Nouvelle génération d'indicateurs de l'impact de la recherche

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Université du Québec à Montréal

IRSST

20 novembre 2015

Université de Montréal

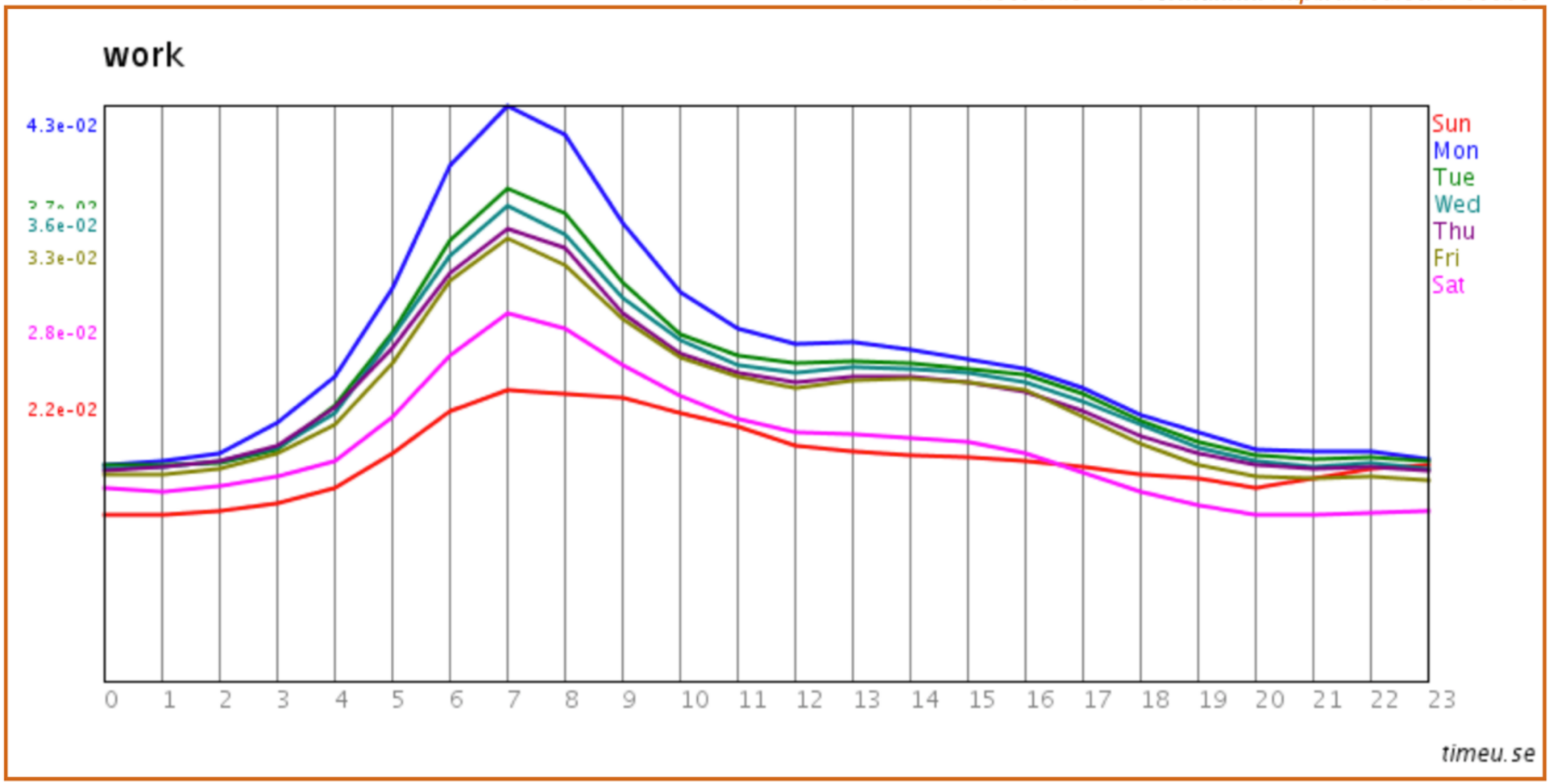
Altmetrics

- Part du principe que les mesures traditionnelles de l'impact scientifique (citations, facteur d'impact, etc.) ne donnent pas le « portrait complet »
  - Peuvent être influencées par les auteurs ou éditeurs
  - Prennent du temps avant d'être observées
- Les articles sont de plus en plus complémentés par des codes source, jeux de données, etc.
  - Sont-ils utilisés par les chercheurs ?
- Le numérique permet la collecte d'une foule d'autres informations sur la visibilité et l'utilisation de ces documents

Twitter et l'analyse des tendances

- De quoi parlent les gens (et quand) ?
  – http://timeu.se/
- Twitter et la prédiction
  – La bourse
  – Les recettes de cinéma
  – Twitter prédit… Twitter!
- Twitter et les "sentiments"
  – https://election.twitter.com/

Tweet This! **Permalink:** http://timeu.se/77ec0b8f



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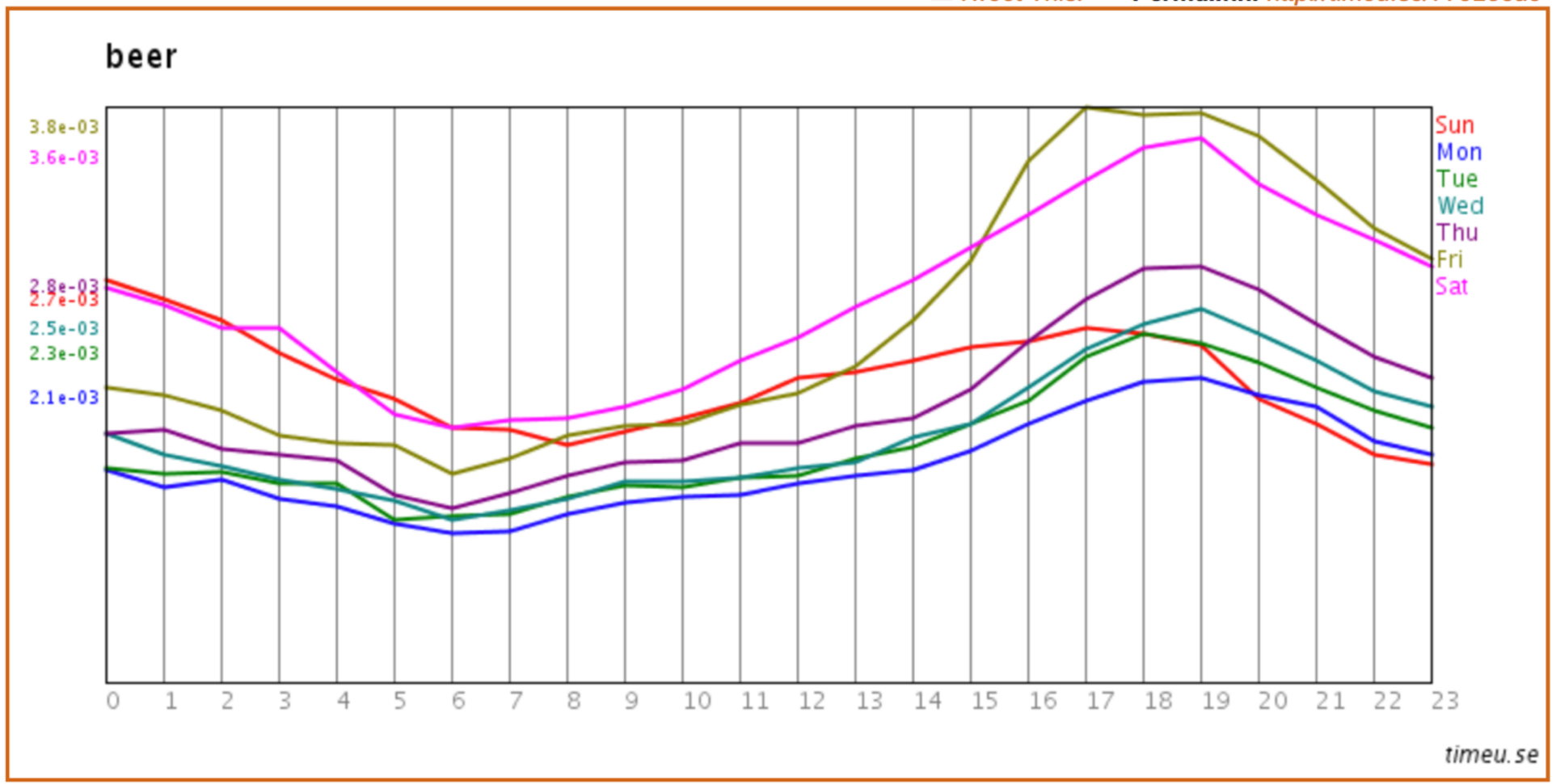
Tweet This! **Permalink:** http://timeu.se/77e258ae



