



## Classic articles in Psychology in the Science Citation Index Expanded: A bibliometric analysis

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Who today are the most highly cited psychologists listed in the Web of Science? This paper reports answers to this question by using the Science Citation Index Expanded to find out. This index covers over 280,350 documents in the Psychology category of the Web of Science from 1900 to 2013 and lists the most highly cited papers published between 1927 and 2012. For example, in 2013, an article published by Jacob Cohen in 1992 obtained (1) the highest ranking with 1,068 citations, (2) the highest for total citations per year, and (3) was ranked 3rd for the total number of citations since publication by 2013. New technology thus provides a seismic shift in the ways that we can obtain and analyse data like these. Indeed, the results for the top 10 articles indicate that practical and methodological papers now receive more citations than the more theoretical papers usually found in earlier surveys.

There is a long history of psychology research and famous psychologists. Some examples of early researchers in the field include Maudsley (1872) and Tuke (1873) on medical psychology and Clevenger (1881) on animal and comparative psychology. In the first half of the 20th century, psychology was dominated by eminent theorists such as, Wundt, James, Freud, Jung, Ebbinghaus, Pavlov, Piaget, Skinner, and many authors have summarized and contrasted their contributions (e.g., Anon, 2011; Butler-Bowdon, 2007; Furnham, 2008). In the latter half of the 20th century, several high impact studies in psychology were also published: For example, 'The magical number seven' by Miller (1956); 'On the framing of decisions and the psychology of choice' by Tversky and Kahneman (1981); and 'Culture and the self: Implications for cognition, emotion, and motivation' by Markus and Kitayama (1991). Currently, two of the highest cited papers are 'The weirdest people in the world' by Henrich, Heine, and Norenzayan (2010) and 'Amazon's mechanical Turk: A new source of inexpensive, yet high-quality, data' by Buhrmester, Kwang, and Gosling (2011).

Today, modern computing techniques have replaced hand-based ones, and, as this paper shows, such research can now be carried out more thoroughly and more quickly. In this study, we analysed classic articles in psychology by comparing their total citations from Web of Science Core Collection from 1900 to 2013. We report on (1) what are the characteristics of highly cited psychology papers – including publication years and journals; (2) who are the most highly cited psychologists and greatest contributors at

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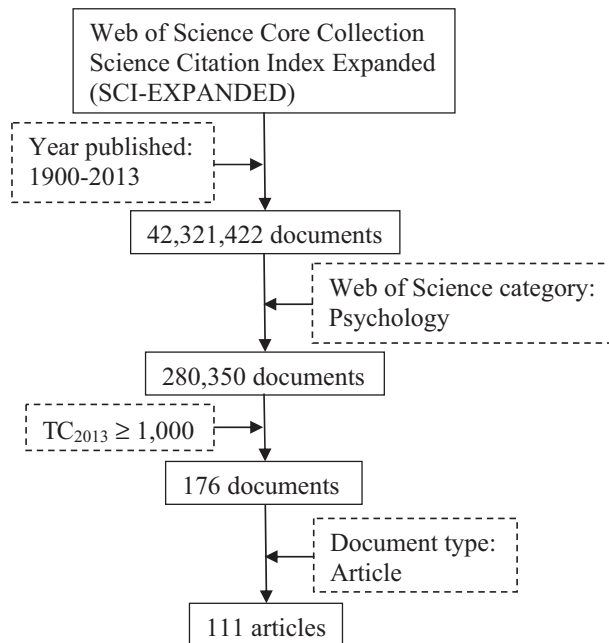
institutional and national level today; and (3) the life citation cycles and attributes of the top cited articles.

## Method

The analysis provided in this study is based on the Science Citation Index Expanded (SCI-EXPANDED) database of Web of Science from Thomson Reuters (updated on 3 March 2015). According to the Journal Citation Reports (JCR) of 2013, there were 74 journals listed in the category of psychology. The procedure for searching for top psychology articles is shown in Figure 1. A total of 42,321,422 documents from 1900 to 2013 were found in SCI-EXPANDED. These results were refined by selecting the Web of Science category of psychology (280,350 documents).  $TC_{2013} \geq 1,000$  was used as a filter to extract the classic documents (176 documents).  $TC_{2013}$  denotes the total citations from Web of Science Core Collection since the publication of the article up to the end of 2013 (Chuang, Wang, & Ho, 2011).

In psychology 176 documents (0.063% of the total 280,350 documents) published in the SCI-EXPANDED are regarded as classic papers. These include articles (111; 63% of 176 documents), reviews (64; 36%), proceedings (4; 2.3%), and editorial materials (1; 0.57%). We retrieved the 111 articles with  $TC_{2013} \geq 1,000$  as classic articles for further study. We chose these articles because they contained complete descriptions of the research and the results (Ho, Satoh, & Lin, 2010). We downloaded data about these articles and their total annual citations, and we analysed them using Microsoft Excel 2010 (Microsoft Corporation, Redmond, WA, USA) (see Table 1).

