

10 Recognizing Faculty Accomplishments

If we take as a given the experimental and observational data that we have presented in earlier chapters, it will not be a surprise to learn that women and people of color are underrepresented in formal and official forms of recognition. The same mechanisms that lead to positions at high-prestige institutions and to higher salaries and faster rates of promotion would be expected to play a role in the recognition of accomplishments. In this chapter we consider whether the specific phenomenon of overlooked excellence in research and scholarship, or “missed merit,” is more likely in the careers of women and people of color.

There are many ways to formally recognize faculty accomplishments apart from prestige, salary, and promotion. For example, internal awards within a scholar’s department or school may be given for exceptional teaching and mentoring, scholarship, or service. Recipients may be selected by colleagues, students, alumni, or administrators of the institution. Disciplinary associations provide awards in a large number of categories, including teaching, mentorship, and research, and honorary degrees recognize a range of accomplishments. Meta-disciplinary associations like the American Academy of Arts and Sciences, the American Association for the Advancement of Science, and the National Academies primarily recognize research accomplishments. Other forms of recognition include invitations to give conference and colloquium talks. We first consider the value of informal recognition to faculty and the academic communities in which we operate, and then consider the costs and benefits of formal recognition for the institution and the person being recognized.

The Significance and Value of Informal Recognition

Scholars receive meaningful personal recognition from students and colleagues. The student who tells a faculty member “I wasn't sure what I wanted to specialize in, but when you gave the guest lecture in the proseminar I thought, ‘that’s what I want to work on’” gives deep satisfaction. The people who write a faculty member out of the blue to say how much they appreciated a particular article the faculty member wrote provide unalloyed gratification. The student who credits an instructor with the support and guidance needed to finish a degree supplies a feeling of well-being and achievement. The colleague who tells a chair how well the faculty member handled a difficult faculty meeting engenders pride.

For many faculty, the most meaningful comments are those from students suggesting that a course, a lecture, or a conversation has influenced them. Transmitted in many ways—both at the time and sometimes years later—the sense that one’s teaching has been valued and recalled is appreciated by all types of faculty and types of institutions. One of us was stopped on an airplane not long ago and asked if we were Professor So-and-So. When we nodded, the man indicated that he had taken a course from us more than 30 years before, and it had influenced him throughout his life. This was not an instance of a student whom the faculty member knew well, but it was a surprising and delightful reminder of the value of one’s work to another person. As the example indicates, the value may take a long time to become clear even to the student and may never be communicated to us. That completely unexpected and unplanned meeting might never have occurred—but it made that semester’s work much lighter and more joyful and is remembered when moments of doubt or overload threaten to make teaching feel burdensome.

Such examples are no less important for being smaller and less public than the formal recognition that we concentrate on in this chapter. In the course of an academic life, there is the opportunity for many gestures of informal recognition. Requests for technical and career advice from colleagues, and invitations to serve on consequential committees in the institution and in the disciplinary associations, are other examples—in this case, where one’s judgment is valued. Learning that a colleague mentioned finding one’s advice valuable or insightful can make one’s day. Hearing from a colleague that one’s contributions to a committee or departmental or institutional

discussion were particularly important to their thinking can make one feel that the extra effort one expended was worth it. Some faculty may experience such expressions of regard as nothing special, but work in “positive psychology” and “appreciative inquiry” supports the observation that appreciation promotes well-being (Cantore & Cooperrider, 2013).

One of us recalls during her first year as a faculty member having a senior colleague leave a note in her mailbox indicating that she had read and admired her newly published article based on her dissertation. That new faculty member walked on air for a long time after that, knowing that her senior colleague had noticed her paper, read it, and claimed to like it!

Sometimes informal recognition comes on the occasion of retirement when students and colleagues convey in notes, letters, and conversations the impact of one’s thinking and work and the importance of the example one has set. These expressions are deeply meaningful to most faculty, even if they do come late in the career, but it behooves wise administrators to reflect on how to encourage that kind of feedback to faculty more often and at earlier stages in their career.

When an institutional environment is positive and most faculty feel they are part of a community that values everyone, one’s colleagues are more likely to feel inclined to convey their positive regard in informal ways. Similarly, there are many ways to encourage students to communicate their regard to the faculty. One high school has created a graduation ceremony in which all students give brief and informal “talks” (they forego more formal speeches to make time for this) about what high school has meant to them. Inevitably, many students talk about things their teachers have said and done that opened their minds to new perspectives and increased their aspirations and ambitions. The habit of reflection on one’s education is one worth inculcating, as is the habit of expressing gratitude to others who facilitate one’s growth. The students think about their final talks for much of high school. And the teachers look forward to that ceremony every year as a time when they know they will hear about actions of their colleagues and their own that mattered to the people they have most tried to serve.

Not all faculty receive informal recognition on a regular basis, and not all faculty prize all forms of informal recognition. We suspect, however, that people who do receive informal recognition have happier and more meaningful work lives and are themselves able to appreciate others’ work as a result. In institutions or departments with high morale, the group is

attuned to the contributions and accomplishments of others, and people feel that it is appropriate to express approval and appreciation of others' contributions and accomplishments. Workplaces in which informal recognition of others' successful efforts flow readily are more pleasant and satisfying workplaces for everyone (see Cantore & Cooperrider, 2013; Cooperrider, 1990). Creating the circumstances for this flow of recognition costs little except in the pleasant labor of imagining ways to foster it (like the cost-free high school ceremony outlined above).

It is also possible, and desirable, to develop more formal but virtually cost-free recognition—in end-of-year ceremonies or in letters of reappointment—at every level of an institution. Developing an institutional culture of acknowledging the value of the work people do to ensure that the place functions well increases the well-being of all concerned—both those who are grateful and those who are appreciated (see, e.g., Algoe, Kurtz, & Hilaire, 2016; Jackowska, Brown, Ronaldson, & Steptoe, 2016).

A final point is that we tend to think of influential scholarship as occurring solely through active engagement in research. But faculty also influence thinking in a field through their teaching by introducing concepts and perspectives to students that change their thinking or by clarifying how to use a particular analytic tool. One of us remembers reading Henry Gleitman's presentation of the statistic d' in the first edition of his textbook in psychology. At last—she understood it. (Alas, recent editions eliminated this section.) She was happy to meet him and be able to tell him how much she appreciated that section and benefited from it. And, still, whenever she uses d' , she thinks of Professor Gleitman and mentally thanks him.

Benefits—and Costs—of Formal Recognition

Institutional Benefits of Creating Forms of Formal Recognition

For the institution, external formal recognition of faculty brings prestige. Formal recognition—whether external or internal—can be an occasion of community celebration and personal satisfaction. Departments, programs, and larger institutions can benefit from recognizing faculty service, teaching, and scholarship. Knowing that others have noticed and valued one's work enhances its meaning for most people, even when it comes without a financial award. Formal recognition can fall disproportionately on a few—and often those few are White and male. To avoid that, processes of

recognition need to identify the full range of faculty accomplishments, and many people need to participate in nomination and selection processes. Some institutions lack the resources to create monetary awards, and others may lack the faculty and administrative time to administer awards even if they do not carry financial benefits. Some institutions have the resources but wonder if they are worth the investment when there is so much other work to be done. But since there is relatively little cost to providing many kinds of recognition, and since the benefit to overall morale is great, we recommend it.

Senior faculty can be encouraged to help recognize their junior colleagues' accomplishments—a practice certain to foster those colleagues' sense of belonging and value. Equally, senior faculty suffering from doubts about their scholarly path may be recognized for extraordinary accomplishment in other arenas and find that more confidence and community support encourages them to redouble their scholarly efforts rather than withdrawing from them. Creating a feeling of mutual community through ready forms of formal recognition is possible, but it requires serious attention to the risk of creating a feeling or reality of a “chosen few” or an elite and exclusionary group of “the recognized.”

Does Formal Recognition Matter for One's Work?

For the individual, formal recognition can provide some of the same benefits as informal recognition: it represents the respect of one's colleagues in one's institution or in the field as a whole. But an individual may also find that recognition is ignored by the local campus community, or, instead, creates envy and distaste in colleagues. It may also discomfit or embarrass the individual being recognized.

Some colleagues have suggested to us that external markers of professional success have little bearing on people's ability to do important and satisfying work. This is reminiscent of the Guerrilla Girls' poster we described in chapter 2 on the “advantages” of being a woman artist, such as working without the pressure of success and not having to undergo the embarrassment of being called a genius (<https://www.guerrillagirls.com>). The advantages of recognition, however, include the suggestion that one's work is valuable and worth pursuing. Recognition of new work is particularly valuable since new ideas are often criticized or ignored. With the support of a high-prestige funding agency or recognition from prizes and invited talks,

a new idea has a better chance of being taken seriously. Formal recognition provides social capital and legitimacy. Recognition that carries or produces financial support can materially help people do their work, especially in fields that require resources such as equipment or research assistance. Funding agencies are more likely to support work that has previously been recognized.

Finally, formal recognition of one's work within one's community may help one's colleagues actually know what we do. Often we are all working away at service, teaching, and scholarship, unaware of the equally interesting and important work of our colleagues. Learning about it can transform our respect for each other and our sense of shared mission. One of us gave a talk to her institution that carried with it a monetary prize that had been donated. The talk was well-advertised and well-attended. Many colleagues outside her department learned about her work for the first time. Her colleagues within her department, who could have given a one-sentence description of her work, now found that the bigger story was genuinely interesting.

Some people, both with and without formal awards and invitations, think that defining success in terms of recognition is at best unimportant and at worst worshipping a false god. We know of one former department chair who did not want his department to receive two special endowed chairs that the dean was offering because he thought that such chairs created invidious distinctions. We agree that success should not be defined solely by recognition. But formal recognition is one marker—among many—of success, as well as of others' appreciation.

Most individuals in academia are there because, as we discuss in chapter 1, they subscribe to the ideals of the university. Many realize that they could make more money elsewhere (although some academics, through the creation of companies, are also successful in purely monetary terms), but their goals are different. We subscribe to the ideals we laid out in chapter 1. We value the variety, autonomy, and flexibility that academia offers. We value our interactions with students and colleagues. We particularly value our freedom to ask and try to answer a range of questions. We also value a full life that includes, but is not limited to, work.