Altmetrics : origines

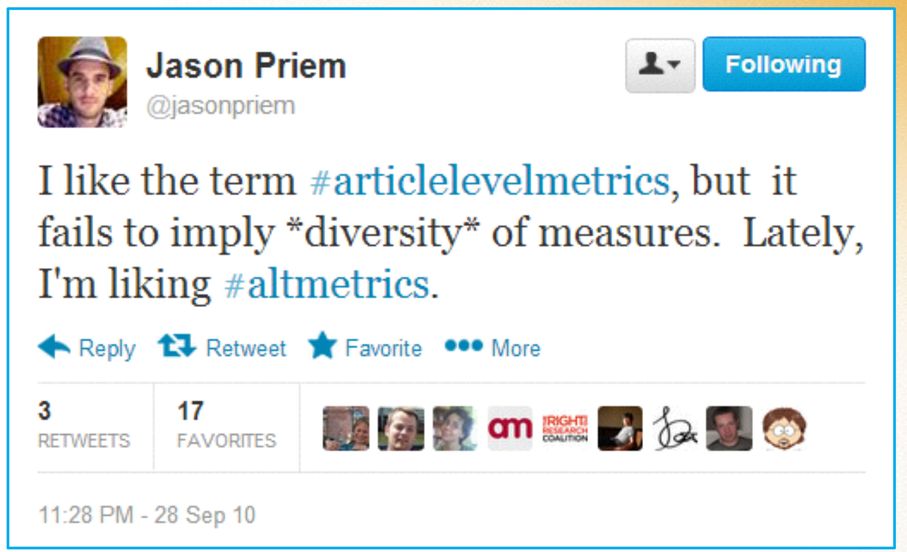
- Terme inventé par Jason Priem (doctorant UNC)
- Développé comme une alternative aux citations et à l'évaluation par les pairs

http://altmetrics.org/manifesto/

- "…altmetrics is a good idea, but a bad name"

Rousseau et Ye (2013)

- Plutôt complémentaire et non pas *alternatif*
- *social media metrics*



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Altmetrics : visées

- Mesurer l'impact plus rapidement que les citations (qui prennent quelques années avant de s'accumuler)
  - ➢ Prédire l'impact scientifique
- Mesurer un "impact" plus large que ce que les citations permettent
  - ➢ Impact social ?
- Impact de tous les "outputs"
  - ➢ "value all research products"

Piwowar (2013)

Altmetrics : différentes formes

- Utilisation alternative et visibilité des publications
  sur les médias sociaux :

  ...

  utilisation plus traditionnelle :

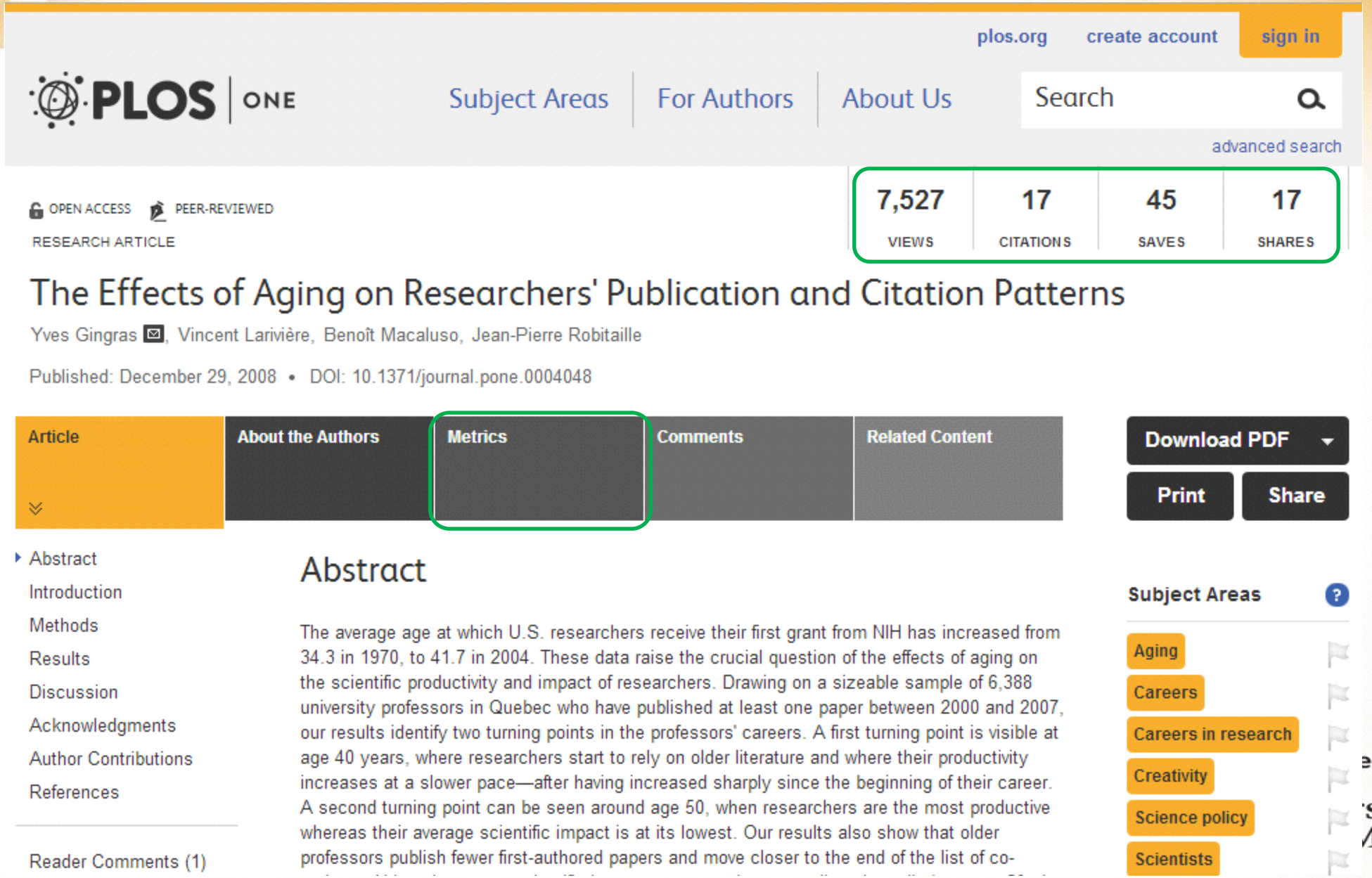
  ...

- Formes alternatives de diffusion des connaissances

  ...

➢ développement technocratique
et pragmatique

Les altmetrics en action : PLOS



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OPEN ACCESS PEER-REVIEWED

RESEARCH ARTICLE

7,527	17	45	17
VIEWS	CITATIONS	SAVES	SHARES

The Effects of Aging on Researchers' Publication and Citation Patterns

Yves Gingras, Vincent Larivière, Benoît Macaluso, Jean-Pierre Robitaille

Published: December 29, 2008 • DOI: 10.1371/journal.pone.0004048

Article | About the Authors | Metrics | Comments | Related Content

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- Abstract
- Introduction
- Methods
- Results
- Discussion
- Acknowledgments
- Author Contributions
- References

Reader Comments (1)

Abstract

The average age at which U.S. researchers receive their first grant from NIH has increased from 34.3 in 1970, to 41.7 in 2004. These data raise the crucial question of the effects of aging on the scientific productivity and impact of researchers. Drawing on a sizeable sample of 6,388 university professors in Quebec who have published at least one paper between 2000 and 2007, our results identify two turning points in the professors' careers. A first turning point is visible at age 40 years, where researchers start to rely on older literature and where their productivity increases at a slower pace—after having increased sharply since the beginning of their career. A second turning point can be seen around age 50, when researchers are the most productive whereas their average scientific impact is at its lowest. Our results also show that older professors publish fewer first-authored papers and move closer to the end of the list of co-

