

Supplementary Tables and Figures

TABLE S1: Working memory engagement in prefrontal and parietal cortices. T-values of peaks in 31 most engaged regions in the parietal and prefrontal cortex in normal controls (NC, N=143), during working memory (WM) manipulation and maintenance, with corresponding engagement in schizophrenia patients (PT, N=66). All peaks survived $p < 0.05$ voxelwise whole-brain family-wise (FWE) correction for multiple comparisons. Regions are annotated according to the Human Connectome Project (HCP) parcellations (1). In bold are the left 46 and LIPd regions-of-interest corresponding to previous connectivity findings associated with dysfunctional context updating and delusions (2) that are examined in the independent samples herein.

	SCEF	a24pr	44-R	IFJp-R	IFSp	46v	a1Op	LIPd-R	FOP4-R	AVI-R	AIP	IP2-R	P10p	a32pr	SFL	7PC	P32pr	8BM	44-L	47l	6r	IFJa	IFJp-L	p9-46v	46	LIPd-L	FOP4-L	AVI-L	Pft	IP2-L	FOP5
T-values (NC-manipulation)	27.5	20.1	20.7	19.4	20.2	22.0	7.6	16.5	17.7	24.5	18.5	22.7	12.7	21.4	26.5	24.7	21.9	24.7	23.9	24.0	28.3	24.9	23.7	22.3	14.9	24.61	19.94	25.8	26.4	25.9	21.1
T-values (NC-maintenance)	18.9	15.0	13.9	12.9	10.5	11.4	4.6	15.2	14.9	17.1	16.7	17.2	8.3	14.2	15.6	24.7	16.3	13.2	13.1	13.8	19.3	15.3	15.8	14.3	11.2	21.27	14.77	16.7	27.1	26.2	14.8
T-values (PT-manipulation)	12.5	7.6	8.4	8.4	8.1	9.8	4.5	9.9	7.2	9.9	11.9	12.2	3.1	8.3	10.7	13.5	11.2	9.5	11.7	7.6	13.1	11.7	10.4	9.0	4.9	12.95	6.91	8.4	13.5	13.9	6.9
T-values (PT-maintenance)	14.8	11.5	7.2	6.2	5.0	6.0	4.0	10.6	7.3	8.0	11.6	10.4	2.4	8.3	10.0	17.1	16.6	8.8	7.0	7.6	11.0	7.7	9.6	5.8	4.2	13.56	6.90	8.2	15.9	16.3	7.8

TABLE S2: Effective connectivity (DCM) for controls (N=143) during WM manipulation. T-values of effective connectivity across the 31 cortical parcels most engaged during WM manipulation. Rows represent connectivity “to” that region, while columns represent connectivity “from” that region. Regions are annotated according to the Human Connectome Project (HCP) parcellations(1). In bold are the left 46 and LIPd regions-of.-interest corresponding to previous connectivity findings associated with dysfunctional context updating and delusions(2) that are examined in the independent samples herein.

	SCEF	a24pr	44 – R	IFJp –R	IFSp	46v	a10p	LIPd –R	FOP4 –R	AVI –R	AIP	IP2 –R	P10p	a32pr	SFL	7PC	P32pr	8BM	44 – L	47l	6r	IFJa	IFJp –L	p9-46v	46	LIPd –L	FOP4 –L	AVI –L	Pft	IP2 –L	FOP5
SCEF	NaN	10.7	16.1	12.8	13.4	13.4	6.5	11.9	14.2	14.9	13.1	14.6	7.9	11.1	15.3	13.7	12.6	13.4	14.7	12.8	15.2	14.3	14.8	13.1	10.8	14.3	14.0	15.5	11.9	14.8	12.4
a24pr	8.5	NaN	10.5	9.9	10.9	10.6	7.2	10.0	10.5	9.9	9.9	11.1	9.1	11.9	9.6	10.6	11.2	6.9	8.8	10.5	8.8	10.0	10.2	9.6	10.5	10.1	10.9	10.4	10.5	10.5	11.8
44 – R	13.8	12.0	NaN	13.8	13.4	13.5	8.7	12.3	15.0	13.8	12.8	14.3	9.9	12.2	13.9	13.8	12.0	12.7	14.1	14.1	12.7	13.5	13.4	12.7	12.3	12.6	12.9	15.0	12.4	13.0	13.4
IFJp –R	11.0	10.8	11.2	NaN	11.6	10.8	7.7	10.3	11.6	10.6	11.2	11.0	10.6	10.5	10.8	11.1	10.1	9.9	10.6	10.4	9.7	10.7	10.4	10.5	11.3	10.6	11.2	10.0	9.9	10.8	11.5
IFSp	9.9	11.6	12.4	12.1	NaN	12.1	8.9	11.5	12.7	11.6	11.6	11.7	10.1	11.7	11.1	11.1	11.3	10.6	10.7	11.9	9.7	11.0	10.9	11.4	11.3	11.4	12.3	12.2	11.2	10.9	12.9
46v	12.2	12.7	14.7	12.9	14.6	NaN	9.1	12.4	13.7	14.3	12.8	13.7	9.5	13.7	13.2	13.4	12.6	13.2	10.2	13.1	11.4	12.5	12.5	13.8	12.9	13.7	11.5	14.0	12.3	12.8	13.3
a10p	6.3	4.0	7.6	7.2	4.8	3.6	NaN	4.5	8.2	7.3	3.9	7.6	7.5	4.5	7.0	4.7	7.6	3.6	6.8	3.8	6.5	3.3	4.0	7.4	3.6	4.3	3.9	4.5	7.5	6.7	4.4
LIPd –R	10.0	9.9	10.4	10.4	10.2	9.7	7.7	NaN	11.0	9.8	11.9	10.7	9.6	9.8	9.6	10.3	9.8	9.7	9.9	10.6	8.8	9.6	9.8	9.7	10.2	10.2	10.6	10.5	10.3	9.8	10.7
FOP4 –R	10.9	9.6	11.7	11.3	11.0	10.9	7.5	10.9	NaN	11.0	10.4	11.0	10.4	10.0	10.6	10.9	10.5	9.1	10.9	11.0	10.5	10.8	10.2	10.5	10.5	10.1	11.9	11.5	11.2	10.0	12.3
AVI –R	12.3	10.7	13.7	11.9	12.0	12.5	8.4	11.4	14.3	NaN	10.6	11.9	8.4	11.5	12.4	12.1	11.8	11.3	10.0	12.8	11.4	12.9	12.7	12.5	11.6	12.3	13.9	14.7	11.8	12.6	13.5
AIP	10.8	10.1	11.1	11.5	11.0	10.8	8.2	13.5	11.6	10.3	NaN	11.7	8.8	10.7	9.5	11.5	10.2	10.1	10.5	11.1	10.1	10.1	10.8	11.0	10.8	11.5	11.0	11.2	11.6	10.8	12.0
IP2 –R	13.6	13.2	14.4	12.7	13.5	12.7	8.7	13.6	14.1	13.2	14.0	NaN	9.6	13.8	12.4	12.6	12.2	13.2	12.3	13.2	10.6	12.5	12.2	13.4	13.1	13.8	13.6	13.5	12.2	11.8	12.1
P10p	8.0	9.6	8.3	9.4	8.3	7.9	7.4	9.8	10.1	8.7	8.8	9.6	NaN	9.3	7.4	8.9	9.1	7.4	6.8	8.1	6.4	8.2	9.4	7.3	7.4	8.8	8.4	7.7	9.2	6.4	10.0
a32pr	8.7	12.6	10.8	10.9	11.5	11.1	8.2	11.1	11.0	10.6	10.9	11.4	9.7	NaN	10.1	11.3	11.2	9.9	8.8	10.8	9.1	9.7	10.3	10.8	11.4	10.5	11.3	11.3	10.7	10.6	12.4
SFL	13.6	11.6	14.4	12.2	12.1	13.0	7.8	11.8	13.4	13.4	11.6	13.6	7.9	12.3	NaN	14.0	12.5	14.4	13.9	12.0	14.1	13.6	14.1	13.6	11.2	13.9	13.3	14.2	12.2	14.0	12.4
7PC	12.3	11.2	14.2	12.2	11.6	11.7	8.8	12.7	13.2	12.6	14.1	13.7	9.0	12.8	13.2	NaN	12.5	12.2	13.1	11.9	12.6	13.3	12.6	11.3	14.3	14.5	13.7	13.2	13.0	12.7	8.0
P32pr	10.2	12.4	11.6	11.1	11.5	11.0	7.5	11.0	11.8	11.1	10.8	11.9	9.7	11.6	10.8	13.7	NaN	10.5	11.2	10.7	10.8	11.0	10.6	10.2	11.2	10.2	11.6	10.6	11.0	11.0	11.1
8BM	12.9	10.9	13.5	11.9	12.0	13.4	7.8	11.8	12.8	12.5	12.2	13.7	7.5	12.6	14.4	13.0	12.7	NaN	12.7	12.9	11.6	12.2	13.5	13.6	10.8	13.3	12.7	13.7	12.3	13.6	12.2