Formal recognition is not essential for personal satisfaction. Indeed, one could argue, along with the former department chair, that a system of formal recognition distracts faculty from the ideals that are most important to

their identity, and that it should be abolished. However, that is not going to happen. Systems of formal recognition exist and will continue to exist. Our goal is fair allocation of rewards. There is reason to suspect that allocation is not impartial, and that individuals in certain demographic groups or with certain characteristics get more than their fair share.

Personal Intellectual Benefits from Formal Recognition

We have commented on the deep meaning faculty attach to the sense that their work matters to their institution, to their colleagues, and to their students. This kind of meaning can also be found from formal recognition within the discipline for teaching and mentoring and service to the field (both in disciplinary associations and at the home institution). Many award committees have only a few candidates to consider because few people nominate their colleagues for awards. Departments and institutions can improve their own standing and their faculty's by nominating them for awards and by providing appropriate documentation to support them. Even being nominated for recognition by one's department or institution can make faculty members aware of their colleagues' respect for their work.

A sense of meaning can be derived from seeing the impact of one's work on the field or discipline beyond the home institution. In order to influence the direction of one's field, to play a role in determining what questions will be seen as central to the field, and to make it more likely that theories one thinks are explanatory will be considered by the field at large, it is helpful to be recognized. Good ideas that no one picks up may be enjoyable and stimulating for an individual researcher to develop and work on, but they do not help shape a field or change the world. When people have ideas that could change the direction of their field, or change how people think about an issue, visibility and formal recognition can be the vehicle. The same holds for the arts. If individuals want their music to be heard, their art to be seen, and their literature to be read, they need recognition.

Costs of Recognition

To the extent that academia is a community of equals, recognition of the few may come with a cost to morale and a sense of community for those who are not recognized. Creating classes of faculty—those who have named chairs and those who do not, those who win prizes and those who do not—may have significant costs in the sense of value and belonging among those

who are in the unrecognized classes, as the department chair mentioned above had feared. Anticipation of those costs to others leads some individuals to be concerned about being recognized, even given the benefits.

Recognition may lead to increased influence, privilege, and authority. To the extent that it does, it can also lead to ignoring advice from others (Tost et al., 2012). A series of experiments either primed people to see themselves as powerful, by remembering a time when they had power over other people; primed people to see themselves as not powerful, by remembering a time when other people had power over them; or did not involve priming, simply asking people to remember their most recent visit to a grocery store. Those in the high-power condition were less likely to take into account information that could potentially help them, even when the advice was described as coming from experts. People with formal power roles (presidents, provosts, deans, chairs, group leaders), as well as those who achieve informal power via recognition, all run the risk of failing to listen. Power does not, however, have to lead to closed-mindedness. Those with firm moral standards do not succumb to the insensitivity of power (DeCelles, DeRue, Margolis, & Ceranic, 2012).

Role of Diversity

If White women and women and men of color are the principal individuals who do not receive formal recognition, the most visible models in the field will be White men. We have seen that a diverse group of faculty who are successful matters to students. One way that young women and people of color can determine if there is a place for them is by seeing a mix of people in positions of power and prestige (Correll, 2004; Murphy, Steele, & Gross, 2007). White men know there is room for them because they see so many White men.

As we have argued when discussing the benefits of diversity in chapter 2, demographic homogeneity is also likely to result in less innovation. We want the people who receive formal recognition and help shape the field to include those who offer diversity and enhance the possibility of innovation. Thus, we should invite White women and people of color to speak (Valian, 2013).

In sum, the main reason to be concerned about formal recognition is that people who do receive formal recognition are likely to influence what questions are asked and how those questions are asked. While formal recognition is not necessary for personal happiness or a high-morale community,

without formal recognition—for our purposes in this chapter, without invitations to give keynote and plenary talks and without awards for one's performance—an individual's voice may not carry. Because of the importance of formal recognition, we recommend that all institutions make an effort to nominate their faculty for external prizes and awards, and make an effort to invite a diverse group of speakers for colloquia and other academic talks. We also recommend that professional societies include a diverse group of members on their awards committees.

Missed Merit

Are women and people of color really “underrepresented” among those who receive formal awards and recognition? Perhaps instead they are represented less than White men for good reason. If one considers typically used markers of accomplishment, such as the impact factors of the journals that prize-worthy individuals publish in or the prestige of the publishers who publish their books, the support they receive from external funding, the amount they have published, or the number of citations their work receives, perhaps White men simply display more excellence. That could be why they are “overrepresented” at high-prestige institutions and why they receive more recognition.

Belief in a just world (Lerner, 1980) suggests that the deserving are rewarded and the rewarded are deserving. According to this logic, White and Asian men receive the most recognition for scholarly achievement because recognition accrues to those who have the greatest ability and make the most strenuous effort, and those people are predominantly White and Asian men (Summers, 2005). If academia is meritocratic, egalitarian, and just, the best people end up at the best institutions and get the most recognition, and excellent work will be rewarded no matter who does it.

Academics, with their commitment to the *idea* of a meritocracy, are likely to find the just-world hypothesis attractive. For one thing, it means that they can take full credit for their own successes. We are not suggesting that the rewarded are *undeserving* (although they may occasionally be so and more than occasionally may be only partially deserving). Nor do we devalue the journals that prominent people publish articles in or the presses that they publish their books with. Nor do we dispute the idea that being cited often suggests that many people found a scholarly work

valuable. Instead, we argue that, for every person who is rewarded, there are others, equally deserving, who are not rewarded. That possibility is a logical extension of the arguments we have made about the effect of schemas on our perceptions of others and our perceptions of ourselves and about the accumulation of advantage (see chapter 4 and Perc, 2014).

If nomination and award committees are more likely to expect success in certain groups, and if small successes indeed accumulate over time, the daily small advantages that White men accrue—however unintentionally—will result in a disproportionate number of them receiving formal accolades. An appreciation of how advantage accumulates is reflected in the adage “Awards beget awards” (see, e.g., Smith, 2011). Someone is unlikely to receive a major award without already having accumulated less major awards. That appears to be true for Nobel Prize winners (Chan, Gleeson, & Torgler, 2014).

It is difficult for people who are successful to fully recognize the role of factors other than their own merit (a combination of their talent and effort) in their success, and they therefore often feel they are uniquely meritorious. People are privy to their own insights and good ideas more than anyone else is, and they know how hard they have worked. They lack that firsthand knowledge about others, and they cannot easily gauge the importance of their own institutional affiliation, the people they know, or sheer luck.

A few Nobel Prize winners, however, have been aware of the role of luck and privilege in their lives, and its absence in others'. In 2008, when Martin Chalfie and Roger Tsien won the Nobel Prize in chemistry (along with Osamu Shimomura), they invited Douglas Prasher and his wife to attend the ceremony and paid their way. Chalfie and Tsien's work was heavily based on a gene that Prasher had cloned, but Prasher had left academia, discouraged by his isolation and lack of funding. When he left, he gave samples of his gene to Chalfie and Tsien and referred people who asked for the gene to them. Chalfie included Prasher as a coauthor on an important publication that was possible only because of Prasher's gene. Prasher continued doing scientific work for a time, but he never had another professorial position. He was driving a courtesy shuttle for a car dealership until, two years after Chalfie and Tsien received the Nobel Prize, he obtained a job doing scientific work at a research and development firm. After being laid off from that position, Prasher accepted a long-standing invitation to work as a researcher in Tsien's laboratory. Both Chalfie and Tsien thought that Prasher deserved a Nobel Prize for his work, as detailed in an article titled

“How Bad Luck and Bad Networking Cost Douglas Prasher a Nobel Prize” (<http://discovermagazine.com/2011/apr/30-how-bad-luck-networking-cost-prasher-nobel/>; see also <http://www.the-scientist.com/?articles.view/articleNo/34536/title/What-Ever-Happened-to-Douglas-Prasher-/>).

Prasher’s story is unusual on two grounds: the lack of recognition he received despite his talent and his achievement and Chalfie and Tsien’s steadfast acknowledgment of Prasher’s contribution. Prasher’s case differs from the better known example of Rosalind Franklin. Franklin’s x-rays were important data for James Watson and Francis Crick’s discovery of the helical structure of DNA. But her contributions were not explicitly recognized at the time of Watson and Crick’s original paper. In accepting the Nobel Prize in 1962, Watson and Crick made no mention of Franklin. She posthumously received greater acknowledgment of her contributions (e.g., Maddox, 2002), and Watson acknowledged her work in an added epilogue to his memoir about the discovery of DNA (Watson, 1980).

These examples suggest that if we want to guard against missed merit in distributing formal recognition, and if we want to promote the best and most innovative discoveries and insights and ensure that they appropriately influence the field, we need to change institutions so that they will retain, support, and recognize such individuals. People like Prasher and Franklin had enough ability, passion, and perseverance to make valuable discoveries. It is the field’s job to make sure that those discoveries are noticed and honored.

Another honor, considerably more frequent than the Nobel Prize but still rare, is membership in the National Academy of Sciences (NAS). There is enormous variation by university in the number of members, even among universities with similar overall rankings. According to summaries on the NAS website for 2016, among state-funded universities Berkeley had three times as many NAS members as did Cornell, five times as many as Michigan, and ten times as many as Stony Brook. It is possible that those differences reflect “merit,” but it is also possible that Berkeley’s success in part owes something to sophisticated nomination strategies and well-developed professional networks. Those strategies can be developed by other institutions as well.

A scientist at a research-intensive university told the following story. He hadn’t given a second thought to becoming a member of the NAS—because he presumed he didn’t have to think about it. His colleagues would nominate him at a suitable time. Then he noticed that some of his younger colleagues were being nominated. He approached one of the more senior members in his department, telling that person that he had waited his turn

and expected to be nominated. He *was* then nominated and was accepted as a member.

