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Scholarly productivity and citation impact of academic psychologists  
in Group of Eight universities

Nick Haslam\*, Michelle Stratemeyer, Adriana Vargas-Sáenz

Melbourne School of Psychological Sciences  
University of Melbourne

\* Corresponding author  
School of Psychological Sciences

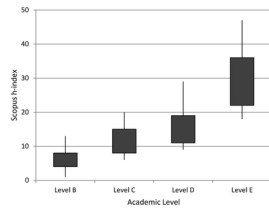
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RUNNING HEAD: Productivity and impact

University of Melbourne  
Parkville VIC 3010

e. nhaslam@unimelb.edu.au  
ph. 03-8344-6379

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## Abstract

**Objective:** This study sought to update norms for scholarly publication and citation impact for Australian Group of Eight (Go8) university psychology academics published by McNally (2010). **Method:** Publication and citation data for 279 Go8 psychology academics were extracted using the Scopus and Google Scholar databases. Norms for career-wise publications, citations, and the *h*-index were developed for each academic level (from Lecturer to Professor), and eight-year publication counts for 2009-2016 were compared with the 2001-2008 figures reported by McNally. **Results:** Evidence of a steep increase in scholarly productivity was found relative to McNally (2010), and new norms were generated. There was notable variation between psychology subdisciplines, with neuroscience and clinical science academics typically having higher publication and citation counts than their cognitive psychology peers. **Conclusions:** Norms for scholarly productivity and citation impact among Australian psychology academics have undergone substantial change in recent years. Caveats concerning the application of research metrics are discussed.

**Keywords:** Citations, impact, *h*-index, productivity

## Key points

What is already known about this topic

1. Publication and citation metrics are increasingly influential in research evaluation
2. Norms for Australian psychology academics in Group of Eight universities based on 2008 data were published by McNally (2010)
3. These norms document significant differences in publication and citation counts for staff at different academic levels

What this topic adds

1. The study provides updated norms for scholarly publication and citation
2. It demonstrates a steep increase in rates of publication in recent years
3. It shows that publication and citation norms differ substantially between some psychology subdisciplines

Metrics are increasingly used to evaluate the research performance of individuals, academic units, universities, and nations. Although their limitations are well known, they provide an objective basis on which to assess productivity and citation impact. Metrics are most commonly employed when evaluating researchers for purposes of hiring, promotion and review of grant applications. Accurate norms, benchmarks, or standards are vitally important in this evaluation process.

In an earlier study, McNally (2010) examined the scholarly productivity, citation impact, and publication quality of academics working within Schools and Departments of Psychology in Australia's research-intensive Group of Eight (Go8) universities. Using the Scopus database, McNally reported norms for the number of publications in the 8-year period from 2001 to 2008, the number of citations they accrued and, as an index of quality, their distribution across the Excellence in Research for Australia (ERA) journal rankings. He also investigated gender as a factor in these measures of research performance.

McNally's (2010) findings have been highly influential within the Australian context. Applicants for positions, promotions, grants, and awards frequently invoke his norms when attempting to give a solid empirical footing to their excellence. However, this practice is now problematic for several reasons. First, the norms are now eight years old at a time when publication practices are undergoing rapid change. Psychology journals are proliferating in major databases (Testa, 2011), the mean number of authors on articles and the mean citation rate of articles are increasing (Persson, Glanzel, & Danell, 2004), and norms are ratcheting up in a very competitive research marketplace where success rates for nationally competitive grant schemes have declined. Second, researchers often compare themselves to the Scopus-based McNally norms using different databases such as Google Scholar (GS). This database typically yields much higher citation values than Scopus because

GS counts citations from a wider range of sources and includes books, book chapters, and unpublished manuscripts rather than published articles alone. Present-day researchers evaluating themselves against the McNally norms, especially when using GS citation counts, will therefore come to assessments of their relative performance that are inflated and outdated.

In an attempt to update McNally's (2010) impactful work, we conducted a follow-up analysis in 2016. Replicating the earlier article, we collected information on all academic staff in Go8 psychology departments and schools, evaluated their publication output and citation impact, and computed means and percentile distributions for staff at different academic levels (Level B Lecturer, Level C Senior Lecturer, Level D Associate Professor, and Level E Professor). For direct comparison with McNally's 2001-2008 dataset, we collected data over an adjacent 8-year period (2009-2016) using Scopus. However, our study went beyond direct replication in four key respects. First, we assessed researchers' citation impact using GS as well as Scopus. Second, whereas McNally's analysis was confined to publications within the 8-year period, our primary focus was on career-wise productivity and impact. This is generally more pertinent to the assessment of researchers' achievement, especially for relatively established researchers. Third, in addition to reporting publication and citation counts, we also examined scores on the popular *h*-index (Hirsch, 2005), which purports to combine publication quantity and quality in a single metric (Haslam & Laham, 2010). Fourth, in addition to combining all academics in our analysis, as McNally did, we also tentatively explored differences in productivity and impact across major subdisciplines of psychology. Whereas McNally paid substantial attention to gender and scrutinised publication quality using the subsequently abandoned ERA journal rankings (Haslam & Koval, 2010), we de-emphasized the former and omitted the latter.

