

**Impaired Error-Likelihood Prediction  
in Medial Prefrontal Cortex in Schizophrenia**

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**Supplementary Material**

The following pages contain Supplementary Tables S1 and S2 and Supplementary Figures S1 through S3. This material includes the dorsomedial prefrontal search volume used in the fMRI analyses, and additional fMRI analyses referred to in the main text.

**Supplementary Table S1**

*fMRI Results: Error Effects for DMTS Accuracy-Matched Subgroups*

<i>Comparison</i> Brain region(s)	BA	Peak MNI coordinates			Peak Z-score	Cluster <i>p</i> -value	Cluster size (voxels)
		x	y	z			
<i>Main effect: All &gt; 0</i>							
B. ACC	24/32	-12	24	20	4.03	< .001	318
<i>Interaction: Control &gt; Patient</i>							
R. MFG	10	10	58	10	3.99	.014	65

*Note.* Clusters are significant within a predefined dorsomedial prefrontal search volume at  $p < .05$ , FWE, with a height threshold of  $p < .001$ .

BA = Brodmann area; MNI = Montreal Neurological Institute; B = bilateral; R = right; L = left; ACC = anterior cingulate cortex; MFG = medial frontal gyrus.

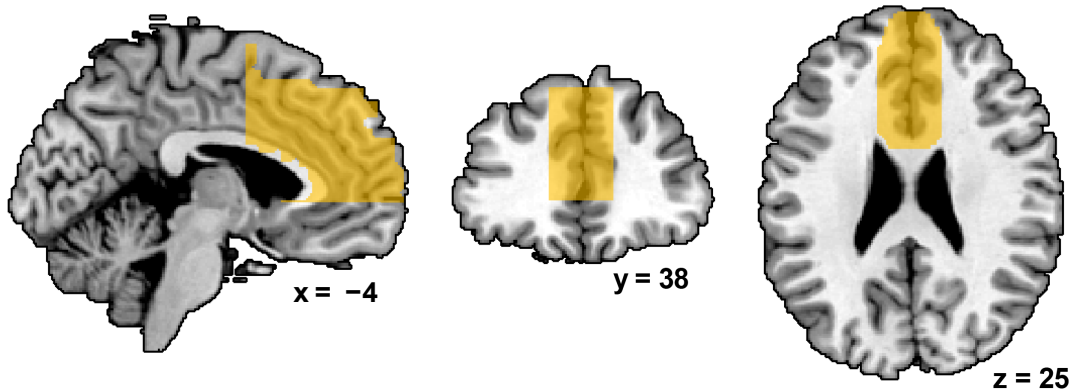
**Supplementary Table S2**

*Mediation Analysis: Error-Likelihood Regions Mediating Error-Unexpectedness ROI*