In thinking about that story, we notice that the scientist had been confident that he would be successfully nominated. He felt entitled. He also felt he needed to wait his turn. But when he saw that younger colleagues were being nominated, he thought it wasn't fair. He had waited his turn, and the others should wait their turn. He also thought that his senior colleagues weren't doing their job properly. Had he not spoken up, his colleagues might never have nominated him.

We suspect that relatively few people have the same sense of entitlement that this individual had. We know from the findings on gender and entitlement that women are likely to feel underentitled and men are likely to feel overentitled (Pelham & Hetts, 2001). Further, powerful people are more likely to feel entitled and to expect fair treatment (Sawaoka, Hughes, & Ambady, 2015). Power heightens sensitivity to unfairness against the self. Had the same faculty member, doing the same research, been a White woman or a person of color at a lower tier institution, that faculty member may not have felt unfairly treated by not being nominated by colleagues to be a member of the National Academy. Nor would colleagues see the lack of nominations as unfair. If people have been viewed as not fully meritorious early in their career, it will be difficult for people to revise their opinion. Once formed, an opinion is difficult to change, even when people learn that it is incorrect (Reuben, Sapienza, & Zingales, 2014, and see our discussion of anchoring in chapter 9).

The Role of Chance

In the cases of Prasher and Franklin, we use the standard benchmarks for recognizing achievement. Our evidence that those individuals were improperly overlooked comes from evidence of people making similar achievements who were not overlooked. There is, however, an additional consideration, namely, the role of chance. Decisions about what accomplishments are considered prizable are in part due to chance, and the many steps leading up to a prize (publications, citations, funding, and so on) are not equally accessible across different demographic groups.

An MIT student, responding to a guest column in *The Tech* about the role of diversity in admissions and hiring at MIT, expressed well the idea that

when rewards are scarce and dimensions of merit are various, many factors will determine outcomes.

... The one thing I remember most on my college tour experiences was at Yale when an admissions representative said that they could reject the first 1200 people and take the next 1200 and NO ONE WOULD KNOW THE DIFFERENCE because there is an overabundance of qualified people applying to these prestigious universities. (February 17, 2012, <http://tech.mit.edu/V132/N4/briscoe.html?comments#comments/>, comment 35; accessed June 3, 2017)

Deciding what counts as merit is an exercise that is similar to deciding who will get into Yale. There are so many dimensions of merit, and the dimensions can be weighted in so many different ways, that there is no single “best.” It is not like determining who can run 400 meters the fastest, where there is a single metric. The people who get Nobel Prizes may well deserve them, but there may be many other equally deserving people who do not get them. Fallible humans are serving as gatekeepers at every stage of someone’s career.

In a set of interviews with physicists, one sees with surprise that many of them expected, early in their career, to eventually receive a Nobel Prize, despite the extreme rarity of that event. One Nobel physicist articulated the Nobel Prize version of the Yale phenomenon (Hermanowicz, 2009):

[The reward system in science] attempts to be fair. [But] there are many people who do wonderful things who don’t get properly recognized. There’s no question about that. I think I was lucky that the work we did was recognized. It could have been otherwise. I mean, after all, we got the Nobel Prize. We did the work probably between ’67 and ’74. We got the Nobel Prize [many years later]. It took close to twenty years to get that recognition. It could have been that we never would have gotten the recognition. We were very fortunate that it came our way because there is uncertainty in that kind of thing. There are many people who do wonderful things who don’t get properly recognized. This last Nobel Prize—the three guys who got it for asymptotic freedom in the strong interactions—it took them thirty years, and there was a chance they wouldn’t have gotten it. If it takes thirty years, it means that there was a chance that you won’t get it, because something has prevented it [from occurring sooner]. (16L)¹

This individual realized that merit—doing “wonderful things”—is not the only determinant of receiving a Nobel Prize. Many other factors—factors that we frequently call “luck”—come into play (Frank, 2016). And one can ask, “Who gets to be lucky?” Luck is most likely to smile on those who are already “lucky.”

Why Missed Merit Occurs—Gender and Prestige; the Accumulation of Advantage

We present an interconnected account of missed merit. Highly talented, well-trained, and hardworking scholars and researchers are found at all types of academic institutions. Despite the wide distribution of talent and effort, we claim, the achievements of individuals at teaching-intensive institutions are undervalued—because status influences recognition and awards. Prestige or status effects are especially negative for White women and people of color because they are overrepresented at teaching-intensive institutions, an argument familiar from earlier chapters. Finally, status effects operate at every stage in the process of building a career. Of course, there are additional reasons we may miss merit. For example, if White women and minorities have thinner professional networks, they may know less about award and lecture possibilities and may have fewer mentors or colleagues who are high-status White men who can and will advocate for them in recognition processes.

First, we consider the data that make a *prima facie* case for the underrepresentation of women in general among awardees and invitees. The absence of racial-ethnic minorities among awardees and invitees is even more striking, if less well-documented to date.

Sex Disparities in Awards

It is relatively easy to assess the distribution of recognition within departments or within an institution because one can compare the number of faculty in a particular demographic at a given rank with the awards those groups accrue. One has some means for computing a baseline (although White women and people of color may not have advanced at an appropriate rate). In contrast, the underrepresentation of White women and underrepresented minorities among award recipients of national and international recognition—prizes, plenary talks, and the like—is much harder to assess. It is hard to know what the relevant pool is. In the case of hiring at the junior level, it is possible at least roughly to gauge the composition of the pool by examining the percentage of different groups among PhD recipients and postdoctoral fellows. If, however, advantage and disadvantage accumulate, as we have demonstrated that they do, the pool of women and underrepresented minorities

progressively narrows as careers progress. Thus, when we see an all-male or all-White lineup of invited speakers at conferences, we do not know whether such lineups could have occurred by chance, though efforts to evaluate this possibility suggest that women are in fact less frequently represented than would be expected by chance (G. Martin, 2015).²

Personal experience offers examples as well. In the middle of the first decade of the twenty-first century, one of us was invited to give a talk on gender to an annual scientific honors society lecture at one of the CUNY colleges. The program listed all the prior speakers—one per year except for a few years when there was no annual meeting—from the 1960s to the present. Every speaker had been a man, definitely not what one would expect by chance. She had been invited by a female colleague who was president of the society that year. And her colleague asked her to speak about gender, not about her research specialty. Presumably, no one was intending to discriminate, in any of the 30-odd years that invitations had been issued, but it was difficult for organizers to see, without aggregating the data, that they were producing a one-sided set of speakers to students. We would like to think that that first woman gave a great talk, but another nine years went by before another woman was invited to speak.

More recent data suggest that women are underrepresented as colloquium speakers at universities across a range of fields, and that the underrepresentation is most severe at the assistant professor level, a career point where visibility is very helpful (Nittrouer, Hebl, Ashburn-Nardo, Trump-Steele, Lane, & Valian, 2018). The lower representation of women was not due to their refusing invitations more often than men did. An analysis of committee membership showed the importance of gender for a subset of the 50 schools that provided data. Whether colloquium decisions were made by a single person or by a committee, the presence of women was associated with a better mix of male and female speakers (Nittrouer et al., 2018).

This is easy to fix if we assume that there are women and people of color worth hearing from. We can invite them to speak. A colleague related the following story. She had just been invited to be a member of board of an international scientific society and was attending the annual business meeting for the first time. One item of business that had not been on the agenda was to develop a list of people to invite to be board members to replace those whose term had finished. As people made nominations, she noticed that all the nominees were male. She suggested that people

take some time to think only of women candidates. Her colleagues, the large majority of whom were male, agreed to do that and quickly came up with the names of women who would be suitable. Women's names were apparently not as cognitively available as men's names, but if the pool was restricted, women's names became available. The colleague also recommended that nominations not be made on the fly, but that people come to the annual meeting with suggestions, and with the understanding that they would aim for a broad representation of scientists.

To reiterate: we do not think that inviters or prize awardees intend to exclude any group. Nor do we think that people should be invited because they are women or people of color. We do think, consistent with the data presented earlier in this book, that White men's names are more cognitively available, and that procedures are necessary to neutralize that tendency.

All groups that invite speakers—from organizers of annual events where only one person speaks, to organizers of departmental colloquia where 4–10 individuals speak—should track whom they invite and who speaks (J. L. Martin, 2014). The Committee on the Status of Women of the American Astronomical Society tracked speakers (though not invitations) for 2013 and posted the results, along with data about the percentage of women members, at <https://cswa.aas.org/percent.html>. Without data, we have only impressions. Data will allow us to measure variation as a function of field, percentage of women or underrepresented minorities in the field, percentage of women and underrepresented minority organizers, and so on.

All-male and all-White lineups of invited speakers at conferences continue to occur. The 2015 International Congress of Quantum Chemistry conference in Beijing initially listed 24 male invited speakers and no women. Three women in chemistry began an online petition to boycott the conference. The petition received about 1,700 supporters. There was a subsequent apology by the president of the society and the conveners, who said that the list was incomplete and had been prematurely posted. Women were subsequently added to the list. Another international conference in theoretical chemistry that took place in Russia in 2014 had 10 invited speakers, all men; an advisory board of 19 scientists, all men; and an international organizing committee of 10 men.

In a study of six conferences in microbiology in two different subfields, there was a difference in how many women were invited to speak at symposia, depending on whether the members of the two-person inviting

committees for each symposium were both male or included at least one woman (Casadevall & Handelsman, 2014). In committees of two men, roughly 25% of symposium speakers were women; in contrast; in committees with one or two women, roughly 38% of symposium speakers were women. Further, there were many more all-male symposia in sessions organized by men than in those organized by committees with one or two women. Roughly a quarter of committee members included themselves as speakers, with no gender difference, so it was not the case that women were inviting themselves to speak more or less often than men were inviting themselves to speak. Similar results were found over a 21-year period in primatology talks at meetings of the American Association of Physical Anthropologists (Isbell, Young, & Harcourt, 2012) and in another study of annual conferences (Sardelis & Drew, 2016).

