Impact and Relevance of Cognition Journal in the Field of Cognitive Science: An Evaluation

M Sadik Batcha[1], Younis Rashid Dar[2], Muneer Ahmad[3*],

[1]*Mentor and Research Supervisor, Professor and University Librarian, Annamalai University, Annamalai nagar, India*
[2]*Ph.D Research Fellow, Department of Linguistics, University of Kashmir, Hazratbal Srinagar, India*
[3*]*Ph.D Research Scholar, Department of Library and Information Science, Annamalai University, Annamalai nagar, India*

Corresponding Author: *Muneer Ahmad, Ph.D Research Scholar, Department of Library and Information Science, Annamalai University, Annamalai nagar, India, , Email: muneerbangroo@gmail.com*

ABSTRACT

This study aims to present a scientometric analysis of the journal titled "Cognition" for a period of 20 years from 1999 to 2018. The present study was conducted with an aim to provide a summary of research activity in current journal and characterize its most aspects. The research coverage includes the year wise distribution of articles, authors, institutions, countries and citation analysis of the journal. The analysis showed that 2870 papers were published in journal of Cognition from 1999 to 2018. The study identified top 20 prolific authors, institutions and countries of the journal. Researchers from USA have been made the most percentage of contributions.

Keywords: *Citations, Cognition Journal, Bibexcel, Most Productive Authors, Histcite, VOSviewer, ACPP, Language.*

INTRODUCTION

Cognition as defined by (Neisser, 1967)[1] "all the processes by which sensory input is transformed, reduced, elaborated, stored , recovered and used" provides an overall sense of the term "*Cognition".* Cognition is the use of conscious mental processes underlying our ability to think, to talk, to remember, to learn from our experiences and to modify and control our behaviour accordingly. However, sometimes the terms "*Cognition*" and "*Thinking*" are taken as synonyms. The topics of cognition involve the study of perception, knowledge representation, attention, thought, Language, problem solving, decision-making, memory, consciousness and aspects of Intelligence. Studying about cognition is fundamental to understanding various mental processes and the subject of cognition finds its place among the basic and most important topics in a growing and broader discipline of cognitive psychology and related fields.

Cognition is an international journal that publishes theoretical and experimental papers on the study of the mind. It publishes many of the most important papers in cognitive science and is the premier international and interdisciplinary journal in the field. It is required reading for anyone who wishes to keep up to date in this exciting research area. It covers a wide variety of subjects concerning all the different aspects of cognition, ranging from biological and experimental studies to formal analysis.

Contributions from the fields of psychology, neuroscience, linguistics, computer science, mathematics, ethology and philosophy are published in the journal provided that the articles have some bearing on the functioning of the mind. In addition, the journal serves as a forum for discussion of social and political aspects of cognitive science (Martin, Tsakiris, & Wagemans, 2019)[2].

Scientometric is the study of measuring research quality and impact, understanding the processes of citations, scientific mapping fields, and the use of indicators in research policy and management (Mingers & Leydesdorff, 2015)[3]. The scientometric analysis shows the topics inside a search criterion, for example, the top countries evolution inside the criterion countries, or a list of specific author keywords inside the criterion author keywords. The temporal analysis allows us to find when a new phenomenon starts, and when it advances to a trending or emerging topic. The scientometric

tools have developed a kind of algorithms to perform the temporal analysis and find the trending topics, such as strategic diagrams (Cobo, Pez-Herrera, Herrera-Viedma, & Herrera, 2012)[4] and Kleinberg's burst detection algorithm (Kleinberg, 2003)[5]. These kinds of analysis are performed in datasets that generally are extracted from a single bibliometric database, like Scopus or WoS, because, most of the tools cannot merge the information successfully from different databases. Also, there is not a longitudinal graph representation of the trending topics evolution provided by all the actual tools.

REVIEW OF LITERATURE

In recent years, many researchers have conducted scientometric analysis in different fields. (Batcha & Ahmad, 2017)[6] analysed comparative analysis of Indian Journal of Information Sources and Services (IJISS) and Pakistan Journal of Library and Information Science (PJLIS) during 2011-2017 and studied various aspects like year wise distribution of papers, authorship pattern & author productivity, degree of collaboration pattern of Co-Authorship , average length of papers , average keywords, etc and found 138 (94.52%) of contributions from IJISS were made by Indian authors and similarly 94 (77.05) of contributions from PJLIS were done by Pakistani authors. Papers by Indian and Pakistani Authors with Foreign Collaboration are minimal (1.37% of articles) and (4.10% of articles) respectively.

