

Authorship Trends and Collaborative Research in Dyslexia Research Output: A Scientometric Study

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Abstract - The present study aims at describing both the common and the distinguishing features of co authorship trends and patterns in Dyxlexia research output based on the data collected from Web of science database published during the 1989-2017. Outcome of the study shows that multi authored articles 83.09% prevail the single authored articles 16.96%. It also shows that author Shaywitz SE J has got highest 7383 global citations against 54 publications. This study is in support for the fact that Dyslexia research output is collaborative in all aspects Ranking of Authors based on Publications.

Keywords: Authorship Trends, Collaborative Research, Dyslexia Research Output, Scientometric Study

I. INTRODUCTION

Authorship is a primary bibliometric descriptor of a scientific publication. Its trends and patterns characterize the social and even the cognitive structure of research fields. The most characteristic tendency of recent times is scientific collaboration. Collaboration in research is reflected by the corresponding co authorship of published results, and can thus be analyzed with the help of bibliometric methods(R. Maheswaran, 2018). Generally authorship of the article or document as become important for scientists and researchers in order to make out the author productivity and authorship pattern, the analysis of nature of research collaboration in research activity is prime factor(Maheswaran, 2016b). In the present paper, collaboration research trends in the field of Dyslexia Research as reflected through the Web of Science database in period of 1989-2017.

II. OBJECTIVE

The present study has been taken to identify the pattern of productivity in veterinary sciences. The objectives of the study are as follows

1. To examine and analyze the authorship pattern in Dyxlexia research output
2. To study the proportion of single-authored papers against multi-authored ones
3. To test Lotka's Law of Author Productivity

III. ANALYSIS

A. Top 25 Author Wise Distribution of the Publications

Table I indicates ranking of authors by number of publications. Author Lyytinen H published highest number of articles for the study period with 89 records; next author Snowling MJ published next highest number of articles for the study period with 88 records, Schulte-Korne G published 85 records Goswami U 82 records and as well as follows.

TABLE I AUTHOR WISE DISTRIBUTION OF THE PUBLICATIONS

	Author	Recs	Percent	TLCS	TGCS	TLCR
1	Lyytinen H	89	0.9	2806	4917	1654
2	Snowling MJ	88	0.9	3193	6266	1318
3	Schulte-Korne G	85	0.9	892	2142	1414
4	Goswami U	82	0.9	2618	4694	1321
5	Pennington BF	81	0.8	3227	5351	1322
6	Fletcher JM	70	0.7	3671	7242	1049
7	Stein JF	70	0.7	2820	4010	1042
8	Berninger VW	62	0.6	1283	2359	1178
9	Olson RK	60	0.6	2003	3481	748
10	Galaburda AM	59	0.6	2017	3103	652
11	Hulme C	58	0.6	969	2371	796
12	Zoccolotti P	58	0.6	744	1523	797
13	Bishop DVM	55	0.6	1581	4128	820
14	Valdois S	55	0.6	1213	1820	1476
15	Monaco AP	54	0.6	1609	3291	952
16	Shaywitz SE	54	0.6	4201	7383	717
17	Rosen GD	53	0.6	1685	2698	841
18	Shaywitz BA	52	0.5	3806	6871	703
19	Shu H	52	0.5	512	1589	849
20	Castles A	51	0.5	1289	2049	861
21	Ho CSH	51	0.5	762	1300	828
22	Fawcett AJ	50	0.5	1805	2652	712
23	Hynd GW	50	0.5	756	2092	352
24	Nicolson RI	50	0.5	1863	2759	755
25	DeFries JC	49	0.5	1998	3369	602

It is found from the analysis that LOTKAS law may not be applicable with regard to author productivity in proliferation of research in Bibliometric Mapping of Dyslexia Research output: The Global Perspective as the research papers equally distributed by a large number of authors(Maheswaran, 2017).

It also shows that author Shaywitz SE J has got highest 7383 global citations against 54 publications, followed by the author Fletcher JM with 7242 global citations against 70

publications and third one is with more citations by Shaywitz BA having 6871 global citations for 52 publications.

