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Main Figures: 8

Supplementary Figures: 8

Supplementary Tables: 2

Supplementary Videos: 2

Reporting Checklist for Nature Neuroscience

This checklist is used to ensure good reporting standards and to improve the reproducibility of published results. For more information, please read Reporting Life Sciences Research.

Please note that in the event of publication, it is mandatory that authors include all relevant methodological and statistical information in the manuscript.

Statistics reporting, by figure

- Please specify the following information for each panel reporting quantitative data, and where each item is reported (section, e.g. Results, & paragraph number).
- Each figure legend should ideally contain an exact sample size (n) for each experimental group/condition, where n is an exact number and not a range, a clear definition of how n is defined (for example x cells from x slices from x animals from x litters, collected over x days), a description of the statistical test used, the results of the tests, any descriptive statistics and clearly defined error bars if applicable.
- For any experiments using custom statistics, please indicate the test used and stats obtained for each experiment.
- Each figure legend should include a statement of how many times the experiment shown was replicated in the lab; the details of sample collection should be sufficiently clear so that the replicability of the experiment is obvious to the reader.
- For experiments reported in the text but not in the figures, please use the paragraph number instead of the figure number.

Note: Mean and standard deviation are not appropriate on small samples, and plotting independent data points is usually more informative. When technical replicates are reported, error and significance measures reflect the experimental variability and not the variability of the biological process; it is misleading not to state this clearly.

		TEST USED		n			DESCRIPTIVE STATS (AVERAGE, VARIANCE)		P VALUE		DEGREES OF FREEDOM & F/t/z/R/ETC VALUE	
	FIGURE NUMBER	WHICH TEST?	SECTION & PARAGRAPH #	EXACT VALUE	DEFINED?	SECTION & PARAGRAPH #	REPORTED?	SECTION & PARAGRAPH #	EXACT VALUE	SECTION & PARAGRAPH #	VALUE	SECTION & PARAGRAPH #
example	1a	one-way ANOVA	Fig. legend	9, 9, 10, 15	mice from at least 3 litters/group	Methods para 8	error bars are mean +/- SEM	Fig. legend	p = 0.044	Fig. legend	F(3, 36) = 2.97	Fig. legend
example	results, para 6	unpaired t-test	Results para 6	15	slices from 10 mice	Results para 6	error bars are mean +/- SEM	Results para 6	p = 0.0006	Results para 6	t(28) = 2.808	Results para 6

		TEST USED		n			DESCRIPTIVE STATS (AVERAGE, VARIANCE)		P VALUE		DEGREES OF FREEDOM & F/t/z/R/ETC VALUE	
	FIGURE NUMBER	WHICH TEST?	SECTION & PARAGRAPH #	EXACT VALUE	DEFINED?	SECTION & PARAGRAPH #	REPORTED?	SECTION & PARAGRAPH #	EXACT VALUE	SECTION & PARAGRAPH #	VALUE	SECTION & PARAGRAPH #
+ -	1f	Mann-Whitney	Figure Legend	21, 30, 6	animals used for analysis	Figure legend	error bars are mean ± SEM	Figure legend	Ctrl vs MPTP (>2 Months) P＜0.0001；Ctrl vs reserpine (>2 Months) P=0.0003;	Figure legend	N/A	N/A
+ -	1g	Mann-Whitney	Figure legend	21, 30, 6	animals used for analysis	Figure legend	error bars are mean ± SEM	Figure legend	Ctrl vs MPTP (>2 Months) P＜0.0001；Ctrl vs MPTP (>2 Months) P=0.0003;	Figure legend	N/A	N/A
+ -	1j	Mann-Whitney	Figure legend	5, 7	animals used for analysis	Figure legend	error bars are mean ± SEM	Figure legend	P=0.6237;	Figure legend	N/A	N/A
+ -	1k	Mann-Whitney	Figure legend	5, 7	animals used for analysis	Figure legend	error bars are mean ± SEM	Figure legend	P=0.5303;	Figure legend	N/A	N/A
+ -	2d	Mann-Whitney	Figure legend	5, 4, 21, 30, 6, 6, 5, 5, 4, 5	animals used for analysis	Figure legend	error bars are mean ± SEM	Figure legend	1 days interval P=0.0159; 4 days interval P＜0.0001; 8 days interval P=0.0050; 12 days interval P=0.0079; 16 days interval P=0.0159;	Figure legend	N/A	N/A
+ -	2e	Mann-Whitney	Figure legend	5, 4, 21, 30, 6, 6, 5, 5, 4, 5	animals used for analysis	Figure legend	error bars are mean ± SEM	Figure legend	1 day interval P=0.0159; 4 days interval P＜0.0001; 8 days interval P=0.0022; 12 days interval P=0.0079; 16 days interval P=0.0195;	Figure legend	N/A	N/A
+ -	2f	Mann-Whitney	Figure legend	5, 4, 21, 30, 6, 6, 5, 5, 4, 5	animals used for analysis	Results, para 4	error bars are mean ± SEM	Figure legend	1 day interval P=0.3252; 4 days interval P=0.0032; 8 days interval P=0.0411; 12 days interval P=0.0119; 16 days interval P=0.0159;	Figure legend	N/A	N/A

