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## Citations in Psychology PhD Theses: An Obsolescence Study

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## **Citations in Psychology PhD Theses: An Obsolescence Study**

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### **Introduction**

Obsolescence studies are one of the main areas of bibliometrics and infometrics. Obsolescence is a vital aspect of scientific literature. Growth and obsolescence are usually considered together, because they represent the initial and final stages of the information cycle. Growth studies investigate patterns in the creation of literature over time.

An obsolescence study could be treated as an aspect of citation analysis for journal articles. Obsolescence studies are useful for researchers, librarians, and decision-makers in information centers. They are also helpful for pioneers in a scientific discipline to know how far they must go back to obtain material in their field of interest.

### **Scope**

The present study attempts to discover the obsolescence rate of psychology literature cited in the doctoral theses awarded from 1963 to 2005, at S.V. University, Tirupati, Osmania University, Hyderabad, and Andhra University, Visakhapattanam. The study focuses on the citations included in doctoral theses awarded in psychology.

### **Objectives**

The objectives of the present study are to discover:

The objectives of the present study are to discover:

- Chronological distribution of journal citations
- Obsolescence and half-life of psychology journals
- Chronological distribution of book citations
- Obsolescence and half-life of psychology book citations.

## **Material and Methods**

The doctoral theses which are the products of research activity were examined for the study: 141 theses in psychology, accepted between 1963-2005 by Sri Venkateswara University, Tirupati, Osmania University, Hyderabad, and Andhra University, Visakhapatnam. The total number of journal and book citations found in those theses is 14,374 and 7,110.

The analysis of different characteristics of the literature was carried out on the citations. Number of authors, bibliographic format, year of publication, journal name, subject, country, language, and publisher's name were recorded.

The data was analyzed using Microsoft Excel and the Statistical Package for the Social Sciences (SPSS).

## **Review of Literature**

Obsolescence is defined as the decline over time in the validity or utility of information. Studies of aging or obsolescence of documents commonly assess the decline in the use of a representative set of documents over time. Growth in the literature of a particular field plays an important role in age distribution.

Such studies help librarians decide which documents to keep or discard. To compare the speed of decay in different subjects, "half-life" is used as a measure. Half-life refers to the time during which one half of the current active literature was published.

The study of age of literature basing on citations has a long history. The age of the literature has been analysed in physics (Hooker 1935), speech literature (Brody 1953), physiology (Lowler 1963), sociology (Lin and Nelson 1969), English literature (Heinzkill 1980), and mathematics (Line 1972). Other studies include chemistry (Brown 1980, Aruna 1999), biological sciences (Vimala 1997), and geology (Mahapatra and Bhagavan 2000).

## **Results and Discussion**

Table 1 presents the obsolescence rate of literature in psychology.

Table: 1: Citation frequency of journals and books in psychology

JOURNALS				BOOKS		
Age (t)	No. of citations	Cumulative no. of citations	Cumulative Percentage	No. of Citations	Cumulative no. of citations	Cumulative percentage
1	2	3	4	5	6	7
0	61	61	0.42	43	43	0.60
1	163	224	1.56	50	93	1.31
2	323	547	3.81	84	177	2.49
3	406	953	6.63	133	310	4.36
4	569	1522	10.59	156	466	6.55
5	530	2052	14.28	178	644	9.06
6	582	2634	18.32	144	788	11.08
7	614	3248	22.60	192	980	13.78
8	598	3846	26.76	235	1215	17.09
9	586	4432	30.83	221	1436	20.20
10	571	5003	34.81	232	1668	23.46
11	593	5596	38.93	257	1925	27.07
12	601	6197	43.11	229	2154	30.30
13	545	6742	46.90	211	2365	33.26
14	541	7283	50.67	265	2630	36.99
15	577	7860	54.68	207	2837	39.90
16	503	8363	58.18	211	3048	42.87
17	435	8798	61.21	194	3242	45.60
18	449	9247	64.33	222	3464	48.72
19	410	9657	67.18	191	3655	51.41
20	375	10032	69.79	239	3894	54.77
21	333	10365	72.11	209	4103	57.71
22	344	10709	74.50	206	4309	60.60
23	309	11018	76.65	208	4517	63.53
24	236	11254	78.29	190	4707	66.20
25	270	11524	80.17	233	4940	69.48
26	248	11772	81.90	154	5094	71.65
27	186	11958	83.19	134	5228	73.53
28	198	12156	84.57	132	5360	75.39
29	180	12336	85.82	124	5484	77.13
30	160	12496	86.93	126	5610	78.90
31	155	12651	88.01	118	5728	80.56
32	145	12796	89.02	103	5831	82.01
33	135	12931	89.96	90	5921	83.28
34	107	13038	90.71	59	5980	84.11
35	116	13154	91.51	72	6052	85.12
36	110	13264	92.28	90	6142	86.39
37	90	13354	92.90	62	6204	87.26
38	79	13433	93.45	52	6256	87.99
39	68	13501	93.93	46	6302	88.64
40	62	13563	94.36	44	6346	89.25

