Received: 16 November 2022 | Revised: 2 October 2023 | Accepted: 18 October 2023

DOI: 10.1002/smj.3564

RESEARCH ARTICLE

SMS | Strategic Management Journal WILEY

The new needs friends: Simmelian strangers and the selection of novelty

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Abstract

Research Summary: The paradox of rejecting novel ideas while being motivated to select them exists in many realms. Deviating from prior research that investigated several *internal* levers to promote the funding of novel ideas in the sciences, we focus on an *external* lever by investigating how seconded employees increase the selection of novel ideas in two ways: (1) they select more novel ideas themselves, and (2) they influence permanent employees to do the same. Combining unique quantitative longitudinal data and 37 in-depth interviews, we test our predictions in the secondment program at the National Science Foundation and find broad support for our theoretical arguments. Our findings have implications for scholars of science and innovation by proposing a relatively light-touch intervention to facilitate the selection of novel ideas.

Managerial Summary: Organizations often face a paradox: they want to select novel ideas but tend to reject them. This study shifts focus from internal measures to an external solution, examining how seconded employees can help. Through both quantitative data and interviews at the National Science Foundation's secondment program, we found that seconded employees choose more novel ideas *and* influence permanent staff to do the same.

This suggests a simple intervention can significantly boost the acceptance of innovative ideas, offering valuable insights for those in the science and innovation. Understanding this dynamic can empower managers to strategically leverage seconded employees, fostering a more innovative and adaptive organizational culture.

KEYWORDS

innovation, novelty, secondments, selection, Simmelian strangers

"In many ways, the work of a critic is easy. We risk very little yet enjoy a position over those who offer up their work and their selves to our judgment. We thrive on negative criticism, which is fun to write and read. But the bitter truth we critics must face, is that in the grand scheme of things, the average piece of junk is probably more meaningful than our criticism designating it so. But there are times when a critic truly risks something, and that is in the discovery and defense of the new. The world is often unkind to new talent, new creations. ***The new needs friends!****"*

Anton Ego (Brad Bird) in *Ratatouille*

Selecting novel ideas is a cognitive and political challenge (Cattani et al., 2022). It is a cognitive challenge as novelty arises from recombining existing knowledge in unprecedented and unconventional ways (Fleming, 2001; Nelson & Winter, 1982; Schumpeter, 1934). It is a political challenge as the inherent uncertainty in novel ideas makes it harder to accurately predict their reception and usage, leaving space for opposing subjective assessments to decide their fate (Mueller et al., 2012; Mueller et al., 2014). Thus, as the quote from the movie Ratatouille reminds us, it is difficult for "the new" to find friends. Even people motivated to select novel ideas often reject them (Cattani et al., 2022; Mueller et al., 2012).

The paradox of rejecting novel ideas while being motivated to select them exists in many realms, including venture capital funding (Falchetti et al., 2021), creative industries (Berg, 2016; Cancellieri et al., 2023), and industrial research (Criscuolo et al., 2017; Mount et al., 2021). It is also acute in the sciences (Barber, 1961; Boudreau et al., 2016; Lane et al., 2022; Nicholson & Ioannidis, 2012; Siler et al., 2015), which is surprising as science hinges upon novel ideas (Merton, 1973). Although novel ideas in science tend to produce superior outcomes, they are often rejected (Ayoubi et al., 2021; Packalen & Bhattacharya, 2020).

Scholars have thus investigated *internal* levers to promote the funding of novel ideas in the sciences. These internal levers include setting up competitive versus block funding mechanisms (Wang et al., 2018), selecting evaluators carefully (Boudreau et al., 2016; Li, 2017), and allowing information sharing among evaluators (Lane et al., 2022). Other internal levers, not tested on science funding but that could also apply there, include setting rules for composing expert panels (Criscuolo et al., 2017), letting panel members engage in a how mindset (Mount et al., 2021), or practices that deliberately generate uncertainty (Harvey & Mueller, 2021).

We take a different path by examining an *external* lever to select novelty in the sciences. Two observations inspired us. First, external actors are often crucial carriers of novelty

(Cattani et al., 2017; Coser, 1965; Merton, 1973) and thus often advantaged in *generating* novel ideas. Second, although funding agencies traditionally rely on their permanent employees to organize and lead the selection process, these internal decision-makers are not considered experts as they are not active researchers (Lamont, 2009). Paradoxically, active researchers who are experts in generating ideas are often only involved as external reviewers but are usually not given the authority to organize and lead the selection process. We thus investigate whether and how bringing external actors who are experts in generating ideas inside the organization and making them responsible for organizing and leading the selection process can positively affect the *selection* of novel ideas in science.

We study our research question in the National Science Foundation (NSF) context. The NSF allocates research funds like many other funding agencies (Lamont, 2009). Program directors send proposals for external reviews and then assemble and lead expert panels before making funding recommendations or decisions. Necessary for our theorizing, the NSF runs a secondment scheme in which permanent and seconded employees, i.e., academics on loan from their universities, act as program directors who organize and lead the selection process.

Our theory starts from the idea that seconded employees are active researchers and, thus, experts in generating ideas. Seconded employees are a contemporary example of the Simmelian stranger who comes today and stays tomorrow to import new qualities into the group that the group does not have (Simmel, 1950). As active researchers, seconded employees better understand the latest knowledge and have access to an extensive external network of university colleagues, co-authors, and peers. A better understanding of the latest knowledge helps seconded employees to overcome cognitive challenges in selecting novel ideas, as they understand new scientific concepts better, demystify associated risks, and assess feasibility and merits more effectively (Franzoni & Stephan, 2023). Access to an extensive external network of university colleagues, co-authors, and peers helps seconded employees gather reviews and form panels with like-minded individuals, which can mitigate the political challenge inherent in the selection of novel ideas. Both qualities help seconded employees to select more novel ideas.

We further theorize that seconded employees will also influence the permanent employees they interact with to do the same. As seconded employees become full-fledged members of the hosting organization, they are co-located with permanent employees, which helps them share their knowledge and network. In addition, as seconded employees are simultaneously near and remote, permanent employees often perceive them as objective and seek them for advice. Hence, seconded employees can share their knowledge and network when permanent employees actively approach them, for example, when they have questions or staff their expert panels.

Combining insights from quantitative and qualitative data from 37 in-depth interviews and exploiting some features of the NSF, such as the quasi-random allocation of proposals to seconded and permanent employees, we find broad support for our theoretical conjectures.

1 | RESEARCH CONTEXT: THE NATIONAL SCIENCE FOUNDATION

1.1 | The Secondment Scheme at the National Science Foundation

The NSF is an independent federal agency in the United States that supports fundamental research across all non-medical fields of science, engineering, and education. In 2022, the NSF evaluated over 39,000 proposals through a competitive merit review process and granted

approximately 11,000 with an annual budget of $8.8 billion (NSF, 2022). Like other science funding agencies, the NSF emphasizes novelty as a crucial criterion for grant selection (Lamont, 2009). Or as the NSF puts it: "The agency supports 'high risk, high pay off' ideas, novel collaborations and numerous projects that may seem like science fiction today, but which the public will take for granted tomorrow." The desire for novelty is understandable, as novel grants often result in more impactful research outputs (Wang et al., 2017; Zhuang & Acuna, 2019). Hence, it is little surprise that NSF-funded discoveries laid the foundation for many groundbreaking innovations, such as the acceleration of sequencing of the structure of the COVID-19 virus and the Internet (NSF, 2022).

Both permanent and seconded employees are responsible for organizing and leading the selection process of research proposals at the NSF. The NSF started its secondment scheme in 1970. Seconded employees, called rotators within the NSF, are academics who are at the NSF on loan from their home institutions for a limited period—on average for 2 years and up to four. NSF's Chief Operating Officer Richard Buckius noted that the NSF uses seconded employees because "they have different talents" than permanent employees (United States Government Publishing Office, 2015). A former seconded employee we interviewed explained: "I had the sense that some of the permanent people had been there too long. [...] I could see that some groups really needed new blood." Although seconded and permanent employees have the same responsibilities, seconded employees are still active researchers, although likely at a different pace than before joining the NSF. Permanent employees, in contrast, are not active researchers.[1]

About 80 seconded employees join the agency annually, constituting roughly one third of its scientific workforce. Seconded employees join the NSF for various reasons, but we heard across many interviews that a primary reason was to give something back to the community or, as one of our interviewees puts it: "I have always kind of felt like there's this giving back kind of thing. You know I felt like NSF is one of these places where I can contribute in a larger way, more than just taking my classes and doing my research." A committee selects seconded employees to serve at the NSF by assessing their qualifications, experience, and expertise. Shortlisted candidates are typically interviewed about their research experience, understanding of NSF's mission, and ability to serve effectively at the agency. Most seconded employees have raised funds and served as reviewers or panelists at the NSF before becoming a rotator. As a result, there is often an informal assessment of their fit for the job even before the formal application process, and the NSF sometimes actively prompts academics to apply for its secondment scheme.