+ -	2g	Mann-Whitney	Figure legend	5, 4, 21, 30, 6, 6, 5, 5, 4, 5	animals used for analysis	Results, para 4	error bars are mean ± SEM	Figure legend	1 day interval P=0.0195; 4 days interval P<0.0001; 8 days interval P=0.0022; 12 days interval P=0.0079; 16 days interval P=0.0159;	Figure legend	N/A	N/A
+ -	2h	Mann-Whitney	Figure legend	6, 5, 5, 6, 5, 4	animals used for analysis	Results, para 5	error bars are mean ± SEM	Figure legend	imaging intervals 0-4-8 P=0.0050; imaging intervals 0-4-12 P=0.0079; imaging intervals 0-4-16 P=0.0159;	Figure legend	N/A	N/A
+ -	3b	Mann-Whitney	Figure legend	6, 6, 4	animals used for analysis	Figure legend	error bars are mean ± SEM	Figure legend	Ctrl vs MPTP (Elimination) P=0.0022; MPTP vs MPTP/L-Dopa (Elimination) P=0.0095; Ctrl vs MPTP (Formation) P=0.0050; MPTP vs MPTP/L-Dopa (Formation) P=0.0095;	Figure legend	N/A	N/A
+ -	3f	Mann-Whitney	Figure legend	21, 30, 14, 13	animals used for analysis	Figure legend	error bars are mean ± SEM	Figure legend	Ctrl vs MPTP (Elimination) P<0.0001; Ctrl vs SCH23390 (Elimination) P<0.0001; Ctrl vs Haloperidol (Elimination) P=0.1956; Ctrl vs MPTP (Formation) P<0.0001; Ctrl vs SCH23390 (Formation) P=0.1475; Ctrl vs Haloperidol (Formation) P<0.0001;	Figure legend	N/A	N/A
+ -	3g	Mann-Whitney	Figure legend	21, 30, 14, 13	animals used for analysis	Figure legend	error bars are mean ± SEM	Figure legend	Ctrl vs MPTP P=0.0150; Ctrl vs SCH23390 P< 0.0001; Ctrl vs Haloperidol P<0.0001;	Figure legend	N/A	N/A