44 -L	14.1	11.1	15.4	13.4	13.1	13.5	8.0	12.2	14.5	15.7	13.1	13.5	8.6	12.0	9.4	12.4	11.3	13.3	NaN	11.6	13.3	14.3	13.5	13.3	11.6	13.5	14.1	11.8	13.1	13.9	14.0
47I	10.6	11.6	12.5	11.4	12.1	11.2	8.2	11.4	13.1	11.3	11.2	11.6	8.8	9.7	10.1	13.6	12.3	11.3	11.5	NaN	11.3	11.2	12.8	11.7	9.3	11.8	13.8	13.7	12.5	10.9	12.3
6r	15.5	10.5	15.9	12.8	12.4	12.9	7.1	11.6	13.5	13.9	11.8	12.5	7.3	11.7	14.8	13.2	11.9	13.1	14.2	13.2	NaN	14.2	15.5	11.5	14.0	15.3	14.7	13.2	14.8	11.3	11.3
IFJa	13.0	11.3	14.5	13.6	13.1	12.6	7.3	11.6	14.4	14.0	12.1	13.3	8.9	11.5	13.6	13.3	11.9	12.5	13.6	13.5	12.1	NaN	12.9	13.1	12.0	14.0	13.2	14.0	12.8	13.6	13.6
IFJp-L	13.4	11.9	14.3	12.9	12.0	12.6	8.6	12.2	13.0	13.2	12.0	12.6	9.4	12.1	13.3	13.0	11.5	12.8	12.3	13.5	12.8	12.4	NaN	13.3	12.4	14.7	13.8	14.3	12.2	12.2	12.6
p9-46v	12.0	11.3	13.8	13.2	13.3	13.6	8.0	11.6	13.1	13.1	12.6	13.4	9.6	12.1	13.1	11.1	10.6	12.9	9.1	13.1	8.7	12.3	12.4	NaN	12.1	12.9	12.9	13.6	13.5	13.0	12.1
46	9.4	11.1	11.5	11.6	11.8	11.1	8.3	10.9	12.1	11.0	11.0	11.0	9.9	11.1	10.5	13.4	11.4	10.4	9.8	11.0	11.0	10.1	9.7	9.8	NaN	<u>10.7</u>	10.1	11.7	10.6	10.6	12.2
LIPd-L	12.2	11.1	11.9	12.5	11.9	12.1	8.6	12.1	12.9	13.2	12.4	13.2	10.1	11.8	12.3	15.0	12.2	11.8	11.5	12.5	13.1	12.0	12.1	12.3	<u>12.2</u>	NaN	12.7	12.8	12.7	12.0	12.5
FOP4-L	10.9	10.7	11.1	10.7	11.8	10.8	7.9	11.3	13.2	11.8	10.1	11.3	8.3	11.4	11.0	12.2	11.8	10.1	10.6	12.7	11.3	10.9	11.6	11.3	9.9	11.3	NaN	12.3	10.7	10.5	12.9
AVI-L	11.4	11.4	13.1	11.1	12.7	12.0	8.5	11.6	13.5	13.9	11.3	12.4	9.0	12.5	11.7	13.6	11.8	11.8	12.2	13.9	12.1	12.0	12.4	12.2	12.2	12.1	14.5	NaN	11.8	11.8	13.6
Pft	11.5	11.7	12.0	11.2	11.6	10.9	8.3	12.2	13.4	11.5	13.4	12.1	10.0	12.8	11.3	15.4	12.2	11.9	11.6	13.5	13.7	12.0	11.4	13.0	11.3	12.7	12.1	12.2	NaN	10.8	13.9
IP2-L	14.6	12.1	15.1	13.5	12.6	13.8	7.8	12.9	13.8	15.2	13.6	14.9	8.8	13.2	15.0	10.6	12.2	14.7	12.2	14.1	8.5	13.6	13.6	14.7	12.8	15.2	14.0	15.3	13.6	NaN	13.6
FOP5	9.3	10.6	10.0	10.4	10.5	10.1	8.1	9.9	11.2	10.2	9.7	10.1	9.4	11.0	9.6	11.1	8.9	8.5	9.4	11.4	8.5	10.1	10.0	9.5	10.1	10.2	11.3	10.9	10.7	9.9	NaN

