

STEREOTYPE THREAT IN INTERGROUP RELATIONS

Toni Schmader, William Hall, and Alyssa Croft

In 1994, a controversial book hit newsstands. Its claim was that the consistent gap in intelligent quotient (IQ) scores between Black and White students was the result of genetic differences between the races. This proposition that one class of people is intellectually inferior to another was not a new claim. In the 1800s, Sir Francis Galton was one of the early psychologists to study intelligence and held the hypothesis that members of the British upper crust were, by birth, intellectually superior to those on lower rungs of the socioeconomic ladder. In the early 20th century, racial differences in scores on intelligence tests were used to support efforts to restrict immigration from certain regions of the world. But the civil rights movement of the 1960s marked a growing emphasis on ensuring equal opportunity, which called into question these earlier notions of racial differences in intelligence. When Herrnstein and Murray published *The Bell Curve* in 1994, their hypothesis that race differences in test scores could be traced to genetic factors was reminiscent of what many hoped was a bygone era.

At the same time that *The Bell Curve* (Herrnstein & Murray, 1994) was raising a firestorm of controversy, two scientists at Stanford University were carrying out research that would yield empirical support for a very different explanation of the race gap in intellectual performance. Those two researchers, Claude Steele and Joshua Aronson, published their work in 1995 showing that performance differences between groups are more about culture than

genetics. Their ground-breaking theory claimed that the mere knowledge that one might be targeted by negative stereotypes (negative beliefs and expectations about one's group) can create a psychological burden that prevents ethnic minority students from performing up to their potential on tests of intellectual ability. They called this phenomenon *stereotype threat*. Steele and Aronson further argued that it is the situation itself that brings these stereotypes to mind. By extension, if the situation can be altered to remove anything that could cue racial stereotypes, the racial gap on achievement tests should be reduced.

Steele and Aronson (1995) tested this hypothesis with a now-classic set of experiments. When a series of verbal problems was described as a diagnostic test of intelligence, African American college students underperformed relative to their European American counterparts, consistent with the often-observed gap in performance on achievement tests. But when the other half of the sample completed the same problems described only as a laboratory exercise, African American students performed as well as their White peers after controlling for prior test scores (Steele & Aronson, 1995). In another study, simply having Black students indicate their race on a demographic sheet before beginning a test was enough to produce lower scores than when race was not salient (see Figure 17.1). Although these initial studies offered no conclusive evidence of the psychological processes underlying this performance

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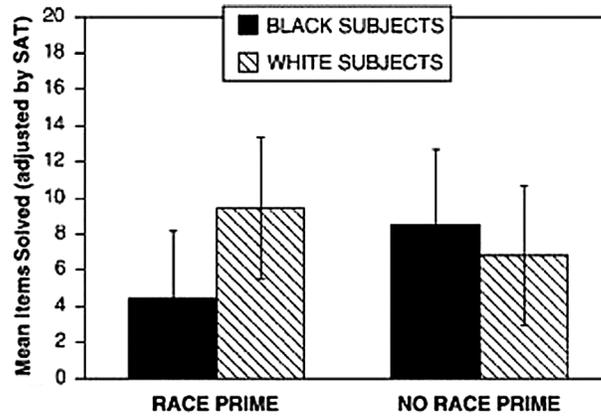


FIGURE 17.1. Black subjects experienced stereotype threat when asked to indicate their race before taking a test of verbal ability, resulting in underperformance on the test. From “Stereotype Threat and the Intellectual Test Performance of African Americans,” by C. M. Steele and J. Aronson, 1995, *Journal of Personality and Social Psychology*, 69, p. 807. Copyright 1995 by the American Psychological Association.

discrepancy, Steele and Aronson did find that when Black students believed a task will measure their intelligence, racial stereotypes and thoughts of self-doubt were more likely to come to mind.

Steele and Aronson’s (1995) paper has been selected as a modern classic in social psychology (Devine & Brodish, 2003). It has been cited more than 1,100 times, and a PsycINFO search of “stereotype threat” brings up more than 500 listings. The original theory, first used to understand race differences in intelligence, quickly expanded to account for a broad range of group differences in performance across a variety of domains.

This chapter presents a brief overview of the empirical study of stereotype threat by discussing the parameters of the effect, the mechanisms that underlie it, and ways to alleviate its debilitating effects on performance. First, the chapter outlines some of the basic assumptions of the original theory; the domains in which it has been studied; and the consequences it can have for performance, self-identification, and engagement in stereotype-relevant domains. Second, it summarizes newer theoretical advances identifying the many different types of threats that stereotyped individuals can face and explains how this phenomenon differs from other related experiences of threat. Third, it describes how stereotype threat actually works to interfere with successful performance by taxing the mental resources needed to focus on a challenging task. Gaining insight into these cognitive underpinnings

has enabled researchers to develop strategies for alleviating stereotype threat and reducing group differences in performance. Therefore, the final section of the chapter provides an overview of the tools that researchers have employed both in the lab and in the classroom to reduce stereotype threat. Last, the final section outlines how the research reviewed in this chapter relates to real-world education policies designed to reduce the group differences in performance that have motivated this area of inquiry. Figure 17.2 provides a schematic overview of the stereotype threat and the ways in which it might be reduced. Note that whereas stereotype threat concerns the ways in which context itself can cue one’s stigmatized status, other research examines how individuals experience prejudice and discrimination from social perceivers. (For a broader discussion of how individuals perceive, are affected by, and cope with prejudice in intergroup interactions, see Chapter 18, this volume.)

ORIGINAL ASSUMPTIONS OF THE THEORY

According to Steele’s (1997) original conceptualization, stereotype threat is predicted to be most prevalent in certain situations and for certain individuals. It is triggered merely by being in situations that bring to mind one’s membership in a negatively stereotyped group or that raise the possibility that one will be evaluated through the lens of a stereotype. Thus, merely being in the minority surrounded by

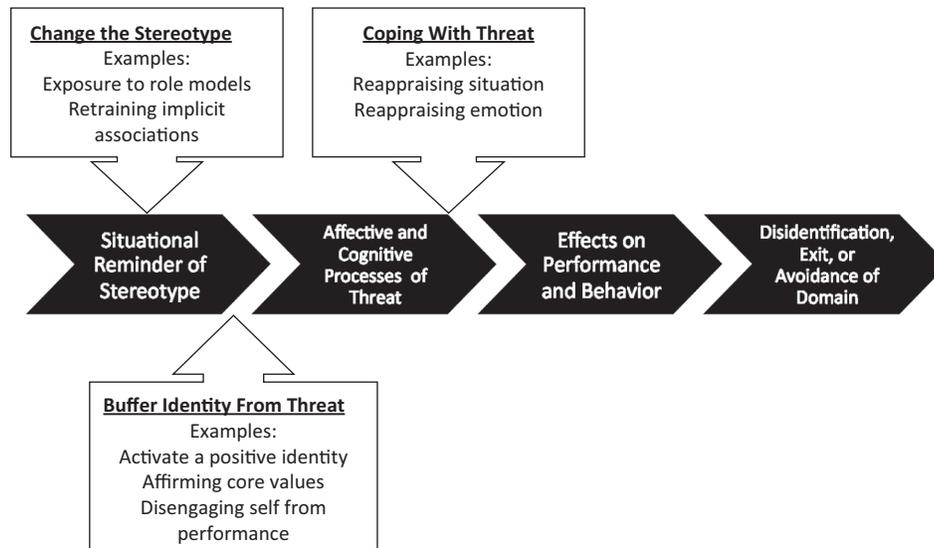


FIGURE 17.2. Schematic of stereotype threat and ways to reduce its effects on performance.

those who would be stereotyped as being more successful can be sufficient to elicit stereotype threat. One logical assumption, however, is that if people are unaware that a negative stereotype exists about their group's performance in a certain domain, they will not experience stereotype threat. Not surprisingly, then, first-generation Black immigrants in the United States have little exposure to the cultural stereotypes denigrating Blacks' intelligence and show less evidence of stereotype threat (Deaux et al., 2007). In other studies, elementary school children who are most aware that their group is stigmatized as academically inferior show lower academic performance when performing a task they think is diagnostic of intellectual ability (McKown & Weinstein, 2003; see also Brown & Pinel, 2003). Because the experience of threat is thought to be elicited by situations that bring negative stereotypes to mind, if one has not formed a stereotyped notion of his or her group, then there is no stereotype to be activated. This is an important point that we will return to later because it suggests that efforts to eliminate stereotypes will, by extension, mitigate stereotype threat and reduce group differences in performance.