Articles originating in England, Scotland, Northern Ireland, and Wales were classified as being from the United Kingdom. In the Web of Science Core Collection database, the corresponding author is designated as the 'reprint author'; but here we use the term



**Figure 1.** Schematic for searching the classic articles.

**Table 1.** Introduction of the indicators used in subsequent analysis

Denotation	Definition
Co	First year of life, that is in its publication year (Ho & Kahn, 2014)
$C_{2013}$	The number of citations from Web of Science Core Collection in the year 2013 (Ho, 2012)
TCPY	The total citations $TC_{2013}$ per year (Ho, 2012)
'Single country articles'	If the researchers' addresses were from the same country
'Single institution article'	If the researchers' addresses were from the same institution
'Internationally collaborative articles'	If the articles were coauthored by researchers from multiple countries (Chiu & Ho, 2005)
'Interinstitutionally collaborative articles'	If authors were from different institutions
'First-author articles'	If the first author's address was from the certain country or institution for analysis
'Corresponding-author articles'	If the corresponding author's address was from the certain country or institution for analysis
'Single-author articles'	If the article has only one author and the author was from the certain country or institution for analysis
TP	Total number of article
CP	Number of internationally collaborative articles and number of interinstitutionally collaborative articles
FP	Number of first-author articles
RP	Number of corresponding-author articles
SP	Number of single-author articles

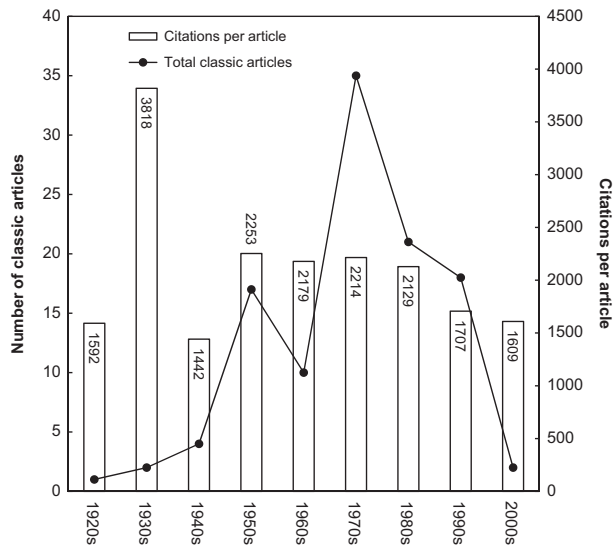
'corresponding author' (Chiu & Ho, 2007). For a single-author article, we classified the single author as both the first and the corresponding author (Ho, 2012). Similarly, in a single institutional article, the institute was classified as the first- as well as the corresponding-author institute (Ho, 2013). The contributions from institutions and countries were identified by the appearance of at least one author in each of the publications. Collaboration types were determined from the addresses of the authors. The articles were classified into five types based on the country and institution (Han & Ho, 2011). We used the acronyms in Table 1 (Ho *et al.*, 2010).

## Results and discussion

Two classic articles had the same author, title, journal, volume, and beginning page but different accession and IDS numbers, so we deleted one of them. Thus, we analysed 110 classic articles with  $TC_{2013} \geq 1,000$ .

### *Characteristics of highly cited psychology papers*

Our 110 articles were published between 1927 and 2002. The minimal value of  $TC_{2013}$  was 1,001, the maximum 9,977, and the average 2,131. Figure 2 shows the distribution of these 110 classic articles over the decades, and their citations per publication (CPP). The 110 classic articles received a total of 231,232 citations.



**Figure 2.** Number of articles and citation per publications by decade.

The mean number of CPP ( $TC_{2013}$  per number of publications) was 2,102, which was much higher than the value of the 100 most-cited articles in some medical fields (Baltussen & Kindler, 2004; Hennessey, Afshar, & MacNeily, 2009; Kelly, Glynn, O'Briain, Felle, & McCabe, 2010; Ohba, Nakao, Isashiki, & Ohba, 2007; Paladugu, Schein, Gardezi, & Wise, 2002). The advantage of using  $TC_{2013}$  for CPP is that they are invariable and ensure repeatability compared with the index of citations from Web of Science Core Collection.

Publication output by decade increased and reached a peak in the 1970s. The most productive year was 1979 with eight classic articles, followed by 1980 with six articles, 1973 with five articles, and 1993, 1988, 1977, 1959, and 1954 with four articles each. Only two classic articles were published in the 2000s and none in the 2010s.

