



Peer Review
from WoS

V. Batagelj,
A. Ferligoj

Introduction

Goal

Data

Analysis of
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References

Network Analysis of "Peer Review" Literature

Vladimir Batagelj and Anuška Ferligoj

University of Ljubljana, IMFM Ljubljana and IAM UP Koper

Networks in the Global World

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Outline

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Vladimir Batagelj:

vladimir.batagelj@fmf.uni-lj.si

Anuška Ferligoj:

anuska.ferligoj@fdv.uni-lj.si



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Peer review is the evaluation of work by one or more people of similar competence (peers) to the producers of the work. It constitutes a form of self-regulation by qualified members of a profession within the relevant field.

Peer review methods are employed to maintain standards of quality, improve performance, and provide credibility. There is still a lot of discussion which methods to employ.



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The goal is to study the publications on 'peer review' included in Web of Science till March 2016. The questions to be answered are:

- Which publications are the most cited?
- Which are the main authors and journals publishing papers on 'peer review'?
- Which are the main keywords in papers on 'peer review'?
- Which are the most influential publications in the field of 'peer review'?

For answering these questions several social network analysis approaches are applied on several two-mode networks and on large citation network obtained from WoS. The most useful ones are the 'main path' analyses and the 'islands' procedure.



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From the **Web of Science** (WoS), using the queries "peer review*" and refereeing, we downloaded in March 2016 the corresponding data set. We manually improved it.

The publications that appear in descriptions are of two types:

- hits – publications with a WoS description (22 094);
- referenced only publications (listed in CR fields of descriptions, but not contained in hits).



WoS networks

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Using the program WoS2Pajek we transformed it into a collection of networks: the citation network, the authorship network, the journalship network, and the keywordship network.

| | | |
|------------------------|---|---------|
| number of publications | = | 721 547 |
| number of authors | = | 295 849 |
| number of journals | = | 39 988 |
| number of keywords | = | 36 279 |
| number of records | = | 22 981 |
| number of duplicates | = | 887 |

We removed multiple links and loops from networks. The cleaned citation network has $n = 721547$ nodes and $m = 8698211$ arcs.



Most cited publications (hits)

| | freq | author | title |
|--------------------------|------|-----------------|--|
| Peer Review from WoS | 173 | Cohen, J | Statistical Power Analysis for the Behavioral Sciences. Routledge,1988 |
| | 164 | Peters, DP | Peer-review practices of psychological journals ... Behav Brain Sci, 1982 |
| V. Batagelj, A. Ferligoj | 151 | Egger, M | Bias in meta-analysis detected by a simple, graphical test. Brit Med J, 1997 |
| | 150 | Stroup, DF | Meta-analysis of observational studies in epidemiology. JAMA, 2000 |
| | 135 | Dersimonian, R | Metaanalysis in clinical-trials. Control Clin Trials, 1986 |
| | 130 | Zuckerman, H | Patterns of evaluation in science. Minerva, 1971 |
| Introduction | 130 | Higgins, JPT | Cochrane Handbook for Systematic Reviews of Interventions. Cochrane, 2011 |
| | 126 | Moher, D | Preferred Reporting Items for Systematic Reviews and Meta-Analyses. Plos Med, 2007 |
| Goal | 125 | Higgins, JPT | Measuring inconsistency in meta-analyses. Brit Med J, 2003 |
| Data | 121 | Cicchetti, DV | The reliability of peer-review for manuscript ... Behav Brain Sci, 1991 |
| | 119 | Hirsch, JE | An index to quantify an individual's scientific research output. P Natl Acad Sci Usa, 2005 |
| Analysis of hits | 114 | Mahoney, M | Publication prejudices. Cognitive Therapy and Research, 1977 |
| | 114 | van Rooyen, S | Effect of open peer review on quality of reviews ... Brit Med J, 1999 |
| | 114 | Easterbrook, PJ | Publication bias in clinical research. Lancet, 1991 |
| Analysis of citations | 110 | Landis, JR | Measurement Of Observer Agreement For Categorical Data. Biometrics, 1977 |
| | 109 | Godlee, F | Effect on the quality of peer review of blinding reviewers ... JAMA, 1998 |
| References | 108 | Horrobin, DF | The philosophical basis of peer-review ... JAMA, 1990 |
| | 107 | Moher, D | Preferred Reporting Items for Systematic Reviews ... Ann Intern Med, 2009 |
| | 107 | Jadad, AR | Assessing the quality of reports of randomized clinical trials. Control Clin Trials, 1998 |
| | 105 | Mcnutt, RA | The effects of blinding on the quality of peer-review. JAMA, 1990 |
| | 104 | Cole, S | Chance and consensus in peer-review. Science, 1981 |
| | 103 | Moher, D | Improving the quality of reports of meta-analyses ... Lancet, 1999 |
| | 98 | Justice, AC | Does masking author identity improve peer review quality? JAMA, 1998 |
| | 97 | Lock, S | A Difficult Balance: Editorial Peer Review in Medicine. Nuffield Trust, 1985 |
| | 95 | van Rooyen, S | Effect of blinding and unmasking on the quality of peer review. JAMA, 1998 |
| | 92 | Black, N | What makes a good reviewer and a good review for a general medical journal? JAMA, 1994 |
| | 91 | Scherer, RW | Full publication of results initially presented in abstracts. JAMA, 1994 |
| | 90 | Higgins, JPT | Quantifying heterogeneity in a meta-analysis. Stat Med, 2002 |
| | 90 | Smith, R | Peer review: a flawed process at the heart of science and journals. J Roy Soc Med, 2001 |