(Batcha, Jahina, & Ahmad, 2018)[7] has examined scientometric analysis of the DESIDOC Journal and analyzed the pattern of growth of the research output published in the journal, pattern of authorship, author productivity, and, subjects covered to the papers over the period (2013-2017). It found that 227 papers were published during the period of study (2001-2012). The maximum numbers of articles were collaborative in nature. The subject concentration of the journal noted was Scientometrics. The maximum numbers of articles (65 %) have ranged their thought contents between 6 and 10 pages.

(Ahmad & Batcha, 2019)[8] analyzed research productivity in Journal of Documentation (JDoc) for a period of 30 years between 1989 and 2018. Web of Science database a service from Clarivate Analytics has been used to download citation and source data. Bibexcel and Histcite application software have been used to present the datasets. Analysis part focuses on the parameters like citation impact at local and global level, influential authors and their total

output, ranking of contributing institutions and countries. In addition to this scientographical mapping of data is presented through graphs using VOS viewer software mapping technique.

(Ahmad, Batcha, Wani, Khan, & Jahina, 2017)[9] explored scientometric analysis of the Webology Journal. The paper analyses the pattern of growth of the research output published in the journal, pattern of authorship, author productivity, and subjects covered to the papers over the period (2013-2017). It was found that 62 papers were published during the period of study (2013-2017). The maximum numbers of articles were collaborative in nature. The subject concentration of the journal noted was Social Networking/Web 2.0/Library 2.0 and Scientometrics or Bibliometrics. Iranian researchers contributed the maximum number of articles (37.10%). The study applied standard formula and statistical tools to bring out the factual results.

(Ahmad & Batcha, 2019)[10] studied the scholarly communication of Bharathiar University which is one of the vibrant universities in Tamil Nadu. The study find out the impact of research produced, year-wise research output, citation impact at local and global level, prominent authors and their total output, top journals of publications, collaborating countries, most contributing departments and publication trends of the university during 2009 to 2018. The 10 years' publication data of the university indicate that a total of 3440 papers have been published from 2009 to 2018 receiving 38104 citations with h-index as 68. In addition the study used scientographical mapping of data and presented it through graphs using VOS viewer software mapping technique.

(Ahmad, Batcha, & Jahina, 2019)[11] quantitatively identified the research productivity in the area of artificial intelligence at global level over the study period of ten years (2008-2017). The study identified the trends and characteristics of growth and collaboration pattern of artificial intelligence research output. Average growth rate of artificial intelligence per year increases at the rate of 0.862. The multi-authorship pattern in the study is found high and the average number of authors per paper is 3.31. Collaborative Index is noted to be the highest range in the year 2014 with 3.50. Mean CI during the period of study is 3.24. This is also supported by the mean degree of collaboration at the percentage of 0.83 .The mean CC

observed is 0.4635. Lotka's Law of authorship productivity is good for application in the field of artificial intelligence literature. The distribution frequency of the authorship follows the exact Lotka's Inverse Law with the exponent á = 2. The modified form of the inverse square law, i.e., Inverse Power Law with á and C parameters as 2.84 and 0.8083 for artificial intelligence literature is applicable and appears to provide a good fit. Relative Growth Rate [Rt(P)] of an article gradually increases from -0.0002 to 1.5405, correspondingly the value of doubling time of the articles Dt(P) decreases from 1.0998 to 0.4499 (2008-2017). At the outset the study reveals the fact that the artificial intelligence literature research study is one of the emerging and blooming fields in the domain of information sciences.

OBJECTIVES OF THE STUDY

The main objective of the study is to consider on the mapping of 2870 articles published by the *Cognition* journal during the period of 1999 –

2018 and the specific objectives are to identify and carry out the following factors:

- To examine the annual publications output of *Cognition* journal.

- To estimate publication density through mapping of top 20 authors, countries and institutions based on their number of research papers.

- Find out the top 20 prolific authors, institutions and countries.

DATA SOURCE AND METHODOLOGY

The data for the present study were taken from the Clarivate analytics-Web of Science database in July 2019. A total of 2870 research publications was downloaded from 1999-2018. The data downloaded was enhanced with different parameters like title, authors, years, countries, and research institutions. Furthermore, the downloaded data were analyzed by using Bibexcel, Histcite, and VOS viewer software applications.