Although experiencing stereotype threat requires some awareness of the stereotype, this does not suggest that the stereotype needs to be internalized (i.e., accepted or believed; Steele, 1997). In some circumstances, it is enough to know that others would view

you or your group through the lens of a negative stereotype (Shapiro & Neuberg, 2007). However, endorsing a stereotype, or suspecting that it might be true, also can exacerbate effects. Women who suspect that men might be inherently superior at math perform poorly when gender stereotypes are made salient compared with those who reject the stereotype (Schmader, Johns, & Barquissau, 2004). There is an important difference between *suspecting* that the stereotype might be true and *believing* that is true. When people completely accept that there are real differences between groups, it makes little sense even to compare oneself to the out-group and thus stereotype threat may be reduced (Blanton, Crocker, & Miller, 2000). Instead, members of the lower performing group might simply *disidentify*, or cease to be personally invested in their performance, and be unmotivated to achieve levels of success enjoyed by the higher performing group (Crocker & Major, 1989). The interesting implication is that as structural barriers between groups are removed and increased efforts are made to level the playing field, the possibility of experiencing stereotype threat becomes more likely as intergroup comparisons are made in a context in which the specter of group differences in ability still lingers.

Among those who are aware of negative stereotypes, there is an added assumption that stereotype threat will be experienced most acutely by those

who are at the vanguard of their group; in other words, those who are the most invested in doing well in a domain in which their group is stereotyped negatively (Steele, 1997). To be threatened by the implication of poor performance in a domain, one must be motivated to achieve success. For instance, when White men preselected for high math ability were told that their math performance would be compared with that of Asian participants (who are stereotyped to excel at math), the extent to which the White men were identified with the math domain moderated the effects of stereotype threat on their performance (Aronson, Lustina, Good, Keough, & Steele, 1999). The fear of being categorized falsely or contributing to an image of group incompetence leads stigmatized students to work even harder on tasks in that domain in an effort to disconfirm the stereotype (Jamieson & Harkins, 2007). The paradox, however, is that added motivation to excel does not necessarily translate into better performance, and on very challenging and complex tasks, it can even be debilitating.

This leads to another assumption of the theory: The experience of threat—the fear that one could confirm the stereotype—comes to mind only as one begins to experience difficulty on tasks purported to diagnose one's ability, tasks that challenge one's current skill level (Spencer, Steele, & Quinn, 1999; Steele, 1997). For example, if a woman who is aware of the stereotype that women are inferior to men at math is performing a relatively simple math problem with the intent of disconfirming that stereotype, she likely will have little difficulty in doing so and might even perform better when stereotypes are brought to mind (O'Brien & Crandall, 2003). When reminders of being stereotyped negatively lead to improved performance, the phenomenon is called *stereotype reactance* (Kray, Thompson, & Galinsky, 2001). On the other hand, if the same woman is performing a difficult math problem requiring more deliberative thought or more novel strategies, fear of confirming the stereotype can disrupt these processes. The precise mechanisms through which these processes are disrupted are considered in the following paragraphs.

Finally, the hallmark of stereotype threat theory is that it conceptualizes a situationally induced

phenomenon. Such threat is activated in contexts that make one's experience contingent on one's identity as part of a group. Importantly, this implies that stereotype threat can be experienced by anyone. Although members of historically stigmatized groups are more likely to find themselves in situations that bring stereotypes to mind, and the bulk of research focuses on their experience, even those who typically are advantaged can face circumstances that arouse stereotype threat (see Leyens, Désert, Croizet, & Darcis, 2000). For example, men outperform women on a visualization task when it is described as a measure of spatial ability (a domain in which men generally excel), but women outperform men on the same task when it is described as a measure of perspective taking (a domain in which women generally excel; Wraga, Helt, Jacobs, & Sullivan, 2007).

In sum, early research on stereotype threat established key preconditions for the phenomenon. Stereotype threat occurs in situations that bring to mind negative stereotypes about a valued group identity; the occurrence of these effects requires knowledge of those stereotypes, an underlying desire to be successful in that domain, and a task that tests the upper boundaries of one's skill level. With the preconditions of the effect established, researchers have extended our understanding of this phenomenon in several important ways, which we review next. A great deal of research has sought to establish the consequences that stereotype threat can have for performance, motivation, and investment across a variety of domains as well as to conceptualize the nature of the threat with greater precision. Furthermore, researchers have turned their attention to exploring the cognitive and affective underpinnings of the effect. As psychological mechanisms that account for stereotype threat effects have been identified, they have suggested strategies for reducing its effects. Initially, such research was conducted in the lab, but increasingly it also has moved into classroom settings to examine the effects of stereotype threat in a real-world context. The remainder of this chapter provides a detailed overview of the research that has been done since the original demonstration of the phenomenon.

Consequences for Performance and Motivation

Although Steele and Aronson's (1995) original test of stereotype threat theory sought to understand how this social psychological process contributes to the racial achievement gap, the theory has since been extended quite broadly both within and outside the academic context. In the sections that follow, we review a host of different consequences that stereotype threat can have for performance, cognition, motivation, and decision making.

Stereotype threat and academic performance.

Most research in this area has sought to understand differences in academic performance on tasks that are cognitively challenging, including traditional IQ tests (Brown & Day, 2006). Just as situational reminders of race or racial stereotypes impair Black students' performance on verbal ability tasks, they also can impair intellectual performance of Latinos, the fastest growing minority in the United States (Gonzales, Blanton, & Williams, 2002). Similarly, reminders of lower socioeconomic status impair the performance of children who are disadvantaged economically (Croizet & Claire, 1998).

Minorities are not the only students who confront stereotype threat. In fact, research on stereotype threat has examined more extensively the experience of threat that women face in the traditionally male domains of science, technology, engineering, and math (Murphy, Steele, & Gross, 2007; Spencer et al., 1999). Just as Herrnstein and Murray (1994) incited controversy with their claims that the race gap in IQ was due to racial differences in inherent ability, nearly a decade later, Lawrence Summers, who was president of Harvard University at the time, suggested that women might not excel in science and engineering because of inherent sex differences in quantitative competence. Contrary to this biological explanation of the gender gap in math, stereotype threat research has demonstrated that women perform equal to or even better than their male peers in testing situations that are threat free (Johns, Schmader, & Martens, 2005), a finding demonstrated even with girls just starting elementary school (Ambady, Shih, Kim, & Pittinsky, 2001). This is particularly unsettling because math education

builds cumulatively from earlier skills, meaning that the experience of stereotype threat at such a young age may be compounded over time.

Furthermore, in addition to the effect that stereotype threat can have on testing, it also can affect certain kinds of learning. In recent research, women under stereotype threat have been less likely to learn the basic rules for solving a novel math problem than women who were not under threat (Rydell, Rydell, & Boucher, 2010), and they even show impairment on tasks of perceptual learning (Rydell, Shiffrin, Boucher, van Loo, & Rydell, 2010). Because many classroom contexts probably cue stereotype threat during learning and testing (e.g., when a woman takes an advanced calculus class surrounded mostly by men and taught by a male instructor), there is the distinct possibility that stigmatized students face "double jeopardy." That is, activated negative stereotypes make it difficult both to learn new information and to demonstrate what has been learned (Taylor & Walton, 2011).

Effects in neurological testing of cognitive impairments. Although most of the studies reviewed in this chapter address stereotype threat in academic contexts, these are not the only domains in which diagnostic tests are used and likely will be affected by stereotype threat. For example, cognitive testing often is used to identify patterns of impairment resulting from disability, injury, drug use, or age. With growing evidence that performance on such tests can be affected by what people *think* the test will assess, clinicians need to take care when administering and interpreting these measures. For example, although cognitive abilities do decline with age, processes of stereotype threat can exacerbate the apparent effect of age on cognitive decline. Studies have shown that older adults cued with stereotypes about memory impairment remember fewer items on a test when first primed with age (Levy & Leifheit-Limson, 2009). In a very different context, Ecstasy users who believed that the researchers sought to document cognitive impairments resulting from drug use performed worse than those who were not given this interpretation of the study (Cole, Michailidou, Jerome, & Sumnall, 2006). One of the

important lessons from stereotype threat research is that diagnostic tests measure more than just ability.