1.2 | Decision-making at the National Science Foundation

The evaluation and selection of research proposals at the NSF are similar to those in other research funding agencies, where funding allocations rely on interactions between evaluators (Lamont, 2009). Once a proposal is submitted, NSF staff conducts an administrative review to ensure it adheres to the guidelines and requirements outlined in the NSF's Proposal and Award Policies and Procedures Guide. The next step is to allocate the proposal to a program director, also called a program officer, who can be either a permanent or a seconded employee. Lamont (2009, p.28) highlights their role: "The most important actors in the evaluation process are the program officers." The assignment of proposals is solely based on expertise and fit with

[1]We looked up the names of permanent employees in the SCOPUS bibliographical database. Most of them had not published articles since they had joined the NSF with only a handful of exceptions.

the topic but not on novelty, a feature we exploit in the empirical analysis. To illustrate, a seconded employee told us: "The proposals are being circulated among the program directors to find the best fit, and usually permanent staff and rotators split the proposals that they will evaluate in an **arbitrary way**" [bold added]. Another program director reflected: "Once we get the grants, we divide them up, roughly according to what the program directors think they have expertise in." Similar to other contexts where panelists are not allowed to judge projects in which individuals close to them are involved (Aadland et al., 2019), seconded employees cannot be assigned proposals with a potential conflict of interest, such as from colleagues.

Program directors lead the review process, which is single-blinded, as the reviewers are aware of the identities of the proposal submitters but not the other way around. The program directors initiate the selection process by sending the proposals for review to ad-hoc reviewers. After that, they assemble an evaluation panel of external members and program directors from other programs. The panel members read the proposals independently from the ad-hoc reviewers before they convene with the program director for a panel meeting. As a former seconded employee told us, "We would rent a hotel, take over 40 or 50 rooms of the hotel, and panels would meet in each of the rooms."

Proposals are evaluated on merit, including novelty and broader impact. Many evaluators perceive the evaluation and selection of ideas as an excellent way to contribute to the greater good. Chaitan Baru, a senior advisor for the NSF, for example, said, "For senior [researchers], there is an opportunity with helping [to set] some direction going into new areas and [bringing] the experience you had as a senior researcher and educator into NSF" (NSF, 2021). Our observations are similar to what Lamont and colleagues described in their fieldwork on evaluation practices in science (Beljean et al., 2015; Lamont, 2009). There are some settings where evaluators may have a strategic, self-serving understanding of evaluative practices, that is, they behave in ways that maximize their strategic self-interests based on their field position (Aadland et al., 2018; Aadland et al., 2019; Bourdieu, 1993). However, evaluators in the sciences often have a different self-understanding impacting their behavior. Beljean et al. (2015, p.42) suggest that evaluating and selecting funding proposals is "more than just an opportunity for panelists to advance their research agendas or reproduce their positions in the academic field. Panelists are driven by the desire to contribute to collective problem solving, and they derive feelings of pleasure and validation from the process of serving as experts whose opinions matter."

During the panel meeting, ideas are exchanged on what the panel deems to be fundable and what not. We often heard in our interviews that program directors have a good sense of the budget and, together with other panelists, put proposals to bins of "fund," "fund if possible," and "do not fund" or/and provide scores per proposal. These initial evaluations form the basis of discussions among all panel members on the strengths and weaknesses of a proposal. Panelists, including program directors, either secondees or permanent employees, are expected to offer support for their recommendations. Secondees, as active researchers, might be better placed in doing so because the support of this kind is an integral part of their daily work lives "as **producers of research** and assessors of evidence" (Lamont, 2009, p.33) [bold added].

The discussions often center on clarifying parts of the proposed research, which leads to de-risking proposals as novel science presents different sources of uncertainty, including technical matters, feasibility, and potential value, which all require expertise to assess with accuracy (Franzoni & Stephan, 2023). For example, a seconded employee we interviewed recalled an exchange with another panel member about a new method, where she was asked to "[t]ell me more about this way people are doing research on [the method]." Many interviewees confirmed

this sentiment, as illustrated in a different interview: "I would use my influence there, with my scientific background, to argue that this is really interesting and innovative science."

Once panels conclude their discussion, program directors ask panelists to make final funding recommendations. In some cases, everyone agrees. Otherwise, program directors typically go with the majority. But they do have leeway to push a proposal they feel strongly about, even though the panel had a different assessment. For example, a seconded employee we interviewed noted that "the final recommendation was mine. It was not a democratic vote." After the panel meeting, program directors make funding recommendations, explaining their rationale to division directors who make the final funding decisions. In practice, division directors rarely deviate from the program directors' recommendations (Lamont, 2009). For instance, Robert Feinberg, a former seconded employee, noted that "final funding decisions are made by program directors" (Feinberg & Price, 2004, p.247), and John Conway, also a former seconded employee, wrote that "in all but a tiny fraction of cases, the program director's recommendation is followed. Therefore, in a practical sense, the program director does make awards...the program director effectively determines the fate of the proposal" (Conway, 2005, p. 647). One of our interviewees stated, "I could take something that was not recommended to be funded and fund it."

Having established our empirical context, we now review existing literature that discusses the problems that can undermine the selection of novelty even in such a carefully designed multi-stage group selection process common among science funding agencies.

2 | THEORETICAL BACKGROUND AND HYPOTHESES

2.1 | The selection of novel ideas

Although research suggests that such a multi-person, multi-stage selection process as the one used by the NSF and many funding agencies can facilitate the selection of novel ideas (Grohsjean et al., 2021; Lane et al., 2022), there are at least three problems even in such process that can undermine the selection of novelty. First, as the individual who organizes and leads the selection process may influence the opinions of the other individuals involved in the process (Teplitskiy et al., 2019), this individual's limited knowledge or personal biases can creep into the selection process (Criscuolo et al., 2021). Second, selection panels are often not very diverse but staffed with similar people who have been in their organizational roles for a long time (Criscuolo et al., 2021). This is problematic because diversity improves decision-making (Gruenfeld, 1995; Nemeth, 1986), especially in non-routine tasks that require combining different perspectives, such as when selecting novel ideas (Phillips et al., 2009). Introducing novel perspectives into the decision-making process triggers more profound thoughts and consideration of alternative views, leading to more thorough information processing. Third, panel members often have a long history of working together. This is problematic as expert panels with a long tenure become more homogenous over time and develop similar beliefs, which can cause them to make errors, particularly in situations of high uncertainty, such as the selection of novel ideas (Kerr & Tindale, 2004). Sharing similar beliefs will make individual members less likely to articulate their concerns openly and instead go with the opinion supporting the shared beliefs (Brodbeck et al., 2007).

These three problems highlight that the individual who organizes and leads the selection process plays a pivotal role, as their actions and voice influence which ideas, incremental or

novel, will get selected (Lamont, 2009). These people need to understand novel ideas and correctly assess their associated risks (Franzoni & Stephan, 2023). In addition, they need to involve a diverse group of people and ensure that everybody can freely articulate their opinion. They may also need to rotate those involved in the selection process to avoid falling into routinized decision-making.

As those individuals responsible for organizing and leading the selection process play such an important role, most funding agencies rely solely on insiders, that is, their permanent employees, to do the job. Ironically, these insiders are not seen as *experts* as they are not active researchers (Lamont, 2009). We start from this observation and investigate how making seconded employees, that is, *Simmelian strangers who are expert researchers*, responsible for organizing and leading the selection process, can affect the selection of novel ideas.