The goal of the present study was primarily descriptive. Rather than attempting to explain why particular bibliometric patterns emerge, we aimed to systematically document current realities in a way that enables informed evaluation of individual researchers. We did so in full awareness that research metrics are not sufficient measures of research, and that the Go8 is not the measure of all Australian, let alone international, universities.

### Method

Websites of Departments or Schools of Psychology at the Go8 universities (the Universities of Adelaide, Melbourne, New South Wales, Queensland, Sydney and Western Australia, as well as the Australian National University and Monash University) were reviewed in May 2016 to locate all academic staff at level B (Lecturer) and above who were working on Australian campuses. Staff listed as emeritus or as research fellows only (with no concurrent academic position) were not included in the sample.

Searches for records of each identified academic staff member were conducted by a team of three researchers using the Scopus and Google Scholar databases. In Scopus, if no single primary record for an academic was located, a full listing of publications was generated by combining multiple records. Records were only combined after reviewing the listed author affiliation and comparing the Scopus record of publications with those listed on the academic's personal webpage. For each academic, one researcher recorded the total career-wise publication number, the publication count from 2009-2016 (counting only articles and reviews for consistency with McNally [2010], including those listed as "in press" given the otherwise truncated eighth year of the period), the career-wise citation count, and the *h*-index value. Where the researcher was uncertain about an academic's Scopus record(s), a second researcher was consulted for resolution. In GS, one researcher

determined whether each academic had a personal profile and, if one was found, the total citation count and *h*-index was recorded. Publication counts were not recorded as these are unreliable in GS, are very rarely used as a bibliometric index, and comparisons with Scopus on this index were not a focus of the investigation. Because GS profiles are manually created by researchers, they were not universally available.

Finally, one researcher examined the personal webpages and/or Scopus records of all academics and coded their primary field of research into the following categories: behavioural neuroscience, clinical psychology, clinical neuropsychology, cognitive neuroscience, cognitive psychology, developmental psychology, health psychology, mathematical psychology, organisational psychology, personality psychology, social psychology, and other.

## Results

Two hundred and seventy-nine academic staff were located, representing a modest increase over the 270 included in the McNally (2010) study. Males made up 54% ( $N=151$ ) of the 2016 population, representing a nonsignificant increase from the 51% reported by McNally,  $\chi^2=0.50$ ,  $df = 1$ ,  $p>.05$ . Table 1 demonstrates that the distribution of Go8 psychologists across academic levels is now different from in 2008,  $\chi^2=17.28$ ,  $df = 3$ ,  $p<.001$ , with a notably reduced proportion of lecturers and increased proportions of senior lecturers and, especially, professors. In 2008, 45% of academics studied were at Levels D and E, compared to 54% in 2016. As was the case in 2008, the distribution of staff by academic level continues to be gendered,  $\chi^2=7.83$ ,  $df = 3$ ,  $p<.05$ . However, whereas McNally (2010) showed under-representation of female academics at both associate professor and professorial levels, our data reveal approximate parity except among professors.

Table 2 presents eight-year (2009-2016) Scopus publication counts (articles and reviews only), with comparative 2001-2008 counts from McNally (2010). There has been a steep increase in typical publication output, with both mean and median more than doubling from 2008 to 2016. This striking increase may represent some combination of rising true productivity, increases in the mean number of authors of psychology articles, increases in average seniority of academics, and increases in the range of publication outlets captured by the Scopus database. Regardless of its cause, the jump in publication norms indicates that to compare recent publication counts to the McNally norms would generate invalid conclusions about performance relative to peers.

Turning from 8-year Scopus publication counts to career-wise publication and citation measures, Table 3 reports norms for the entire population of academics for total publication counts from Scopus (now including all items, not just articles and reviews: the mean count was 9.6% lower if restricted to these publication types), and citation counts and *h*-index values from Scopus and GS. GS results were based on the 170 academics with personal GS profiles and so cannot be compared directly to the Scopus results based on all 279 academics. The table indicates that the median academic had 45 Scopus publications, which had been cited 816 times and generated an *h*-index of 15. Consistent with previous research (Moed, Bar-Ilan, & Halevi, 2016), citation and *h*-index values in GS were substantially higher than those in Scopus (mean GS citations and *h*-indices were 85.2% and 31.0% higher, respectively, for the 170 academics with GS profiles). Both citations and *h*-index values were positively skewed. It should be noted that academics with GS profiles did not differ from those without profiles on Scopus publications, citations or *h*-indices (all  $t(277) \leq 1.80$ ,  $ps > .05$ ), indicating that this group subset is broadly representative of the population.