Among the top 25 authors, author Lyytinen H has append 1654 references for its 89 publications which is followed by the authors Valdois S with 1476 cited references for its 55 publications. There are only two authors having more than 7000 global citations and three authors having more than 5000 global citations.

TABLE II AUTHOR WISE DISTRIBUTION OF THE PUBLICATIONS

	Author	Recs	Sum of the times cited	Self-citations	Without self-citations	h-index
1	Lyytinen H	89	2806	734	2072	39
2	Snowling MJ	88	3193	345	2848	33
3	Schulte-Korne G	85	892	163	729	27
4	Goswami U	82	2618	574	2044	34
5	Pennington BF	81	3113	497	2616	36
6	Fletcher JM	70	3671	450	3221	36
7	Stein JF	70	2817	410	2407	37
8	Berninger VW	62	1283	359	924	30
9	Olson RK	60	1999	373	1626	30
10	Galaburda AM	59	744	237	507	21
11	Hulme C	58	1971	422	1549	27
12	Zoccolotti P	58	904	148	756	26
13	Bishop DVM	55	1213	347	866	23
14	Valdois S	55	1565	216	1349	29
15	Monaco AP	54	1609	398	1211	32
16	Shaywitz SE	54	1685	478	1207	25
17	Rosen GD	53	4201	438	3763	35
18	Shaywitz BA	52	512	178	334	22
19	Shu H	52	1289	166	1123	19
20	Castles A	51	762	216	546	20
21	Ho CSH	51	3806	406	3400	33
22	Fawcett AJ	50	1998	394	1604	29
23	Hynd GW	50	1583	212	1371	25
24	Nicolson RI	50	597	206	391	25
25	DeFries JC	49	1641	219	1422	26

Table II shows that author wise self-citations of the publications.

The author Lyytinen H in the highest number of the Self Citations 734 out of 2806 citations, Goswami U in the second rank of the self-citations with 574 and citations 2618, Shaywitz SE in the third highest number of the self-citations 478 and citations 1685 and it shows strength and

continuity of research in the particular domain. (Maheswaran, 2016a)

Table III shows that the highest number of the publications on 2185 records in two author productivity and followed by the one and three author's productivity with 1605 and 1810 records of the publications respectively and followed by other patterns.