Authors with the largest number of publications

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| n | works | author | n | works | author |
|----|-------|------------|----|-------|------------|
| 1 | 282 | [ANONYMO_ | 24 | 27 | CASTAGNA_C |
| 2 | 61 | BORNMANN_L | 25 | 25 | COHEN_J |
| 3 | 59 | ALTMAN_D | 26 | 25 | HELSEN_W |
| 4 | 55 | SMITH_R | 27 | 24 | MAZEROLL_S |
| 5 | 55 | LEE_J | 28 | 24 | LEE_M |
| 6 | 50 | MOHER_D | 29 | 24 | ADAMS_J |
| 7 | 48 | DANIEL_H | 30 | 23 | CHENG_J |
| 8 | 46 | SMITH_J | 31 | 23 | LI_Y |
| 9 | 38 | CURTIS_K | 32 | 22 | JONES_A |
| 10 | 36 | BROWN_D | 33 | 22 | WANG_H |
| 11 | 36 | RENNIE_D | 34 | 22 | BROWN_R |
| 12 | 35 | LEE_S | 35 | 22 | ANDERSON_P |
| 13 | 32 | WANG_J | 36 | 21 | CALLAHAM_M |
| 14 | 32 | WILLIAMS_J | 37 | 21 | WILSON_D |
| 15 | 31 | THOENNES_M | 38 | 20 | MARSHALL_E |
| 16 | 29 | JOHNSON_C | 39 | 20 | LI_J |
| 17 | 29 | JOHNSON_J | 40 | 20 | YANG_Y |
| 18 | 29 | REYES_H | 41 | 20 | JOHNSON_D |
| 19 | 28 | ZHANG_Y | 42 | 20 | JONES_R |
| 20 | 28 | WANG_Y | 43 | 20 | BROWN_C |
| 21 | 27 | ZHANG_L | 44 | 20 | ZHANG_X |
| 22 | 27 | SMITH_M | 45 | 20 | BJORK_B |
| 23 | 27 | WILLIAMS_A | 46 | 19 | ANDERSON_M |



Main authors through time

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| | -1970 | 1971-1980 | 1981-1990 | 1991-2000 | 2001-2005 | 2006-2010 | 2011-2015 |
|-----------------------|--------------|--------------|--------------|--------------|---------------|--------------|--------------|
| Introduction | 13 CLARK_G | 6 WEINSTEI_ | 13 SQUIRES_B | 19 RENNIE_ | 13 BENNINGE_M | 34 BORNMANN_ | 36 LEE_J |
| Goal | 12 FISHER_ | 6 MILGROM_P | 8 CHALMERS_T | 16 SMITH_R | 13 SMITH_R | 30 DANIEL_H | 31 BROWN_D |
| Data | 9 MILSTEAD_K | 6 RATENER_P | 8 COHEN_L | 12 REYES_ | 12 ALTMAN_D | 26 ALTMAN_ | 25 ZHANG_L |
| Analysis of hits | 8 SMITH_J | 6 MORRISON_K | 7 CHUBIN_D | 11 MARSHALL_ | 12 JOHNSON_J | 20 HELSEN_W | 25 LEE_S |
| Analysis of citations | 8 WILEY_F | 6 ZUCKERMA_ | 5 GARFIELD_ | 9 LUNDBERG_ | 11 CASTAGNA_ | 18 ANDERSON_ | 24 WANG_J |
| References | 8 REINDOLL_ | 5 HULKA_B | 5 LOCK_S | 9 KOSTOFF_R | 10 RUBEN_R | 17 RESNICK_D | 24 CURTIS_K |
| | 8 GRIFFIN_E | 5 READ_W | 5 HARGENS_ | 9 JOHNSON_ | 10 KENNEDY_ | 17 MOHER_ | 23 BORNMANN_ |
| | 8 ROBERTSO_A | 5 GARFIELD_ | 5 RENNIE_D | 8 BERO_L | 9 YOUNG_E | 17 KAISER_ | 23 MAZEROLL |
| | 7 ALFEND_S | 4 MERTON_R | 5 MARSHALL_E | 8 COHEN_J | 9 WEBER_P | ----- | 23 WANG_Y |
| | 7 MARSHALL_C | ----- | ----- | 8 HAYNES_R | 9 JOHNS_M | 11 THOENNES_ | 19 WANG_H |
| | 6 HALVORSO_H | 2 CHUBIN_D | 3 LUNDBERG_G | 8 RUBIN_H | 9 SATALOFF_ | 10 LEE_J | 19 MOHER_D |
| | 6 CAROL_J | 2 CHALMERS_T | ----- | 8 FLETCHER_ | 8 D'OTTAVI_ | 9 CASTAGNA_C | ----- |
| | ----- | ----- | ----- | 8 MOHER_D | 8 MOHER_D | 9 SMITH_R | 13 ALTMAN_D |
| | 4 GARFIELD_F | ----- | ----- | 8 KHUDER_S | 8 WEBER_R | ----- | 13 SMITH_R |
| | 2 MERTON_R | ----- | ----- | ----- | ----- | ----- | ----- |
| | ----- | ----- | ----- | 7 ALTMAN_D | 5 DANIEL_H | ----- | ----- |
| | ----- | ----- | ----- | 6 SQUIRES_B | 5 REYES_H | ----- | ----- |
| | ----- | ----- | ----- | 5 MOHER_D | 4 BORNMANN_L | ----- | ----- |
| | ----- | ----- | ----- | ----- | 4 RENNIE_D | ----- | ----- |



