# How to Recognize and Address Unconscious Bias

Magali Fassiotto and Sabine C. Girod

Despite the dramatic increase in the number of women and racial minorities pursuing careers in medicine, their representation among medical school faculty remains strikingly low. One potential explanation for this disparity is unconscious bias: opinions that we hold about different social groups that operate outside of our conscious awareness. During the past few decades, social scientists have discovered that unconscious bias can strongly influence the way we evaluate and treat other people. This chapter explains the nature of unconscious bias and how it might impact the careers of women and minority faculty members. We first explain what unconscious bias is and what social scientists know about why

unconscious bias exists. Next we briefly cover the ways that unconscious bias affects the careers of junior faculty. We then outline several specific strategies that individuals and institutions can take in order to prevent unconscious bias from negatively influencing careers. At the individual level, these strategies include promoting awareness in self and others, adopting a growth mindset, building and maintaining strong professional networks, and taking charge of one's own career development. Institutional strategies include promoting awareness across the workplace, developing structured recruitment processes, and reflecting inclusion in the institutional environment.

Despite the dramatic increase in the number of women and racial minorities pursuing careers in medicine, their representation among medical school faculty remains strikingly low. One potential explanation for this disparity is *unconscious bias*: opinions that we hold about different social groups that operate outside of our conscious awareness. During the past few decades, social scientists have discovered that unconscious bias can strongly influence the way we evaluate and treat other people. For that reason, it is important to understand what unconscious bias is and how it might influence one's career.

The medical field has become increasingly diverse in the past 50 years. In 2017, women made up 48%, nearly half, of all medical school students. The number of racial minorities in

M. Fassiotto
Office of Faculty Development and Diversity, Stanford University School of Medicine, Stanford, CA, USA
e-mail: magali.fassiotto@stanford.edu

S. C. Girod (✉)
Department of Surgery, Stanford University Medical Center, Stanford, CA, USA
e-mail: sgirod@stanford.edu

medical school has also increased: the number of those considered underrepresented in medicine grew by 28% from 2013 to 2017, while the total number of enrolled medical students in the same time period grew by just 7.9%. Despite these changes, a 2017 report by the Association of American Medical Colleges (AAMC) found that women and minorities make up a small proportion of faculty in academic medicine. According to AAMC estimates, women make up just 24% of faculty at the rank of Full Professor. African-Americans and those of Hispanic origin make up only 6% of all medical school faculty. The composition of medical school faculty has not kept up with either the growing diversity of physicians-in-training or society at large.

Enough time has passed such that "pipeline" explanations cannot explain these disparities. We believe that until individuals and institutions address the issue of unconscious bias, faculty from underrepresented groups will continue to have a difficult time climbing the academic ladder. The aim of this chapter is to help the academic physician identify and understand unconscious bias so that he or she may take steps to prevent it from negatively influencing his or her career.

## What Is Unconscious Bias?

*Unconscious bias* includes opinions and attitudes that we are not consciously aware of having. Unconscious bias can be difficult to grasp because it contradicts what we intuitively believe about human behavior: we tend to think that most of our behavior and our thoughts are intentional and chosen. However, social scientists have found that thoughts and feelings outside of our conscious awareness have the power to influence us in important ways. Although we can hold unconscious biases about anything or anyone, this chapter focuses on the biases we hold about people from underrepresented social groups. For example, many people hold an unconscious bias that men are more likely than women to have an aptitude for science. In the psychology research literature, the terms *implicit attitude* and *implicit bias* are often used interchangeably with *unconscious bias*.

Where do our unconscious biases come from? Why do we have them? Psychologists believe that unconscious bias results from the way in which our brains process and store information. Research from cognitive psychology has shown that we use mental shortcuts in order to quickly process new information about the world. One of these shortcuts is automatically sorting people into categories such as age, gender, and race. Categorizing others in this way helps us quickly determine how to interact with people with whom we are not familiar.