Effects on behavior that is best enacted

automatically. Distinct from effects on intellectual tasks, stereotype threat also can impair performance in domains that rely on automated forms of action. In sports, for example, becoming an expert athlete means developing automated patterns of sensorimotor action. But stereotype threat can disrupt the execution of automated behaviors and lead to choking. For example, White athletes require more putts than Black athletes to sink a golf ball when told that the task measures natural athletic ability (something Whites, relative to Blacks, are stereotyped to lack), but Black athletes show similar impairments if the task is instead described as a measure of sports intelligence (a frame that stereotypically favors Whites; Stone, Lynch, Sjomeling, & Darley, 1999). Beilock and members of her lab (Beilock, Jellison, Rydell, McConnell, & Carr, 2006) have shown that being evaluated critically during a well-learned sensorimotor task leads people to adopt a more conscious, deliberate approach to performing the task, which disrupts the flow of the proceduralized muscle memory the participants normally would use. You should think of this the next time you hear someone disparaging women drivers. In a recent study, women were more likely to hit pedestrians in a driving simulator if they were reminded of gender stereotypes (Yeung & von Hippel, 2008).

Similar to sports and driving, social interactions are another class of activity usually performed best without too much conscious attention. One kind of social interaction that can often lead to self-consciousness is an interracial interaction. In these encounters, members of each race can experience a form of stereotype threat in which they fear being perceived as stereotypical of their group (Richeson & Shelton, 2012). Whites may be concerned about confirming the stereotype that Whites are prejudiced (Vorauer, Main, & O'Connell, 1998), and minorities may be concerned about confirming more general stereotypes (negative or positive) about their group (Bergsieker, Shelton, & Richeson, 2010). Research examining these contexts reveals striking parallels to stereotype threat studied in academic contexts. For example, Whites who fear being stereotyped as racist

exhibit physiological profiles of threat (Mendes, Blascovich, Lickel, & Hunter, 2002), engage in efforts to avoid and mask their biases, and experience cognitive fatigue as a result (Richeson & Shelton, 2003).

Effects for judgment and decision making.

The first decade of research examining stereotype threat was devoted to generalizing its effects on a broad array of groups and domains. More recently, researchers have begun to examine other types of behaviors and judgments that are affected when one is evaluated through the lens of a stereotype. For example, if a female identity is made salient before a financial decision-making task, women take fewer risks and are more likely to opt out of participating in a lottery due to fear of losing money (Carr & Steele, 2010). Such effects are consistent with other evidence suggesting that stereotype threat encourages a prevention focus rather than a promotion focus, in which the goal is to prevent or minimize losses rather than maximize gains (Seibt & Förster, 2004). Interestingly, some situations can be more conducive to a prevention focus, and when people are asked to perform tasks with a mind-set of avoiding errors, stereotype threat can even benefit performance by creating regulatory fit in which the demands of the task match their current motivational state (Grimm, Markman, Maddox, & Baldwin, 2009).

Disidentification. The concern about stereotype threat is not only that it can prevent certain segments of the population from performing up to their potential but also that it can lead them to disidentify with the domains in which their group is stereotyped negatively (Steele, 1997). *Disidentification* occurs when people cease to be invested personally in their performance, a reaction that is assumed to underlie reduced interest and motivation. Researchers have documented patterns of academic disidentification among minority high school students, and particularly among African American men (Osborne, 1997). Disidentification can stem from at least three sources. For some, the absence of similar others in a domain is itself a signal that one does not belong or would not be welcome. In this instance, individuals never become identified with the domain in the first place. For example, research

suggests that women often dismiss computer science as a college major because their preconceived stereotype of a computer scientist does not seem to fit them (Cheryan, Plaut, Davies, & Steele, 2009). Even subtle reminders of group stereotypes can cue the avoidance of certain domains and roles. For example, when women watch television commercials that include stereotypically feminine characters, they subsequently show less interest in learning about math and science majors and are less willing to step into a leadership position (e.g., Davies, Spencer, Quinn, & Gerhardstein, 2002).

A second route to disidentification is open to people who have attempted to enter and excel in a stereotyped domain but who encountered direct or indirect forms of bias. These negative experiences of bias can elevate stress levels and cause avoidance (Pascoe & Smart Richman, 2009). The underrepresentation of a group in a domain might itself be viewed as evidence of bias (Purdie-Vaughns, Steele, Davies, Diltmann, & Crosby, 2008) and could signal disidentification. For example, Murphy et al. (2007) had male and female participants view a video recording of a math, science, and engineering conference in which the ratio of men to women in the video was either balanced or imbalanced. Women who viewed the conference video depicting fewer women than men reported less desire to participate in the conference and less of a sense of belonging in math and science. Men, however, were unaffected by the manipulation. Perceptions of racial bias and hierarchy also can cue disidentification. Minority students who generally believe that tests are biased racially and that existing racial hierarchies are unfair report less psychological investment in their academic outcomes (Schmader, Major, & Gramzow, 2001).

The third route to disidentification arises through repeated experiences of stereotype threat itself by those who already have experienced some success but nonetheless find themselves failing to perform up to their potential. For example, in one naturalistic observation study of workplace conversations among science faculty members, Holleran, Whitehead, Schmader, and Mehl (2011) examined how the interpersonal environment can cue disengagement for female science faculty. Male and female faculty members wore an electronic

recording device that randomly sampled their conversations throughout the day. Among men, the more time they spent talking about research while at work, the more engaged they reported being with their jobs. Among women, however, the more time they spent talking about research with their male (but not their female colleagues), the more disengaged they were from their work. Women also were rated by coders as sounding less competent than men during their conversations with male colleagues. Taken together, these data suggest that even women in professional research careers may be susceptible to stereotype threat in their day-to-day conversations with male colleagues, which could predict disidentification with their careers. More research clearly is needed, however, to fully delineate the processes by which disidentification occurs.

UNPACKING THE “THREAT” IN STEREOTYPE THREAT

Thus far we have summarized some of the empirical evidence establishing stereotype threat as a phenomenon that can contribute to group differences in performance across a broad array of domains. As evidence of the effect has accrued, researchers have further specified and expanded on what stereotype threat is and how it relates to other forms of performance anxiety or impairments. Some research also has examined the benefits and potential pitfalls of being a target of positive stereotypes. Having summarized the original evidence for stereotype threat as a phenomenon, we turn next to a discussion of more recent developments related to the conceptual parameters of the phenomenon.

Multithreat Model of Stereotype Threat

Stereotype threat originally was defined as the fear that, through one's actions, one inadvertently could confirm a negative stereotype in one's own eyes or the eyes of another. Recently, Shapiro and Neuberg (2007) proposed the multithreat model of stereotype threat to clarify the definition of stereotype threat. According to their model, it is possible to distinguish theoretically among six distinct forms of stereotype threat. These six types are derived by considering the *target* of the threat (is one concerned about the self

or the in-group being labeled by a stereotype?) and the *source* of the threat (does the threat stem from what the out-group thinks, what the in-group thinks, or what the individual him- or herself thinks?).

One benefit of making these distinctions is that it becomes possible to predict which type of threat is more likely to be experienced by different kinds of groups. For example, as mentioned earlier, stereotype threat effects can be magnified for those who endorse a stereotype about their group (Schmader et al., 2004). Shapiro (2011) found evidence that endorsing the stereotype makes one more concerned about validating the stereotype in one's own eyes. Groups with only a weak tendency to endorse the stereotype are less likely to experience this variety of threat.

Similarly, another variable that can make one susceptible to stereotype-based performance decrements is being identified strongly with one's group, meaning that the group is an important and defining aspect of one's personal identity. These effects have been seen with gender (Schmader, 2002), age (Kang & Chasteen, 2009), and ethnicity (Armenta, 2010). But again, group identification specifically should elicit concerns that one might, through his or her own behavior, confirm the stereotype about one's group. For types of stigma associated with low group identification (e.g., mental illness, obesity), individuals are less likely to experience a form of stereotype threat with their social identity as the target (Shapiro, 2011).