TABLE III AUTHOR WISE DISTRIBUTIONS OF THE PUBLICATIONS

Year	1	2	3	4	5	6	7	8	9	10	>10	Records
1990	10 (0.11)	5 (0.05)	4 (0.04)	3 (0.03)	1 (0.01)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	23 (0.24)
1991	47 (0.50)	30 (0.32)	21 (0.22)	10 (0.11)	7 (0.07)	1 (0.01)	2 (0.01)	(0.0)	2 (0.02)	(0.0)	3 (0.03)	123 (1.30)
1992	61 (0.64)	49 (0.52)	24 (0.25)	10 (0.11)	9 (0.09)	5 (0.05)	1 (0.01)	(0.0)	1 (0.01)	(0.0)	1 (0.01)	161 (1.70)
1993	67 (0.71)	40 (0.42)	20 (0.21)	13 (0.14)	4 (0.04)	4 (0.04)	4 (0.04)	1 (0.01)	0 (0.0)	(0.0)	1 (0.01)	154 (1.62)
1994	47 (0.50)	40 (0.42)	33 (0.35)	14 (0.15)	8 (0.08)	6 (0.06)	1 (0.01)	1 (0.01)	3 (0.03)	(0.0)	2 (0.02)	155 (1.63)
1995	76 (0.80)	63 (0.66)	33 (0.35)	18 (0.19)	9 (0.09)	3 (0.03)	2 (0.02)	2 (0.02)	1 (0.01)	1 (0.01)	4 (0.04)	212 (2.23)
1996	64 (0.68)	53 (0.56)	49 (0.52)	28 (0.29)	13 (0.14)	9 (0.09)	7 (0.07)	2 (0.02)	0 (0.0)	0 (0.11)	3 (0.03)	228 (2.40)
1997	56 (0.59)	63 (0.66)	43 (0.45)	15 (0.16)	12 (0.13)	10 (0.11)	3 (0.03)	1 (0.01)	1 (0.01)	1 (0.01)	1 (0.01)	206 (2.17)
1998	55 (0.58)	57 (0.60)	45 (0.47)	19 (0.20)	14 (0.15)	12 (0.13)	3 (0.03)	2 (0.02)	3 (0.03)	2 (0.02)	3 (0.03)	215 (2.27)
1999	65 (0.69)	74 (0.78)	50 (0.53)	35 (0.37)	17 (0.18)	12 (0.13)	9 (0.09)	7 (0.07)	6 (0.06)	1 (0.01)	2 (0.02)	278 (2.93)
2000	65 (0.69)	84 (0.88)	67 (0.71)	46 (0.48)	16 (0.17)	16 (0.17)	10 (0.11)	7 (0.07)	3 (0.03)	4 (0.04)	4 (0.04)	322 (3.39)
2001	63 (0.67)	78 (0.82)	61 (0.64)	27 (0.28)	20 (0.21)	17 (0.18)	16 (0.17)	11 (0.12)	3 (0.03)	1 (0.01)	7 (0.07)	304 (3.20)
2002	67 (0.71)	59 (0.62)	60 (0.63)	31 (0.33)	27 (0.28)	15 (0.16)	13 (0.14)	6 (0.06)	5 (0.06)	3 (0.03)	8 (0.08)	294 (3.10)
2003	63 (0.67)	70 (0.74)	52 (0.55)	46 (0.48)	28 (0.29)	17 (0.18)	7 (0.07)	7 (0.07)	7 (0.07)	1 (0.01)	8 (0.08)	306 (3.22)
2004	53 (0.56)	83 (0.87)	60 (0.63)	58 (0.61)	20 (0.21)	17 (0.18)	10 (0.11)	10 (0.11)	9 (0.09)	2 (0.02)	11 (0.12)	333 (3.51)
2005	60 (0.63)	98 (1.03)	71 (0.75)	46 (0.48)	35 (0.37)	28 (0.29)	10 (0.11)	10 (0.11)	12 (0.13)	6 (0.06)	8 (0.08)	384 (4.05)
2006	75 (0.79)	104 (1.10)	78 (0.82)	53 (0.56)	43 (0.45)	28 (0.29)	20 (0.21)	9 (0.09)	4 (0.04)	4 (0.04)	13 (0.14)	431 (4.54)
2007	56 (0.59)	101 (1.06)	66 (0.70)	46 (0.48)	35 (0.37)	25 (0.26)	9 (0.09)	9 (0.09)	9 (0.09)	4 (0.04)	9 (0.09)	369 (3.89)
2008	57 (0.60)	110 (1.16)	65 (0.68)	61 (0.64)	45 (0.47)	36 (0.38)	18 (0.19)	18 (0.19)	7 (0.07)	3 (0.03)	11 (0.12)	431 (4.54)
2009	62 (0.66)	82 (0.86)	73 (0.77)	68 (0.72)	39 (0.41)	22 (0.23)	12 (0.13)	10 (0.11)	15 (0.16)	6 (0.06)	6 (0.06)	395 (4.16)
2010	44 (0.47)	105 (1.11)	102 (1.07)	69 (0.73)	49 (0.52)	35 (0.37)	18 (0.19)	15 (0.16)	4 (0.04)	2 (0.02)	11 (0.12)	454 (4.78)
2011	64 (0.68)	104 (1.10)	77 (0.81)	71 (0.75)	53 (0.56)	34 (0.36)	22 (0.23)	16 (0.17)	14 (0.15)	2 (0.02)	10 (0.11)	467 (4.92)
2012	42 (0.44)	106 (1.12)	86 (0.91)	74 (0.78)	68 (0.72)	26 (0.27)	19 (0.20)	12 (0.13)	6 (0.06)	7 (0.07)	17 (0.18)	463 (4.88)
2013	37 (0.39)	94 (0.99)	106 (1.12)	96 (1.01)	64 (0.68)	34 (0.36)	24 (0.25)	17 (0.18)	7 (0.07)	9 (0.09)	17 (0.18)	505 (5.32)
2014	50 (0.53)	101 (1.06)	116 (1.22)	98 (1.03)	75 (0.79)	39 (0.41)	25 (0.26)	12 (0.13)	10 (0.11)	4 (0.04)	22 (0.23)	552 (5.82)
2015	69 (0.73)	127 (1.34)	113 (1.19)	99 (1.04)	54 (0.57)	30 (0.32)	17 (0.18)	11 (0.12)	9 (0.09)	3 (0.03)	16 (0.17)	548 (5.77)
2016	70 (0.74)	104 (1.10)	115 (1.21)	95 (1.00)	83 (0.87)	39 (0.41)	24 (0.25)	15 (0.16)	16 (0.17)	7 (0.07)	19 (0.20)	587 (6.18)
2017	60 (0.63)	101 (1.06)	120 (1.26)	101 (1.06)	74 (1.06)	45 (0.47)	34 (0.36)	23 (0.24)	7 (0.07)	9 (0.09)	18 (0.19)	592 (6.24)
	1605 (17)	2185 (23.0)	1810 (19.1)	1350 (14.2)	922 (9.71)	565 (5.95)	340 (3.58)	234 (2.47)	164 (1.73)	82 (0.86)	235 (2.48)	9492 (100)

