# New algorithmic approach predicts strong leaders

September 15 2021



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Research on leadership has long recognized the importance of understanding how leaders are perceived, and past studies have used a variety of techniques to examine different aspects of leadership. In a new study, researchers developed a computational method to predict and identify the correlates of leadership perceptions. The researchers used

the method to predict leadership perceptions for more than 6,600 well-known historical and contemporary figures, and to uncover the traits, concepts, and attributes people associate most strongly with effective leaders.

The study, by researchers at Carnegie Mellon University (CMU) and the University of Pennsylvania (Penn), is published in *The Leadership Quarterly.*

"Classic methodological approaches to studying leadership are costly and slow, and they can only be applied to relatively few leaders and dimensions of evaluation," explains Christopher Olivola, Associate Professor of Marketing at CMU's Tepper School of Business, who coauthored the study. "We developed a new methodological approach that can analyze and predict perceptions of leadership in an automated way on a very large scale to estimate how people judge the leadership ability of individuals mentioned in books, news, and social media."

The researchers started with the idea that people have a shared understanding of the traits associated with effective leadership, and that they intuitively form judgments concerning a given individual's potential to be an effective leader. Key to their approach is that well-known individuals—discussed in historical texts and the media—who share similar characteristics tend to be frequently mentioned together, and that the traits most associated with these individuals—including traits used to guide leadership perceptions—are usually mentioned alongside them. Therefore, by analyzing the frequencies with which famous individuals were mentioned together and said to have certain traits, the researchers uncovered semantic representations of these people and predicted how they are perceived in terms of leadership ability.

Using machine learning techniques, data from a large body of news articles, and a modest sample of survey ratings, they built a model that

estimates which individuals and groups of individuals are more or less likely to be perceived as effective leaders. They then applied their model to more than 6,600 famous individuals—including historical figures and contemporary celebrities—to see which ones were widely seen as effective leaders.

Many of the individuals the model predicted would be seen as the most effective leaders were liberators—such as Jomo Kenyatta and Abraham Lincoln—who worked to free countries and peoples, as well explorers—such as Francis Drake and Kalpana Chawla. By contrast, the model predicted that media celebrities—especially artists and reality show stars who appear on the cover of gossip magazines—would be seen as most lacking in leadership qualities.

To test the validity of their method, the researchers examined how well it predicted 210 survey participants' ratings of leadership effectiveness for nearly 300 famous individuals. The new method predicted participants' ratings extremely well, maintaining a high accuracy rate even when the researchers separated participants by gender, ethnicity, and political affiliation.

"Our method does more than simply predict people's judgments of leadership effectiveness," says Sudeep Bhatia, Assistant Professor of Psychology at Penn, who led the study. "The conceptual map we generated can also help uncover the particular traits and concepts that underlie those judgments."

"Scholars of leadership can use this approach to advance and accelerate their research, while practitioners–including people who advise leaders—can use it to better monitor how leaders are perceived, for example during an election campaign or following a scandal."

Among the study's limitations, the authors note that their method is

constrained by the body of text used to build their model, as it can only make predictions about individuals mentioned in that text. In addition, the authors stress that their approach is designed to understand people's subjective impressions of leaders, not their actual qualities.

Provided by Carnegie Mellon University