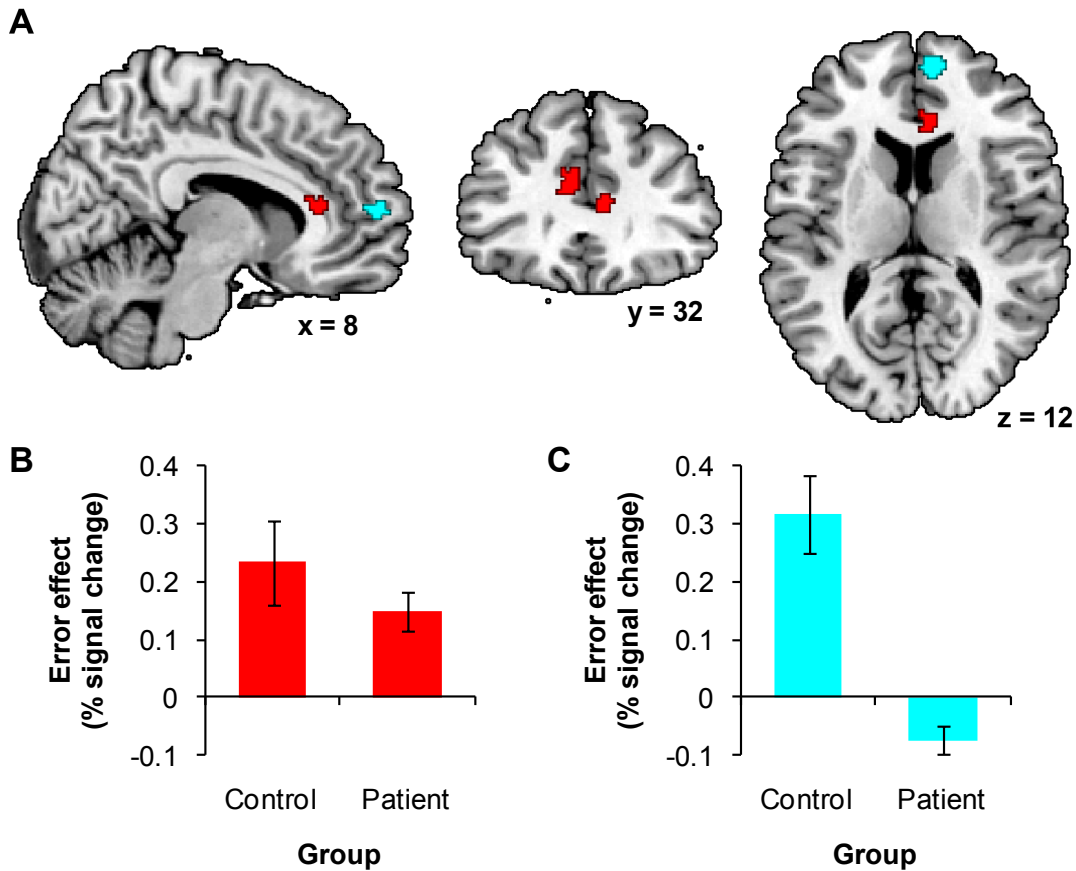
<i>Effect (Comparison)</i> Brain region(s)	BA	Peak MNI coordinates			Peak Z-score	Peak p-value	Cluster size (voxels)
		x	y	z			
<i>Error-unexpectedness (Contrast: Control &gt; 0)</i>							
R. ACC	32	14	14	32	3.74	< .001	113
B. MFG	9	6	44	34	3.55	< .001	100
L. ACC	24	-10	22	24	2.94	.002	49
R. MFG	10	10	56	8	3.18	.001	23
L. MFG	6	-6	0	64	2.75	.003	6
R. MFG	6	14	0	66	2.84	.002	5
L. ACC	24	-10	4	50	2.82	.002	4
R. MFG	8	10	28	52	2.82	.002	3
<i>Error-likelihood mediates error-unexpectedness (Main effect: All &gt; 0)</i>							
R. MFG	9	8	48	20	3.44	< .001	50

*Note.* Clusters are significant within a predefined medial prefrontal search volume at  $p < .005$ , uncorrected, with a cluster size threshold of 3.