Using mental shortcuts is not necessarily a bad thing. Without them we would be paralyzed by the amount of information that we receive from the outside world. Physicians often use mental shortcuts in order to make quick and efficient diagnoses of patients in time-pressured situations. However, mental shortcuts become a problem when they lead to s*tereotyping*—when we make assumptions about an individual based on what we think members of that person's social group are like. Stereotyping may lead us to treat people in unfair and unjustified ways. Many people believe that stereotypes do not influence their opinions about others. Regardless, numerous studies show that stereotypes can enter our minds without us being fully aware of them. This means that we can end up stereotyping others even when we have a strong desire not to do so.

This *unconscious stereotyping* occurs because of our tendency to automatically sort people into categories. When we encounter somebody who is new and unfamiliar, we instantly put him or her in one or more categories. These categories are linked in our minds with specific beliefs that tell us what members of that category are like. For example, the category of "women" is often associated in our minds with adjectives such as warm, nurturing, and yielding, and the category of "men" is often associated with qualities such as assertiveness, decisiveness, and influence. This pattern explains why men are more likely to be chosen as leaders in all kinds of situations. The qualities that we associate with good leadership are more strongly associated with men than women. When it comes time to choose an individual for a leadership position, these strong

associations tend to bias us against selecting a woman, even if we consciously believe that men and women are equally good at leadership.

Where do our biases come from? Psychologists believe that we learn them, starting at an early age, from our family, friends, teachers, and the media. There is evidence that young children often hold the same biases that adults do. For example, when asked to draw a scientist, the majority of elementary school students draw a white man in a lab coat. Since unconscious bias originates from the society in which we live, most of us tend to hold similar biases, regardless of who we are. Men and women are both likely to hold a bias that women are less effective leaders than men. When asked to draw a scientist, even African-American children are more likely to draw a white scientist.

Research has found that our unconscious biases tend to be stable over time. They are so ingrained in us that at the fundamental level, they are probably exceedingly difficult to change. However, by becoming more aware of them, we may be able to self-correct for their influence on our behavior.

## Measuring Unconscious Bias

How can we know our unconscious biases? Psychologists have developed a computer-based test, called the Implicit Association Test (IAT), that can detect the type and strength of people's unconscious biases. The IAT does this by measuring the speed at which we associate a set of words or images with one category or another. For example, in an IAT assessing unconscious race bias, respondents are asked to quickly classify African-American- or White-American-sounding names with the categories "good" or "bad." The speed with which a respondent pairs good or bad words with either race represents his or her unconscious bias. The IAT has been found to be robust at detecting many different types of bias (e.g., race, gender, social class) and has become a widely used research tool. It is debatable as to how closely the IAT may predict behavior.

## The Effects of Unconscious Bias

In the context of academic medicine, women and minority faculty may be especially vulnerable to the effects of unconscious bias. Although most people express a conscious desire to be fair and objective, unconscious bias influences the way they perceive other people. One study found that employers preferred job candidates with White-American names to those with African-American names, even though the study was set up so that all the resumes were identical in their qualifications. A similar study found that male and female psychology professors preferred to hire a male candidate over a female candidate for a faculty position in psychology, even though both candidates had identical curriculum vitae.

Women and minority medical school faculty are at special risk because of long-standing stereotypes that question their scientific and intellectual abilities. In addition to contributing to discrimination, these stereotypes can also undermine the performance of women and minorities through the phenomenon of *stereotype threat*. Introduced by social psychologist Claude Steele in 1995, stereotype threat describes the fear or anxiety that individuals face in situations where they might confirm a negative stereotype about their social group. This anxiety does not need to be conscious in order to disrupt intellectual performance, nor do individuals need to personally endorse the stereotype in order to suffer from its ill effects.

Stereotype threat happens because of the shared knowledge that people have about the stereotypes that exist about certain groups of people. The mere threat of confirming the negative stereotype is enough to disrupt people's actual performance. Studies have shown that women perform worse on math tests after being reminded of the stereotype that women lack mathematical ability. Similarly, African-American students perform worse on the SAT after being told that the test is a valid measure of intelligence. Fortunately, social scientists have begun to develop interventions that can prevent stereotype threat from happening. We turn to these and other strategies below.