41	41	13604	94.64	43	6389	89.86
42	58	13662	95.05	37	6426	90.38
43	54	13716	95.42	34	6460	90.86
44	43	13759	95.72	29	6489	91.27
45	47	13806	96.05	29	6518	91.67
46	41	13847	96.33	28	6546	92.07
47	33	13880	96.56	27	6573	92.45
48	31	13911	96.78	20	6593	92.73
49	45	13956	97.09	33	6626	93.19
50	31	13987	97.31	21	6647	93.49
51	33	14020	97.54	26	6673	93.85
52	27	14047	97.73	23	6696	94.18
53	15	14062	97.83	19	6715	94.44
54	26	14088	98.01	25	6740	94.80
55	31	14119	98.23	19	6759	95.06
56	25	14144	98.40	21	6780	95.36
57	17	14161	98.52	21	6801	95.65
58	15	14176	98.62	21	6822	95.95
59	9	14185	98.69	8	6830	96.06
60	17	14202	98.80	15	6845	96.27
61	5	14207	98.84	27	6872	96.65
62	17	14224	98.96	15	6887	96.86
63	19	14243	99.09	12	6899	97.03
64	13	14256	99.18	8	6907	97.14
65	10	14266	99.25	8	6915	97.26
66	26	14292	99.43	10	6925	97.40
67	1	14293	99.44	2	6927	97.43
68	6	14299	99.48	9	6936	97.55
69	7	14306	99.53	8	6944	97.67
70	6	14312	99.57	6	6950	97.75
71	7	14319	99.62	10	6960	97.89
72	9	14328	99.68	2	6962	97.92
73	5	14333	99.71	6	6968	98.00
74	2	14335	99.73	10	6978	98.14
75	1	14336	99.74	7	6985	98.24
76	1	14337	99.74	2	6987	98.27
77	4	14341	99.77	8	6995	98.38
78	1	14342	99.78	6	7001	98.47
79	1	14343	99.78	7	7008	98.57
80	0	14343	99.78	3	7011	98.61
81	0	14343	99.78	2	7013	98.64
82	0	14343	99.78	4	7017	98.69
83	0	14343	99.78	6	7023	98.78
84	2	14345	99.80	3	7026	98.82
85	0	14345	99.80	2	7028	98.85
86	1	14346	99.81	3	7031	98.89
87	0	14346	99.81	6	7037	98.97
88	2	14348	99.82	2	7039	99.00
89	1	14349	99.83	6	7045	99.09

90	1	14350	99.83	2	7047	99.11
91	3	14353	99.85	2	7049	99.14
92	0	14353	99.85	1	7050	99.16
93	0	14353	99.85	2	7052	99.18
94	0	14353	99.85	0	7052	99.18
95	0	14353	99.85	1	7053	99.20
96	5	14358	99.89	1	7054	99.21
97	0	14358	99.89	0	7054	99.21
98	0	14358	99.89	1	7055	99.23
99	4	14362	99.92	3	7058	99.27
100	3	14365	99.94	1	7059	100
100-252	9	14374	100	51	7110	100
TOTAL	14374	14374	100	7110	7110	100

More than one-quarter of journal citations are 8 years old or less. Fifty percent of journal citations are 14 years old or less. About 75 percent are 22 years old or less.

