nature research

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Reporting Summary

Nature Research wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Research policies, see our Editorial Policies and the Editorial Policy Checklist.

Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

n/a	Confirmed	
☐	☒	The exact sample size (*n*) for each experimental group/condition, given as a discrete number and unit of measurement
☐	☒	A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
☐	☒	The statistical test(s) used AND whether they are one- or two-sided *Only common tests should be described solely by name; describe more complex techniques in the Methods section.*
☒	☐	A description of all covariates tested
☐	☒	A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons
☐	☒	A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)
☐	☒	For null hypothesis testing, the test statistic (e.g. *F*, *t*, *r*) with confidence intervals, effect sizes, degrees of freedom and *P* value noted *Give P values as exact values whenever suitable.*
☒	☐	For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings
☒	☐	For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes
☒	☐	Estimates of effect sizes (e.g. Cohen's *d*, Pearson's *r*), indicating how they were calculated

Our web collection on statistics for biologists contains articles on many of the points above.

Software and code

Policy information about availability of computer code

Data collection	Data was acquired using the OpenEphys system, Powerlab Labchart system (version 7; ADI instruments), Actimetrics FreezeFrame software system (version 4), Keyence system (BZ-X Analyzer 700)
Data analysis	Data was analysed using Graphpad Prism (version 7 and 8), MClust (version 4.4), as well as functions available in the Fieldtrip (http://www.fieldtriptoolbox.org/) and EEGLAB (https://sccn.ucsd.edu/eeglab) toolboxes.

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Research guidelines for submitting code & software for further information.

Data

Policy information about availability of data

All manuscripts must include a data availability statement. This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A list of figures that have associated raw data
- A description of any restrictions on data availability

Source data are provided with this paper. This statement is included in the manuscript.

Corresponding author(s): [redacted]

Last updated by author(s): [redacted]

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☐	☒ The statistical test(s) used AND whether they are one- or two-sided
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☐	☒ For null hypothesis testing, the test statistic (e.g. *F*, *t*, *r*) with confidence intervals, effect sizes, degrees of freedom and *P* value noted
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Software and code

Policy information about availability of computer code	
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[redacted]

Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

☐ Life sciences ☐ Behavioural & social sciences ☒ Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see nature.com/documents/nr-reporting-summary-flat.pdf

Ecological, evolutionary & environmental sciences study design

All studies must disclose on these points even when the disclosure is negative.

Study description	[redacted]
Research sample	[redacted]
Sampling strategy	[redacted]
Data collection	[redacted]
Timing and spatial scale	[redacted]
Data exclusions	[redacted]
Reproducibility	[redacted]
Randomization	[redacted]
Blinding	[redacted]
Did the study involve field work?	☒ Yes ☐ No

Field work, collection and transport

Field conditions	[redacted]
Location	[redacted]
Access & import/export	[redacted]
Disturbance	[redacted]

Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

Materials & experimental systems		Methods	
n/a	Involved in the study	n/a	Involved in the study
☐	☒ Antibodies	☒	☐ ChIP-seq
☒	☐ Eukaryotic cell lines	☒	☐ Flow cytometry
☒	☐ Palaeontology and archaeology	☒	☐ MRI-based neuroimaging
☐	☒ Animals and other organisms		
☐	☒ Human research participants		
☒	☐ Clinical data		
☐	☒ Dual use research of concern		

Antibodies

Antibodies used	[redacted]
Validation	[redacted]

Eukaryotic cell lines

Policy information about cell lines and Sex and Gender in Research	
Cell line source(s)	[redacted]
Authentication	[redacted]
Mycoplasma contamination	[redacted]
Commonly misidentified lines	[redacted]

See ICLAC register

Palaeontology and archaeology

Specimen provenance	[redacted]
Specimen deposition	[redacted]
Dating methods	[redacted]

Tick this box to confirm that the raw and calibrated dates are available in the paper or in Supplementary Information.

Animals and other organisms

Policy information about studies involving animals; ARRIVE guidelines recommended for reporting animal research	
Laboratory animals	[redacted]
Wild animals	[redacted]
Reporting on sex	[redacted]
Field-collected samples	[redacted]
Ethics oversight	[redacted]

Note that full information on the approval of the study protocol must also be provided in the manuscript.

Human research participants

Policy information about studies involving human research participants and Sex and Gender in Research.	
Population characteristics	[redacted]
Recruitment	[redacted]
Ethics oversight	[redacted]

Note that full information on the approval of the study protocol must also be provided in the manuscript.

Ethics oversight	All animal procedures were performed in accordance with the NIH Health Guide for the Care and Use of Laboratory Animals and were approved by the Tufts University Institutional Animal Care and Use Committee.

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Human research participants

Policy information about studies involving human research participants

Population characteristics	n/a
Recruitment	n/a
Ethics oversight	n/a

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