Stereotype Threat
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An Integration of Processes that Underlie Stereotype Threat

Steele and Aronson's (1995) discovery that performance could be easily manipulated by merely how a task is described or who is present in the room was astonishing. Just how is it that being surrounded by male test-takers can lead women to do worse on a math test? Why does the mere knowledge that a task will be used to measure intelligence impair the performance of black but not white college students? Many cues in our immediate environment can signal in subtle and not so subtle ways our cultural "fit" within that context (Murphy & Jones Taylor, 2011, Chapter 2, this volume). Whereas the first wave of research on stereotype threat established that these cues exist and can affect performance and behavior for a wide range of groups on a wide range of tasks, questions were soon raised about the process by which these effects occur. Although this thirst for process information is partly a manifestation of a current zeitgeist for breaking open phenomena to see how they work, it also stems from a very practical need to identify how these effects can be reduced.

(p. 35) Early stereotype threat research searched for evidence that those who show performance decrements when they are negatively stereotyped also report feeling more anxious, more concern about being evaluated negatively, or lower expectations for how they would do (Spencer, Steele, & Quinn, 1999; Stangor, Carr, & Kiang, 1998). Yet, although these effects emerged in a few studies, they remained elusive in other work. The early dearth of evidence for threat-based mediators led to some speculation that stereotype threat effects were not due to threat at all (Wheeler & Petty, 2001). Rather, it was argued that situations can prime negative stereotypes that individuals (even those who are not the target of the stereotype) then automatically assimilate into their behavior (Marx, 2011, Chapter 8, this volume).

From our perspective, both anxiety and negative stereotype activation are overly simplistic explanations for stereotype threat. It is not just the case that individuals feel anxious when they are stereotyped and that is why they underperform. Furthermore, it is not just the case that stereotypes are activated and automatically induce stereotype-consistent behavior. The phenomenon is more complex. It involves both cognitive

and affective components and engages both automatic and controlled processes. Schmader, Johns, and Forbes (2008) outlined an integration of processes that underlie stereotype threat. Likewise, Beilock and colleagues (e.g., Beilock, 2008; Beilock, Jellison, Rydell, McConnell, & Carr, 2006; Beilock, Rydell, & McConnell, 2007) have proposed connections between stereotype threat mechanisms. The goal of this chapter is to summarize some of what we know about the ways in which stereotype threat reduces performance by focusing specifically on articulating the automatic and controlled effects stemming from the experience of being targeted by negative stereotypes.

Stereotype Threat Is What Stereotype Threat Does

Understanding what stereotype threat is as a phenomenon requires insight into what it does psychologically. By definition, stereotype threat characterizes a concern that one might inadvertently confirm an unwanted belief about one's group. As a result, those who experience stereotype threat have a motivation to avoid enacting any behavior that might be seen as stereotypical. For example, blacks anticipating having their intelligence assessed report less liking for stereotypically black music and sports (Steele & Aronson, 1995), and women majoring in math and science disciplines report dressing and behaving in less feminine ways (Pronin, Steele, & Ross, 2004). But this focus on preventing any form of stereotype confirmation does not simply affect behavioral preferences, it also prompts more subtle changes in how one processes information at both an automatic and a controlled level. As we will review, these shifts in processing have important implications for performance that help us understand exactly why negative stereotypes can have such pernicious effects for those who are targeted by them. Although situations of stereotype threat clearly cue physiological responses as well, we focus our review on cognitive, neural, (p. 36) and affective mechanisms, and refer the reader to Mendes and Jamieson (2011, Chapter 4, this volume) for an excellent review of the physiological concomitants of stereotype threat.

