Supporting Information

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SI Materials and Methods

Structural and functional data were collected on a 3-tesla Siemens scanner at the Athinoula A. Martinos Imaging Center at the McGovern Institute for Brain Research at MIT. T1-weighted structural images were collected in 128 axial slices with 1.33 mm isotropic voxels (TR = 2 ms, TE = 3.39 ms). Functional, blood oxygenation level dependent (BOLD), data were acquired in 3 × 3 × 4 mm voxels (TR = 2 sec, TE = 30 ms), in 30 near-axial slices. The first four seconds of each run were excluded to allow for steady state magnetization.

Data analysis was performed using SPM2 (www.fil.ion.ucl.ac.uk) and in-house software. The data were realigned, smoothed with a 5 mm smoothing kernel, and normalized to a standard template, in Montreal Neurological Institute (MNI) space. The general linear model was used to analyze BOLD activity of each subject as a function of condition. Covariates of interest were convolved with a standard hemodynamic response function (HRF). Nuisance covariates included: run effects, an intercept term and global signal. Time series data were subjected to a high-pass filter (128 Hz).

BOLD signal differences between conditions were evaluated through second level, random effects analysis. In whole-brain analyses, false positive rate was controlled at $\alpha < .05$ (corrected) by performing Monte-Carlo permutation tests on the data (using a cluster size threshold of pseudot = 3). ROI analyses were performed on PSC during TR 3 through 10 relative to a rest baseline. (The first two TRs were excluded to account for the hemodynamic lag.) Functional ROIs were identified in individual subjects based on localizer experiments or orthogonal contrasts. For the purposes of defining ROIs, contrasts were thresholded in individual subjects at $P < 0.00001$, $k \geq 10$. If no voxels were observer at this threshold, the threshold was lowered to $P < 0.0001$ and then 0.001. If no voxels were observed at the lowered threshold, the subject was excluded from that analysis.

Voxel-by-voxel pattern correlation analysis was used to compare the similarity of activations between the sighted and EB groups. We performed random-effects analyses, in each group, for the ToM network (belief stories–physical stories contrast) and Language Network (physical stories–backward speech contrast). For each contrast and group we extracted voxel-wise t-values from the entire cerebrum. All negative *t* values were set to zero, so as to focus specifically on belief-and-language-related activity above their respective baselines. We then computed a correlation between the pattern of *t* values in the sighted and EB group for belief contrast and for the language contrast. Note that the distributions of t-values were not normal in any of the samples. The large sample sizes, however, rendered the regression robust to violations of the normality assumption (1). We compared the resulting correlations coefficients to each other using the procedure described in Steiger (ref. 2; see also ref. 3). This procedure is designed to compare correlations that are based on data from the same sample. The sample size for this comparison was the number of independently measured *t* values, or 'resels'(4, 5). We computed the average number of resels in each image based on the RPV.img file provided by SPM (average number of resels = 494). We performed the same correlation analyses across two halves of our sighted participants to rule out the possibility that the language network is in general more variable across participants than the ToM network. For this analysis we computed the ToM and language correlations across two halves of our sighted participants.

1. Lumley T, Diehr P, Emerson S, Chen L (2002) The importance of the normality assumption in large public health data sets. *Annu Rev Public Health* 23:151–169.
2. Steiger JH (1980) Tests for comparing elements of a correlation matrix. *Psychol Bull* 87:245–251.
3. DeCoster J (2007) *Applied Linear Regression Notes Set 1*. Available at www.stat-help.com/notes.html. Accessed December 16 2008.
4. Poline JB, Worsley KJ, Holmes AP, Frackowiak RS, Friston KJ (1995) Estimating smoothness in statistical parametric maps: Variability of p values. *J Comput Assist Tomogr* 19:788–796.
5. Worsley KJ, Friston KJ (1995) Analysis of fMRI time-series revisited—again. *NeuroImage* 2:173–181.