+ -	3h	Mann-Whitney	Figure legend	6, 6, 4, 6	animals used for analysis	Figure legend	error bars are mean ± SEM	Figure legend	Ctrl vs MPTP (Elimination) P=0.0050; Ctrl vs SCH23390 (Elimination) P=0.0139; Ctrl vs Haloperidol (Elimination) P=0.3776; Ctrl vs MPTP (Formation) P=0.0022; Ctrl vs SCH23390 (Formation) P=0.0871; Ctrl vs Haloperidol (Formation) P=0.0022;	Figure legend	N/A	N/A
+ -	3i	Mann-Whitney	Figure legend	6, 6, 4, 6	animals used for analysis	Figure legend	error bars are mean ± SEM	Figure legend	Ctrl vs MPTP P=0.0087; Ctrl vs SCH23390 P=0.0095; Ctrl vs Haloperidol P=0.0022;	Figure legend	N/A	N/A
+ -	4e	Kruskal-Wallis ANOVA, multiple comparisons	Figure legend	5, 5, 5, 5, 5, 5, 5, 5	animals used for analysis	Figure legend	error bars are mean ± SEM	Figure legend	K-W ANOVA does not report exact P value	Figure legend	N/A	N/A
+ -	5f	Mann-Whitney	Figure legend	8(6), 5(3)	Number of neurons recorded (number of mice)	Figure legend	error bars are mean ± SEM	Figure legend	P=0.0186	Figure legend	N/A	N/A
+ -	5i	Mann-Whitney	Figure legend	8(6), 10(5), 5(4)	Number of neurons recorded (number of mice)	Figure legend	error bars are mean ± SEM	Figure legend	Ctrl vs Reserpine P=0.0085; Ctrl vs 6-OHDA P=0.0186	Figure legend	N/A	N/A
+ -	5l	Mann-Whitney	Figure legend	8(6), 8(5), 7(4)	Number of neurons recorded (number of mice)	Figure legend	error bars are mean ± SEM	Figure legend	Ctrl vs SCH23390 P=0.0207; Ctrl vs Sulpiride P=0.5358	Figure legend	N/A	N/A
+ -	6c	Mann-Whitney	Figure legend	5(3), 5(5)	Number of neurons recorded (number of mice)	Figure legend	error bars are mean ± SEM	Figure legend	P=0.4127	Figure legend	N/A	N/A
+ -	6d	Mann-Whitney	Figure legend	5(3), 5(5)	Number of neurons recorded (number of mice)	Figure legend	error bars are mean ± SEM	Figure legend	P=0.4127	Figure legend	N/A	N/A
+ -	6e	Mann-Whitney	Figure legend	5(3), 5(3), 5(3)	Number of neurons recorded (number of mice)	Figure legend	error bars are mean ± SEM	Figure legend	Ctrl vs CPP, P=0.0159; Ctrl vs Reserpine, P=0.0079	Figure legend	N/A	N/A
+ -	6f	Mann-Whitney	Figure legend	5(3), 5(3), 5(3)	Number of neurons recorded (number of mice)	Figure legend	error bars are mean ± SEM	Figure legend	Ctrl vs CPP, P=0.0159; Ctrl vs Reserpine, P=0.0079	Figure legend	N/A	N/A

+ -	7c	Fisher's exact test	Figure legend	121, 45, 54, 35, 80, 41	Number of induction attempts for each condition	Figure legend	(percentage only)	Figure legend	Ctrl vs SCH23390 P= 1.00; Ctrl vs Sulpiride P=0.0049; Ctrl vs Haloperidol P=0.0083; Ctrl vs R-CPP P=0.0302; Ctrl vs MK801 P=0.3624.	Figure legend	N/A	N/A
+ -	7d	Mann-Whitney	Figure legend	7, 5, 7, 5	animals used for analysis	Figure legend	error bars are mean ± SEM	Figure legend	Ctrl vs MK801 (Elimination) P=0.0025; Ctrl vs MK801 (Formation) P=0.1465	Figure legend	N/A	N/A
+ -	8c	Mann-Whitney	Figure legend	5,9	animals used for analysis	Figure legend	error bars are mean ± SEM	Figure legend	Repeated measure, 2 way ANOVA with post-hoc comparisons. P=0.0003 for control trained group. P<0.0001 for MPTP trained group. Prism does not report exact P values using this test. Post-hoc Multiple comparisons: Control: Day 1 vs Day5, P<0.01, Day1 vs Day 6, P<0.01, Day 1 vs Day 7, P<0.01, Day 1 vs Day 8, P<0.01, Day 1 vs Day 38, P<0.05; MPTP trained group: Day 1 vs Day5, P<0.05, Day1 vs Day 6, P<0.01, Day 1 vs Day 7, P<0.001, Day 1 vs Day 8, P<0.0001, Day 1 vs Day 38, not significant.	Figure legend	N/A	N/A
+ -	8d	Mann-Whitney	Figure legend	5,4,5,4,5, 4,5,4,5,4	animals used for analysis	Figure legend	error bars are mean ± SEM	Figure legend	-4~0 no training vs training P=0.7302; 0~2 no training vs training P=0.0159; 2~4 no training vs training P=0.0317; 4~6 no training vs training P=0.0317; 6~8 no training vs training P=0.3252;	Figure legend	N/A	N/A

