

## Online Supplemental Material

### Behavioral Ratings on Trustworthiness Task

As anticipated, separate one-way (group: healthy control vs. non-paranoid schizophrenia vs. paranoid schizophrenia) ANOVAs on trustworthiness ratings made during scanning showed significant group differences for both the number of faces rated as trustworthy ( $F(2,54)=6.44$ ,  $p=.003$ ) and those rated as untrustworthy ( $F(2,54)=7.59$ ,  $p=.001$ ). Tukey's HSD post hoc comparisons demonstrated that the paranoid schizophrenia group rated more faces as untrustworthy and fewer faces as trustworthy relative to both healthy control and non-paranoid individuals with schizophrenia ( $p<.025$  for all comparisons). The healthy control and non-paranoid schizophrenia groups did not differ from one another. Means are provided in Supplemental Table 1.

### Voxel-based Morphometry (VBM)

#### *Statistical Analysis*

VBM provides a voxel-wise comparison of brain tissue composition between groups (Ashburner and Friston, 2000) and was implemented here to examine whether structural differences between groups could potentially account for the CBF findings. SPM8 was used for preprocessing and statistical comparisons. First, the high-resolution T1-weighted anatomical images were preprocessed for VBM by segmenting each image in subject space into gray matter (GM), white matter (WM) and cerebral spinal fluid. The resulting GM and WM images were then rigidly aligned and warped to evolving GM and WM population templates using the DARTEL toolbox (Ashburner, 2007). The GM and WM segmentations were then normalized and smoothed using DARTEL's "Normalize to MNI" module. In this module, the appropriate DARTEL template is affinely registered to MNI space and segmentation images are then

transformed using the DARTEL flow-fields and this affine transformation. Segmentation images are also modulated to account for volume changes occurring during this procedure. Finally, the GM and WM images were smoothed using an 8 mm FWHM Gaussian kernel.

Two one-way (group: healthy control vs. non-paranoid schizophrenia vs. paranoid schizophrenia) ANCOVAs were first used to compare total GM and WM volumes across groups. Linear regression models were then used to test for voxel-wise group differences in GM and WM volume. Separate analyses were conducted for GM and WM, however, in each analysis, participant gender, age, race, and total intracranial volume were used as covariates of no interest. Voxel-wise results were corrected for multiple comparisons using Monte Carlo cluster correction (AlphaSim; Ward, 2000) at  $p < 0.05$ , and these maps were used to visually determine areas of overlap with the perfusion results. The main effect of group from the WM analysis produced a robust cluster ( $k=8941$ ) that included subclusters driven by different patterns of group differences (e.g. areas in which the non-paranoid schizophrenia group was greater than the healthy control group and vice versa). Thus, to clarify the findings, results for the VBM analyses are presented at a more conservative cluster corrected threshold of  $p < .01$ , which yields smaller, more easily interpreted clusters.

### *Results*

Total GM and WM volume did not significantly differ between groups (GM:  $F(2,51)=1.19$ ,  $p=.31$ ; WM:  $F(2,51)=.52$ ,  $p=.60$ ); however voxel-wise comparisons revealed several focal differences between groups. As compared to control participants, reduced GM in patients was evident in right cingulate gyrus (BA 24), right postcentral gyrus (BA 43), and bilateral cerebellum. The healthy control group also showed greater GM volumes in left insula (BA 13) relative to the paranoid group and in left cerebellum relative to the non-paranoid

schizophrenia group. There were no regions in which patients showed greater GM volumes than controls. Differences in WM volumes were also evident with controls showing greater volumes than both patient groups in left internal capsule, left middle frontal WM, and right cerebellum (Supplemental Table 2).

Importantly, there was relatively little overlap between regions showing GM or WM differences between groups and those areas showing CBF group differences. The only areas of overlap occurred in right paracentral lobule (due to an extension of the GM cluster at cingulate gyrus into paracentral lobule) and bilateral internal capsule (Supplemental Figure 1).