Table1. *Detail of the Important Points of the Data Sample During 1999 to 2018*

S.No.	Details about Sample	Observed Values
1	Duration	1999-2018
2	Collection Span	20 Years
3	Total No. of Records	2870
4	Total No. of Authors	5233
5	Frequently Used Words	4550
6	Document Types	9
7	Languages	1
8	Contributing Countries	61
9	Contributing Institutions	1127
10	Institutions with Sub Division	2709
11	Total Cited References	145261
12	Total Local Citation Scores	5045
13	Total Global Citation Scores	121457
14	H-Index	159

DISCUSSION AND RESULT

Evaluate the Annual Output of Publications

The data from Table 2 and graph 1 can be clearly seen that the numbers of research documents published from 1999 to 2018 shows a gradual increase in publication of research articles in the Journal. According to the publication output from the Table 2 the year wise distribution of research documents, 2008 has the highest number of research documents 255 (8.89%) with 746 (14.79%) of total local citation score and 16855 (13.88%) of total global citation score values and being prominent among the 20 years output and it stood in first rank position. The year 2016 has 249 (8.68%) research documents and it stood in second

position with 116 (2.30%) of total local citation score and 2241 (1.85%) of total global citation score were scaled. It is followed by the year 2018 with 236 (8.22 %) of records and it stood in third rank position along with 8 (0.16%) of total local citation score and 337 (0.28%) of total global citation score measured. The year 2017 has 234 (8.15%) research documents and it stood in fourth position with 71 (1.41%) & 1220 (1.00%). The year 2015 has 217 (7.56%) research documents and it stood in 5th position with 151(2.99%) of total local citation score and 2987 (2.46%) of total global citation score were scaled. It has been observed from the data that the increase in publications in the journal does not necessarily imply an increase in the overall citation score of the research articles. Graph no.

1 presents the year wise publications and depicts the citation score. It clearly indicates on the fact that increase in publication rate is not directly linked to increase in citation score.

Table2. *Annual Distribution of Publications and Citations*

S.No.	Year	Records	%	Rank	TLCS	%	Rank	TGCS	%	Rank
1	1999	64	2.23	19	396	7.85	2	7390	6.08	5
2	2000	60	2.09	20	308	6.11	5	6671	5.49	8
3	2001	77	2.68	15	342	6.78	4	9034	7.44	2
4	2002	78	2.72	14	51	1.01	19	6849	5.64	7
5	2003	76	2.65	16	291	5.77	9	6337	5.22	11
6	2004	73	2.54	18	185	3.67	14	8313	6.84	3
7	2005	84	2.93	13	292	5.79	8	6533	5.38	9
8	2006	75	2.61	17	242	4.80	10	5800	4.78	13
9	2007	119	4.15	12	237	4.70	12	6497	5.35	10
10	2008	255	8.89	1	746	14.79	1	16855	13.88	1
11	2009	149	5.19	11	358	7.10	3	8018	6.60	4
12	2010	161	5.61	8	293	5.81	7	7385	6.08	6
13	2011	153	5.33	10	298	5.91	6	6320	5.20	12
14	2012	160	5.57	9	236	4.68	13	4784	3.94	14
15	2013	181	6.31	6	242	4.80	10	4494	3.70	15
16	2014	169	5.89	7	182	3.61	15	3392	2.79	16
17	2015	217	7.56	5	151	2.99	16	2987	2.46	17
18	2016	249	8.68	2	116	2.30	17	2241	1.85	18
19	2017	234	8.15	4	71	1.41	18	1220	1.00	19
20	2018	236	8.22	3	8	0.16	20	337	0.28	20
	Total	2870	100.00		5045	100.00		121457	100.00	

