Opioid Epidemic Policy: Predictive Power of Collaborative Quantity vs. Quality in Determining Impactful Research

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Introduction

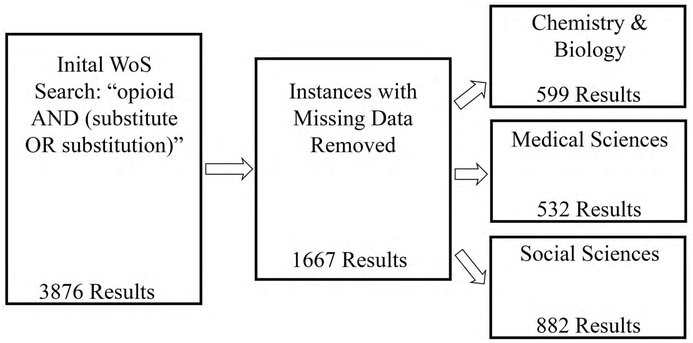
In the ongoing battle against the opioid epidemic, opioid substitution therapy (OST), a widely used intervention, is a viable solution but more research is needed to improve its usage. The majority of current research therein, however, has little impact as per bibliometric measures and is essentially forgotten. Prior work finds increased collaboration correlates with impact (Katz & Hicks, 1997) others find the opposite (Bordons et al., 2015) or else no substantive correlation (Glänzel, 2008).

Objectives

To gain a more consistent view especially as it relates to OST research, two sets of the most suggested (Hou et al., 2019) variables were taken, being quality (prestige of author and institution) and quantity (number of collaborating authors and institutions), in order to determine which more accurately predicted impact therein and to thus inform future methods.

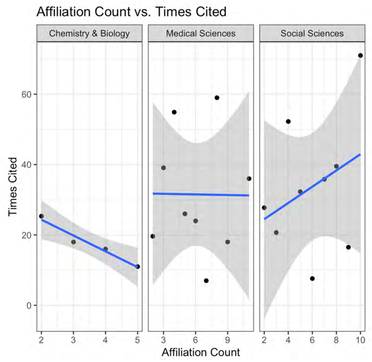
Methods

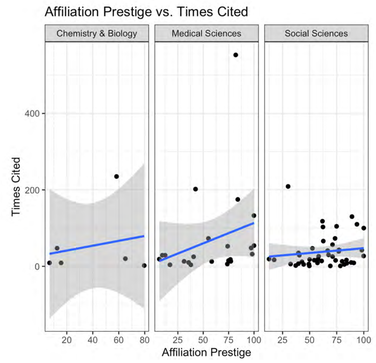
Pulling data from Web of Science and imputing affiliation prestige from the QS Ranking List we used citation count to measure the impact of a piece of literature. The topic being interdisciplinary, we binned into 3 related categories, creating for each a two variable linear model focused on quantitative and qualitative measures and their correspondence to impact.

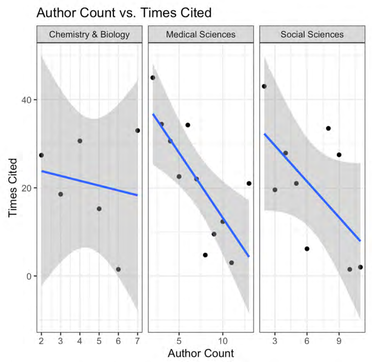


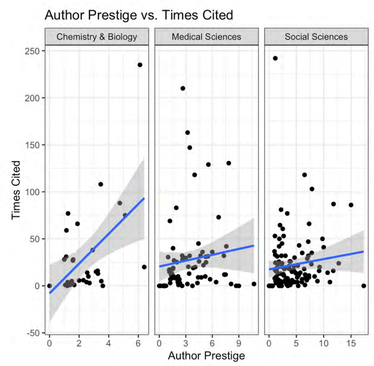
Results

As modeled by the two-variable linear regression model, trends between author/affiliation count and times cited were mixed along disciplines, with a negative association in Social and Medical Sciences and a positive for Chemical and Biological sciences, though only the former was significant ($p < .05$). As for author/affiliation prestige a clear, significant, and positive correlation presented itself across all three subgroups.



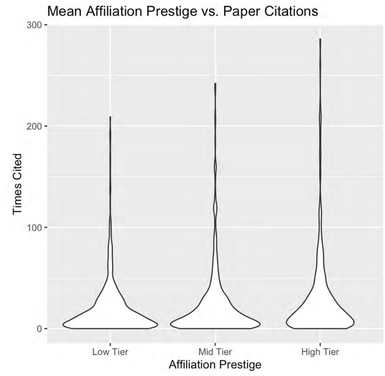


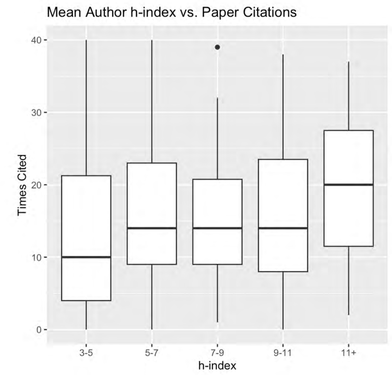




Author & Affiliation Count vs. Times Cited	Chem/Bio	Medical	Social
Slope (Author Count)	1.335	-1.3774	-0.0299
Slope (Affiliation Count)	1.03	1.7391	0.01222
Intercept	10.867	35.2221	26.28181
P-value	0.002545	0.2071	0.997

Author & Affiliation Prestige vs. Times Cited	Chem/Bio	Medical	Social
Slope (Author Prestige)	0.76526	4.62071	1.25124
Slope (Affiliation Prestige)	0.20606	0.32642	0.05639
Intercept	16.31722	4.09121	18.66457
P-value	0.000281	2.94E-09	0.02312





Conclusion

Our bibliometric analysis on OST research papers illustrates that our qualitative measures of collaboration demonstrated a much stronger positive correlation with the impact than our quantitative ones. Prior work suggests that in some cases addition of collaborators can actually hinder productivity (Bordons et al., 2015) as more lean, robust, and less redundant collaboration networks are more conducive to it. Other literature finds that when a more scientifically developed country collaborates with a less scientifically developed country the total impact of their research is lessened (Vieira, 2023). Thus it seems reasonable to suggest that high prestige authors/affiliations are able to produce greater impact work because of their superior scientific facilities and more refined channels of communication. This highlights the crucial role that distinguished authors in positions of institutional authority must play in taking initiative and driving research that is key to improving the recovery of individuals suffering from opioid abuse.

References

1. Katz, J.S., Hicks, D. How much is a collaboration worth? A calibrated bibliometric model. Scientometrics 40, 541–554 (1997). https://doi.org/10.1007/BF02459299
2. Bordons, María et al. “The relationship between the research performance of scientists and their position in co-authorship networks in three fields.” J. Informetrics 9 (2015): 135-144.
3. Hou, Jie, et al. “Prediction methods and applications in the Science of Science: A Survey.” Computer Science Review, vol. 34, 2019, p. 100197. https://doi.org/10.1016/j.cosrev.2019.100197.
4. Vieira, E.S. The influence of research collaboration on citation impact: the countries in the European Innovation Scoreboard. Scientometrics 128, 3555–3579 (2023). https://doi.org/10.1007/s11192-023-04715-4
5. Web Of Science Database
6. R-studio Application