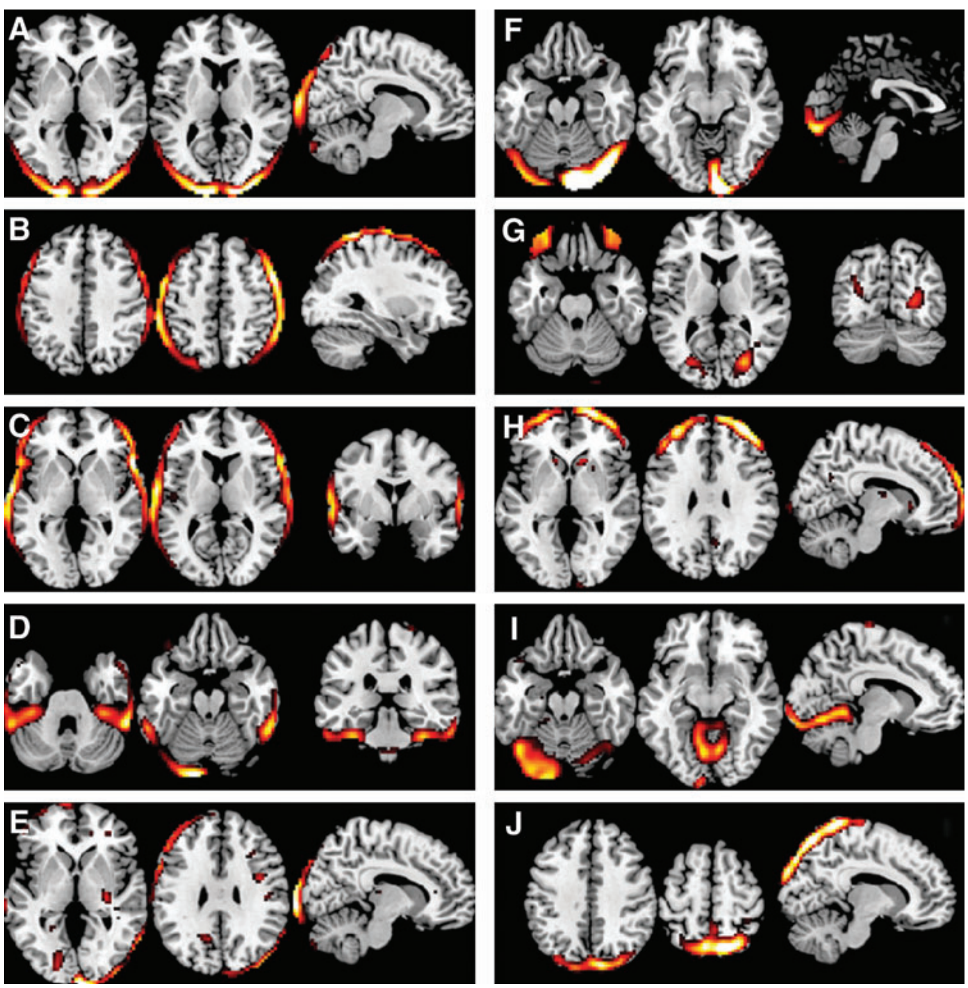
Supplementary Data

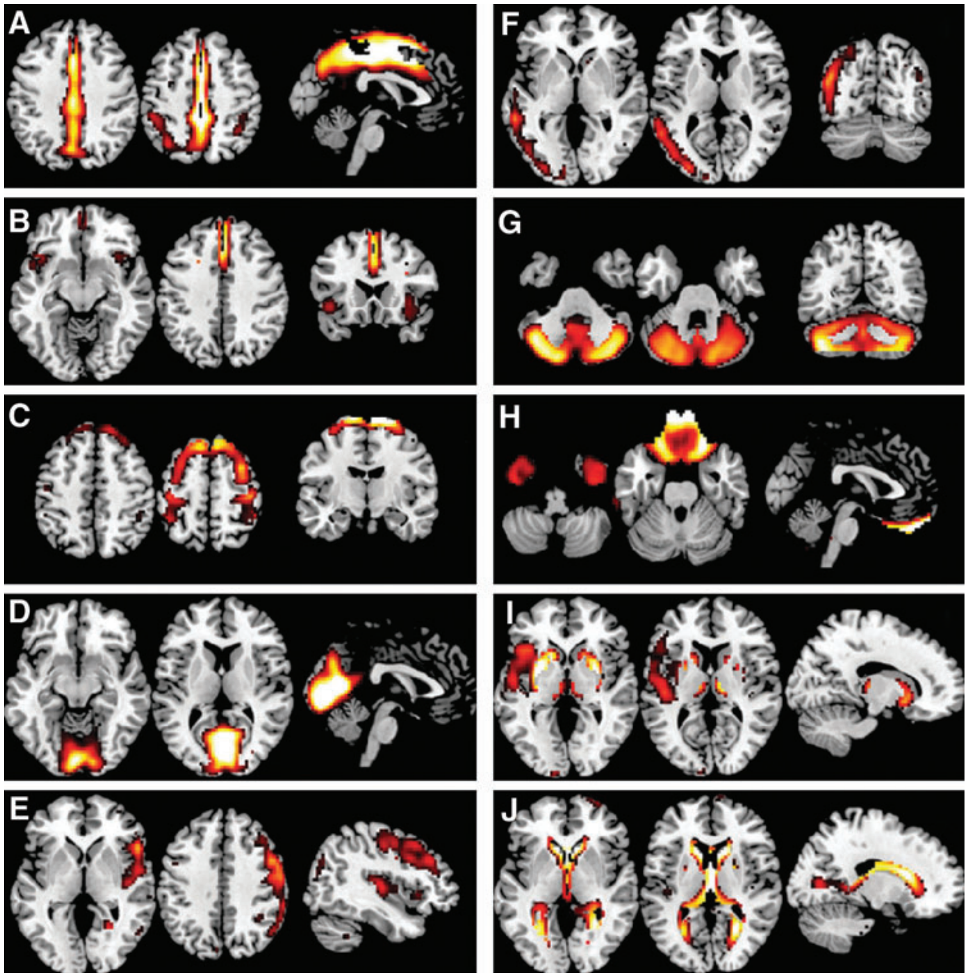
Supplementary Methods

One possible confounding variable of the positron-emission tomography-independent component analysis (PET ICA) and intersubject correlation analysis is the partial volume effect. Because of the low resolution of PET images, the signals of the PET image might be affected by the underlying proportion of gray matter structure. Consequently, the covariance of the PET signals might due to the variance of underlying gray matter volume (GMV), but not metabolic signals *per se*. To rule out this possibility, GMV image for each subject was obtained to control the partial volume effect. The GMV images were obtained from the segmentation of subjects' T1 images. All the GMV images were smoothed using a Gaussian kernel of 6-mm full-width at half maximum.

Two types of GMV information might affect PET connectivity analysis, within-subject spatial variance, and intersubject variance. For the ICA, the question is whether the spatial variance of PET signals is due to underlying spatial variance of GMV. Thus, we used a spatial regression for each subject to regress out spatial GMV variance from the PET images (a similar method has been used in functional magnetic resonance-imaging experiments) (Di *et al.*, 2012). Specifically, for each subject, all the voxels of the PET image and GMV image within a GM mask were concatenated as vectors. The GMV vectors were mean centered. Then, a simple linear regression was calculated with the PET vector as dependent variable, and the



SUPPLEMENTARY FIG. S1. Independent components that were classified as noise **(A–J)** when 20 ICs were extracted. Individual IC map was *z*-transformed, and thresholded at $z > 1.96$.



SUPPLEMENTARY FIG. S2. Ten independent components of the positron-emission tomography (PET) subject series obtained after removal of gray matter volume (GMV) information. These 10 components **(A–J)** appear similar to the components before removal of GMV information (Fig. 1A–J).

