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Abstract

Objectives: This article reports the first estimated h-index values for social work faculty.

Methods: Multiple raters blindly assessed two samples of faculty (1) tenure-track faculty at

institutions listed in the U.S. News andWorld Report top 10 (n=337) and (2) tenure-track

editorial board members of 5 highly ranked social work journals (n=215). Results: Intraclass

correlation coefficients for h-index values among the multiple raters ranged from .83 to .92,

indicating good reliability. For faculty at top 10 institutions, mean estimated h-index values were

3.97 (SD=2.87) for assistant professors; 8.59 (SD=3.72) for associate professors; and 16.14

(SD=8.35) for full professors. Values for editorial board members were generally similar.

Conclusions: These are the first such published data; further research is needed.

Keywords evidence-based practice, bibliometrics, quantitative

Evaluating the Productivity of Social Work Scholars Using the H-Index

The measurement of scholarly productivity is a consistently popular topic in the social work literature (Green, Baskind, & Bellin, 2002; Seipel, 2003; Thyer & Bentley, 1986). The evaluation of research is often limited by subjectivity, which may have negative consequences for social work researchers, for instance, in terms of promotion and tenure decisions (Holden, Rosenberg, & Barker, 2005a; Kirk & Rosenblatt, 1977). It has been proposed that bibliometric evaluations such as citation analysis may be a more objective way to evaluate faculty productivity (Holden et al., 2005a, 2005b), although the limitations of this approach have also been pointed out (e.g., Kirk, 2005; Ligon & Thyer, 2005). In general, though, it seems that there is a trend towards the acceptance of bibliometrics, and at least in some research contexts, bibliometrics are increasingly valued as a tool for assessing quality and promise of scholarship (i.e., Costas & Bordons, 2007).

Within bibliometrics, various forms of citation analysis are most popular and perhaps promising form of measurement. The availability of modern electronic databases makes the counting of citations an accessible means of measurement. Citations are a "potentially valid, although imperfect, measure of a scientist's impact" (Holden et al., 2005b, p. 3). This is superior to other basic bibliometric measures, such as total number of publications, because the citing of scientific work implies that it has had impact on the field.

Many social work faculty are familiar with the general concept of citation analysis (e.g., Holden, Rosenberg, & Barker, 2006). However, the recent introduction of a new bibliometrics statistic- the 'h-index' has taken much of the academic world by storm, yet, it does not seem to have been assimilated yet within academic social work. This is of some concern, because it raises the possibility that the performance of social work academics could be evaluated with a

form of measurement with which they are unfamiliar. For instance, in the last year, the *h*-index

has been mentioned by several senior faculty at our home institution, all noting that the *h*-index

is one form of measurement used by promotion and tenure committees. In contrast, at several

recent scholarly social work conferences, informal discussions with colleagues revealed that

most had never heard of the *h*-index. Thus, although there is a broad and active discussion in

many scientific fields regarding the *h*-index (e.g., Kelly & Jennions, 2006), so far, academic

social work has not participated in this discussion.

This article seeks to remedy this by introducing the *h*-index and related bibliometric

statistics, describing both the potential advantages and disadvantages of assessing scientific

performance through *h*, and perhaps most importantly, discussing the ramifications for social

work faculty who are likely to be evaluated by the standard of *h*. We also present the first

published data on *h*-index values among tenure-track social work faculty.

<div align="center">The Case for the H-Index</div>

In 2005, physicist Jorge Hirsch published, "An Index to Quantify an Individual's

Scientific Research Output," in the *Proceedings of the National Academy of Scientists.* The

article proposed the *h*-index, a new bibliometrics statistic used to quantify scientific productivity.

Hirsch's article has already been cited over 1300 times and has spawned a deluge of articles

assessing the scholarship of various scientific disciplines based on the *h*-index (e.g., Ball, 2005).

Hirsch (2005) defined the *h*-index by writing, "A scientist has index *h* if *h* of his or her N_p papers

have at least *h* citations and the other (N_p - *h*) papers have fewer than $\leq h$ citations each" (p.

16569). Put more simply, a researcher has an *h* of 10 when she has published ten papers that

have each been cited at least ten times (see Figure 1). The researcher's *h* will not rise to 11 until

the researcher has 11 papers which have each been cited at least eleven times; and so on. Generally speaking, *h*-index values never decrease and can only increase with time.

