

RESEARCH CORRESPONDENCE



Determinants of Popularity and Natural History of Social Media Accounts in Interventional Cardiology

Interventional cardiology is a remarkable example in the area of education through social media, and Twitter has recently emerged as a trendy platform in this context (1). The reasons why some Twitter accounts are more popular than others and attract a higher followers' number (HFN) are not well understood (2). We designed a prospective study aiming at investigating the predictors and natural history of Twitter popularity in interventional cardiology.

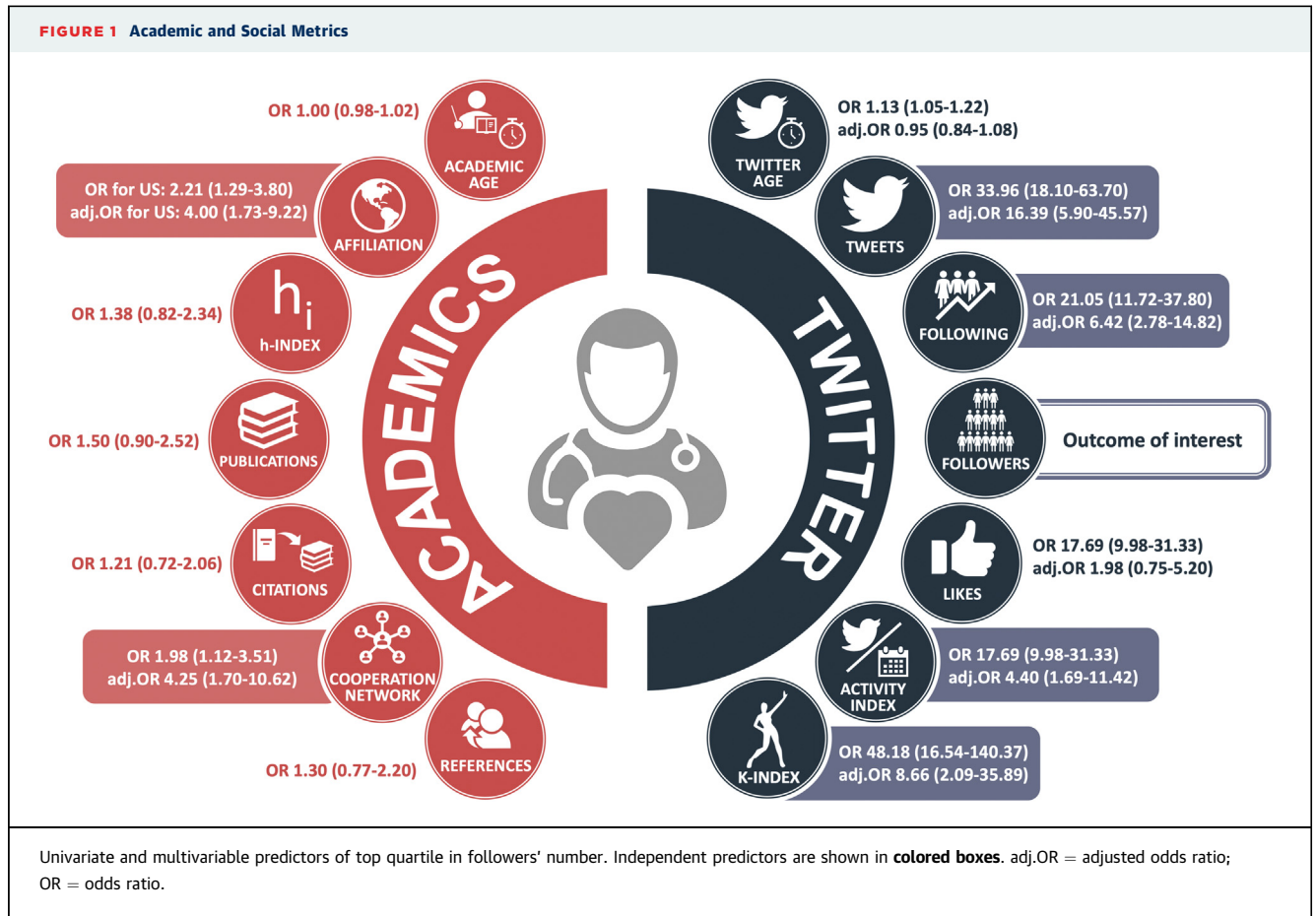
Academic and social metrics of faculty members from an interventional cardiology meeting (Transcatheter Cardiovascular Therapeutics [TCT]) were extracted from Scopus and Twitter, respectively. The primary outcome of interest was HFN, defined as belonging to the top quartile of followers' number on Twitter (i.e., >736 followers). Three candidate predictors of HFN were explored: 1) the Hirsch index (h-index), a broadly accepted marker of academic proficiency combining the numbers of published papers and related citations; 2) the activity index (a-index), computed as total number of tweets indexed by weeks from Twitter subscription; and 3) the Kardashian index (k-index), a measure of the potential discrepancy between social media reputation and publication record (using the cutoff of 5 introduced by its inventor to identify researchers who are potentially overrated by the community) (3). At 1 year, academic and social metrics were retracked and variations from baseline were analyzed. On the basis of the increase in followers' number from baseline to 1 year, fast-growing accounts were identified as those belonging to the top quartile (i.e., >344 additional followers).