## Addressing Unconscious Bias: Individual and Institutional Strategies

Our underlying unconscious biases are difficult to change. However, there is promising new evidence that we can take steps to consciously self-correct for them both as individuals and as institutions, thereby limiting their influence on our thoughts and behavior. Here are several suggestions for faculty members and institutions on how to counter the effects of unconscious bias in academic medicine.

## Individual Strategies

### Promote Awareness in Self and Others

By reading this chapter, the academic physician has already begun the first step: becoming more aware of what unconscious bias is and how it affects people's behaviors. It is also important to educate others about unconscious bias. When the issue of stereotyping occurs in conversation, it helps to be knowledgeable about the ways our unconscious biases may operate. The physician may want to take the Implicit Association Test (available online), as it can be a useful experience for learning about one's biases. Sharing one's own biases can help others feel more secure about exploring their own. To protect against the influence of unconscious bias on one's judgments about other people, one must pay close attention to the specific thoughts that may be driving one's opinions about others. In addition, being open to alternate perspectives and opposing viewpoints may help the physician become more aware of the unconscious biases that drive his or her and others' opinions.

### Adopt a "Growth" Mindset

What do academic physicians do when they suspect they may be on the receiving end of unconscious bias? Recognizing that the work climate may not be entirely fair can be very threatening. Indeed, there is evidence that many people would rather blame themselves than accept the possibility that the system may be unfair. When people

perceive their environment as unfair, they start to feel helpless and unmotivated. Research on how people respond and cope with failure suggests that a person can cope better with a difficult environment by adopting the right mindset. Specifically, adopting a "growth" mindset may buffer people against the negative effects of being stereotyped. Carol Dweck, a developmental psychologist, has conducted a number of studies revealing how having either a "fixed" or "growth" mindset powerfully affects our potential for future success.

People with a fixed mindset tend to view human abilities, such as intelligence, as stable and difficult to change. In contrast, people with a growth mindset view human abilities as malleable and changeable through sustained effort. Fixed versus growth beliefs about intelligence have important implications for how well people do at school and in their careers. People who believe that intelligence is fixed from birth tend to experience more distress and give up more easily when faced with challenges. Meanwhile, people with growth mindsets tend to bounce back quickly from setbacks and persist longer in the face of difficulty.

These differences in mindset have particular relevance to people who belong to stereotyped groups. Because people with fixed mindsets view human traits as inherent and stable, they are more prone toward stereotyping others. They are also less likely to cope well in environments where stereotypes are pervasive. For example, in her study of women in a high-level calculus course, Dweck found that only those women with fixed mindsets seemed to react badly to the perceived stereotype that women are less gifted at math. By the end of the course, many of them no longer intended to pursue math in the future. In another study, researchers found that African-American students who had a fixed mindset were less likely to incorporate constructive criticism about their intellectual work, whereas students with growth mindsets were less likely to become discouraged after setbacks and more likely to view difficult situations as challenges rather than threats. Adopting a growth mindset is helpful for many people, but it might be especially important for

individuals who belong to negatively stereotyped groups.

How does one develop a growth mindset? Although it may seem difficult to change, Dweck has been able to change people's mindsets in experimental settings. Dweck suggests the following steps:

1. *Pay attention to what you are telling yourself.* When you succeed, do you think it is because of your natural ability or because of the effort you put out? Do you see failures as indicative of your inherent ability?
2. *Recognize that you have a choice.* It is possible to interpret failure in different ways. It is possible to view a rejection or a setback as a challenge rather than a disaster.
3. *Talk back to your fixed mindset "voice."* Instead of telling yourself that your manuscript being rejected is proof that you shouldn't pursue an academic career, remind yourself that it is an opportunity to improve your work and your knowledge of how to publish successfully.
4. *Accept challenges and interpret the results within a growth mindset.* Often when we have a fixed mindset, we avoid doing things that seem risky. By making it okay for yourself to fail, you can take on new challenges without too much fear and anxiety. If you do fail, interpret it as a learning experience and nothing more.