Automatic Activation of Threat

An interesting and often understated feature of stereotype threat is its ability to affect performance without a person's conscious awareness of the stereotype having been activated. Although we do not deny that stereotype threat can be acutely experienced in a very conscious way, such awareness is not always necessary. Rather, many of the processes instigated by being the target of negative stereotypes happen automatically, outside of conscious awareness, and result in outcomes in direct opposition to the person's explicit goals and intentions.
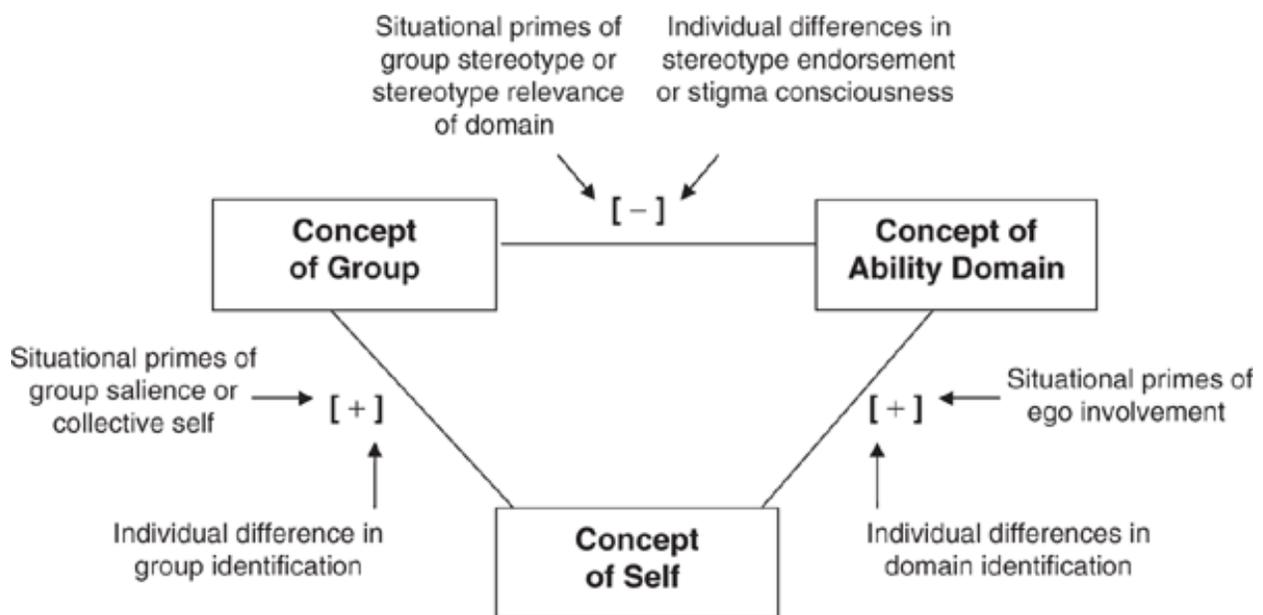
Figure 3.1 Stereotype threat as a cognitive imbalance triggered by person and/or situation factors. Adapted from Schmader, T., Johns, M., & Forbes, C. (2008). An integrated process model of stereotype threat effects on performance. Psychological Review, 115, 336–356, with permission of the publisher.

First, situations that cue stereotype threat activate a schema of that stereotype. This was demonstrated directly by Steele and Aronson (1995), who found that black college students expecting to take an intelligence test were more likely than their white peers to complete word fragments like R_C_ with the word RACE instead of reasonable alternatives like RICE, ROCK, or RICH. Such evidence reveals that a cue as simple as the way a task is described can bring the stereotype to mind. However, activating the stereotype might lead to stereotype threat only to the extent that it cues an imbalance between three relevant propositions: "I am a member of Group G, Group G is expected to do poorly at Domain D, but I do well at Domain D" (see Figure 3.1). As Schmader et al. (2008) contend, it is the logical inconsistency among these propositions that is what actually constitutes stereotype (p. 37) threat. This implies that stereotype threat will be experienced most strongly in those situations and for those individuals most likely to activate all three ideas simultaneously (for confirmatory evidence, see Rydell, McConnell, & Beilock, 2010).

Ultimately, the cognitive imbalance referred to above elicits other automatic but downstream consequences. As humans have a fundamental motive for cognitive consistency (Festinger, 1957), the immediate reaction is a sense of uncertainty and self-doubt since one clear resolution to the imbalance is to activate a more negative association between oneself and the domain (Johns & Schmader, 2010). Several studies

have documented these thoughts of doubt (Beilock, Rydell, & McConnell, 2007; Steele & Aronson, 1995; Cadinu, Maass, Rosabianca, & Kiesner, 2005), and others have shown that once doubt has been activated (even if outside of awareness), it can color the interpretation of one's experience in ways that disrupt cognitive abilities (Schmader, Forbes, Zhang, & Mendes, 2009).