TABLE IV SHOWS THAT AUTHORSHIP PATTERN OF DYSLEXIA

Authorship Pattern	No. of Contribution	Percentage of Authors	Cumulative Percentage
1	1605	16.91	16.91
2	2185	23.02	39.93
3	1810	19.07	59.00
4	1350	14.22	73.22
5	922	9.71	82.93
6	565	5.95	88.88
7	340	3.58	92.46
8	234	2.47	94.93
9	164	1.73	96.66
10	82	0.86	97.52
>10	235	2.48	100
Total	9492	100.00	

The authorship pattern shows that the collaboration trend is dominant as only 16.91percent are contributed by single authors. The highest productivity of publications output (23.02%) from two authors.(Jeyaraj, 2012) This is followed by three authors' contribution (19.07%).

The table shows that single vs. Multiple authors research output, the highest publications was single author output of 76 records in the year 1995, 75 records in the year 2006, 70 records in the year 2016 and 69 records in the year 2015. As soon as 532 records in the 2017, 517 records in the year 2016, and 502 records in the year 2014 of the multiple authors output of the publications of distributions.

B. Lotka's Law of Author Productivity

Generally author productivity is determined on the basis of number of papers contributed by the Dyslexia Research output in a specific field. It is quite relevant to study the impact of Lotka's Law in examining the author productivity in Dyslexia Research output research. Table VI presents the results of author productivity based on Lotka's Law.

TABLE V SINGLE VS. MULTIPLE AUTHOR RESEARCH OUTPUT

Year	Single Authors		Multiple Authors		Total
	No. of Output	Percentage	No. of Output	Percentage	
1990	10	0.11	13	0.14	23(0.24)
1991	47	0.50	76	0.80	123(1.30)
1992	61	0.64	100	1.05	161(1.70)
1993	67	0.71	87	0.92	154(1.62)
1994	47	0.50	108	1.14	155(1.63)
1995	76	0.80	136	1.43	212(2.23)
1996	64	0.68	164	1.73	228(2.40)
1997	56	0.59	150	1.58	206(2.17)
1998	55	0.58	160	1.69	215(2.27)
1999	65	0.69	213	2.24	278(2.93)
2000	65	0.69	257	2.71	322(3.39)
2001	63	0.67	241	2.54	304(3.20)
2002	67	0.71	227	2.39	294(3.10)
2003	63	0.67	243	2.56	306(3.22)
2004	53	0.56	280	2.95	333(3.51)
2005	60	0.63	324	3.41	384(4.05)
2006	75	0.79	356	3.75	431(4.54)
2007	56	0.59	313	3.30	369(3.89)
2008	57	0.60	374	3.94	431(4.54)
2009	62	0.66	333	3.51	395(4.16)
2010	44	0.47	410	4.32	454(4.78)
2011	64	0.68	403	4.25	467(4.92)
2012	42	0.44	421	4.44	463(4.88)
2013	37	0.39	468	4.93	505(5.32)
2014	50	0.53	502	5.29	552(5.82)
2015	69	0.73	479	5.05	548(5.77)
2016	70	0.74	517	5.45	587(6.18)
2017	60	0.63	532	5.60	592(6.24)
	1605	16.96	7887	83.09	9492(100)