Some groups likely will show variability among the members of the group in the type of threat they experience. For example, Cohen and Garcia (2005) found that Black undergraduates reported feeling both a sense of group-reputation threat (a worry that they could confirm the stereotype about Blacks) and self-reputation threat (a worry that the Black stereotype would be used to evaluate them personally). Women reflecting on their experience in math also have reported each of these threats (Zhang, Schmader, & Hall, 2012). Going forward, researchers should consider the type of threat that is evoked for different people or in different situations because interventions might need to be designed with the type of threat in mind.

Belongingness Threat

Recent theoretical developments not only have sought to highlight the different forms that

stereotype threat can take but also have broadened the focus beyond simply the threat of confirming a stereotype. The more general theory of *social identity threat* describes the ways in which situations can signal the value of certain groups (Steele, Spencer, & Aronson, 2002). For example, the lack of women or minorities in the higher echelons of management, government, or academia signals both the presumption that women would be incompetent in these domains and a sense that they might be unwelcome there. Thus, stigmatized individuals often face two types of psychological threats: the threat of confirming a negative stereotype and the sense that one does not belong in that context.

Baumeister and Leary (1995) have argued that humans have a fundamental need for belonging. We prefer situations that signal acceptance and understandably wish to avoid those that do not. When women were asked to evaluate a science workshop that was heavily male dominated (rather than having an equal gender representation), they experienced a greater physiological stress response and became more vigilant for details about the workshop but also were less interested in actually taking part (Murphy et al., 2007). In addition, individual differences in rejection sensitivity based on race can elevate minority students' risk of experiencing stereotype threat (Mendoza-Denton, Downey, Purdie, Davis, & Pietrzak, 2002).

Walton and Cohen (2007) similarly argued that underrepresented minorities have difficulties with the transition to college, not only because of stereotype threat but also because of belongingness threat. In one of their studies, they asked Black and White students to list either two or eight friends who would fit in well in their field of study. The researchers hypothesized that listing eight friends would be difficult for all students; however, Black students would interpret this difficulty as being indicative of their lack of belonging in academics. As predicted, White students were unaffected by the manipulation, but Black students reported less belonging in academics and lower prospects of success when they had to list eight friends rather than two. In a remarkable intervention, first-year minority college students who read testimonials from more senior students about overcoming challenges after the first year in college performed better

in their classes over the next 3 years, and the race gap in grade point average was reduced by 50% (Walton & Cohen, 2011).

In comparing stereotype threat and belongingness threat side by side, there are a couple of notable differences. First, as discussed, the experience of stereotype threat implies that one is identified with the domain in question. In other words, only those who already are invested in doing well can be threatened by the possibility that they will perform poorly. In contrast, belongingness threat does not require this kind of identification because it is a threat to social connectedness, not to one's sense of competence. If the need to belong is universal, then we might still feel threatened by a sense of rejection even in a domain about which we do not care. For example, people still feel the sting of ostracism even from others they dislike (Gonsalkorale & Williams, 2007).

Additionally, a common reaction to stereotype threat is to double one's efforts in an attempt to disconfirm the stereotype, but belongingness threat instead could cause avoidance and withdrawal. Although belongingness threat might keep those who are stigmatized from even stepping foot into a domain in which they are stereotyped, stereotype threat makes it harder for them to perform up to their true potential once they are there.

Conceptual Relatives of Stereotype Threat

Stereotype threat is related closely to, but can be distinguished from, several other threat-related phenomena. The idea that mere knowledge of the stereotype can lead one to behave in a way that confirms the expectancy of that stereotype is similar to the classic notion of *self-fulfilling prophecy* (Rosenthal & Jacobson, 1992). To be precise, however, the traditional conceptualization of self-fulfilling prophecy suggests that it is a perceiver's expectations and behaviors that create the self-fulfilling prophecy. For example, if a student expects her college roommate to be shy, she inadvertently might behave in ways that will confirm her initial expectation. By treating the roommate as shy, not talking to her, avoiding her, and so forth, the roommate may be induced to reciprocate this treatment by exhibiting shyness. On the other hand, stereotype threat does not rely on the expectations of specific others;

it is "a threat in the air" that perhaps operates on generalized expectations communicated by cultural stereotypes and activated by contextual features. Targets of a negative stereotype need not believe that people *expect* them to do poorly at a task to feel threatened and anxious; they simply need to be *aware* that their performance inadvertently could confirm a negative stereotype about their group.

Another relative of stereotype threat is addressed by *self-objectification theory* (Fredrickson, Roberts, Noll, Quinn, & Twenge, 1998). According to this theory, prevailing gender norms in society lead women to be treated more as objects than as people. As a result, women come to see themselves from the perspective of an outside observer (Fredrickson & Roberts, 1997). The consequence of this skewed self-perception is an increase in stereotypical beliefs about women, which then hinders performance on stereotype-relevant tasks. For example, women who were asked to dress in a provocative way performed worse on a math test and were less adept at throwing a ball than women who were not asked to dress provocatively (Fredrickson et al., 1998). Self-objectification theory is specific to gender stereotypes but likely will activate some of the same mechanisms that undermine performance under stereotype threat. Specifically, dressing provocatively cues women's female identities, activating the subtle "threat" that they will be evaluated based on that identity.

Finally, stereotype threat is also a relative of social evaluation threat and test anxiety. *Social evaluation threat* is a general label given to situations that induce the perception that one will be evaluated critically. These kinds of contexts have been used to study physiological changes that result from social anxiety (Dickerson & Kemeny, 2004; Kirschbaum, Pirke, & Hellhammer, 1993). They often are triggered by using very difficult and challenging performance tasks paired with a critical evaluator. They therefore combine some of the elements present in situations of stereotype threat—performing a complex task under a presumption of incompetence. In a social evaluation threat context, however, the presumed incompetence does not stem from a negative stereotype but rather from the critical evaluator. *Test anxiety* is perhaps an individual-difference analog of social evaluation threat—an indicator of one's

unique susceptibility to experience stress in a testing context regardless of other features of that context. Those who score high in test anxiety suffer cognitive deficits that impair performance (Sarason, 1984).

Both situational inductions of social evaluative threat and individual differences in test anxiety have known effects on physiological threat, anxiety, and impaired performance. But stereotype threat is in some ways more pernicious than these other phenomena. Consider that people often are unaware that stereotypes could be producing anxiety or performance decrements. In contrast, those who suffer from test anxiety freely report it on a questionnaire, and in situations that arouse social evaluative threat, it is blatantly obvious what is causing the sense of being threatened. When an individual faces stereotype threat, the stereotype often is cued quite subtly and leads to anxiety that people often are unable or unwilling to identify (Bosson, Haymovitz, & Pinel, 2004; Johns, Inzlicht, & Schmader, 2008). This form of threat is harder to detect and, therefore, harder for individuals to defend against.

The Costs and Benefits of Positive Stereotypes

Thus far we have discussed the influence of negative stereotypes on people who belong to stigmatized groups. On the opposite end of the stereotype spectrum, however, are those who are stereotyped as likely to excel relative to those who are stigmatized. These are the members of the advantaged “reference group” to which the stigmatized individuals are being compared. Past research has shown that positively stereotyped individuals often show a slight boost in performance when they believe their performance is being compared with a negatively stereotyped group. Although these effects often are nonsignificant in any one study, meta-analyses confirm their existence (Walton & Cohen, 2003). This evidence of improved performance as a result of a downward social comparison to a negatively stereotyped group has been called *stereotype lift* (Walton & Cohen, 2003) or *stereotype boost* for members of groups that are targets of specific positive stereotypes (Shih, Pittinsky, & Ambady, 1999).