TABLE S3: Effective connectivity (DCM) for controls (N=143) during WM maintenance. T-values of effective connectivity across the 31 cortical parcels most engaged during WM maintenance. Rows represent connectivity “to” that region, while columns represent connectivity “from” that region. Regions are annotated according to the Human Connectome Project (HCP) parcellations (1).

	SCEF	a24pr	44-R	IFJp-R	IFSp	46v	a10p	LIPd-R	FOP4-R	AVI-R	AIP	IP2-R	P10p	a32pr	SFL	7PC	P32pr	8BM	44-L	47l	6r	IFJa	IFJp-L	p9-46v	46	LIPd-L	FOP4-L	AVI-L	Pft	IP2-L	FOP5
SCEF	NaN	9.2	3.8	4.5	6.6	8.3	4.1	8.1	8.6	7.7	9.3	9.7	6.9	8.1	8.5	9.3	9.6	5.7	9.5	7.7	6.3	7.8	7.0	9.0	9.1	8.2	10.0	8.4	8.9	10.0	9.8
a24pr	8.0	NaN	3.3	4.7	6.4	5.6	4.4	7.5	7.2	8.4	7.8	8.3	5.0	7.2	7.3	8.2	6.9	6.4	6.9	7.3	7.2	7.3	6.7	5.6	6.9	8.0	8.6	7.2	6.6	8.4	3.6
44-R	6.5	6.7	NaN	3.9	4.5	5.5	4.7	8.3	4.7	7.4	8.2	8.5	7.4	7.8	6.2	7.4	4.6	6.9	8.8	7.2	6.3	6.3	4.3	6.6	8.0	7.7	9.1	6.5	7.8	7.8	7.9
IFJp-R	1.9	3.8	3.5	NaN	3.6	3.9	2.7	4.5	5.4	2.7	4.1	5.4	1.6	1.6	1.9	4.3	4.2	3.8	4.5	2.9	2.0	1.1	5.9	5.8	4.2	3.5	3.1	4.4	3.1	4.1	5.8
IFSp	6.5	5.9	7.0	1.6	NaN	6.5	4.8	5.8	6.2	5.1	4.5	7.2	6.7	5.0	6.1	6.9	6.4	6.3	3.4	4.2	5.4	5.9	6.3	4.1	6.8	6.3	5.9	4.0	6.5	6.8	7.0
46v	8.0	6.6	8.6	5.9	8.3	NaN	5.8	8.2	8.0	5.3	9.5	8.9	7.8	5.5	7.9	8.5	7.3	7.8	7.0	5.0	5.8	8.4	9.0	8.5	9.2	8.7	6.9	7.6	8.6	8.3	7.3
a10p	3.6	4.5	5.1	4.1	5.6	5.6	NaN	5.8	4.8	6.1	5.9	5.8	6.3	4.8	5.1	5.9	5.8	4.9	5.0	5.5	4.5	5.1	5.1	5.4	6.3	5.7	5.3	4.9	6.1	5.8	5.7
LIPd-R	4.9	6.6	3.7	4.2	6.8	7.4	5.2	NaN	7.6	6.8	5.7	7.9	6.3	6.0	5.2	7.0	7.3	5.8	6.9	7.9	5.5	5.3	5.0	7.5	6.8	6.2	7.3	7.2	4.0	7.2	7.8
FOP4-R	7.0	8.2	7.7	1.9	6.2	6.5	3.9	8.2	NaN	2.9	2.8	2.8	6.6	7.6	5.9	2.6	5.9	4.6	7.6	6.9	4.9	4.9	6.3	6.4	3.7	8.0	3.1	8.4	7.8	2.8	3.5
AVI-R	8.6	7.9	8.3	2.2	6.1	4.7	5.9	8.3	9.8	NaN	7.1	7.9	6.3	7.1	4.9	7.7	7.8	6.1	6.1	7.5	5.7	2.8	5.8	7.9	7.7	4.7	8.9	5.8	7.8	5.4	9.1
AIP	6.1	7.4	5.2	5.3	7.6	8.8	5.3	9.8	7.2	7.1	NaN	9.2	7.1	3.5	6.0	8.4	8.2	3.1	6.6	7.9	3.3	2.8	7.1	8.7	7.4	7.9	8.2	7.5	7.8	7.7	8.2
IP2-R	6.5	7.7	8.5	3.6	3.9	8.5	4.2	9.8	6.8	8.0	4.5	NaN	2.8	3.2	5.7	8.3	8.2	3.1	5.8	8.2	4.3	2.5	6.6	4.9	5.0	4.1	8.2	5.9	8.9	7.8	8.8
P10p	5.9	4.1	6.6	5.2	7.1	6.8	6.2	7.1	6.3	6.3	7.3	6.8	NaN	5.5	3.2	6.3	6.4	4.7	6.2	5.8	4.6	7.4	7.3	7.2	7.8	6.1	6.9	5.7	6.5	6.3	2.3
a32pr	6.5	6.2	7.8	5.7	3.1	5.6	4.8	6.7	5.5	5.9	7.1	7.6	5.6	NaN	6.7	7.6	6.4	7.4	5.7	5.6	5.6	6.8	6.2	6.3	7.4	5.7	7.6	6.5	7.2	7.1	3.1
SFL	8.1	6.1	7.4	2.5	6.3	6.5	5.3	6.8	3.7	6.1	8.1	5.9	6.2	6.4	NaN	8.0	7.3	4.8	7.6	7.0	4.6	6.6	6.2	7.2	8.0	4.2	7.3	6.1	8.5	7.5	7.7
7PC	9.2	9.9	7.1	6.4	9.4	10.7	6.8	9.0	8.3	10.0	8.4	11.4	7.9	8.4	9.3	NaN	8.6	8.5	8.6	9.4	9.7	8.7	8.2	9.9	7.9	11.3	8.7	8.3	10.1	12.2	7.3
P32pr	7.2	6.7	3.1	3.6	4.4	6.4	5.7	7.9	6.4	3.8	9.0	8.8	6.1	7.1	6.0	7.4	NaN	5.9	8.2	7.7	6.3	4.4	5.0	7.1	7.6	7.1	8.1	4.6	7.0	7.5	6.3
8BM	7.8	6.5	8.4	1.6	3.4	7.5	3.7	6.8	3.9	4.4	7.1	7.9	5.0	5.0	7.6	7.3	6.1	NaN	6.9	6.7	7.8	5.3	2.8	4.0	6.9	5.7	7.1	6.4	8.2	6.4	7.5
44-L	8.3	7.4	9.0	5.1	6.2	8.0	4.9	3.8	6.8	6.7	3.5	3.9	6.5	3.4	4.8	6.8	6.8	3.2	NaN	8.9	6.7	6.5	7.5	8.3	7.2	3.9	8.6	6.8	7.5	3.6	8.0
47l	7.5	7.5	8.3	4.1	5.3	5.4	5.5	6.7	7.5	8.4	7.0	8.1	6.0	7.1	7.6	7.3	7.3	6.5	8.6	NaN	6.6	7.5	7.0	7.4	7.0	7.1	9.3	6.7	8.0	5.3	8.4
6r	6.0	5.8	6.5	4.5	3.8	7.2	3.5	7.0	4.7	6.1	5.8	6.7	5.3	3.1	5.5	7.2	5.5	3.2	8.3	8.5	NaN	8.3	6.7	4.9	8.5	5.3	7.7	4.4	6.4	6.0	7.8
IFJa	5.7	6.3	5.2	1.6	7.2	7.2	3.9	6.0	4.9	4.8	6.2	7.6	3.0	3.1	0.8	6.6	4.0	1.3	7.8	6.9	3.0	NaN	7.5	3.7	7.8	5.8	7.1	5.8	6.6	5.6	7.3
IFJp-L	3.9	5.7	4.3	3.0	6.1	6.5	3.5	6.7	6.3	4.5	5.7	7.3	2.7	6.1	2.3	4.9	5.1	2.9	5.1	6.7	2.0	3.4	NaN	7.3	6.1	5.1	4.3	6.2	4.5	6.1	7.2