Table 4 presents norms for career-wise publications, citations, and *h*-indices broken down by academic level, and for the academics as a whole. Most metrics show great variability within each academic level, some of it likely to reflect differing seniority within each level. They also show a relatively linear increase in means from academic levels B through D (Lecturer to Associate Professor, inclusive), with a steeper rise to level E (Professor) norms, reflecting the generally greater range of age and career accomplishment at this level. This pattern is illustrated by Figure 1, which shows the interquartile range (25<sup>th</sup>-75<sup>th</sup> percentile: indicated as a solid bar) for the Scopus *h*-index, with line extensions to the 10<sup>th</sup> and 90<sup>th</sup> percentiles, as a function of academic level.

As a final analysis, we investigated whether publication and citation norms differ across major subdiscipline areas. In view of the modest sample size and the large number of coding categories, four substantial groupings were constructed by combining the categories as follows: a “clinical science” group ( $N=100$ ) was composed of academics classified as clinical psychologists, clinical neuropsychologists, and health psychologists; a “cognitive psychology” group ( $N=52$ ) was composed of cognitive and mathematical psychologists; a “neuroscience” group ( $N=50$ ) was composed of cognitive and behavioural neuroscientists; and a “social psychology” group ( $N=35$ ) was made up of academics classified as such. A residual “other” group ( $N=42$ ) contained a mixture of less common subdisciplines (e.g., developmental, organisational, and those initially coded as ‘other’). Table 5 shows that these groups differed in their typical career-wise scholarly output and citation impact. Cognitive and social psychologists published less than clinical scientists and neuroscientists, and the latter – neuroscientists in particular – tended to achieve much greater citation impact (citation counts and *h*-index values) than the former, especially on Scopus. Social

psychologists closed the gap on the GS metrics, probably because more of their published output and citations appear in books and book chapters, which are not captured by Scopus.

### Discussion

Our analysis demonstrates that rates of scholarly publication have risen steeply in the past decade, so that the norms established by McNally (2010) are now out of date. Average publication output, as captured by the widely used Scopus database, has more than doubled over an 8-year period to a median of more than three publications annually, and productivity that was once exceptional is now relatively ordinary. This increase cannot be taken entirely at face value – it may reflect increasing team publication (Persson et al., 2004), the growing trend for short articles (Haslam, 2010), and an increase in publication outlets included in Scopus – but it is real nonetheless.

Beyond the 8-year norms, our analysis presents for the first time in Australia norms for career-wise publications, citations, and *h*-index values. These norms should be useful for researchers making cases for professional recognition, advancement, and funding, as well as for selection panels, granting agencies, and other gatekeepers who are required to compare the track records of multiple researchers. Although these norms are also likely to become dated in due course, they should serve as valid benchmarks for several years.

Having said this, it is crucial to recognise several caveats. First, research metrics must be placed with the context of the researcher's profile of activities and opportunities. Academics who have had extended periods of time devoted solely to research, or who have relatively low teaching loads, will be advantaged in research productivity and citation impact relative to their peers at the same academic level whose work fractions have tilted more towards teaching and service. As a result, academics who have had greater research

opportunities might be expected to perform above the norms present here, which combine all academics regardless of research history and fraction. In addition, research performance is generally only one criterion on which academic staff are evaluated, and standing relative to these norms is therefore only one component of an assessment of overall performance.

A second caveat is that metrics are not the whole story even when it comes to assessing research track records, and evaluators should always complement publication metrics with assessments of research quality and leadership (e.g., as indicated by first- or last-authored publications). It is possible to amass large publication and citation counts by serving as a minor player in a large team, as these counts are accrued equally regardless of number of co-authors or authorship position. Some scholars have proposed new indices such as *h<sub>i</sub>* (Harzing & Alakangas, 2016) that correct for co-authorship patterns for this reason.

Our third caveat is that publication and citation norms vary by field of research. Some areas of study within psychology are more conducive to large publication and citation counts than others. Researchers in clinical science and neuroscience tend to publish more than their colleagues in other areas, and to be cited more for their published work. These differentials are consistent with evidence that journal impact factors tend to be relatively high in these subdisciplines (e.g., Haslam & Koval, 2010). It is essential that research evaluators are sensitive to typical variations in such metrics within disciplines.

Despite these qualifications, research metrics are likely to grow in importance as the managerial auditing of research performance increases and the competitiveness of the research environment grows. In this context it is essential to have valid comparison standards and the wisdom to apply them with sensitivity and balance. The present analysis

offers a foundation for empirically grounded research evaluation that is also mindful of some of the factors that should lead them to be applied flexibly.