Our perspective emphasizes uncertainty not as an end state but as a phenomenological driver of additional processing aimed at resolving the inconsistency of one's thought processes. As a result, situations of stereotype threat raise competing possible outcomes ("I could do poorly as the stereotype predicts," or "I could do well, consistent with my goals and past experience"), and one's attention becomes focused on cues that might provide evidence for or against either alternative. Because the underlying goal, however, is to avoid confirmation of the stereotype, one's attention is likely to be oversensitive in its detection of any sign that could indicate that unwanted outcome. As a result, cues that might be otherwise innocuous, such as feeling anxious during an interview or making a simple arithmetic error while solving math problems, can be overinterpreted as a sign of failure.

Evidence for this increased vigilance for negative cues comes from a recent study by Forbes, Schmader, and Allen (2008). In this experiment, patterns of brain activity were assessed in minority college students who thought that their intelligence was being assessed using neurological measurements. The researchers were most interested in measuring activity in the anterior cingulate cortex (ACC) by analyzing error related negativity (ERN), observed as a negative deflection in an event-related potential occurring 50–100 ms after making an incorrect response (Gehring, Goss, Coles, Meyer, & Donchin, 1993). Past research has confirmed that individuals show larger ERNs to errors when they are particularly motivated to avoid mistakes or when they are being evaluated (e.g., Hajcak, McDonald, & Simons, 2003). Not surprisingly, then, results revealed that minority college students who were invested in doing well academically exhibited greater vigilance (i.e., larger ERNs) to the errors they made during a simple response time task when they believed that their intelligence was being assessed compared to when the task was described more neutrally.

In addition to an automatic detection of errors and bias from others, people also become more vigilant to signs of threat in their environment (Kaiser, Vick, & Major, 2006) as well as to their own internal experience. For example, in one study, women expecting to take a difficult math test (as opposed to a more neutrally described problem-solving task) exhibited an automatic attentional shift toward anxiety-related (p. 38) words, betraying the emotional state they were likely experiencing at the time (Johns, Inzlicht, & Schmader, 2008).

In sum, situations of stereotype threat bring to mind thoughts about one's relation to a valued domain that conflict with one's relation to a valued group that is stereotyped to do poorly. This cognitive inconsistency triggers certain automatic effects, including a sense of uncertainty and increased vigilance toward cues that might help one to detect, with the goal of avoiding, behavior that could confirm the stereotype. As we will see, these automatic effects are complemented by more controlled processes aimed at managing one's behavior, thoughts, and emotions.

Explicit Efforts to Manage the Situation and One's Response

As is quite evident from the discussion thus far, stereotype threat can affect our thoughts and behavior via automatic processes that run largely outside conscious awareness. However, this is not the entire story. The automatic processes that negative self-relevant stereotypes set in motion are accompanied by a number of controlled processes that can, in turn, affect performance—often for the worse but, sometimes, even for the better.

Increased Effort at the Task

A core tenet of stereotype threat theory is that it increases one's motivation to disconfirm the stereotype. Interestingly, however, increased effort is not purely a controlled or explicit process. Jamieson and Harkins (2007) articulate this idea in their mere effort account of stereotype threat. From this perspective, when people are threatened by how they might be evaluated, their increased drive to perform well increases activation of the prepotent or dominant response to the task. The problem is that one's dominant response is not always the best response to achieve success. Performance will be enhanced if the task is one that relies on a cognitively simple or well-learned thought process or behavior. But, as we will discuss in more detail below, performance will be impaired when the task is more cognitively challenging.

Research has uncovered evidence that stereotype threat increases arousal in a way that can facilitate a dominant response. For example, Ben-Zeev, Fein, and Inzlicht (2005; see also O'Brien & Crandall, 2003) demonstrated that women were faster to write their name repeatedly when they were expecting to take a math test that had revealed gender differences in the past compared to when they did not receive threatening instructions about the upcoming test. Presumably, the increased arousal due to stereotype threat facilitated a dominant response of name writing in an automatic way.

