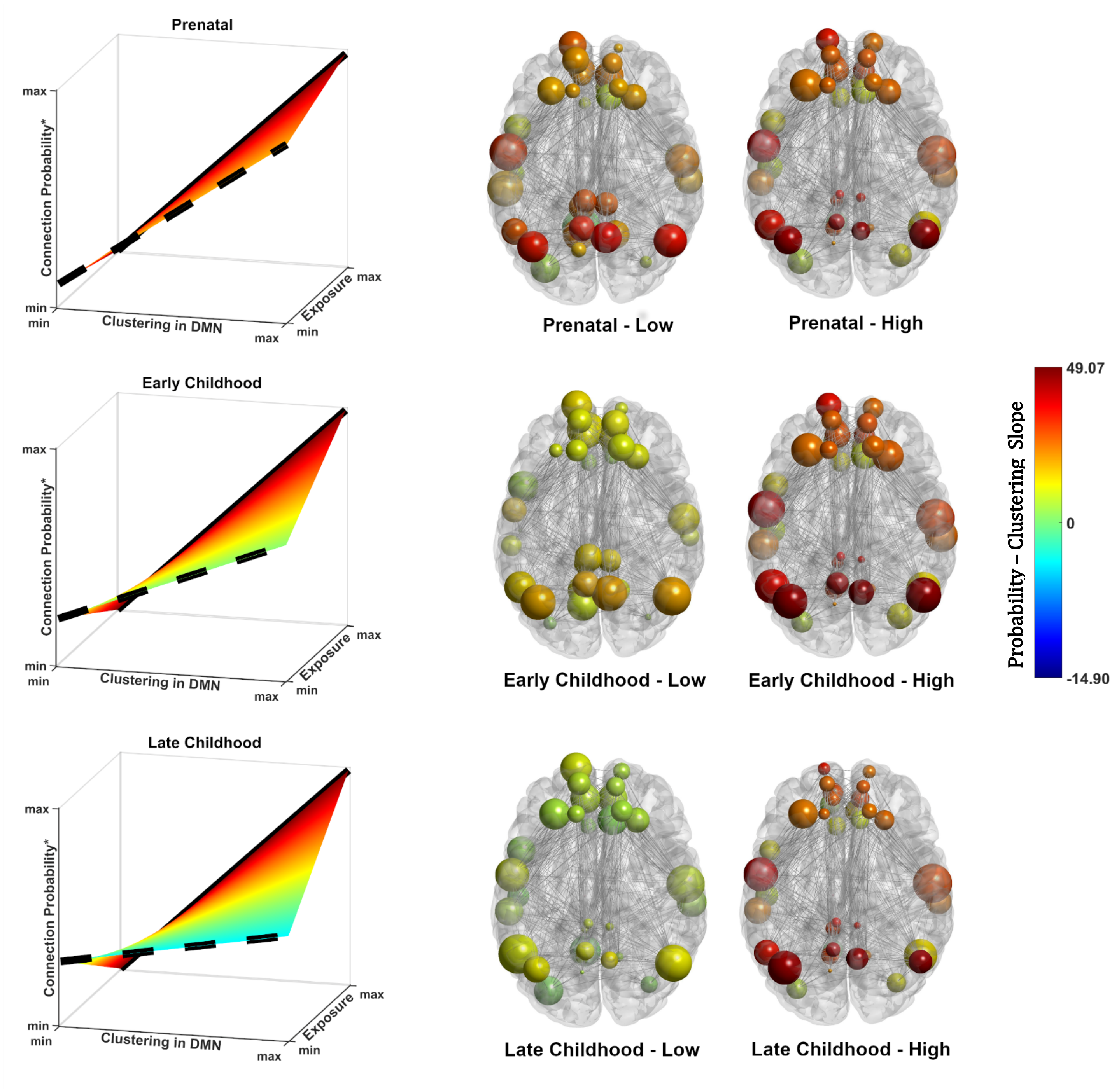

Figure S6. Connection probability* as a function of history of childhood pesticide exposure and clustering coefficient in the DMN. As in Figures 1 and 2 of the paper, we have created this figure from the coefficient from the probability model. Group representative networks are shown for the subjects with minimum (dashed line on the surface) and maximum (solid line on the surface) exposure values for each group (For node color and size, see Figures 1 and 2 captions). We have used the same color scale for all networks shown in this Figure and Figure S7 as the color bar shows.