Main journals

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| n | number | journal | n | number | journal |
|----|--------|----------------------|----|--------|----------------------|
| 1 | 515 | BMJ OPEN | 21 | 66 | ANN PHARMACOTHER |
| 2 | 288 | JAMA-J AM MED ASSOC | 22 | 64 | NEW ENGL J MED |
| 3 | 177 | PLOS ONE | 23 | 62 | CUTIS |
| 4 | 175 | NATURE | 24 | 59 | ANN ALLERG ASTHMA IM |
| 5 | 174 | SCIENTOMETRICS | 25 | 59 | BEHAV BRAIN SCI |
| 6 | 174 | BRIT MED J | 26 | 59 | PEDIATRICS |
| 7 | 165 | SCIENCE | 27 | 57 | CHEM ENG NEWS |
| 8 | 127 | unknown | 28 | 57 | MED J AUSTRALIA |
| 9 | 102 | ACAD MED | 29 | 54 | J GEN INTERN MED |
| 10 | 98 | LANCET | 30 | 53 | MATER TODAY-PROC |
| 11 | 92 | SCIENTIST | 31 | 53 | J SCHOLARLY PUBL |
| 12 | 91 | LEARN PUBL | 32 | 53 | J NANOSCI NANOTECHNO |
| 13 | 81 | J AM COLL RADIOL | 33 | 53 | AM J PREV MED |
| 14 | 80 | PHYS TODAY | 34 | 52 | BMC PUBLIC HEALTH |
| 15 | 78 | ARCH PATHOL LAB MED | 35 | 50 | J SEX MED |
| 16 | 78 | J UROLOGY | 36 | 50 | J SPORT SCI |
| 17 | 75 | J ASSOC OFF AGR CHEM | 37 | 50 | MED EDUC |
| 18 | 73 | CAN MED ASSOC J | 38 | 48 | RES EVALUAT |
| 19 | 71 | ANN INTERN MED | 39 | 48 | BRIT J SPORT MED |
| 20 | 67 | ABSTR PAP AM CHEM S | 40 | 47 | PROCEDIA ENGINEER |



Main journals through time

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-1970
75 J ASSOC OFF AGR CHEM
21 LANCET
15 BRIT MED J
9 PHYS TODAY
7 SCIENCE
6 J ASSOC OFF ANA CHEM
4 J AM OIL CHEM SOC
4 YALE LAW J
3 NATURE
3 BRIT J SURG
3 AM SOCIOL

2001-2005
49 JAMA-J AM MED ASSOC
40 CUTIS
32 BRIT MED J
28 LEARN PUBL
26 NATURE
24 ABSTR PAP AM CHEM S
23 ACAD MED
22 J PROSTHET DENT
22 ANN ALLERG ASTHMA IM
18 SCIENTOMETRICS
16 J UROLOGY
16 MED EDUC

14 LANCET
13 SCIENCE
12 SCIENTIST

1971-1980
24 SCIENCE
20 MED J AUSTRALIA
18 NEW ENGL J MED
16 AM J PSYCHIAT
15 PHYS TODAY
11 JAMA-J AM MED ASSOC
10 HOSP COMMUNITY PSYCH
10 FED PROC
10 BRIT MED J
9 NATURE
9 AM SOCIOL
7 NEW YORK STATE J MED
7 MED CARE

2006-2010
44 SCIENTOMETRICS
33 JAMA-J AM MED ASSOC
31 J SEX MED
27 PLOS ONE
27 J NANOSCI NANOTECHNO
27 ACAD MED
25 SCIENTIST
25 J UROLOGY
23 LEARN PUBL
23 J SPORT SCI
23 ARCH PATHOL LAB MED
21 NATURE

