Measuring impact with alternative metrics

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Looking for broader impacts with altmetrics indicators

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We'll cover

- What are altmetrics
- Rules of thumb for using them
 - Exercise 1 a single article
 - Exercise 2 gaming
- Understanding biases, caveats and appropriate inputs
- Jumping in
 - Exercise 3 policy citations from Overton
- Some metrics based approaches

We won't cover

- Too much history / backstory
- Details of every altmetrics source
- Projects that despite being cool aren't of immediate practical use to this group:
 - Depsy.org (software tracking)
 - Humetrics (more general "measure what you care about" framework)
 - Crossref Event Data (infrastructure rather than an app or tool)

Introduction

We might consider a book or journal article "good" because:

- It is cited a lot
- It resulted in follow-up collaborations
- It inspires lots of alumni donations
- It shifted the way people thought or talked about an important issue after reading it
- It's really useful in teaching
- It had valuable implications in practice
- It influenced policy or clinical guidelines
- ... or any number of other, subjective reasons.

We can't measure most of these things with citations.

What can we do?



Captures: bookmarks,

Altmetrics – what are they?

- You've almost certainly seen them before in research assessment: downloads, \$ raised by spin outs, patent registrations
- Since 2012 used as a shorthand for social media & news mentions especially
- But actually a broad field
- Nowadays two main camps: attention (social media, news, downloads) & impact (policy, patents, guidelines)

Altmetrics – what are they?

- Not originally intended for research assessment per se, but for discovery & filtering
- PLoS One had launched recently: given megajournals how do you know which papers you might be interested in?
- First stirrings of responsible metrics were starting
- It was clear traditional citations did not work for "broader" impacts

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cited	papers 🔊	Search papers
	Showing results 0 - 20 out of 814 next 20 >	can search titles, abstracts and author
	Late-associativity, synaptic tagging, and the role of dopamine during LTP and LTD. 💿 Neurobiol Learn Mem Sreedharan Sajikumar, Julietta U Frey	
Impact 14.89	Tags: network/systems level	Search
	I put my thang down, flip it, and reverse it. – Missy ElliotI have been invited on as an author at Gene Expression, so this post will go up at The Genius and at GNXP. To GNXPers: Hello. I'm a gr	Filter results
	Now where was I? in gene expression Now where was I? in the genius	You can filter papers by the category of blog they came from.
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13.03	Tags: network/systems level	Impact tracker (top 25)
	I put my thang down, flip it, and reverse it. – Missy ElliotI have been invited on as an author at Gene Expression, so this post will go up at The Genius and at GNXP. To GNXPers: Hello. I'm a gr	Which journals are bloggers linking to most frequently?
	Now where was I? in gene expression Now where was I? in the genius	13.4% Nature11.4% Science7.9% Proc Natl Acad Sci U S A2.9% Nat Neurosci
ure.com	Common deletions and SNPs are in linkage disequilibrium in the human genome. 💿 Nat Genet David A Hinds, Andrew P Kloek, Michael Jen, Xiyin Chen, Kelly A Frazer	2.6% PLoS Biol 2.5% Nat Genet 2.1% N Engl J Med 2.0% Neurop
Impact 12.00	Three papers in the January issue of Nature genetics, "Common deletions and SNPs are in linkage disequilibrium in the human genome", "Common deletion polymorphisms in the human genome" and "A high-res	1.6% Cell 1.2% Genetics
	Common structural variants are like SNPs in gene expression	1.2% PLoS Med 1.2% BMJ
	Encoding new episodes and making them stick.	1.2% Nucleic Acids Res 1.1% Am J Phys Anthropol 1.0% BMC Bioinformatics 0.9% Nat Biotechnol
Impact	Neuron wenay A Suzuki Tags:	0.9% Bioinformatics

Altmetrics

(a brief aside)

Altmetrics (a brief aside) Is a terrible name

Not alternative, but complementary Altmetrics (a brief aside) Is a terrible name



Aims to expand research assessment in 3 directions







- News mentions how often did a research output appear on mainstream news websites?
- Social media mentions did it get talked about on Twitter or Facebook?
- Blog mentions did it get linked to from scientific blogs?
- Wikipedia is it cited by any Wikipedia pages?
- F1000, Pubpeer has it been reviewed by academics?
- Mendeley saves have researchers been saving it to their reference manager?
- Policy citations did it get cited in government policy documents?
- Syllabi is it a course text or otherwise on the reading list for any university courses?
- Clinical guidelines did it get cited by any clinical guidelines?
- Patent citations did it get cited by any patents?

Research "qualities"

- At different times you may be interested in different aspects of how a paper is being read and used: in the attention, influences or impacts associated with it.
- In any given scenario pick the approach and data most appropriate to what you're trying to assess.