2.2 | Seconded employees select more novel ideas

Central to our theory is that seconded employees are active researchers and, thus, experts in generating ideas. In contrast to permanent employees who are only engaged in selecting novel ideas, seconded employees create and select novel ideas. Similar to the stranger who "imports qualities into [the group], which do not and cannot stem from the group itself" (Simmel, 1950, p. 402), the simultaneous engagement in the creation and selection of novel ideas allows seconded employees to bring new qualities into the hosting organization that permanent employees do not possess but help to select more novel ideas: (1) a better understanding of the knowledge frontier and (2) an extensive external network of university colleagues, co-authors, and peers.

The *first quality* that seconded employees as active researchers can rely on when evaluating scientific proposals is a better understanding of the knowledge frontier. They have this better understanding as they have been creating new knowledge through their own research before joining the hosting organization, and they often keep engaging in these activities while at the organization, although likely at a different pace than before. Put differently, in contrast to permanent employees who devoted most of their career to selecting ideas, seconded employees devoted it to their generation. As active researchers, seconded employees must keep up with methods, techniques, and emerging issues as it allows them to publish their research, commercialize their discoveries, and participate in scientific debates (Teodoridis et al., 2019). Keeping up to date with the current advances in the field poses a significant challenge for permanent employees as they may lack the time to invest heavily in understanding it deeply. They also do not have explicit incentives to engage in research because their job descriptions are solely about evaluating others' research.

A better understanding of the knowledge frontier is essential for selecting novel ideas for several reasons. First, novelty often arises through recombining knowledge in unprecedented and unconventional ways (Fleming, 2001; Nelson & Winter, 1982; Schumpeter, 1934; Uzzi et al., 2013). Second, a better understanding makes seconded employees more capable of recognizing which research questions are legitimate and interesting to ask, what constitutes appropriate and valuable approaches to address these questions, what methods might be fruitfully employed, and even what legitimate answers might look like (Kuhn, 1962). In addition, this

better understanding may also change the perception of how risky or feasible a novel idea is. The risk associated with a novel proposal can arise from uncertainty on what can be found, how likely the proposed method is to work, and the proposal's value (Franzoni & Stephan, 2023). Seconded employees are more aware of new research and knowledge to see novel ideas as less risky and more feasible. In contrast, permanent employees might be skeptical about supporting more novel grants because they lack a better understanding of the knowledge frontier, and they likely see highly novel grants as unfeasible and too risky.[2]

Seconded employees can also use their better understanding of the knowledge frontier when reading through the proposals before sending them out for review and during the meetings when the panel discusses them. During the meeting, as experts, "they are expected to know how to offer convincing support for the determination. These expectations are similar to those they must meet in their daily work lives as producers of research and assessors of evidence" (Lamont, 2009, p.33). That similarity can put secondees at an advantage when swinging the opinions of others. And finally, they can use a better understanding of the knowledge frontier when making the final funding discussion. Although there are some cases where all or most panel members agree, and the panel leader can go with the majority, they can sometimes push back if they feel strongly about a proposal, even though not all panel members share the assessment.[3]

The *second quality* that seconded employees can bring to the hosting organization when evaluating and selecting novel ideas is their large external network of university colleagues, co-authors, and peers. As seconded employees are still active researchers, they have co-authors, colleagues at their home institution, and peer fellows with whom they engage, for example, at conferences and workshops. An extensive network of university colleagues, co-authors, and peers allows seconded employees to find a more suitable person with relevant knowledge and a greater tolerance for novel ideas when selecting reviewers and panel members. Permanent employees, in contrast, are more likely to draw on the same pool of potential candidates. Relying on the same people is problematic as expert groups that stay together over a long time become more homogeneous (Katz, 1982), making individuals less willing to share an opinion that goes against the shared understanding of the group (Brodbeck et al., 2007).

In sum, seconded employees possess a better understanding of the knowledge frontier, which helps them to understand novel ideas better and to perceive them as less risky. They also have access to an extensive external network of university colleagues, co-authors, and peers to rely on when selecting reviewers and panel members who understand and appreciate novel ideas. We hypothesize:

> **Hypothesis 1.** Seconded employees select ideas with higher levels of novelty than permanent employees.

[2]We thank an anonymous reviewer who suggested this idea.

[3]Despite the aforementioned benefits of a better understanding of the knowledge frontier some research suggests that proximity to the knowledge frontier also has the potential to discourage evaluators from selecting novel ideas, for example, to protect the field to which they have contributed with their own research (Boudreau et al., 2016). Although this idea is theoretically appealing the empirical evidence is rather mixed. For instance, Li (2017) finds that "on net, the benefits of expertise weakly dominate the costs of bias" and Teplitskiy et al. (2022) conclude that more novel research is more likely to be accepted for publication. We will discuss this further in the results section.

2.3 | Seconded employees help permanent employees select more novel ideas

In the first hypothesis, we theorized that seconded employees select more novel ideas as they better understand the knowledge frontier and have access to an extensive external network of university colleagues, co-authors, and peers. However, there are reasons to believe that the seconded employees' knowledge and network will also help the permanent employees who observe, interact, and collaborate with them to select more novel ideas. We naturally expect the indirect effect to be smaller than the direct effect. Yet, this effect is still essential as seconded employees interact with many permanent employees. Put differently, we expect the indirect effect to be smaller than the direct effect but also to affect more people.

The indirect effect happens because of two features of the Simmelian stranger in general and seconded employees in specific. These two features help seconded employees share their knowledge and network with permanent employees. First, as Simmelian strangers, seconded employees become full-fledged members of the hosting organization (Simmel, 1950), and as such members, they are *co-located* with permanent employees for some time. Second, as seconded employees are only temporarily at the hosting organization, permanent employees often perceive them as being simultaneously near and remote and thus *objective and trustworthy confidants* (Simmel, 1950). We elaborate on how these two features help seconded employees to share their knowledge and network with the permanent employees, enabling them to select novel ideas.

A rich literature on knowledge and innovation suggests that *co-location* facilitates knowledge sharing and collaboration (Breschi & Lissoni, 2005; Fleming et al., 2007; Jaffe et al., 1993). Co-location increases the likelihood and frequency of serendipitous face-to-face interactions (Catalini, 2018), promoting fine-grained knowledge sharing. Further, co-location allows a deeper understanding of someone else's knowledge and skills (Tortoriello et al., 2015) and enables access and awareness of distinct knowledge pieces (Borgatti & Cross, 2003). By sharing their knowledge, seconded employees can help permanent employees understand proposals better and more accurately assess the level of risk involved (Franzoni & Stephan, 2023). Co-location does not only allow seconded employees to share technical and tacit knowledge but also knowledge about the social world (Obstfeld, 2005) so that they can also share their extensive network with permanent employees. Finally, permanent employees can collaborate with seconded employees by asking them to be on their selection panels. Co-location creates interpersonal channels that "are more effective in forming and changing attitudes toward a new idea, and thus in influencing the decision to adopt or reject a new idea" (Rogers 2010, p.36).

In addition, we suggest that permanent employees see seconded employees as *objective and trustworthy confidants*, making them approachable for advice and collaboration. Permanent employees are less afraid of asking seconded employees compared to asking other permanent employees who might judge them and may compete with them for resources and promotions. Simmel's view of strangers suggests that their roles as temporal members mean they are viewed as objective as they take a bird's eye view of events and relationships. Simmelian strangers in general and seconded employees in specific often receive "the most surprising openness—confidences which sometimes have the character of a confessional and which would be carefully withheld from a more closely related person" (Simmel, 1950, p. 404). Hence, secondees may be close confidants because their social distance from

permanent employees prevents them from judging them too harshly. Thus, seconded employees are more likely to be approached for advice, circumventing a common trend where advice-seeking is seen as revealing ignorance, which can carry long-term effects (MacAulay et al., 2020; Tortoriello et al., 2012). Being approached and then offering unique insights and advice underpin the indirect effect we hypothesize:

> **Hypothesis 2.** Permanent employees who interact with a seconded employee select ideas with higher levels of novelty than permanent employees who do not interact with a seconded employee.

3 | METHODS

3.1 | Data

We drew on several sources to compile our data. We filed a Freedom of Information request to receive a list of all seconded employees serving at the NSF between 2000 and 2012. The list included their names, institutional affiliations, positions, programs and divisions they served, and when they worked at the NSF. We also retrieved information on each grant awarded between 1998 and 2012 from the NSF website.[4] These data include the amount of money awarded, the principal investigator's name, the abstract, and the program director who handled the grant.