*TLCS = Total Local Citation Score, *TGCS = Total Global Citation Score
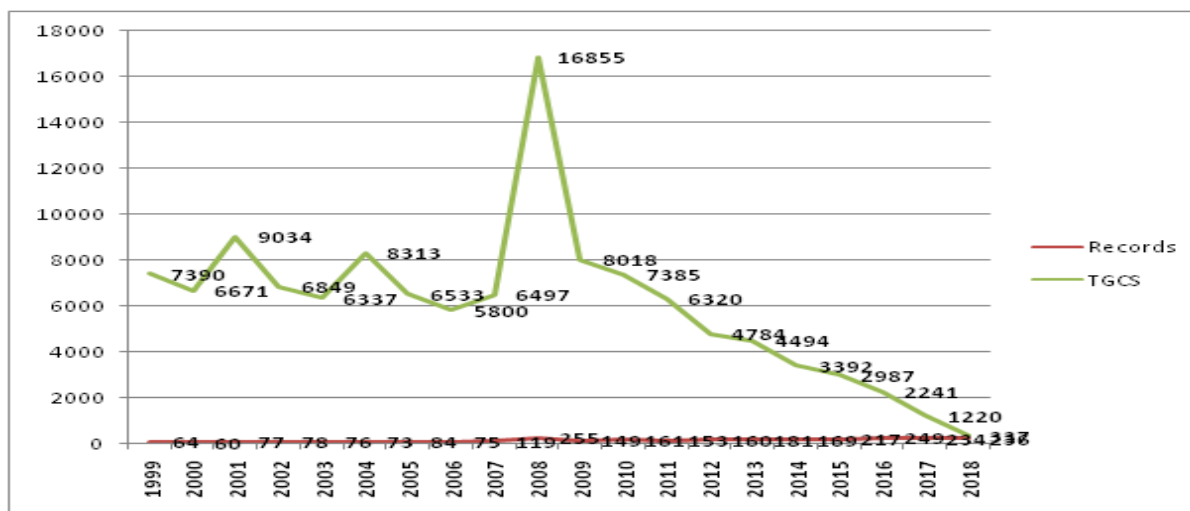
Graph1. *Annual Distribution of Publications and Citations*

Analysis of the Publication Output of Top 20 Authors

The ranking of authors of various research articles is displayed in Table 3 and figure 1. In the rank analysis the authors who have published more than 12 articles or more are considered into account to avoid a long list. It is observed that there are a total of 5233 authors for 2870 records and it shows the top 20 most productive authors during 1999-2018. Spelke ES published 25 (0.87%) articles with 2370 TGCS articles, followed by Carey S 24 (0.84%) with 1596 TGCS articles, Bloom P 19 (0.66%) with 1225 TGCS articles, Tanenhaus MK 19 (0.66%) with 1140 TGCS articles, Tomasello M 19 (0.66%) with 1496 TGCS article, Tenenbaum JB 18 (0.63%) with 737 TGCS articles, Dehaene S with 17 articles (0.59%) with 2196 TGCS and other authors have contributed comparatively less than the top seven authors during the period of study.

The data set clearly depicts that the increase in number of publications of an authors usually has a direct impact in the increase in citation score. It is found that the ranked contributors are from the following research Institutions: Harvard

University, University College London, MIT, Yale University, University of Illinois and so on. It could be identified from the author wise analysis, the following authors: Spelke ES, Carey S, Bloom P, Tanenhaus MK, Tomasello M and Tenenbaum JB were the most productive authors based on the number of research papers published in the Journal. The data set puts forth that the authors Spelke ES with 2370 citations, Dehaene S with 2196 citations, Aslin RN with 1779 citations and Carey S with 1596 citations.