More research is needed to explore the underlying mechanisms for these outcomes, such as the impact of network composition on invitation offers and acceptances by both men and women. One woman suggested, on the basis of her personal experience, that men and women might offer invitations differently to women. She received an invitation that said, “I really hope you can come because the only other woman that we have is X’s partner.” They expressed no interest in her work, nor did they identify X’s partner by name. We would like to think that woman’s experience is anomalous! But women may show more enthusiasm than do men when they are inviting women, leading women invitees to be more interested in accepting. Research increasingly suggests that having women on a committee leads to more—and equivalently qualified—women speakers (Klein et al., 2017).

We recommend that all professional societies track data on nominations and final awards and make those data public, as has been accomplished in one study of awards in physics (Lincoln, Pincus, Koster, & Leboy, 2012).

Assessments of Merit

Both structural and psychological factors conspire to place men and women, Whites and people of color, in positions that differ in how likely they are to lead to large quantities of prize-worthy work or to recognition of the prize-worthy work that they do perform. Recognition is intended to celebrate the “best,” but the notion of best—despite its obvious attractions—is

not tenable without setting a number of background conditions. Without awareness of those conditions, the notion of the best ignores the many dimensions on which quality can be evaluated and it ignores the role of fashion.

For several reasons, it is difficult to define merit or to separate merit from recognition, and different fields use different metrics. In “book” fields, for example, there is often a rough consensus about which publishers offer the “best” lists in a particular field (usually known only to people in that field!), but in some “article” fields there are quantitative indicators. For example, one study attempted to separate merit from recognition by examining papers that were essentially duplicates of each other published in two different journals (which of course should not happen)—one with a high average rate of citation of its publication (or impact factor) and one with a lower rate of citation of its publications (Larivière & Gingras, 2010). Papers were deemed to be duplicates if they had the same title, the same first author, and the same number of references. For each pair of duplicates, the same paper was cited significantly more often—close to twice as often—if published in a higher impact journal.³

Some scholarship may end up in a low-impact journal (or be published by a less prestigious press) for a plethora of reasons that have nothing to do with the quality of the work, some of which were described in chapter 6. People may not be particularly conscious of prestige of the publication outlet as critical to their success and may rely on other factors (people they know publish in a particular journal or press, their advisor or colleague suggests it, etc.), so they may not weight prestige in their submission practices. People at low-prestige institutions may have few immediate colleagues in their specialty to ask for advice. Individuals and members of some groups may underestimate their chances of being published in a prestigious outlet. They may also underestimate the chances of their manuscript's being accepted at journals that do not practice double-blind review (where the author's identity and institution are not disclosed to reviewers and the reviewers' identities are not disclosed to authors). Or people, particularly White women and people of color, may receive well-meaning advice to aim for a “safe” publication outlet.

White women and people of color in fields where humans are the object of study may often study gender and race, topics frequently seen as outside

the “mainstream” of the field. For that reason they may submit manuscripts to journals and publishers that are known to be receptive to research on these topics, and that are read by others who share their interests, and are thus appropriate outlets. But such outlets may have lower impact scores and thus fail to contribute to an author’s prestige. Finally, those at institutions that provide fewer resources may not be willing or able to take the additional time or have the funds to generate additional material to meet demands of high-prestige publication outlets. When reviewers suggest that an additional experiment be run, for example, they are assuming that the authors have the time and funding to run the experiment.

One of us experienced two different “desk rejections” by editors of a highly-ranked journal for two different papers separated by 25 years; the reason given by two different male editors was that the papers relied on a “specialized sample”—college-educated women. A colleague told us about submitting a paper reporting a study that had only used African American participants to a prestigious social psychology journal. The journal declined to publish it on the grounds that there was no White control group. Both psychologists wondered about the thousands of studies with White or college-educated male participants that have no female or Black control groups but make generalizations about humans as a whole. Both published their studies in “specialty” journals. If highly cited, prestigious journals are unreceptive to new subject matter—or to gender- or race-linked subject matter—researchers have no choice but to publish elsewhere.

Finally, people may not know that it is sometimes possible to successfully challenge an editor’s rejection (though of course this does not always work!). In our own networks, considerably more White men than White women or people of color report having done this successfully. Moreover, those few White women and people of color we know who have requested reviews of editors’ decisions usually only did so after receiving advice from White men.

Inconsistency in Peer Review

Several studies have demonstrated reviewers’ fallibility, and their imperviousness to training, at least over the short run. One study asked reviewers of the *British Journal of Medicine* to successively evaluate three previously published papers on general topics; the investigators put in nine major and five

minor errors (with the original authors' permission), retitled the papers, and changed identifying details (Schroter, Black, Evans, Godlee, Osorio, & Smith, 2008). A control group received no training; the two experimental groups either received one day of live training in recognizing errors or a self-administered training package. The first paper was evaluated before any training began; the second, two to three months after training; and the third, six months later. Reviewers detected fewer than 30% of the major errors and fewer than 20% of the minor errors. Training was largely ineffective. Similar findings have been obtained in other fields (Peters & Ceci, 1982).

Articles in science and social science fields that report no differences between groups, or no statistically significant effects, are more likely to have their methodology scrutinized, no doubt in part because there are so many possible reasons for these "null" findings. The result, however, is that reviewers are more lenient with papers reporting positive effects, even when there are errors. One study created papers that were identical except for finding either a positive result or no result. Errors that were deliberately inserted in the paper were more likely to be identified in the paper that reported no effects (Emerson, Warme, Wolf, Heckman, Brand, & Leopold, 2010). The higher bar that is maintained for results that show no difference means that positive effects are overreported (Ioannidis, 2005), leading to a higher likelihood of publishing error-ridden papers (see also Franco, Malhotra, & Simonovits, 2014).

The Role of Prestige

Retractions of papers later found to be fraudulent or simply in error are more likely to occur in high-prestige journals (although retractions are extremely rare, there is a strong correlation between impact factor and retraction rate; Cokol, Iossifov, Rodriguez-Esteban, & Rzhetsky, 2007; Fang & Casadevall, 2011).

Prestige plays a role not only at the level of journals, with higher impact journals overreporting positive results, but also at the level of universities. States with higher prestige universities are most likely to produce papers finding positive results (Fanelli, 2010). Thus, individuals who are at lower prestige institutions, whose faculty produce fewer papers than do those at high-prestige institutions, are at a disadvantage.

Biased Peer Review: Gender and Status

The results thus far concern noise: the peer review system contains a lot of inconsistency. However, there are also possible sources of systematic bias in the review process, such as author gender and race or ethnicity; reviewer gender and race or ethnicity; prestige of authors' institutions; prestige of individual authors, particularly first and last authors; reviewers' publication history; and prestige of reviewers' institutions. We concentrate on author gender and author prestige, where there is ample evidence.

An experimental study asked graduate students in communications to evaluate abstracts that had been accepted for conference presentation (Knobloch-Westerwick, Glynn, & Huge, 2013). The authors varied author gender and the subfield "gender" (some subfields are associated more with men than women). Abstracts designated with male authors were rated as having higher scientific quality than the same abstracts designated with female authors, but only in fields that were seen as male. For neutral and female fields, there was no difference in ratings of male and female authors. In addition, abstracts in male fields were seen as having higher scientific quality than abstracts in female or neutral fields, but only when males were the designated authors. There were no differences between male and female participants. Both thought that the highest quality abstracts were those in male subfields with male authors. Participants with progressive attitudes toward women were less likely to favor male authors.

In this experimental study, the authors were able to create conditions where the impact of gender could be isolated from other potential factors. When examining real-life examples, where there are many variables that are not controlled, there is less evidence of gender effects due to author or reviewer. For example, a study of submissions to *Journal of Neurophysiology* (five-year impact factor of approximately 3.5), which rejects a little more than half of its submissions, detected no gender bias in acceptance rates (Lane & Linden, 2009). What is impossible to determine from this and similar observational studies is the merit of the studies rejected and accepted. When men and women, or prestigious and nonprestigious authors, receive equivalent ratings, can we safely assume that the "true" merit is equal? If fewer women or fewer nonprestigious researchers submit their work to a journal, we face the possibility that women and nonprestigious authors submit only papers that they have reason to believe are at the high end

of the distribution, while men and prestigious authors may submit papers that occupy a broader range of the distribution. What makes this possibility more than idle speculation are data demonstrating men's overentitlement and women's underentitlement, and men's overestimation of their likely performance, as we discussed earlier in this chapter.

Other studies have compared acceptance and rejection rates as a function of whether or not the reviewers are blind to author characteristics like race or gender. Here, the evidence is mixed. For example, one study compared two similar journals in behavioral ecology, one of which initiated double-blind review (in which both author's and reviewer's gender were concealed in the process) and the other of which continued with single-blind review (in which only reviewer gender is concealed; Budden, Tregenza, Aarssen, Koricheva, Leimu, & Lortie, 2008). The percentage of papers published by female first authors increased in the journal where double-blind review began, while the percentage stayed the same in the other journal. Such a finding could result either from differences in reviewer evaluations or differences in how often women submitted papers to one or another journal. Other data support the second interpretation more solidly than the first: data from the same field suggest that women are more concerned about likelihood of acceptance than men are (Aarssen, Tregenza, Budden, Lortie, Koricheva, & Leimu, 2008). Analyses of acceptance rates at two similar journals that did not practice double-blind review found no differences as a function of author sex (Primack, Ellwood, Miller-Rushing, Marrs, & Mulligan, 2009; Whittaker, 2008). Further, the rate of increase of female authors in other journals in the field of behavioral ecology seems to have been similar to the rate in the journal that instituted the double-blind review (Webb, O'Hara, & Freckleton, 2008).

To reconcile the findings of strong gender effects in laboratory studies with noneffects in the majority of journal experiences, we can suggest several possibilities. We have already mentioned that women may be more selective than men are about submitting to prestigious journals. Another possibility is that, in many fields, most articles have multiple authors of mixed genders and ethnicities, effectively reducing gender cues. Or the laboratory results could be incorrect. We consider further possibilities after discussing effects due to status.