More than one quarter of book citations are 11 years old or less, slightly over half are 19 years old or less, and. Seventy five percent are 28 years old or less.

### Age Distribution of Book and Journal Citations

The Kolmogorov-Smirnov (K-S) test was used to test the exponentiality of the distribution. The Observed (F(x)) and Estimated (E(x)) cumulative percentages and the absolute differences between the observed and estimated cumulative percentages were calculated.

[D N = [1F(x)-E(x)] are calculated and are shown in Figures 1 and 2.

Under the assumption that the data follow a negative exponential distribution, the estimated cumulative percentages are calculated using the formula of exponential distribution

$$E(X) = 1 - e^{-dx}$$

Where  $d = 1/\text{mean}$  and  $X = 0, 1, 2, 3 \dots n$

Significance at 0.01 levels: The K-S statistic (the critical value of D) is equal to  $1.63/n^{0.5}$ . In this case  $n = 252$  and hence the critical value of D from table it is observed that the maximum value of D does not exceed this critical value (0.0129) and hence it confirms statistically that the age distribution of citations in both bibliographic forms viz., journals and books, follows a negative exponential distribution in all the fields under study.

### Half-Life of Journal Citations

A graph is plotted taking the age of citations (in years) on X-axis and cumulative percentage of citations on Y-axis to find out half-life of citations. A line parallel to the X-axis is drawn from a point say "A" representing the half of the citations to meet the curve say "B". Then perpendicular to X-axis (BC) is drawn from point B to meet the X-axis at C. "C" represents the half-life period of citations.

The half-life value obtained by Brown (1980) for chemical Literature is 9.3 years. Vimala (1997) obtained a half-life value of 16.22 years for biological sciences. Aruna Prasad Reddy (1999) obtained a

half-life value of 17.84 years for chemistry and Mahapatra and Bhagavan Das (2000) obtained a half-life value of 17 years for geography. In general literature relating to descriptive aspects like properties of matter, basic methodology etc., basic laws and basic concepts decline more slowly compared to empirical matter. The above figures indicate that the obsolescence rate differs from one subject to another and also from one bibliographic form to another one. It is noticed that the half-life period is longer for books than for journals.