We added information on publications and authors from the SCOPUS database. Using the algorithm described in Rose and Kitchin (2019), we collected bibliographical information (e.g., abstract and authors) on 296,667 publications. Of these publications, 40,958 were (co-) authored by the sample seconded employees, and 255,709 were published in journals we used to construct one of the dependent variables. In addition, we used the Global Ranking of Academic Subjects, the field-specific ranking of the Shanghai Ranking, to look up the rank of the principal investigator's institution. Finally, we sourced dissertation data (e.g., graduation institution, year, and research topic) for both seconded and permanent employees from the ProQuest Dissertations database.

We also conducted 37 in-depth, semi-structured interviews that lasted, on average, 40 min. We spoke to 25 former seconded employees, seven permanent employees (six former and one current), and five former panel members. The interviewees covered seven directorates, 19 divisions, and 24 programs. We transcribed each interview, and all of us reviewed them independently.

3.2 | Measures and empirical specification

3.2.1 | Dependent variable: Novelty

We employ two different operationalizations of our dependent variable to ensure we capture novelty comprehensively. For both cases, we follow Gross (2020), who compared the similarity

[4]Our analysis starts from 2000. We sourced data on grants back to 1998 to calculate the novelty variable for observations in 2000.

of pairs (in his context images) to infer novelty. For the first dependent variable *Novelty (grant to publications)*, we calculate how similar a grant is to recent articles published in leading journals in the corresponding field of science. For the second dependent variable *Novelty (grant to prior grants)*, we measure how similar a grant is to previous recent grants of the same NSF program. The logic for both dependent variables is that grants are more novel the more they deviate from existing knowledge. Both dependent variables capture novelty *vis-à-vis* the field of science, but science funding agencies and journals may prioritize or have a taste for different sorts of (novel) research. We thus report both dependent variables.

To construct the dependent variables, we first measure the similarity of the grant abstract in question to the abstracts of articles published in the previous 2 years in leading journals[5] (first dependent variable) or the abstracts of grants awarded by the same program in the previous 2 years (second dependent variable).[6] To measure the similarity between two abstracts, we developed a text algorithm similar to those used by Kuhn et al. (2020) and Arts et al. (2018). The algorithm yields a score from 0 to 1, with 0 indicating no similarity (i.e., high novelty) and 1 indicating high similarity (i.e., low novelty).[7] We define a previously published article (first dependent variable) or previously awarded grant (second dependent variable) as having low similarity with the focal grant when the similarity score is below 0.05. We compare the similarity of every grant abstract with, on average, 524 article abstracts that were published in the previous 2 years in the leading field journals and 150 grant abstracts that were funded by the same program in the preceding 2 years—approximately 24,000,000 comparisons for the first dependent variable and more than 10,000,000 for the second dependent variable. We then calculated the dependent variable as the share of previous articles (first dependent variable) or grants (second dependent variable) with low similarity to the focal grant.[8] Increasing values of the dependent variable correspond to higher levels of novelty.

3.2.2 | Variables testing the hypotheses

To test Hypothesis 1, we built the variable *Seconded employee*, which equals 1 if a seconded employee handled the grant and 0 otherwise. We test Hypothesis 2 with the variable *Seconded employee in program*, which equals 1 if the grant was awarded in a year when the permanent employee's program had at least one seconded employee and 0 otherwise.

3.2.3 | Control variables

We also included three sets of control variables at the level of (1) the principal investigator, (2) the grant, and (3) the program. We included two variables at the level of the principal investigator, as specific characteristics of a scientist may relate to the novelty of their granted

[5]We identified the two top journals per field from the SCImago Journal Rank. In cases where the NSF program funds interdisciplinary research, we selected one top-ranked journal for each of the disciplines in the program.

[6]A potential limitation of this dependent variable is for cases where the same program director selected the focal and previous grants. Our conclusions remain intact when we eliminate such cases from the analysis.

[7]We provide two examples in the Online Appendix A1.

[8]For example, assume that the focal grant is compared to 10 previous grants. Of those 10, four have a similarity score with the focal grant below 0.05. For this grant the (second) dependent variable takes the value of 0.4.

proposal. First, to account for gender differences in creativity (Baer & Kaufman, 2008), we include the variable *Female principal investigator* that takes the value 1 if the principal investigator is female and 0 otherwise. We used the software *Namsor* to identify the gender of the principal investigators. Second, as principal investigators from world-leading institutions may produce research that is more novel, we included a variable *High-status principal investigator* that takes the value of 1 if the principal investigator's university is ranked in the focal year among the top 30 universities in the Shanghai Ranking's Global Ranking of Academic Subjects and 0 otherwise. At the grant level, we include *Grant size* as more novel work might require more financial resources and *Number of investigators* as novel work might require more or more diverse expertise. At the program level, we included the variable *Program size* that counts the number of seconded and permanent employees in a program each year. As larger programs with more employees have a higher budget, they may also have a higher tolerance for failure, making larger programs fund more novel proposals.[9]

3.2.4 | Fixed effects

We incorporated program and year-fixed effects to account for time-invariant features that could affect the funding of novel proposals, such as the general proclivity toward risk or the scientific rewards for novelty accruing in a scientific field.

3.2.5 | Estimation method

We employ an ordinary least squares (OLS) estimator with standard errors clustered at the program level. Because our dependent variable is a proportion, OLS with clustered standard errors yields more efficient estimates than alternative estimators such as weighted least squares (Lewis & Linzer, 2005).

3.2.6 | Treatment and control groups for testing Hypothesis 1

We test Hypothesis 1 by sequentially comparing the first treatment group against three control groups. The treatment group comprises all grants awarded by seconded employees. The first control group is composed of grants awarded by permanent employees whose program never hosted a seconded employee. The second control group builds on the first control group. It entails all proposals handled by permanent employees whose program never hosted a seconded employee but

[9]Quality may also affect novelty. Indeed, as the allocation of proposals to permanent or seconded employees is quasi-random, they should receive proposals of similar quality. Hence, any effects of quality on selecting novel projects are accounted for. Along the same lines, if quality correlates negatively with novelty, this may call into question NSF's explicit guidelines to select more novel projects. Existing evidence suggests that this is not the case (Zhuang & Acuna, 2019). This was also echoed in the interviews where novelty was often regarded even a component of quality falling under NSF's merit criterion. For example, a former secondee noted "*So what we're looking for is the quality of the science. Is the science something new and innovative? Will the science further what we know about a certain area? Will it increase our knowledge? Will it provide answers to difficult questions that have not yet been answered or that are still a problem within the field?*". *Similarly, another secondee commented "So, the two main things from NSF, you're looking for innovation, something that will move the field forward, so that's intellectual merit.*"

which belongs to a division with a program that hosted a seconded employee. Exploiting the divisional structure of the NSF helps to account for potential differences across divisions that may influence preferences for funding novel research. The third control group also builds on the first control group and includes proposals handled by permanent employees whose program never hosted a seconded employee, but the proposal received funding in the same year as a proposal handled by a seconded employee. Leveraging the longitudinal nature of our data, this control group accounts for time-varying factors that may condition the propensity to fund novel ideas, such as scientific advances and shifting NSF funding priorities over time.

3.2.7 | Treatment and control groups for testing Hypothesis 2

To test Hypothesis 2, we sequentially compare the treatment group for Hypothesis 2 against three control groups. The treatment group for Hypothesis 2 includes all proposals handled by permanent employees during the years their program hosted a seconded employee. The first control group entails all proposals awarded by permanent employees in years when their program did not host a seconded employee. Hence, when comparing the treatment group against this control group, we compare a program in years with a seconded employee to the same program in years without a seconded employee, which helps to account for differences within programs. As employee turnover at the NSF is relatively low, this comparison allows us to focus on the effect of having a seconded employee in the program while holding other features of the program constant. Moreover, we restrict this control group to permanent employees associated with programs that lasted for the entire observation period to compare similarly successful programs, as proxied by years they were active, to each other.

