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Inferring Scientific Continuation Behavior from Administrative Funding Data

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Abstract

Scientific research involves a continual choice between extending established lines of work and pursuing new directions. Funding systems shape this decision through application mechanisms, funding probabilities, and long-term support programs, yet scientists' underlying continuation preferences remain largely unobservable. Administrative funding records typically reveal only funded proposals, but not the latent behavioral process preceding submission — whether researchers intend to continue an existing project through renewal or redirect effort toward new research trajectories. As a result, large-scale evidence on scientific continuation behavior remains limited. Existing work in the science of science has primarily focused on funded grants, publications, and citation outcomes, while the behavioral dynamics underlying continuation decisions remain difficult to measure computationally at scale.

In this paper, we developed a novel, scalable measure of Willingness to Renew, defined as the share of projects near completion that result in renewal applications within a specified time window. Using administrative data from the National Institutes of Health (NIH), we build an Institute-by-year panel that approximates the underlying decision margin—whether to continue an existing line of research through renewal application or to redirect effort toward new proposals. Our approach relies solely on observed project timelines and IC-level funding data, allowing us to recover this otherwise unobserved behavioral margin without survey data. Because the set of "eligible" projects is constructed, we assess robustness across alternative window definitions and show that the main patterns are stable across specifications.

We use this framework to study how scientists respond to three key policy levers: (1) success rate, measured by lagged success rates for new and renewal applications; (2) award size, measured by average first-year award size; and (3) alternative funding pathways, focusing on the rollout of the R35 Outstanding Investigator Award since 2015 in a subset of Institutes and Centers (ICs). Empirically, we exploit variation across Institutes and over time within a fixed-effects framework, allowing us to approximate quasi-causal responses of renewal behavior to policy-relevant changes.

We find three main results. First, willingness to renew declines sharply across Institutes over time (median willingness across ICs drop from 44.20% in 2009 to 15.32% in 2024), suggesting a broad shift away from the willingness to continuation-oriented applications. Second, scientists respond strongly to funding probabilities: higher success rates for new applications significantly reduce renewal propensity, consistent with substitution toward new proposals. In contrast, variation in award size has little effect, indicating that researchers respond to higher odds of funding rather than higher monetary awards. Third, the expansion of the R35 Outstanding Investigator Award is associated with a substantial decline in renewal applications, suggesting that investigator-based funding may crowd out project-based continuation.

Importantly, this substitution arises despite the conceptual distinction between project-based and investigator-based funding, highlighting that from the perspective of scientists, these mechanisms may serve similar underlying goals—securing stable support to continue an established line of research.

Beyond these behavioral responses, our findings may suggest a broader transformation in the administrative representation of scientific continuity. Declining renewal rates may not necessarily indicate increased intellectual exploration, but instead reflect changing relationships between the institutional categories of "new" and "renewal" research. To investigate this possibility, our ongoing work combines grant-text similarity measures, publication linkage analysis, and investigator-level trajectory modeling to compare the semantic continuity between successive R01 projects labeled as "renewal" versus those labeled as "new". Conceptually, continuation-related projects should exhibit greater similarity to prior grants than nominally new projects. If the similarity gap between these categories narrows over time, this would suggest that the semantic boundary between "new" and "renewal" research is becoming increasingly blurred.

More broadly, this study contributes to the emerging Science of Science literature by demonstrating how latent scientific behaviors can be computationally inferred from administrative funding data at scale. Our findings show how funding structures and administrative measures shape scientific continuation behavior beyond direct resource allocation. These results highlight the value of computational social science approaches for studying the adaptive dynamics of modern scientific workforces and the evolving organization of biomedical research systems.