Although positive stereotypes are often beneficial to performance, there are contexts in which being a

target of a positive stereotype can be just as damaging to performance as being a target of a negative stereotype. For example, although Asian Americans perform better on a math test when subtly primed with their Asian identity (Shih et al., 1999), they seem to “choke under the pressure” created by their group’s positively stereotyped status when reminded of the stereotypes in an explicit way (Cheryan & Bodenhausen, 2000; Shih, Pittinsky, & Trahan, 2006). Other research reveals that performance boosts among Asian American participants are largest for those who are identified most ethnically (Armenta, 2010). To our knowledge, evidence of choking in the face of explicit reminders of positive stereotypes has been found only in Asian American samples, raising the possibility that cultural differences play a role in these effects. For example, given the greater interdependence of self-definition among those of Asian cultural background (Markus & Kitayama, 1991), the dishonor of not living up to positive expectations might be just as threatening as the possibility of confirming negative stereotypes (Cheryan & Bodenhausen, 2000).

In sum, contemporary research on stereotype threat has identified various kinds of threats that can be experienced when one is viewed through the lens of a stereotype. The competence-based threat of confirming negative stereotypes about ability can be distinguished from a more social-based threat that one does not belong. One can either worry about being seen stereotypically or have concerns that he or she would confirm a negative stereotype about his or her group. These concerns can be located in one’s own beliefs or in how one is evaluated by others and sometimes can stem from a fear that one might not live up to a positive stereotype. The unifying theme here is that our membership in social groups and the stereotypes that attach to them can threaten our sense of identity in a host of different ways. When our identity is threatened, performance and motivation can be compromised. The mechanisms by which this occurs are the focus of the next section.

THE MECHANISMS UNDERLYING STEREOTYPE THREAT

The fact that subtle variations in a situation can impair performance is a compelling finding and one

that demands further exploration. How is it that describing a test as diagnostic of ability, or taking a math exam as the only woman surrounded by men, can disrupt performance? The question of mechanisms that underlie stereotype threat effects on cognitive performance plagued the literature for several years, as studies initially failed to identify consistent or convincing mediators of the effect. More recently, however, accumulated evidence points to a variety of contributing factors. The *integrated process model* of stereotype threat (Schmader, Johns, & Forbes, 2008) organizes these findings into an overarching framework (see Figure 17.3).

The Central Role of Working Memory

The integrated process model is an outgrowth of earlier research that identified deficits in working memory capacity as playing a critical role in lower performance observed in situations that cue negative stereotypes. Working memory capacity is defined as one's ability to focus one's attention on a task at hand and inhibit distracting or irrelevant cues (Engle, 2002). Because working memory capacity is known to be highly related to performance on a range of cognitive tasks, it is a likely candidate as a domain-general cognitive mechanism that could be impaired by additional processing due to stereotype threat. Schmader and Johns (2003) first demonstrated that both women and minorities exhibit lower levels of working memory capacity when they believe that group differences in ability will be diagnosed in that context. These decrements in working

memory accounted for lower performance on a subsequent test. Other research points to the role of cognitive fatigue effects due to stereotype threat (e.g., Beilock, Rydell, & McConnell, 2007) and reveals that people who are dispositionally low in working memory capacity could be particularly susceptible to these effects (Régner et al., 2010).

The evidence reviewed thus far suggests that the situation of being negatively stereotyped can impair a central cognitive resource needed for effective performance on a range of different cognitively based tasks. More recently, evidence has suggested that one reason deficits in working memory capacity impair performance in situations of stereotype threat is that difficulties in attentional focus due to stereotype threat allow the mind to wander off the focal task (Mrazek et al., 2011). The integrated process model identifies several pathways by which situational reminders of being stereotyped negatively can impair these executive functions.

Physiological Stress Response

The first pathway is through a physiological stress response. Contrary to earlier speculation that stereotype threat might simply be a manifestation of an automatic priming effect (Wheeler & Petty, 2001), several pieces of evidence now are showing an increased physiological stress response in situations in which one must perform under the burden of a negative stereotype. Studies have revealed evidence of an increase in sympathetic response arousal (Murphy et al., 2007). African Americans taking what

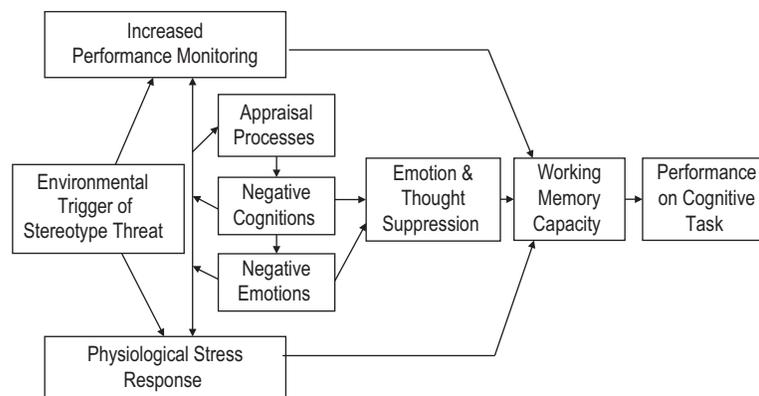


FIGURE 17.3. Integrated process model of stereotype threat. From “An Integrated Process Model of Stereotype Threat Effects on Performance,” by T. Schmader, M. Johns, and C. E. Forbes, 2008, *Psychological Review*, 115, p. 337. Copyright 2008 by the American Psychological Association.

is described as a diagnostic intelligence test exhibit increased blood pressure compared with their European American peers and unthreatened Blacks (Blascovich, Spencer, Quinn, & Steele, 2001). When students take a math test while being reminded of gender differences in math ability, men exhibit a pattern of cardiovascular challenge whereas women exhibit cardiovascular threat (Vick, Seery, Blascovich, & Weisbuch, 2008). When the test is described as gender fair, however, this pattern reverses such that men now are threatened and women are challenged. All of these findings point to increased stress.

Recent models point toward cortisol as a glucocorticoid that is elevated in response to situations of social evaluative threat, indicating activation of the hypothalamic-pituitary-adrenal (HPA) axis (Dickerson & Kemeny, 2004). Because stereotype threat often is framed as a specific kind of evaluative threat, researchers have sought to demonstrate evidence of increased cortisol in such situations. The few studies that have been published, however, have found that only a segment of people exhibit higher cortisol when faced with a negative stereotype. In one study, only participants low in problem-focused coping skills, who perhaps felt less optimistic about their chances of disconfirming the stereotype, showed elevated levels of cortisol when their school affiliation was devalued (Matheson & Cole, 2004). In other work, women who believed that sex discrimination is pervasive showed elevated cortisol when being evaluated by a man unless there was clear evidence that he was not sexist (Townsend, Major, Gangi, & Mendes, 2011). Although Schmader et al. (2008) postulated that a physiological stress response, especially indicated by a rise in cortisol and heightened HPA activity, could directly impair prefrontal processing due to the large number of cortisol receptors in the dorsolateral prefrontal cortex, a brain region that underlies working memory processes, evidence does not yet support this direct physiological link to lower performance.

Metacognitive Performance Monitoring

A second mediational pathway to lower performance is an increased tendency to explicitly monitor one's behavior and the situation. This more conscious and deliberative mind-set is thought to be activated by the dueling and imbalanced cognitions described earlier:

I do well in the domain, but I am a member of a group that is not expected to do well. These two possible predictions concerning one's performance, along with the desire to disconfirm the more negative expectation, lead one to be vigilant for cues that support either outcome and to be more cautious in one's approach to the task (Seibt & Förster, 2004). For example, those confronted with the possibility of being stereotyped become more vigilant to social cues of rejection (Inzlicht, Kaiser, & Major, 2008) or performance errors (Forbes, Schmader, & Allen, 2008).

At a cognitive level, we view stereotype threat as eliciting metamonitoring processes in the service of making sense of oneself in that context (Schmader, Forbes, Zhang, & Mendes, 2009). For example, in a threatening performance context, people's activated self-schemas for a stereotyped domain cease to be predicted by their default or baseline self-schemas in that domain (Schmader, Croft, & Whitehead, 2012). This state of self-uncertainty fuels a need to appraise the situation in light of the activated stereotype. Cues that typically might seem to be par for the course in a testing context take on added significance. For example, initial levels of anxiety going into a math test predict lower working memory among women and minorities who have been primed subtly with doubt but not among those primed with confidence (Schmader et al., 2009). Moreover, these effects are present only when the stereotype is activated and performance is thought to diagnose ability.