+ -	8e	Mann-Whitney	Figure legend	5,4,5,4,5, 4,5,4,5,4	animals used for analysis	Figure legend	error bars are mean ± SEM	Figure legend	-4~0 no training vs training P=0.2857; 0~2 no training vs training P=0.0159; 2~4 no training vs training P=0.0159; 4~6 no training vs training P=0.0195; 6~8 no training vs training P=0.0159;	Figure legend	N/A	N/A
+ -	8f	Mann-Whitney	Figure legend	5,5,5,5,5, 5,4,5,4,5	animals used for analysis	Figure legend	error bars are mean ± SEM	Figure legend	-4~0 no training vs training P=0.4206; 0~2 no training vs training P=0.1508; 2~4 no training vs training P=0.6905; 4~6 no training vs training P=0.1111; 6~8 no training vs training P=0.9048;	Figure legend	N/A	N/A
+ -	8g	Mann-Whitney	Figure legend	5,5,5,5,5, 5,4,5,4,5	animals used for analysis	Figure legend	error bars are mean ± SEM	Figure legend	-4~0 no training vs training P=0.5476; 0~2 no training vs training P=0.1425; 2~4 no training vs training P=0.0317; 4~6 no training vs training P=0.9048; 6~8 no training vs training P=0.1111;	Figure legend	N/A	N/A

+ -	8h	Mann-Whitney	Figure legend	control + training: n=4, MPTP +training n=5, control no training n=5, MPTP no training n=5	animals used for analysis	Figure legend	error bars are mean ± SEM	Figure legend	Day 4: Ctrl no training vs Ctrl +training: P=0.0159, Day 6: Ctrl no training vs Ctrl +training: P=0.0159; Day 8: Ctrl no training vs Ctrl +training: P=0.0159; Day 38: Ctrl + training vs MPTP + training: 0.0317; Day 4 MPTP no training vs MPTP +training: P=0.0238, Day 6 MPTP no training vs MPTP +training: P=0.0397; Day 8 MPTP no training vs MPTP +training: P=0.9683 not significant. Day 38 MPTP no training vs MPTP +training: P=0.7381 not significant.	Figure legend	N/A	N/A
+ -	SUPP 3	Mann-Whitney	Figure legend	5,4,5,4	animals used for analysis	Figure legend	error bars are mean ± SEM	Figure legend	Ctrl vs Raclopride (Elimination) P=0.7302; Ctrl vs Raclopride (Formation) P=0. 0159;	Figure legend	N/A	N/A
+ -	SUPP 5d	Mann-Whitney	Figure legend	5(4), 5(3)	number of neurons recorded (number of mice)	Figure legend	error bars are mean ± SEM	Figure legend	P=1 not significant	Figure legend		
+ -	SUPP 8	Mann-Whitney		6,4,6,6	animals used for analysis		error bars are mean ± SEM	Results, para 15	Ctrl vs SCH23390 (Spine survival rate) P=0.2395; MPTPvs Haloperodol (Spine survival rate) P=0. 0152;	Results, para 15	N/A	N/A
+ -	1h	Mann-Whitney	Figure legend	4, 5	animals used for analysis	Figure legend	error bars are mean ± SEM	Figure legend	Ctrl vs MPTP (1 Months) P=0.0159	Figure legend	N/A	N/A
+ -	1i	Mann-Whitney	Figure legend	4, 5	animals used for analysis	Figure legend	error bars are mean ± SEM	Figure legend	Ctrl vs MPTP (1 Months) P=0.0159;	Figure legend	N/A	N/A

Representative figures

1. Are any representative images shown (including Western blots and immunohistochemistry/staining) in the paper?

   If so, what figure(s)?

Yes:

Figure 1c-e
Figure 2b, c
Figure 3c-e
Figure 4c,d
Figure 5b, c
Figure 6a, b
Figure 7b

Supp Figure 1a-l
Supp Figure 2b, c
Supp Figure 4b
Supp Figure 5a, b
Supp Figure 7a, c

2. For each representative image, is there a clear statement of how many times this experiment was successfully repeated and a discussion of any limitations in repeatability?

   If so, where is this reported (section, paragraph #)?

Figure 1c-e: Results, "Dopamine depletion enhances dendritic spine dynamics in the motor cortex", paragraph 2. Figure 1 legend.