When considering a new bibliometric variable such as the *h*-index, a natural question is the degree to which the variable correlates with other evaluations of research performance. The convergent validity of the *h*-index has been tested in some scientific fields. In biomedical research, recipients of research fellowships had higher *h*-index scores than those who were rejected (Bornmann & Daniel, 2006). In fields such as chemistry and biology, a consistent correlation is found between *h*-index and other measures of performance, such as peer judgment (Bornmann & Daniel, 2007; van Raan, 2006). In information science, *h*-index is highly correlated with citation counts (Spearman rank order correlation = 0.9, *p* <.01) but provides, "some additional discriminatory power" (Cronin & Meho, 2006, p. 1278) as some scientists with similar citations counts have substantively different *h*-index values. In physics, Hirsch (2007) found that the *h*-index "is better than other indicators considered (total citation count, citations per paper, and total paper count) in predicting future scientific achievement" (p. 19193). While bibliometric measures in general have been found to be poor predictors of promotion decisions, *h*-index has outperformed the number of citations and citations per paper (Jensen, Rouquier, & Croissant, 2008). The utility and validity of *h*-index is likely to be field-dependent, and in some disciplines, research has contradicted the proposition that *h*-index is a valid indicator of scientific performance (Garcia-Perez, 2009; Lehmann, Jackson, & Lautrup, 2005).

The rapid widespread adoption of *h*-index has several potential explanations. First of all, the *h*-index is intuitively easy to understand. It combines two variables (number of papers published and number of citations per paper) in a single number (Alonso, Cabrerizo, Herrera-Viedma, & Herrera, 2009). As a sort of "lifetime achievement" metric, it has obvious utility. It

rewards the publication of scientific work that has impact as measured by subsequent citation. A researcher with many publications will only have a high *h* if his/her published work is cited; uncited articles do not count towards *h*. Also, journal impact factor has been criticized as a flawed metric for measuring the impact of a scholar's work (PLoS Medicine Editors, 2006; Young, Ioannidis, & Al-Ubaydli, 2008). In social work specifically, there is evidence that journal impact factor is a less than ideal predictor of impact (Holden, Barker, & Onghena, 2006). The impact factor of publication outlets is irrelevant to *h*-index, which may be seen as an advantage to those that regard the impact factor as problematic (although see van Raan, 2006, for a counterargument to this proposition).

The *h*-index is a relatively robust statistic (Bornmann, Mutz, & Daniels, 2008). When collecting data on *h*-index, minor mistakes in data collection will only have a small impact on *h*. Each publication can only raise *h* by one, so, for instance, missing one publication due to an indexing error cannot have a large effect on the overall *h*-index of the researcher (although this impact will be greater for authors with lower *h*-index scores). Similarly, scholars who publish a "one-hit wonder" (a solitary highly cited paper) cannot benefit more than one point in *h*, no matter how many times the paper is cited. Thus, the *h*-index "favors enduring performers that publish a continuous stream of papers with lasting and above-average impact" (Bornmann & Daniel, 2007, p. 1381). As long as this is seen as a desirable type of performance, *h*-index measures it reasonably well.

H-index can be applied at variable levels of analysis. Although it was originally developed to quantify the output of individuals, mezzo and macro-level variations have already emerged. Using *h*-index, it is possible to evaluate the scientific output of research groups (Grothkopf & Stevens-Rayburn, 2006), universities, and even entire countries, or to assess "hot"

scientific topics (Banks, 2006). Journals are now being evaluated by *h*-index (Anne-Wil Harzing & Wal, 2009; Hodge & Lacasse, 2010), as a complementary and perhaps competing metric for impact factor.

<div style="text-align:center">Caveats Regarding the *H*-Index</div>

While the response to *h*-index has been largely positive, a body of literature critical of the *h*-index has also emerged. Some critiques are directed at the perceived shortcomings of the *h*-index itself, while some apply to all bibliometric measures dependent upon citation counts. Here, we cover both categories of caveats. We begin by reviewing concerns related to citation analysis in general, and then move on to critiques of *h*-index.

Citation patterns are an imperfect indicator of the scientific worth of a paper and may be affected by social, political, and geographic variables. In ecology, for instance, authors are more likely to cite potential reviewers and journal editors (Leimu & Koricheva, 2005). Authors are also more likely to cite scientific papers originating in their home country (Wong & Kokko, 2005). Some have argued that scientific papers sometimes shape the scientific literature without receiving a high number of citations (Garcia-Perez, 2009). Lindsey (1989) argues that popularity and quality are distinct constructs, an important critique, because all citation analysis is predicated on the assumption that quantity of citations are a reasonable proxy for quality of research. In addition to these general concerns, a number of criticisms have focused solely on the *h*-index.