Status effects develop from someone's structural position—whether authors are at high- or low-prestige institutions—and from the extent of

their recognition via prizes, awards, and invitations to be keynote or plenary speakers. Both types of status effects may influence how someone's work is received. Status effects are conceptually separable from the "intrinsic" merit of someone's work, but it is difficult in practice to determine whether we think an intellectual or artistic product is of high quality because of features of the work alone or because of the context in which we encounter it. It is also possible that status accrues to individuals as a result of their intrinsic merit—as the just-world hypothesis would claim. However, if recognition is contingent on status effects instead of or in addition to the objective value of someone's research, disciplines run the risk of missing contributions from individuals at low-status institutions and overvaluing those from high-status institutions. In the same way that men get a small boost in professional life just by being men, from judgments by both women and men, individuals from high-status institutions may get a small boost in professional advancement just by being at a high-status institution.

Having a good idea and publishing that good idea does not guarantee positive reception of that good idea. It is similar, though with higher stakes, to making suggestions at a meeting. A woman's suggestion may be excellent, as indicated by her peers' reception of that suggestion when it comes from a male colleague, but not get its due when it comes from her. Conversely, the suggestion may not be so great and get more than its due when presented by a man.

We have noted that academics, in part because of their commitment to the ideal university, would like to think that the just-world hypothesis holds in academia, even if nowhere else. Similarly, individuals at high-status institutions would like to believe that they are there because of their superior performance. It is thus fitting for them to command more attention than people at lower prestige schools: their ideas and work are not just good, but "better" than many other people's ideas and work; they have been properly rewarded for their efforts. For obvious reasons, it is hard to evaluate how reasonable this is.

An analysis of acceptance rates of abstracts submitted for presentation at meetings of the American Heart Association compared reviews of abstracts from two years in which only single-blind reviewing was used to three subsequent years in which double-blind reviewing was used (Ross et al., 2006). The overall acceptance rate was roughly 28%; 41% of abstracts from the United States were accepted in single-blind review, compared to 33% under

double-blind review. There were no effects of author gender in either single- or double-blind reviewing. Results on prestige of institution were confined to schools in the United States; three levels of prestige were coded. Under single-blind review, the acceptance rates for the most prestigious institutions averaged 51%; for medium-prestige schools, 43%; and for low-prestige schools, 33%. Under double-blind review, the comparable figures were 39%, 34%, and 29%. Thus, all U.S. academic institutions dropped in their acceptance rates under double-blind review, but the authors from the most prestigious schools showed the largest decline, and acceptance rates from proposers of institutions of different prestige were bunched more closely together under double-blind review. Abstracts from high-prestige institutions continued to show an advantage, but a much smaller one.

Other evidence of prestige effects comes from a study of how often multi-authored proposals of Internet protocols were accepted by a task force that determined how the Internet should be managed. For several years, when the proposals were posted for review, only the first author's name was cited, with the rest labeled as "et al." The investigators examined the difference in acceptance rate depending on whether high- or low-status individuals' names were omitted (Simcoe & Waguespack, 2011). One set of proposals could be designated as general interest: there were many such proposals, and few were chosen. In that case, failure to include a high-status individual's name in the original posting of the material resulted in lower publication. A different set of proposals was posted to one or another technical group; there, hiding a prestigious author's name had no effect. The conclusion is that when there are too many proposals to evaluate easily, readers make use of prestige to decide what to read or read carefully. Status has a signaling effect.

The discussion of prestige suggests an additional reason for a general absence of gender effects in journal paper reviews and in abstract submissions, namely, that gender is less salient than prestige cues. In the laboratory, experimenters can ensure that only gender distinguishes two conditions. The tight controls that laboratory investigations include make it different from real life, where many cues jostle with gender for influence. Prestige is a powerful cue in some contexts.

One woman, who was born and completed her undergraduate education in Japan, came to the United States for graduate study because her professors in Japan had told her there was no future for a woman in science

in Japan. The woman received her PhD in the United States in 1990 and obtained a position at a high-prestige research university in the United States. Fourteen years later she also became head of a research laboratory in Japan. Her explanation for her now being welcomed in Japan was not that Japan had changed, but that her age and experience at the U.S. university overcame the disadvantage of being a woman. The more systematic data we have presented suggest that her experience is not unusual. Real life presents us with many different factors simultaneously.

Thus, prestige may overcome gender effects unless we look only at institutions of comparable prestige. One story we savor was told to us by a woman at a very high-prestige university. She was talking to a man who said that the chair of his department was stepping down and there was no one in the department who could replace him. She said, "What about X?," naming a woman in that department who had had a cabinet position in the U.S. government, with thousands of people under her. "Oh," he said, "there's nothing to that job, you have staff who do everything. This is being chair, this is hard!" At institution A, where everyone had high prestige, additional prestige was discounted and gender came to the fore.

Citations

It is close to axiomatic that papers published in prestigious journals will receive more citations than those published in less prestigious journals, and citations lead to perceptions of achievement. This phenomenon is something of a closed loop. If enough people agree that something counts as an outstanding achievement, then it is one. There is no court of higher opinion until history has its say and the historical record changes. If something should have spurred research but did not, was it still an achievement? If a certain path that many people followed turns out to be a dead end, was the achievement of the person who inspired many people to go down that path a genuine achievement or the unfortunate result of someone's being very convincing?

With those caveats in mind, we consider variables that might affect citation rates. One notable example of how the accumulation of advantage works can be seen in status effects, where the rich get richer. It appears, for example, that Leibniz and Newton independently invented calculus (although each had some information about the other's methods and they had some correspondence). Leibniz, in 1684, published his first paper,

laying out differential calculus, while Newton did not publish his variant until 1693. Yet Newton commonly receives the credit for inventing the calculus, perhaps because of the prestige of Great Britain's Royal Society.⁴

If we take the example of Leibniz and Newton at face value, it suggests that above and beyond the "objective" value of one's contributions, recognition in the form of prizes and awards or a position at a high-prestige institution affects how one's projects are received by others. A report of a "natural experiment" examined the citation rate for papers that were published before their authors received a prestigious award, namely, becoming a Howard Hughes Medical Investigator (Azoulay, Stuart, & Wang, 2014). For individuals who already had high status, becoming a Howard Hughes Medical Investigator had little effect. But for individuals with lower status, the award increased citations of previously published papers. Thus, upward changes will be particularly important for those with lower status, including women and people of color.

We referred earlier to the problem of null findings. Compounding that problem is that subsequent researchers, especially in some disciplines, are more likely to pay attention to reports of positive findings than to reports of no effects (Fanelli, 2013). The very fact that prestigious journals have a bias to publish positive findings means that positive findings will be over-cited. Across all fields, positive results are cited about 30% more often than negative results (Fanelli, 2013), with large variability by field.

Journal prestige, recency of references, number of references, and degree of citation of highly cited papers appear to be more important factors than author prestige (as measured by prior citations) or prestige of authors' institutions (see reviews by Didegah & Thelwall, 2013; Onodera & Yoshikane, 2015). The fact that papers with more recent and numerous references tend to be cited more often than those with older and fewer references (Onodera & Yoshikane, 2015) may reflect a rational choice on the part of readers (a preference not to cite a paper that is not au courant).

The weaker findings for prestige of author and institution may be due to several factors. One is that some studies have examined the prestige only of the first author, who is not necessarily the lead author. Another is that prestigious journals' authors are already likely to be at high-prestige institutions. There are so many variables that affect a paper's reception, and those variables interact in so many complex ways, that it is difficult to provide a clear answer to the question of what factors determine how

frequently a paper is cited. A machine-learning effort to predict citation rates finds variation across discipline in the importance of different factors. For example, the use of highly cited references is more important in biology than physics, as is authors' prestige and institution prestige (Livne, Adar, Teevan, & Dumais, 2013).

Finally, gender disparities in rate of self-citation affect rates of citation overall (King, Bergstrom, Correll, Jacquet, & West, 2016; West, Jacquet, King, Correll, & Bergstrom, 2013). Between 1991 and 2011, men cited their own work 70% more frequently than women cited theirs.

We note in closing this discussion that fields in which the primary scholarly form is journal publication are studied much more intensively than fields in which the primary scholarly form is books. That said, many of the same factors appear to be relevant (though precisely how relevant is not clear). For example, awards for books are coveted, and books are often awarded more than one prize (perhaps a result of the accumulation of advantage), and individuals from prestigious institutions appear to be the winners of the most prestigious awards (for books and also for fellowships). Gender and race and ethnicity play a role in the distribution of individuals in most of those fields at more and less prestigious institutions, and gender and race and ethnicity schemas apply to judgment processes. For these reasons we suspect that prestige, gender, and race and ethnicity are important factors affecting recognition in book fields, despite the dearth of research examining them.

Working at a High-Prestige Institution

Prestige of institution matters to faculty in all fields on a daily basis in the provision of resources, both material and collegial. Consider a thought experiment in which two individuals, A and B, of equivalent talent (which we stipulate for this example even though we think "talent" is insufficiently multidimensional), effort, and achievement, each have offers from the same two schools—one is a research-intensive school and the other a teaching-intensive school. Person A is single and accepts the offer from the research-intensive school. Person B has a partner, C. C is also a talented academic and has an offer from a third school, a research-intensive institution 3,000 miles away from the research-intensive institution that offered B a position. Neither research-intensive school will offer B's or C's partner

a position. But C also has an offer from the same teaching-intensive school that offered B a position. B and C decide that they want to live together, rather than commute 3,000 miles on a semiregular basis. They both accept positions at the teaching-intensive school even though they would both prefer, on purely professional grounds, to be at research-intensive schools.

Whose research career, measured in traditional terms—publication and citation in high-prestige outlets, visibility, influencing graduate students and postdocs—is more likely to flourish? It must be A's since A has access to resources that B and C do not have.

