

## 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 analysis

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

The APS data can be downloaded via <https://journals.aps.org/datasets>. The computer science data can be downloaded via <https://www.aminer.cn/aminetwork>. The multi-disciplinary data was download from <https://docs.microsoft.com/en-us/academic-services/graph>. Other related, relevant data are available from the corresponding author upon reasonable request.

## 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](https://www.nature.com/documents/nr-reporting-summary-flat.pdf)

## Behavioural & social sciences study design

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

|                   |   |
|-------------------|---|
| Study description | We study the originality and multi-disciplinary impact of the papers published by fresh and old teams.  |
| Research sample   | We analyze in the paper the publication data from all journals of American Physical Society (APS). The computer science data analyzed in the supplementary materials was obtained by extracting scientists' profiles from on-line Web databases. The Chemistry data analyzed in the supplementary materials was the publication data of Journal of the American Chemical Society. The multi-disciplinary data analyzed in the supplementary materials contains all papers in five representative multi-disciplinary journals including Nature, Science, Proceedings of the National Academy of Sciences (PNAS), Nature Communications and Science Advances. |
| Sampling strategy | As our study focuses on papers published by teams, we take into account the papers with number of authors from 2 to 10.   |
| Data collection   | The American Physical Society data was downloaded via <a href="https://journals.aps.org/datasets">https://journals.aps.org/datasets</a> , and the computer science data was downloaded via <a href="https://www.aminer.cn/aminernetwork">https://www.aminer.cn/aminernetwork</a> . The data of Journal of the American Chemical Society was downloaded from <a href="http://apps.webofknowledge.com">http://apps.webofknowledge.com</a> . The multi-disciplinary data was download from <a href="https://docs.microsoft.com/en-us/academic-services/graph">https://docs.microsoft.com/en-us/academic-services/graph</a> .                                   |
| Timing            | The American Physical Society data ranges from year 1893 to year 2010. The computer science data ranges from year 1948 to year 2014. The data of Journal of the American Chemical Society ranges from 1997 to 2017. The data of multi-disciplinary journals ranges from 1869 to 2020.   |
| Data exclusions   | No data were excluded from the analysis.  |
| Non-participation | No dropout participates.  |
| Randomization     | Participates were not allocated into experimental groups.   |

## 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

| n/a                                 | Involvement in the study                               |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Antibodies                    |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Eukaryotic cell lines         |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Palaeontology and archaeology |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Animals and other organisms   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Human research participants   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Clinical data                 |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Dual use research of concern  |

### Methods

| n/a                                 | Involvement in the study                        |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> ChIP-seq               |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Flow cytometry         |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> MRI-based neuroimaging |