19 CUTIS
19 MED EDUC
19 SCIENCE
16 BRIT MED J

1981-1990
46 JAMA-J AM MED ASSOC
42 SCIENCE
33 BEHAV BRAIN SCI
32 PHYS TODAY
29 NATURE
27 NEW ENGL J MED
27 SCIENTIST
25 BRIT MED J
19 CAN MED ASSOC J
16 PROF PSYCHOL
13 SCI TECHNOL HUM VAL
13 S AFR MED J
12 HOSPITALS

9 LANCET
6 SCIENTOMETRICS

2011-2015
489 BMJ OPEN
146 PLOS ONE
78 SCIENTOMETRICS
73 J AM COLL RADIOL
53 MATER TODAY-PROC
47 PROCEDIA ENGINEER
47 PROCEDIA COMPUT SCI
43 ARCH PATHOL LAB MED
41 BMC PUBLIC HEALTH
30 BMC HEALTH SERV RES
30 J ATHL TRAINING
30 AM J PREV MED
29 ACAD MED

24 LEARN PUBL
23 JAMA-J AM MED ASSOC
19 BMJ-BRIT MED J

1991-2000
126 JAMA-J AM
71 NATURE
66 BRIT MED J
45 SCIENCE
39 ANN INTERN
38 LANCET
29 CAN MED AS
28 SCIENTIST
26 BEHAV BRAI
25 SCIENTOMET
23 ACAD MED
23 J ECON LIT

12 PHYS TODAY
9 NEW ENGL J



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| n | freq | keyword | n | freq | keyword | n | freq | keyword |
|----|------|-------------|----|------|------------------|----|------|---------------|
| 1 | 7375 | review | 26 | 1132 | treatment | 51 | 673 | meta-analysis |
| 2 | 3835 | peer | 27 | 1122 | outcome | 52 | 672 | woman |
| 3 | 2546 | research | 28 | 1097 | assessment | 53 | 656 | prevention |
| 4 | 2139 | quality | 29 | 1086 | medical | 54 | 630 | datum |
| 5 | 2085 | health | 30 | 1008 | model | 55 | 628 | policy |
| 6 | 1973 | systematic | 31 | 1004 | intervention | 56 | 623 | experience |
| 7 | 1671 | journal | 32 | 979 | performance | 57 | 604 | information |
| 8 | 1590 | management | 33 | 961 | program | 58 | 586 | bias |
| 9 | 1573 | care | 34 | 948 | education | 59 | 586 | association |
| 10 | 1460 | peer-review | 35 | 930 | control | 60 | 582 | behavior |
| 11 | 1447 | trial | 36 | 917 | child | 61 | 572 | service |
| 12 | 1432 | study | 37 | 911 | cancer | 62 | 569 | protocol |
| 13 | 1362 | analysis | 38 | 901 | evaluation | 63 | 567 | method |
| 14 | 1354 | referee | 39 | 891 | practice | 64 | 544 | human |
| 15 | 1354 | use | 40 | 846 | scientific | 65 | 523 | peer-reviewed |
| 16 | 1349 | publication | 41 | 777 | medicine | 66 | 521 | social |
| 17 | 1337 | impact | 42 | 775 | effect | 67 | 518 | drug |
| 18 | 1304 | patient | 43 | 767 | guideline | 68 | 516 | united-states |
| 19 | 1292 | therapy | 44 | 760 | process | 69 | 513 | adult |
| 20 | 1278 | science | 45 | 747 | report | 70 | 512 | evidence |
| 21 | 1208 | literature | 46 | 736 | factor | 71 | 506 | mortality |
| 22 | 1193 | randomize | 47 | 733 | controlled-trial | 72 | 504 | article |
| 23 | 1188 | clinical | 48 | 720 | disorder | 73 | 503 | community |
| 24 | 1181 | disease | 49 | 688 | surgery | 74 | 500 | improve |
| 25 | 1152 | risk | 50 | 682 | development | 75 | 494 | student |