H-index is field-dependent because citation patterns vary across academic fields. Different *h* values may result from myriad variables, such the size of the academic field, the mean number of publications by scientists in the field, and the normative number of references within the field. Cross-field comparisons of *h* without statistical correction for confounding

variables are thus inappropriate (Batista, Campiteli, & Kinouchi, 2006; Iglesias & Pecharromán, 2007). Studies of social work faculty have found modest publication rates in aggregate (Green et al., 2002), especially compared to other disciplines (Pardeck, 2002; Thyer & Polk, 1997) so "typical" *h* values are likely to be lower in social work relative to some other fields. Research is needed which establishes "typical" rates of *h* for social work academics, ideally tabulated by rank and type of institution (i.e., teaching schools versus research institutions).

Although reference standards for *h*-index have been proposed in some academic fields (e.g., Kelly & Jennions, 2006), this may prove difficult in social work. The interdisciplinary and somewhat fragmented nature of social work research probably means that evaluators need to take contextual issues into account when considering h-index, rather than establishing firm standards for what comprises a "good" *h*-index score. Social work scholars working in highly topical areas, doing interdisciplinary work, or both, will be favored by the *h*-index. For instance, social work scholars working in criminology or mental health benefit from a large number of scholars outside the field of social work who can cite their work. A social work scholar working in a tiny subfield (e.g., spirituality in military social work) would not have the benefit of large numbers of scholars writing in their area, and would be unlikely to be cited outside of social work, and thus a lower *h* could result. At present, there are no obvious quantitative solutions to this dilemma, although evaluators of productivity should consider these factors when judging the meaning of an individual scholar's *h* score.

The *h*-index rewards academic age and disadvantages newcomers. A researcher's *h*-index score cannot exceed the total number of papers they have published, regardless of the impact of these papers. It takes time for papers to be published and then subsequently cited. This is an important issue within the field of social work, where concerns have been raised about

the length of time it takes for manuscripts to be reviewed and then published (Thyer & Myers, 2003). This may privilege social work scholars that publish in medicine, psychology, or other fields where time-to-publication is shorter and knowledge dissemination occurs more effectively. This does not necessarily detract from the overall utility of the *h*-index, but it does suggest that scholars submitting work primarily to social work journals could find it difficult to attain a high *h*-index in the short period prior to evaluation for tenure. This context may be of critical importance within promotion and tenure decisions.

The *h*-index measures lifetime achievement and as such is relatively insensitive to performance changes. It never decreases, no matter what the recent performance of a scholar. Scholars who stop publishing can still have *h*-index values that continue to increase, if their previously published work continues to be cited (Cronin & Meho, 2006; van Raan, 2004). On the other hand, senior social work scholars with higher *h*-index values may find that they hit a plateau wherein *h* does not increase in concert with short-term success. For instance, consider a senior professor with $h = 17$, meaning 17 papers cited ≥ 17 times. If her 18nd most-cited paper has only been cited 4 times, for *h* to increase by one, she will need 14 additional citations, or, alternately, to publish a brand-new paper that is then cited 18 times. Neither is likely to happen in the short-term and many scientific papers become less relevant over time, thus, veteran professors may have little ability to change their *h*.

The potential for scholars to directly impact their own *h*-index values through self-citation exists. If self-citations make good intellectual sense (e.g., a self-citation in a replication study by the same author), then self-citations may not be objectionable (Holden et al., 2005a). However, awareness of the widespread use of citation analysis (including *h*-index) may motivate scholars to self-cite in a manner that is not intellectually sound. This is one potential drawback

of the *h*-index. If evaluators wish to distinguish between valid and invalid self-citations, this will require a subjective, qualitative judgment of the self-citation in question, which, it can be argued, may be time-consuming and contradictory to the idea of the *h*-index as an objective indicator of impact.