Figure 2b, c: Results, "Dopamine depletion induced reorganization leads to unstable neuronal circuits in the motor cortex", paragraph 1. Figure 2 legend.

Figure 3c-e: Results, "D1 and D2 dopamine receptor signaling differentially regulate spine elimination and formation", paragraph 2. Figure 3 legend.

Figure 4c, d: Results, "Spine turnover is regulated by direct dopaminergic projections in M1", paragraphs 2 and 3. Figure 4 legend.

Figure 5b, c: Results, "Dopamine regulation of long-term potentiation (LTP) and long-term depression (LTD)", paragraph 1. Figure 5 legend.

Figure 6a, b: Results, "Dopamine regulation of long-term potentiation (LTP) and long-term depression (LTD)", paragraph 1. Figure 6 legend.

Figure 7b: Results, "Dopamine regulates structural and functional plasticity in the motor cortex," paragraph 2. Figure 7 legend.

Supp Figure 1a-l: Figure legends, "Supplementary Figure 1.", paragraph 1.

Supp Figure 2b, c: Figure legends, "Supplementary Figure 2.", paragraph 1.

Supp Figure 4b: Figure legends, "Supplementary Figure 4.", paragraph 1. Results, "Spine turnover is regulated by direct dopaminergic projections in M1," paragraph 2.

Supp Figure 5a, c: Figure legends, "Supplementary Figure 5.", paragraph 1. Results, "Dopamine regulation of long-term potentiation (LTP) and long-term depression (LTD) " paragraph 1.

Supp Figure 7a, c: Figure legends, "Supplementary Figure 7.", paragraph 1. Results, "Dopamine regulates structural and functional plasticity in the motor cortex" paragraph 2.

Statistics and general methods

1. Is there a justification of the sample size? If so, how was it justified? Where (section, paragraph #)? Even if no sample size calculation was performed, authors should report why the sample size is adequate to measure their effect size.	We didn't include sample size justification in the manuscript. However, the sample size is determined based on our observation and previous publication. The common practice for in vivo imaging studies is to compare at least 4-5 animals from each group. In each animal, ~200 spines were analyzed. For ex vivo electrophysiology, the sample size is n= 7-10 neurons from 3-5 animals in each group. Our sample sizes are quite similar to those documented in previous papers studying in vivo spine imaging and slice patch recording. We are aware of the importance of documenting exact sample size, therefore, sample sizes are described in each figure legends and Supplementary table 1 for spine imaging and the method section for slice recording.
2. Are statistical tests justified as appropriate for every figure? Where (section, paragraph #)?	Yes, statistical tests are clearly documented in the methods section and in figure legends for every figure.
a. If there is a section summarizing the statistical methods in the methods, is the statistical test for each experiment clearly defined?	Yes, statistical tests for each experiment are clearly defined in the method section (paragraph 14) and individual figure legends.
b. Do the data meet the assumptions of the specific statistical test you chose (e.g. normality for a parametric test)? Where is this described (section, paragraph #)?	The data meet the assumptions of specific statistical tests we used in the manuscript. We didn't assume Gaussian distribution for our data and, throughout our paper, non-parametric test (Mann-Whitney Rank Sum test) was used for statistical analysis for comparison. Kruskal-Wallis ANOVA is used for multiple comparisons. This is documented in the method section. These information was described in results and figure legends where the comparison was reported.
c. Is there any estimate of variance within each group of data? Is the variance similar between groups that are being statistically compared? Where is this described (section, paragraph #)?	We used and reported standard errors of the mean (SEM) throughout the manuscript because we focused on comparing the mean value between control and drug treatments. However, we are aware that standard error does not necessarily indicate the variance of data. Standard deviation was reported in the supplementary table 1 for clear demonstration of the data distribution.
d. Are tests specified as one- or two-sided?	No, it is not specified as one- or two-sided.
e. Are there adjustments for multiple comparisons?	Multiple comparisons was only used twice in the manuscript. First: (Figure 4). In this experiments, we were comparing the effect of M1, striatal, M1+striatal 6-OHDA lesion with control sham lesion, therefore, we used Kruskal-Wallis ANOVA for comparing 4 groups. All four experiments were performed simultaneous with identical injection and imaging conditions. Second, (Figure 8). In this experiments, control and MPTP-injected animals went thought the same behavior training. In addition, the same cohort of mice were tested on different days (day 1 to day 8 daily, and day 38). All mice went though the behavior tests with identical conditions.

