Seven Costs of the Money Chase: How Academia's Focus on Funding Influences Scientific Progress

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You may recall Willie Sutton, the thief who, when asked by a reporter why he robbed banks, purportedly replied, "because that's where the money is." Whether or not Sutton actually said this (he denied it), the Willie Sutton Principle makes a point self-evident to those familiar with the matching law: When organisms, including academicians, are confronted with two or more choices that differ substantially in reinforcement value (read: grant dollars), they will apportion more of their efforts to the alternative possessing the highest reinforcement value. This pattern of behavior is amplified when administrators impose incentives (e.g., tenure, promotions, awards, salary increases, resources) and penalties (e.g., threats of being denied tenure, loss of laboratory space) tied to the acquisition of grant dollars.

As our field gradually rights the ship — addressing questionable research practices (QRPs) that have contributed to the replication crisis — we have been insufficiently proactive in confronting institutional

obstacles that stand in the way of our scientific progress.

Institutional variables, including the growing emphasis on external funding as an expectation or de facto requirement for faculty tenure and promotion at many research-oriented institutions, pose largely unappreciated hazards for psychological science.

Grants Versus Discoveries

About a decade ago, I was a regular attendee at Grand Rounds presentations in a prestigious psychiatry department. Before introducing speakers, the chairman routinely announced the names of professors who had received large federal grants along with their precise dollar amounts. It struck me as odd that he never announced faculty members' important publications or scientific discoveries. I have since come to realize that this reinforcement pattern is common in psychology departments, too: Faculty members routinely garner plaudits for receiving grants but frequently find that their scholarly accomplishments go largely unnoticed.

Grants in science should be regarded as means to an end rather than ends in and of themselves. After all, we don't laud novelists or film producers for securing large contracts for their planned projects. Instead, we rightly acclaim them if and when they produce high-quality artistic work.

For a field that prides itself on empirical rigor, psychology's encouragement of this practice is decidedly nonempirical. In a 2008 bibliometric study, APS Fellow Nick Haslam and his University of Melbourne colleagues found that grant funding bore a minimal relation to published studies' citation impact, and perhaps no relation when controlling for potential confounds such as journal and first-author prestige.

What's more, grants aren't needed for many forms of impactful research. For example, most researchers who have authored articles cited 1,000 or more times had no current National Institutes of Health (NIH) funding, according to a 2012 evaluation by biomedicine researchers Joshua M. Nicholson and John P. A. Ioannidis; many of those articles had reported landmark methodological advances. Furthermore, numerous Nobel laureates in physics, chemistry, and medicine received no federal funding for the work that culminated in their prizes, Ioannidis and other colleagues found.

To be clear, I am not opposed to grants. For some scientific questions, grant funding is essential for high-quality research — or any research at all. For many of my colleagues in neuroscience-related fields, for example, money is a virtual prerequisite for research. We should encourage these scholars to apply for grants and make allowances in their workloads for grant-related work. Furthermore, we should reward colleagues who obtain training grants to support graduate student education. In addition, the grant culture has its upsides, including provision of funding for graduate and postdoctoral scholars and its propensity to spur competition in the marketplace of ideas.

What I am opposed to is the implication that researchers' scholarly merit should be gauged in large measure by grant success. This fundamental and largely unquestioned law of academic life has spawned several corollary ordinances. Most notably, faculty members in a growing number of psychology departments cannot be hired, tenured, or promoted without a solid grant track record — regardless of the quality or impact of their work. Remarkably, researchers who are generating significant discoveries and influencing the field's thinking without using large sums of money may nonetheless risk being fired if

they don’t obtain grants.

A Bevy of Negative Consequences

The grant culture has contributed to a number of other troublesome consequences for psychological science, each of which I describe briefly.

1. Heightened incentives for questionable research practices (QRPs). To obtain large grants, promising pilot work is typically required; to maintain uninterrupted grant funding, a strong track record of positive results can be a virtual necessity. Adding to the pressure for positive findings is the reality that investigators whose research programs hinge on grants often feel responsible for the livelihoods of their postdoctoral candidates, students, and administrative staff.

In these respects, the grant culture would appear to be a virtual recipe for confirmation bias, fueled by motivated reasoning, the lure of grant dollars, and the fear of losing funding. These powerful inducements can generate incentives for positive results by means of p hacking, outcome reporting bias, and other QRPs. Training in research ethics, important as it is, may only partially discourage these QRPs because confirmation bias operates largely outside of conscious awareness.

Furthermore, as Columbia University biological scientist Stuart Firestein noted in his 2015 book, Failure: Why Science is So Successful, failure is a crucial element of the scientific enterprise. When studies are well-designed, we learn at least as much from disconfirmation as from corroboration of our hypotheses. Nevertheless, the grant culture implicitly discourages failure, especially when negative results raise the specter of the investigator’s theory being in error.

Fortunately, the preregistration of hypotheses and analytic plans is a critical safeguard against QRPs, as it diminishes the odds that researchers will erroneously present exploratory research as confirmatory. Preregistration won’t, however, significantly diminish the foregoing problems emanating from the grant culture.

2. Single-minded focus on programmatic research. One of the unquestioned mantras of academia is that programmatic research is invariably preferable to nonprogrammatic research. To be fair, programmatic research brings certain clear-cut advantages. Cracking an exceedingly complex scientific question often requires a lengthy series of interlinked investigations.