## Expand Networks

In addition to focusing one's mindset, connecting with others and expanding one's professional networks can also be helpful in countering the effects of unconscious bias. Stereotypes can lower one's sense of belonging to an environment, which may have discouraging effects on one's career. Research shows, for instance, that women who do not feel that they belong in computer science are less likely to pursue careers in it, even when they have high aptitudes. Individuals who belong to stereotyped groups are at greater risk of feeling isolated, especially in mainstream institutions like school and work. In academic medicine, for example, research suggests that

junior women faculty report greater susceptibility to stereotype threat than their male counterparts. Uncertainty about belonging can undermine performance and well-being and pose significant challenges to career development and advancement.

Developing connections to colleagues and similar others not only provides an important source of professional support but also serves as a buffer against the effects that a low sense of belonging can have on actual performance. Networks provide many positive effects, such as mentoring, access to information and opportunities, and professional and personal support. Specific to unconscious bias, connecting with others can also increase your sense of belonging, thereby protecting against feelings of isolation that may accompany stereotype threat. Experimental research shows that interventions, such as learning that others have faced similar adversities, can increase one's sense of belonging and thereby elevate one's well-being and performance. Building one's networks allows for exchange and sharing of experiences, which can alleviate the doubt and uncertainty that stereotypes can create.

## Professional Development

Being proactive in one's career advancement process can be critical to overcoming unconscious bias. Below are some specific strategies that faculty members can consider using:

1. *Communicate with supervisors.* It is easy to assume that your unit head or other evaluators already know everything there is to know about you. However, studies on hiring and promotion show that evaluators tend to fall back on stereotypes when they have missing, incomplete, or ambiguous information. It is important to make sure that your evaluators are fully aware of your background and qualifications. For example, when requesting a letter of recommendation, provide your recommender with detailed information about your background and qualifications.
2. *Critically examine the resources allocated to you.* Unconscious bias often manifests itself

in the amount of resources allocated to members of one group versus another. Do you feel you have the resources you need to accomplish your research and other work activities? If your resources seem scant, especially compared to your colleagues, actively seek out ways to get more of what you need. Differences in resources might seem small on the surface, but over time they can significantly affect how successful you are in the long run.

3. *Do not be afraid to self-nominate*. When the NIH Pioneer Awards began to allow for self-nominations, the number of women nominees and recipients increased dramatically. People may unintentionally overlook certain people for awards because of unconscious bias. Therefore, you should not be afraid of nominating yourself for awards and other opportunities.

## Institutional Strategies

Although we have outlined a number of recommendations in this chapter that individuals can act upon, a long-term, sustainable strategy for combatting the effects of unconscious bias on faculty careers must include institutional commitment. Actions taken at the institutional level can go a long way in reducing the impact of unconscious bias on hiring and promotion.

### Promote Awareness Across the Workplace

At the institutional level, there is growing evidence that the widespread education of faculty members about unconscious bias may help remove barriers that prevent underrepresented groups from succeeding. In a study at Stanford Medicine, faculty members who participated in workshops on unconscious bias were significantly more likely to show reduced gender bias regardless of age or gender. The University of Wisconsin developed several hiring workshops for faculty that included information on unconscious bias and how it affects decision making. Those departments where faculty members par-

ticipated in the workshops showed significantly higher odds of increasing their percentages of women faculty than departments where no one participated. However, research also suggests that mandatory trainings can have a negative effect on biases, particularly when focusing on legal repercussions. This suggests that attendance at institution-sponsored educational programs should be voluntary and should focus primarily on the benefits of a diverse workforce and ways to involve attendees in devising best practices.

There is also evidence that teaching people about the cause and consequences of stereotype threat can help them avoid its detrimental influence. One study found that teaching women about stereotype threat and its potential effects on math performance caused their scores on a math test to increase. The implication of this finding, as the title of that study suggests, is that "knowing is half the battle." If other department members are open to it, the academic physician may want to lead a discussion on unconscious bias. If one does bring up unconscious bias with one's colleagues, one would do well to emphasize that the potential effects apply to everyone. It is not a matter of just some people holding prejudices—we all are vulnerable to letting our biases influence our judgments; however, this is not to say that biases are impossible to avoid. By knowing about our biases, we can work toward avoiding them in our decision-making processes.