Of course, recent articles need time to accumulate citations (Picknett & Davis, 1999) and similar results have been found for classic articles ( $TC_{2011} > 1,000$ ) in the Web of Science category of surgery (Long, Huang, & Ho, 2014) as well as the classic research works (Ho, 2013), single-author articles (Chuang & Ho, 2014), and reviews (Ho & Kahn, 2014) in the SCI-EXPANDED. In this current paper, two articles with  $TC_{2013} = 6,451$  and 1,184, that were published in psychology in the 1930s had the highest CPP of 3,818 ( $CPP = TC_{2013}/\text{number of publications}$ ;  $3,818 = (6,451 + 1,184)/2$ ). These were, 'Studies of interference in serial verbal reactions' by Stroop (1935) with a  $TC_{2013}$  of 6,451 (ranked 5th) and  $C_{2013}$  of 457 (ranked 7th) and 'Studies on the structure of the cerebral cortex XI Continuation of the study of the ammonic system' by de No (1934) with a  $TC_{2013}$  of 1,184 (ranked 84th) and  $C_{2013}$  of 24 (ranked 106th). The CPPs in the other eight decades ranged from 3,818 in the 1930s to 1,144 in the 1940s. Ridley Stroop, from George Peabody College in the United States, published his famous colour-word task (Jensen & Rohwer, 1966; Stroop, 1935), and Stroop's paper has had a long impact history after its publication.

The earliest classic article recorded in psychology was 'A law of comparative judgment' (Thurstone, 1927) published in 1927 with  $TC_{2013}$  of 1,592. The highest annual citation of this article occurred in 2012 with  $C_{2012}$  as 88. After such a long history, this article still has a high impact in psychology, especially recently. The most recent classic article entitled 'Short screening scales to monitor population prevalences and trends in

non-specific psychological distress' by Kessler *et al.* (2002) was published in 2002 in *Psychological Medicine* with  $TC_{2013}$  of 1,198. This paper, like that of Stroop (1935), is a strongly practical rather than a theoretical paper: It proves short questionnaires for discriminating between people who and people who do not show psychiatric systems.

Twenty-four (22%) of the 110 classic articles were published in 12 journals which were not listed in the category of psychology in 2013. The current category of psychology contains 74 journals in 2013 and the impact factor ( $IF_{2013}$ ) of these journals ranges from 0.000 for *Psychologie & Gezondheid* to 20.533 for the *Annual Review of Psychology*. *Multisensory Research* – the new title for *Seeing Perceiving* – was the only journal with no impact factor information in 2013. Fourteen journals (19% of 74 journals) published 87 classic articles and 12 journals, not in the JCR in 2013, published 24.

Table 2 shows the 26 journals with total number of classic articles and impact factor for 2013 ( $IF_{2013}$ ). *Psychological Review* ( $IF_{2013} = 7.719$ ) ranked 1st in the psychology category, and published the most classic articles with 45 articles (41% of 110 articles), followed by *Psychological Bulletin* ( $IF_{2013} = 14.392$ , ranked 2nd) with 19 articles (17%), and *Psychological Medicine* ( $IF_{2013} = 5.428$ , ranked 8th) with three articles. Five classic articles were published in the *Journal of Experimental Psychology* which was not listed in SCI-EXPANDED after 1975. *Psychophysiology* (two articles), *International Journal of*

**Table 2.** Characteristics of 26 journals in the Psychology category of who/where in 2013

Journal	TP (%)	$IF_{2013}$ (rank)
Psychological Review	45 (41)	7.719 (5)
Psychological Bulletin	19 (17)	14.392 (2)
Psychological Medicine	8 (7.3)	5.428 (8)
Journal of Experimental Psychology	5 (4.5)	N/A
Journal of Verbal Learning and Verbal Behavior	3 (2.7)	N/A
British Journal of Medical Psychology	2 (1.8)	N/A
International Journal of Eating Disorders	2 (1.8)	3.033 (22)
Journal of Abnormal and Social Psychology	2 (1.8)	N/A
Journal of Comparative and Physiological Psychology	2 (1.8)	N/A
Perception & Psychophysics	2 (1.8)	N/A
Psychophysiology	2 (1.8)	3.18 (18)
Psychosomatic Medicine	2 (1.8)	4.085 (10)
Quarterly Journal of Experimental Psychology	2 (1.8)	1.73 (46)
Spatial Vision	2 (1.8)	N/A
Behavioral Science	1 (0.91)	N/A
British Journal of Social and Clinical Psychology	1 (0.91)	N/A
Cognitive Psychology	1 (0.91)	3.571 (15)
International Journal of Psychophysiology	1 (0.91)	2.648 (28)
Journal fur Psychologie und Neurologie	1 (0.91)	N/A
Journal of Child Psychology and Psychiatry and Allied Disciplines	1 (0.91)	5.669 (7)
Journal of Experimental Psychology-Animal Behavior Processes	1 (0.91)	1.764 (45)
Journal of Experimental Psychology-Learning Memory and Cognition	1 (0.91)	3.098 (21)
Journal of Studies on Alcohol	1 (0.91)	N/A
Neuropsychobiology	1 (0.91)	2.303 (32)
Neuropsychology	1 (0.91)	3.425 (17)
Psychological Monographs	1 (0.91)	N/A

Note. TP = total number of classic articles;  $IF_{2013}$  = impact factor for 2013; N/A = not available in 2013.

*Psychophysiology* (one article), and *Journal of Experimental Psychology-Animal Behavior Processes* (one article) were also listed in five different Web of Science categories, respectively. Classic articles in psychology can be found in journals ranked from 2nd ( $IF_{2013} = 14.392$ ) to 46th ( $IF_{2013} = 1.730$ ).