Subject Areas

Aging
Careers
Careers in research
Creativity
Science policy
Scientists

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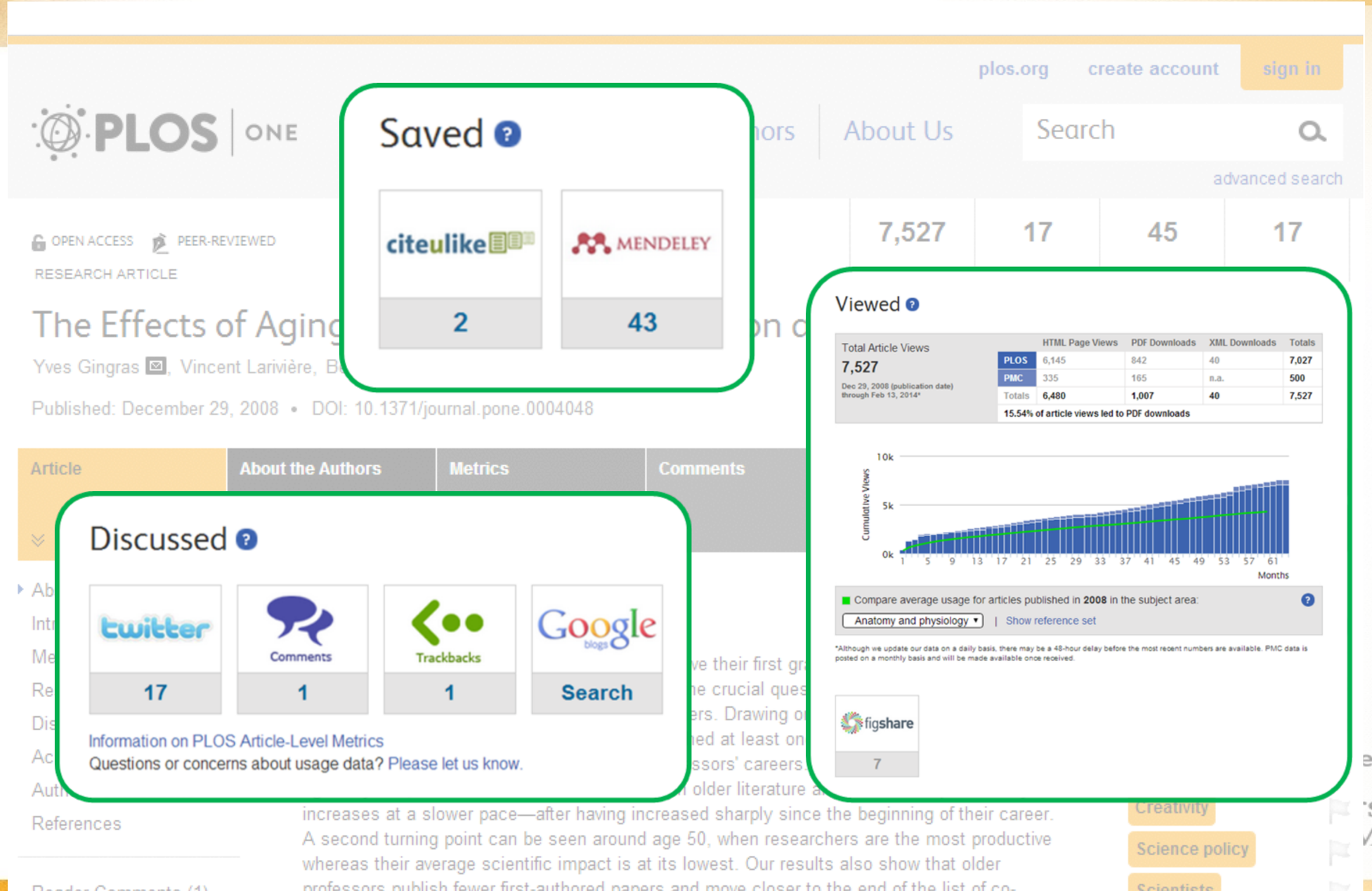
Les altmetrics en action : PLOS



Les altmetrics en action : altmetric.com

NATURE | LETTER

日本語要約

Video game training enhances cognitive control in older adults

J. A. Anguera, J. Boccanfuso, J. L. Rintoul, O. Al-Hashimi, F. Faraji, J. Janowich, E. Kong, Y. Larraburo, C. Rolle, E. Johnston & A. Gazzaley

Affiliations | Contributions | Corresponding authors

Nature **501**, 97–101 (05 September 2013) | doi:10.1038/nature12486

Received 16 January 2013 | Accepted 18 July 2013 | Published online 04 September 2013

PDF | Citation | Reprints | Rights & permissions | Article metrics

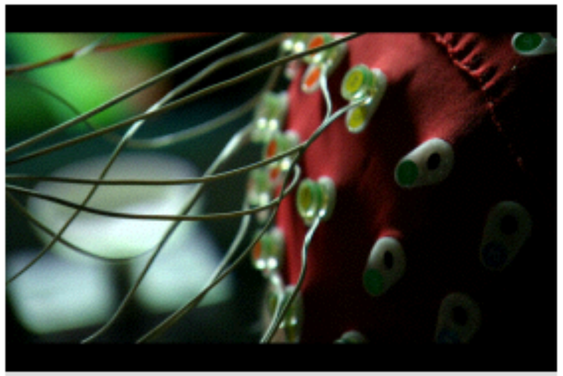
Cognitive control is defined by a set of neural processes that allow us to interact with our complex environment in a goal-directed manner[1]. Humans regularly challenge these control processes when attempting to simultaneously accomplish multiple goals (multitasking), generating interference as the result of fundamental information

Editor's summary العربية

Our ability to multitask and our capacity for cognitive control decline linearly as we age. A new study shows that cognitive training can help repair this decline. In older adults aged between 60 and ...