3. Are criteria for excluding data points reported? Was this criterion established prior to data collection? Where is this described (section, paragraph #)?	The only occasion that we excluded data was when the experiment was a total failure, such as unsuccessful surgery or losing the recording before data collection. Under such conditions, no data point was collected. We faithfully reported all data we successfully collected from each successful experiment.
4. Define the method of randomization used to assign subjects (or samples) to the experimental groups and to collect and process data. If no randomization was used, state so. Where does this appear (section, paragraph #)?	We randomly assigned the animals for either control saline or drug treatment. This was described in method section.
5. Is a statement of the extent to which investigator knew the group allocation during the experiment and in assessing outcome included? If no blinding was done, state so. Where (section, paragraph #)?	Experimenters who analyzed spine dynamics data were blind to the experimental groups and conditions. This is documented in the method section (paragraph 4). No blinding was done in other experiments.
6. For experiments in live vertebrates, is a statement of compliance with ethical guidelines/regulations included? Where (section, paragraph #)?	Yes, it is included. This is described in the first paragraph of method section.
7. Is the species of the animals used reported? Where (section, paragraph #)?	Yes, method section, first paragraph.
8. Is the strain of the animals (including background strains of KO/ transgenic animals used) reported? Where (section, paragraph #)?	Yes, method section, first paragraph.
9. Is the sex of the animals/subjects used reported? Where (section, paragraph #)?	Yes, method section, first paragraph.
10. Is the age of the animals/subjects reported? Where (section, paragraph #)?	Yes, method section, first paragraph.
11. For animals housed in a vivarium, is the light/dark cycle reported? Where (section, paragraph #)?	Yes, method section, first paragraph.
12. For animals housed in a vivarium, is the housing group (i.e. number of animals per cage) reported? Where (section, paragraph #)?	Yes, method section, first paragraph.
13. For behavioral experiments, is the time of day reported (e.g. light or dark cycle)? Where (section, paragraph #)?	Yes, normal light dark cycle method section

14. Is the previous history of the animals/subjects (e.g. prior drug administration, surgery, behavioral testing) reported? Where (section, paragraph #)?	Yes, method section and figure legend on experimental design.
a. If multiple behavioral tests were conducted in the same group of animals, is this reported? Where (section, paragraph #)?	N/A
15. If any animals/subjects were excluded from analysis, is this reported? Where (section, paragraph #)?	We didn't exclude any animals from analysis.
a. How were the criteria for exclusion defined? Where is this described (section, paragraph #)?	N/A
b. Specify reasons for any discrepancy between the number of animals at the beginning and end of the study. Where is this described (section, paragraph #)?	N/A

Reagents

1. Have antibodies been validated for use in the system under study (assay and species)?	We used TH antibody to evaluate DA neuron degeneration. TH antibody has been widely used by many research groups.
a. Is antibody catalog number given? Where does this appear (section, paragraph #)?	Rabbit polyclonal anti-Tyrosine hydroxylase (TH)primary antibody (Sigma, T8700); CY3-conjugated goat Anti-rabbit IgG (Invitrogen, A10520) secondary antibody. Method section.
b. Where were the validation data reported (citation, supplementary information, Antibodypedia)? Where does this appear (section, paragraph #)?	We did not cite the original paper because TH antibody has proved to be one of the most reliable antibodies. Many papers (hundreds) have been published using this antibody.
2. If cell lines were used to reflect the properties of a particular tissue or disease state, is their source identified? Where (section, paragraph #)?	N/A
a. Were they recently authenticated? Where is this information reported (section, paragraph #)?	N/A

Data deposition

Data deposition in a public repository is mandatory for:

a. Protein, DNA and RNA sequences
b. Macromolecular structures
c. Crystallographic data for small molecules
d. Microarray data

Deposition is strongly recommended for many other datasets for which structured public repositories exist; more details on our data policy are available here. We encourage the provision of other source data in supplementary information or in unstructured repositories such as Figshare and Dryad.

We encourage publication of Data Descriptors (see Scientific Data) to maximize data reuse.

1. Are accession codes for deposit dates provided?

   Where (section, paragraph #)?