Table3. *Publication output of Top 20 Authors and Citation Score*

| S.No	Author	Records	%	TLCS	TGCS
1	Spelke ES	25	0.87	136	2370
2	Carey S	24	0.84	127	1596
3	Bloom P	19	0.66	80	1225
4	Tanenhaus MK	19	0.66	57	1140
5	Tomasello M	19	0.66	75	1496
6	Tenenbaum JB	18	0.63	65	737
7	Dehaene S	17	0.59	66	2196
8	Haggard P	16	0.56	35	883
9	Goldin-Meadow S	15	0.52	16	550
10	Griffiths TL	15	0.52	63	663
11	Call J	14	0.49	17	440
12	Waxman SR	14	0.49	39	544
13	Baillargeon R	13	0.45	77	668
14	Pickering MJ	13	0.45	45	782
15	Aslin RN	12	0.42	90	1779
16	Fisher C	12	0.42	44	561
17	Frank MC	12	0.42	33	498
18	Gelman SA	12	0.42	51	547
19	Hauser MD	12	0.42	35	894
20	Knoblich G	12	0.42	25	574
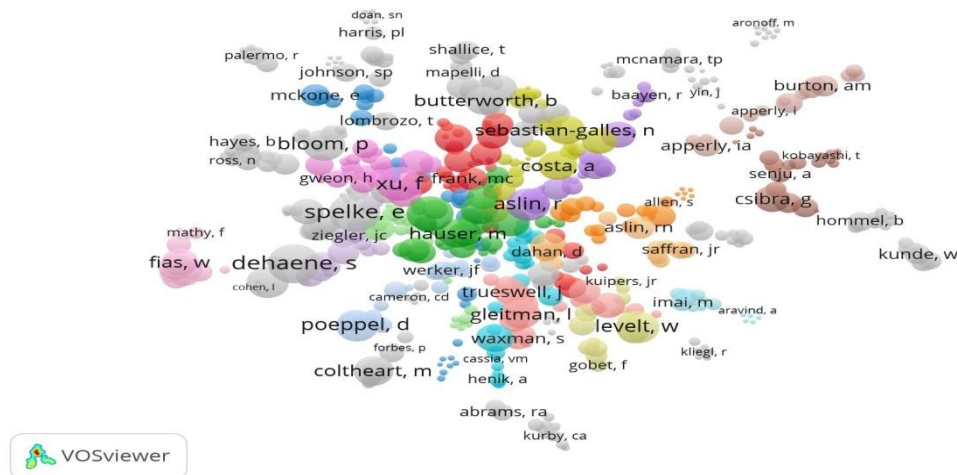
Figure1. *Highly Prolific Authors*

Analysis of the Publication Output of Top 20 Institutions

The individualities of 20 most productive institutions were analyzed in this part, Institutions which published more than 41 and above publications have been considered as highly productive institutions. Table 5 summarizes articles, the global citation score, local citation score and average author per paper of the publications of these institutions. In total, 1127 institutions, including 2709 subdivisions published 2870 research papers during 1999 – 2018. The topmost twenty institutions involved in this research have published 41 and more research articles.

The mean average is 2.54 research articles per Institution. Out of 1127 institutions, top 20 institutions published 1247 (43.45%) research papers and the rest of the institution published 1623 (56.55%) research papers respectively. Based on the number of published research records the institutions are ranked.

Among the institution listed in Table 4 "Harvard University" holds the first rank and the institution published 149 (5.19%) research papers with 404 local and 9140 global citation scores, the average citation per paper is 61.34. The second rank holds by "University College London" the institution published 110 (3.83%) research papers with 223 local and 6613 global citation scores, the average citation per paper is 60.12. The "MIT" holds the 3rd rank, the institution published 74 (2.58%) research papers with 317 local and 4978 global citation scores, the average citation per paper is 67.27. The "Yale University" holds the 4th rank, the institution published 74 (2.58%) research papers with 197 local and 3125 global citation scores, the average citation per paper is 42.23. The "University of Illinois" holds the 5th rank, the

institution published 66 (2.30%) research papers with 201 local and 2899 global citation scores, the average citation per paper is 43.92. It is clear from the analysis that following institutions: Harvard University, University College London, MIT, Yale University and University of Illinois among others were identified the most productive institutions based on the number of research papers published in the Journal. However, University of Rochester (79.70), MIT (67.27), Max Plank Institute for Psycholinguistics (65.84), Harvard University (61.34) and University College London (60.12) are the institutions with high ACPP indicating the quality work with high citation impact hence they can be recognized as the most productive institutions based on the annual citation per paper received in terms of publications.