Even in fields where research funding—to buy equipment and to hire assistants or fund students—is less important, prestige of institution affects one's ability to do one's work. Research-intensive institutions are, almost by definition, designed to facilitate faculty research, regardless of field. In research-intensive institutions and in highly ranked liberal arts colleges, faculty will be more experienced at writing proposals for the kinds of fellowships and travel and scholarship grants that enable the research necessary for writing books. In addition, the institutional infrastructure is likely to work better at every level: classrooms, offices, and laboratories are better equipped with technology and furniture; the libraries have extensive holdings; the classrooms, offices, and laboratories, are more likely to be clean, bright, free of vermin, warm in winter and cool in summer, and functional. The duplicating machines mostly work. There is an office that will produce posters. The bathrooms are more often free of graffiti or repainted when graffiti appear, the toilets flush reliably, toilet paper and paper towels are replenished as needed. The elevator is more likely to respond by lighting up when the user presses a button. The grounds are more likely to be well-kept. The staff are more likely to be adequately paid and competent. The teaching assistants are more likely to be capable and well supported. Instructors' teaching responsibilities leave them time to perform research and to accommodate undergraduate students as well as graduate students and postdocs in individual projects. The grants office(s) and institutional review boards are at least relatively well run by helpful individuals who understand federal, state, and local requirements and have experience submitting grants and evaluating research.

In addition to the tangible benefits of being at a research-intensive institution are the intangible benefits of being in the company of people who are recognized leaders in their field, of being part of a network of individuals

who know people with whom it might be desirable to collaborate or who know techniques or have information that will help one with one's work, and of having graduate students who are already well trained. All of those features, tangible and intangible, help to produce achievements.

There are also negative aspects to very highly research-intensive environments. The environment in such schools can feel oppressive, confining, isolating, and overly pressured. Faculty who care deeply about teaching may feel that teaching is not appreciated. Those who care about creating an inclusive and welcoming academic community for both faculty and students may feel they are in an unappreciated minority. The emphasis in the sciences on attaining funding and publishing frequently can make it difficult for researchers to think more broadly about their work, to go in new directions, or to incubate an idea. And an emphasis on external funding may lead faculty in the humanities and the humanistic social sciences to feel devalued.

The advantages and disadvantages of working at a research-intensive institution are thus two sides of the same coin. Everything is in place for a faculty member to be productive in certain specific terms, such as scholarly publication (Joy, 2006). Faculty who are not productive in those ways or who have other important goals and values may feel, at a minimum, out of place.

Whether the commitment to publication of scholars at research institutions is higher, whether such scholars profit from the advantages that research institutions offer, or some combination of both, cannot be answered by the data we have reviewed. We suggest that the higher publication productivity of individuals at research-intensive institutions is at least a combination of both and, given the facts we have reviewed, is in many cases due to the advantages of a research institution. Other research has attributed the difference in publication quantity between men and women to structural factors like prestige of institution (e.g., Xie & Shauman, 2003).

One objection to that conclusion might be that even if the prestige of an institution affects publication productivity, high-prestige institutions primarily serve an amplifying function: they support the performance of people who are already performing very highly. The benefits of that support compound over time—advantage accumulates. Yet there is evidence that location affects publication productivity as much as or more than publication productivity affects a researcher's institutional location. One study tracked chemists' publication productivity as a function of the prestige of

the institutions they taught at. Moves “up” the prestige ladder led to more publications; moves “down” led to fewer (Allison & Long, 1990). Publication productivity contributed to location, but location had an independent effect. More recent research suggests that more productive researchers are more likely to move up than down, and that mobility up increases productivity even further (Fernández-Zubieta, Geuna, & Lawson, 2015).

A study outside academia looked at the short-term effects of arbitrarily bestowed benefits in four different areas (van de Rijt, Kang, Restivo, & Patil, 2014). At a crowdfunding source the researchers randomly chose 100 start-ups to give money to and another 100 to track as a control group. Neither the control nor the experimental start-ups had received any funding 24 days before the date by which their goal would expire. The initial randomly placed benefit led to significantly more subsequent funding. The advantage of this study is that the start-ups were randomly divided into a control and an experimental group. In real life, selection committees do not choose randomly among their top candidates when hiring and bestowing awards. The disadvantage is that the tracking period was relatively short, so long-term benefits could not be assessed. The simulation is imperfect in another way: research-intensive institutions provide a suite of constantly active benefits to individuals rather than a one-time infusion of cash. Nevertheless, the data are valuable because they show that randomly placed benefits prime the pump for more benefits.

Presence at a research-intensive institution does not, however, guarantee that researchers’ work will be creative. There is evidence that the pressure for immediate results works against new ideas in a comparison of individuals with funding from the National Institutes of Health (NIH) and individuals with funding from the Howard Hughes Medical Institute (HHMI). The individuals were matched on a variety of characteristics, including receipt of other prestigious awards. The investigators compared the researchers’ productivity, likelihood of producing very highly cited papers, and likelihood of producing papers that were seldom cited (Azoulay, Graff Zivin, & Manso, 2011). HHMI investigator awards are for five years, with the possibility of one renewal; NIH awards range from three to five years. HHMI awards are to the person, rather than a particular project, while NIH awards are for a specific set of proposed studies. Investigators are free to ignore the NIH reviews, but, mindful of the need to have results for the next round of

funding, are unlikely to do so. In theory, HHMI, more than NIH, provides individuals with time to explore high-risk ideas.

The HHMI investigators indeed took more risks, as measured by the number of their papers with fewer citations than any they had published before receiving the HHMI award (adjusted for date of publication; Azoulay et al., 2011). They also, however, published papers that were more highly cited than those prior to receiving the HHMI award. An examination of the keywords for the HHMI researchers' papers showed that they explored new directions.

We recognize that individuals at both low- and high-prestige institutions have difficulties. Researchers at low-prestige institutions generally lack many resources to do the work that can be done at high-prestige institutions and have higher teaching responsibilities, but they are also free to explore new ideas. Researchers at high-prestige institutions may have the resources they need and have lower teaching demands, but they are also under pressure to conduct fundable research and publish as much as possible.

Our thought experiment about three equivalently talented candidates who took jobs at research-intensive versus teaching-intensive institutions was intended to show that individuals with equal potential can, for reasons external to talent and effort, take jobs at very different types of institutions. There is increasing recognition that many fields are overproducing PhDs for the available academic positions (Ghaffarzadegan, Hawley, Larson, & Xue, 2015). Every top-rated university grants more PhDs every year than there are academic jobs available for those doctorate holders. Where are those newly minted PhDs going to go? In fields that require postdoctoral positions, there is room for many more postdocs than for assistant professors, but there is a similar, if somewhat smaller, glut of postdocs. There are not enough jobs available for them, either. For a fair number of people, then, chance—or extra-academic factors—determines whether they end up at an elite institution, a less prestigious institution, or outside academia. An individual's commitment and ambition could be one factor, but the sheer paucity of positions is an overwhelming consideration.

The paucity of positions at top-rated schools works against a successful job search for any candidate, but especially for women and people of color. A small amount of advantage for White men can make the difference in the type of institution at which a researcher gets his or her first job.

Although people of every description teach at lower prestige institutions, White men are overrepresented as faculty at high-prestige institutions. The slight advantage for White (and, in science, Asian) males results in fewer women and people of color at top-rated institutions. In particular, top-rated institutions hire a smaller percentage of women than they graduate.

For structural and schema-related reasons, White women and people of color are more likely to obtain positions at schools that do not foster the quantity (and perhaps the quality) of research that is required for visibility. At medium levels of quantity, they are less likely to be recognized by the field as a whole. In addition, they often do not have as part of their immediate professional network people who will nominate them for prizes and write effective letters for them. This pattern can be altered, but only if the top-tier institutions recognize the merit they are currently missing and make a serious effort to alter their distribution of faculty with different backgrounds, and only if professional societies encourage and develop opportunities for nominations of people from diverse institutions.

Summary

Informal recognition is a very important part of faculty life, and a culture that supports it can and should be created and enhanced wherever possible. In addition, departments and institutions may benefit, and create higher faculty morale, if they create low-cost forms of recognition of many kinds of faculty labor: teaching, mentoring, community service, institutional service, and scholarship. It is critical that these forms of recognition be distributed fairly; one way to ensure that this occurs is to engage all faculty in the process of nomination and selection of individuals for awards; another is to create procedures that minimize the likelihood of a small group's receiving most forms of recognition.

Formal recognition at national and international levels is demonstrably vulnerable to some nonrational factors that produce biased outcomes. Neither formal award selection nor peer review of publications and applications for funding is reliable, in the technical sense of high consensus among reviewers, except at the extremes. Gender does not seem to play a consistent role in publication and grant acceptance rates, but it may play a role in paper and grant submission rates since submission rates to high-prestige journals and to granting agencies tend to be lower for women than for men.

Prestige clearly plays a role in all of the outcomes for formal recognition. To the extent that White women and people of color are underrepresented at the most prestigious institutions and overrepresented at less prestigious institutions, their work is more likely to go unrecognized. Both advantage and disadvantage will continue to accumulate in the domain of formal recognition unless major effort is invested in reducing the roles of schemas and prestige in awarding formal recognition. Institutions and professional organizations can improve the procedures by which individuals are recognized.

Recommendations for Practices that Improve Faculty Recognition Processes

Administrative Leaders (Presidents, Provosts, Deans, Department Chairs)

1. Administrative leaders can create a climate of informal recognition of faculty accomplishment, in part by practicing recognition themselves—naming particular contributions, thanking individual faculty in writing or orally for them, and holding other leaders accountable for identifying faculty contributions of many different kinds.
2. Administrative leaders can create formal recognition for many kinds of contributions by faculty and can seek funding to include some kind of financial element. The procedures for nominations should allow many faculty to make nominations (including self-nomination) and should engage many diverse faculty in the selection process.
3. Institutions can make a concentrated effort to nominate their faculty—including White women and underrepresented minorities—for disciplinary and meta-disciplinary awards. The more awards faculty have, the better known their department and institution will be, the more likely it is that faculty will be successful in getting grants, and the more likely it is that their letters of recommendations for students will count.
4. If nominators are not knowledgeable about the potential nominees' work, they can confer with them about the names of external people who could be approached about nominating the person. Consulting the letters of recommendation that were written for people when they were hired or the referee letters that were written when they was promoted could be useful. The people who wrote those letters thought well of the potential awardee and might thus be willing to nominate or conominate them. The

chair of a department, or the dean or provost of a school, can also be a nominator, using as a draft a letter that someone else at the institution may have written. The institution's imprimatur will be helpful.