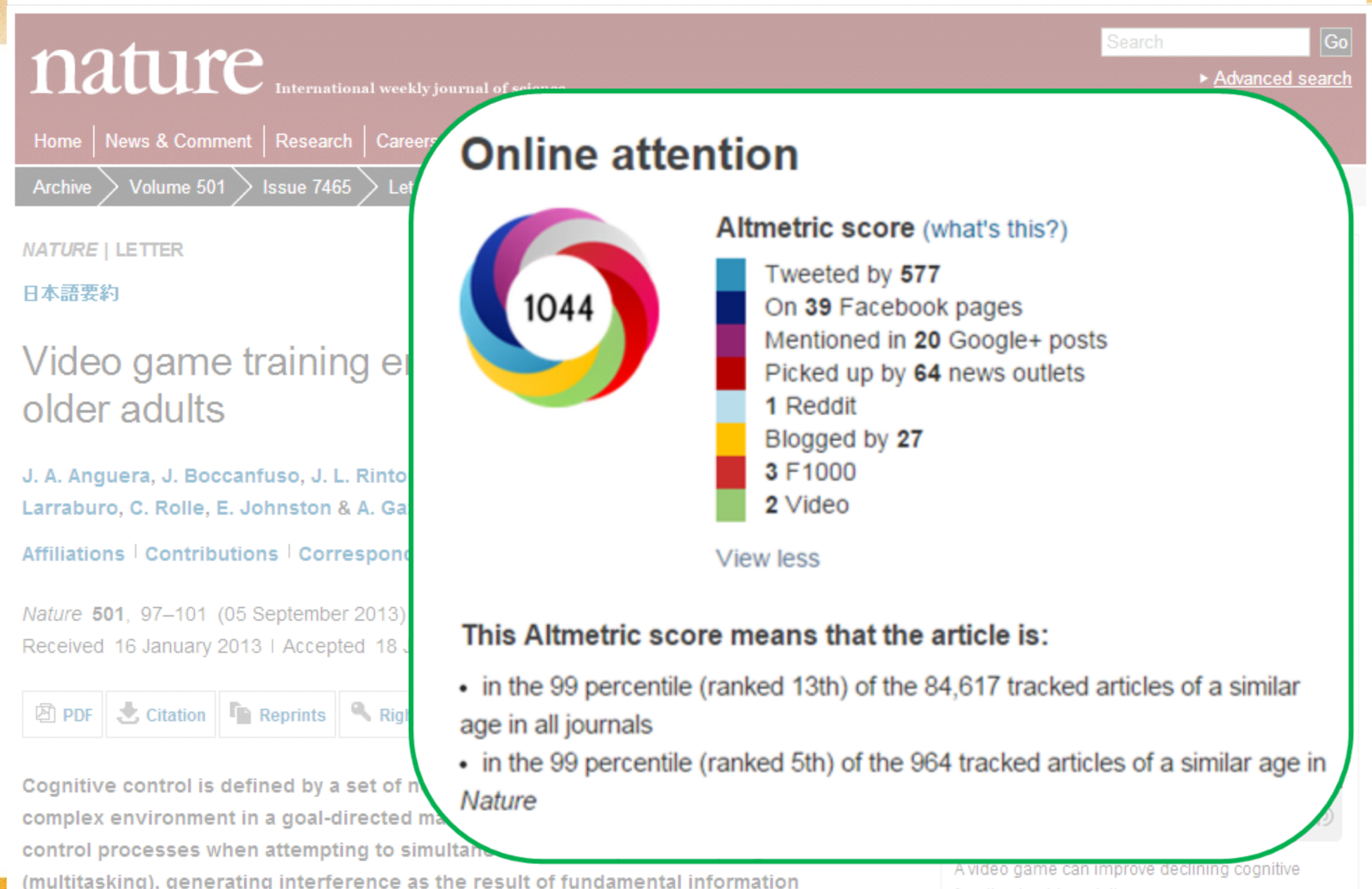
Related video

Rewing up brain skills

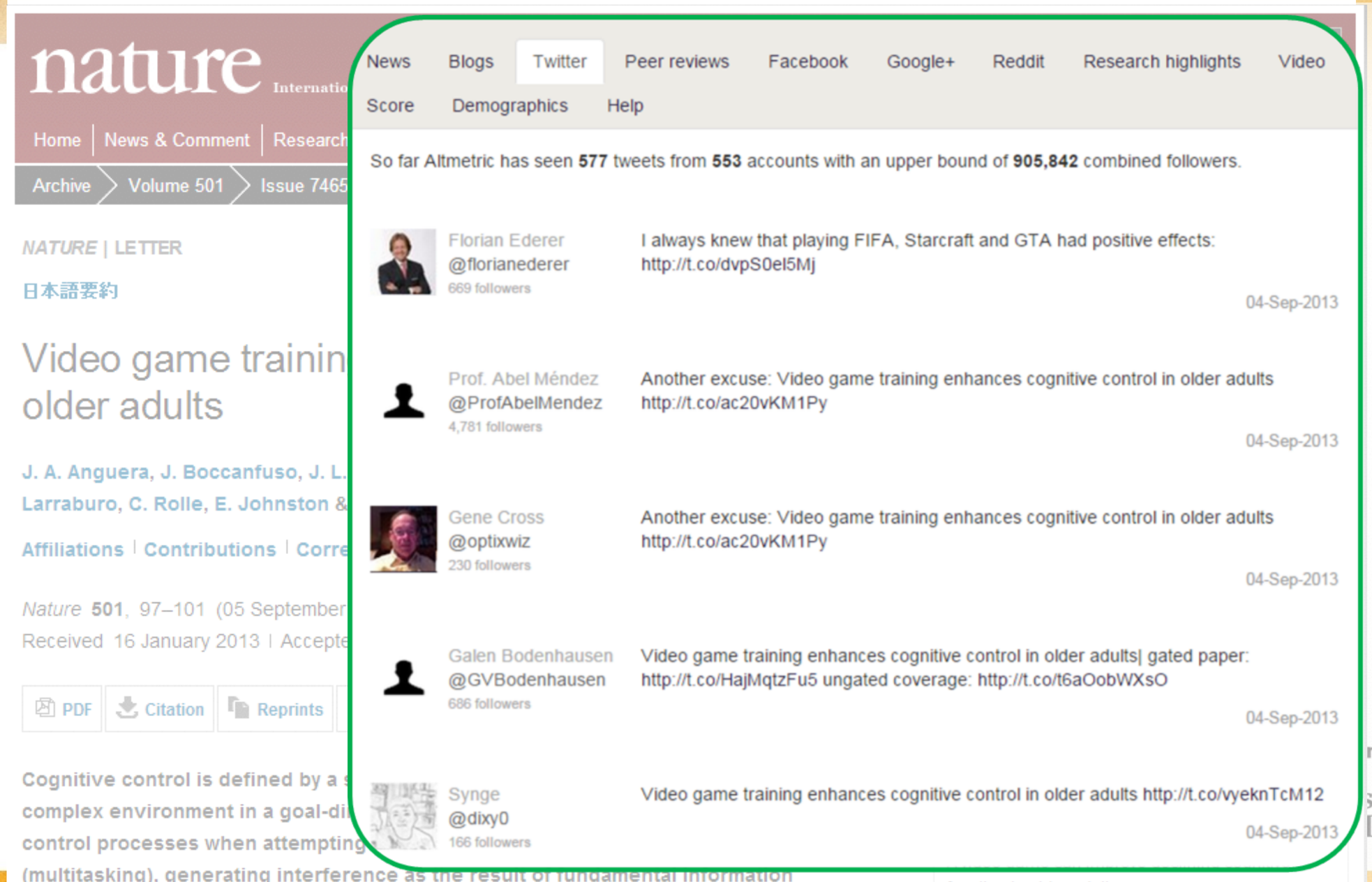


A video game can improve declining cognitive

Les altmetrics en action : altmetric.com



Les altmetrics en action : altmetric.com



Les altmetrics en action : altmetric.com

nature Internatio

Home | News & Comment | Research

News | Blogs | Twitter | Peer reviews | Facebook | Google+ | Reddit | Research highlights | Video

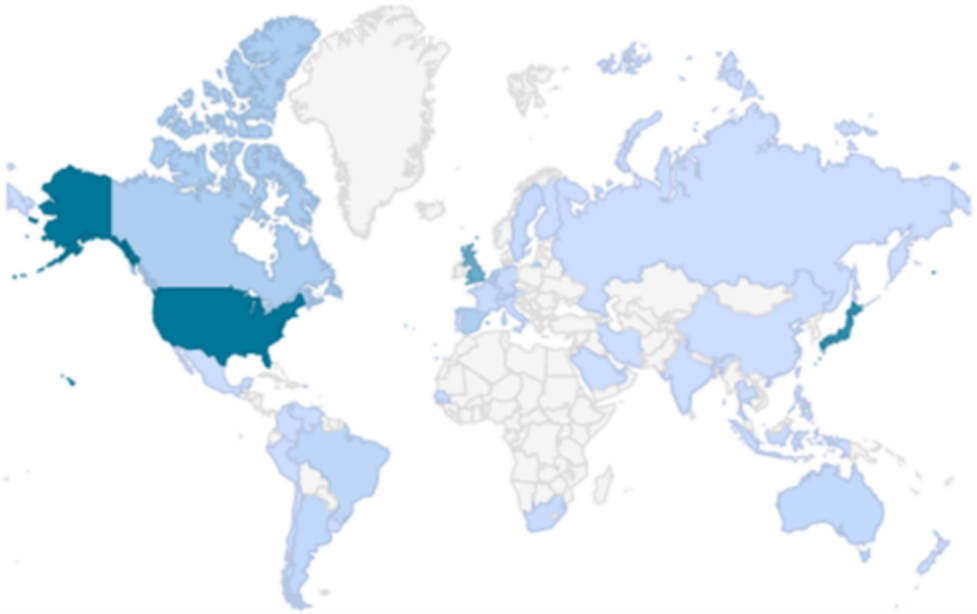
Score | Demographics | Help

So far Altmetric has seen **577** tweets from **553** accounts with an upper bound of **905,842** combined followers.

Twitter attention

The data shown below were collected from the profiles of tweeters who shared this article. Click here to find out more about how the information was compiled.

Geographical breakdown



#	Country	As %
1	US	16%
2	JP	13%
3	GB	8%
4	CA	2%
4	ES	2%
6	NL	1%
6	BR	1%
6	AR	1%
9	BE	<1%
–	Other	8%
–	Unknown	43%

ive effects:

04-Sep-2013

trol in older adults

04-Sep-2013

trol in older adults

04-Sep-2013

s| gated paper:
fXsO

04-Sep-2013

s http://t.co/vyeknTcM12

04-Sep-2013

(multitasking), generating interference as the result of fundamental information

nces

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Les altmetrics en action : altmetric.com

Nick Byrd
@byrd_nick

PhD student linking to #cogsci, #neuroscience, #psychology, #xPhi, #philSci, #philMind, #philosophy, #reasoning, #implicitBias, #selfContro #wellbeing.