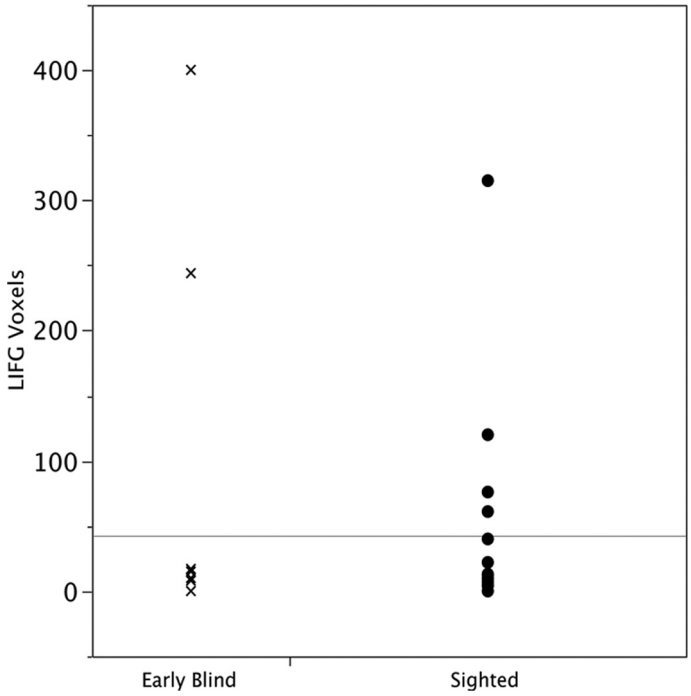

Fig. S1. Number of active voxels in the Left Inferior Frontal Gyrus (LIFG) for the Belief - Physical Representations contrast. On the *y* axis is the number of voxels in the LIFG that reached a threshold of $P < 0.0001$, uncorrected in each individual subject. Each point represents a single subject. Xs represent EB participants; dots represent sighted participants.

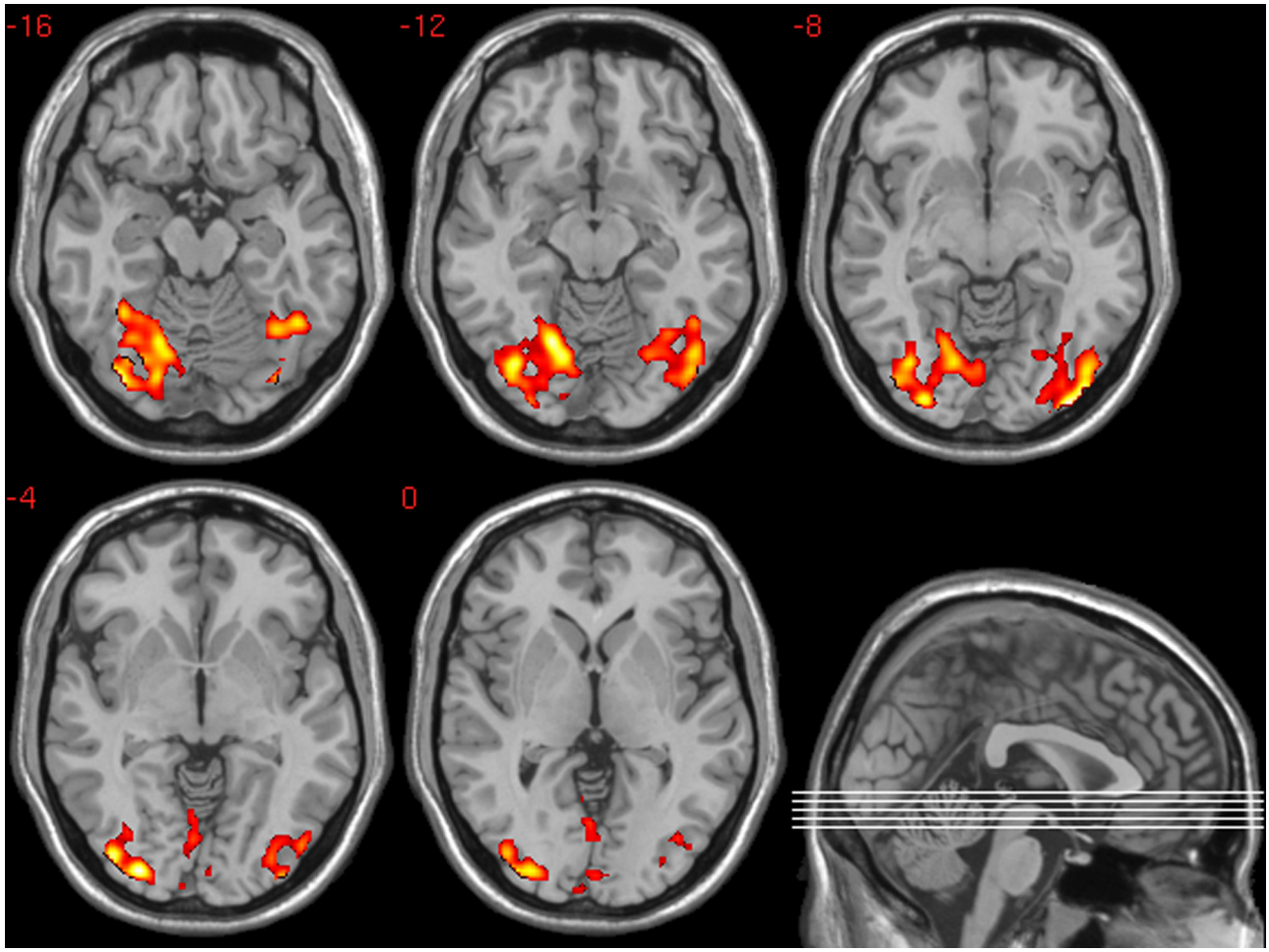

Fig. S2. Greater activity in EB than sighted participants for the physical stories–backwards speech contrast. Depicted is a group-by-condition interaction of Group: sighted vs. early blind; condition: physical stories vs. backwards speech. These are results of a whole-brain, random-effects analyses, $P < 0.05$ corrected.