### **Most highly cited psychologists and greatest contributors at institutional and national level**

Among the 220 authors contributing to 110 classic articles in psychology, 207 (94% of 220 authors) published only one classic article in psychology; 11 authors (5.0%) published two; and 2 (0.91%) published three. Following Ho (2014) we applied four bibliometric indicators – the total number of articles, first-author articles, corresponding-author articles, and single-author articles, to evaluate these classic articles. Table 3 lists the 13 authors who published two or more classic articles with these four indicators. The first author in psychology is normally considered the person who contributes most to the work, including conducting the research and writing the manuscript (Riesenberg & Lundberg, 1990). The corresponding author (normally also the first author) is responsible for responding to requests for information and copies of relevant papers (Burman, 1982). In the Web of Science category of psychology, D.M. Garner from Clarke Institute of Psychiatry at Canada and J.L. Fleiss from New York State Department of Mental Hygiene

**Table 3.** Thirteen highly productive authors of two or more classic articles

Author	Institution	Rank (TP)	Rank (FP)	Rank (RP)	Rank (SP)
Garner, D.M.	Clarke Institute of Psychiatry, Canada	3	1 (3)	1 (3)	1 (3)
Fleiss, J.L.	New York State Department of Mental Hygiene, USA	3	1 (3)	2 (2)	2 (2)
Bentler, P.M.	University of California, Los Angeles (UCLA), USA	2	3 (2)	2 (2)	2 (2)
Bradley, M.M.	University of Florida, USA	2	3 (2)	N/A	N/A
Bruner, J.S.	Harvard University, USA	2	3 (2)	10 (1)	8 (1)
Cohen, J.	New York University (NYU), USA	2	3 (2)	2 (2)	2 (2)
Collins, A.M.	Bolt Beranek and Newman Inc., USA	2	3 (2)	2 (2)	N/A
Cronbach, L.J.	Stanford University, USA	2	3 (2)	2 (2)	8 (1)
Garfinkel, P.E.	University of Toronto, Canada	2	3 (2)	N/A	N/A
Kintsch, W.	University of Colorado, USA	2	3 (2)	2 (2)	2 (2)
Lang, P.J.	University of Florida, USA	2	3 (2)	2 (2)	2 (2)
Tversky, A.	Hebrew University of Jerusalem, Israel	2	3 (2)	2 (2)	2 (2)
Allen, J.P.	National Institute on Alcohol Abuse and Alcoholism (NIAAA), USA	2	13 (1)	10 (1)	8 (1)

Note. TP = total number of classic articles; FP = first-author classic articles, RP = corresponding-author classic articles; SP = single-author classic articles; N/A = not available.

published three classic articles, respectively. Garner also published the most first- and corresponding-author articles and the most single-author ones. Finally, J. Cohen from New York University and A. Tversky from Hebrew University of Jerusalem in Israel each published two single-author classic articles.

To evaluate the publications of institutes and countries, 77 articles (70% of the 110 classic articles) with author information in the Web of Science Core Collection were analysed, following Ho and Kahn (2014). Six indicators were used: Total publications, independent publications, collaborative publications, first-author publications, corresponding-author publications, and single-author publications. Table 4 shows the 10 most productive institutions with three or more classic articles in the category of psychology. It can be seen that the University of Toronto at Canada takes the first place for the number of classic articles together with the most institutionally collaborative ones. The other nine universities are located in the United States. Stanford University has no interinstitutional classic articles in psychology but it ranks top for four indicators: Institutional independent, first-author, corresponding-author, and single-author articles, while the University of Colorado also published the same number of first-author and corresponding-author articles. Harvard University was the most frequent research partner in psychology classic articles, and it ranked top in six indicators – including classic reviews (Ho & Kahn, 2014), classic articles (Ho, 2013), and single-author articles (Chuang & Ho, 2014) in the SCI-EXPANDED. Harvard University has also been found to be one of the most collaborative institutes in health care sciences and services (Hsu & Ho, 2014) and in other medically related fields (Lin & Ho, 2015).

There were 33 articles in the sample (30% of the 110 classic articles) that had no author address information. Among the 77 articles with this information, five articles (6.5% of 77 articles) were international collaborations and 72 (94%) were country independent articles. Table 5 lists the nine countries that published classic articles in psychology. The United States convincingly takes the first place by all the shown indicators. The United