Jamieson and Harkins' (2007) mere effort account expands upon this idea of an automatic activation of a prepotent response to suggest that stereotype threat also increases one's efforts to counter that response when it is identified as an error—efforts that are likely to be more explicit and controlled in nature. To demonstrate (p. 39)

these ideas, Jamieson and Harkins (2007) employed an antisaccade task in which people try to inhibit an automatic tendency to look toward, or saccade to, a stimulus cue that flashes to the left or the right of a central fixation point on a computer screen. On antisaccade trials, participants are explicitly instructed to look away from this cue and toward the opposite side of the screen, where a target that they have to identify will briefly appear. To be successful at this identification task, individuals must inhibit their prepotent saccade to the cue or at least quickly correct for an automatic saccade in order to see and identify the target before it disappears from the screen.

Several interesting results emerged from Jamieson and Harkins' (2007) research with this task. First, they showed that women who were told the task was related to visuospatial and math ability were more likely to saccade toward the distracting cue on trials in which they needed to inhibit this reflex, a result that is consistent with the idea that threat increases a prepotent response pattern. But they also demonstrated that women under stereotype threat were faster to launch a corrective saccade—to correct their mistake by reversing their gaze direction in time to identify the target on the opposite side of the screen. This corrective response pattern, likely stemming from their enhanced motivation to do well, seems to rely on a more controlled mode of processing, given that it was eliminated by giving women an additional cognitive load in one study.

In sum, stereotype threat enhances one's motivation to do well, but effort is not purely a function of controlled processing. Arousal or increased drive cues prepotent responses in a fairly automatic way. But when errors are identified, the motivation to disconfirm the stereotype can cue more controlled attempts to correct one's mistake.

Decreased Working Memory

Perhaps the greatest paradox of stereotype threat is that it can simultaneously increase motivation while also decreasing performance, particularly when one is performing a task that requires the mental manipulation of complex information. Indeed, Ben-Zeev and colleagues (2005) found that, in contrast to an easy name writing task, women under threat did worse than those who were not threatened on a difficult name writing task (in which people were asked to write their name backward as many times as they could for 20 seconds).

Several researchers have proposed that performance is impaired on these kinds of tasks because stereotype threat taxes working memory capacity (Beilock, 2008; Beilock et al., 2007; Schmader & Johns, 2003). Working memory can be thought of as a short-term memory system that is involved in the control, regulation, and active maintenance of a limited amount of information with immediate relevance to the task at hand (Miyake & Shah, 1999). It is also thought to allow one to focus attention on information relevant to that task, while inhibiting other irrelevant or distracting cues (Engle, 2002). Because

working memory is integral to performance on sustained, effortful, and/or complex processing tasks, performance on such tasks (p. 40) will suffer if one's working memory resources are temporarily depleted or used for another purpose.

Support for stereotype threat's impact on working memory capacity comes from work by Schmader and Johns (2003). The researchers had women complete a working memory task and a difficult math task under control conditions or following the activation of a stereotype regarding gender differences in quantitative ability. They found that women in the stereotype threat condition showed reduced working memory capacity and poorer math test performance relative to the control group. Furthermore, working memory capacity mediated the link between stereotype threat and poorer math performance, supporting a causal relationship. Other research soon followed that confirmed the general idea that individuals under threat are mentally overloaded (Beilock et al., 2007; Croizet, Despres, Gauzins, Hugeut, & Leyens, 2004) and cognitively depleted (Inzlicht, McKay, & Aronson, 2006).

But how exactly might this working memory compromise occur? To answer this question, one must delve a little deeper into the various controlled processes regulated by working memory. Although a number of prominent working memory models differ on both structural and functional dimensions (Miyake & Shah, 1999), one of the most common is Baddeley's (2000) multicomponent model. According to this framework, a domain-general central executive controls and coordinates the information active in working memory. Some of this information is represented and maintained in domain-specific short-term stores, such as the phonological loop for acoustic/verbal information and the visual–spatial sketchpad for visual images. A fourth component, a multimodal episodic buffer, serves to bind information from the phonological loop, the visual–spatial sketchpad, and long-term memory into a unitary episodic representation. Using this analysis, we consider a couple of ways in which stereotype threat can affect working memory.