@CU-Boulder & @FSU
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Joined August 2011

Florian Ederer
@florianederer

Austrian. Economist. But definitely not Austrian economist! @YaleSOM

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Prof. Abel Méndez
@ProfAbelMendez

Planetary Scientist and Astrobiologist. Director of the Planetary Habitability Laboratory @ UPR Arecibo. Studying habitable worlds in the universe.

Arecibo, Puerto Rico
phl.upr.edu
Joined November 2009

Gene Cross
@optixwiz

Astronomy is my passion-! My day job i optical engineering, including design an build of telescopes and instruments.

The Niles District of Fremont,

Paul Gribble
@paulgribble

Professor; originally from Vancouver

London, Ontario, Canada
gribblelab.org
Joined July 2008

MediGlance
@MediGlance

Here's what we think are the top 10 mo exciting medical articles of the week fro the top 5 medical journals, enjoy! :)

AFA
@alzfdn

Alzheimer's Foundation of America: A leading national nonprofit organization providing optimal care to individuals with dementia, and caregivers.

New York City
alzfdn.org

Ricky Chan
@ChanR11

Fueling NeuroTech Ontario with Big Data & Analytics @OntarioBrain | Catalyzing partnerships to advance new tech | #NeuroTechON | (views are my own)

Toronto, Ontario, Canada

Rebecca Latham
@RebeccaLatham

Detailed realism in watercolor (animals & nature), showing in galleries & exhibits worldwide. Loves art, nature, wildlife, science, tech, travel & nice people.

My studio in the frozen woods.
lathamstudios.com/rebecca
Joined December 2007

Timothy Wachtel
@WachtelTim

Founder at COAD @optimaladult, evidence-informed Development and #Learning of adults, e-Learning Content Developer, Collaborator

Austin, Texas USA
optimaladult.org
Joined March 2012

Les altmetrics en action : *impactstory*

Carl Boettiger

Theoretical Ecologist. Bio at: http://carlboettiger.info

Open Access

- Overview
- Map
- articles (16)
- datasets (23)
- figures (1)
- posters (3)
- slide decks (16)
- software products (49)
- unknowns (9)

Selected works

Is your phylogeny informative? Measuring the power of comparative methods.
(2012) Boettiger, Coop, Ralph. *Evolution*
read fulltext
highly cited | highly saved | highly discussed | highly viewed +146 | saved

rfishbase: exploring, manipulating and visualizing FishBase data from R.
(2012) Boettiger, Lang, Wainwright. *Journal of fish biology*
read fulltext
highly saved | highly discussed | highly viewed +49 | cited | saved

Tipping points: From patterns to predictions.
(2013) Boettiger, Hastings. *Nature*
read fulltext
highly cited | highly discussed | highly viewed +38 | saved

Lab Notebook, 2012
(2013) *figshare.*
highly discussed | highly viewed +11 | highly discussed +199
highly viewed +68 | saved +1

Key profile metrics

1.4M **impressions** on 16 articles

773 **saves** on 16 articles

99.4k **impressions** on 23 datasets

33.2k **impressions** on 16 slide decks

93 **forks** on 49 software products

Impactstory

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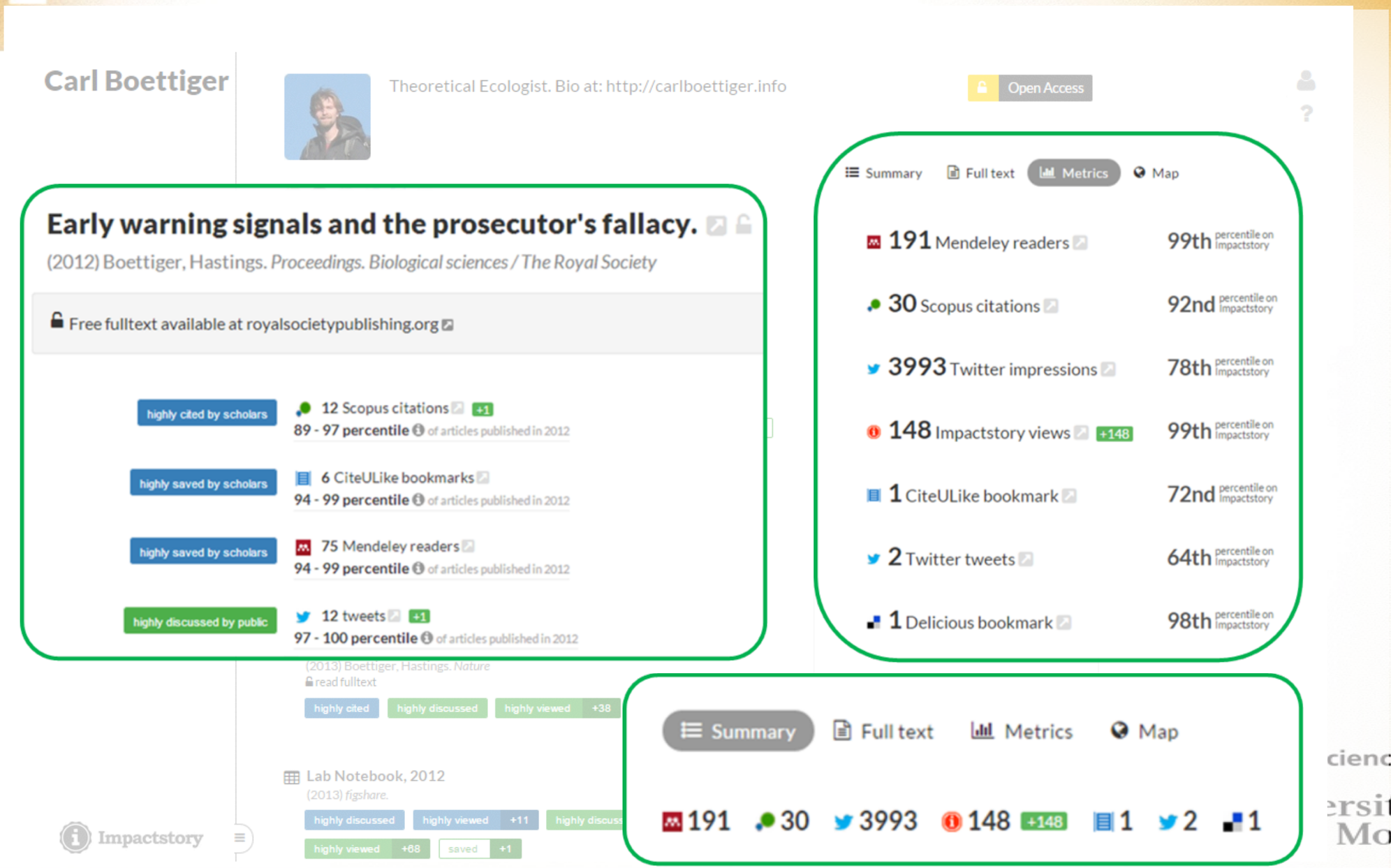
Les altmetrics en action : *impactstory*



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Croissance des médias sociaux

- Croissance mensuelle de 5 % à 10 % de l'activité liée aux articles savants sur les médias sociaux
- Mendeley et Twitter sont les deux sources qui mentionnent le plus les documents savants :

Mendeley

521 millions signets
2,7 millions utilisateurs
32 % croissance utilisateurs du 9/2012 à 09/2013

Twitter

500 millions tweets par jour
230 millions utilisateurs actifs
39 % croissance utilisateurs de 9/2012 à 09/2013

Mendeley et Twitter : Prévalence

Mendeley

- 93 % des articles de Science en 2007 (Li, Thelwall et Giustini, 2012)
- 94 % des articles de Nature en 2007 (Li, Thelwall et Giustini, 2012)
- 80 % des articles de PLOS en 2003-2010 (Priem, Piwowar et Hemminger, 2012)
- 66 % des articles PubMed/WoS 2010-2012 (Haustein et al., 2014a)
- 63 % des articles WoS avec un DOI 2005-2011 (Zahedi, Costas et Wouters, 2014)
- 47 % des articles en sciences sociales (WoS) en 2008 (Mohammadi et al., 2014)
- 35 % des articles en génie (WoS) en 2008 (Mohammadi et al., 2014)
- 31 % des articles en physique (WoS) en 2008 (Mohammadi et al., 2014)
- 13 % des articles en humanités (WoS) en 2008 (Mohammadi et Thelwall, 2014)