**Table 4.** Characteristics of the 10 most productive institutions (TP  $\geq$  3)

Institution	Rank (TP)	Rank (IP)	Rank (CP)	Rank (FP)	Rank (RP)	Rank (SP)
University of Toronto, Canada	1 (6)	2 (3)	1 (3)	3 (3)	3 (3)	5 (1)
Harvard University, USA	2 (4)	13 (1)	1 (3)	7 (2)	7 (2)	5 (1)
Stanford University, USA	2 (4)	1 (4)	N/A	1 (4)	1 (4)	1 (3)
University of Colorado, USA	2 (4)	5 (2)	3 (2)	1 (4)	1 (4)	5 (1)
Carnegie Mellon University, USA	5 (3)	2 (3)	N/A	3 (3)	3 (3)	5 (1)
Columbia University, USA	5 (3)	13 (1)	3 (2)	15 (1)	15 (1)	N/A
Johns Hopkins University, USA	5 (3)	5 (2)	6 (1)	7 (2)	7 (2)	N/A
University of California, Los Angeles, USA	5 (3)	2 (3)	N/A	3 (3)	3 (3)	2 (2)
University of Illinois, USA	5 (3)	5 (2)	6 (1)	3 (3)	3 (3)	5 (1)
University of Michigan, USA	5 (3)	5 (2)	6 (1)	7 (2)	7 (2)	N/A

Note. TP = total number of classic articles; IP = single institution classic articles; CP = interinstitutionally collaborative classic articles; FP = first-author classic articles; RP = corresponding-author classic articles; SP = single-author classic articles; N/A = not available.

**Table 5.** Characteristics of the all contributing countries

Country	Rank (TP)	Rank (IP)	Rank (CP)	Rank (FP)	Rank (RP)	Rank (SP)
United States	1 (56)	1 (51)	1 (5)	1 (53)	1 (50)	1 (77)
United Kingdom	2 (10)	3 (8)	2 (2)	2 (10)	2 (8)	2 (10)
Canada	3 (8)	4 (7)	4 (1)	3 (7)	3 (7)	3 (6.5)
Australia	4 (4)	5 (2)	2 (2)	4 (3)	4 (2)	N/A
Germany	5 (1)	6 (1)	N/A	5 (1)	5 (1)	N/A
Israel	5 (1)	6 (1)	N/A	5 (1)	5 (1)	4 (3.2)
The Netherlands	5 (1)	N/A	4 (1)	N/A	N/A	N/A
Sweden	5 (1)	6 (1)	N/A	5 (1)	5 (1)	4 (3.2)
Switzerland	5 (1)	6 (1)	N/A	5 (1)	N/A	N/A

Note. TP = total number of classic articles; IP = single country classic articles, CP = internationally collaborative classic articles; FP = first-author classic articles, RP = corresponding-author classic articles; SP = single-author classic articles; N/A = not available.

States published internationally collaborative articles with Australia, the United Kingdom, Canada, and Netherlands. Researchers from United States contributed to 56 of 77 classic articles, followed distantly by the United Kingdom with 10 articles, Canada with eight articles, and Australia with four.

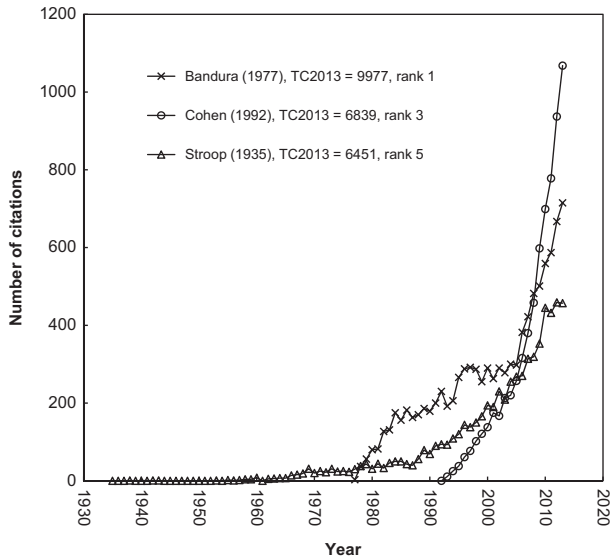
### **Life citation cycles and attributes of the top cited articles**

It is generally accepted that an article's impact might not always be high immediately after its publication (Fu, Wang, & Ho, 2012). Indeed, some papers have been called 'Sleeping Beauties', that is papers that suddenly get cited after a long period of time (Li, 2014). van Raan (2004) defined the three characteristics of such publications to be depth of sleep, length of sleep, and awakening intensity. The article published by Stroop (1935) provides an example: This paper introduced a the colour-word test for identifying where knowledge acted as a handicap – people reading coloured words (e.g., blue) printed in a different colour (e.g., red), for example, take longer to say blue than when the word blue is printed in blue. This paper had an average citation per year of 0.68 in the first 25 years, including the publication year, and 24 years after its publication. After such deep sleep (50 years) however, the annual citations increased slightly for another 31 years and then increased sharply in last two decades (Figure 3) as the test is now currently being used in multiple clinical and cognitive situations.

Albert Bandura from Stanford University was the originator of social learning theory and the theoretical construct of self-efficacy. Bandura's article, 'Self-efficacy – toward a unifying theory of behavioral change' (Bandura, 1977) has the highest value of  $TC_{2013}$  (9,977), and a sharply increase in citations can be found after 2005. This indicates that concept of 'self-efficacy' remains strong in related fields (Figure 3).