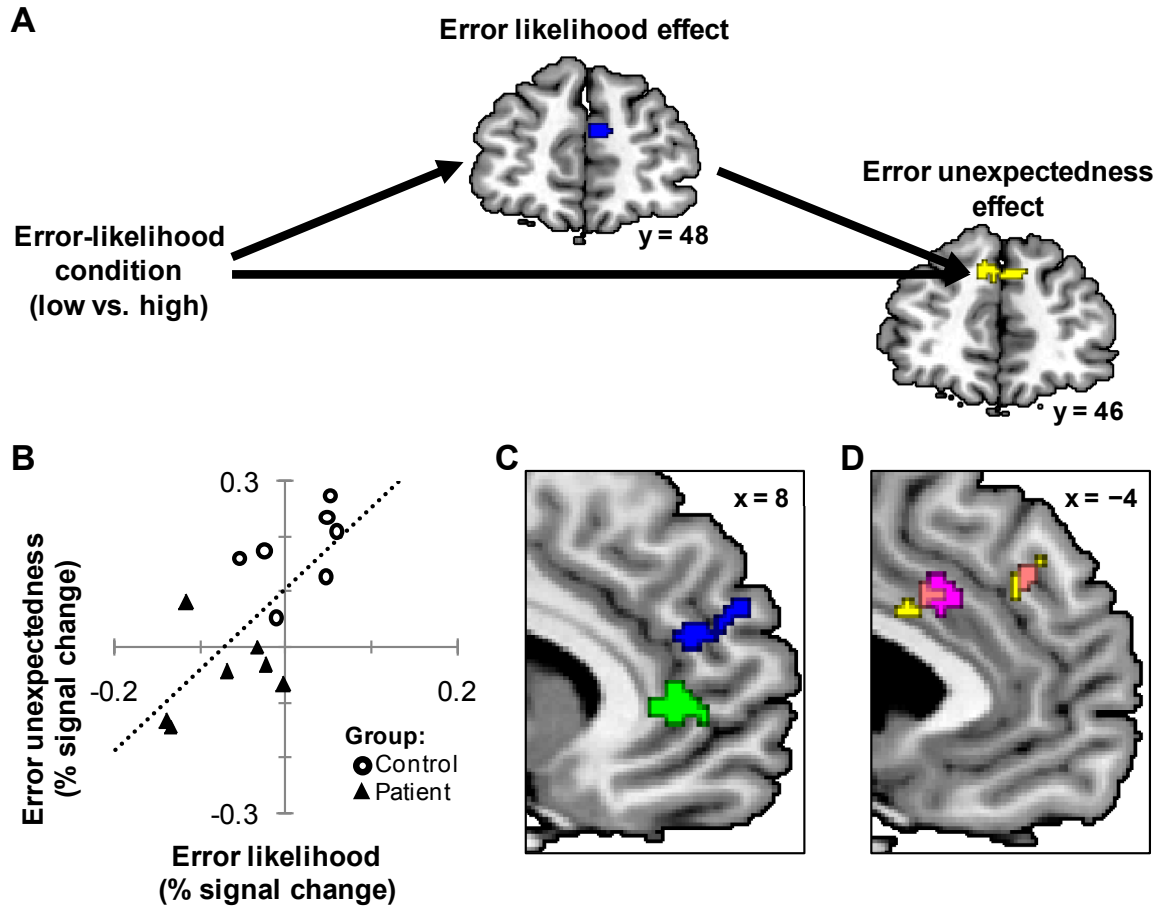
BA = Brodmann area; MNI = Montreal Neurological Institute; B = bilateral; R = right; L = left; ACC = anterior cingulate cortex; MFG = medial frontal gyrus.



**Supplementary Figure S1.** The dorsomedial prefrontal search region used for small volume correction (orange). Defined, using WFU Pickatlas and MarsBaR, as the conjunction of the anterior cingulate, the cingulate gyrus, and the medial frontal gyrus, with a 3-dimensional dilation of 1 mm, and limited to  $15 \geq x \geq -15$ ,  $y \geq 0$ , and  $z \geq 0$  in MNI coordinates.



**Supplementary Figure S2.** Regions showing error effects with DMTS accuracy-matched subgroups. A) Red clusters show a main effect of error across both groups. Cyan clusters show an interaction, with a greater error effect for controls than patients. Clusters are significant within a predefined medial prefrontal search volume at  $p < .05$ , FWE, with a height threshold of  $p < .001$ . Coordinates are in MNI space. B and C) Post hoc ROI analyses showing the error effects for patients and controls in the red and cyan regions respectively. Error bars indicate *SEM*.



**Supplementary Figure S3.** Regions showing error-likelihood that mediates error-unexpectedness within-subject with DMTS accuracy-matched subgroups. A) The relationship across controls and patients between the error-likelihood condition and error unexpectedness in the yellow ROI, identified as showing an error-unexpectedness effect in controls, is mediated by error likelihood in the blue clusters. Voxels are significant within a predefined medial prefrontal search volume at  $p < .005$ , uncorrected, with a cluster-size threshold of 3. B) Post hoc ROI analysis showing the relationship between the error-likelihood effect in the blue region and the error-unexpectedness effect in the yellow region for controls and patients. Each point represents one participant. C) Proximity of the blue region described above and the region previously identified by a

greater error-likelihood effect in controls than patients (green). D) Overlap of the yellow region described above and the region previously identified by a greater error-unexpectedness effect in controls than patients (violet). All coordinates are in MNI space.