

## Possible limitations of the document co-citation analysis in psycho-oncology research

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Scientometric studies investigate the structure of scientific research mainly based upon citation and co-citation analysis. Co-citation analysis enables us to identify the groups of scientists and their publications from which conclusions can be drawn about the inner structure of research disciplines, schools or paradigms<sup>1</sup>. There are many co-citation networks and one of them, i.e. document co-citation network is generated in this study to analyse the psycho-oncology field and method of document co-citation analysis.

The data used in this study are from the *Web of Science* database, published by the Institute for Scientific Information (ISI). Data retrieval strategy as follows:

SU = (psychology and oncology)  
 Refined by: Document Type = (ARTICLE)  
 Timespan = 1898–2011. Databases = SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH.

Lemmatization = On

The full bibliographic records, including authors, titles, abstracts and reference lists for 1479 articles were retrieved and downloaded on 23 January 2012. CiteSpace II was used to create co-citation networks. (CiteSpace was developed by Chaomi Chen, Drexel University; <http://cluster.cis.drexel.edu/~cchen/citespace/>).

Table 1 lists the top-ten highly cited documents in the psycho-oncology field using document co-citation network analysis.

Here we use two indicators for measuring the academic importance of these documents in the psycho-oncology research through CiteSpace II. One is the citation frequency and the other is Freeman's betweenness centrality metric<sup>2</sup>, which was used by Leydesdorff<sup>3</sup> in scientometrics research.

As characteristic of medical psycho-oncology, we can see from Table 1, that half

of the 'top citations' are actually some psychological and behavioural scales. Hence Table 1 displays papers describing instruments commonly used in psycho-oncology studies and research papers on psycho-oncology. Through qualitative analysis, we can easily find some limitations of the document co-citation analysis, at least in this case for the psycho-oncology research.

Theory of scientometrics may not serve as the best method to evaluate and justify the 'top 10' documents. For example, 'The hospital anxiety and depression scale', which has the highest value in frequency and the second highest value in centrality, is actually a widely used scale, not limited to psycho-oncology alone. Though most widely cited, it tells us little about psycho-oncology. This limitation may also appear in the analysis of other applied and operational disciplines.

On the other hand, under the same circumstances, earlier published documents

**Table 1.** The top-ten highly cited documents in the psycho-oncology field

Frequency	Centrality	Title	Author	Source/Press	Year
174	0.25	The hospital anxiety and depression scale	Zigmond, A. S. <i>et al.</i>	<i>Acta Psychiatrica Scandinavica</i>	1983
95	0.35	Impact of event scale: a measure of subjective stress	Horowitz, M. <i>et al.</i>	<i>Psychosomatic Medicine</i>	1979
95	0.14	<i>Stress, Appraisal, and Coping</i>	Lazarus, R. S. <i>et al.</i>	Springer-Verlag	1984
91	0.10	The European Organization for Research and Treatment of Cancer QLQ-C30: a quality-of-life instrument for use in clinical trials in oncology	Aaronson, N. K. <i>et al.</i>	<i>Journal of the National Cancer Institute</i>	1993
73	0.08	The functional assessment of cancer therapy scale: development and validation of the general measure	Cella, D. F. <i>et al.</i>	<i>Journal of Clinical Oncology</i>	1993
70	0.05	The prevalence of psychological distress by cancer site	Zabora, J. <i>et al.</i>	<i>Psycho-Oncology</i>	2001
63	0.16	The prevalence of psychiatric disorders among cancer patients	Derogatis, L. R. <i>et al.</i>	<i>Jama – Journal of the American Medical Association</i>	1983
61	0.09	The CES-D scale: a self-report depression scale for research in the general population	Radloff, A. L.	<i>Applied Psychological Measurement</i>	1977
52	0.06	Development of a questionnaire measure of adjustment to cancer – the MAC scale	Watson, M. <i>et al.</i>	<i>Psychological Medicine</i>	1988
47	0.10	How coping mediates the effect of optimism on distress – a study of woman with early-stage breast-cancer	Carver, C. S. <i>et al.</i>	<i>Journal of Personality and Social Psychology</i>	1993

can get more citations. Hence some of the top citations are over 40 years old; and only one document that published after 2000 is listed in Table I. And a new paradigm changing paper published five or ten years ago probably would not make the top 10 but hoary old chestnuts are still hanging there. This kind of limitation may also appear in the analysis of other rapidly developing research fields.

The document co-citation analysis is an important scientometrics research method. But like all other research methods, it has some limitations. For exam-

ple, Cole and Cole<sup>4</sup> expressed concern that scientists tend to cite friends and research colleagues more frequently (cronyism). Additionally, they observed that academic works which have already gained reputation in a field tend to get more credit and thus more citations in future literature, an observation termed the Matthew effect in science. Thus the applicability of the document co-citation analysis in scientometrics research on different disciplines is different.

1. Small, H., *J. Doc.*, 1980, **36**(3), 183–196.

2. Freeman, L. C., *Soc. Networks*, 1979, **1**(3), 215–239.
3. Leydesdorff, L., *J. Am. Soc. Inf. Sci. Technol.*, 2007, **58**(1), 25–38.
4. Cole, J. R. and Cole, S., *Social Stratification in Science*, University of Chicago Press, Chicago, IL, USA, 1973.

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	8	75,000	1,25,000	1,15,000	1,90,000	1,60,000	2,20,000
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