Finally, Jacob Cohen from New York University (Shrout, 2001), published an article entitled 'A power primer' with a 'distinguished pattern' in psychology field (Figure 3). This article ranked top in  $TC_{PY}$  (311) and  $C_{2013}$  (1,068), respectively. Here Cohen pointed to a number of rules that psychologists should follow when determining where or not their results were statistically significant, and provided practical examples in multiple situations for psychologists to follow. In addition, Cohen gave his name to a particular statistical measure now known as Cohen's kappa (Carletta, 1996).





**Figure 3.** Comparison of citation life cycles of the three types of the top articles.

Table 6 shows the top 10 articles with a  $C_{2013}$  of  $>300$  where both citation numbers and rankings for  $C_{2013}$ ,  $TC_{2013}$ ,  $TCPY$ , and  $C_0$  are shown. Seven and nine of the top 10 articles still have a  $TC_{2013}$  and  $TCPY$  ranked respectively in the top 10. This indicates that these highly cited articles will continue to receive a high number of citations in the future. However, not all of these classic articles continued to have high citations in the future. Fifty-four articles (49% of the 110 articles) had no citations in publication year ( $C_0 = 0$ ). Five of the 10 articles listed in Table 6 were published before the 1990s, four in the 1990s, and one in the 2000s. Four were published in *Psychological Bulletin* with its  $IF_{2013}$  of 14.392, ranked 2nd in category of psychology. *Spatial Vision* with two articles and *Journal of Experimental Psychology* with one article are not listed in SCI-EXPANDED after 1975 and 2009, respectively.

The correlation between the journal impact factor in 2013 ( $IF_{2013}$ ) and the top classic articles with  $C_{2013}$  of 300 seems important. Most of the top 10 articles did not have a high citation in their publication year ( $C_0$ ) ranking. The month of the year when an article is published is one of the main reasons for  $C_0$ . For instance, it is harder to be cited when your article is published in October, November, or December of the publication year. Fu *et al.* (2012) found that articles were not always highly cited after publication. Here an important relationship between classic articles and  $C_{2013}$ ,  $TC_{2013}$ , and  $TCPY$  can be found but it is not related to  $C_0$ .

Inspecting Tables 3 and 6 shows that many of the key authors from the major schools (e.g., behavioural and cognitive) have now disappeared. Most of the highly cited articles in psychology today can be divided into two main kinds – theoretical – and methodological. The papers by Stroop (1935) and Pelli (1997) describe introduce useful tools that are still going strong and that of Cohen (1992) is a kind of procedural recipe book.

## Conclusions

The 110 classic articles in Web of Science category of psychology were cited an average  $TC_{2013}$  of 2,102 times from Web of Science Core Collection (ranging from 1,001 to 9,977

**Table 6.** Top 10 articles in citations in 2013 ( $C_{2013} > 300$ )

Rank ( $C_{2013}$ )	Rank ( $TC_{2013}$ )	Rank (TCPY)	Rank ( $C_0$ )	Article	References
1 (1,068)	3 (6,839)	1 (311)	57 (0)	A power primer	Cohen (1992)
2 (715)	1 (9,977)	2 (270)	15 (3)	Self-efficacy: Toward a unifying theory of behavioral change	Bandura (1977)
3 (699)	2 (7,514)	4 (215)	57 (0)	Intraclass correlations: Uses in assessing rater reliability	Shrout and Fleiss (1979)
4 (687)	6 (6,408)	3 (267)	15 (3)	Comparative fit indexes in structural models	Bentler (1990)
5 (677)	14 (3,554)	5 (209)	23 (2)	The psychophysics toolbox	Brainard (1997)
6 (484)	19 (2,810)	6 (165)	6 (4)	The VideoToolbox software for visual psychophysics: Transforming numbers into movies	Pelli (1997)
7 (457)	5 (6,451)	18 (82)	57 (0)	Studies of interference in serial verbal reactions	Stroop (1935)
8 (395)	34 (2,020)	8 (144)	15 (3)	The unity and diversity of executive functions and their contributions to complex frontal lobe tasks: A latent variable analysis	Miyake <i>et al.</i> (2000)
9 (362)	4 (6,739)	9 (116)	6 (4)	The magical number 7, plus or minus 2: Some limits on our capacity for processing information	Miller (1956)
10 (347)	8 (5,549)	7 (163)	57 (0)	Significance tests and goodness of fit in the analysis of covariance-structures	Bentler and Bonett (1980)

Note.  $C_{2013}$  = number of citations from Web of Science Core Collection in 2013;  $TC_{2013}$  = number of citations since publication to the end of 2013; TCPY =  $TC_{2013}$  per year;  $C_0$  = number of citations in publication year.

total citations), for the years 1927–2002. These 110 classic articles were published by 220 authors in 68 institutions in nine countries. The decades with the most articles and CPP were the 1970s and 1930s, respectively. *Psychological Review* published the most articles. The University of Toronto in Canada ranked highest with six classic articles, while the United States published the most of classic articles. Stanford University in the United States published the most single-author articles. These 110 classic articles were published in 26 journals including 12 journals not listed in JCR in 2013.