Twitter

- 2 % des articles (WoS) avec un DOIs 2005-2011 (Zahedi, Costas et Wouters, 2014)
- 9 % des articles PubMed/WoS 2010-2012 (Haustein et al., 2014b)
- 13 % of WoS papers with DOIs July-December 2011 (Costas, Zahedi et Wouters, 2014)
- 22 % of WoS papers with DOIs 2012 (Haustein, Costas et Larivière, submitted)

Altmetrics : Critiques

- Qu'est-ce que ça mesure ?
  - Quel type d'impact ? Social ? Scientifique ?
  - Buzz ?
- Limites :
  - Distributions tout aussi non paramétriques que les citations
  - Peut-être facilement modifié, tricoté, bref, influencé…
  - On ne connaît pas sa signification dans le processus de communication savante

Relation entre tweets et citations

Corrélations pour le domaine médical

Publication year	Twitter coverage	Papers (T≥1)	Spearman's ρ	Mean	Median	Maximum
T^{2010}	2.4%	13,763	.104**	2.1	1	237
C^{2010}				18.3	7	3,922
T^{2011}	10.9%	63,801	**.183****	2.8	1	963
C^{2011}				5.7	2	2,300
T^{2012}	20.4%	57,365	.110**	2.3	1	477
C^{2012}				1.3	0	234
$T^{2010-2012}$	**9.4%**	134,929	.114**	2.5	1	963
$C^{2010-2012}$				5.1	1	3,922

Relation entre tweets et citations

Proportion d'articles «tweetés»

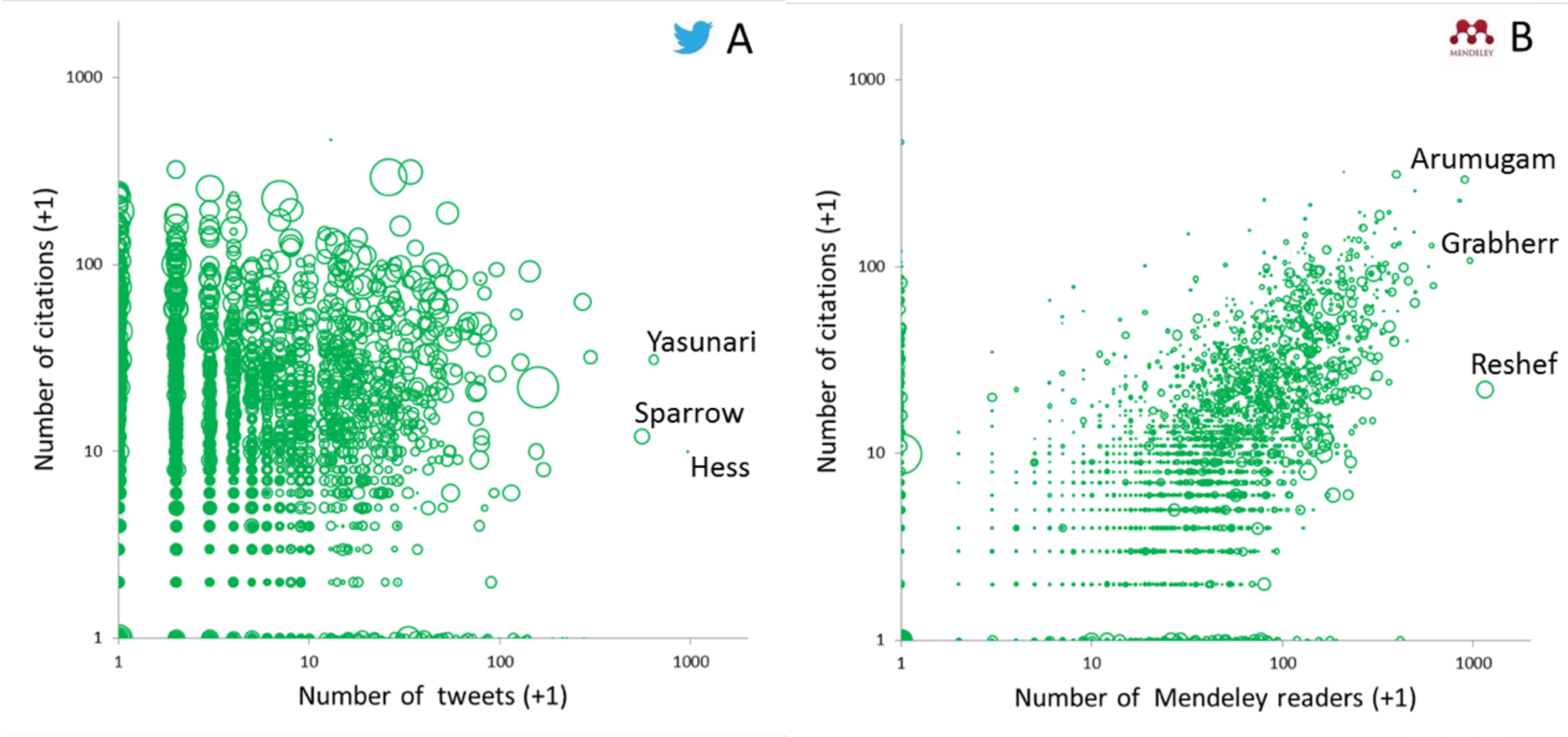
NSF disciplines	P_{PubMed}	$P_{tweeted}$	$P\%_{tweeted}$	T	$T/P_{tweeted}$
Biology	61,587	4,357	7.1%	9,634	2.2
Chemistry	121,770	6,640	5.5%	10,933	1.6
Clinical Medicine	774,961	77,991	10.1%	184,002	2.4
Earth and Space	26,925	1,070	4.0%	2,885	2.7
Engineering and Technology	27,567	1,517	5.5%	2,916	1.9
Health	58,580	7,483	12.8%	17,306	2.3
Humanities	691	45	6.5%	121	2.7
Mathematics	2,459	134	5.4%	197	1.5
Physics	19,353	340	1.8%	539	1.6
Professional Fields	5,586	950	17.0%	2,510	2.6
Psychology	35,873	5,350	14.9%	16,240	3.0
Social Sciences	8,922	812	9.1%	2,192	2.7
Total	**1,431,399**	**134,929**	**9.4%**	**340,751**	**2.5**

Relation entre tweets et citations

Citations et tweets (A, ρ=0.181**)

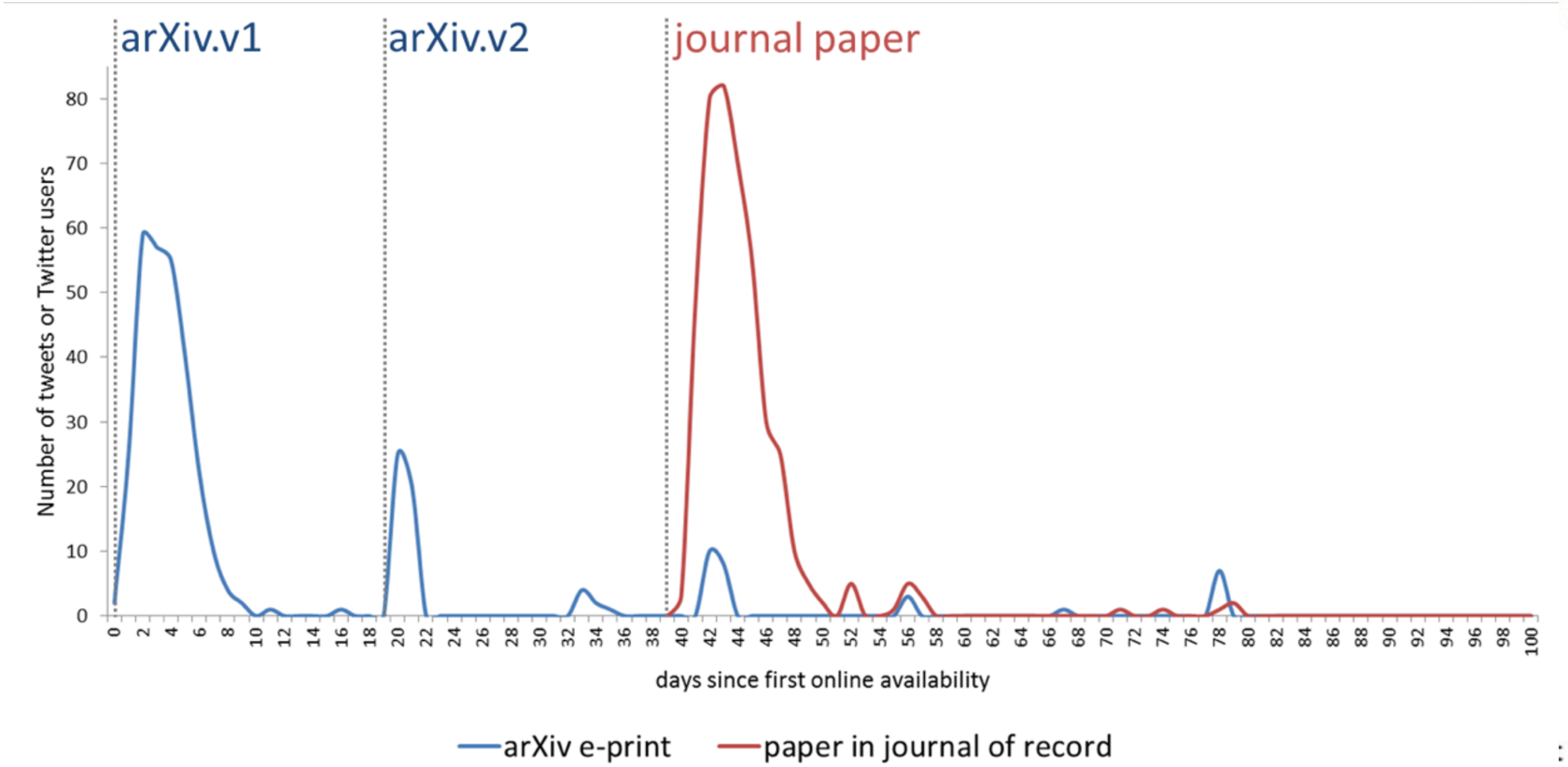
Citations et lecteurs Mendeley (B, ρ = 0.677**)