A total of 382 of 1,423 TCT participants (26.8%) had a Twitter account (89.3% male, 10.7% female). Twitter users more frequently had a U.S. affiliation. Academically, they had higher median values of h-index, publications, citations, and total amount of references used in their papers, and they were more likely to belong to a large cooperation network defined as a total of at least 150 coauthors over their academic career (data not shown). The results of univariate and multivariable analyses of academic and social metrics of Twitter users are summarized in [Figure 1](#) and reported as odds ratio (OR) and adjusted OR with their respective 95% confidence interval (CI). Significant univariate predictors of HFN were entered in the

multivariable model. The h-, a-, and k-indexes were dichotomized on the basis of quartiles or established cutoffs and forced in the multivariable model regardless of their significance at univariate analysis. After adjustment, 6 independent predictors of HFN were identified: top quartile of tweets number (i.e., >505 tweets; adjusted OR: 16.39; 95% CI: 5.90 to 45.57), k-index >5 (adjusted OR: 8.66; 95% CI: 2.09 to 35.89), top quartile of following (i.e., >309 following; adjusted OR: 6.42; 95% CI: 2.78 to 14.82), top quartile of a-index (i.e., 2.6 tweets per week; adjusted OR: 4.40; 95% CI: 0.69 to 11.42), large cooperation network (adjusted OR: 4.25; 95% CI: 1.70 to 10.62), and U.S. affiliation (adjusted OR: 4.00; 95% CI: 1.73 to 9.22). The top quartile of h-index (>33) was not independently associated with HFN. Fast-growing accounts were associated with the top quartile of tweets number (adjusted OR: 12.66; 95% CI: 5.13 to 31.24), top quartile of a-index (adjusted OR: 7.10; 95% CI: 3.35 to 15.07), and U.S. affiliation (adjusted OR: 3.48; 95% CI: 1.75 to 6.93), whereas a k-index >5 was not independently predictive (adjusted OR: 1.63; 95% CI: 0.63 to 4.21).

Our study investigated 3 potential mechanisms fostering popularity on Twitter, belonging to the domains of academic activity, energy spent on the platform, and individual charisma. The a- and k- indexes, but not the h-index, were independently associated with HFN. Indeed, accounts generating a stream of valuable content are more likely to be followed (4). In addition, some accounts may take advantage of celebrity to amplify their success, in a kind of incremental cycle. However, follow-up at 1 year showed a faster increase in followers for accounts with a higher baseline number of tweets and higher a-index, whereas the baseline k-index was no longer associated with a significant increase in popularity, denoting nonlasting effects. In aggregate, our results suggest that a prediction rule for durable popularity on Twitter is to be active and generate valuable contents rather than relying on individual academic or social reputation.

The current analysis carries some potential limitations. First, identifying individual accounts is challenged by the use of aliases and avatars to replace true names and profile pictures, respectively; in addition, some accounts are private and not accessible. For this reason, we assigned an account as belonging to a study participant only when the matching could be conclusively established. Second, we restricted our observations to members of the TCT faculty to collect a representative sample of international subjects with established academic records. As such, our results apply to a selected cohort that may not represent the entirety of the interventional cardiology community.



In conclusion, among faculty participants of a large interventional cardiology meeting, a Twitter account was owned by a minority. The popularity of such accounts was independently associated with their level of social media activity but did not seem to be associated with the academic reputation of their owners.

“G. Rodolico - San Marco”
 Via S. Sofia 78
 95123 Catania
 Italy
 E-mail: dcapodanno@gmail.com
 Twitter: [@DFCapodanno](https://twitter.com/DFCapodanno), [@AGrecoMD](https://twitter.com/AGrecoMD)
<https://doi.org/10.1016/j.jcin.2021.01.021>

Paolo D'Arrigo, MD†
 Antonio Greco, MD†
 Antonio Gabriele Franchina, MD
 Salvatore Ingala, MD
 Rocco Paolo Milluzzo, MD
 Dario Calderone, MD
 Federica Agnello, MD
 Marco Legnazzi, MD
 Giovanni Occhipinti, MD
 Lorenzo Scalia, MD
 Marco Spagnolo, MD
 *Davide Capodanno, MD, PhD

*Division of Cardiology
 Centro Alte Specialità e Trapianti
 Azienda Ospedaliero-Universitaria Policlinico

© 2021 by the American College of Cardiology Foundation. Published by Elsevier.

†Drs. D'Arrigo and Greco contributed equally to this work. The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the [Author Center](#).

REFERENCES

1. Capodanno D. Twitterature. *EuroIntervention* 2018;14:e959-61.
2. Redfern J, Ingles J, Neubeck L, Johnston S, Semsarian C. Tweeting our way to cardiovascular health. *J Am Coll Cardiol* 2013;61:1657-8.
3. Hall N. The Kardashian index: a measure of discrepant social media profile for scientists. *Genome Biol* 2014;15:424.
4. Parwani P, Choi AD, Lopez-Mattei J, et al. Understanding social media: opportunities for cardiovascular medicine. *J Am Coll Cardiol* 2019;73:1089-93.