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| | 1971-1980 | 1981-1990 | 1991-2000 | 2001-2005 | 2006-2010 | 2011-2015 |
|----------------|-----------------|-----------------|-----------------|-----------------|------------------|-----------|
| 234 review | 647 peer-review | 759 review | 872 review | 1753 review | 3588 review | |
| 228 peer | 159 reeree | 631 peer | 592 peer | 974 peer | 1413 systematic | |
| 116 referee | 67 journal | 423 peer-review | 336 research | 620 research | 1321 peer | |
| 87 peer-review | 51 peer | 335 quality | 294 quality | 551 quality | 1234 health | |
| 15 care | 51 review | 279 research | 245 trial | 471 health | 1225 research | |
| 15 reply | 48 process | 264 journal | 232 journal | 424 journal | 885 quality | |
| 14 method | 35 research | 217 referee | 196 health | 385 systematic | 847 management | |
| 14 comment | 34 editorial | 190 medical | 186 management | 379 management | 833 care | |
| 14 medical | 33 reviewer | 185 care | 184 referee | 369 publication | 811 study | |
| 14 quality | 32 quality | 174 publication | 180 publication | 342 care | 755 impact | |
| 14 role | 31 medical | 166 trial | 177 clinical | 340 treatment | 746 use | |
| 13 study | 28 science | 151 clinical | 171 medical | 338 patient | 698 analysis | |
| 13 use | 28 scientific | 147 management | 170 science | 331 impact | 688 trial | |
| 13 research | 26 publication | 138 science | 170 analysis | 331 analysis | 678 patient | |
| 12 journal | 25 reply | 134 study | 162 care | 330 randomize | 677 literature | |
| 12 scientific | 22 editor | 134 assessment | 160 therapy | 329 therapy | 651 therapy | |
| 11 science | 20 policy | 129 therapy | 156 control | 315 trial | 649 journal | |
| 11 impact | 20 manuscript | 128 analysis | 154 disease | 311 clinical | 647 intervention | |
| 10 papers | 19 report | 128 health | 149 patient | 308 science | 638 outcome | |
| 10 experience | 18 author | 126 use | 146 randomize | 300 study | 619 risk | |
| 10 process | 18 balance | 125 control | 145 use | 298 use | 613 randomize | |
| 10 anonymous | 16 comment | 119 evaluation | 141 literature | 294 literature | 609 disease | |
| 9 ambulatory | 16 program | 119 patient | 137 study | 293 assessment | 603 science | |
| 9 evaluation | 16 evaluation | 114 program | 135 impact | 287 risk | 574 publication | |
| 9 problem | | 112 process | 130 treatment | 287 disease | 561 model | |
| 9 guideline | | | 128 model | | | |
| 9 audit | | | | | | |



Citation networks

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A citation network is based on the citing relation **C_i**

$w \mathbf{C}_i z \equiv$ work w cites work z

We first restricted the original citation network to its 'boundary' (45917 nodes). Excluded publications are only among referenced only publications. Excluded are those ones that are cited less than 3 times or have no authors mentioned.

This citation network has one large weak component (39533 nodes), 155 small components, and 5589 isolated nodes. It contains also 22 small strong components. We transform it into an acyclic network using the Preprint transformation. Finally, it has $n = 45965$ nodes and $m = 132601$ arcs.



SPC – Search path count method

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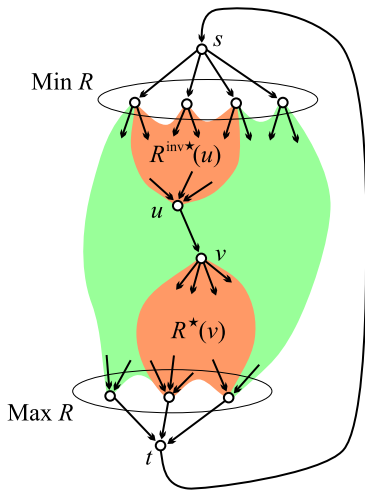
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The *search path count* (SPC) method is based on counters $n(u, v)$ that count the number of different paths from s to t through the arc (u, v) (Batagelj et al. 2014).

The *Main path* starts in a link with the largest SPC weight and expands in both directions following the adjacent link with the largest SPC weight.

The *CPM path* is determined using the Critical Path Method from Operations Research (the sum of SPC weights in a path is maximal).



Citation networks – SPC weights analysis

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In the network we computed the SPC weights and on their basis determine the main path, CPM path and link islands [20 200].

All analyses were done by the program *Pajek*.

Main path and CPM path gave the same result.

In July 2015 a new option was added to program Pajek:
Network/Acyclic Network/Create (Sub)Network/Main Paths
with several suboptions for computing local and global main paths
and for searching for Key-Route main path in acyclic networks (Liu
and Lu 2012).



Main path

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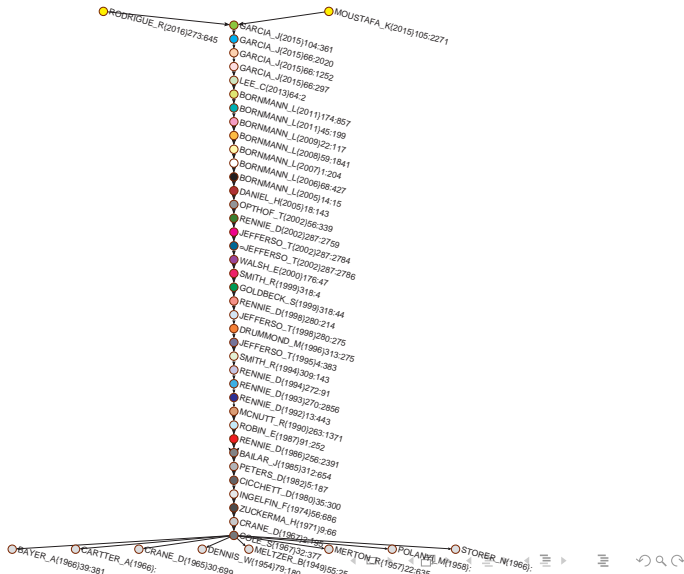
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List of publications on main path