This metacognitive appraisal shifts the focus from the task per se to oneself as a performer of the task. But these self-perceptions are skewed by the activation of negative stereotypes. This can be debilitating in a range of performance situations. It manifests as intrusive thoughts of worry or self-doubt that can be directly harmful for performance on complex cognitive tasks (Cadinu, Maass, Rosabianca, & Kiesner, 2005; Steele & Aronson, 1995). For motor tasks, it is this shift to explicit monitoring of behavior that prevents stereotyped individuals from accessing their proceduralized skills that would lead to more efficient performance (Beilock et al., 2006).

Suppression Processes

Thus far, the integrated process model suggests that situational reminders of negative stereotypes can cue

a physiological stress response, increased metacognitive monitoring of the situation and oneself, and a sense of uncertainty. The model also proposes that, if occurring together, these effects create a cocktail of sources of anxiety. That is, the combination of self-doubt or uncertainty and difficulty in performing the task elevates anxiety levels that further exacerbate the effects of threat (Johns et al., 2008; Spencer et al., 1999). But feelings of anxiety are not thought to be helpful in a high-pressure performance situation. In fact, those experiencing stereotype threat are likely to evaluate their own anxiety as another manifestation of poor performance. Thus, the third mechanism by which stereotype threat could impair performance is via attempts to suppress unwanted negative thoughts and emotions cued by one's stereotyped status. This would help to explain why attempts to measure anxiety using self-report measures seldom reveal strong or consistent effects, whereas implicit or physiological measures of anxiety do (e.g., Bosson et al., 2004). If stereotype threat leads individuals to suppress feelings of anxiety, they will not necessarily admit to feeling anxious on a questionnaire.

Support for anxiety avoidance, stereotype suppression, or other attempts at emotional regulation come from various quarters. Johns et al. (2008) demonstrated not only that women and minorities under threat tried to avoid revealing anxiety in a testing context but also that these avoidance attempts were related to lower working memory capacity. Other functional magnetic resonance imaging investigations of performance under stereotype threat reveal activation in regions of the brain implicated in emotion regulation (Krendl, Richeson, Kelley, & Heatherton, 2008; Wraga et al., 2007). Although one's anxiety might be what is experienced most acutely in situations of stereotype threat, there is also some evidence that performance deficits can stem from efforts to suppress the stereotype itself (Logel, Iserman, Davies, Quinn, & Spencer, 2009).

The relevance of these self-regulatory attempts is that such suppression processes are known to rely on working memory (Wegner, 1994). Using working memory for a purpose other than the task adds a substantial cognitive load that leaves individuals depleted for tasks that follow (Johns et al., 2008). For example, researchers have shown that after performing under

stereotype threat, participants show evidence of ego depletion and lack the ability to self-regulate on unrelated behavioral and performance tasks—a phenomenon known as *stereotype threat spillover* (Beilock et al., 2007; Inzlicht & Kang, 2010).

Mere Effort

In addition to the interrelated set of mechanisms described in the integrated process model, another account has been based on a process known as mere effort (Jamieson & Harkins, 2007). According to this view, because individuals under threat are motivated to disconfirm the stereotype, they automatically (presumably cued by increased arousal) exert more effort on the task at hand. Because this effort is employed in an automatic fashion, it facilitates the dominant response or response strategy. When completing a math test, the dominant strategy is to try to solve the problem, but some kinds of problems are better performed using logical deductions or shortcuts (Jamieson & Harkins, 2009). Situations of stereotype threat seem to increase a tendency to fall back on the dominant “solve” strategy, which can pay off if the problems rely on that strategy but can prevent people who are under threat from breaking free of set strategies and employing a novel but more effective solution.

Although Jamieson and Harkins (2007) originally suggested that a mere effort account was incompatible with a cognitive depletion explanation, other research suggests otherwise. For example, when situations of stereotype threat induce a lack of flexibility in problem solving, this effect is predicted by stereotype suppression (Carr & Steele, 2009). In other words, the degree to which one is experiencing cognitive load due to other processes outlined earlier could be a reason why one defaults to the dominant response strategy. Furthermore, evidence showing that stereotype threat elicits mind-wandering is consistent with a framework in which cognitive resources are depleted but is difficult to explain if threat elicits only greater effort and (presumably) attention toward the task (Mrazek et al., 2011).

In sum, nearly two decades after stereotype threat was first identified as a phenomenon, we now have a much firmer understanding of the host of mechanisms that can hijack working memory

resources and disrupt attentional processes, leading to poorer performance. By activating self-relevant negative stereotypes, stereotype threat induces an increased motivation to disconfirm the stereotype and an increase in the physiological stress response, while increasing efforts to monitor performance and understand oneself in context. Finally, because people under threat usually are trying to regulate negative thoughts and feelings, cognitive resources needed for efficient and effective problem solving are otherwise absorbed in self-regulation. An understanding of these mechanisms not only helps us to understand what stereotype threat is but also provides a guidebook for remedying it.

REMOVING THE THREAT

This final section reviews laboratory manipulations and field-tested interventions that alleviate stereotype threat and maximize performance for members of negatively stereotyped groups. These methods of minimizing threat range include changing stereotypes themselves, buffering identities from the sting of stereotyped expectations, and empowering people with coping strategies to deal with the experience of stereotype threat. At the end of this overview, we present a few specific policy implications of this work.

Changing the Stereotype

The most effective means to ensure that people do not experience stereotype threat is to change the cultural stereotypes that people have. Situations lose their power to cue the experience of stereotype threat if those stereotypes cease to exist in people's minds. In the sections that follow, we review evidence that this strategy is effective. However, broad change in cultural stereotypes admittedly is difficult to achieve.

Role models. Changing cultural stereotypes is necessarily a slow and difficult process. However, given evidence that the unequal distribution of people (e.g., men, women) in different careers and roles can underlie stereotype formation (Eagly & Steffen, 1984), greater equality in role division and representation should minimize the descriptive power of stereotypes. One implication is that members of stigmatized groups who do excel in a

stereotype-relevant domain can serve as role models who challenge prevailing stereotypes and promote feelings of self-enhancement and inspiration.

Research has confirmed that the presence of role models can mitigate stereotype threat. For example, Marx and Roman (2002) demonstrated that under conditions of stereotype threat, women's gender identity was more salient, which then made them more receptive to positive female role models. With these role models in mind, women were able to perform well on a subsequent math test. How do these role models have their effect? Recent research suggests that they can change implicit stereotypes and attitudes toward the domain. In both a naturalistic study and in laboratory experiments involving women in science, technology, engineering, and math (STEM), exposure to female STEM experts improved women's implicit attitudes toward STEM, increased their self-efficacy, and increased their effort on a math test (Stout, Dasgupta, Hunsinger, & McManus, 2011).

Although role models have the power to inspire, they also can be demotivating when they appear far removed from one's self-perceptions. For example, when researchers varied both a computer science role model's gender and whether the role model embodied computer science stereotypes, women did not uniformly benefit from seeing a successful female computer scientist (Cheryan, Siy, Vichayapai, Kim, & Drury, 2011). Rather, they rated their likely interest and success in computer science to be higher when they saw role models (both male and female) who did not conform to the stereotype of a computer scientist. Such findings suggest that role models may be effective only when their presence can be internalized. Sharing the same group membership is one way to achieve this, but other interests and attributes also can cue a sense of similarity to people who excel in a stereotyped domain.

Stereotype retraining. Role models provide one way to punch holes in the validity of prevailing gender stereotypes. Other research suggests that these stereotypes also can be retrained directly to benefit performance in contexts that normally would cue stereotype threat. Such findings derive from initial research showing that both women and men have a tendency to automatically associate math with men (Nosek,

Banaji, & Greenwald, 2002). This is true even among a sample of students majoring in math and science disciplines. Furthermore, the stronger this association, the less women identify with math and the lower their scores on the math portion of the SAT.