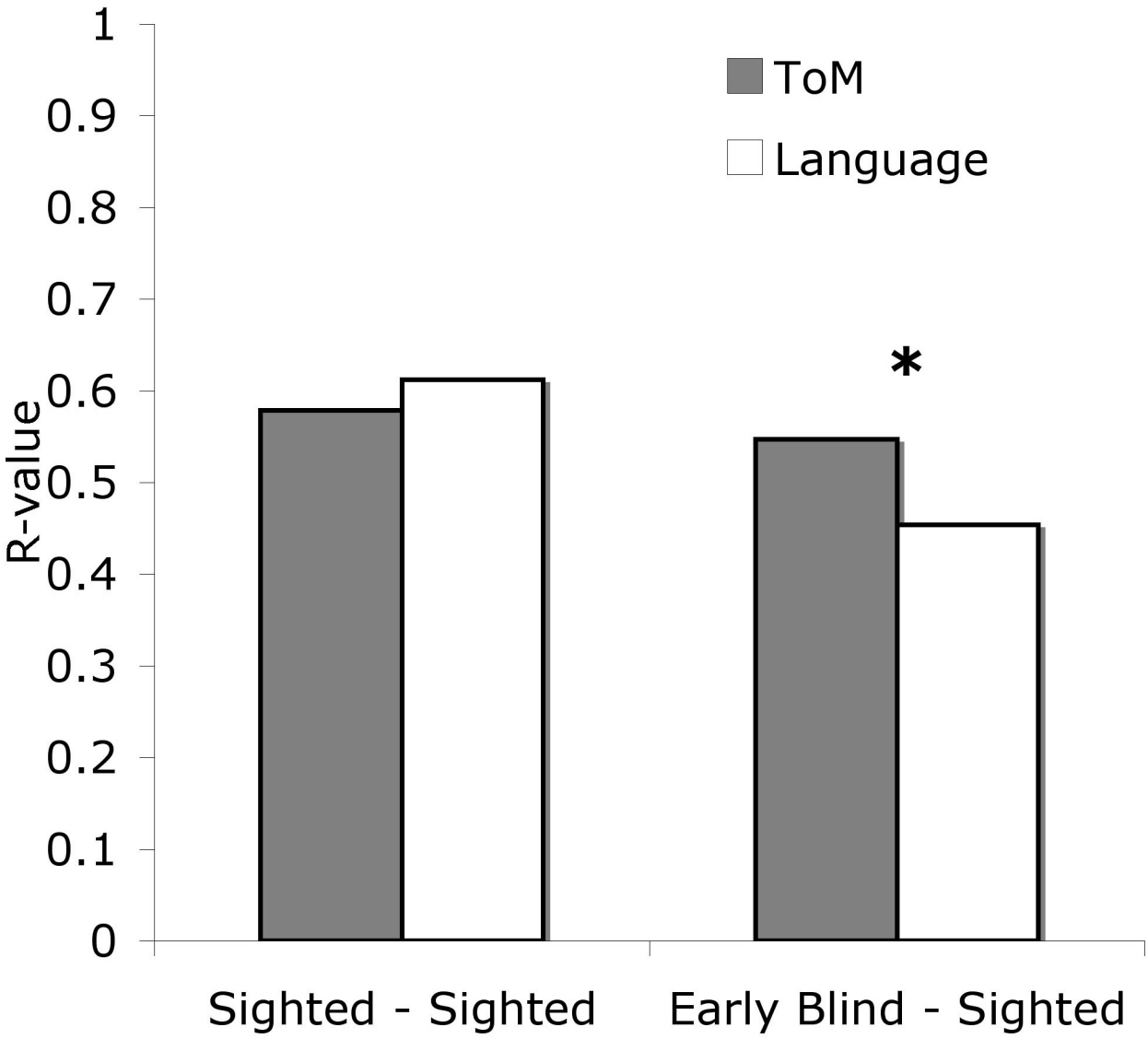

Fig. S3. Similarity between activation patterns of sighted and EB in the ToM and language contrasts. *R* values of between-group correlations computed over voxel-wise activation pattern in the ToM and language contrasts. The ToM contrast is the pattern of activation for the belief stories greater than physical representation stories. The language contrast is the pattern of activation for physical representation stories greater than backwards speech. On the left are correlations between two halves of the sighted participants. On the right are correlations between EB and sighted groups.