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| year | first author | title | journal |
|------|----------------|---|--------------|
| 1949 | Meltzer BN | The productivity of social scientists | AmJSocial |
| 1954 | Dennis W | Bibliographies of eminent scientists | ScientificM |
| 1957 | Merton RK | Priorities in scientific discovery - a chapter in the sociology of sci... | AmSocialRev |
| 1958 | Polanyi M | Personal Knowledge: Towards a Post-Critical Philosophy | UPChicago |
| 1965 | Crane D | Scientists at major and minor universities | AmSocialRev |
| 1966 | Bayer AE | Some correlates of citation measure of productivity in science | SociolEduc |
| 1966 | Storer NW | The Social System of Science | HRW |
| 1966 | Cartter A | An Assessment of Quality in Graduate Education | ACE |
| 1967 | Crane D | Gatekeepers of science - some factors affecting selection... | AmSocial |
| 1967 | Cole S | Scientific output and recognition - study in operation of reward... | AmSocialRev |
| 1971 | Zuckerman H | Patterns of evaluation in science - institutionalisation, struct... | Minerva |
| 1974 | Ingelfinger FJ | Peer review in biomedical publication | AmJMed |
| 1980 | Cicchetti DV | Reliability of reviews for the american-psychologist | AmPsychol |
| 1982 | Peters DP | Peer-review practices of psychological journals - the fate... | BehavBrainS |
| 1985 | Bailar JC | Journal peer-review - the need for a research agenda | NewEnglJMe |
| 1986 | Rennie D | Guarding the guardians - a conference on editorial peer-review | Jama |
| 1987 | Robin ED | Peer-review in medical journals | Chest |
| 1990 | McNutt RA | The effects of blinding on the quality of peer-review | Jama |
| 1992 | Rennie D | Suspended judgment - editorial peer-review - let us put it on trial | ControlClinT |
| 1993 | Rennie D | More peering into editorial peer-review | Jama |
| 1994 | Rennie D | The 2nd international-congress on peer-review in biomedical... | Jama |
| 1994 | Smith R | Promoting research into peer-review | BritMedJ |
| 1995 | Jefferson T | Are guidelines for peer-reviewing economic evaluations necessary | HealthEcon |
| 1996 | Drummond M | Guidelines for authors and peer reviewers of economic submis... | BritMedJ |
| 1998 | Jefferson T | Evaluating the BMJ guidelines for economic submissions | Jama |
| 1998 | Rennie D | Peer review in Prague | Jama |



List of works on main path cont.

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| year | first author | title | journal |
|------|----------------|--|-------------|
| 1999 | Smith R | Opening up BMJ peer review - A beginning that should lead to... | BritMedJ |
| 1999 | Goldbeck-W. S | Evidence on peer review - scientific quality control or smokescreen? | BritMedJ |
| 2000 | Walsh E | Open peer review: a randomised controlled trial | BritJPsycho |
| 2002 | Jefferson T | Effects of editorial peer review - A systematic review | Jama |
| 2002 | Rennie D | Fourth International Congress on Peer Review in Biomedical Pub... | Jama |
| 2002 | Opthof T | The significance of the peer review process against ... bias | Cardiovasc |
| 2002 | Jefferson T | Measuring the quality of editorial peer review | Jama |
| 2005 | Bornmann L | Committee peer review at an international research foundation | ResEvaluat |
| 2005 | Daniel HD | Publications as a measure of scientific advancement and of... | LearnPubl |
| 2006 | Bornmann L | Selecting scientific excellence through committee peer review | Scientomet |
| 2007 | Bornmann L | Convergent validation of peer review decisions using the h index | JInformetr |
| 2008 | Bornmann L | Selecting manuscripts for a high-impact journal through peer review | JAmSocInf |
| 2009 | Bornmann L | The luck of the referee draw: the effect of exchanging reviews | LearnPubl |
| 2011 | Bornmann L | Scientific Peer Review | AnnuRevIn |
| 2011 | Bornmann L | A multilevel modelling approach to investigating the predictive... | JRStatSoc |
| 2013 | Lee CJ | Bias in peer review | JAmSocInf |
| 2015 | Garcia JA | The Principal-Agent Problem in Peer Review | JAssocInfS |
| 2015 | Garcia JA | Adverse selection of reviewers | JAssocInfS |
| 2015 | Garcia JA | Bias and effort in peer review | JAssocInfS |
| 2015 | Garcia JA | The author-editor game | Scientomet |
| 2015 | Moustafa K | Don't infer anything from unavailable data | Scientomet |
| 2016 | Rodriguez-S. R | Evolutionary games between authors and their editors | ApplMathC |



The main path publications

Phases

Peer Review
from WoS

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- before 1982: social science journals;
- from 1982 to 2002: biomedical journals;
- after 2002: specialized journals on science studies.



The main path publications till 1982

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Journals: social science journals (sociological, psychological, educational,...) and three books.