### Develop Effective Structures for Recruitment Processes

In addition to educating organizational leaders on unconscious bias, institutions can create ground rules for hiring and promotion to ensure equity in the employment process. For example, it is important to assign someone or appoint a committee with the role of overseeing hiring practices. Such oversight may include paying attention to the language in job postings and flyers and encouraging the active recruitment of candidates from underrepresented groups. Another important strategy for institutions is to require sufficient diversity among search com-

mittees. A study on law firms revealed that the odds of a female hire increases when women are included in the evaluative and decision-making process (e.g., as a hiring partner). In addition, setting criteria before evaluating candidates can ensure that criteria do not shift to fit the favored candidate. Creating a key set of questions for the interview can ensure that discussions about the candidates focus on job-related factors.

### Reflect Inclusion in the Institutional Environment

Programs can assist in creating a more inclusive institutional environment when they increase the visibility of underrepresented individuals. For example, a program targeted to residents doubled underrepresented interviewees using a strategy that included an externship program, a funded second look event, and increased involvement of underrepresented faculty in the recruitment process. Increasing sense of belonging and exposure to role models within academic medicine are key program elements that support the recruitment and retention of underrepresented individuals.

This aligns with studies that show the working environment can greatly influence feelings of belonging and inclusion. An often cited example is the changing of portraits in public spaces to reflect the diversity of the institution (e.g., portraits of male and female scientists of diverse cultural backgrounds), which can foster a greater sense of belonging among women and minority physicians.

### Words to the Wise

- Mental shortcuts become a problem when they lead to stereotyping.
- By becoming more aware of unconscious biases, we may be able to self-correct for their influence on our behavior.
- Networks provide many positive effects, such as mentoring, access to information and opportunities, and professional and personal support.

### Ask Your Mentor or Colleagues

- How aware are people at this institution about unconscious bias and the potential role it plays in faculty careers?
- Does the institution have any programs, initiatives, or guidelines that may help in combatting unconscious bias? If no, what might be a way to develop some?
- Are there other faculty, with backgrounds similar to my own, to whom you could introduce me?
- Are there career development, mentoring, or professional networking programs at this institution in which you would recommend that I participate?

### Suggested Reading

Aboud FE. The development of prejudice in childhood and adolescence. In: Dovidio JF, Glick P, Rudman LA, editors. On the nature of prejudice. Malden: Blackwell; 2005. p. 310–26.

Amodio DM, Devine PG. Stereotyping and evaluation in implicit race bias: evidence for independent constructs and unique effects on behavior. J Pers Soc Psychol. 2006;91:652–61.

Aronson J, Fried CB, Good C. Reducing the effects of stereotype threat on African-American college students by shaping theories of intelligence. J Exp Soc Psychol. 2002;38:113–25.

Association of American Medical Colleges (AAMC). Total U.S. Medical School Enrollment by Race/Ethnicity and Sex, 2013–2014 through 2017–2018. https://www.aamc.org/download/321534/data/fact-stableb3.pdf. Accessed 26 June 2018.

Association of American Medical Colleges. U.S. Medical School Faculty by Sex, Race/Ethnicity, and Rank, 2017. https://www.aamc.org/download/486098/data/17table11.pdf. Accessed 26 June 2018.

Association of American Medical Colleges. Women in academic medicine statistics and medical school benchmarking, 2009–2010. https://www.aamc.org/members/gwims/statistics/. Accessed 13 Feb 2012.

Association of American Medical Colleges. Unconscious bias in faculty and leadership recruitment: a literature review. https://www.aamc.org/download/102364/data/aibvol9no2.pdf. Accessed 24 Feb 2012.

Bertrand M, Mullainathan S. Are Emily and Greg more employable than Lakisha and Jamal? A field experiment on labor market discrimination. Am Econ Rev. 2004;94:991–1013.

Blackwell LS, Trzesniewski KH, Dweck CS. Implicit theories of intelligence predict achievement across

an adolescent transition: a longitudinal study and an intervention. Child Dev. 2007;78:246–63.

Bragger JD, Kutcher E, Morgan J, Firth P. The effects of the structured interview on reducing biases against pregnant job applicants. Sex Roles. 2002;46:215–26.

Carnes M. Gender: macho language and other deterrents. Nature. 2006;442:868.