General Biomedical Research papers 2011



La vie d’un tweet

Traces de multiples versions d’un document



Relation entre tweets et citations

Articles les plus «tweetés»

Top 10 tweeted documents:

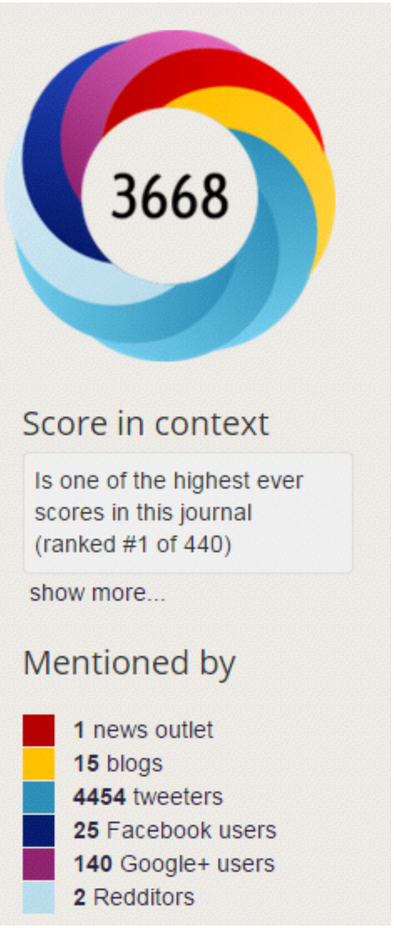
catastrophe & topical / web & social media / curious story
scientific discovery / health implication / scholarly community

Article	Journal	C	T
Hess et al. (2011). Gain of chromosome band 7q11 in papillary thyroid carcinomas of young patients is associated with exposure to low-dose irradiation	PNAS	9	963
Yasunari et al. (2011). Cesium-137 deposition and contamination of Japanese soils due to the Fukushima nuclear accident	PNAS	30	639
Sparrow et al. (2011). Google Effects on Memory: Cognitive Consequences of Having Information at Our Fingertips	Science	11	558
Onuma et al. (2011). Rebirth of a Dead Belousov–Zhabotinsky Oscillator	Journal of Physical Chemistry A	--	549
Silverberg (2012). Whey protein precipitating moderate to severe acne flares in 5 teenaged athletes	Cutis	--	477
Wen et al. (2011). Minimum amount of physical activity for reduced mortality and extended life expectancy: a prospective cohort study	Lancet	51	419
Kramer (2011). Penile Fracture Seems More Likely During Sex Under Stressful Situations	Journal of Sexual Medicine	--	392
Newman & Feldman (2011). Copyright and Open Access at the Bedside	New England Journal of Medicine	3	332
Reaves et al. (2012). Absence of Detectable Arsenate in DNA from Arsenate-Grown GFAJ-1 Cells	Science	5	323
Bravo et al. (2011). Ingestion of Lactobacillus strain regulates emotional behavior and central GABA receptor expression in a mouse via the vagus nerve	PNAS	31	297

Relation entre tweets et publications

Article de physique parmi les plus «tweetés»

Highly tweeted Physics paper



IOP FTC

IOP PUBLISHING — JOURNAL OF PHYSICS A: MATHEMATICAL AND THEORETICAL

J. Phys. A: Math. Theor. **44** (2011) 492001 (5pp) — doi:10.1088/1751-8113/44/49/492001

FAST TRACK COMMUNICATION

Can apparent superluminal neutrino speeds be explained as a quantum weak measurement?

M V Berry[1], **N Brunner**[1], **S Popescu**[1] **and P Shukla**[2]

[1] H H Wills Physics Laboratory, Tyndall Avenue, Bristol BS8 1TL, UK
[2] Department of Physics, Indian Institute of Technology, Kharagpur, India

Received 12 October 2011, in final form 27 October 2011
Published 11 November 2011
Online at stacks.iop.org/JPhysA/44/492001

Relation entre tweets et publications

Article de physique parmi les plus «tweetés»

Highly tweeted Physics paper

Conrad Hackett
@conradhackett
Suivre

Great moments in science: This research paper abstract is a model of brevity. bit.ly/Tn5eFu pic.twitter.com/9J94Rtwf

Répondre Retweeter Favori Plus

Can apparent superluminal neutrino speeds be explained as a quantum weak measurement?

M V Berry[1], N Brunner[1], S Popescu[1] & P Shukla[2]

[1]H H Wills Physics Laboratory, Tyndall Avenue, Bristol BS8 1TL, UK
[2] Department of Physics, Indian Institute of Technology, Kharagpur, India

Abstract

Probably not.

4454 tweeters
25 Facebook users
140 Google+ users
2 Redditors

Richard P Grant
@rpg7twit
3,040 followers
Via @skdh: Best. Abstract. EVER http://t.co/T24ynptn
14-Oct-2011

Kelly Oakes
@kahoakes
4,154 followers
Haha! RT @Stephen_Curry: :-) RT @rpg7twit: Via @skdh: Best. Abstract. EVER http://t.co/pLPgIGnf
14-Oct-2011

Ian Walker
@ianwalker
2,383 followers
RT @DrBillyo: Ha ha ha! RT @Stephen_Curry: :-) RT @rpg7twit: Via @skdh: Best. Abstract. EVER http://t.co/MqbkeAqb
14-Oct-2011

Ben O'Steen
@benosteen
1,906 followers
RT @biochembelle: Ha! RT @Stephen_Curry: :-) RT @rpg7twit: Via @skdh: Best. Abstract. EVER http://t.co/osnoTR6R
14-Oct-2011

Mahendra Bhujel
@MahendraBhujel
18 followers
RT @DrBillyo via @skdh : The most awesome abstract ever; http://t.co/m1R2oeen !
14-Oct-2011

Margaret Harris
@DrMLHarris
282 followers
"Best abstract ever" http://t.co/gfkuhzzG clearly inspired by http://t.co/ItiHuu2k
14-Oct-2011
Reply Retweet Favorite