Table4. *Ranking of Institutions and their Research Performance*

| S.No.	Institution	Records	%	TLCS	TGCS	ACPP
1	Harvard University	149	5.19	404	9140	61.34
2	University College London	110	3.83	223	6613	60.12
3	MIT	74	2.58	317	4978	67.27
4	Yale University	74	2.58	197	3125	42.23
5	University of Illinois	66	2.30	201	2899	43.92
6	Northwestern University	64	2.23	126	2327	36.36
7	University Chicago	62	2.16	169	2979	48.05
8	CNRS	59	2.06	95	2493	42.25
9	University Pennsylvania	59	2.06	132	3055	51.78
10	University of Edinburgh	58	2.02	127	2250	38.79
11	Stanford University	55	1.92	149	3189	57.98
12	University of Rochester	53	1.85	207	4224	79.70
13	University Calif San Diego	52	1.81	114	1946	37.42
14	New York University	49	1.71	96	1709	34.88
15	University of Oxford	49	1.71	69	2039	41.61
16	Max Planck Institution, Psycholinguist	44	1.53	70	2897	65.84
17	Radboud University Nijmegen	44	1.53	43	1509	34.30
18	Brown University	43	1.50	104	1422	33.07
19	University of Padua	42	1.46	72	2420	57.62
20	University of California, Berkeley	41	1.43	121	1506	36.73
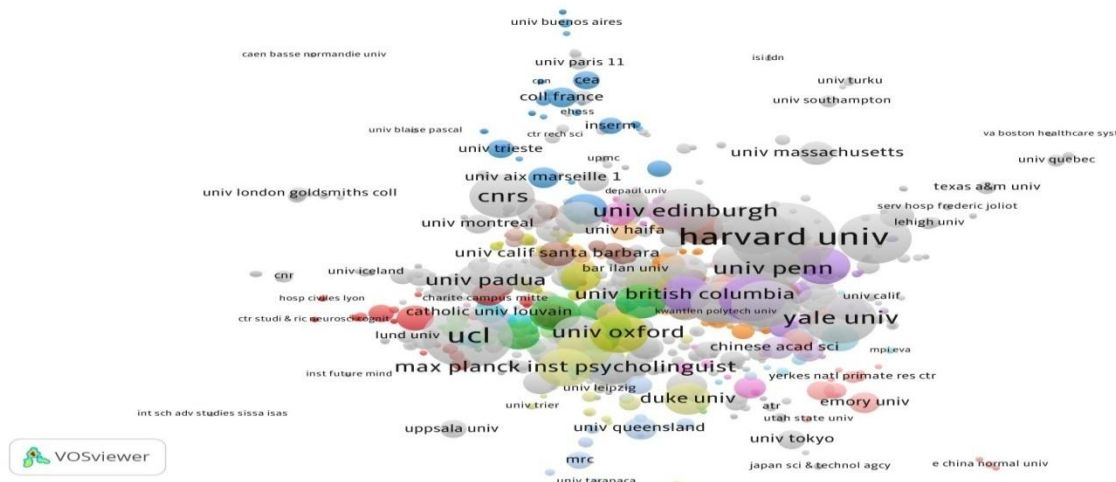
Figure2. *Collaboration of Institutions and their clusters*

Analysis of the Publication Output of Top 20 Countries

Table 5 and Figure 3 displays the publication output of the top twenty countries based on number of research publications. After analysing the data it was found that USA acquired 1st rank among the top twenty countries under consideration with its total global citation score 63151. Among all the 61 countries that participated in research during 1999 and 2018, the countries that rank between 2nd and 20th position are: UK, Germany, Canada, France, Italy, Netherlands, Australia, Belgium, Israel, Spain China, Japan, Switzerland, Sweden, Austria, Hungary, South Korea, Finland and New Zealand . By using Country Mapping Analysis, it has been found that the nodes are linked to each other indicating that countries are having collaboration with other associated nations. It could also be identified from the analysis the following countries: USA, UK, Germany, Canada, France, Italy, Netherlands, Australia, Belgium and Israel were identified the most productive countries in terms of the number of research papers published.

Table5. *Distribution of the Publication Output of Top 20 Countries*

| S.No.	Country	Records	%	TLCS	TGCS
1	USA	1390	48.43	2974	63151
2	UK	649	22.61	1029	26264
3	Germany	261	9.09	289	7782
4	Canada	243	8.47	373	9367
5	France	187	6.52	317	8487
6	Italy	133	4.63	168	4534
7	Netherlands	133	4.63	134	4842
8	Australia	105	3.66	129	4304
9	Belgium	87	3.03	110	3957
10	Israel	77	2.68	62	1780
11	Spain	68	2.37	87	2834
12	China	67	2.33	58	1298
13	Japan	61	2.13	83	1941
14	Switzerland	53	1.85	58	1327
15	Sweden	32	1.11	34	720
16	Austria	18	0.63	14	847
17	Hungary	17	0.59	45	564
18	South Korea	17	0.59	15	347
19	Finland	16	0.56	18	523
20	New Zealand	16	0.56	12	265
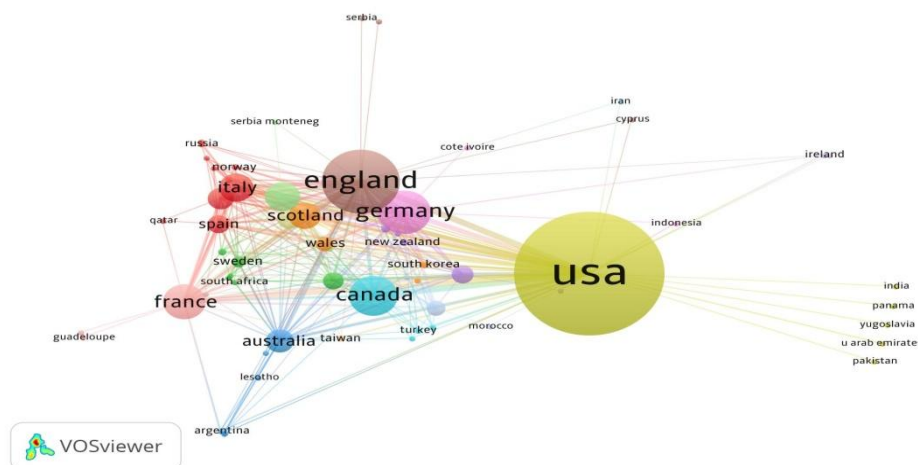
Figure3. *Ranking of Country wise Distribution*