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## Figure legend

Figure 1. Distribution of Scopus h-index values by academic level.

Table 1

*Distribution of Staff By Academic Level and Gender*

| Level               | McNally (2010) |       | Present Study |       |
|---------------------|----------------|-------|---------------|-------|
|                     | Total          | F:M   | Total         | F:M   |
| Lecturer            | 79             | 49:30 | 42            | 23:19 |
| Senior Lecturer     | 70             | 37:33 | 86            | 44:42 |
| Associate Professor | 56             | 22:34 | 60            | 30:30 |
| Professor           | 65             | 24:41 | 91            | 31:60 |

Table 2

*Publications (Articles & Reviews) Over 8-Year Period (Scopus)*

|                    | McNally (2010-2008) | Present Study (2009-2016) |
|--------------------|---------------------|---------------------------|
| Mean               | 16                  | 34                        |
| Standard deviation | 18                  | 31                        |
| Median             | 11                  | 25                        |
| Min                | 0                   | 0                         |
| Max                | 141                 | 238                       |

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Table 3

*Percentiles for Career-Wise Publications and Citations*

|                         | Percentiles |     |      |      |      |       |
|-------------------------|-------------|-----|------|------|------|-------|
|                         | 10          | 25  | 50   | 75   | 90   | 95    |
| Publications (Scopus)   | 7           | 22  | 45   | 86   | 142  | 178   |
| Citations (Scopus)      | 65          | 259 | 816  | 2117 | 4097 | 6064  |
| Citations (GS)          | 241         | 638 | 1785 | 4280 | 7778 | 11528 |
| <i>h-Index</i> (Scopus) | 4           | 8   | 15   | 24   | 34   | 41    |
| <i>h-Index</i> (GS)     | 8           | 13  | 20   | 34   | 47   | 57    |

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Table 4

*Career-Wise Publications, Citations and h-Indices by Academic Level*

| Level                      | Publications |        | Citations |        | <i>h-Index</i> |  |
|----------------------------|--------------|--------|-----------|--------|----------------|--|
|                            | Scopus       | Scopus | GS        | Scopus | GS             |  |
| <b>Lecturer</b>            |              |        |           |        |                |  |
| Mean                       | 15           | 189    | 316       | 6      | 8              |  |
| Median                     | 14           | 113    | 219       | 5      | 8              |  |
| Min                        | 0            | 0      | 8         | 0      | 2              |  |
| Max                        | 50           | 1086   | 1667      | 17     | 20             |  |
| <b>Senior Lecturer</b>     |              |        |           |        |                |  |
| Mean                       | 33           | 604    | 1096      | 12     | 16             |  |
| Median                     | 30           | 467    | 876       | 11     | 15             |  |
| Min                        | 4            | 14     | 114       | 2      | 5              |  |
| Max                        | 93           | 2553   | 3478      | 30     | 34             |  |
| <b>Associate Professor</b> |              |        |           |        |                |  |
| Mean                       | 52           | 1239   | 2384      | 16     | 23             |  |
| Median                     | 48           | 982    | 1940      | 15     | 22             |  |
| Min                        | 6            | 101    | 298       | 5      | 6              |  |
| Max                        | 162          | 9227   | 7788      | 47     | 51             |  |
| <b>Professor</b>           |              |        |           |        |                |  |
| Mean                       | 124          | 3544   | 6781      | 30     | 40             |  |
| Median                     | 114          | 2841   | 4971      | 28     | 37             |  |
| Min                        | 10           | 15     | 177       | 2      | 6              |  |
| Max                        | 480          | 15979  | 28088     | 68     | 91             |  |
| <b>All Academics</b>       |              |        |           |        |                |  |
| Mean                       | 64           | 1637   | 3195      | 18     | 25             |  |
| Median                     | 45           | 816    | 1795      | 15     | 21             |  |
| Min                        | 0            | 0      | 8         | 0      | 2              |  |
| Max                        | 480          | 15979  | 28088     | 68     | 91             |  |

Table 5

*Mean Career Publications, Citations and h-Indices by Academic Groupings*

| Grouping             | Publications |        | Citations |        | <i>h-Index</i> |  |
|----------------------|--------------|--------|-----------|--------|----------------|--|
|                      | Scopus       | Scopus | GS        | Scopus | GS             |  |
| Clinical Science     | 77           | 1927   | 3474      | 19     | 26             |  |
| Cognitive Psychology | 59           | 1321   | 1921      | 17     | 20             |  |
| Neuroscience         | 77           | 2360   | 4007      | 23     | 30             |  |
| Social Psychology    | 53           | 1297   | 4395      | 16     | 28             |  |
| Other                | 36           | 760    | 2326      | 12     | 20             |  |

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