p9-46v	5.9	7.9	8.3	7.6	7.9	8.2	5.3	8.2	6.9	8.5	7.9	8.7	7.6	7.7	6.7	7.7	6.7	6.2	7.5	7.6	6.9	7.1	8.7	NaN	8.9	7.2	8.4	7.8	10.0	9.1	8.3
46	7.3	7.0	7.4	2.4	7.5	8.3	6.1	8.1	7.8	7.9	3.6	3.2	7.7	7.9	7.6	3.1	6.5	7.6	8.3	8.2	8.2	7.5	7.5	9.0	NaN	7.9	9.0	3.4	9.4	8.5	8.3
LIPd-L	7.9	7.9	9.1	6.5	7.9	9.6	6.1	8.7	8.4	5.6	8.6	9.1	7.0	3.8	6.5	10.0	8.2	5.3	8.3	8.1	5.0	3.4	6.6	6.5	6.7	NaN	8.6	6.0	7.3	8.5	7.8
FOP4-L	9.3	3.9	3.6	3.2	7.9	2.9	1.8	4.3	8.6	5.4	4.1	3.9	6.2	3.9	3.3	3.1	8.0	3.7	3.4	8.8	3.3	7.1	3.9	4.2	4.4	3.6	NaN	4.5	4.3	3.6	4.9
AVI-L	6.1	6.4	8.6	4.7	5.9	6.0	4.2	7.4	8.4	8.4	6.5	7.1	4.6	6.9	6.0	5.6	6.7	5.3	7.6	6.0	4.3	5.8	7.6	8.2	6.7	6.2	9.1	NaN	5.7	6.5	9.0
Pft	8.2	8.2	7.4	5.7	8.9	4.2	6.8	8.8	8.5	5.0	5.3	9.2	7.3	4.9	8.6	6.5	8.6	7.0	7.1	9.6	7.5	7.2	6.3	10.0	10.4	10.9	10.8	4.8	NaN	12.0	8.3
IP2-L	9.4	9.1	7.2	6.5	8.3	9.4	6.8	10.6	8.4	7.1	8.2	10.3	7.7	5.4	8.8	11.8	8.6	6.3	9.2	7.6	8.4	7.4	8.4	8.7	8.0	9.6	8.5	8.4	9.6	NaN	9.9
FOP5	7.4	6.9	8.0	5.5	7.0	6.5	5.1	7.6	7.3	7.8	2.4	7.8	5.4	3.4	7.0	2.0	7.5	2.3	7.0	8.1	7.2	6.9	7.6	7.9	7.0	7.0	9.8	8.5	5.6	8.1	NaN

TABLE S4: Effective connectivity (DCM) for schizophrenia patients (N=66) during WM manipulation. T-values of effective connectivity across the 31 cortical parcels most engaged during WM manipulation. Rows represent connectivity “to” that region, while columns represent connectivity “from” that region. Regions are annotated according to the Human Connectome Project (HCP) parcellations(1). In bold are the left 46 and LIPd regions-of-interest corresponding to previous connectivity findings associated with dysfunctional context updating and delusions(2) that are examined in the independent samples herein.