Experiment 1

		Story	True/False Question
Belief	Representations	The morning of high school dance Sarah placed her high heel shoes under her dress and then went shopping. That afternoon, her sister borrowed the shoes and later put them under Sarah's bed.	Sarah gets ready assuming her shoes are under the dress.
	Reality	When Jeff got ready this morning, he put on a light pink shirt instead of a white one. Jeff is colorblind, so he can't tell the difference between subtle shades of color.	In reality, Jeff's shirt is pink.
Physical	Representations	A photograph was taken of an apple hanging on a tree branch. The film took half an hour to develop. In the meantime, a strong wind blew the apple to the ground.	The developed photograph shows the apple on the ground.
	Reality	A volcano erupted on this Carribean island three months ago. Barren lava rock is all that remains. Satellite photographs show the island as it was before the eruption.	The island itself is covered in rock.

Experiment 2

Belief (Seeing)	Positive	Today Eric is going to meet his future in-laws. When he gets to the restaurant, Eric sees his fiancée standing with her parents. Her face looks very happy.
	Negative	Today Eric is going to meet his future in-laws. When he gets to the restaurant, Eric sees his fiancée standing with her parents. Her face looks very worried.
Belief (Hearing)	Positive	Today Eric is going to meet his future in-laws. When he gets to the restaurant, Eric hears his fiancée talking with her parents. She is laughing happily.
	Negative	Today Eric is going to meet his future in-laws. When he gets to the restaurant, Eric hears his fiancée talking with her parents. She sounds very worried.
Bodily Feeling	Positive	Today Eric is going to meet his future in-laws. When he gets to the restaurant, Eric smells something delicious. He feels hungry and ready for dinner.
	Negative	Today Eric is going to meet his future in-laws. When he gets to the restaurant, Eric smells something disgusting. He feels nauseated, not hungry at all .
Control	Positive	Today is opening day for a new bridge over the river. Once it is open, the bridge will be architecturally unique in the world. The suspension structure is elegant and functional.
	Negative	Today a large diamond has disappeared from the bank. Since early this morning, all the locks on the bank vault are smashed. The famous diamond, along with thousands of dollars in cash, are missing.

Fig. S4. Examples of stories and questions from each condition in experiments 1 and 2. On the left are stories from experiment 1. To the right of each story is its corresponding true/false questions. On the right are stories from experiment 2. For each story, participants decided whether the protagonist felt or the news was ''very good,'' ''a little good,'' ''a little bad,'' or ''very bad.'' Belief stories appear in dark gray.

Table S1. Accuracy and reaction time data for experiments 1 and 2

Group	Condition	% Correct	RT, msec
Experiment 1			
EB	Belief	85 (17)	4,525 (222)
	Physical	81 (15)	4,339 (276)
	Noise	55 (11)	4,447 (240)
Sighted	Belief	89 (11)	4,262 (270)
	Physical	88 (11)	4,161 (311)
	Noise	52 (8)	4,409 (396)
Experiment 2			
EB	Hearing Belief	—	5,230 (1,409)
	Seeing Belief	—	5,435 (1,403)
	Bodily	—	5,093 (1,553)
	Control	—	4,945 (1,327)
Sighted	Hearing Belief	—	5,366 (1,186)
	Seeing Belief	—	5,168 (1,202)
	Bodily	—	5,189 (1,247)
	Control	—	4,987 (1,412)

Shown are the means of accuracy and reaction time data across participants. Standard deviations appear in parentheses. RT, reaction time.

Table S2. Demographic characteristics of EB participants

Subject	Gender	Age, yr	Age of blindness	Cause of blindness	Visual perception	Highest level of education (years)
EB1	F	47	Birth	Premature birth/RLF	none	3 yr of college
EB2	F	61	Birth	Not known	minimal light perception in left eye	multiple MAs (22)
EB3	M	46	Birth	Retnoblastoma	none	MA (18)
EB4	M	54	Birth	Premature birth/RLF	none	MA (18)
EB5	M	40	Birth	Congenital bilateral cataracts	none	Some college (13)
EB6	F	43	Birth	Premature birth/RLF	none	BA (16)
EB7	M	55	2.5 yr	Retnoblastoma	none	JD (19)
EB8	M	44	Birth	Congenital rubella syndrome	none	BA (16)
EB9	F	57	Birth	Premature birth/RLF	none	MA (18)
EB11	F	53	Birth	Premature birth/RLF	minimal light perception	MA (18)

Age of blindness describes onset of blindness, which is defined as absence of vision with at most minimal light perception. RLF, retinopathy of prematurity; JD, juris doctorate.