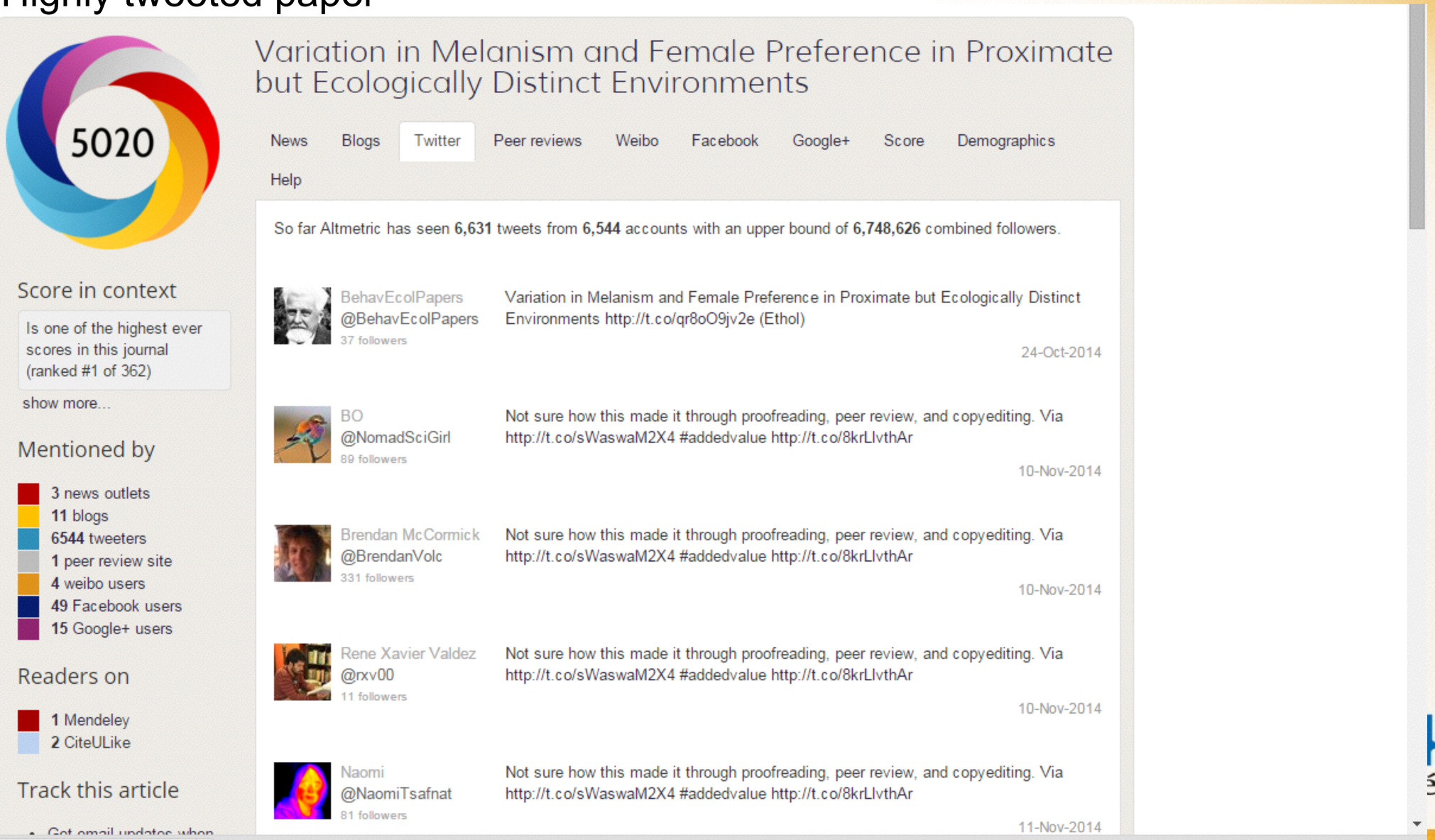
Abstract
Probably not.

Anna Sharman
@sharmanedit
2,032 followers
RT @David_S_Bristol: "Best abstract ever" from Berry @bristoluni a) shows power of arxiv system and b) questions point of an abstract! http://t.co/sp6IgOAJ
14-Oct-2011

Relation entre tweets et publications

Article viral de la semaine dernière

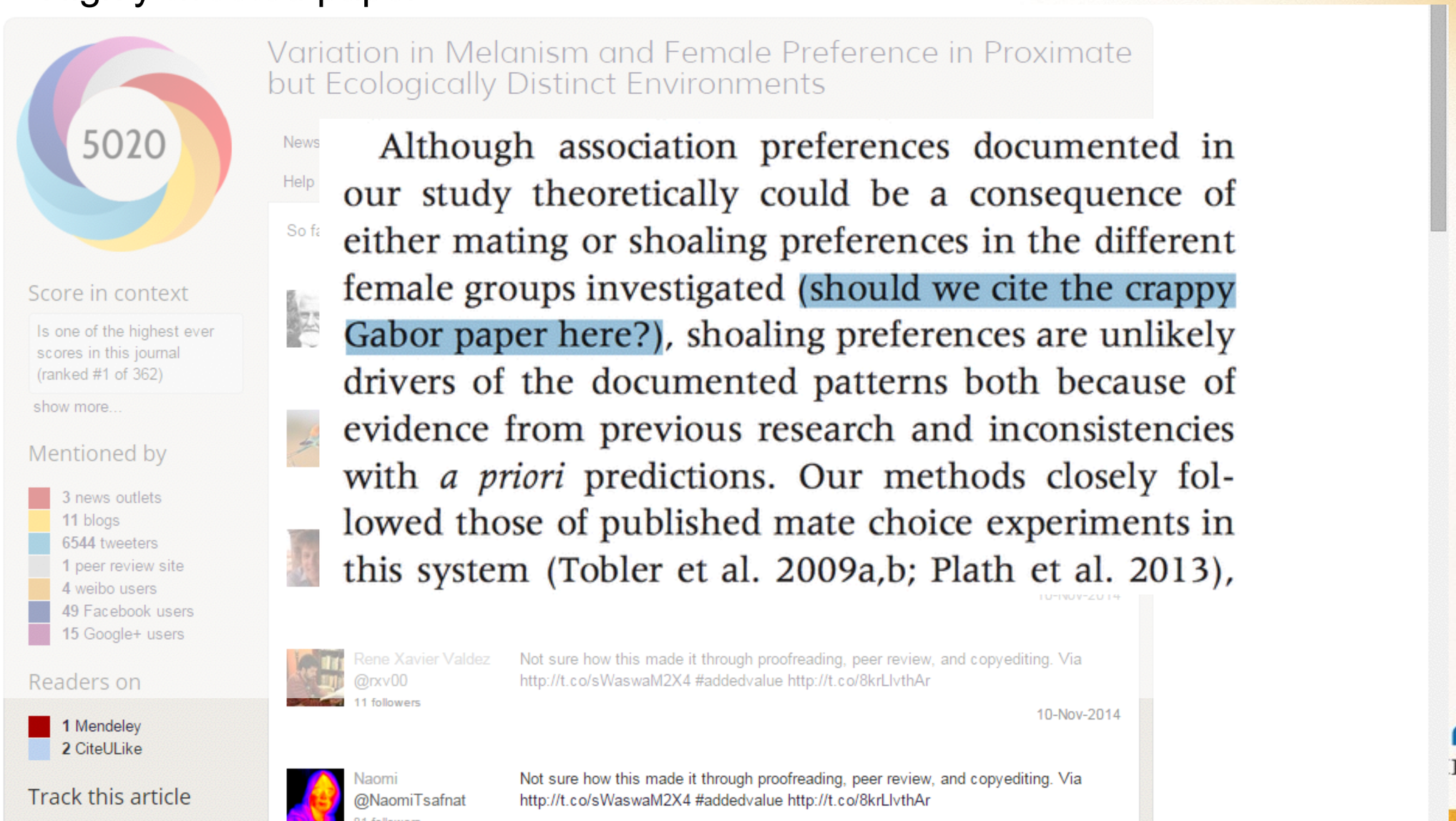
Highly tweeted paper



Relation entre tweets et publications

Article viral de 2014

Highly tweeted paper



Relation entre tweets et citations

Articles les plus «tweetés» - SST

Titre	Tweets	Citations
Analysis of the Load on the Knee Joint and Vertebral Column with Changes in Squatting Depth and Weight Load	761	20
Global pattern of experienced and anticipated discrimination reported by people with major depressive disorder: a cross-sectional survey	243	132
Is prostitution harmful?	738	15
Effect of range of motion in heavy load squatting on muscle and tendon adaptations	216	36
Long working hours may increase risk of coronary heart disease	193	2
Prevalence of hearing loss in the United States by industry	218	30
Early predictors of lumbar spine surgery after occupational back injury: results from a prospective study of workers in Washington State.	218	12
Genetic damage in soybean workers exposed to pesticides: evaluation with the comet and buccal micronucleus cytome assays.	204	27
Are flexibility and muscle-strengthening activities associated with a higher risk of developing low back pain?	136	2
Is cancer risk of radiation workers larger than expected?	129	50