	SCEF	a24pr	44-R	IFJp-R	IFSp	46v	a10p	LIPd-R	FOP4-R	AVI-R	AIP	IP2-R	P10p	a32pr	SFL	7PC	P32pr	8BM	44-L	47l	6r	IFJa	IFJp-L	p9-46v	46	LIPd-L	FOP4-L	AVI-L	PfT	IP2-L	FOP5
SCEF	NaN	3.8	3.5	4.2	3.9	4.2	3.6	4.0	4.5	5.2	4.7	4.4	3.6	4.6	2.9	4.5	4.1	4.6	4.4	3.2	4.7	4.1	3.6	4.7	5.0	4.5	4.5	4.7	4.6	3.8	4.8
a24pr	3.8	NaN	2.2	2.9	2.9	2.2	2.8	3.6	4.3	4.0	4.0	2.7	3.6	4.5	2.3	3.0	4.7	3.5	3.3	3.1	2.0	2.7	3.7	3.6	4.7	3.5	4.5	4.6	4.5	2.8	4.3
44-R	3.6	2.4	NaN	3.7	4.2	4.4	3.4	3.5	2.4	4.6	3.3	5.1	4.1	3.2	4.4	4.4	1.6	3.3	4.2	3.1	5.1	4.1	4.1	3.6	3.2	4.6	2.5	3.0	4.0	4.6	3.5
IFJp-R	4.4	3.0	3.4	NaN	3.3	3.3	3.0	3.3	3.8	3.7	4.4	4.8	3.5	3.4	3.2	4.0	2.9	3.0	3.2	3.8	3.9	3.8	3.5	3.3	3.5	3.9	3.9	4.5	3.7	4.4	3.9
IFSp	3.7	2.7	4.4	3.5	NaN	4.7	3.2	3.5	2.9	3.7	3.8	4.5	4.0	2.8	3.3	3.9	2.7	2.9	4.4	3.9	4.2	4.1	3.9	3.6	2.4	4.0	2.7	3.5	2.8	4.2	2.9
46v	4.0	2.8	4.5	3.7	5.4	NaN	4.3	3.5	2.6	4.5	3.8	4.9	4.0	2.4	3.5	5.4	2.4	4.1	4.9	2.9	4.8	4.4	4.4	4.6	3.7	3.9	2.7	3.7	3.2	4.5	2.4
a10p	3.4	2.6	3.6	3.4	4.0	4.4	NaN	3.0	2.5	4.0	2.9	4.1	3.8	2.5	3.0	3.1	2.4	3.9	4.0	2.8	3.7	3.1	3.6	1.9	3.0	3.6	2.6	3.1	2.2	3.6	2.5
LIPd-R	4.4	3.5	3.6	3.7	3.8	3.8	2.8	NaN	3.7	4.2	3.8	4.4	3.4	3.8	3.4	4.0	3.3	3.6	3.8	3.4	3.6	4.4	4.2	3.5	4.1	4.4	4.5	4.2	3.9	4.3	3.6
FOP4-R	4.6	3.8	1.7	4.4	2.8	3.1	1.5	4.0	NaN	4.5	4.4	3.5	3.0	4.0	2.5	3.2	4.3	1.6	3.4	3.8	2.7	3.0	3.9	3.1	4.0	4.1	4.5	4.3	4.1	2.7	4.8
AVI-R	5.0	3.9	4.7	4.2	4.1	4.8	3.6	4.0	3.7	NaN	4.6	5.6	4.0	3.9	3.5	4.7	3.8	4.5	4.6	4.2	4.8	4.3	4.1	4.2	4.8	3.9	3.8	4.4	4.3	3.5	4.6
AIP	5.0	4.1	3.5	4.4	3.9	4.2	2.8	3.9	4.2	4.9	NaN	4.4	3.5	4.3	3.4	5.2	3.6	3.1	4.1	3.9	3.7	4.4	4.4	3.7	4.3	4.8	4.6	4.3	4.3	4.8	4.3
IP2-R	4.0	2.7	4.8	4.0	4.2	4.8	4.0	3.9	3.3	4.5	4.4	NaN	3.8	2.7	3.4	5.0	2.7	4.6	4.9	3.9	4.7	4.7	4.2	4.5	3.6	4.6	3.6	3.8	4.0	5.0	3.9
P10p	3.8	3.1	3.6	4.4	4.7	4.3	3.4	3.7	3.0	4.2	4.1	3.9	NaN	3.1	3.7	2.6	2.8	3.5	3.7	3.4	4.2	4.0	4.4	2.6	3.0	4.1	3.4	4.0	3.9	3.6	3.5
a32pr	4.5	4.9	3.5	3.7	3.0	2.4	2.6	4.1	4.2	3.8	4.4	3.1	3.6	NaN	3.1	3.9	4.8	3.7	4.3	4.2	2.8	4.2	3.6	4.1	4.0	4.0	4.7	4.6	4.3	3.1	4.3
SFL	3.0	3.0	4.4	3.3	3.8	3.7	2.4	3.4	3.0	3.5	3.7	4.1	3.4	3.2	NaN	4.0	2.9	3.6	4.3	3.5	4.6	3.5	3.9	2.9	2.2	3.9	3.4	3.0	3.0	3.3	2.6
7PC	4.8	3.3	4.2	3.9	4.7	5.2	2.9	4.6	3.4	4.7	4.8	5.3	3.1	3.3	4.0	NaN	2.5	3.5	4.7	4.2	3.9	4.0	4.3	3.3	2.7	5.8	3.6	4.2	3.0	5.9	3.2
P32pr	4.4	5.1	2.3	2.8	1.9	2.0	2.2	3.9	4.8	4.1	3.8	2.8	3.0	4.5	1.9	2.6	NaN	3.4	3.5	2.8	2.1	3.0	3.5	3.8	4.6	3.4	4.6	4.6	4.1	2.5	4.5
8BM	4.0	3.0	4.0	3.2	3.4	3.7	3.6	3.8	2.2	4.0	3.6	4.2	3.8	3.6	3.4	3.6	3.1	NaN	4.4	2.9	4.3	4.5	4.3	4.1	3.7	3.9	2.9	3.2	3.3	4.1	2.5
44-L	4.1	2.8	4.5	3.3	4.3	4.7	1.6	3.7	3.6	4.5	4.2	5.3	3.2	4.0	4.1	5.3	2.4	3.5	NaN	4.3	5.0	5.1	5.0	3.3	2.5	5.1	3.6	2.8	2.9	5.0	3.9
47l	3.3	3.3	3.1	4.0	4.0	3.1	3.3	3.6	4.0	4.3	3.6	3.7	3.0	4.2	2.9	4.0	3.4	3.1	3.7	NaN	4.5	3.8	4.5	3.6	3.7	4.5	4.1	4.4	4.3	3.2	4.3
6r	4.7	2.2	5.3	3.3	4.7	5.3	3.9	4.1	3.1	4.6	4.2	5.3	3.6	3.1	3.8	4.1	2.6	4.4	5.7	4.2	NaN	4.7	4.7	3.5	2.2	4.7	2.9	3.7	3.1	5.0	3.1