For every grant in the treatment group (i.e., every grant from a program with a seconded employee in a year), we populate the second control group with grants from a different program without a seconded employee but in the same division in the same year as the grant in the treatment group. Structuring the second control group in this way helps us to circumvent two problems arising from a within-program comparison. First, if permanent employees learn from secondees (as we suggest in Hypothesis 2), the learning may outlast the presence of the seconded employee, decreasing the size of the coefficient of interest. Second, after a secondee leaves the NSF, they might talk with interested applicants about which program to apply to and advise against the program they worked for. The second control group circumvents both problems by exploiting the organizational structure of the NSF, which allows us to compare permanent employees between programs within divisions.

We populate the third control group with grants from programs in a different division without a seconded employee. Doing so helps us to account for differences in programs between divisions addressing the problem that different programs within the same division may have increased communication channels, allowing the insights a seconded employee brings to spill over to other programs in the same division.

3.3 | Addressing potential endogeneity problems

In the following, we discuss three potential endogeneity problems that may affect our results, and we provide qualitative and quantitative evidence to mitigate these concerns.[10]

[10]We provide an overview of the results of this analysis in Table A1 in the Online Appendix.

3.3.1 | Strategic submissions

A potential concern is that the pool of proposals in a program is more novel when a seconded employee is around. For example, submitters could strategically delay submissions of novel proposals, anticipating the future entry of a seconded employee into the NSF. Or it could be that the NSF only hosts seconded employees when the pool of proposals is more novel; however, we learned in our interviews that seconded employees arrive at the NSF irregularly and at different times. The point in time they joined the NSF is unrelated to the novelty of proposals at the NSF at that time. The NSF typically hosts secondees when their personal and professional duties match the *constant* need of the NSF to bring in fresh perspectives. Jack Snoeyink, a former secondee of the Division of Computing and Communication Foundations, explained this in an illustrative way: "A couple of years before I actually came here, I was asked if I could do that, and I said ask me again when my son is out of high school." (NSF, 2021). Finally, the entry of seconded employees is typically not announced well before the starting date.

We also assess this concern quantitatively. A potential group of people who might strategically change their submission behavior to NSF are the seconded employee's university colleagues. They may know in advance that their colleague is departing for the NSF, and even though conflict of interest rules would not allow the secondee in question to evaluate their proposal, they might expect having a "local" at the NSF to help in terms of reputation and ease the circulation of soft information at the NSF. Hence, we measured the number of awards granted to principal investigators at the seconded employee's university before and during the seconded employee's time at the NSF. The average number of grants of seconded employees' colleagues is qualitatively indistinguishable before and during rotation—2.3 awards, on average, per year before and 2.5 during the service of the seconded employee. Strategic submissions are not driving our results.

3.3.2 | Proposal allocation by novelty

Another concern is that the NSF assigns more novel proposals to seconded employees. However, our interviews suggested that the assignment of proposals is only based on expertise and fit with the topic. As such, both seconded and permanent employees start with similar pools of proposals. Therefore, inference based on data on awarded proposals, similar to previous works (Packalen & Bhattacharya, 2020; Poege et al., 2019), is meaningful because differences in the novelty of awarded proposals are unlikely to stem from differences in the pool of proposals each type of program director starts with.

To test for this potential source of endogeneity, we examine whether our observed effects are indeed tied to the period the seconded employee was at the NSF. The intuition is that if seconded employees are assigned more novel proposals, the effects should only be present during their time at the NSF. For example, if a program hosted a secondee from 2007 to 2009, we expect the program to select more novel grants in those years. We follow Brogaard et al. (2014) to construct a placebo test and include "false" seconded employee appointments. Within programs with a seconded employee, we randomly define a year as the year the secondee supposedly joined the NSF and then stayed for 2 years. Building on the example above, we specify via a random draw a false period where the program had a secondee: say, 2003 to 2005. Then, the *Seconded employee* and *Seconded employee in program* variables are by design false in this exercise. As such, if the effects we observe are tied to the 2007 to 2009 period and not the 2003 to

2005 period, these two variables should not be statistically significant, which is what we find in our analysis.

3.3.3 | Inherent differences in taste for novelty

Selection into NSF or academia could also explain differences in funding novel research if PhD graduates who work in academia before becoming a secondee at the NSF have a higher taste for novelty than PhD graduates who directly landed a job at the NSF or if there are differences in the two groups in terms of PhD training and ability. Although this would not alter the results, it may change their interpretation. In this case, our results would not be driven by our theory but by different (inherent) abilities and tastes for novelty between permanent and seconded employees. Two observations suggest that this is not the case. First, home institutions of the seconded employees vary greatly in prestige, research intensity, and so forth. This diversity implies that secondees are, as a group, not better trained or have a higher ability than permanent employees. Second, to test for such differences, we sourced the doctoral dissertations of permanent and seconded employees from the ProQuest Dissertations database. We then compared the novelty of their dissertations and the status of their graduating institution (to ease readability, we provide details on how we did that at the bottom of Table A1 in the online appendix). The former speaks to the taste for novelty, and the latter to ability and training. The comparisons suggest no meaningful differences between seconded and permanent employees. For example, 43.8 percent of permanent employees graduated from a member of the Association of American Universities and 13 percent from an Ivy League university. The equivalent figures for seconded employees are 44 percent and 10. Seconded and permanent employees are, on average, of similar ability and training.

4 | RESULTS

Table 1 presents descriptive statistics of the dependent and control variables for the treatment and the three control groups for Hypothesis 1 and Hypothesis 2 separately. Two aspects are noteworthy in the raw data. First, treatment and control groups are similar in most control variables. Second, except in one case, the novelty in the treatment group is higher than in the control groups, providing initial support for our hypotheses. These differences are consistent across the two operationalizations of novelty. Tables A2 and A3 in the Online Appendix display the correlation coefficients among the variables.

4.1 | Establishing the baseline results

We report our main results in Table 2A (first dependent variable: grant to articles) and Table 2B (second dependent variable: grant to prior grants). For each hypothesis, we sequentially compare the treatment group against the three control groups. We present the results for Hypothesis 1 in Models 1–3 and for Hypothesis 2 in Models 4–6. For each pair of treatment and control group, we first present a model including only the variable testing the hypothesis and the fixed effects (models denoted with the letter a) before we present the full model (models marked with the letter b). Our discussion below is based primarily on Models 1b and 4b, as we consider the first control group closest to the counterfactual.

TABLE 1 Descriptive statistics.

	Sample testing Hypothesis 1				Sample testing Hypothesis 2			
	Treatment group	**First control group**	**Second control group**	**Third control group**	**Treatment group**	**First control group**	**Second control group**	**Third control group**
Novelty (grant to publications)	0.894 (0.001)	0.765 (0.005)	0.765 (0.005)	0.765 (0.005)	0.848 (0.002)	0.843 (0.003)	0.834 (0.003)	0.932 (0.003)
Novelty (grant to prior grants)	0.284 (0.002)	0.146 (0.003)	0.140 (0.001)	0.132 (0.001)	0.455 (0.000)	0.414 (0.000)	0.415 (0.000)	0.242 (0.009)
Female principal investigator	0.234 (0.003)	0.223 (0.007)	0.233 (0.002)	0.221 (0.003)	0.201 (0.000)	0.209 (0.000)	0.216 (0.000)	0.149 (0.014)
High-status principal investigator	0.030 (0.001)	0.032 (0.003)	0.034 (0.001)	0.033 (0.001)	0.023 (0.000)	0.032 (0.000)	0.038 (0.000)	0.047 (0.008)
Number of investigators	1.738 (0.009)	1.799 (0.022)	1.800 (0.005)	1.784 (0.009)	1.424 (0.001)	1.500 (0.001)	1.490 (0.001)	1.742 (0.043)
Grant size	254,981 (3387)	293,671 (7868)	302,960 (1924)	300,320 (3732)	237,188 (584)	300,679 (1098)	323,594 (875)	501,870 (74,344)
Program size	4.592 (0.021)	1.603 (0.130)	1.700 (0.003)	1.518 (0.005)	6.192 (0.004)	4.463 (0.004)	3.725 (0.003)	3.868 (0.116)
Number of seconded employees	457							
Number of permanent employees		41	41	41	234	180	153	47
Number of grants	19,380	3113	3113	3113	12,059	10,611	9559	643

Note: Figures reflect averages with standard deviations in parentheses. For both samples, the observations belonging to the treatment group are not identical across comparisons with the three control groups. This is because not all treatment observations match the control observations. For example, the sample we employ for the first control group for Hypothesis 1 includes only treatment observations referring to programs that for some year(s) had seconded employees and for others they did not. This is not a requirement for the sample that employs the second control group. Those differences are small, and not including separate columns for each manifestation of the same treatment group does not come at any significant cost while maintaining ease of presentation. For both samples, the treatment group columns in the table match the observations in the first control group.