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Rules of thumb when looking at altmetrics

- Have a goal in mind: what exactly are you interested in assessing? What is irrelevant?
- Context is king: always check why numbers are high
- Try to understand the biases and caveats of relevant data sources
- Use the quantitative (indicators) to support the qualitative (story)

Exercise 1

"A randomized trial of e-cigarettes versus nicotine-replacement therapy" (from QMU & King's)

- "What is the societal impact of this paper?"
- Do you think that altmetrics data is useful in the context of that question?
- If so how might you present it in order to answer? As metrics? Informing a case study? A different way?
- What data or extra analysis if any is missing?

Exercise 1 – dataset

https://www.nejm.org/doi/metrics/10.1056/NEJMoa1808779

<u>or</u>

https://www.altmetric.com/details/54720742

"A randomized trial of e-cigarettes versus nicotine-replacement therapy" (from QMU & King's)

Metrics 🛈



February 14, 2019 N Engl J Med 2019; 380:629-637 DOI: 10.1056/NEJMoa1808779 Chinese Translation 中文翻译

A NEW NEJM GROUP SERIES: Fossil-Fuel Pollution and Climate Change



Overview of attention for article published in New England Journal of Medicine, February 2019



Out this Attention Score

In the top 5% of all research outputs scored by Altmetric

MORE... MORE.... MORE.... MORE.... MORE.... MORE.... MORE....

SUMMARY	News	Blogs	Policy documents	Twitter	Patents	Facebook	Wikipedia	Reddit	Research highlights	More
Title Published in	A Randomized Trial of E-Cigarettes versus Nicotine-Replacement Therapy d in New England Journal of Medicine, February 2019 10.1056/neimoa1808779								ublisher site	
Pubmed ID Authors	30699054 🔽 Peter Hajek, Anna Phillips-Waller, Dunja Przulj, Francesca Pesola, Katie Myers Smith, Natalie Bisal [show]							🗹 Alert me a	bout new mentions	
	TWITTER D	EMOGRAPHIC	s	MENDE	ELEY READERS		Д	TTENTION SCO	RE IN CONTEXT	

The data shown below were collected from the profiles of **3,069** tweeters who shared this research output. Click here to find out more about how the information was compiled.





Туре	Count	As %
Members of the public	2561	83%
Practitioners (doctors, other healthcare professionals)	226	7%
Scientists	211	7%
Science communicators (journalists, bloggers, editors)	40	1%
Unknown	31	1%

High Attention Score compared to outputs of the same age and source (99th percentile)

Overview of attention for article published in New England Journal of Medicine, February 2019



Overview of attention for article published in New England Journal of Medicine, February 2019



Out this Attention Score

In the top 5% of all research outputs scored by Altmetric

High Attention Score compared to outputs of the same age (99th percentile)

High Attention Score compared to outputs of the same age and source (99th percentile)

LESS....

https://t.co/BVfKp3IMzb http

N100 machinalis

Fuck your wilfully ignorant moral panic

@PsionicPsittacc

11 Feb 2023



364 news outlets 41 blogs



11 Feb 2023



James A @GoBeepUK

Overview of attention for article published in New England Journal of Medicine, February 2019



Compared to Other NEJM Articles

In the

 $99\%_{\rm ile}$

Ranks

66th

Compared to Articles in Other Medical Journals

 $\mathbf{\wedge}$

In the

 $99\%_{\rm ile}$

Ranks

635th

Other Activity

Emailed

288



Exercise 1 - contrast

https://militaryhealth.bmj.com/content/early/2023/01/03/military-2022-002237.altmetrics

<u>or</u>

https://bmj.altmetric.com/details/140855410

"Impact of cold exposure on life satisfaction and physical composition of soldiers"

Impact of cold exposure on life satisfaction and physical composition of soldiers

Overview of attention for article published in BMJ Military Health, January 2023



About this Attention Score

In the top 5% of all research outputs scored by Altmetric

Mentioned by

MORE...

1 news outlet



@DrRalphNap @anymanfitness It's actually been proven to help with fat loss https://t.co/q2DJwj5vbs

06:37AM



Luis Tobajas Belvís 💷 📁

@luisotobajas

RT @DoctorCasado: Las duchas frías mejoran la percepción de salud (y en hombres reducen grasa abdominal y cintura). https://t.co/BwTY02iAcc

06·12AM

Context is key

Health Nerd 🤣 @GidMK

This paper on cold immersion recently went viral, because it seems to indicate that cold water can improve many facets of human health!

...