Presumably slight differences might be found if investigators use different indicators such as total citations from Web of Science Core Collection, total citations from the Web of Science since publication to the end of recent year, total citations in the most recent year completed, and total citations per year. But data cited from the Web of Science Core Collection are not renowned for their reliability (Hennessey *et al.*, 2009; Kelly *et al.*, 2010; Ohba *et al.*, 2007; Paladugu *et al.*, 2002). However, whatever new measures we use today we know that they will allow us to find and count the scientific impact of new scholars more rapidly, in more detail, and for a greater length of time than ever before.

And, as this paper shows, it is helpful and informative to apply these new measures to help us keep track of developments in any discipline. Although papers from the major theorists might no longer be in the top 10 (in any discipline) this does not mean that they are not important, or have been totally forgotten. New giants stand on their shoulders.

## References

- Anon (2011). *The psychology book*. London, UK: Dorling Kindersley.
- Baltussen, A., & Kindler, C. H. (2004). Citation classics in anesthetic journals. *Anesthesia and Analgesia*, 98(2), 443–451. doi:10.1213/01.ANE.0000096185.13474.0A
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191–215. doi:10.1037//0033-295X.84.2.191
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, 107(2), 238–246. doi:10.1037/0033-2909.107.2.238
- Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance-structures. *Psychological Bulletin*, 88(2), 588–606. doi:10.1037//0033-2909.88.3.588
- Brainard, D. H. (1997). The psychophysics toolbox. *Spatial Vision*, 10(2), 433–436. doi:10.1163/156856897X00357
- Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's mechanical Turk: A new source of inexpensive, yet high-quality, data? *Perspectives on Psychological Science*, 6(1), 3–5. doi:10.1177/1745691610393980
- Burman, K. D. (1982). "Hanging from the masthead": Reflections on authorship. *Annals of Internal Medicine*, 97(2), 602–605. doi:10.7326/0003-4819-97-4-602
- Butler-Bowdon, T. (2007). *50 psychology classics*. Boston, MA: Nicolas Brealey Publishing.
- Carletta, J. (1996). Assessing agreement on classification tasks: The kappa statistic. *Computational Linguistics*, 22(2), 249–254.
- Chiu, W. T., & Ho, Y. S. (2005). Bibliometric analysis of homeopathy research during the period of 1991 to 2003. *Scientometrics*, 63(1), 3–23. doi:10.1007/s11192-005-0201-7
- Chiu, W. T., & Ho, Y. S. (2007). Bibliometric analysis of tsunami research. *Scientometrics*, 73(1), 3–17. doi:10.1007/s11192-005-1523-1
- Chuang, K. Y., & Ho, Y. S. (2014). Bibliometric profile of top-cited single-author articles in the Science Citation Index Expanded. *Journal of Informetrics*, 8(4), 951–962. doi:10.1016/j.joi.2014.09.008
- Chuang, K. Y., Wang, M. H., & Ho, Y. S. (2011). High-impact papers presented in the subject category of water resources in the essential science indicators database of the institute for scientific information. *Scientometrics*, 87(3), 551–562. doi:10.1007/s11192-011-0365-2
- Clevenger, S. V. (1881). Contributions to comparative psychology. I. Instinct and reason. *Science*, 2(49), 253. doi:10.1126/science.ns-2.48.253
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112(1), 155–159. doi:10.1037/0033-2909.112.1.155
- de No, R. L. (1934). Studies on the structure of the cerebral cortex XI Continuation of the study of the ammonic system. *Journal für Psychologie und Neurologie*, 46, 113–177.
- Fu, H. Z., Wang, M. H., & Ho, Y. S. (2012). The most frequently cited adsorption research articles in the Science Citation Index (Expanded). *Journal of Colloid and Interface Science*, 379(1), 148–156. doi:10.1016/j.jcis.2012.04.051
- Furnham, A. (2008). *50 psychology ideas*. London, UK: Quercus Publishing PLC.
- Han, J. S., & Ho, Y. S. (2011). Global trends and performances of acupuncture research. *Neuroscience and Biobehavioral Reviews*, 35, 680–687. doi:10.1016/j.neubiorev.2010.08.006
- Hennessey, K., Afshar, K., & MacNeily, A. E. (2009). The top 100 cited articles in urology. *Canadian Urological Association Journal*, 3(4), 293–302. doi:10.5489/auj.12223

- Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the world? *The Behavioral and Brain Sciences*, *33*(2–3), 61–83. doi:10.1017/S0140525X0999152X
- Ho, Y. S. (2012). Top-cited articles in chemical engineering in Science Citation Index Expanded: A bibliometric analysis. *Chinese Journal of Chemical Engineering*, *20*(3), 478–488. doi:10.1016/S1004-9541(11)60209-7
- Ho, Y. S. (2013). The top-cited research works in the Science Citation Index Expanded. *Scientometrics*, *94*(3), 1297–1312. doi:10.1007/s11192-012-0837-z
- Ho, Y. S. (2014). A bibliometric analysis of highly cited articles in materials science. *Current Science*, *107*(9), 1565–1572.
- Ho, Y. S., & Kahn, M. (2014). A bibliometric study of highly cited reviews in the Science Citation Index Expanded™. *Journal of the Association for Information Science and Technology*, *65*(2), 372–385. doi:10.1002/asi.22974
- Ho, Y. S., Satoh, H., & Lin, S. Y. (2010). Japanese lung cancer research trends and performances in Science Citation Index. *Internal Medicine*, *49*(20), 2219–2228. doi:10.2169/internalmedicine.49.3687
- Hsu, Y. H. E., & Ho, Y. S. (2014). Highly cited articles in health care sciences and services field in Science Citation Index Expanded: A bibliometric analysis for 1958–2012. *Methods of Information in Medicine*, *53*(6), 446–458. doi:10.3414/ME14-01-0022
- Jensen, A. R., & Rohwer, Jr, W. D. (1966). The Stroop color-word test: A review. *Acta Psychologica*, *24*(1), 36–93. doi:10.1016/0001-6918(66)90004-7
- Kelly, J. C., Glynn, R. W., O'Briain, D. E., Felle, P., & McCabe, J. P. (2010). The 100 classic papers of orthopaedic surgery: A bibliometric analysis. *Journal of Bone and Joint Surgery, British Volume*, *92B*(10), 1338–1343. doi:10.1302/0301-620X.92B10.24867
- Kessler, R. C., Andrews, G., Colpe, L. J., Hiripi, E., Mroczek, D. K., Normand, S. L. T., . . . Zaslavsky, A. M. (2002). Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychological Medicine*, *32*(6), 959–976. doi:10.1017/S0033291702006074
- Li, J. (2014). Citation curves of “all-elements-sleeping-beauties”: “flash in the pan” first and then “delayed recognition”. *Scientometrics*, *100*(2), 595–601. doi:10.1007/s11192-013-1217-z
- Lin, C. L., & Ho, Y. S. (2015). A bibliometric analysis of publications on pluripotent stem cell research. *Cell Journal*, *17*(1), 59–70.
- Long, X., Huang, J. Z., & Ho, Y. S. (2014). A historical review of classic articles in surgery field. *American Journal of Surgery*, *208*(5), 841–849. doi:10.1016/j.amjsurg.2014.03.016
- Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, *98*(2), 224–253. doi:10.1037/0033-295X.98.2.224
- Maudsley, H. (1872). An address on medical psychology. *British Medical Journal*, *2*, 163–167.
- Miller, G. A. (1956). The magical number seven, plus or minus two: Some limits on our capacity for processing information. *Psychological Review*, *63*(2), 81–97. doi:10.1037/0033-295X.101.2.343
- Miyake, A., Friedman, N. P., Emerson, M. J., Witzki, A. H., Howerter, A., & Wager, T. D. (2000). The unity and diversity of executive functions and their contributions to complex “frontal lobe” tasks: A latent variable analysis. *Cognitive Psychology*, *41*(1), 49–100. doi:10.1006/cogp.1999.0734
- Ohba, N., Nakao, K., Isashiki, Y., & Ohba, A. (2007). The 100 most frequently cited articles in ophthalmology journals. *Archives of Ophthalmology*, *125*, 952–960. doi:10.1001/archophth.125.7.952
- Paladugu, R., Schein, M., Gardezi, S., & Wise, L. (2002). One hundred citation classics in general surgical journals. *World Journal of Surgery*, *26*(9), 1099–1105. doi:10.1007/s00268-002-6376-7
- Pelli, D. G. (1997). The VideoToolbox software for visual psychophysics: Transforming numbers into movies. *Spatial Vision*, *10*(4), 437–442. doi:10.1163/156856897X00366
- Picknett, T., & Davis, K. (1999). The 100 most-cited articles from JMB. *Journal of Molecular Biology*, *293*(2), 173–176. doi:10.1006/jmbi.1999.3148

- Riesenberg, D., & Lundberg, G. D. (1990). The order of authorship: Who's on first. *JAMA-Journal of the American Medical Association*, *264*(14), 1857. doi:10.1001/jama.264.14.1857
- Shrout, P. E. (2001). Jacob Cohen (1923–1998) – obituary. *American Psychologist*, *56*(2), 166. doi:10.1037/0003-066X.56.2.166
- Shrout, P. E., & Fleiss, J. L. (1979). Intraclass correlations: Uses in assessing rater reliability. *Psychological Bulletin*, *86*(2), 420–428. doi:10.1037//0033-2909.86.2.420
- Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology*, *18*, 643–662. doi:10.1037/h0054651
- Thurstone, L. L. (1927). A law of comparative judgment. *Psychological Review*, *34*(4), 273–286. doi:10.1037/h0070288
- Tuke, T. H. (1873). An address to the section of psychology. *British Medical Journal*, *2*, 188–194.
- Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science*, *211*(4481), 453–458. doi:10.1126/science.7455683
- van Raan, A. F. J. (2004). Sleeping beauties in science. *Scientometrics*, *59*(3), 467–472. doi:10.1023/B:SCIE.0000018543.82441.f1

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