IFJa	4.0	3.3	5.0	4.4	4.4	5.0	3.3	3.4	3.3	4.4	4.0	5.4	3.8	3.3	3.6	4.1	2.6	4.0	5.2	3.6	4.8	NaN	5.1	4.5	3.4	4.1	4.0	3.9	4.0	4.5	3.5
IFJp-L	3.6	3.3	4.2	4.1	4.3	5.2	3.7	4.0	4.3	4.2	4.4	4.9	3.8	3.8	4.1	4.0	3.7	4.2	4.9	4.2	5.0	5.4	NaN	4.6	4.0	4.4	4.4	4.1	4.3	4.8	4.1
p9-46v	4.3	3.5	4.3	3.0	4.4	4.5	2.6	3.8	3.6	4.2	4.1	4.5	3.0	3.6	3.4	3.1	3.5	4.5	4.1	3.5	4.0	4.8	4.6	NaN	2.8	4.0	3.5	4.4	3.2	3.9	3.1
46	4.6	4.1	3.4	3.3	2.7	3.7	2.5	4.2	4.0	4.5	3.9	3.3	2.5	4.4	3.3	2.6	4.4	3.8	2.9	3.7	2.5	3.4	4.0	2.6	NaN	3.4	4.2	3.8	4.3	3.0	4.2
LIPd-L	4.4	2.9	4.6	3.9	4.4	4.5	3.6	4.4	3.9	4.8	5.3	5.1	4.2	4.1	4.5	5.9	3.3	4.4	4.7	4.5	5.6	4.2	4.6	4.5	4.2	NaN	3.8	4.7	5.1	5.5	4.7
FOP4-L	4.4	4.1	3.4	3.6	2.8	3.5	2.3	4.3	4.5	4.4	4.7	4.1	3.6	4.3	3.0	3.4	4.1	2.8	3.6	4.1	3.1	3.7	4.1	3.4	4.6	3.9	NaN	4.9	5.5	3.8	4.8
AVI-L	5.2	4.9	3.1	3.6	3.2	2.8	2.8	4.1	4.2	4.9	4.0	3.1	3.2	4.4	2.4	3.3	3.8	3.5	3.6	3.7	2.9	3.2	4.2	3.6	4.2	4.7	5.0	NaN	4.8	3.6	4.4
Pft	4.1	4.5	3.9	3.6	2.9	3.5	2.1	3.9	4.7	4.3	5.0	4.0	3.2	4.5	2.5	3.5	4.5	3.6	3.4	4.3	1.4	3.8	4.1	1.4	0.6	4.5	4.8	4.5	NaN	5.0	4.8
IP2-L	4.5	2.9	5.0	4.0	4.1	5.3	3.5	4.4	3.0	4.3	4.5	5.8	4.0	3.6	4.1	6.1	2.7	4.5	4.7	3.8	5.3	4.9	4.8	4.5	3.3	4.9	3.4	4.0	5.0	NaN	3.1
FOP5	4.4	4.8	3.3	4.3	3.4	2.7	2.2	4.4	4.4	4.3	4.4	3.4	3.1	3.5	2.5	3.4	4.5	2.5	4.2	4.8	3.2	4.0	4.4	3.5	4.4	4.5	5.4	5.0	4.5	3.4	NaN

TABLE S5: Effective connectivity (DCM) for schizophrenia patients (N=66) during WM maintenance: T-values of effective connectivity across the 31 cortical parcels most engaged during WM maintenance. Rows represent connectivity “to” that region, while columns represent connectivity “from” that region. Regions are annotated according to the Human Connectome Project (HCP) parcellations(1).