5. Some departments and some schools have committees that are charged with identifying potential awardees and matching them with potential awards. A committee structure helps solve the problem of lack of knowledge of a person's work, makes it more likely that helpful ideas will emerge, and increases everyone's knowledge about awards.

6. Many people may not know how to write a good letter even if they are knowledgeable about the potential nominee's work. To solve that problem, a nominator can write a letter and ask for constructive critiques from others, both inside and outside the institution. A well-crafted letter carries weight.

7. The nomination letter, updated as appropriate, can be submitted again. Many nominees only win on their third round. That, too, is a fact that is not widely known.

8. As with all institutional metrics, it is important to track the distribution of informal and formal awards as well as nominations by gender, race-ethnicity, and field. Regular review of those data can identify underrecognized individuals and fields and can lead to corrections in the process.

Disciplinary and Metadisciplinary Societies (Like the National Academies)

1. Disciplinary societies should track their own data over time by gender and ethnicity in a way similar to what we recommend for evaluating job candidates. If the data can be published without revealing anyone's identity, they should be published:

- Who is nominated? Is the proportion of women and underrepresented minority nominees what would be expected relative to the membership of the society? If not, the society needs to do more to solicit nominations from underrepresented groups.
- Among those who are in the nomination pool, who receives an award? Is the proportion by demographic group what would be expected given the pool? If not, the society needs to examine its evaluation metrics and procedures.
- Are the awards affected by the number or percentage of women and underrepresented minority members on the awards committee? If so, the

society needs to probe for the reasons and appoint committees likely to make fair decisions.

- Are the awards affected by the type of institution where nominees are located? If so, the society needs to rethink the basis for its awards.

Conference Organizers and Colloquium Committee Members

1. At conferences, there are generally several invited speakers, or several symposia with invited participants. At graduation ceremonies and departmental colloquia, there are generally several honorary degree recipients or speakers each year. Include members of underrepresented groups among them.
2. Suggestions for organizers can be found in several places: at the Gendered Conference Campaign (<https://feministphilosophers.wordpress.com/gendered-conference-campaign/>), at the blogspot For Gender Equity at Conferences (<http://forgenderequityatconferences.blogspot.com/>), and in a range of articles (Casadevall, 2015; J. L. Martin, 2014; Masur, 2015).
3. Especially if you are inviting people from small or teaching-intensive institutions, provide funding for them. If they decline, find out why and see if you can accommodate their needs. Ask other White women and people of color if the first invitees decline.
4. Express enthusiasm and respect in your invitation.

Conference Hosts and Funders

1. Institutions that host conferences and workshops, and funders that sponsor them, can hold organizers accountable for equitable lineups. That means that to receive hosting or funding, organizers present their best estimates of the composition of the pool from which they can draw speakers and detail their plans for issuing invitations and ensuring appropriate representation.

Individual Faculty

1. Contribute to a culture of informal appreciation:
 - Express your appreciation of your colleagues' contributions.
 - Pass on to your colleagues the positive things you hear about them from students and others.
2. If you are a White female faculty member, or a faculty member of color, accept invitations to speak!
3. If you are a White woman or member of a racial-ethnic or other underrepresented minority in your field, consider organizing symposia. By

organizing a symposium or workshop, you can introduce a theme you think is important; structure it in a way that you think makes sense; and include yourself, a colleague, and/or a student as a presenter.

4. If you are a White man who is invited to speak at conferences, you can ask the organizer some variation of this: "I think it's important to have a gender balance at conferences. You probably do, too. Could you tell me what you are doing to ensure that?" Then you decide whether you think the organizers' efforts are adequate. If not, decline. You may have to forfeit some invitations in order to live according to this principle.

5. Do not be shy about looking for awards you might be eligible for. You can look at the CVs of past awardees and compare it with yours to see whether you are on track. You can draft a sample nomination letter to give to someone else and ask people for tips on what to emphasize and how to bring out what is most important about your work. Ask the most prestigious people you can to nominate you.

6. If you have been the recipient of awards, use your status to nominate those who you know are deserving but may not otherwise be nominated.

Notes

1. Although that interviewee mentioned a long time lag, the average lag between the publication date of the work that is cited as important and the receipt of the prize is 5 years in physics, 9 in chemistry, and 11 in medicine or physiology (Chan & Torgler, 2013).

2. There have been attempts to estimate the percentage of conference speakers who should be female, based on any distribution of males and females who could be invited. There are different ways of making this estimate, and different conclusions to draw depending on what one calculates. One way uses the Poisson distribution and, via an interactive applet from Aanand Prasad (<http://aanandprasad.com/diversity-calculator/?groupName=women&numSpeakers=20&populationPercentage=10/>), predicts the likelihood of overrepresentation, exact representation, and zero representation, as a function of how one sets different parameters. For example, if women are 10% of available speakers, and there is a random selection of 20 speakers, women should be *overrepresented* 32% of the time, exactly represented 29% of the time, and not represented at all 12% of the time. But with that applet one cannot calculate, say, the probability of having two or fewer speakers, or two or more speakers. Another applet (vassarstats.net; several clicks are required to get to the applet itself) will do that, using the binomial theorem to estimate the likelihood of a given outcome or that outcome plus more extreme outcomes. The probability of obtaining

one or fewer female speakers is 0.39, rather a large percentage. The probability of obtaining two or fewer is 0.68, and the probability of obtaining two or more is 0.61. What one can conclude is that, by chance, one would expect women to be over-represented considerably more often than is the case, but one would also expect to see women underrepresented often, as is the case. For mathematics, Martin (2015) analyzes two conferences, estimating the pool of female speakers at 25%, and finds that women are underrepresented more often than one would expect by chance. The math for Martin's estimates is given here: <http://www.laurenbacon.com/how-likely-is-an-all-male-speakers-list-statistically/>

The site <https://biaswatchneuro.com/> tracks the percentages of female invited speakers to a variety of conferences in topics related broadly to neuroscience. In a helpful move, the site estimates the base rate of women in the field and provides the basis for the estimation. For example, on December 2, 2016, it summarized the gender breakdown for speakers at a conference held in Germany on episodic memory—one woman and six men—and gave a link to the conference. It estimated the pool as 45% female. It stated how they arrived at their estimate: they searched the “NIH RePORTER with keyword ‘episodic memory’ and counted the ratio of women among the unique researchers in pages 1, 3, 7, 9 and 10 of 10 results pages.” And see Schroeder, Dugdale, Radersma, Hinsch, Buehler, Saul, et al. (2013) for information about evolutionary biology.

3. Impact factors are established yearly for journals in some fields, based on the average number of citations in a given year to articles published in the preceding two years. Within the natural sciences, *Science* and *Nature* have very high impact factors (roughly 35 and 38, respectively), reflecting the breadth and importance of articles that they publish, while highly respected specialty journals, such as the suite of physics journals *Physical Review A-E* range from about 2.5–8. Small fields automatically have journals with small impact factors—there are not enough researchers to write enough articles with enough references to yield a high citation count.

4. The full story is considerably more complicated, but it seems relatively clear that Leibniz's and Newton's methods were different, that integral and differential calculus was due to Leibniz, and that infinitesimal calculus was due to Newton. Arguments raged at the time about whether Leibniz saw Newton's notebooks, but their methods were sufficiently different that seeing Newton's notebooks could have done little more for Leibniz than reassure him that he was on the right track.

References

- Aarssen, L. W., Tregenza, T., Budden, A. E., Lortie, C. J., Koricheva, J., & Leimu, R. (2008). Bang for your buck: Rejection rates and impact factors in ecological journals. *Open Ecology Journal*, 1(1), 14–19.

Algoe, S. B., Kurtz, L. E., & Hilaire, N. M. (2016). Putting the “you” in “thank you”: Examining other-praising behavior as the active relational ingredient in expressed gratitude. *Social Psychological & Personality Science*, 7(7), 658–666.

Allison, P. D., & Long, J. S. (1990). Departmental effects on scientific productivity. *American Sociological Review*, 55, 469–478.

Azoulay, P., Graff Zivin, J. S., & Manso, G. (2011). Incentives and creativity: Evidence from the academic life sciences. *Rand Journal of Economics*, 42(3), 527–554.

Azoulay, P., Stuart, T., & Wang, Y. (2014). Matthew: Effect or fable? *Management Science*, 60(1), 92–109.

Budden, A. E., Tregenza, T., Aarssen, L. W., Koricheva, J., Leimu, R., & Lortie, C. J. (2008). Double-blind review favours increased representation of female authors. *Trends in Ecology & Evolution*, 23(1), 4–6.

Cantore, S. P., & Cooperrider, D. (2013). Positive psychology and Appreciative Inquiry: The contribution of the literature to an understanding of the nature and process of change in organizations. In H. S. Leonard, R. Lewis, A. M. Freedom, & J. Passmore (Eds.), *The Wiley-Blackwell handbook of the psychology of leadership, change, and organizational development* (pp. 267–287). New York, NY: Wiley.

Casadevall, A. (2015). Achieving speaker gender equity at the American Society for Microbiology meeting. *mBio*, 6(4), e01146–15. <http://mbio.asm.org/content/6/4.toc>

Casadevall, A., & Handelsman, J. (2014). The presence of female conveners correlates with a higher proportion of female speakers at scientific symposia. *mBio*, 5(1), e00846–13.

Chan, H. F., Gleeson, L., & Torgler, B. (2014). Awards before and after the Nobel Prize: A Matthew effect and/or a ticket to one’s own funeral? *Research Evaluation*, 23(3), 210–220.

Chan, H. F., & Torgler, B. (2013). Science prizes: Time-lapsed awards for excellence. *Nature*, 500(7460), 29.

Cokol, M., Iossifov, I., Rodriguez-Esteban, R., & Rzhetsky, A. (2007). How many scientific papers should be retracted? *EMBO Reports*, 8(5), 422–423.