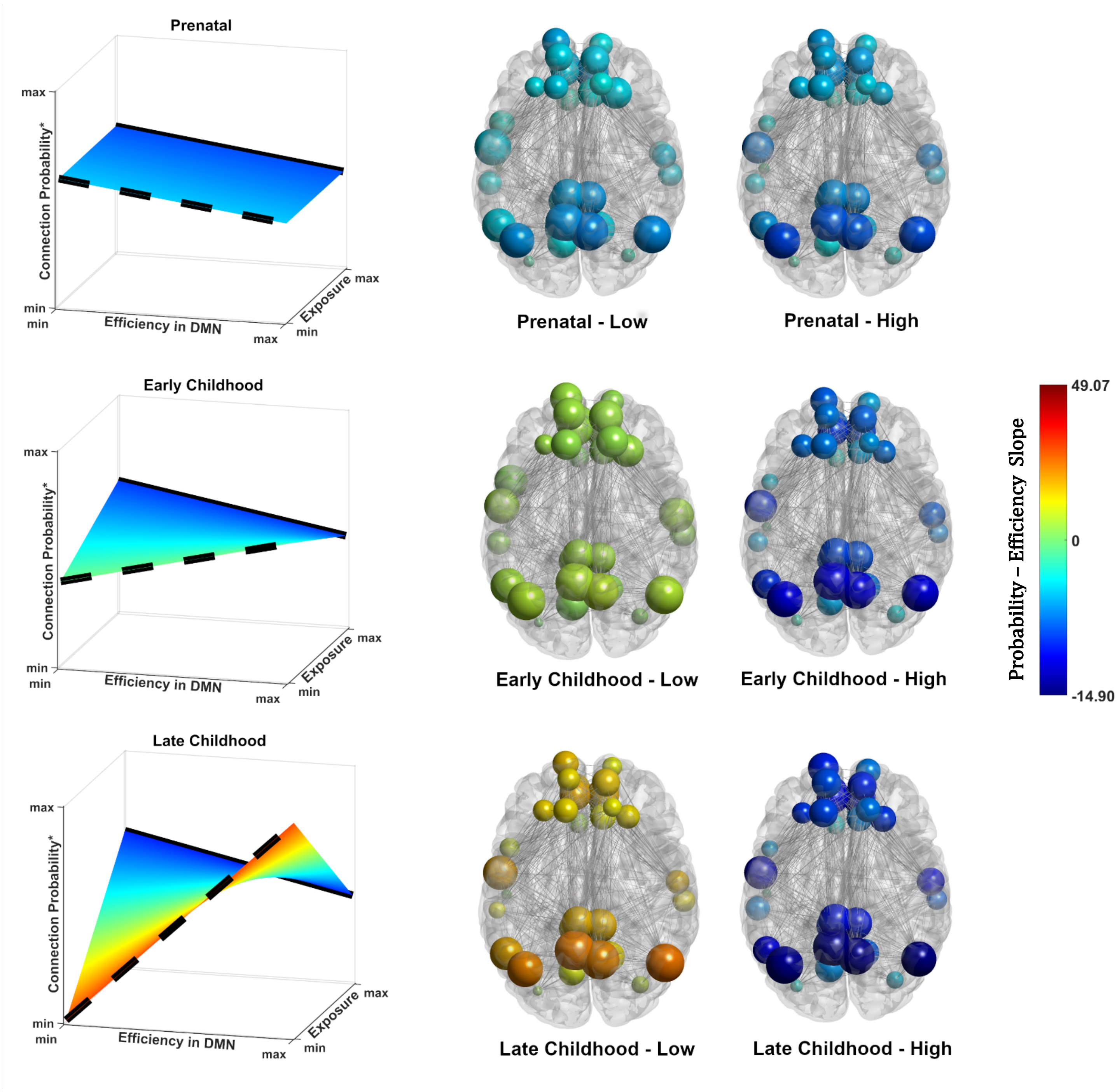

Figure S7. Connection probability* as a function of history of childhood pesticide exposure and global efficiency in the DMN. As in Figure S6, we have created this figure from the coefficient from the probability model. Group representative networks are shown for the subjects with minimum (dashed line on the surface) and maximum (solid line on the surface) exposure values for each group (For node color and size, see Figures 1 and 2 descriptions.).

Reliability Analysis. We evaluated the reliability of our analytical framework, which uses a mixed effects regression model, by simulating brain networks from fitted models. We used the estimates from the fitted models in eqs.3 and 4 and covariates from the children to simulate 2500 networks. We ran 50 permutations in which 50 networks were simulated for 50 children (randomly selected from 78 children) within each permutation. To simulate each network, we first simulated the existence of edges (presence/absence) for all 35778 node pairs (vectorized symmetric network with 268 nodes) from a Bernoulli distribution with the probability from the fitted model ($p_{ijkt}(\boldsymbol{\beta}_r; \boldsymbol{b}_{ri})$ from eq. 3 and the covariates used for each child's network. We simulated the random effect coefficients ($\boldsymbol{b}_{ri}$) for each of the children from a normal distribution with mean zero and the covariance matrix obtained from the estimated parameters for random effects in eq.3. To simulate the strength values, we first simulated continuous values from a normal distribution with the mean and covariance obtained from the fitted model in eq. 4 and the covariates for each network ($N\big(\mu_{sim} = \boldsymbol{T'}_{ijkt}\boldsymbol{\beta}_s\, , \sigma^2_{sim} = \boldsymbol{Z}_{ijk}\boldsymbol{\Sigma}_{bsi}(\boldsymbol{\tau}_{bs})\mathbf{Z'}_{ijk} + \sigma^2\boldsymbol{I}\big)$). We then used the inverse Fisher's Z-transform to get the untransformed values, and finally multiplied the resulting vector by the simulated binary vector to get the simulated strength values for the weighted network. We then compared the clustering coefficient and global efficiency of the simulated networks, averaged across permutations and children (yielding a matrix of size 268×2), with the clustering coefficient and global efficiency of the observed networks averaged across the children. We also compared these network metrics for the DMN between the two groups. As the (node-wise) correlation and (nodal) average values show in Table S11, the simulated networks represent the observed networks at both global and local (DMN) levels. All simulations were done in MATLAB. The Matlab code will be provided upon request.

Table S11. Network metrics for observed and simulated networks

Network Metrics	Observed	Simulated	Correlation
Clustering - Global	0.1473	0.1301	0.9268
Efficiency - Global	0.2602	0.2377	0.8370
Clustering - DMN	0.1661	0.1462	0.9526
Efficiency - DMN	0.2712	0.2687	0.9376

References

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