The most **influential authors:** Meltzer (1949), Dennis (1954), Merton (1957), Polany (1958), Crane (1965, 1967), Bayer and Folger (1966), Storer (1966), Cartter (1966), Cole and Cole (1967), Zuckerman and Merton (1971), Ingelfinger (1974), Cicchetti (1980) and Peters and Ceci (1982).

Topics: scientific productivity, bibliographies, knowledge, citation measures as measures of scientific accomplishment, scientific output and recognition, evaluation in science, referee system, journal evaluation, peer-evaluation system, review process, peer review practices.



The main path publications from 1983 to 2002

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Journals: biomedical journals, mainly JAMA. From 1986 the International Congress on Peer Review and Biomedical Publication is organized every four years.

The most **influential authors:** Rennie (1986, 1992, 1993, 1994, 1998, 2002), Smith (1994, 1999), Jefferson (1995, 1998, 2002), and their collaborators.

Topics: the effects of blinding on review quality, research into peer review, guidelines for peer reviewing, monitoring the peer review performance, open peer review, bias in peer review system, measuring the quality of editorial peer review. Development of meta-analysis and systematic reviews studies of peer-review.



The main path publications

from 2003 on

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Journals: specialized journals on science studies: Scientometrics, Research Evaluation, Journal of Informetrics, JASIST.

The most **influential authors:** Bornmann and Daniel (2005, 2006, 2007, 2008, 2009, 2011) and Garcia, Rodriguez-Sanchez and Fdez-Valdivia (4 papers in 2015, 2016). Others are Lee et al. (2013) and Moustafa (2015).

Topics: Bornmann and Daniel studied the validity of committee peer review process for awarding long-term fellowship to post-graduate researchers, the use of h-index and pre-screening of applications at Boehringer Ingelheim Fonds. They also analysed citations of accepted and rejected papers at a prime chemistry journal, the effect of exchanging reviews, the peer review process in this journal, the validity of its editorial decisions. The other papers studied bias in peer review, selection of reviewers, and the author-editor game.



Main paths for 100 largest weights

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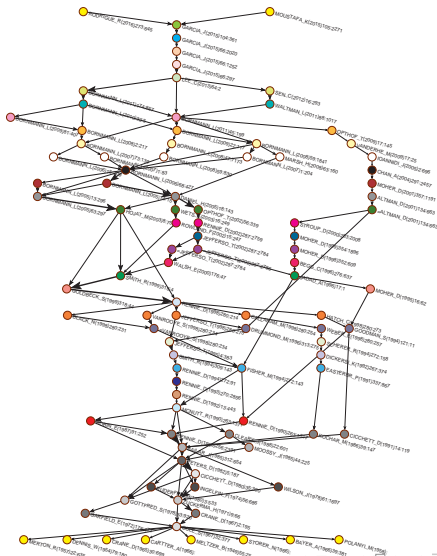
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Islands

Peer Review
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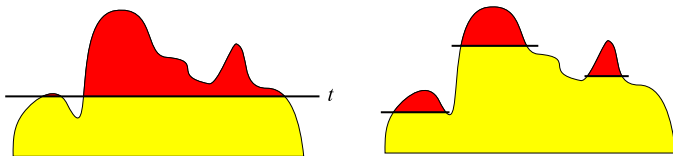
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If we represent a given or computed property of vertices / lines as a height of vertices / lines and we immerse the network into a water up to selected property level we get *cuts*. Varying the level we get different *islands* (connected subnetworks).



Batagelj et al. (2003) developed very efficient algorithms to determine the islands hierarchy and to list all the islands of selected sizes.



SPC line islands [20 200]

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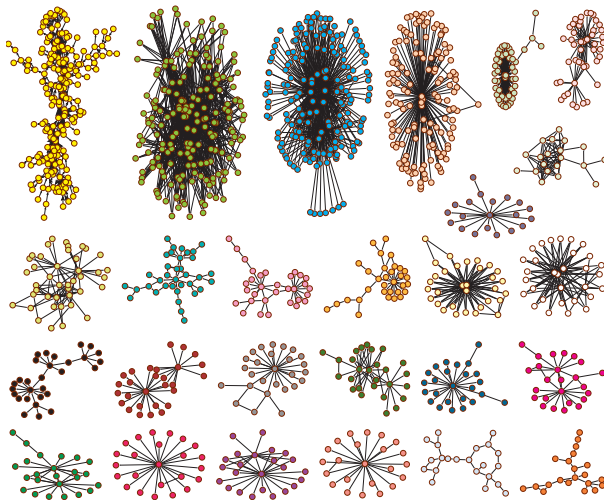
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Normalized collaboration network

Peer Review
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The usual collaboration network \mathbf{Co} can be obtained from the authorship network \mathbf{WA} using the network multiplication $\mathbf{Co} = \mathbf{WA}^T * \mathbf{WA}$. The value of an entry co_{uv} is equal to the number of different works authors u and v wrote together.