Cooperrider, D. L. (1990). Positive image, positive action: The affirmative basis of organizing. In S. Srivastva & D. L. Cooperrider (Eds.), *Executive appreciation and leadership* (pp. 91–125). San Francisco, CA: Jossey-Bass.

Correll, S. J. (2004). Constraints into preferences: Gender, status, and emerging career aspirations. *American Sociological Review*, 69(1), 93–113.

DeCelles, K. A., DeRue, D. S., Margolis, J. D., & Ceranic, T. L. (2012). Does power corrupt or enable? When and why power facilitates self-interested behavior. *Journal of Applied Psychology*, 97(3), 681–689.

Didegah, F., & Thelwall, M. (2013). Determinants of research citation impact in nanoscience and nanotechnology. *Journal of the American Society for Information Science and Technology*, *64*(5), 1055–1064.

Emerson, G. B., Warme, W. J., Wolf, F. M., Heckman, J. D., Brand, R. A., & Leopold, S. S. (2010). Testing for the presence of positive-outcome bias in peer review: A randomized controlled trial. *Archives of Internal Medicine*, *170*(21), 1934–1939.

Fanelli, D. (2010). Do pressures to publish increase scientists' bias? An empirical support from US States Data. *PLoS One*, *5*(4), e10271.

Fanelli, D. (2013). Why growing retractions are (mostly) a good sign. *PLoS Medicine*, *10*(12), e1001563. doi:10.1371/journal.pmed.1001563

Fang, F. C., & Casadevall, A. (2011). Retracted science and the retraction index. *Infection and Immunity*, *79*(10), 3855–3859.

Fernandez-Zubieta, A., Geuna, A., & Lawson, C. (2015). Mobility and productivity of research scientists. In A. Geuna (Ed.), *Global mobility of research scientists: The economics of who goes where and why* (pp. 105–132). San Diego, CA: Academic Press.

Franco, A., Malhotra, N., & Simonovits, G. (2014). Publication bias in the social sciences: Unlocking the file drawer. *Science*, *345*(6203), 1502–1505.

Frank, R. H. (2016). *Success and luck: Good fortune and the myth of meritocracy*. Princeton, NJ: Princeton University Press.

Ghaffarzagadan, N., Hawley, J., Larson, R., & Xue, Y. (2015). A note on PhD population growth in biomedical sciences. *Systems Research and Behavioral Science*, *32*(3), 402–405.

Hermanowicz, J. C. (2009). *Lives in science: How institutions affect academic careers*. Chicago, IL: University of Chicago Press.

Ioannidis, J. P. (2005). Why most published research findings are false. *PLoS Medicine*, *2*(8), e124.

Isbell, L. A., Young, T. P., & Harcourt, A. H. (2012). Stag parties linger: Continued gender bias in a female-rich scientific discipline. *PLoS One*, *7*(11), e49682.

Jackowska, M., Brown, J., Ronaldson, A., & Steptoe, A. (2016). The impact of a brief gratitude intervention on subjective well-being, biology and sleep. *Journal of Health Psychology*, *21*(10), 2207–2217.

Joy, S. (2006). What should I be doing, and where are they doing it? Scholarly productivity of academic psychologists. *Perspectives on Psychological Science*, *1*, 346–364.

King, M. M., Bergstrom, C. T., Correll, S. J., Jacquet, J. J., & West, J. D. (2016). Men set their own cites high: Gender and self-citation across fields and over time. arXiv:1607.00376 [physics.soc-ph]

Klein, R. S., Voskuhl, R., Segal, B. M., Dittel, B. N., Lane, T. E., Bethea, J. R., et al. (2017). Speaking out about gender imbalance in invited speakers improves diversity. *Nature Immunology*, *18*(5), 475–478.

Knobloch-Westerwick, S., Glynn, C. J., & Huges, M. (2013). The Matilda effect in science communication: An experiment on gender bias in publication quality perceptions and collaboration interest. *Science Communication*, *35*(5), 603–625.

Lane, J. A., & Linden, D. J. (2009). Is there gender bias in the peer review process at *Journal of Neurophysiology*? *Journal of Neurophysiology*, *101*(5), 2195–2196.

Larivière, V., & Gingras, Y. (2010). The impact factor's Matthew effect: A natural experiment in bibliometrics. *Journal of the American Society for Information Science and Technology*, *61*(2), 424–427.

Lerner, M. J. (1980). *The belief in a just world: A fundamental delusion*. New York, NY: Plenum Press.

Lincoln, A., Pincus, S., Koster, J., & Leboy, P. (2012). The Matilda effect in science: Awards and prizes in the United States, 1990s and 2000s. *Social Studies of Science*, *42*(2), 307–320.

Livne, A., Adar, E., Teevan, J., & Dumais, S. (2013, February). Predicting citation counts using text and graph mining. In *Proceedings of the iConference 2013 Workshop on Computational Scientometrics: Theory and Applications*.

Maddox, B. (2002). *Rosalind Franklin: The dark lady of DNA*. London, UK: HarperCollins.

Martin, G. (2015). Addressing the underrepresentation of women in mathematics conferences. *arXiv preprint arXiv:1502.06326*.

Martin, J. L. (2014). Ten simple rules to achieve conference speaker gender balance. *PLoS Computational Biology*, *10*(11), e1003903. doi:10.1371/journal.pcbi.1003903

Masur, S. (2015, December). Great meetings require great speakers: Finding the women speakers you need. *American Society for Cell Biology Newsletter*. Retrieved January 27, 2018, from <http://www.ascb.org/newsletter/2015-december-newsletter/great-meetings-require-great-speakers-finding-women-speakers-need/>

Murphy, M. C., Steele, C. M., & Gross, J. J. (2007). Signaling threat: How situational cues affect women in math, science, and engineering settings. *Psychological Science*, *18*(10), 879–885.

Nittrouer, C. L., Hebl, M. R., Ashburn-Nardo, L., Trump-Steele, R. C. E., Lane, D. M., & Valian, V. (2018). Gender disparities in colloquium speakers at top universities. *Proceedings of the National Academy of Sciences*, *115*(1), 104–108.

Onodera, N., & Yoshikane, F. (2015). Factors affecting citation rates of research articles. *Journal of the Association for Information Science and Technology*, *66*(4), 739–764.

Pelham, B. W., & Hetts, J. J. (2001). Underworked and overpaid: Elevated entitlement in men's self-pay. *Journal of Experimental Social Psychology, 37*(2), 93–103.

Perc, M. (2014). The Matthew effect in empirical data. *Journal of the Royal Society, Interface, 11*(98), 1–15, 20140378.

Peters, D. P., & Ceci, S. J. (1982). Peer-review practices of psychological journals: The fate of published articles, submitted again. *Behavioral and Brain Sciences, 5*(02), 187–195.

Primack, R. B., Ellwood, E., Miller-Rushing, A. J., Marrs, R., & Mulligan, A. (2009). Do gender, nationality, or academic age affect review decisions? An analysis of submissions to the journal *Biological Conservation*. *Biological Conservation, 142*(11), 2415–2418.

Reuben, E., Sapienza, P., & Zingales, L. (2014). How stereotypes impair women's careers in science. *Proceedings of the National Academy of Sciences of the United States of America, 111*, 4403–4408.

Ross, J. S., Gross, C. P., Desai, M. M., Hong, Y., Grant, A. O., Daniels, S. R., et al. (2006). Effect of blinded peer review on abstract acceptance. *Journal of the American Medical Association, 295*(14), 1675–1680.

Sardelis, S., & Drew, J. A. (2016). Not “pulling up the ladder”: Women who organize conference symposia provide greater opportunities for women to speak at conservation conferences. *PLoS One, 11*(7), e0160015.

Sawaoka, T., Hughes, B. L., & Ambady, N. (2015). Power heightens sensitivity to unfairness against the self. *Personality and Social Psychology Bulletin, 41*(8), 1023–1035.

Schroeder, J., Dugdale, H. L., Radersma, R., Hinsch, M., Buehler, D. M., Saul, J., et al. (2013). Fewer invited talks by women in evolutionary biology symposia. *Journal of Evolutionary Biology, 26*(9), 2063–2069.

Schroter, S., Black, N., Evans, S., Godlee, F., Osorio, L., & Smith, R. (2008). What errors do peer reviewers detect, and does training improve their ability to detect them? *Journal of the Royal Society of Medicine, 101*(10), 507–514.

Simcoe, T. S., & Waguespack, D. M. (2011). Status, quality, and attention: What's in a (missing) name? *Management Science, 57*(2), 274–290.

Smith, D. O. (2011). *Managing the research university*. New York, NY: Oxford University Press.

Summers, L. H. (2005, January 14). Remarks at NBER conference on diversifying the science and engineering workforce. https://www.harvard.edu/president/speeches/summers_2005/nber.php/

Tost, L. P., Gino, F., & Larrick, R. P. (2012). Power, competitiveness, and advice taking: Why the powerful don't listen. *Organizational Behavior and Human Decision Processes*, *117*(1), 53–65.

Valian, V. (2013). Invite women to talk. *Nature*, *495*, 36.

van de Rijt, A., Kang, S. M., Restivo, M., & Patil, A. (2014). Field experiments of success-breeds-success dynamics. *Proceedings of the National Academy of Sciences of the United States of America*, *111*(19), 6934–6939.

Watson, J. D. (1980). *The double helix: A personal account of the discovery of the structure of DNA*. New York, NY: Atheneum.

Webb, T. J., O'Hara, B., & Freckleton, R. P. (2008). Does double-blind review benefit female authors? *Trends in Ecology & Evolution*, *23*(7), 351–353.

West, J. D., Jacquet, J., King, M. M., Correll, S. J., & Bergstrom, C. T. (2013). The role of gender in scholarly authorship. *PLoS One*, *8*(7), e66212.

Whittaker, D. (2008). Journal review and gender equality: A critical comment on Budden *et al.* *Journal of Biogeography*, *23*(9), 478–479.

Xie, Y., & Shauman, K. A. (2003). *Women in science: Career processes and outcomes*. Cambridge, MA: Harvard University Press.