## Supplemental Table 1

## Trustworthiness Task Ratings

Characteristic	Healthy Control	Non-paranoid Schizophrenia	Paranoid Schizophrenia
	(n=25) Mean (SD)	(n=16) Mean (SD)	(n=16) Mean (SD)
Number of faces rated Trustworthy	36.88 (6.88)	35.44 (12.17)	25.25 (13.27)
Number of faces rated Untrustworthy	20.84 (6.86)	22.63 (12.29)	33.50 (13.09)

## Supplemental Table 2

VBM results: Brain regions showing significant group differences in gray and white matter volumes

Cluster Size <sup>a</sup>	Anatomical Label and Brodmann Area <sup>b</sup>	Talairach Coordinates x, y, z	Peak Z Score	Direction of Effect
<b>Gray Matter</b>				
452	R. cingulate gyrus (BA 24)	6, -9, 38	7.47	HC > SCZ
1109	R. cerebellum, anterior lobe	23, -51, -29	6.78	HC > SCZ
304	R. postcentral gyrus (BA 43)	49, -15, 20	6.68	HC > SCZ
570	L. insula (BA 13)	-46, -16, 18	6.41	HC > P-SCZ
347	L. cerebellum, tuber	-29, -83, -9	6.15	HC > NP-SCZ
350	L. cerebellum, cerebellar tonsil	-29, -59, -40	5.14	HC > SCZ
<b>White Matter</b>				
2861	L. anterior limb of internal capsule	-10, 8, 6	6.35	HC > SCZ
359	L. middle frontal WM	-29, 38, -2	5.67	HC > SCZ
455	R. cerebellar WM	7, -47, -31	4.45	HC > SCZ

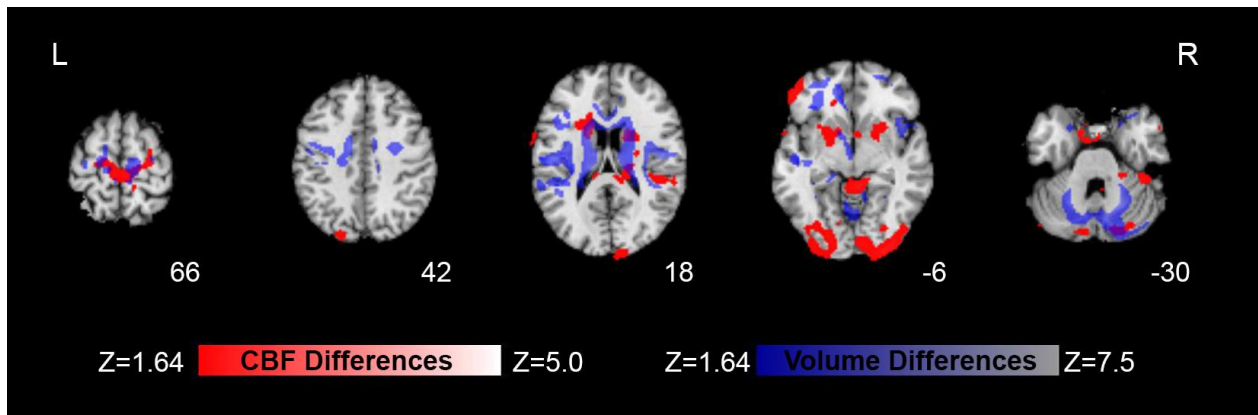
HC=healthy comparison; NP-SCZ=non-paranoid schizophrenia; P-SCZ=paranoid schizophrenia.

R=right, L=left, WM=white matter

<sup>a</sup> Cluster size is reported in voxels (2 x 2 x 2 mm).

<sup>b</sup> Anatomical labels for gray matter were assigned according to Talairach and Tournoux (1988), and anatomical labels for white matter were assigned according to the JHU\_MNI\_SS\_WMPM\_TypeI atlas (Oishi et al., 2009).

Supplemental Figure 1



Neural regions showing areas of overlap between the CBF and VBM analyses. Red clusters indicate significant differences in rCBF between groups; blue clusters indicate significant differences in tissue volume. Images are cluster level corrected at  $p < .05$ .

## References

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