Although such automatic associations initially were taken to be stable, more recent research has revealed them to be malleable. Furthermore, changing an individual's automatic associations can change his or her behavior. For example, Kawakami, Steele, Cifa, Phillips, and Dovidio (2008) demonstrated that repeatedly training participants to associate approach actions (as opposed to avoidance actions) to math can lead women to expend more effort on math-related tasks and identify more strongly with the math domain; unfortunately, however, this approach motivation did not improve actual performance. Forbes and Schmader (2010) hypothesized that changing one's attitude toward the domain might increase motivation, but improving performance necessitates changing the implicit stereotypes that get activated in a threat context. Confirming this hypothesis, women retrained to have an automatic "like" association to math chose to spend more time on math problems but did not show improvement in working memory when cues to threat were present. When, however, women were retrained directly through repeated trials to implicitly associate math with women (rather than men), they exhibited increased working memory capacity and better math performance when completing a test under stereotype threat conditions.

Buffering the Threat to Identity

Even when stereotypes themselves are not changed, other interventions have been successful in providing buffers against the threat of negative stereotypes. Many of these methods have in common strategies that mitigate threat by shifting its impact on identity.

Shift to a positive group identity. When most individuals enter into a performance situation, they bring with them a number of different social identities. One of these identities might be stereotyped as doing poorly in that domain (e.g., an African American taking an intelligence test), but other identities could be stereotyped positively (e.g., a

student at a prestigious college). Because stereotype threat is triggered by making a devalued identity salient, other aspects of the environment can offset these identity threats by either shifting attention to a more positive identity or deemphasizing group identity altogether. For example, women primed with a positive identity (e.g., a student at an elite private college) performed better on a math test than those who were not reminded of a positive identity (McGlone & Aronson, 2006). Other work reveals that positive identity cues have benefits for performance because they improve working memory functioning (Rydell, McConnell, & Beilock, 2009).

Emphasize personal identity or downplay group identity. Although shifting attention to a more positively stereotyped identity is one means of helping stigmatized students manage the threat to identity from negative stereotypes, another strategy is to shift attention away from group identity altogether. For example, Ambady, Paik, Steele, Owen-Smith, and Mitchell (2004) found that women who were primed nonconsciously with gender performed worse on a math test than those who were not primed. When the primed participants completed an individualization manipulation (listing their favorite movie, book, hobbies, and food), however, they no longer showed performance decrements.

Affirming the self. Before Steele (1988) developed his influential theory of stereotype threat, he proposed another important theory—self-affirmation theory. *Self-affirmation theory* maintains that we have a fundamental need to maintain a sense of integrity to our sense of self. By extension, threats to the self can be managed by restoring this sense of overarching integrity, most commonly by reflecting on core values that provide structure or meaning to one's worldview. Thus, negative stereotypes that impugn one's group identity also can be managed by affirmations to important self-defining values. Self-affirmation is thought to reduce stereotype threat by reminding stereotyped individuals that their sense of self is contingent not just on their performance on a test but also on broader more abstract values that maintain a sense of integrity to the self-concept. With this in mind, a stereotyped individual might still recognize the threat, but its impact could be minimized

by the broader and more grounded perspective he or she now has of the self. For example, in laboratory studies, women perform better on a math test if they are first asked to reflect on their core values (Martens, Johns, Greenberg, & Schimel, 2006).

More recent research has demonstrated that this simple affirmation intervention can be used in classrooms and college campuses to create meaningful benefits to performance and motivation that extend across time (Cohen, Garcia, Purdie-Vaughns, Apfel, & Brzustoski, 2009). Most notably, when seventh-grade African American and European American children spent just 15 minutes at the start of the academic year reflecting on their most important values, the achievement gap in academic grades between these groups was reduced by nearly 40% at the end of the semester (Cohen, Garcia, Apfel, & Master, 2006). Although European American students were unaffected by this intervention, African Americans showed less activation of negative stereotypes about their group, and their grades improved compared with those in a control condition. Furthermore, the benefits of this intervention persisted for 2 years with only two short reminders to reflect on their core values (Cohen et al., 2009). In another study with students enrolled in a college-level physics course, two sessions of writing about personal values led women, but not men, to perform better in the class, raising their modal grade from a C to a B (Miyake et al., 2010). These provocative studies suggest that relatively brief interventions employed at critical points of academic transition might lead to recursive psychological processes that buffer individuals from experiencing threat over time and therefore break negative cycles of lower performance.

Distancing or disengaging identity from the stereotyped group. According to Schmader et al.'s (2008) integrated process model, stereotype threat is triggered by the imbalance of being a member of a group stereotyped to do poorly in a domain that one values. This model suggests that unlinking one's sense of self from the group should be an effective way to minimize stereotype threat. Indeed, there is evidence that reminders of being stereotyped negatively cause disadvantaged group members to minimize stereotypic preferences and behaviors (Pronin,

Steele, & Ross, 2004; Steele & Aronson, 1995). Surprisingly, research has not yet examined whether this identity bifurcation strategy is beneficial for performance.

Moreover, given Shapiro and Neuberg's (2007) multithreat framework, we might predict that these distancing strategies would be beneficial for those most concerned that the stereotype impugns their personal identity, but it could backfire for those who feel the threat to their social identity. For the latter, disavowing an important aspect of their identity could lead to feelings of inauthenticity. These questions have not been explored thoroughly. Several studies, however, have suggested that when it is emphasized that performance is anonymous and will be examined only in the aggregate, women perform better on a math test than when they believe their performance will be used to evaluate them as individuals (Jamieson & Harkins, 2010; Zhang et al., 2012). Removing the self from the performance context seems to alleviate stereotype threat, at least for the average female college student taking a math test. One exception to this is women who report being highly gender identified. Highly gender-identified women still exhibit lower performance because they feel they have the potential to confirm negative stereotypes about their group even when performance is anonymous (Wout, Danso, Jackson, & Spencer, 2008).

Coping With the Threat

The first two kinds of interventions are aimed at preventing stereotype threat by reducing the likelihood that threat is ever triggered. After all, one cannot be threatened if the stereotype is never activated, when it has been retrained to be more positive, or when its relevance to identity is minimized. But even when all the elements of threat are present, other interventions allow stigmatized individuals to cope with that threat.

Reappraisal of the situation. Biopsychosocial models of stress suggest that different appraisals of a situation can lead to different physiological stress responses (Blascovich & Tomaka, 2008). A threat appraisal occurs when people perceive the demands of a situation to exceed the resources available to

cope with the stressor. A challenge appraisal occurs when an individual's perceived resources meet or exceed what is demanded by the task at hand. On difficult tasks, a threat response often predicts poorer performance as compared with a challenge response (Scheepers, 2009; Vick et al., 2008). Applying this model to stereotype threat suggests that interventions that foster challenge appraisals also should improve performance, particularly for those targeted by negative stereotypes.

In some research, a challenge frame has been induced by changing how the test itself is appraised. For example, Steele and Aronson's (1995) seminal studies mitigated threat by reframing a test not as a diagnostic measure of ability but as a simple problem-solving task. Other research, stemming from work by Carol Dweck (1999), has demonstrated that an emphasis on mastery and learning leads to better academic performance than an emphasis on performance outcomes per se. Recent work by Alter, Aronson, Darley, Rodriguez, and Ruble (2010) shows that such mastery instructions are particularly beneficial for negatively stereotyped students. In this study, the experimenters had participants complete a test under threat-inducing instructions that emphasized evaluation of their abilities or challenge-inducing instructions that emphasized how the test would help them learn. The researchers found that Black participants performed worse when they had to report their race before the test, unless they completed the test under a challenge frame.

In addition to directly framing a test as part of a learning experience, other research shows that adopting the mind-set that intelligence is malleable can be beneficial over the long term. Specifically, Good, Aronson, and Inzlicht (2003) conducted an intervention in which a sample of seventh-grade students was mentored by college students who encouraged them to view intelligence as malleable (vs. a control group who were mentored with reference to the dangers of drug use). The researchers found that stigmatized students (girls in math and minority students) who received the mentoring session that suggested the malleability of intelligence received significantly higher standardized test scores at the end of the year compared with students who were assigned to the control condition.

Finally, work by Dar-Nimrod and Heine (2006) demonstrated that the appraisal of the roots of a negative stereotype can be a useful means to reduce stereotype threat. The researchers demonstrated that exposure to genetic (entity orientation) explanations for gender differences in math performance led women to underperform on a subsequent math test. When participants in the same study were provided with evidence suggesting that differences in math performance could be explained by environmental factors (perhaps fostering what Dweck, 1999, called a more incremental orientation), female participants no longer suffered performance impairments. Together these studies reveal that manipulations changing how academic contexts and ability are appraised can be effective in elevating performance for those who are stereotyped negatively.