TABLE 2A OLS regressions for Hypothesis 1 and Hypothesis 2 on the novelty of a grant compared to articles in leading journals.

	Results for Hypothesis 1 on the novelty of a grant compared to articles						Results for Hypothesis 2 on the novelty of a grant compared to articles					
	Model 1a	**Model 1b**	**Model 2a**	**Model 2b**	**Model 3a**	**Model 3b**	**Model 4a**	**Model 4b**	**Model 5a**	**Model 5b**	**Model 6a**	**Model 6b**
Hypothesis 1: Seconded employee	0.106 [.000]	0.100 [.000]	0.201 [.000]	0.200 [.000]	0.075 [.000]	0.070 [.001]						
Hypothesis 2: Seconded employee in program							0.022 [.000]	0.064 [.000]	−0.001 [.422]	0.023 [.000]	0.000 [.917]	0.001 [.680]
Female principal investigator		0.003 [.223]		−0.003 [.753]		0.003 [.161]		0.004 [.125]		−0.010 [.018]		0.002 [.187]
High-status principal investigator		0.007 [.153]		0.017 [.090]		0.007 [.160]		0.003 [.547]		−0.013 [.162]		0.002 [.536]
Number of investigators		−0.001 [.081]		−0.006 [.064]		−0.001 [.236]		0.008 [.000]		0.004 [.000]		0.004 [.000]
Grant size		−0.000 [.000]		−0.000 [.878]		−0.000 [.000]		−0.000 [.003]		−0.000 [.034]		−0.000 [.000]
Program size		0.001 [.397]		−0.002 [.000]		0.000 [.365]		−0.022 [.000]		−0.015 [.000]		−0.001 [.087]
Constant	0.772 [.000]	0.775 [.000]	0.745 [.000]	0.772 [.000]	0.802 [.000]	0.804 [.000]	0.993 [.000]	1.033 [.000]	0.893 [.000]	0.974 [.000]	0.952 [.000]	0.947 [.000]
Control group	First	First	Second	Second	Third	Third	First	First	Second	Second	Third	Third
Program FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22,493	22,493	7816	7816	22,493	22,493	22,670	22,670	16,954	16,954	9242	9242
Adjusted R^2	0.361	0.362	0.2567	0.373	0.350	0.345	0.695	0.707	0.778	0.783	0.340	0.344

Note: All models show OLS regressions with robust standard errors for two-tailed tests clustered at the program level. We report exact *p*-values in brackets.
Abbreviation: OLS, ordinary least squares.

TABLE 2B OLS regressions for Hypothesis 1 and Hypothesis 2 on the novelty of a grant compared to prior grants.

	Results for Hypothesis 1 on the novelty of a grant compared to prior grants						Results for Hypothesis 2 on the novelty of a grant compared to prior grants					
	Model 1a	**Model 1b**	**Model 2a**	**Model 2b**	**Model 3a**	**Model 3b**	**Model 4a**	**Model 4b**	**Model 5a**	**Model 5b**	**Model 6a**	**Model 6b**
Hypothesis 1: Seconded employee	0.181 [.000]	0.253 [.000]	0.264 [.000]	0.269 [.000]	0.219 [.000]	0.283 [.000]						
Hypothesis 2: Seconded employee in program							0.016 [.000]	0.018 [.000]	0.006 [.172]	0.012 [.014]	0.030 [.003]	0.046 [.000]
Female principal investigator		−0.001 [.816]		0.000 [.934]		−0.001 [.721]		0.004 [.365]		0.005 [.317]		−0.004 [.437]
High-status principal investigator		−0.010 [.169]		0.002 [.891]		−0.010 [.128]		0.014 [.240]		−0.013 [.162]		0.002 [.878]
Number of investigators		−0.000 [.994]		0.002 [.152]		−0.000 [.828]		0.014 [.000]		0.006 [.022]		0.014 [.000]
Grant size		−0.000 [.000]		−0.000 [.000]		−0.000 [.000]		−0.000 [.000]		−0.000 [.002]		−0.000 [.000]
Program size		−0.003 [.002]		−0.002 [.421]		−0.003 [.001]		−0.001 [.522]		−0.004 [.002]		−0.011 [.000]
Constant	0.168 [.000]	0.184 [.000]	0.256 [.000]	0.264 [.000]	0.106 [.000]	0.122 [.000]	0.223 [.000]	0.202 [.000]	0.501 [.000]	0.518 [.000]	0.232 [.000]	0.241 [.000]
Control group	First	First	Second	Second	Third	Third	First	First	Second	Second	Third	Third
Program FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22,493	22,493	7816	7816	22,493	22,493	22,670	22,670	16,954	16,954	9242	9242
Adjusted R^2	0.555	0.558	0.426	0.431	0.565	0.567	0.680	0.682	0.678	0.680	0.51	0.522

Note: All models show OLS regressions with robust standard errors for two-tailed tests clustered at the program level. We report exact *p*-values in brackets.
Abbreviation: OLS, ordinary least squares.

Hypothesis 1 states that seconded employees select ideas with higher levels of novelty than permanent employees. In line with our prediction, we find a positive coefficient of the variable *Seconded employee* across all models. In Model 1b in Table 2A, the coefficient of the variable *Seconded employee* ($\beta = .100$, p-value = .000) suggests that seconded employees select proposals that are, on average, 10 percent more novel compared to proposals selected by permanent employees who do not interact with a seconded employee. The equivalent percent in Model 1b in Table 2B is 25 ($\beta = .253$, p-value = .000).

Hypothesis 2 states that permanent employees who interact with a seconded employee are more likely to select novel ideas compared to permanent employees who do not interact with a seconded employee. The coefficient of the variable *Seconded employee in program* is positive in most models. The result in Model 4b in Table 2A indicates that permanent employees who interact with a seconded employee select grants that are 6.4 percent more novel ($\beta = .064$, p-value = .000). In Model 4b in Table 2B, the equivalent figure is 1.8 percent ($\beta = .018$, p-value = .000). Although this indirect effect is smaller than the direct effect, it is still meaningful as it affects more people as the NSF employs more permanent than seconded employees.[11]

4.2 | Robustness checks

To probe the robustness of our results, we ran additional tests modifying either the dependent variable or the sample. In all tests, we compare the treatment group against the first control group, which we consider the closest to the counterfactual. Although we only present the results for our first dependent variable, they are identical for the second dependent variable.

In these tests, we (1) employed a stricter novelty threshold of the similarity algorithm, (2) relaxed some of the assumptions underlying our baseline results such as by including grants awarded in short-lasting programs and conducting an analysis including programs with a seconded employee in the previous 2 years, and (3) analyzed the sensitivity of our estimates to data reporting practices at the NSF in cases where seconded employees might have been erroneously recorded as handling a grant. These robustness checks further bolster our theoretical arguments that seconded employees boost the rate of novel grants awarded by the NSF directly (Hypothesis 1) and indirectly (Hypothesis 2). Online Appendix A2 explains the robustness checks in detail and Table A4 presents the corresponding results.

4.3 | Heterogeneity of the treatment effect

We suggested in the theory that seconded and permanent employees interacting with them select more novel ideas, as seconded employees have (1) a better understanding of the knowledge frontier, and (2) a larger external network of university colleagues, co-authors, and peers. We now explore these heterogeneity effects empirically. Table A5 in the Online Appendix

[11]The effect is larger after the secondee's first year at the NSF. We discovered that when we split the treatment group into two subgroups: permanent employees who interacted with a secondee in the first year and those who interacted with a secondee in subsequent years. We then compared each subgroup against the first control group and run the baseline specification. The coefficient of the *seconded employee in program* variable is 0.107 (p-value .000) for the remaining years and 0.064 (p-value .000) for the first year.

provides an overview of the arguments, illustrative quotes from the interviews, and how we designed quantitative tests to assess them. Table A6 in the Online Appendix shows the quantitative results using the first dependent variable, which compares grants to articles.

