



The urgent need for modification of scientific ranking indexes to facilitate scientific progress and diminish academic bullying

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Article Info



Article Type:
Perspective

Article History:

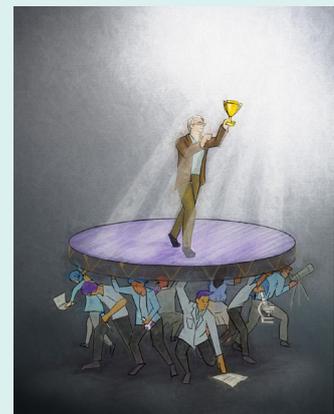
Received: 31 Aug. 2019
Accepted: 5 Sep. 2019
ePublished: 25 Sep. 2019

Keywords:

Academic bullying
Nobel Prize
H-index

Abstract

Academic bullying occurs when senior scientists direct abusive behavior such as verbal insults, public shaming, isolation, and threatening toward vulnerable junior colleagues such as postdocs, graduate students and lab members. We believe that one root cause of bullying behavior is the pressure felt by scientists to compete for rankings designed to measure their scientific worth. These ratings, such as the *h*-index, have several unintended consequences, one of which we believe is academic bullying. Under pressure to achieve higher and higher rankings, in exchange for positive evaluations, grants and recognition, senior scientists exert undue pressure on their junior staff in the form of bullying. Lab members have little or no recourse due to the lack of fair institutional protocols for investigating bullying, dependence on grant or institutional funding, fear of losing time and empirical work by changing labs, and vulnerability to visa cancellation threats among international students. We call for institutions to reconsider their dependence on these over-simplified surrogates for real scientific progress and to provide fair and just protocols that will protect targets of academic bullying from emotional and financial distress.



In late 2005, Dr. Jorge E. Hirsch from the Department of Physics at the University of California San Diego introduced an index (now called the *h*-index) to quantify an individual's scientific research output.¹ Before the introduction of the *h*-index, the impact and relevance of a researcher's work were mostly limited to well-recognized awards such as the Nobel Prize, which have a profoundly positive impact on the reputations and careers of not only the recipients but also their entire lab or team. Now, a few short years after its introduction, the majority of research community members/centers/institutions are using the *h*-index to represent their scientific worth. The *h*-index, which is based on the set of a scientist's most cited papers and the number of citations that they have received, is supposed to show the quantity and quality of the cumulative impact and relevance of a scientist's research output. However, unlike recognizing someone's quality and continued research focus using well-recognized honors (e.g., major awards such as Nobel

Prize), the cumulative impact of the *h*-index is not an accurate representation of the focused and continued high-quality research that culminates in benefit to mankind. The central reason for the misleading outcomes of the *h*-index is its cumulative nature, which undermines the focus and continuity of a scientist's research and his/her contribution to publications, and instead, reinforces scientists for conducting scattered research. Although Dr. Hirsch tried to introduce other indexes to address the limitations of the *h*-index^{2,3} to better reflect the quality of a researcher's work, the *h*-index is still being widely used for evaluation and comparison for a wide range of purposes, including university faculty recruitment and promotions, awards, and grants.

The practice of ranking scientists and giving them honorific titles (e.g., highly cited researchers - the most influential scientific minds by Clarivate Analytics) according to the *h*-index and their cumulative citations has been expanded exponentially over the past few years.

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These new academic metrics have become a central source of intense competition between scientists to increase the number of their citations and therefore their *h*-index to maximize their chance for achieving awards (and even, in rare cases, receiving cash in exchange for academic prestige⁴), grants, and a scientific recognition. Such competition causes several major problems, including, but not limited to (i) reducing the interest of scientists in focused and continued research in their area of expertise - which may not be a “hot topic” - in order to achieve the required cumulative citations; (ii) unnecessary shift of research to “hot topics” to increase publications and obtain higher *h*-index citations; and (iii) creation of nominal collaborative projects between labs, which produce papers with many authors, some of which make no meaningful contribution, all running the risk of violating authorship ethics. Aside from these newly emerging scientific issues, *h*-index and cumulative citation ranking cause a noxious social byproduct: academic bullying, which is a growing issue in the scientific community. A cursory search in PubMed with academic bullying keywords reveals a significant increase in the number of publications on the subject over recent years.