Still, programmatic research can foster confirmation bias, especially when designed to test the investigator’s favored theory. Research on sunk costs and effort justification further suggests that once individuals have invested a great deal of time and effort in a project, they’ll feel the need to persist with it even when doing so is no longer fruitful. In addition, programmatic research often runs its course and may yield diminishing returns of knowledge following a large number of studies.

3. Intellectual hyperspecialization. An allied consequence of the grant culture is its tendency to canalize scholars into highly specialized lines of thinking. Although interdisciplinary grants can force scholars to step outside of their comfort zones to collaborate with colleagues in other fields, the grant culture often keeps researchers locked into similar intellectual questions for long stretches of their careers.

In today's academic environment, big-picture thinkers may be at risk for extinction, Columbia University political scientist Alan Wolfe wrote last year in The Chronicle of Higher Education. Paul Meehl, the most influential clinical psychologist of the latter half of the 20th century, received a grand total of one federal grant during his career. I'm hardly the first to observe that psychology's great generalist thinkers of the past, such as Meehl, Lee J. Cronbach, Donald Campbell, Lloyd Humphreys, Jane Loevinger, and Robyn Dawes, are now few and far between. What would have come from these scholars had they experienced incessant career pressure to apply for funding?

4. Disincentives for conducting direct replications. Until recently, major federal agencies allocated relatively little funding to supporting direct replications of previous work. Hence, investigators had scant incentive for replicating others' research. In this respect, the grant culture has often worked against the accumulation of reproducible knowledge. (On the positive side, in the United States and the Netherlands, grant agencies are beginning to appreciate the value of replication. Last year, for example, the Netherlands Organisation for Scientific Research, the nation's largest research-funding agency, launched what is believed to be the world's first national fund for replication studies.)

5. Stifling of creativity and intellectual risk-taking. Scientists who pursue daring lines of work, whose ideas don't fit into accepted paradigms, are essential to the field's progress. But the grant culture has almost certainly led many scholars to instead pursue safe research that is more likely to secure funding. Those same reinforcement contingencies operate for methodologies. Functional neuroimaging is now all the rage in psychological science, and provisional survey data suggest that many investigators feel pressured to incorporate neuroimaging and other biological techniques into grant applications. Hence, researchers whose questions don't readily lend themselves to such methods may be hard pressed to obtain funding.

6. Promising more than we can deliver. Many grant applications on the etiology of psychopathy (my own field of expertise) dutifully conclude by assuring reviewers that the findings may bear significant implications for intervention. Yet despite a handful of promising leads, there has been minimal progress in the treatment or prevention of psychopathy over the past several decades, despite dozens of large federal grants — including one on which I was co-principal investigator. One trick of the "grantsmanship" trade, especially for grant applications submitted to the National Institutes of Health, is the art of persuading reviewers that planned research bears significant real-world implications, even when grant applicants are well aware that such implications are at best a faint hope. Our field's habitual tendency to overpromise has almost certainly tarnished our perception in the public eye.

7. Diminished time to think deeply. Along with the grant culture comes mounting pressure to apply for funding at each entry point in the grant cycle. For psychologists on research tracks in medical schools, the grant cycle has become the human equivalent of the hamster's running wheel, although with less positive reinforcement. Inevitably, these demands allow diminished time for thinking deeply about psychological questions. A prime example of this point can be found in the pages of Nobel laureate Daniel Kahneman's magisterial book, Thinking, Fast and Slow, or in Michael Lewis's The Undoing Project, about the historic collaboration between Kahneman and Amos Tversky.

You can't help but be struck by the extent to which these two scientists' remarkable intellectual collaboration was cultured by lengthy conversations during leisurely walks. The freedom to engage in this kind of freewheeling, in-depth reflection is becoming increasingly constrained in today's

supercharged grant environment.

Looking Forward

My concerns aside, my global appraisal of psychology's progress is reasonably positive. The replication crisis has taught us that we need to become more modest in our assertions and to steer clear of confident proclamations based on isolated positive results. Despite resistance from some quarters within our field, we are starting to engage in the healthy self-scrutiny that characterizes a mature science.

Still, formidable institutional challenges lie in the way. For a group of psychologists, our approach to the grant culture has been surprisingly nonpsychological. We have accorded scant consideration to how reinforcement contingencies, abetted by cognitive biases, make our myopic focus on grant funding counterproductive to scientific progress. These psychological impediments collide head-on with our recent emphases on minimizing false-positive findings and generating a corpus of reproducible scientific knowledge.

The corporate culture of academia places young scholars in a precarious position, as they feel incessant pressure to secure grant funding even if they don't need it. Perhaps the best advice I can give them is to strive for balance between specialization and breadth in their thinking and reading, and to remember that the best science typically emerges from the integration of diverse perspectives. Admittedly, reading broadly is easier said than done given the growing demands on young investigators to invest much of their time applying for grants, and it will almost certainly necessitate challenging tradeoffs. This pragmatically knotty issue demands considerably more thought than it has received.

Finally, it's incumbent on us as a field to initiate a thoroughgoing and intellectually honest conversation about the negative impact of funding on scientific progress, and on potential remedies for the problem. As Ioannidis has suggested, those correctives could range from institutions prioritizing scholarly quality and replicability over financial success to more radical proposals, such as penalties for scholars who have a lengthy track record of grant funding without a commensurate record of high-quality published research (although I am at present loathe to endorse the latter recommendation).

Much like a dysfunctional family that avoids addressing uncomfortable issues out of fear of opening up a can of worms, we have put off this difficult discussion for too long. But we need to take it up if we ever hope to realize psychological science's considerable potential.

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