	SCEF	a24pr	44-R	IFJp-R	IFSp	46v	a10p	LIPd-R	FOP4-R	AVI-R	AIP	IP2-R	P10p	a32pr	SFL	7PC	P32pr	8BM	44-L	47l	6r	IFJa	IFJp-L	p9-46v	46	LIPd-L	FOP4-L	AVI-L	PfT	IP2-L	FOP5
SCEF	NaN	5.1	5.9	1.2	3.8	3.5	1.9	1.7	6.0	5.3	2.5	4.7	2.0	4.8	5.6	3.9	5.4	4.4	0.3	3.9	4.3	5.3	3.1	0.7	3.4	5.5	5.5	5.3	2.0	1.6	5.9
a24pr	5.7	NaN	6.1	5.1	4.3	4.9	1.8	5.3	5.4	5.1	5.6	5.0	3.6	5.6	4.3	4.1	4.9	4.7	5.1	3.8	5.8	5.5	4.6	3.4	3.3	5.1	5.2	4.9	5.8	5.2	5.5
44-R	4.5	5.3	NaN	3.8	2.8	-0.2	1.8	5.1	5.4	1.5	1.6	0.3	1.7	5.2	1.1	3.6	5.9	4.3	0.8	3.8	0.6	3.1	0.9	3.7	4.4	5.6	1.0	5.4	5.0	4.9	1.3
IFJp-R	2.2	5.0	0.2	NaN	4.4	0.7	1.6	1.0	4.6	3.9	1.5	0.8	1.9	3.4	4.6	3.3	4.3	3.8	5.3	3.1	4.6	4.8	4.8	2.3	2.9	5.1	4.2	4.7	4.3	0.7	1.0
IFSp	-0.2	3.8	-0.4	0.4	NaN	-0.2	1.1	-1.0	0.8	-0.2	1.3	-0.7	1.3	3.5	-1.0	0.2	0.4	-1.2	-1.0	-0.1	-1.6	-1.0	-1.4	-0.2	3.0	-0.4	-0.4	-1.2	0.6	-0.9	-0.2
46v	-0.5	4.3	0.1	-0.5	4.0	NaN	1.9	0.1	4.8	4.9	0.5	-0.2	1.1	3.6	-0.6	2.8	4.7	3.2	-0.4	3.5	-0.8	-0.6	-0.2	0.3	1.1	-0.1	2.1	0.4	5.6	-1.0	0.8
a10p	0.7	0.9	0.7	0.7	0.2	0.6	NaN	1.2	1.6	0.4	1.2	0.7	1.5	1.3	1.1	1.3	0.0	0.1	1.2	2.2	1.6	0.5	1.1	1.2	1.4	0.8	0.2	0.2	2.3	1.5	1.0
LIPd-R	1.4	4.9	2.1	1.2	0.7	1.4	1.6	NaN	4.9	5.4	1.1	4.5	2.0	4.1	1.2	1.3	4.7	4.0	1.4	3.9	1.6	1.3	4.7	0.7	3.8	6.2	3.6	5.3	0.6	1.4	5.0
FOP4-R	5.8	4.8	5.4	4.4	4.4	5.0	2.1	4.5	NaN	6.1	5.7	4.5	2.8	4.8	4.4	4.4	5.6	4.2	6.2	4.2	5.9	5.5	4.2	3.9	3.8	3.7	5.5	5.5	5.8	3.9	5.9
AVI-R	6.1	4.8	6.5	4.2	4.5	5.6	1.8	5.3	6.0	NaN	6.6	5.2	2.5	4.8	5.3	4.7	5.6	4.6	5.0	4.3	6.5	1.3	5.8	4.7	4.6	5.4	5.4	4.8	6.0	5.1	5.4
AIP	6.1	5.1	6.5	4.9	4.6	5.3	2.1	4.6	5.8	6.3	NaN	5.1	2.1	4.0	1.7	4.9	5.6	4.9	6.3	4.3	6.5	6.6	6.6	1.3	4.4	6.5	5.4	6.5	1.5	1.7	5.8
IP2-R	4.8	4.8	4.9	4.1	3.9	4.3	1.9	1.5	4.8	5.1	1.8	NaN	2.6	3.8	4.9	3.8	4.6	4.0	4.3	4.0	5.9	5.2	5.1	4.2	-0.3	5.4	5.5	4.9	4.8	0.2	2.4
P10p	2.0	2.9	1.8	1.5	1.8	1.5	2.3	1.3	1.9	1.8	1.9	2.1	NaN	3.0	1.5	1.4	2.6	1.3	1.7	1.6	1.6	1.2	1.8	0.9	1.4	1.3	1.7	0.8	2.5	1.4	0.7
a32pr	4.8	5.3	5.0	3.7	3.6	3.9	1.7	3.7	4.6	4.9	4.2	4.0	3.5	NaN	4.2	3.1	4.8	4.3	4.8	4.0	4.3	4.5	4.5	2.7	3.3	5.1	4.6	4.6	4.8	3.9	4.7
SFL	1.5	0.9	2.0	4.3	0.2	0.4	2.2	1.3	4.7	5.0	5.3	4.7	2.3	0.6	NaN	3.5	1.1	-0.1	1.0	3.7	0.5	1.4	1.3	4.2	4.4	1.4	0.8	1.1	1.3	1.4	1.5
7PC	4.8	3.8	1.2	0.5	0.7	0.3	2.5	1.2	4.4	4.3	1.7	3.5	2.3	3.4	4.0	NaN	4.4	0.7	0.4	2.9	1.3	0.8	0.9	0.3	3.8	0.9	2.8	4.4	5.2	1.0	3.5
P32pr	5.6	5.3	6.5	4.5	3.8	5.6	1.7	4.9	5.5	6.1	6.0	4.6	3.0	4.9	5.3	4.9	NaN	5.1	6.8	4.8	6.8	5.9	6.3	4.4	4.1	6.1	6.2	6.4	6.3	5.5	6.1
8BM	1.2	0.9	1.9	0.8	-0.5	4.2	1.1	1.1	4.2	5.1	4.9	4.2	1.8	1.1	1.2	4.0	1.0	NaN	0.5	3.6	1.5	-0.4	1.7	3.6	3.0	1.2	0.6	1.1	1.1	1.0	1.2
44-L	0.3	1.1	0.5	1.6	0.9	0.5	2.3	1.6	5.7	1.0	2.3	-0.7	2.0	1.1	0.6	3.3	6.2	-0.2	NaN	4.5	-0.9	-0.4	-0.6	1.2	4.8	1.3	4.4	1.3	1.8	0.2	1.6
47l	0.6	0.5	1.3	3.4	0.2	3.8	2.2	3.2	4.1	4.4	4.0	3.4	1.7	0.6	0.7	3.1	4.5	0.9	4.6	NaN	1.4	0.8	1.2	3.9	3.5	0.6	4.0	0.0	0.7	0.7	4.6
6r	0.0	5.1	0.1	0.3	-0.1	0.9	2.2	0.0	5.8	6.0	1.4	2.3	0.0	5.1	-0.3	0.4	5.8	-0.5	-0.7	1.4	NaN	-0.2	-0.4	-0.1	1.4	5.5	1.8	1.3	2.1	1.4	0.7
IFJa	1.6	5.4	0.6	1.7	0.9	1.0	1.6	1.6	5.8	4.9	2.6	1.7	-0.1	4.8	0.6	4.1	5.6	2.5	4.7	4.3	5.2	NaN	1.9	2.4	1.0	5.9	3.9	5.0	5.7	1.4	1.6