Hirsch (2005) originally argued that the impact of self-citations on *h* would be minimal among well-published scholars and would impact the *h*-index score less than other bibliometric measures. It was proposed that evaluators could simply scrutinize publication records for the impact of self-citations, as adjusting *h* downward would be easily accomplished and involve examining only a few citations. Some research supports the proposition that self-citations are not a major problem for the *h*-index. An empirical study of the impact of self-citations on *h*-index among information scientists found that eliminating self-citations did not have a substantial effect on the rank order of authors (Bornmann & Daniel, 2007; see Cronin & Meho, 2006), and, in ecology, the impact of self-citation was found to negligible (Engqvist & Frommen, 2008). However, the impact of self-citations is probably field-dependent, and it is likely that the lower the mean *h*-index score in a field, the more impacting (and potentially problematic) self-citation may be. Among Spanish academics in the behavioral sciences, where *h*-index values are relatively low, self-citations were found to be impacting (Garcia-Perez, 2009).

In particular, low *h*-index scores early in a social work academic's career can easily be moved upwards through self-citation. A doctoral student with an $h = 0$ can cite herself in her very next article, raising her to $h = 1$; and scholars with *h*-index values that are relatively low (say, < 5) will be able to raise it quickly through self-citation. In cases such as these, a handful of citations raises *h* exponentially. As *h* grows, however, it becomes more and more unlikely that self-citation can have a substantial effect.

H-index values can be increased by others, though, which raises the potential dilemma of co-authorship. If six professors co-author an article, and all subsequently cite it, five of the six citations will not be obvious "self-citations," although the article citation rate has clearly benefitted from self-citation by co-authors of the paper. Some analysts argue that citations by co-authors should be categorized as a type of self-citation (Schreiber, 2007). These citations can be identified by evaluators and removed prior to analysis, but, again, this is labor intensive.

Beyond citations by co-authors, other problematic issues are raised by co-authorship. Using the *h*-index, each author is given equal credit for each citation, regardless of their contribution to the work. Consider two professors with the same number of publications and citations; one has solo-authored all of their articles, while the other has performed data analysis as part of a large authorship team. Although both academics would have equivalent *h*-index scores, the degree to which their contributions are 'equivalent' can easily be challenged.

Rousseau (2008) argued that *h*-index is only "useful for comparing the better scientists in the field. It does not discriminate among average scientists" (p. 2). This is similar to a point made in the social work literature on bibliometrics by Klein and Bloom (2005): "…while citation counts in the extremes (no citations and those in the very highest ranges) are probably indicative of *something*, those in the middle- and we would expect that this captures the great majority of individuals- probably do not distinguish anything among scholars" (p. 119, italics in original; see also Lindsey, 1989). This serves as a reminder that *h*-index is ultimately just a bibliometric variable subject to the various critiques of citations analysis (for a review, see Holden et al., 2005a). Among these critiques is the fact that *h* may lack utility in terms of comparing "average" academics (Costas & Bordons, 2007).

The very idea of reducing a scientist down to one specific statistic may be alluring, but ultimately this may not be a sound idea. It is difficult (some would argue, impossible) to summarize a scientist's lifework through just one number, a sentiment voiced by many bibliometric researchers (e.g., van Raan, 2006). Thus, even proponents of bibliometrics analysis may find the *h*-index wanting when it is presented as the only indicator. Rather than rely on one statistic, some endorse the use of a portfolio of related statistics, many of which are designed to address some of the limitations covered above.

Variations on *H*-Index

Hirsch (2005) proposed the first variation on the *h*-index in his original article. He proposed the *m*-quotient, a companion statistic for *h*, in which is *h* divided by the researcher's academic age, defined as the number of years since first publication. The *m*-quotient allows for comparing researchers at different levels of seniority, and also assesses continuing productivity. Consider two researchers who both have $h = 10$. Viewed only in terms of *h*, they would appear to be equivalent; but if one is an assistant professor with an academic age of 5 ($m = 2$), this is considerably different than a senior professor with 20 years experience ($m = 0.5$). Hirsch (2005) originally proposed that in physics, $m \approx 1$ indicated a "successful scientist," while $m \approx 2$ was "outstanding" and $m \geq 3$ "characterizes truly unique individuals" (p. 16571).

The contemporary *h*-index (Sidiropoulos, Katsaros, & Manolopoulos, 2007) is a modification of the original *h*-index which weights recent publications more heavily. This addresses one limitation of the original *h*-index- that researchers can effectively stop publishing and still have a stable or rising *h*-index score. The contemporary *h*-index seems to have the most utility in evaluating senior faculty; inactive researchers will have lower contemporary *h*-index values as compared to the standard *h*-index. Another useful statistic is the individual *h*-index, or

h_i-index (Batista et al., 2006), which corrects for the impact of co-authorship. Using h_i-index scores, evaluators can assess the degree to which *h*-index values have been increased through co-authorship. Scholars whose cited work is co-authored will have lower (sometimes much lower) h_i-index values as compared to those whose cited work is largely or exclusively solo-authored.