To neutralize the over-representation of works with many co-authors in the resulting collaboration network we used the normalized collaboration network $\mathbf{Ct}' = \mathbf{N}^T * \mathbf{N}'$ (as defined in [3]), where

$$\mathbf{N} = \text{diag}\left(\frac{1}{\max(1, \deg(w))}\right) \cdot \mathbf{WA} \text{ and } \mathbf{N}' = \text{diag}\left(\frac{1}{\max(1, \deg(w)-1)}\right) \cdot \mathbf{WA}.$$

Because all arcs in \mathbf{Ct}' are bidirected with the same weights, we replaced them with undirected links with doubled weights. In this way we neutralize works with many co-authors: a k -clique of authors (of the same work) would bring in the weight of $\frac{k \cdot (k-1)}{2}$ and this is neutralized in \mathbf{Ct}' . We also set the diagonal values to 0.



Normalized collaboration the most intensive links

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Here is the list of pairs of authors collaborating the most:

| first author | second author | weight |
|--------------|---------------|--------|
| Bornmann L | Daniel H | 25.822 |
| Brown D | Raff H | 11.000 |
| Saper C | Maunsell J | 10.338 |
| Deangeli C | Fontanar P | 9.333 |
| D'Angelo C | Abramo G | 6.333 |
| Reyes H | Andresen M | 5.500 |
| Fry C | Thoennes M | 5.333 |
| Kravitz R | Feldman M | 5.067 |
| Fletcher R | Ferris L | 5.000 |



Normalized collaboration

simple islands including the most intensive links

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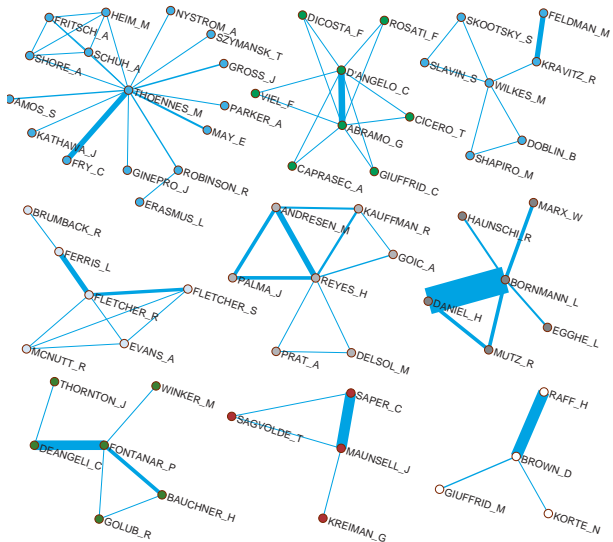
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Support

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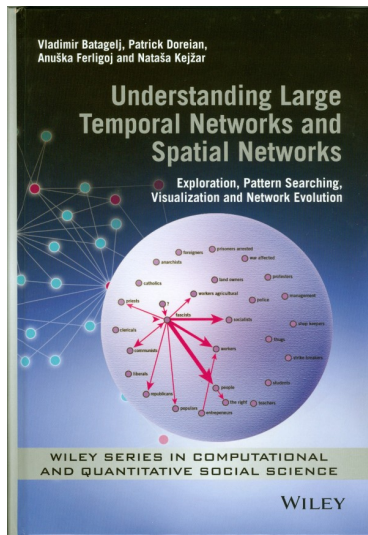
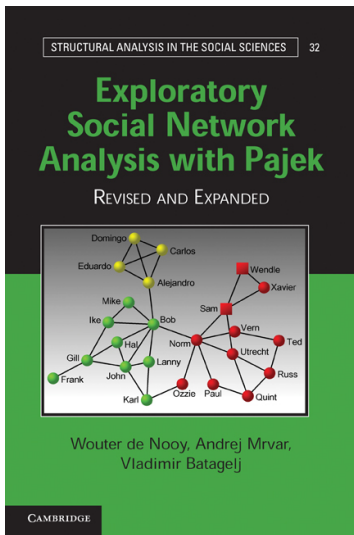
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Peer Review from WoS





References I

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Batagelj, V., Doreian, P., Ferligoj, A., Kejžar, N.: Understanding Large Temporal Networks and Spatial Networks: Exploration, Pattern Searching, Visualization and Network Evolution. Wiley Series in Computational and Quantitative Social Science. Wiley, October 2014.



Batagelj, V., Cerinšek, M. (2013). On bibliographic networks. *Scientometrics*, 96(3), 845–864. doi: 10.1007/s11192-012-0940-1



Liu, J.S. and Lu, L.Y.Y.: An integrated approach for main path analysis: Development of the Hirsch index as an example. *Journal of the American Society for Information Science and Technology*, 63 (2012), 528-542 ([paper](#)).



De Nooy, W., Mrvar, A., Batagelj, V.: Exploratory Social Network Analysis with Pajek; Revised and Expanded Second Edition. Structural Analysis in the Social Sciences, Cambridge University Press, September 2011.



References II

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Wikipedia: Peer review