Except, the paper shows PRECISELY THE OPPOSITE OF THAT

A 📃 1/n

Pub Med

Andrew D. Huberman, Ph.D. 🤣 @hubermanlab

A 2 min cold immersion to the neck and five, 30 second cold showers per week led to a significant reduction in abdominal fat and waist circumference in the men in this study; also multiple psychological improvements related to stress & wellbeing.

pubmed.ncbi.nlm.nih.gov

Impact of cold exposure on life satisfaction and physical c... Cold water exposure can be recommended as an addition to routine military training regimens. Regular exposure ...



0	τī.	0	.↑
Y	C+	~	_



- Stuart Ritchie 💳 @StuartJRitchie · Mar 5
- -Sample size: 49
- -p-values: 0.045, 0.052, 0.029, 0.032 (i.e. prima facie p-hacking) -Scientific value: very little
- -Number of views on Twitter regardless: 3,000,000

Doesn't this Huberman guy have any standards for the stuff he promotes to his huge audience?

(via @alexabelson9)

👷 Andrew D. Huberman, Ph.D. 🤣 @hubermanlab · Mar 3

A 2 min cold immersion to the neck and five, 30 second cold showers per week led to a significant reduction in abdominal fat and waist circumference in the men in this study; also multiple psychological improvements related to stress & wellbeing. pubmed.ncbi.nlm.nih.gov/36599485/

Show this thread

🗘 111 🗘 339 🖤 3,013 📊 967.9К



Stuart Ritchie 💳 @StuartJRitchie · 20h

...

仚

①

Love some of the people that come out of the woodwork to reply to this^:

- -"Acktchually I'm very clever and it's FINE if scientists run tiny, p-hacked studies"
- -"He's at Stanford so how can you judge him?"
- -"You have a Ukraine flag in your username so you must be a beta cuck"

Q 10 1, 3 ♡ 106 1, 15.1K



"The more any quantitative indicator is used for social decision-making, the more subject it will become to corruption pressures and the more apt it will be to distort and corrupt the social processes it is intended to monitor."

Donald T Campbell

Exercise 2

- You work for an altmetrics provider.
- You're interested in measuring attention (not the same as quality).
- You've signed up to DORA, which states:

13. Be clear that inappropriate manipulation of metrics will not be tolerated; be explicit about what constitutes inappropriate manipulation and what measures will be taken to combat this.

• Which of the following scenarios are you comfortbale with, and what is unacceptable manipulation?

Alice has a new paper out...

- 1. She tweets about it, and twenty of her (non-academic) friends retweet her in support.
- 2. She writes about it on her lab's blog and sends an email highlighting it to a colleague who reviews for Faculty of 1000.
- 3. She asks her colleagues to share it via social media if they think it'd be useful to others.
- 4. She asks those grad students of hers who blog to write about it.
- 5. She believes that it contains important information for diabetes patients and so pays for an in-stream advert on Twitter.
- 6. She believes that it contains important information for diabetes patients and so signs up to a '100 retweets for \$\$\$' service.

.... look at value & intent

"We define gaming as any activity intended to influence article metrics, where the content adds no value to the conversation around a paper and is just there to bump up numbers."



Biases, caveats and appropriate inputs

- If you're using an altmetrics source, look at these three things in turn to try and flag up potential issues early
- **Biases**: what biases in the source itself could affect our analysis?
- Caveats: what technical shortcomings do we need to bear in mind?
- Appropriate inputs: you don't need to restrict yourself to article DOIs

Biases

- Toward geographies: Twitter is banned in China
- Towards certain types of venue: only science blogs are collected, not news blogs that may occasionally have a science story in them
- Towards certain kinds of user: we don't track downloads made from the mobile site
- Towards older or more recent articles: data collection for the source only started in 2018, so we can't tell for sure how frequently older articles were mentioned
- Towards subject areas: book tracking isn't very good, which is fine for medical sciences but 30% of our social science outputs are books

Caveats

- Ideally what is the approximate precision and recall rate for citations in the source?
- Do citations need to be in a specific format?
- Does it collect from everywhere, or just some parts of the data source? (e.g all Wikipedia languages? All news sites on the web?)
- How often is the source updated by the provider?

Appropriate inputs

- Do you have the inputs you need to be able to answer your question?
- If we're looking for broader social impacts from the School of Economics, is it enough to have a list of article DOIs from Scopus?
 - Working papers or other pieces of grey literature?
 - Datasets?
 - Names of individual academics, to find e.g. policy mentions for?
- If using ORCID, do your authors have up to date records?
- If using Fundref, are your articles adequately represented?

