

Reporting Summary

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Statistical parameters

When statistical analyses are reported, confirm that the following items are present in the relevant location (e.g. 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
- ☐ ☒ An indication of 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 statistics 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
- ☐ ☒ Clearly defined error bars
State explicitly what error bars represent (e.g. SD, SE, CI)

Our web collection on [statistics for biologists](#) may be useful.

Software and code

Policy information about [availability of computer code](#)

Data collection

For data on Papers we asked to American Physical Society for the complete corpus in September 2017. For data on patents, we used the NBER data set publicly available in <http://www.nber.org/patents/>. For data on Songs, Movies, and biographies we use python 2.7 and we connect to Spotify and LastFm API for songs and to Wikipedia API (<https://wikimedia.org/api>) for Movies and Biographies. Also, we got all historic the data from Hot-100 billboard ranking from <https://www.billboard.com/charts/hot-100>. For movies, we also downloaded data from IMDB from <https://www.imdb.com/interfaces/>.

Data analysis

We use Python 2.7 for preprocessing data. Then, we use R 3.1.1 for data processing and statistical 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/reviewers upon request. 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 datasets from the American Physical Society, analyzed during the current study is available in the APS Data Sets for Research repository, under request <https://journals.aps.org/datasets>.

The datasets of United State Patents analyzed during the current study is available in the NBER repository, <http://www.nber.org/patents/>.

The datasets for Songs, Movies, and Biographies generated during and analyzed during the current study are available from the corresponding authors on reasonable request.

Field-specific reporting

Please select 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/authors/policies/ReportingSummary-flat.pdf](https://www.nature.com/authors/policies/ReportingSummary-flat.pdf)

Behavioural & social sciences study design

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

Study description	This is a study of collective behavior. We use time series data and also cross-section data.
Research sample	We use all temporal citation data available from UPSTO in NBER repository. We also use all temporal citation data from APS for 6 of its journals (PRA, PRB, PRC, PRD, PRE, and PRL). For songs, movies and biographies, we use cross-section data. Here we use a sample of songs movies and biographies (people) that have a similar accomplishment (reach the billboard ranking at least once, to have more than 1,000 votes in IMDB, and be part of an international performance ranking respectively), in order to be compared accounting by preferential attachment (popularity) effects.
Sampling strategy	For patents and papers we don't do samples. For music, movies, and biographies we select all the cultural pieces that have similar accomplishments. For basketball players, we consider the "Slam 500 Greatest NBA Players of All Times," for tennis players we consider the "Top 600 International males singles tennis player," and for Olympic medal winners we consider athletes who have won more than three gold medals. We didn't do sample calculation because we prove with time series data for all data of patents and papers that cultural pieces with similar accomplishment (number of cumulated citations) show the same behavior, and because we select all the data for every kind of accomplishment.
Data collection	For data on Papers we asked to American Physical Society for the complete corpus in September 2017. For data on patents, we used the NBER data set publicly available in http://www.nber.org/patents/ . For data on Songs, Movies, and biographies we use python 2.7 and we connect to Spotify and LastFm API for songs and to Wikipedia API (https://wikimedia.org/api) for Movies and Biographies. Also, we got all historic the data from Hot-100 billboard ranking from https://www.billboard.com/charts/hot-100 . For movies, we also downloaded data from IMDB from https://www.imdb.com/interfaces/ .
Timing	We use data for all papers published between 1970 and 2003 in Physical Review Letters (PRL), and in Physical Review A to E. For The United States Patent and Trademark Office (USPTO) data, we use all patents granted between 1976 and 1995 in all categories. For songs, we use weekly ranking data from the "Hot-100 Billboard's ranking" between October 1958 and July 2017. To measure online attention, we use Spotify's popularity index taken on October 2016 and July 2017, and last.fm's play counts for the last week of July 2017. For movies, we collect data on 14,633 movies released between 1937 and 2017 that have obtained more than 1,000 votes in the Internet Movie Database as of July 2017. To measure the current popularity of movies we use the play counts for the trailer of each movie taken from YouTube. For online biographies we focus on basketball, tennis, and Olympic medal winners. Current popularity was measured using the number of pageviews received by the Wikipedia biography of each athlete between July 2016 and June 2017
Data exclusions	There is no data exclusion in this study.
Non-participation	There are no participants in this study, therefore, there is no dropout.
Randomization	There is no randomization in this study

Reporting for specific materials, systems and methods

Materials & experimental systems		Methods	
n/a	Involved in the study	n/a	Involved in the study
☒	☐ Unique biological materials	☒	☐ ChIP-seq
☒	☐ Antibodies	☒	☐ Flow cytometry
☒	☐ Eukaryotic cell lines	☒	☐ MRI-based neuroimaging
☒	☐ Palaeontology		
☒	☐ Animals and other organisms		
☒	☐ Human research participants		