TABLE VI LOTKA'S LAW OF AUTHOR PRODUCTIVITY

No. of authors	Observed Number of authors with 'n' or (an) or (f)	Observed percentage of authors 100 x an/a1	Expected number of authors (an=an/n ²) or (p)	Expected percentage of authors	(F-P)^2/P
1	1605	100.00	1605.00	100.00	0.00
2	2185	136.14	546.25	136.14	4916.25
3	1810	112.77	201.11	112.77	12871.11
4	1350	84.11	84.38	84.11	18984.38
5	922	57.45	36.88	57.45	21242.88
6	565	35.20	15.69	35.20	19225.69
7	340	21.18	6.94	21.18	15986.94

8	234	14.58	3.66	14.58	14511.66
9	164	10.22	2.02	10.22	12958.02
10	82	5.11	0.82	5.11	8036.82
11	89	5.55	0.74	5.55	10591.74
12	30	1.87	0.21	1.87	4260.21
13	33	2.06	0.20	2.06	5511.20
14	18	1.12	0.09	1.12	3492.09
15	17	1.06	0.08	1.06	3791.08
16	14	0.87	0.05	0.87	3556.05
17	3	0.19	0.01	0.19	861.01
18	4	0.25	0.01	0.25	1288.01
19	4	0.25	0.01	0.25	1436.01
20	2	0.12	0.01	0.12	796.01
21	2	0.12	0.00	0.12	878.00
22	2	0.12	0.00	0.12	964.00
26	2	0.12	0.00	0.12	1348.00
27	1	0.06	0.00	0.06	727.00
30	2	0.12	0.00	0.12	1796.00
31	2	0.12	0.00	0.12	1918.00
32	3	0.19	0.00	0.19	3066.00
35	1	0.06	0.00	0.06	1223.00
39	2	0.12	0.00	0.12	3038.00
41	1	0.06	0.00	0.06	1679.00
46	1	0.06	0.00	0.06	2114.00
48	1	0.06	0.00	0.06	2302.00
52	1	0.06	0.00	0.06	2702.00
Total	9492	591.4	2504.17	X ²	188072.17

Further the Lotka's Law is also tested with application of scientific productivity Chi-square model in relation to the number of authors who contributed n number of publications. It is observed from the Table that the calculated chi-square value (188072.17) is lesser than the table value at 0.05 level of significance. Therefore the growth of 'Dyslexia Research output' do fit with the lower pattern and the analysis of quantum of productivity theoretically validated Lotka's findings. From the above analysis, it is inferred that Lotka's Inverse Square Law does not apply to the 'Dyslexia Research output' research output studied. However it is to be mentioned that Lotka's Law to be treated as general and theoretical estimate of productivity not as precise statistical distribution.(Balasubramani, 2011)

IV. CONCLUSION

The trend in the direction of collaborative research is seen steady during 1989-2017 in the field of Dyslexia Research. Outcome of study clearly show that authorship trend is moving on the way to multiple authorship and degree of collaboration is found to be high. However, multi authorship pattern is found high flying in the field of Dyslexia Research. Present study supported the fact that

collaborative research in various fields of technical sciences has become more worthy and prefer to work together for an objective like a team.

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