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A Field Normalized Exploration of Awoken Papers

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A Field Normalized Exploration of Awoken Papers

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Awoken Papers & Sleeper Coefficients

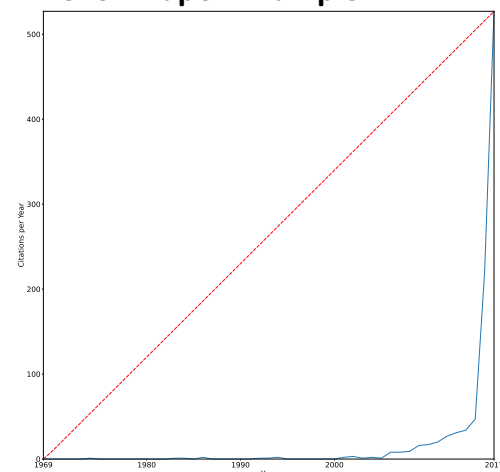
- Awoken Papers (APs) are papers which receive few to no citations for a number of years and then receive a sudden spike in citations
- Sleeper Coefficients (SC) for all articles in Clarivate's Web of Science were calculated using the formula from Ke, Ferrara, Radicchi, and Flammini^a

$$B = \sum_{t=0}^{t_m} \frac{c_{t_m} - c_0}{t_m} \cdot t + c_0 - c_t$$

- t is the age of an article
- c_t is the number of citations it receives in year t
- m is the year with the most citations.

- The papers with SC values in the top 0.1% of all articles are defined to be APs
- A Discipline's **AP Ratio** is a discipline's number of APs divided by its total article count

Awoken Paper Example



Citation History for Investigating Causal Relations by Econometric Models and Cross-spectral Methods with a dotted line indicating a linear growth to its max citation. The SC is essentially calculating the difference between these two plots.

^a<https://www.pnas.org/doi/10.1073/pnas.1424329112>

Mathematics is the biggest driver for the creation of Awoken Papers

Raw AP Counts and Ratios

Top Disciplines by Ke Et. Al. (1900-2014)	Top Disciplines by Total AP Counts (1900-2017)	Top Disciplines by AP Ratio (1900-2017)
Physics, Multidisciplinary	Chemistry, Multidisciplinary	Anatomy & Morphology
Chemistry, Multidisciplinary	Physics, Multidisciplinary	Social Sciences, Mathematical Methods
Multidisciplinary Sciences	Multidisciplinary Sciences	Statistics & Probability
Mathematics	Mathematics	Physics, Multidisciplinary
Medicine, General & Internal	Chemistry, Physical	Mathematics
Physics, Applied	Medicine, General & Internal	Audiology & Speech-Language Pathology
Surgery	Physics, Applied	Anthropology

Observations

- The differences between Ke Et. Al.'s 1900-2014 calculation of raw AP counts and my 1900-2017 are minor
- Normalizing the raw counts by the total number of articles indexed in Web of Science in a discipline drastically changes which disciplines rank as the largest creators of APs
- While inter- and multidisciplinary were seen to drive the creation of APs by Ke Et. Al., mathematical content seems to correlate strongly with higher AP Ratios

AP Ratio for Highly Cited Articles

At Least 100 Citations ^a	At Least 300 Citations ^b	At Least 500 Citations ^c
Mathematics	Mathematics	Mathematics
Statistics & Probability	Psychology, Mathematical	Psychology, Mathematical
Psychology, Mathematical	Psychology, Psychoanalysis	Engineering, Multidisciplinary
Social Sciences, Mathematical Methods	Social Sciences, Interdisciplinary	Social Sciences, Interdisciplinary
Engineering, Geological	Statistics & Probability	Metallurgy & Metallurgical Engineering
Physics, Multidisciplinary	Metallurgy & Metallurgical Engineering	Operations Research & Management Science
Anthropology	Engineering, Multidisciplinary	Audiology & Speech-Language Pathology
Social Sciences, Interdisciplinary	Audiology & Speech-Language Pathology	Transportation Science & Technology
Mathematics, Applied	Mathematics, Applied	Social Sciences, Mathematical Methods
Crystallography	Social Sciences, Mathematical Methods	Statistics & Probability

Observations

- Mathematics, in many different forms, is by far the most likely area to generate highly cited APs
 - At least half of the top 10 disciplines for each citation cut off are mathematical in nature
- Multi- and Interdisciplinary, social science, and engineering disciplines all generate highly cited APs with regularity
- For mathematics articles published in the last century, there is
 - Over a **1 in 10** chance that is an Awoken Paper for articles with 100 Citations (11.5%, the next highest is 6.6%)
 - Over a **1 in 5** chance that is an Awoken Paper for articles with 300 Citations (22.7%, the next highest is 16.2%)
 - Over a **1 in 4** chance that is an Awoken Paper for articles with 500 Citations (26.2%, the next highest is 21.9%)

Limitations

- Web of Science indexes more STEM content than other subject areas
- Not all Subject Categories are indexed for whole period under investigation

^a Only disciplines with at least 1.09% publications having 100 citations were considered (Top 80th Percentile)

^b Only disciplines with at least .117% publications having 300 citations were considered (Top 75th Percentile)

^c Only disciplines with at least .042% publications having 500 citations were considered (Top 70th Percentile)



← Awoken Papers Data