CONCLUSION

The number of papers published in Journal of *Cognition* has gradually increased during 1999–2018 and the study has shown that a total number of 2870 research documents have been published during period of 20 years. The data from this paper also suggest that authors Spelke ES, Carey S, Bloom P, Tanenhaus MK, Tomasello M and Tenenbaum JB were identified as the most prolific authors based on the number of research papers contributed. It could be seen from

Institution Wise Analysis that the following institutions: Harvard University, University College London, MIT, Yale University and University of Illinois have published maximum number of research papers in the journal. The following countries: USA, UK, Germany, Canada, France, Italy, Netherlands, Australia, Belgium and Israel were recognised the nations that have contributed highest number of publications during the period under study.

REFERENCES

[1] Neisser U. Cognitive Psychology. New York: Appleton-Century-Crofts; 1967.

[2] Martin R, Tsakiris M, Wagemans J. Cognition . Elsevier. 2019. Available from: https://www. journals. elsevier.com/cognition

[3] Mingers J, Leydesdorff L. A review of theory and practice in scientometrics . Eur J Oper Res .Elsevier Ltd.; 2015;246(1):1–19. Available from:http://dx.doi.org/10.1016/j.ejor.2015.04.002

[4] Cobo MJ, Pez-Herrera AG, Herrera-Viedma E, Herrera F. SciMAT: A New Science Mapping Analysis Software Tool. J Am Soc Inf Sci Technol. New York, NY, USA: John Wiley & Sons, Inc.; 2012 Aug;63(8):1609–30. Available from: http://dx.doi.org/10.1002/asi.2 2688

[5] Kleinberg J. Bursty and Hierarchical Structure in Streams. Data Min Knowl Discov. 2003;7(4):373–97.

[6] Batcha M S & Ahmad M. Publication Trend in an Indian Journal and a Pakistan Journal : A Comparative Analysis using Scientometric Approach. J Adv Libr Inf Sci. 2017;6(4):442–9.

[7] Batcha MS, Jahina SR, Ahmad M. Publication Trend in DESIDOC Journal of Library and Information Technology during 2013-2017 : A Scientometric Approach. Int J Res Eng IT Soc Sci. 2018;8(4):76–82.

[8] Ahmad M, & Batcha MS. Mapping of Publications Productivity on Journal of Documentation 1989-2018 : A Study Based on Clarivate Analytics – Web of Science Database. Libr Philos Pract (e-journal). 2019;2213–26. Available from: https://digitalcommons.unl. edu/libphilprac/2213/

[9] Ahmad M, Batcha MS, Wani BA, Khan MI, Jahina SR. Research Output of Webology Journal (2013-2017): A Scientometric Analysis. Int J Mov Educ Soc Sci. 2017;7(3):46–58.

[10] Ahmad M, & Batcha MS. Scholarly Communications of Bharathiar University on Web of Science in Global Perspective : A Scientometric Assessment. Res J Libr Inf Sci. 2019;3(3):22–9.

[11] Ahmad M, Batcha MS, Jahina SR. Testing Lotka's Law and Pattern of Author Productivity in the Scholarly Publications of Artificial Intelligence. Libr Philos Pract (e-journal). 2019; Available from: https:// digitalcommons. unl.edu/libphilprac/2716