Reappraisal of emotion. Our current understanding of mechanisms that underlie stereotype threat effects points to the combined roles of physiological arousal and one's interpretation of that arousal (Schmader et al., 2008). This implies that stereotype threat not only can be reduced by changing one's appraisal of the situation but also can be reduced by changing one's appraisal of the arousal and the emotions one feels in that situation (Johns et al., 2008). Early studies revealed, for example, that leading students to misattribute arousal to the surrounding environment alleviated stereotype threat effects (Ben-Zeev, Fein, & Inzlicht, 2005). These studies demonstrate that arousal plays some role, but arousal or anxiety itself can be interpreted as a sign that one might be confirming the stereotype about one's group. For example, when a student enters a university, he or she might reasonably feel a bit anxious being away from home, trying to establish new friends, and facing more challenging courses. Many students will take this stress in stride as a normal part of any life transition, but for members of stigmatized groups, this emotional reaction may be seen as indicating their lack of fit or belonging in that environment, especially if they see very few students like themselves (Walton & Cohen, 2007).

From this perspective, interventions that reframe anxiety as a normal experience or as otherwise benign should provide a more effective means of coping with stereotype threat. For example, in the study

described earlier by Good et al. (2003), a third group of seventh-grade students were mentored by college students to see academic setbacks and the resulting stress as normal parts of the learning process. Students who received a reframing message about what their stress implied had similarly high test scores to those who were mentored to see intelligence as malleable. Similarly, Walton and Cohen (2007) demonstrated the importance of these reappraisal messages for college students. In one of their studies, Black students led to reconstrue negative college experiences as something all college students experience had grades that were one third of a grade point higher than Black students in the control group and than Black students who did not participate in the intervention. White students were unaffected by the intervention. Furthermore, Black students in the reconstrual condition had a higher grade point average than Black students in the control conditions a full 3 years after the original intervention.

Paralleling these field studies, laboratory-based research has provided insight into the mechanisms that underlie the benefits of reappraisal. As detailed in a previous section, stereotype threat reduces performance by diminishing executive resources (Schmader & Johns, 2003). Building on this work, Johns et al. (2008) have shown that providing threatened individuals with a specific instruction to reappraise anxiety as having no negative effect on performance can reduce a tendency to suppress negative emotion, restore executive resources, and consequently improve test performance. In other work, women with a dispositionally strong tendency to reappraise negative emotions have shown a positive relationship between sympathetic activation and performance on a math test, whereas those low in reappraisal tendencies have shown a negative relationship between sympathetic activation and performance (Schmader et al., 2009).

A compelling demonstration of the efficacy of emotion reappraisal in improving performance under threat recently was provided by Jamieson, Mendes, Blackstock, and Schmader (2010). The researchers recruited participants who were studying for the Graduate Record Exam (GRE) to complete a practice test in the context of a lab study. Those students who were instructed to

reappraise their arousal in a more positive way exhibited increased sympathetic nervous system activation during a GRE practice test and outperformed control participants. Furthermore, participants in the reappraisal condition scored significantly higher on their actual GRE more than 1 month after the lab session.

One final intervention that operates on the principle of reappraising emotion involves teaching stigmatized students about stereotype threat. If students understand that the anxiety they experience in a testing situation is a function of cultural stereotypes and not a signal of underperformance, the threat may cease to impair their performance. To test this hypothesis, Johns et al. (2005) had male and female participants complete a math test described either as a problem-solving task (control) or as a math test (threat). In a third condition, participants also took what was described to them as a math test, but in addition, they were taught about stereotype threat and about how any anxiety they might feel during the math test could be a result of negative stereotypes and not indicative of a lack of ability. Results showed that women performed worse than men in the threat condition but did not differ from men in the problem-solving condition or in the condition in which they learned about stereotype threat. The results of this study demonstrated that educating students about stereotype threat might be an effective means of diffusing its negative effects.

Changing Policies to Create Stereotype-Safe Environments

The previous discussion of interventions provides an overview of the many ways that stereotype threat effects can be minimized or reduced. The wealth of evidence collected in the past two decades on this phenomenon has implications for specific education and organizational policies.

Affirmative action. Affirmative action policies are designed to recruit and retain individuals whose true ability previously has been underrepresented. Although these policies often are misunderstood, they are an important tool for combating stereotype threat (Crosby, Iyer, & Sincharoen, 2006). Specifically, affirmative action is important in two

ways: First, in the short term, affirmative action can mitigate the emphasis on grades and test scores for college admissions, employment, and fellowships. Research on stereotype threat suggests that test scores of women and minorities can be lowered systematically by the cultural prevalence of negative stereotypes that prevent large segments of the population from performing up to their true or latent ability (Walton & Spencer, 2009; but see Sackett & Ryan, 2012, for a critique). Thus, efforts to actively recruit students from stigmatized backgrounds and expand selection procedures beyond test scores provide opportunities for capable students and applicants who otherwise might be excluded. Although critics suggest that affirmative action might increase the stigmatization that women and minorities feel, these harms are eliminated when merit is emphasized as part of selection procedures (Crosby et al., 2006).

The long-term benefit of such programs comes from increasing representation of people from diverse backgrounds who then act as role models for the next generation of students or employees. With an increased number of stigmatized individuals entering into an environment, their very presence should further reduce avoidance and underperformance for others (Inzlicht & Ben-Zeev, 2000; Murphy et al., 2007). Furthermore, these role models should help to build positive cognitive associations between the stigmatized group and success in the domain, which should help stigmatized individuals overcome stereotype threat (Forbes & Schmader, 2010; Stout et al., 2011).

Test administration. Policies that expand selection beyond grades and test scores are one means of combating stereotype threat. Another focus is on testing itself. Performance measures often are construed in ways that have been shown to cue stereotype threat. For example, standardized tests often ask test takers to indicate their gender and ethnicity before they begin the test. In controlled experiments, social psychologists often use this same procedure to cue stereotype threat. Danaher and Crandall (2008) examined the effects of the placement of demographic questions in a national study of students taking an Advanced Placement (AP) calculus exam (data originally analyzed by Stricker & Ward, 2004).

Danaher and Crandall (2008) found that women benefited on the calculus test from answering the demographic questions after the test rather than before it. Specifically, the authors found that this small change would increase the number of female students receiving AP calculus credit by more than 4,700 each year. Similarly, simple instructions that emphasize tests as diagnostic of ability are known to induce stereotype threat. Instructions that instead emphasize an assessment of current progress are likely to evoke learning rather than performance goals, which could promote better performance. Thus, research suggests that simple changes in how standardized tests are administered could help to reduce the potential for stereotype threat.

Education policies. A third policy approach is to educate the public about how negative stereotypes can impair performance. Providing individuals with a broad understanding of the mechanisms that impair performance would be beneficial for both those who face negative stereotypes and those who do not. In educating stigmatized individuals about the experience of stereotype threat, researchers should aim to provide constructive appraisals designed to help them cope with threatening performance situations. But such education efforts also would help to ensure that others are sensitive to the ways in which cultural and contextual factors implicitly stigmatize people. Providing teachers and other individuals in performance environments with an understanding of the experience of stereotype threat will enable them to take measures to reduce potential cues that could trigger these effects.

CONCLUSION

In the 21st century, we increasingly are living, working, and learning in diverse contexts. But these experiences continue to be informed and influenced by cultural stereotypes that have a self-perpetuating power. As research on stereotype threat demonstrates, even subtle reminders of these cultural expectancies can lead to underperformance for the very individuals most likely to break through the glass ceilings and be seen as role models if they are given a fair chance. Others then are left trying to

make sense of continued gaps in advancement even after institutional barriers to success have been removed. In stark contrast to biologically based views of group differences in performance or even entrenched patterns of socialization, the theory of stereotype threat offers optimism for change. Through small changes in framing or context, we can clear the air of stereotype threat and improve the performance of those who are stigmatized. When we live in a society in which all individuals truly have an equal opportunity to demonstrate their skills and advance to the levels of their ambition, everyone will reap the benefits.

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