Exercise 3

https://app.overton.io

Email: euan+aesis@overton.io

Password:

!impactconf

Exercise 3

- 1. Start from a policy area what impact might we be having here?
 - Search "COVID-19 AND masks"
 - Use the "Cites or mentions institution" filter on the sidebar
- 2. "second order" citations
 - Change "sorted by" to "citations"
- 3. Start from outputs where might we be involved in other areas?
 - 1. Select an institution
 - 2. Choose "See Report"
 - 3. If the result set is large, optionally select a country
 - 4. Choose "Explore" -> "Explore the topics in these documents"

Overton START	SEARCH	BROWSE DATA	HELP	euan+aesis@overton.io LOGOUT			
SEARCH POLICY DOCUMENTS	SEARCH PE	OPLE SEARCH S	CHOLARLY ARTICLES				
covid-19 AND masks			Search policy or	Reset search			
■ Click to hide sear	ch filters	Showing docume	ents matching the query 'covid-19 A	ND masks' × sorted by JF Relevance -			
CITES OR MENTIONS INSTITUTION							
University College Dublin	335	☆ Save search	B See report ▲ Export	Explore			
Harvard University	2,716			Showing 28,802 results 1 2			
University of Oxford	2,271						
Stanford University	1,791	Policy document	The efficacy of respirators	s and medical masks for healthcare worke			
Johns Hopkins University	1,641		reduce transmission of CC	VID-19 u			
	show more	Saxinetitute ⁶ 9	Sax Institute on August 18th	2020 Publication			
SOURCE TYPE		The efficacy of respirators and medical masks for healthcare workers to reduce transmission of COVID-19	August 2020. This Evidence Sno efficacy healthcare workers use reducing COVID-19 transmission	not is a rapid review of the evidence for the N95 masks compared with surgical masks in hospitals and residential aged-care. The review			
government	20,228	identified 13 reviews and one commentary addressing comparative effective respirators and medical masks, eight of which were specific []					
think tank	4,859						
igo	3,897		N95 RESPIRATOR SURGICAL M	ASK RESPIRATOR			
government > city	1,000		Tag this Pownload PDF				

Policy document

Euroround Promoting social cohesion and convergence Maintaining trust during the COVID-19 pandemic

Maintaining trust during the COVID-19 pandemic.

🔅 Ahrendt, Daphne, Consolini, Michele, Saeys, Mathis & others from Publications Office of the European Union on

December 8th 2022 Publication

The report examines how citizens' trust in institutions – including national governments, the EU, science and the media – evolved during the COVID-19 pandemic in 2020 and 2021. The role of the media is analysed, in particular the relationship between the use of social media and trust and the impact of misinformation (incorrect or misleading information) and disinformation (deliberately deceptive information) during the crisis period. Based on an extensive literature review, the report describes

NEWS SOCIAL DISTANCING SOCIAL CAPITAL



Social capital, political trust and purchase of illegal liquor: A population-based study in southern Sweden

Martin Lindström (2008) Health Policy

Author from Malmö University is Martin Lindström

The literature on the consequences of trust for compliance is scarce; however, there is evidence supporting the hypothesis that both social trust and institutional trust favour compliance (Scholz and Lubel, 1998; Levi and Stoker, 2000; Lindström, 2008; Marien and Hooghe, 2011).

On page 24

Lindström, M. 2008, Social capital, political trust and purchase of illegal liquor: A population-based study in southern Sweden, Health Police Vol. 86, No. 23, pp. 266275.

On page 62



Deaths rise in good economic times: Evidence from the OECD

Ulf-G. Gerdtham et al. (2006) Economics & Human Biology

Author from Malmö University is Ulf Gerdtham

Metrics based approaches

- Ideally we'll compare apples to apples
- Control for age and subject area
- Bear in mind that metrics based approaches are safer for large datasets, risky for small ones

Share of Voice

"When we look at government documents about geoengineering, papers from our institution appear in 22% of them, second to Harvard (28%) and Oxford (26%)"

• Take the number of documents which match your criteria, divide it by the total number of documents

Compared to Expected

"12% of the articles we published in 2018 have been cited in policy, compared to the 8% we might have expected"

- Given a large set of DOIs X:
 - Calculate the proportion of X cited in policy
 - Build a set of comparands Y, pairing each DOI in X with a randomly selected DOI published in the same journal and close to the same time
 - Calculate the proportion of Y cited in policy
 - Repeat the comparands step 1k times to obtain a distribution
 - Compare actual proportion to the distribution to see if it is higher, lower or as expected and to what degree

Thanks for participating!

• Am always happy to chat – <u>euan@overton.io</u>

Enjoy the science gallery!

Bonus exercise

https://www.altmetric.com/explorer/login

Email: euan+aesis@overton.io

> Password: !impactconf