The Depleting Effects of Task Ruminations

One notable means by which working memory can be impaired when one is targeted by negative stereotypes is by saturating central executive and phonological loop resources with internal worries about one's performance (Beilock, 2008). Steele, Spencer, and Aronson (2002) suggested that stereotype threat is accompanied by explicit and verbalizable "concerns about how one will be perceived, doubts about one's ability, and thoughts about the stereotype ..." (p. 392). Work by Cadinu et al. (2005) supports this idea. Women performing difficult math problems after being told that gender differences in math exist had more negative math-related thoughts and performed more poorly than did women who did not receive this information. These task worries partially mediated their impaired performance on the test (see also Beilock et al., 2007).

If stereotype threat induces distracting thoughts and worries, these internal ruminations should most heavily tax the phonological aspect of working memory thought to support inner speech and thinking in the service of complex cognitive activities (Miyake & Shah, 1999; Rapee, 1993). Moreover, signs of stereotype threat should occur most strongly for tasks that rely on verbal working memory resources (p. 41) in addition to general executive components. Consistent with this idea, Beilock et al. (2007) observed that women who were reminded about gender differences in math showed increased worries and negative thoughts about the situation compared to those who were not, and this translated to poor performance on difficult math problems thought to rely heavily on verbal working memory resources (but not on similar problems that were more spatial in nature).

Additional research has suggested that thoughts of doubt might be particularly detrimental to working memory when they occur in the presence of general arousal or anxiety (Schmader et al., 2009). Earlier, we suggested that stereotype threat automatically cues a sense of self-uncertainty stemming from an imbalanced set of thought processes activated in situations of threat. But that sense of uncertainty, we believe, then elicits more controlled processes aimed at interpreting and ruminating about one's performance. Although feeling somewhat anxious or aroused in a performance situation could be seen as understandable to sustain attention and engagement, if interpreted in light of self-doubt, that arousal is translated into the sort of worry likely to consume the phonological loop and deplete working memory. In a series of studies, Schmader and colleagues demonstrated that working memory deficits under stereotype threat are greatest for those who are generally most anxious, but only if they are also primed with thoughts of doubt. Anxious arousal actually predicted better working memory under stereotype threat when individuals were primed with confidence or had a dispositional tendency to reappraise negative emotions in a more positive way.

It is important to note that a heavy involvement of verbal resources in stereotype threat impairment does not exclude other subcomponents of the working memory system from being implicated. Rather, stereotype threat not only affects the functioning of the phonological loop (via verbal thoughts and worries), it can also hijack central executive functioning via attempts to suppress such thoughts. This leaves open the possibility that tasks that do not rely on phonological resources can still be impaired by stereotype threat.

Efforts To Regulate Thoughts and Emotions

As mentioned above, the central executive component of working memory provides one with the ability to focus attention and regulate thought processes. When solving complex cognitive problems, this central executive selects what information is relevant, engages in the online process of logical computation or critical thinking, and makes

deliberative choices between alternative options. However, this powerful tool for controlled processing of information plays double duty for those experiencing stereotype threat. Because the experience of threat activates a goal to avoid confirmation of the stereotype, and the experience of self-doubt or anxiety is often interpreted as a sign of failure, efforts are made to detect and suppress these negative thoughts and feelings and push them out of mind. Research on self-regulatory control reveals that such suppression processes are cognitively depleting as they rely on the same central executive processes needed for other types of problem solving (Baumeister, Muraven, & Tice, 2000; Richards & Gross, 2000).

(p. 42) Evidence that people are ego depleted after experiencing stereotype threat comes from research by Inzlicht and colleagues (Inzlicht et al., 2006), who showed that situational reminders of one's stigmatized status led minority students expecting to take an intelligence test to perform more poorly on a Stroop interference task in one study and led women expecting to have their math ability assessed to have greater difficulty squeezing a hand-grip. Together, these effects point to general reductions in self-regulatory abilities when one is anticipating being evaluated through the lens of a stereotype. Other research has since demonstrated that these kinds of effects might occur because people under threat are actively trying to regulate the negative thoughts and feelings that have been activated by the stereotype.