Figure 1. Citation frequency of journals in psychology

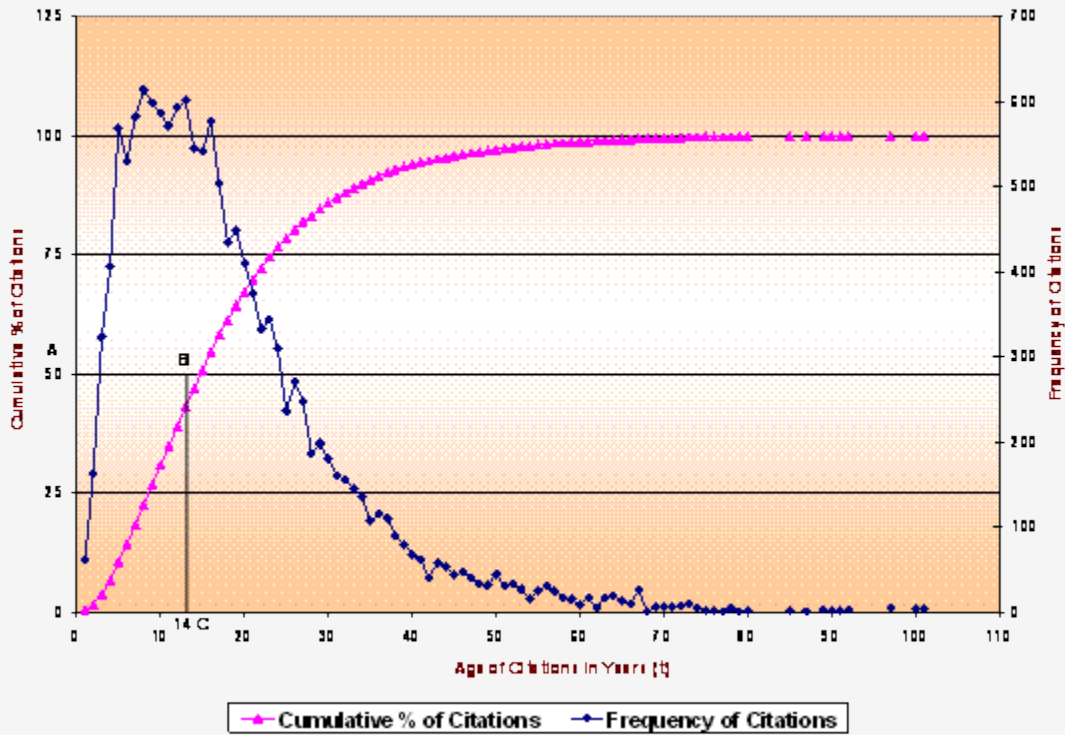
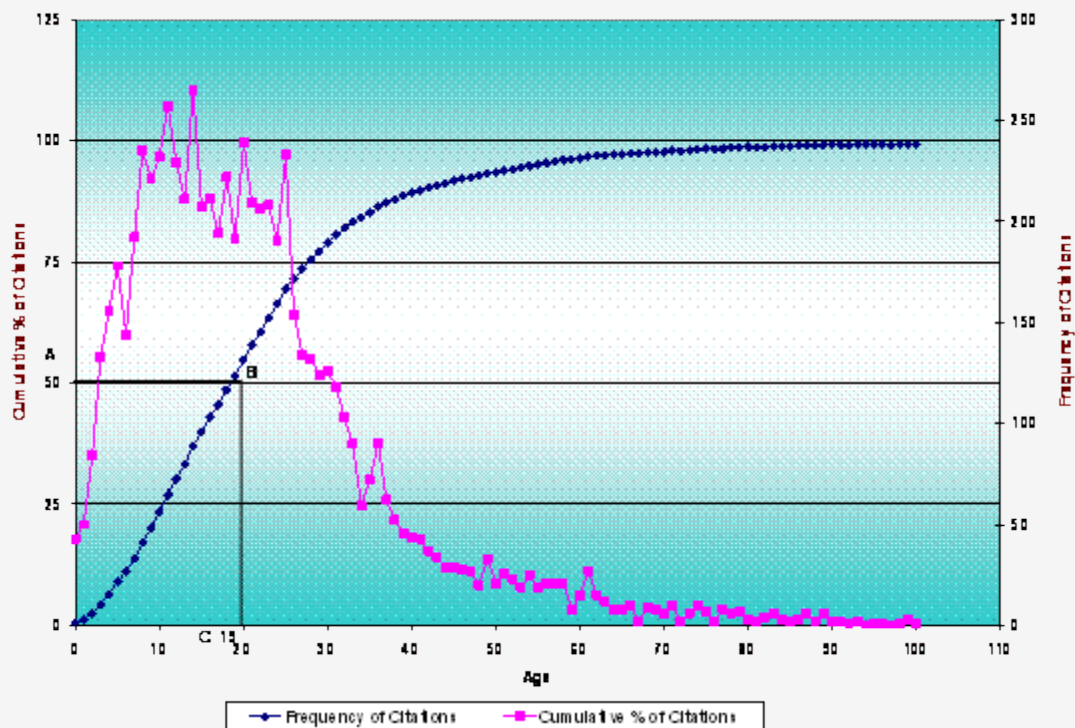


Figure 2. Citation frequency of books in psychology



### Findings and Conclusion

1. Nearly 27 percent of journal citations are 8 years old or less, 50 percent are 14 years old or less, and 75 percent are 22 years old or less.
2. Twenty-seven percent of book citations are 11 years old or less. Fifty-one percent are 19 years old or less. Seventy-five percent are 28 years old or less.
3. The results of K-S test confirmed statistically that the obsolescence (distribution) rate of journal and book citations follows a negative exponential distribution.
4. Half-life of journal citations in psychology is 14 years, while it is 19 years for book citations.
5. Psychology researchers prefer to refer to current journals.
6. There is a significant difference between the obsolescence of psychology journals and books.

Obsolescence studies play a vital role for librarians, researchers, and information managers as a decision support tool for the retention of the most frequently-used literature, and is also useful for weeding out unused or less-used literature.

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