Cheryan S, Plaut G, Davies PG, Steele CM. Ambient belonging: how stereotypical cues impact gender participation in computer science. J Pers Soc Psychol. 2009;97:1045–60.

Croskerry P. A universal model of diagnostic reasoning. Acad Med. 2009;84:1022–8.

Dobbin F, Kalev A. Why diversity programs fail. Harvard Bus Rev. 2016;2016:52–60

Dweck CS. Self-theories: their role in motivation, personality, and development. Philadelphia: Psychology Press; 1999.

Dweck CS. Mindset: the new psychology of success. New York: Random House; 2006a.

Dweck CS. Is math a gift? Beliefs that put females at risk. In: Ceci SJ, Williams W, editors. Why aren't more women in science? Top researchers debate the evidence. Washington, DC: American Psychological Association; 2006b.

Eagly AH, Karau SJ. Role congruity theory of prejudice toward female leaders. Psychol Rev. 2002;109:573–98.

Fassiotto M, Hamel EO, Ku M, Correl S, Grewal D, Lavori P, et al. Women in academic medicine: measuring stereotype threat among junior faculty. J Womens Health. 2016;25:292–8.

Finson KD. Drawing a scientist: what we do and do not know after fifty years of drawings. Sch Sci Math. 2002;102:335–45.

Fiske ST. Social cognition and the normality of prejudgment. In: Dovidio JF, Glick P, Rudman LA, editors. On the nature of prejudice. Malden: Blackwell; 2005. p. 36–53.

Greenwald AG, Banaji MR. Implicit social cognition: attitudes, self-esteem, and stereotypes. Psychol Rev. 1995;102:4–27.

Greenwald AG, Banaji MR, Nosek BA. Statistically small effects of the Implicit association test can have societally large effects. J Pers Soc Psychol. 2015;108:553–61.

Girod S, Fassiotto M, Grewal D, Ku MC, Sriram N, Nosek BA, Valantine H. Reducing implicit gender leadership bias in academic medicine with an educational intervention. Acad Med. 2016;91:1143–50.

Greenwald AG, McGhee DE, Schwartz JLK. Measuring individual differences in implicit cognition: the implicit association test. J Pers Soc Psychol. 1998;74:1464–80.

Greenwald AG, Poehlman TA, Uhlmann EL, Banaji MR. Understanding and using the implicit association test, III: meta-analysis of predictive validity. J Pers Soc Psychol. 2009;97:17–41.

Gorman E. Gender stereotypes, same-gender preferences, and organizational variation in the hiring of women: evidence from law firms. Am Sociol Rev. 2005;70:702–28.

Gorman E. Work uncertainty and the promotion of professional women: the case of law firm partnership. Soc Forces. 2006;85:865–90.

Heilman ME. Description and prescription: how gender stereotypes prevent women's ascent up the organizational ladder. J Soc Issues. 2001;57:657–74.

Heilman ME, Block CJ, Stathatos P. The affirmative action stigma of incompetence: effects of performance information ambiguity. Acad Manag J. 1997;40:603–25.

Hitchcock MA, Bland CJ, Hekelman FP, Blumenthal MG. Professional networks: the influence of colleagues on the academic success of faculty. Acad Med. 1995;70:1108–16.

Ito TA, Urland GR. Race and gender on the brain: electrocortical measures of attention to the race and gender of multiply categorizable individuals. J Pers Soc Psychol. 2003;85:616–26.

Johns M, Schmader T, Martens A. Knowing is half the battle: teaching stereotype threat as a means of improving women's math performance. Psychol Sci. 2005;16:175–9.

Jost JT, Rudman LA, Blair IV, Carney DR, Dasgupta N, Glaser J, Hardin CD. The existence of implicit bias is beyond reasonable doubt: a refutation of ideological and methodological objections and executive summary of ten studies that no manager should ignore. Res Organ Behav. 2009;29:39–69.

Kaiser CR, Miller CT. Stop complaining! The social costs of making attributions to discrimination. Personal Soc Psychol Bull. 2001;27:254–63.