N/A

Computer code/software

Any custom algorithm/software that is central to the methods must be supplied by the authors in a usable and readable form for readers at the time of publication. However, referees may ask for this information at any time during the review process.

1. Identify all custom software or scripts that were required to conduct the study and where in the procedures each was used.

N/A

2. If computer code was used to generate results that are central to the paper's conclusions, include a statement in the Methods section under "**Code availability**" to indicate whether and how the code can be accessed. Include version information as necessary and any restrictions on availability.

N/A

Human subjects

1. Which IRB approved the protocol?

   Where is this stated (section, paragraph #)?

N/A

2. Is demographic information on all subjects provided?

   Where (section, paragraph #)?

N/A

3. Is the number of human subjects, their age and sex clearly defined?

   Where (section, paragraph #)?

N/A

4. Are the inclusion and exclusion criteria (if any) clearly specified?

   Where (section, paragraph #)?

N/A

5. How well were the groups matched?

   Where is this information described (section, paragraph #)?

   N/A

6. Is a statement included confirming that informed consent was obtained from all subjects?

   Where (section, paragraph #)?

   N/A

7. For publication of patient photos, is a statement included confirming that consent to publish was obtained?

   Where (section, paragraph #)?

   N/A

fMRI studies

For papers reporting functional imaging (fMRI) results please ensure that these minimal reporting guidelines are met and that all this information is clearly provided in the methods:

1. Were any subjects scanned but then rejected for the analysis after the data was collected?

   N/A

   a. If yes, is the number rejected and reasons for rejection described?

      Where (section, paragraph #)?

      N/A

2. Is the number of blocks, trials or experimental units per session and/or subjects specified?

   Where (section, paragraph #)?

   N/A

3. Is the length of each trial and interval between trials specified?

   N/A

4. Is a blocked, event-related, or mixed design being used? If applicable, please specify the block length or how the event-related or mixed design was optimized.

   N/A

5. Is the task design clearly described?

   Where (section, paragraph #)?

   N/A

6. How was behavioral performance measured?

   N/A

7. Is an ANOVA or factorial design being used?

   N/A

8. For data acquisition, is a whole brain scan used?

   If not, state area of acquisition.

   N/A

   a. How was this region determined?

      N/A

9. Is the field strength (in Tesla) of the MRI system stated?	N/A
a. Is the pulse sequence type (gradient/spin echo, EPI/spiral) stated?	N/A
b. Are the field-of-view, matrix size, slice thickness, and TE/TR/ flip angle clearly stated?	N/A
10. Are the software and specific parameters (model/functions, smoothing kernel size if applicable, etc.) used for data processing and pre-processing clearly stated?	N/A
11. Is the coordinate space for the anatomical/functional imaging data clearly defined as subject/native space or standardized stereotaxic space, e.g., original Talairach, MNI305, ICBM152, etc? Where (section, paragraph #)?	N/A
12. If there was data normalization/standardization to a specific space template, are the type of transformation (linear vs. nonlinear) used and image types being transformed clearly described? Where (section, paragraph #)?	N/A
13. How were anatomical locations determined, e.g., via an automated labeling algorithm (AAL), standardized coordinate database (Talairach daemon), probabilistic atlases, etc.?	N/A
14. Were any additional regressors (behavioral covariates, motion etc) used?	N/A
15. Is the contrast construction clearly defined?	N/A
16. Is a mixed/random effects or fixed inference used?	N/A
a. If fixed effects inference used, is this justified?	N/A
17. Were repeated measures used (multiple measurements per subject)?	N/A
a. If so, are the method to account for within subject correlation and the assumptions made about variance clearly stated?	N/A
18. If the threshold used for inference and visualization in figures varies, is this clearly stated?	N/A
19. Are statistical inferences corrected for multiple comparisons?	N/A
a. If not, is this labeled as uncorrected?	N/A

20. Are the results based on an ROI (region of interest) analysis? N/A

    a. If so, is the rationale clearly described? N/A

    b. How were the ROI's defined (functional vs anatomical localization)? N/A

21. Is there correction for multiple comparisons within each voxel? N/A

22. For cluster-wise significance, is the cluster-defining threshold and the corrected significance level defined? N/A

Additional comments

Additional Comments