Supplemental Materials A.

Functional MRI Acquisition

Specifics of our scanning parameters are previously described and success rates are detailed [1–5]. Of the typical control children, 17 (of 74) children were excluded for the following reasons: seven for movement during scanning, seven due to questionable task engagement (poor task accuracy and/or no significant clusters of activation), two due to aborted scans because of a technical difficulty and one child due to request to be removed from the scanner. None of the normal adults were excluded.

The majority of patients who did not have successful fMRI scans were young, inattentive, and/or anxious[1,2]. Thirteen patients could not complete the scan due to anxiety and/or hyperactivity, and five patients had uninterpretable results due to movement and/or no significant clusters of activation. Three patients were excluded due to technical difficulty during scanning. Ten patients could not be scanned due to preexisting conditions such as implanted metallic devices (5), shunts (2), and VNS (3). Twelve patients that had a Full Scale IQ in the intellectually deficient range (FSIQ <70) were included. All included participants had activation on visual inspection.

All patients and 61 controls were scanned on a 3.0 Tesla scanner (General Electric Medical Systems, Milwaukee, WI) using echoplanar imaging (EPI) blood oxygen level dependent (BOLD) techniques. Gradient echoplanar images were collected using TE=30 msec, FOV=22 x 22 cm, acquisition matrix=64 x 64, and interscan interval (TR)=2000 msec. Brain volumes consisted of 30 x 4-mm-thick axial slices. Anatomical images were collected using a three-dimensional fast SPGR sequence and brain volumes consisting of

30 axial slices (4-mm thickness). Images were collected parallel to the anterior commissure-posterior commissure plane.

57 controls were scanned on a Siemens 3.0 Tesla Magnetom Trio scanner (Erlangen, Germany) using EPI BOLD techniques. Gradient echoplanar images were collected using TR=3000ms, TE =30ms, FoV= 192mm, and voxel size=3.0 x 3.0 x 2.8 mm. Whole brain volumes consisted of 50 axial slices of 2.8mm thickness and with 0.2mm between slices. Anatomic images were collected using a sagittal T1 MPRAGE sequence, slice thickness of 1.0, TR of 1600ms and TE of 3.37. Images were collected parallel to the anterior commissure–posterior commissure plane. We have determined that results do not vary by scanner [4]. Further more, all patients are scanned using the same scanner and thus scanner is not a variable for the primary results of this paper. All scans were individually reoriented and preprocessed in SPM2 using realignment (coregistered and resliced), normalization to MNI EPI template, and smoothed using an 8mm Gaussian smoothing kernel. Individual statistics were computed in SPM2, through fMRI model specification where realignment parameters were used as multiple regressors to correct for movement, followed by model estimation and creation of T-contrast.

References

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