With the emergence of social media, we are exposed to the exponential growth of self-promotion⁵ by scientists, through their publications, awards, citations, and so on, which is incompatible with the integrity and history of truly influential scientists. The eagerness to continuously self-promote in the media, triggered by the pressure from their institutions to achieve publications, awards, and grants forces lab leaders (even the well-intentioned ones) to transfer their needs/stress to lab members, manifesting as a wide range of actions that can be considered academic bullying. Such bullying takes a wide variety of forms, from insults, snubs, or invasions of privacy to violations of intellectual property and unfair crediting of authors.⁶

This pernicious cycle is supported by the research on abusive supervision in the management field which has shown that when stressed out by pressures at work, supervisors become frustrated and take out their frustration on their subordinates.⁷ These bullying behaviors cause serious and long-lasting psychological issues for targets and their families.⁸ Unfortunately, the targets of academic bullying seldom have any choice but to tolerate the bullying and its deleterious consequences, which may affect their psychological/emotional life (and that of their families) for a long time - even for the rest of their lives. The reasons that targets have no choice but to tolerate being bullied include: (i) the lack of unbiased and fair institutional protocols for reporting incidents without the risk of reprisal^{9,10}; (ii) dependence on monthly paychecks and obtaining positive supervisor recommendations to secure future positions; (iii) fear of prolonging their training/degree period and giving up previous research findings by changing supervisors,⁸ and (iv) vulnerability to visa cancellation threats, especially

among international lab workers.¹⁰

Although institutions can play critical roles in diminishing these abusive behaviors by lab leaders, they are also indirectly involved in producing the feeling among targets that the best choice is to tolerate the abusive behavior,⁹ mainly because (i) institutions force lab leaders to publish, get awards, and secure external funding (the situation is worse for academics who operate on “soft money”), facilitating the transfer of pressure on leaders to lab members; (ii) institutions are ill-equipped to investigate bullying reports, and although they claim neutrality during the process, they often minimize corrective actions against bullies and keep them confidential, probably for the sake of their own reputation, desire to protect their most prolific and well-known scientists, and fear of being sued by targets. Additionally, due to their powerful position and probable seniority, violating lab leaders are likely to have connections/advocates on the investigating committee who can facilitate dismissal of charges. Therefore, in the absence of an external, unbiased organization responsible for receiving notification of and thoroughly investigating incidents of bullying, the feeble actions (or even silence) of institutions in response to bullying reports (i) signals to other bullies that it is acceptable to continue their abusive behavior; and (ii) communicates to targets that there is no choice but to tolerate such bullying.

As it will likely take considerable time and effort to establish an independent yet sufficiently powerful system to receive, investigate, and act against bullying reports, modification of current outputs/recognition strategies (e.g., *h*-Index and cumulative citations) in evaluating researchers for promotion, grants, and so forth would be the most expeditious approach to address academic bullying. Such changes could also facilitate scientific progress by allowing researchers to focus more on their chosen research field (regardless of its popularity), which in turn may positively affect publication and citation of their scientific outcomes.

Ameliorating the severe scientific and social issues being caused by current scientific ranking/recognition systems requires consensus and collaboration among stakeholders and decision-makers in both academic/scientific institutions and funding agencies to reconceive the scientific ranking/recognition approaches in place. The media may also play a crucial role by forcing institutions to release bullying reports to the public, which would in turn materially reduce bullying incidence among lab leaders and encourage targets to speak out. Governments may also help through facilitating visa extension for international students/scholars until the outcomes of bullying investigations are released. We believe that these efforts will set the stage for a dramatic reduction in academic bullying, ultimately protecting postdocs, students, scholars, and lab members (and their families) - from a wide range of psychological stressors and both emotional and financial duress. Otherwise, we risk future

generations weighing us in the balance: how much did we know? what could we have done?

Funding sources

None.

Ethical statement

Not applicable.

Competing interests

None.

Authors' contribution

All authors are equally contributed to the paper.

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