Early Career Mentorship and Scientific Creativity

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Abstract

Collaboration and science are entwined. Einstein emphasized the mentor-protégé collaboration as one of the most powerful types because of its near-ubiquity and its enduring impact on a scientist's intellectual development. At the same time, any grants require mentorship as a condition of the award and universities increasingly consider it in promotion and recruitment decisions. Yet, few studies have investigated the causal links between mentorship and advisees' scientific impact. Mentors purportedly develop students by passing on their formal, codified expertise on a particular subject matter, which helps their students be on the leading edge of a scientific topic or a rising star in a field of study. Mentors also broaden students' solution space by transferring their informal tacit information, which builds students' intuitions and thus their ability to creatively redefine and frame original scientific problems of their own above and beyond codified, subject matter proficiency. To quantify early career mentorship effects, we investigated the impact of a mentor's tacit information on their students' post-graduate performance. Our extensive data marshals information on the genealogical networks and scientific impact of over 50,000 scientists in biology, chemistry, math, and physics worldwide from 1960 to 2017. To investigate causal linkages, we designed a quasi-experiment that compares treated and control groups of protégés, the members of each of which are equivalent in talent and tutelage and different only in that treated students study under mentors who have demonstrated tacit information related to scientific creativity. Our analysis found three patterns. First, tacit information transfer is linked to creativity in science. Treated protégés are 3.3 times likelier than control protégés to publish uncommonly celebrated research; 3.1 times likelier to be recognized by election to the National Academy of Science for their continuing contributions of innovative research, and 1.4 times likelier to have higher citation impact in the last third of their careers when creativity tends to wane. Second, these empirical regularities generalize across time, gender, and diverse disciplines. Third, the apple that falls far from the tree displays more success. Treated protégés are more likely to study original problems that break from the topics of their advisors than control protégés.

Speaker Profile

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