IFIp-L	0.5	1.1	1.6	0.6	0.9	1.3	1.9	1.2	4.7	2.7	3.1	2.4	0.5	4.5	0.6	0.9	6.0	0.4	2.2	1.5	1.2	0.8	NaN	1.3	1.2	1.8	1.8	1.6	5.6	0.8	6.4
p9-46v	0.2	3.0	0.2	-0.8	2.3	0.1	2.0	0.3	3.6	4.7	0.8	1.0	1.0	2.6	-0.3	3.7	3.6	3.1	-0.6	3.3	-0.3	-0.7	0.6	NaN	-0.4	2.9	4.3	0.4	3.1	0.4	-0.2
46	3.4	3.5	4.3	2.6	3.1	-0.1	1.9	4.1	3.7	4.1	4.6	1.9	1.7	3.0	3.3	3.7	3.7	2.7	0.8	3.5	-0.1	3.0	2.3	3.8	NaN	4.0	3.7	4.4	3.9	3.9	4.1
LIPd-L	2.5	4.9	2.7	2.0	1.1	1.8	1.9	2.5	5.2	5.9	6.9	5.3	1.6	4.8	1.9	4.0	5.6	1.4	1.9	4.0	2.9	2.4	2.4	1.5	3.9	NaN	4.9	6.1	2.5	5.8	5.8
FOP4-L	5.6	4.6	4.6	4.1	3.0	5.3	1.4	4.8	5.3	5.8	5.6	5.4	1.4	4.4	4.1	3.7	5.6	0.8	1.9	3.9	2.1	1.2	5.7	4.6	4.0	5.5	NaN	5.5	4.7	5.0	5.8
AVI-L	1.4	4.4	6.0	4.8	3.1	4.4	1.4	5.3	5.1	5.8	6.1	5.1	1.5	4.3	3.7	3.5	5.8	3.6	5.4	4.6	5.6	5.2	1.8	4.7	4.2	6.0	5.7	NaN	6.0	1.1	5.8
PFt	6.7	4.9	2.2	4.2	0.9	1.8	3.2	5.5	5.6	5.9	6.1	5.6	2.5	4.7	5.2	3.9	5.5	4.8	5.2	4.2	6.6	5.7	6.1	3.3	4.7	5.8	4.2	6.0	NaN	5.5	5.8
IP2-L	1.9	5.2	2.4	1.7	1.1	1.0	2.0	2.0	4.9	5.3	5.0	4.1	2.4	4.0	1.6	1.8	4.8	1.1	1.4	3.8	2.2	1.8	1.7	1.1	3.4	1.9	5.0	5.2	2.2	NaN	5.4
FOP5	5.7	5.2	5.9	3.9	4.1	4.8	2.0	1.6	5.4	5.7	2.4	1.7	2.3	5.0	4.8	3.5	6.2	4.4	5.5	4.8	6.2	5.8	5.9	4.6	4.5	5.8	5.7	5.4	5.6	4.8	NaN

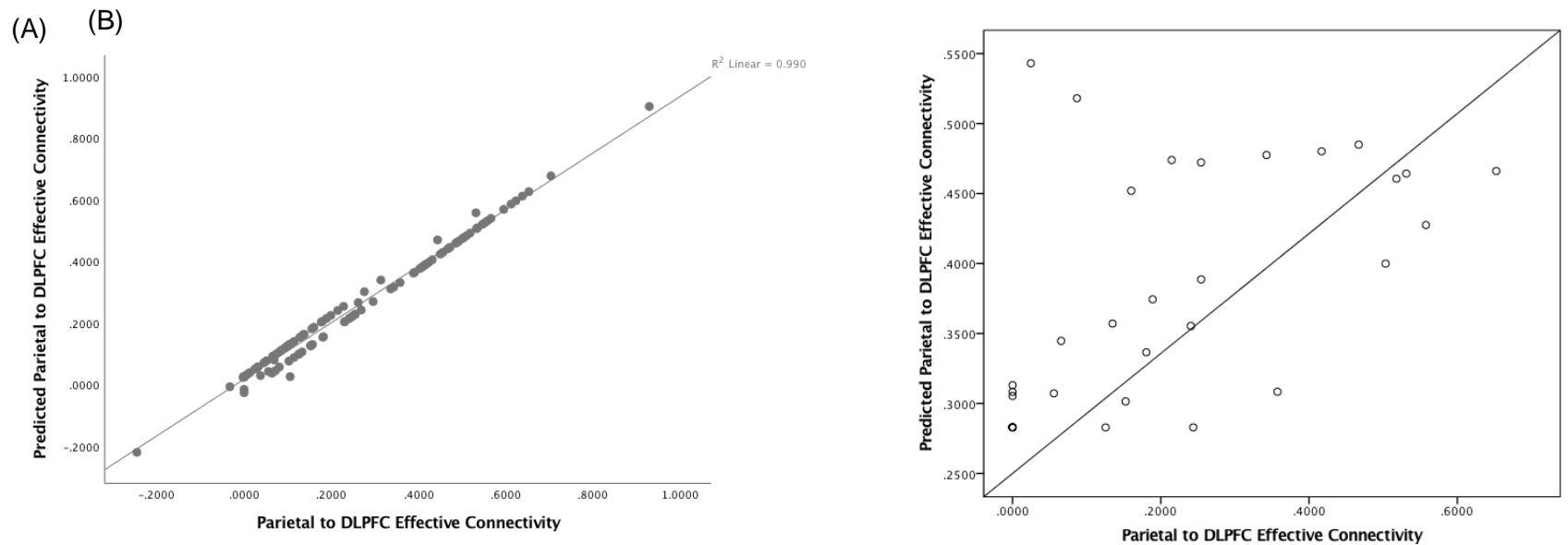


FIGURE S1: Modeled parietal-prefrontal effective connectivity.

Correspondence with actual effective connectivity, in healthy controls ($N=143$, $r=0.9$, $p<0.001$), of leave-one-out predicted feedforward parietal-prefrontal effective connectivity during context updating in WM manipulation, derived from parietal and prefrontal effective connectivity patterns during WM maintenance using support vector regression models. As noted in the main text, a more conservative SVR model with 4/5 of the healthy sample ($N=116$) and testing on a held out 1/5 sample also gave robust predictions ($N=27$, $r>0.8$, $p<0.001$; Fig 1 in main text). (B) Elastic net regularization and variable selection (α 0.5), which effectively tackles model fitting with number of variables exceeding subjects, yielded connectivity predictions in the held out sample with a reasonably similar effect size as the SVR with a held out sample ($N=27$, $r=0.60$, $p<0.001$).

Supplementary References

1. Glasser MF, *et al.* (2016) A multi-modal parcellation of human cerebral cortex. *Nature* 536:171.
2. Kaplan C.M., *et al.* (2016) Estimating changing contexts in schizophrenia. *Brain* 139:2082-2095.