Finally, the *g*-index is a modification of *h*-index in which highly-cited papers are weighted more heavily, thus rewarding review articles (e.g., systematic reviews, meta-analyses) and other high-impact publications (Egghe, 2006). Values of *g*-index will be higher than *h*-index scores, and it has been argued that the *g*-index scores may have more validity in terms of "life-time achievement" (Bornmann, Mutz, & Daniel, 2008; Egghe, 2006). In social work, we have observed that researchers can have their *g*-index values inflated markedly by a single well-cited review article.

While other variants of *h*-index exist (Bornmann et al., 2008), the handful of *h*-related statistics described seem to augment the utility of the basic *h*-index substantially. Using these metrics, the effects of time/experience, co-authorship, and highly-impacting papers can be assessed separately, and compared to the basic *h*-index values. We now move to the pragmatic issue of calculating *h*-index values for researchers.

<div align="center">Calculating H-Index</div>

H-index can be calculated using any citation database. Selecting a database which accurately captures the work produced by a researcher is of clear importance. In physics and in many other fields where *h*-index has been studied, the ISI Web of Science database is used. Since social work is an interdisciplinary field and many social work journals are not indexed by ISI, using Web of Science to calculate *h*-index in social work would underestimate *h*-index values (Hodge & Lacasse, 2010).

An alternative is Google Scholar, which offers many advantages to researchers publishing in interdisciplinary social science (Kousha & Thelwall, 2008; Meho & Yang, 2006; Vaughan & Shaw, 2008; Walters, 2007). For instance, Google Scholar captures citations from sources such as government reports and doctoral dissertations. Some may argue that these additional citations are problematic, since citations in a government report will be counted as equivalent to citations in ISI-indexed highly-ranked social work journals. Others have advocated that many of these citations deserve to be counted and that databases such as Web of Science actually underestimate impact (Harzing & van der wal, 2008), perhaps particularly in social work (Hodge & Lacasse, in press).

Harzing's Publish or Perish (Tarma Software Research Pty Ltd., 2010) is a free software program that calculates *h*-index values and related statistics for both researchers and journals through use of the Google Scholar database (Jacsó, 2009). Publish or Perish has been used in bibliometric research, for instance, in quantifying the *h*-index scores of academic neurosurgeons (Lee, Kraus, & Couldwell, 2009). Although many other fields have similar articles in their literature- where *h*-index scores are reported for a group of scholars- no similar effort has yet taken place in social work. Below, we report on our effort to address this gap in the literature, by pursuing the exploratory research question, "What are *h*-index scores for faculty members in social work?"

<div align="center">*H*-Index Scores for Social Work Faculty: A First Look</div>

Method

During academic year 2009-2010, we identified two samples of faculty for which we wished to estimate *h*-index scores. The first sample consisted of all tenure-track faculty (*n* = 337) at institutions ranked in the Top-10 of the *U.S. News and World Report* rankings (2008).

The second sample consisted of all editorial board members of five social work journals with high reputational and bibliometric rankings ($n = 215$; the journals were *Health and Social Work, Research on Social Work Practice, Social Service Review*, *Social Work, and Social Work Research*). Each individual was entered into a database along with their academic rank and institutional affiliation. We then sought to estimate *h*-index scores for each individual, using a labor-intensive procedure to ensure reliability. Two raters independently assessed each author with Harzing's Publish or Perish bibliometric analysis software (version 3.1.3926, Tarma Software Research Pty Ltd, 2010). The raters followed standardized protocols, searching for publications in the fields of social science and/or medicine. Raters used the Google search engine to locate the curricula vitas and/or faculty profiles of the professors they were rating, and used this information in forming their ratings.

A third rater then created estimated *h*-index values by applying several decision rules to the data submitted by the two independent raters. Special attention was paid to common names, hyphenated names, and estimated *h*-index values that were unusual for rank (Full professor < 8 or > 25, associate professor < 5 or > 20, or assistant professor > 10; a detailed coding protocol including decision rules is available from the 1st author upon request). A 4th rater blinded to all other ratings then coded a subsample of the original sample, with these ratings compared to the estimated *h*-index values in order to further establish the reliability of the estimated *h*-index values.