For example, in one set of studies, Logel, Iserman, Davies, Quinn, and Spencer (2009) revealed that women who experience stereotype threat related to their math abilities attempt to suppress gender stereotypes, and presumably as a result, exhibit an ironic rebound in activation of these concepts later. Interestingly, when women were given a thought, either about themselves or something completely arbitrary, to replace the distracting thoughts about the stereotype, these rebound effects were attenuated and their math performance improved. In other research, Carr and Steele (2009) replicated this stereotype suppression effect and showed that the more women under threat try to suppress a negative performance stereotype, the more likely they were to perseverate on an incorrect problem-solving strategy, when switching to a different strategy would be more successful. Given that the central executive plays an important role in task switching (Crinella & Yu, 1999), this research provides some indirect evidence that effortful suppression processes underlie performance impairments.

In addition to suppressing thoughts of the stereotype, it has also been argued that stereotype threat might more commonly lead to attempts to suppress negative emotions. For example, Johns et al. (2008) provided evidence that when women and minorities experience stereotype threat, they are motivated to avoid appearing anxious, and their efforts to regulate that anxiety lead to deficits in working memory capacity. Earlier, we mentioned that, in one of these studies, women expecting to take a difficult math

test had their attention automatically drawn toward anxiety-related stimuli in a dot probe paradigm. In this paradigm, participants have to identify the location of a dot as above or below a fixation point. Prior to each trial, however, two words are flashed on the screen for one second, one in the upper and one in the lower position. If people are anxious (as they tend to be under stereotype threat), their attention tends to be pulled toward the anxiety-related word, and they are faster to identify the dot if it is in that same position (and slower if the subsequent dot is in the other position).

However, the effect was only exhibited when women didn't know what this task was meant to assess. When they knew how the task could reveal their anxiety, they showed evidence of anxiety suppression: They were faster to identify the dot when it was in the same position as the neutral word, suggesting that they were actively trying to avoid appearing anxious. Interestingly, the more their reaction times revealed a motivation to suppress anxiety, the lower their working memory on (p. 43) a subsequent task. Another study revealed similar low levels of inhibitory control among women in two conditions: a standard stereotype threat condition and a threat condition in which they were explicitly instructed to suppress their emotional reactions, compared to third threat condition in which women were instructed to remain objective during the tasks. Again, this result suggests that stereotype threat might elicit spontaneous efforts to suppress one's emotional reactions during a performance situation. Because the cognitive mechanism used for this kind of regulatory control is the same one needed to do well on complex cognitive tasks, performance suffers.

Finally, recent advances in our ability to examine neurological function during a situation of stereotype threat also point to the involvement of brain regions that most typically underlie emotion regulation. For example, a study by Krendl and colleagues (2008) revealed greater activation in the ventral anterior cingulate cortex among women experiencing stereotype threat compared to those in a control condition. Activation in this same region was found in work by Wraga, Helt, Jacobs, and Sullivan (2007), who created stereotype threat in women about their spatial abilities relative to men. Given evidence that this region is activated in other situations involving social evaluation and emotion regulation, these results provide converging evidence for these processes being activated when people experience stereotype threat.

Threat Depends on the Task

Stereotype threat can impact performance in a variety of ways that are both controlled and automatic in nature. But, to truly understand the threat phenomenon, one cannot just consider the cognitive and neural mechanisms by which it occurs. Some of the processes that result from stereotype threat—a vigilance-based mindset and explicit

monitoring of one's performance—have different effects on performance depending on the situation and task at hand.

As we have already seen from the work presented above, on simple tasks in which one's dominant response is the optimal response, or on tasks in which people have time to correct their prepotent response and know what that correction should be, performance can be enhanced rather than harmed under threat (Jamieson & Harkins, 2007). In the case of the antisaccade task used by Jamieson and Harkins, for example, increased vigilance is beneficial. However, this is not always true.