GMV vector as independent variable. The residual vector was obtained, and back reconstructed into 3D image. The resulting GMV-removed PET images were entered into the ICA procedure. Twenty components were extracted. The resulting IC maps were visually compared to the IC maps before GMV removal to see whether the removal of GMV information would affect the PET ICA results.

For the intersubject correlation of the PET signals in the region of interest (ROI) analysis, the high correlations might also due to high intersubject correlation of GMV. To rule out this possibility, the correlations between the PET signals and GMV for each ROI were calculated. Then, the GMV variances were regressed out from the PET signals using linear regression. PET correlations before and after removing GMV effects were calculated.

Supplementary Results

ICA results of the PET data

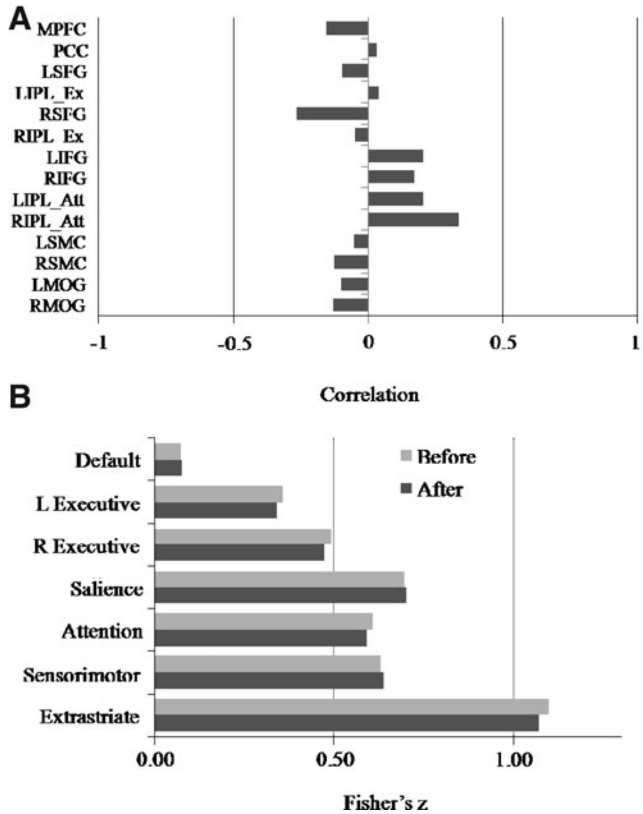
For the PET ICA extracting 20 components, in addition to the 10 ICs reported in the main text (Fig. 1A–J), the remaining 10 ICs were illustrated in Supplementary Figure S1. These components were mainly located at the border of the brain, which were classified as noise.

The effects of GMV on PET ICA results

Supplementary Figure S2 illustrates the 10 PET IC maps after removal of individual GMV information. These 10 ICs were corresponding well with the 10 ICs before GMV removal (see Fig. 1A–J). Thus, the spatial variance of GMV has limited effects on the ICA results of PET images.

The effects of GMV on intersubject PET correlations

The correlations between regional PET signal and regional GMV for each ROI are illustrated in Supplementary Figure S3A. Only small correlations were observed in the right superior frontal gyrus (RSFG; $r = -0.27$, $p < 0.001$), left inferior frontal gyrus (LIFG; $r = 0.20$, $p = 0.011$), right IFG (RIFG; $r = 0.17$, $p = 0.034$), LIPL_att ($r = 0.20$, $p = 0.011$), and RIPL_att ($r = 0.34$, $p < 0.0001$). The correlations in other ROIs were not significant. Most importantly, regressing out GMV variances from the PET signals had very little effects on the PET covariances (Supplementary Fig. S3B).



SUPPLEMENTARY FIG. S3. The effects of structural variances on the metabolic covariance. **(A)** The intersubject correlation between PET signals and GMV in each region of interest. **(B)** The correlation between nodes in each network before and after removal of GMV effects.