Data analyses consisted of interclass correlation coefficients (ICC) using single measures, to assess interrater reliability of coded *h*-index values; measures of central tendency for estimated *h*-index values; and ANOVA, examining mean estimated *h*-index values by academic rank (assistant, associate, or full professor). Due to the purposive sampling method, the ANOVA

analysis should be interpreted descriptively rather than inferentially (Berk, 2004; Oakes, 1986),

and thus confidence intervals are presented in lieu of *p*-values. As our study only used publicly

available information and involved no human subjects, our study was deemed exempt from

review by our institutional review board.

Results

Sample 1: Tenure-track faculty at top-10 institutions. There was a high level of interrater

reliability between the 2 initial raters and the estimated *h*-index ratings produced by the 3rd rater

with an ICC of 0.913 , 95% CI [0.892, 0.931]. The 4th rater coded a non-probability subsample

(*n* = 37), with good interrater reliability between these codings and the estimated *h*-index values,

ICC = 0.882, 95% CI [0.783, 0.938]. Mean estimated *h*-index values for faculty at top 10 social

work programs were, for assistant professors, 3.97, 95% CI, [3.32, 4.62], *SD* = 2.87; for

associate professors, 8.59, 95% CI [7.85, 9.32], *SD* = 3.72; and for full professors, 16.14, 95%

CI [14.83, 17.45], *SD* = 8.35. For assistant and associate professors, median values differed only

marginally from the mean values (less than 1 point on *h*; see Table 2).

Sample 2: Tenure-track members of social work journal editorial boards. The interrater

reliability between the first 2 raters and the estimated *h*-index ratings produced by the 3rd rater

was high, with an ICC of 0.921, 95% CI [0.902, 0.937]. Additionally, a 4th rater blinded to all

other ratings coded a probability subsample (*n* = 41, ~20% of total sample) with 35/41 ratings

(87.8%) within 2 points of the estimated h-index values, resulting in an ICC of 0.83, 95% CI

[0.70, 0.90] between these blinded ratings and the estimated *h*-index values used as the

dependent variable. Mean estimated *h*-index values for members of highly ranked social work

editorial boards were, for assistant professors, 4.35, 95% CI [3.46, 5.24], *SD* = 2.85; for associate

professors, 7.68, 95% CI [6.48, 8.88], *SD* = 4.68; and for full professors, 13.82, 95% CI [12.09,

15.54], *SD* = 8.01. As displayed in Table 2, the median values were close to the mean.

Discussion and Applications in Social Work

   This article has reviewed the strengths and limitations of the *h*-index, a recently

introduced bibliometric statistic which measures faculty productivity through citation analysis.

Additionally, we have presented data on estimated *h*-index scores for social work faculty in two

samples, one consisting of tenure-track faculty at top-10 social work institutions, and the other

consisting of editorial board members of highly ranked disciplinary social work journals.

Estimated *h*-index values were similar among assistant professors in both samples (3.97 and

4.35), which was also the case among associate professors (8.59 and 7.68). Full professors in the

top-10 sample had higher estimated *h*-index values than those in the editorial board sample

(16.14 and 13.82). To our knowledge, these are the first published *h*-index values for social

work academics.

   These data should be interpreted carefully, particularly when considering scholars at high

rank who have low *h*-index scores when compared with our data (e.g., a full professor with *h* =

5). Hirsch (2005) argued that while a high *h*-index score is a reliable indicator of a scholar's

impact, a low score does not necessarily indicate the converse; it only requires an explanation,

such as noting that a scholar is working in a very small subfield. Thus, while our aggregate data

sketch a rough outline of what might be considered 'norms' of high achievement in academic

social work, individual scholars will need to be judged in the context of their research agendas.

   The coding phase of our study led to several interesting findings. We were surprised by

the number of social work academics without a publicly available, current curricula vitae.

Although most of our authors were easily coded without one, a publicly available curricula vitae

was very helpful in some cases. We used these vitae to cross-reference publications, primarily to resolve the question of whether a particular publication had been authored by the scholar in question. Curricula vitaes were particularly useful when an academic had undergone a name change at some point during his/her career. When vitas were unavailable, there was often information on college websites that was similarly helpful, but vitaes clearly contained the most information. It would facilitate widespread bibliometrics research for social work academics to have current vitas publicly posted on their college website. Also, we noted that some academics have changed their use of a middle initial during their career (e.g., writing some articles as "Terry S. Smith" and others as "Terry Smith"). This complicates citation analysis, requiring some verification that the two identities should be merged. Doctoral students and junior professors should be advised to adopt a name early in their career and then to use that name consistently throughout their entire career.