Models 1–3 in Table A6 focus on the first source of heterogeneity between seconded and permanent employees: the former have a better understanding of the knowledge frontier, allowing them and the permanent employees they interact with to judge better novel ideas that entail advancements at the knowledge frontier. We first split the seconded employees into those with many publications in the 5 years before joining NSF (i.e., those in the top decile in the sample) and the remaining. Then, for Hypothesis 1, we built a specification that resembles the baseline specification for Hypothesis 1 but replaced the *Seconded employee* variable with a variable that takes a value of 1 if the seconded employee has a high number of recent publications and 0 otherwise (*Seconded employee is closer to the knowledge frontier*). Running this specification in a sample including only grants by seconded employees, the coefficient of the *Seconded employee is closer to the knowledge frontier* variable is positive ($\beta = .037$, p-value = .000), suggesting that more research active seconded employees before joining NSF select grants with higher levels of novelty than other seconded employees. In interviews, several program directors, both seconded and permanent employees, clarified that having a better understanding of the knowledge frontier gives seconded employees an edge in judging ideas. A former seconded employee told us: "Whereas a [seconded employee] will bring that information in because the [seconded employee] is somebody who's working in the field, who has a lab, who's working in the area, knows something about what other people are doing. And, in fact, generally does know what everybody else is doing. The permanent one, the permanent program director, will know that from going to meetings and reading literature, that is not the same thing as actually working in the field."

To investigate this idea for Hypothesis 2, we ran two regressions similar to the baseline specification testing Hypothesis 2. The control observations are the same in both regressions—permanent employees who have not interacted with seconded employees. The first regression includes as a treatment group all grants selected by permanent employees who have interacted with seconded employees closer to the knowledge frontier (i.e., the number of recent publications in the top decile of the sample). The second regression includes, as a treatment group, all grants handled by permanent employees who have interacted with seconded employees less close to the knowledge frontier. The coefficient of the *Seconded employee in program* variable is larger in the first regression, and the difference is statistically significant ($\chi^2 = 110.34$, probability $> \chi^2 = .000$). This supports the idea that permanent employees who interacted with a seconded employee closer to the knowledge frontier award grants with higher novelty levels. Our interviews echoed this with both seconded and permanent employees telling us about instances of a seconded employee sharing knowledge, as illustrated in the following quote: "Most NSF guys knew microarrays, but RNAseq was new, so I explained to them what it can do and how, as we would see more and more proposals using it." Another seconded employee told us:" I just had that experience. I know it's a recent case where my permanent colleague thought a proposal was terrific, and I had to explain to him why the science was just awful. And the reviewer completely agreed with me. So, we bring a perspective that is from someone who is an active researcher in the field."

While we suggested that proximity to the knowledge frontier helps to select more novel ideas, some research suggests that experts who are close to the knowledge frontier may reject novel ideas as these ideas challenge their own research (Boudreau et al. (2016). However, the empirical evidence for this is somewhat mixed. For instance, Li (2017) finds that "the benefits of expertise weakly dominate the costs of bias" and Teplitskiy et al. (2022) conclude that more novel research is more likely to be accepted for publication. To investigate this possibility, we

calculated the proximity between a secondee's research and the grants they have handled. If proximity and expertise work against novelty, secondees closer to the knowledge frontier will be *less* likely to award novel grants *when* these grants are closer to their own research.[12] Using the algorithm described above, we measured the similarity between a secondee's publications in the last 5 years and the grants they handled (on average, each grant was compared to 13 publications for a total of 280,169 similarity calculations). Including this variable in the baseline specification showed that the similarity between a secondee's research and the grants they assess has no effect on the selection of novelty.

Models 4–6 in Table A6 test the second source of heterogeneity between seconded and permanent employees: the latter leverage their larger networks to select more novel research. We follow the same logic as before and split seconded employees into those with a large and a smaller network. We capture the network size of a seconded employee by the number of unique co-authors they had over their career as reported in SCOPUS-indexed publications. The coefficient of the variable *Seconded employee has a large network* shown in Model 4 is positive ($\beta = .059$, p-value = .000), indicating that seconded employees with a large network grant more novel awards than others. The quantitative evidence that seconded employees use their larger networks to choose the right people as reviewers and panelists was also echoed in our interviews. One seconded employee told us: "[Seconded employees] have the expertise to suggest qualified reviewers and panel members from a larger pool of colleagues—former and present co-authors, departmental colleagues, doctoral students, editors for whom they had reviewed journal submissions in the past, or even friends in the profession, among others."

In Models 5 and 6, we reran two different specifications for Hypothesis 2. The first regression includes as a treatment group all grants selected by permanent employees who have interacted with seconded employees with a large network. The second regression includes, as a treatment group, all grants handled by permanent employees who have interacted with seconded employees with a smaller network. We find that the coefficient of the *Seconded employee in program* variable in Model 5 in Table A6 ($\beta = .137$, p-value = .000) is larger than the coefficient of the same variable in Model 6 in Table A5 ($\beta = .019$, p-value = .000) and the difference is statistically significant ($\chi^2 = 496.62$, probability > $\chi^2 = .000$). The quantitative evidence that permanent employees who interact with seconded employees with a large network select more novel proposals is also supported by our interviews. One seconded employee told us: "I remember once when (a permanent employee) was looking to find a reviewer for a proposal that was, then, cutting-edge and combined with established research from a different domain. She ran an expert's name by me. I said, (he) knows his stuff, but every time he has reviewed for me before, he has been too conservative with (the technique). Then I suggested another person whose work was close enough, had research combining domains, and I thought was better placed to see the value of this new approach." As one of our informants told us, permanent employees share this view: "This is where [seconded employees] come in. As active researchers, they leverage their networks and expertise to help permanent NSF employees locate qualified colleagues to provide reviews and join panels that can better assess the merits of a given proposal, novelty being chief among them." Overall, we find evidence that seconded employees with larger networks select more novel grants and share these networks with the permanent employees they interact with.

We suggested that seconded employees share their knowledge and network with permanent employees with whom they are co-located and that they are considered objective and trustworthy confidants. This was echoed in interviews with a seconded employee noting how "...the permanent

[12]We thank the anonymous reviewers for pointing this out.

trust you from the time you walk into the door..." Another secondee told us, "One thing I could say is that, I was quickly accepted as a colleague and valued for my expertise by the permanent program officers. And I never felt less. Like a second-class citizen, as we might say. Quite the opposite. I felt that at times, especially for matters that were more related to my expertise, I was approached more frequently than permanent were approached." Their deep expertise was valued as a different secondee noted, "So they valued my input and my expertise on STEM, and science, greatly. And I always felt that when somebody had to make a comment about the science of the proposals that we were considering, they would look to me or one of the few other STEM focused scientists in our cluster."

5 | DISCUSSION

Research has documented an irony: even when motivated to select novel ideas, individuals and organizations often fall short of their ambition (Cattani et al., 2022; Mueller et al., 2012). Novel ideas are often difficult to understand, risky, and challenging to fit in as their inherent uncertainty makes it harder to predict their reception and usage. While there is broad evidence for this irony across many realms (Berg, 2016; Criscuolo et al., 2017; Falchetti et al., 2021), it is especially surprising how common it is in the realm of science (Barber, 1961; Boudreau et al., 2016; Lane et al., 2022; Nicholson & Ioannidis, 2012; Siler et al., 2015) as science hinges upon novel ideas (Merton, 1973).

5.1 | Theoretical implications

5.1.1 | Novelty in the sciences

Scholars have investigated internal levers to promote the funding of novel ideas in the sciences, such as competitive versus block funding mechanisms (Wang et al., 2018), selecting evaluators carefully (Boudreau et al., 2016; Li, 2017), and allowing information sharing among evaluators (Lane et al., 2022). Other approaches, while not tested in science funding but could certainly apply there, include setting rules for composing expert panels (Criscuolo et al., 2017), letting panels engage in a how mindset (Mount et al., 2021), or in practices that deliberately generate uncertainty (Harvey & Mueller, 2021). Deviating from existing research, we explore an external lever in the form of seconded employees to help organizations select more novel ideas. Our findings suggest that the selection of novel ideas in the sciences can be improved by infusing funding agencies with external experts in decision-making roles. These experts exercise their knowledge and network to select more novel ideas themselves *and* disseminate knowledge and network on how to do the same to permanent employees.