Kiefer AK, Sekaquaptewa D. Implicit stereotypes and women's math performance: how implicit gender-math stereotypes influence women's susceptibility to stereotype threat. J Exp Soc Psychol. 2007;43:825–32.

Koenig AM, Eagly AH, Mitchell AA, Ristikari T. Are leader stereotypes masculine? A meta-analysis of three research paradigms. Psychol Bull. 2011;137:616–42.

Lenton AP, Bruder M, Sedikides C. A meta-analysis on the malleability of automatic gender stereotypes. Psychol Women Q. 2009;33:183–96.

Levy S, Stroessner S, Dweck CS. Stereotype formation and endorsement: the role of implicit theories. J Pers Soc Psychol. 1998;74:1421–36.

Lyubormirsky S, Sheldon KM, Schkade D. Pursuing happiness: the architecture of sustainable change. Rev Gen Psychol. 2005;9:111–31.

Massachusetts Institute of Technology. A study on the status of women faculty in science at MIT. http://web.mit.edu/fnl/women/women.html. Accessed 27 Feb 2012.

National Academy of Sciences, National Academy of Engineering, & Institute of Medicine. Beyond bias and barriers: fulfilling the potential of women in academic science and engineering. Washington, D.C: National Academies; 2007.

Nosek BA, Banaji MR, Greenwald AG. Harvesting implicit group attitudes and beliefs from a demonstration website. Group Dyn. 2002;6:101–15.

Nosek BA, Greenwald AG, Banaji MR. The implicit association test at age 7: a methodological and conceptual review. In: Bargh J, editor. Automatic processes in social thinking and behavior. London: Psychology Press; 2007. p. 265–92.

Oswald FL, Mitchell G, Blanton H, Jaccard J, Tetlock PE. Predicting ethnic and racial discrimination: a meta-analysis of IAT criterion studies. J Pers Soc Psychol. 2013;105:171–92.

Project Implicit. https://implicit.harvard.edu/implicit/. Accessed 14 Feb 2012.

Ridgeway CL, Correll SJ. Unpacking the gender system: a theoretical perspective on gender beliefs and social relations. Gend Soc. 2004;18:510–31.

Rudman LA, Glick P. Prescriptive gender stereotypes and backlash toward agentic women. J Soc Issues. 2001;57:743–62.

Rudman LA, Heppen JB. Implicit romantic fantasies and women's interest in personal power: a glass slipper effect? Personal Soc Psychol Bull. 2003;29:1357–70.

Rudman LA, Fairchild K. Reactions to counterstereotypic behavior: the role of backlash in cultural stereotype maintenance. J Pers Soc Psychol. 2004;87:157–76.

Schmader T, Major B, Gramzow RH. Coping with ethnic stereotypes in the academic domain: perceived injustice and psychological disengagement. J Soc Issues. 2001;57:83–111.

Sheridan JT, Fine E, Pribbenow CM, Handelsman J, Carnes M. Searching for excellence and diversity: increasing the hiring of women faculty at one academic medical center. Acad Med. 2010;85:999–1007.

Steele CM. A threat in the air: how stereotypes shape intellectual identity and performance. Am Psychol. 1997;52:613–29.

Steinpres RE, Anders KA, Ritzke D. The impact of gender on the review of the curricula vitae of job applicants and tenure candidates: a national empirical study. Sex Roles. 2003;41:499–28.

Stewart TL, Latu IM, Kawakami K, Myers AC. Consider the situation: reducing automatic stereotyping through situational attribution training. J Exp Soc Psychol. 2010;46:221–5.

Tunson J, Boatright D, Oberfoell S, Bakes K, Angerhofer C, Lowenstein S, Zane R, King R, Druck J. Increasing resident diversity in an emergency medicine residency program: a pilot intervention with three principal strategies. Acad Med. 2016;91:958–61.

Uhlmann EL, Cohen G. Constructed criteria. Psychol Sci. 2005;16:474–80.

Walton GM, Cohen GL. A question of belonging: race, social fit, and achievement. J Pers Soc Psychol. 2007;92:82–96.

Walton GM, Cohen GL. A brief social-belonging intervention improves academic and health outcomes of minority students. Science. 2011;331:1147–451.