Based on our research experience here and the *h*-index literature at large, we suggest that when professors need to report their own individual *h*-index scores (as in cases of promotion and tenure), that they submit a self-calculated accounting based on their entire list of publications. This recommendation has also been advocated by some bibliometric researchers (Bornmann & Daniel, 2007). Minor errors will not cause aggregate measures of central tendency to vary substantially, but mistakes can easily be made in an individual case that may be critically important to an individual professor.

There are several limitations to this study. The two samples studied were purposive in nature and thus the results cannot be generalized to the population of social work academics as a whole. We selected the *U.S. News and World Report* top-10 because these schools are often aspirational peers of research-oriented institutions, and the comparison may be useful to faculty

in the tenure and promotion process. For instance, if an associate professor at a school ranked in

the 55th school per *U.S. News and World Report* is applying for full professor, it may be useful to

note that her *h*-index is higher than the mean at the top-10 institutions. However, the utility of

these data is limited to these types of situations, and more extensive research is needed, which

should include systematic inquiry into estimated *h*-index scores among faculty at institutions

with lower reputational rankings. Also, although we reported the results of the two samples

separately, there was some overlap between the groups; a handful of scholars appeared on both

lists.

Other limitations relate to our methodology. There is historically a "precision problem"

in bibiometrics research; it is difficult, and time-consuming, to narrow search results to one

individual, and name changes and common names present difficulties. We used a time-

consuming methodology with standardized protocols and decision rules, but, ultimately, arriving

at many of the codings required a subjective judgment by one (or more) of the raters. Our high

reliability suggests that this was not a major problem in aggregate, but on an individual level it

was inevitable that some authors would be coded with estimated *h*-index values that were, to

some degree, inaccurate. We only collected data on the basic *h*-index, which has much less

potential for measurement error compared to related statistics such as *g* or *m-quotient.* We also

refrained from collecting additional information about authors, such as academic age or research

agenda. Instead, as an exploratory, descriptive effort, we focused entirely on deriving reliable

estimated *h*-index values. Future research should focus on retrieving more comprehensive

bibliometrics data for each individual, as well as demographics such as academic age and type of

institution.

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Table 1

Bibliometric Statistics Related to or Derived from H-index

Measure	Description	Utility
h-index	"A scientist has index *h* if *h* of his or her N_p papers have at least *h* citations each and the other $(N_p - h)$ papers have fewer than $\leq h$ citations each" (Hirsch, 2005, p. 16569).	Robust to measurement error; attempts to quantify impact of a scientist
m quotient	*H* divided by academic age (years since publishing first paper)	Adjusts for career length
Contemporary *h*-index	Weights citations based on how recently the article was published: "For an article published 4 years ago, its citations account only one time. For an article published 6 years ago, its citations account 4/6 times, and so on" (Wil-Harzing, 2008).	Can differentiate between active and inactive researchers
h_i index	*H* divided "by the mean number of researchers in the *h* publications" (Batista et al., 2006, p. 184)	Adjusts for the effect of co-authorship; may facilitate comparisons across fields where authorship patterns differ
g-index	"The highest number of *g* papers that together received g^2 or more citations"	Authors receive more credit for highly-cited papers

Table 2

Estimated H-index Values

Rank	n	Min	Max	M (SD)	Mdn	95% CI
For Tenure-Track Faculty at Top-10 Institutions						
Assistant	78	0	17	3.97 (2.87)	3.5	[3.32, 4.62]
Associate	101	1	20	8.59 (3.72)	8.0	[7.85, 9.32]
Full	158	4	59	16.14 (8.35)	14.75	[14.83, 17.45]
For Editorial Board Members						
Assistant	42	0	11	4.35 (2.85)	4.0	[3.46, 5.24]
Associate	61	1	25	7.68 (4.68)	7.0	[6.48, 8.88]
Full	85	2	37	13.82 (8.01)	12.0	[12.09, 15.54]

Note. CI= confidence interval, *Min*= Minimum value, and *Max*=Maximum value

Figure Captions

Figure 1. A scholar has an *h*-index value of *h* when she has *h* publications cited *h* times.

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Figure 1.