Professor probes why only some researchers cross boundaries

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Tom Bateman, professor of management at the University of Virginia's McIntire School of Commerce

Whether it's crossing disciplines, breaking down silos or thinking outside

the box, everyone's talking about boundary spanning as the key to solving the world's toughest problems.

So why isn't everyone doing it?

A new study conducted by Tom Bateman, professor of management at the University of Virginia's McIntire School of Commerce, and Andrew Hess, assistant professor of business administration at Washington & Lee University, offers some intriguing clues. The study, titled "Different Personal Propensities among Scientists Relate to Deeper vs. Broader Knowledge Contributions," appeared March 2 in the journal *Proceedings of the National Academy of Sciences*.

"We wanted to see if we could predict who would do deeper, more specialized work, and who would do broader, boundary-spanning work," said Bateman, an expert in leadership, motivation and decision-making. "Scientific research is absolutely crucial to the health and well-being of our planet and its people – and if we want to understand how scientific progress occurs, we have to develop a better understanding of why and how researchers pursue their work in the ways that they do."

Deep Thoughts?

Examining 10-year archival records of research published by some 466 medical researchers, Bateman and Hess first scored each published article according to the depth and breadth of its contribution to existing knowledge, based on key subject terms for every article. By indexing the scored articles by author, the two were then able to assess each researcher's publication record according to its breadth and depth.

Next, Bateman and Hess sent questionnaires to the researchers, seeking insight into key work-related behaviors and attitudes. How might factors such as an individual's professional competitiveness or conscientiousness

affect the nature of their research output? What about the individual's fundamental attitude toward his or her research, as either an opportunity to learn or an opportunity to perform?

"We were able to relate the researchers' questionnaire scores to the breadth and depth of their research," Bateman said. "And the predictors were different for the two different types of research output."

Broadly speaking, highly competitive researchers were more likely to turn out highly specialized work; similarly, highly conscientious researchers, keen to follow rules and meet expectations, likewise avoided breadth. Those who regarded their work as an opportunity to perform were also more likely to produce highly specialized research, but those who regarded their work as an opportunity to learn were likely to lean toward boundary-spanning breadth.

Attitude Adjustment

Bateman was quick to point out that the researchers' behaviors are only that – behaviors.

"These are not necessarily deeply engrained personality traits, but behavioral workplace styles that can be changed if people decide they want to change them," he said. "If individual researchers know what their tendencies are, they can start to think strategically about whether they want to strive for greater depth, or greater breadth.

"The same point applies to research teams and research administrators, who can start thinking about how to change goals and approaches to research output."

Bigger Picture

Moreover, he points out, the researchers' behavior is occurring within a professional context that overwhelmingly favors specialization.

"Most research journals are highly specialized, and most incentive systems reward specialization," he said, noting a preliminary study that he and Hess conducted in which more than 500 scientific researchers clearly indicated that they regarded engaging in boundary-spanning research as entailing high levels of professional risk and low levels of professional return.

"Research organizations of all kinds – including universities – say they want interdisciplinary, boundary-spanning work, but often they do very little to encourage it," Bateman said. Indeed, he points out, a recent national survey of faculty members in 22 disciplines found that in 20 of the disciplines, a majority of faculty members favored more interdisciplinarity.

"Certainly, specialization has its distinct merits, and in many instances it may prove to be the most productive mode of work," Bateman said. "But unless incentive systems change such that they also reward boundary crossing, a few people might drift in that direction, but many will not, because of the way these personal predilections play out within existing systems."

Still, he said, his research is a start. "Individuals can think about this, teams can think about this, schools and institutions can think about this – and at any level, change can be made."

More information: "Different personal propensities among scientists relate to deeper vs. broader knowledge contributions." *PNAS* 2015 ; published ahead of print March 2, 2015, DOI: 10.1073/pnas.1421286112

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