For instance, Beilock and colleagues (2006) examined stereotype threat's impact on expert golf putting, a skill that, unlike the antisaccade task, is harmed when too much attention is allocated to performance and not when working memory is impaired. Beilock et al. found that well-learned golf putting is susceptible to stereotype threat, but that giving expert golfers a secondary task eliminates stereotype threat—induced impairment. Distracting attention away from the stereotyped behavior eliminated the harmful impact of negative stereotype activation, suggesting that performance degradation under threat can occur when too much attention is allocated to processes that usually run more automatically. That is, unlike in the antisaccade task, increased vigilance to the task is not always a good thing.

Thus, it seems as if stereotype threat can alter performance in multiple ways. It populates working memory with worries, and it entices the performer to try to pay attention to step-by-step control, possibly resulting from motivation to succeed. Whether or not such effects will be beneficial or detrimental depends on the nature of the task being performed.

Policy box

Understanding the mechanisms that underlie the experience of stereotype threat yields insight into the ways in which threat can be reduced. Our focus on examining the automatic and controlled components to threat-induced performance impairments points to two broad types of interventions: those that seek to change situations that would induce threat in the first place, and those that provide individuals with coping strategies to contend with stereotype threat when it is triggered. Armed with this framework, education and organizational policies should be aimed at two key solutions. First, affirmative action policies are an efficacious approach not only because they involve targeted efforts to recruit and retain those individuals whose past performance on standardized tests might under-represent their true ability, but also because they provide the next generation with role models that build an important cognitive association between the stigmatized group and success in the domain. This

is the most critical step in breaking down stereotypes. In addition, efforts need to be made to educate the public about how stereotypes subtly impair performance. Broad understanding of these mechanisms is essential not only for justifying the continuing need of affirmative action policy, but also to provide those who experience stereotype threat with a new awareness of their phenomenological experience and the appraisals they need to cope with the threats imposed by negative stereotypes.

(p. 44) A Guide for Reducing Stereotype Threat Effects on Performance

As we have reviewed, situations that remind us that we are negatively stereotyped set in motion a sequence of automatic and controlled processes that roughly correspond to the detection of threat to one's identity and subsequent efforts to cope with that threat. So, now that we understand how these impairments come about, the critical question is whether that information can inform how stereotype threat is reduced or eliminated. Following from our analysis, we consider two broad categories of remedies: those that decrease the activation of threat in the first place and those that increase one's ability to cope with the threat after it has been perceived. Because other chapters will provide a more exhaustive review of remedies (see Aronson & Dee, 2011, Chapter 17, this volume; Cohen, Purdie-Vaughns, & Garcia, 2011, Chapter 18, this volume), our goal here is merely to relate these effects to the processes we have outlined.

(p. 45) Threat Inoculations

One way to combat the experience of stereotype threat is to reduce the likelihood that such threatening cognitions get activated in the first place, leading to the cognitive imbalance discussed earlier. Most obviously, as stereotypes change and become less prevalent in a culture, the ability for situations to cue those beliefs is diminished. For example, structural changes that balance the representation of people in different occupations and roles can effectively erode the automatic associations that people have (Dasgupta & Asgari, 2004). In fact, the direct retraining of implicit stereotypes can boost women's working memory and increase their math performance even under stereotype threat (Forbes & Schmader, 2010). Many students report a belief that stereotypes (at least as they pertain to gender roles) will diminish over the coming years (Diekman & Eagly, 2000), giving us some reason for optimism. But even if the larger cultural stereotypes are slow to change, situations can be modified to include threat inoculations. The presence of role models (Marx & Roman, 2002) or affirmations of other good qualities of one's group (McIntyre, Paulson, & Lord, 2003) can dull the threatening sting that the stereotype might normally have.

Because stereotype threat results from an imbalance of thoughts activated in the situation, the likelihood that the threatening stereotype will be applied to oneself is also

dependent on one's perceived identification with the stereotyped group (Schmader, 2002). Not surprisingly then, individuals cope with stereotype threat by distancing themselves from activities that would signal a stereotypical connection to the group (Pronin et al., 2004; Steele & Aronson, 1995). But strengthening one's confidence in the domain might also be effective at reducing the automatic activation of threat (Schmader et al., 2009).