5.1.2 | Novelty and seconded employees

As the opening quote suggested, the world is often unkind to new ideas.[13] Prior work has considered *internal* levers for organizing selection, which we expand by theorizing about an

[13]We hope this paper is an exception.

external lever to change the selection of novelty through a light-touch intervention. We build upon a long tradition of work that has suggested that external actors can see things from a fresh new angle and be more likely to generate novel ideas (Cattani & Ferriani, 2008). We shift attention to external actors as more able to generate *and* select novel ideas.

Seconded employees—the focus of our paper—are a contemporary version of the Simmelian stranger who comes from the outside to join the group today and stay tomorrow (Simmel, 1950). As strangers were not always part of the group, they can bring qualities into it that do not and cannot stem from the group itself (Simmel, 1950). They devoted most of their career to generating rather than selecting ideas. Generating novel ideas helps seconded employees develop a better understanding of the knowledge frontier and an extensive academic network. These qualities help select more novel ideas but are difficult for permanent employees to develop (Lamont, 2009). Although strangers become full-fledged group members, insiders still perceive them differently. They see them as being simultaneously near and remote and as being objective. Hence, it is no surprise that insiders trust them and often openly approach them for help. Being together with insiders and being entrusted by them helps strangers to share their qualities with insiders.

Our core argument is that bringing seconded employees into the organization and making them responsible for organizing and leading the selection process offers a *direct* path, allowing organizations to select more novel projects. We also theorized and showed a smaller—albeit significant—*indirect* effect, wherein seconded employees help permanent employees select more novel projects. Seconded employees interact with many permanent employees as they sit in decision panels, exchange soft and technical information, and socialize. Thus, while this indirect effect is smaller in magnitude and conditional on the direct effect, its economic significance is material as it applies to a wide range of permanent employees.

Our analysis also shows *when* seconded employees are particularly apt to select novelty. First, seconded employees who have a *better understanding of the knowledge frontier* account for an increased selection of novel projects. Prior work suggests that internal training can increase the selection of novel projects (Harvey & Mueller, 2021). Yet, when training has reached saturation, or permanent employees think too similarly, adding seconded employees, especially those more proximate to the knowledge frontier, can aid the selection of novelty. Second, a *larger external academic network* enables seconded employees to choose more suitable reviewers and panel members from a larger pool of experts, which helps them select more novel projects. We also show that not only the permanent employees benefit from their extensive network but also the permanent employees who interact with them. Overall, our analysis of the heterogeneity of treatment suggests that organizations seeking to promote novelty would be wise to seek seconded employees selectively.

5.1.3 | Spillovers and mobility

Prior research suggests that there are knowledge spillovers that help *creating* novel ideas (e.g., Azoulay et al., 2010; Waldinger, 2012). We suggest that there are also spillovers that help *selecting* novel ideas. Research has studied how individuals and groups select ideas (Criscuolo et al., 2017, 2021). Social influence can come into play when groups make decisions that sway the group outcome. For instance, a senior manager may speak first and influence others who speak next. Seconded employees who join can create spillovers *beyond* a focal group discussion. When permanent employees work independently afterward, they select more novel

ideas. Proximity in terms of geography and time can thus shape an individual in how they select ideas.

Our findings add to the scant research on short-term inter and intrafirm mobility, such as the literature on secondments (Hoenen & Kolympiris, 2020; Kolympiris et al., 2019; Wang et al., 2010), short-term intrafirm mobility (Choudhury, 2017) and boomerang employees (Keller et al., 2020; Snyder et al., 2021). This literature has focused on the advantages and challenges of short-term mobility events for the individual and the *sending* unit after the individual returns. Despite significant benefits for the sending unit (Hoenen & Kolympiris, 2020; Kolympiris et al., 2019) and the mobile individual (Snyder et al., 2021), there are also challenges to returning and having your newfound experience recognized (Swider et al., 2017). Our work investigates the effects on the *hosting* unit and finds that mobility aids the selection of novelty. Research on external actors has convincingly argued that standing outside the immediate social circle gives creative freedom relative to those shackled by conformity (Cattani et al., 2014; Cattani et al., 2017; Cattani & Ferriani, 2008). Our work implies that those new to a unit can better recognize and appreciate the novelty.

5.2 | Managerial implications

The allocation of public funds to scientists is an important line of inquiry for public accountability and the direction of science (Bol et al., 2018; Stephan, 2012). Bringing in seconded employees can help fund novel science, which carries significant implications for research direction and its impact (Fortunato et al., 2018). Similar secondment schemes are used in public and private organizations such as the European Commission, the World Trade Organization, the National Health Service in the UK, Shell, Procter and Gamble, and Rolls-Royce. Integrating seconded employees into decision-making processes contributes to selecting more novel projects. However, the efficacy of seconded employees in selecting novel ideas can vary greatly based on their understanding of cutting-edge knowledge and the breadth of their external networks, suggesting that these are important factors for managers to consider when deciding whom to bring in. Seconded employees can also lead to learning spillovers within an organization, influencing permanent employees to select more novel ideas after the seconded employee leaves. Cultivating an environment that encourages these learning spillovers can thus result in lasting effects after the strangers have left for other pastures.

5.3 | Limitations and boundary conditions

Unlike some other funding agencies, the NSF does not release unfunded applications. This implies that we cannot check directly how comparable the proposals managed by permanent and seconded employees are. Neither the interviews nor an array of empirical tests exploiting key features of the secondment program indicate that they are different. Still, access to rejected proposals would have added assurance to our conclusions. Beyond our setting, the lack of rejected applications by the NSF, the largest funder of non-medical research in the United States, limits research in several ways. To name just one, despite significant differences across disciplines (Rahmandad & Vakili, 2019; Sauermann & Stephan, 2013), our knowledge of what drives funding success and the role of panels

derives mainly from studies using (bio)medical data (Li, 2017; Myers, 2020). We used the quasi-random assignment of grants to evaluators and tested differences between permanent employees and seconded. This increased the confidence in our findings, but there are some remaining concerns that only an experiment could fully tackle. The perfect experiment would have a random assignment and put people in different roles of insiders versus strangers.

We can identify generalizable boundary conditions for our theory. The allocation of funds at the NSF resembles the process followed by many agencies and companies, and its secondment program shares many commonalities with other secondment programs. We expect the findings to hold when (1) organizational culture promotes innovation and (2) seconded employees have relatively high quality and are put in a decision-making role. There are situations when tensions arise between permanent and seconded employees. In our case, these Simmelian strangers become entrusted confidants. A similar pattern happens for VC funds that bring external experts to evaluate companies in their deal flow. This implies that strangers of lower quality than internal employees may not reap the same benefits. Our results support this argument, as individuals with higher research intensity have a stronger impact on the selection of novelty.

5.4 | Conclusion

We uncover the value of seconded employees in fostering the selection of novelty, especially those that leverage external networks and understand the knowledge frontier. We shift attention to external actors as generating *and* selecting novel ideas. Our study shows the lasting influence of seconded employees on organizations' idea selection. Embracing externals can be advantageous in selecting innovation. Simmelian strangers are often good friends of the new.

ACKNOWLEDGMENTS

All authors contributed equally and are listed in reversed alphabetical order. We are thankful for comments from Michaël Bikard, Matt Bothner, Solon Moreira, Ahmed Nofal, Henning Piezunka, Ammon Salter, and seminar participants at Asia Innovation and Entrepreneurship Association, Bayes Business School, LMU Munich, Singapore Management University, University of Bath, and Warwick Business School. Michael Rose and Denzel Glandel helped with data collection. We thank the Associate Editor, Gino Cattani, and two anonymous reviewers for guidance in the review process and for helping us improve our work. All errors are ours alone. Open Access funding enabled and organized by Projekt DEAL.

OPEN RESEARCH BADGES

The data is available from the corresponding author upon request.

DATA AVAILABILITY STATEMENT

We can share data in anonymized form as well as code.

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How to cite this article: Lampraki, A., Kolympiris, C., Grohsjean, T., & Dahlander, L. (2023). The new needs friends: Simmelian strangers and the selection of novelty. *Strategic Management Journal*, 1–29. https://doi.org/10.1002/smj.3564