Working from the idea that threat is triggered from an activated imbalance of thoughts that impugn the identity of oneself and/or one's group, we can infer that threat can also be alleviated by manipulations that allow one to tolerate specific instances of dissonance by affirming the self. As discussed by Cohen et al. (2011, Chapter 18, this volume), a simple affirmation of one's own values can lead to a dramatic increase in grades and academic motivation among minority college students (Cohen, Garcia, Apfel, & Master, 2006). Reminders of the complexity in one's self-concept can also diffuse the threat of being targeted by a stereotype (Gresky, Ten Eyck, Lord, & McIntyre, 2005; Rosenthal & Crisp, 2006).

A Better Way to Cope

If threat itself cannot be reduced, interventions can facilitate more effective ways of coping with stereotype threat. At first glance, it might seem that problem-focused coping strategies are always called for. But, as we have already discussed, too much effort or conscious attention to the task can sometimes further compromise performance (Beilock et al., 2006; Jamieson & Harkins, 2007). A better approach than trying to channel more controlled processing to the task at hand is to figure (p. 46) out how to channel fewer cognitive resources to ineffective emotion-focused coping efforts. The explicit processes of monitoring one's performance and suppressing unwanted thoughts and feelings both stem from an initial appraisal that errors, anxiety, and self-doubt are all evidence that one is confirming a negative stereotype about one's group. Changing this appraisal can effectively eliminate the need for these additional processes. Several pieces of evidence now point to these effects.

First, it is notable that individuals who generally report a tendency to reframe their negative feelings in a more positive way show a positive relationship between sympathetic nervous system activation and task performance in a stereotype threatening domain (Schmader et al., 2009). For them, anxiety seems to be reframed as a challenge rather than a threat. But even if a person doesn't have a natural disposition to reappraise threats, he or she can be taught that anxiety is not necessarily a sign of failure, and with this reappraisal show less of effortful anxiety suppression, greater working memory, and as a consequence better test performance (Johns et al., 2008).

In addition to helping individuals reappraise what anxiety means, interventions can inform individuals about where anxiety comes from. When women were taught about stereotype threat and its ability to induce anxiety and impair performance, they performed at the same level as their male counterparts and significantly better than women merely expecting to take a diagnostic math test (Johns, Schmader, & Martens, 2005). Knowing that anxiety is an indication of cultural stereotypes rather than an indication of one's own ability seems to enable people to distance themselves from these negative feelings and perform better as a result. Having knowledge of these effects really does grant the power to overcome them.

Conclusion

As we have reviewed, being the target of negative stereotypes in a domain that one cares about elicits a host of processes at both implicit and explicit levels. Stereotypes are automatically activated that call into question, at an implicit level, one's association to the domain. The resulting cognitive imbalance cues uncertainty that drives vigilance toward any cue that might signal that one is confirming the stereotype. It is when these cues are detected that more explicit and controlled processes kick in. These include added efforts to correct mistakes; explicit monitoring, worrying, and rumination about one's performance; and active efforts to suppress these negative thoughts and feelings that are assumed to distract from the task at hand.

Fortunately, an understanding of these mechanisms allows us to identify solutions. Indeed, research has uncovered a host of solutions. Some of these reduce the experience of threat in the first place by affecting the initial cognitions that prompt a cognitive imbalance between self, group, and domain. Others help establish performance skills that are impervious to threat or free up working memory for use at cognitively complex tasks by helping individuals reappraise the situation and their (p. 47) reaction to it in a less negative or self-relevant way. Finally, other strategies help individuals keep skills that normally operate outside working memory running smoothly without too much explicit control.

It used to be standard language in research papers that little is known about what mediates the effect of stereotype threat on performance. This is no longer the case. Research has revealed a great deal about the underlying mechanisms, and we are optimistic that the knowledge gained from this research can help educators, administrators, and individuals combat the pernicious effects that negative stereotypes can have on performance. In fact, knowing that these effects exist and how they work seems to be one means of diffusing their effects. The future of research, then, is not only to delve deeper in search of more mediators, but to expand outward to show how the knowledge we have gained from this basic science approach can be applied in the

field to create practical interventions that enable individuals to truly perform up to their potential.

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