The perils of double consciousness: The role of thought suppression in stereotype threat ☆

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ABSTRACT

The goal of the present research is to demonstrate, and then alleviate, the role of thought suppression in depressing women's math performance under stereotype threat. We hypothesize that when taking a math test, women (but not men) attempt to suppress thoughts of the math-related gender stereotype. Suppression leads to underperformance when it uses up cognitive resources. In Study 1, women underperform on a math test and show postsuppressional rebound of the stereotype when cognitive resources are reduced. In Study 2, women suppress the stereotype after a math test begins, but show rebound when the test is complete. In Study 3, making the stereotype irrelevant to the test improves performance and reduces postsuppressional rebound. In Studies 4 and 5, we test a strategy women can use to make suppression easier, and show that it restores math performance. Theoretical and practical implications are discussed.

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Introduction

When a woman mathematician enters a room, attends a meeting, goes to a conference, or applies for a job, the first thing that is noticed is that she is a woman... As a result, many women talk about feeling 'guilty until proven innocent.' (Henrion, 1997, p. 70).
Some argue that the Association of Women in Mathematics should take more of a traditional focus, for example sponsoring more talks by women about mathematics, not about being a woman in mathematics... As a result, the topic of what women experience as women in mathematics is shunned in most mathematical contexts (Henrion, 1997, p. 79).

As the first quote above suggests, women in math contexts are often acutely aware that they may be judged negatively because they are women. Yet as the second quote describes, women may also be strongly motivated to avoid this judgment. Drawing on

the language of W.E.B. Dubois, women in mathematics are in a state of *double consciousness* (Steele, Spencer, & Aronson, 2002). On one hand, as targets of negative stereotypes, women are hyper-vigilant to the possibility of being stereotyped. Yet on the other hand, they are motivated to deny and avoid the implications of such stereotyping. We argue that this predicament lies at the heart of how stereotype threat undermines women's performance in math—the effort required to avoid thinking about a negative stereotype uses up mental resources needed to perform well in the stereotyped domain. In the present studies, we seek to demonstrate, and then alleviate, the role of this thought suppression in the math underperformance of women who are experiencing stereotype threat.

When individuals take math tests, they may feel pressure to perform well for any number of reasons. They may want to meet a personal goal, impress their family, or achieve a required grade to stay in their major. But women face an additional pressure that men do not face: women are aware that many people believe that they are not as good at math as are men, and thus women know that if they do poorly they could confirm this negative stereotype about their gender (e.g., Spencer, Steele, & Quinn, 1999). This "*stereotype threat*" is present, for example, when women take a math test as part of the SAT or GRE exams or for a mathematics course. These types of tests are commonly understood to measure math ability, and thus are situations in which negative stereotypes about women's ability could be applied. This threat of confirming a negative stereotype about one's group has been shown to undermine

the performance of stigmatized groups in a number of domains, including, for example, Black and Latino students on intellectual tests (Gonzales, Blanton, & Williams, 2002; Steele & Aronson, 1995), students with lower socioeconomic status on intellectual tests (Croizet & Claire, 1998), and even White athletes on measures of natural athletic ability (Stone, Lynch, Sjomeling, & Darley, 1999). Most relevant to the present research, stereotype threat also adversely affects women's math performance (Spencer et al., 1999).

Underperformance due to stereotype threat has been partially explained by several mechanisms, including anxiety (Ben-Zeev, Fein, & Inzlicht, 2005; O'Brien & Crandall, 2003; Osborne, 2001; Spencer et al., 1999; but see also Leyen, Desert, Croizet, & Darcis, 2000; Stangor, Carr, & Kiang, 1998; Stone et al., 1999), dejection (Keller & Dauenheimer, 2003), lower performance expectancies (Cadinu, Maas, Frigerio, Impaglizaao, & Latinotti, 2003; Sekaquptewa & Thompson, 2002), and stereotype activation (Davies, Spencer, Quinn, & Gerhardstein, 2002; Steele & Aronson, 1995). Thought suppression has been proposed previously, as an explanation for findings that people experiencing stereotype threat have reduced mental resources available for completing a test (e.g., Schmader, Johns, & Forbes, 2008). However, the present studies are the first that we know of to actually examine the role of thought suppression in stereotype threat effects. By identifying the key role that thought suppression plays in stereotype threat, we can develop a way of reducing stereotype threat effects by reducing the effort required to suppress thoughts of the stereotype.

Activation, suppression, and mental load

When individuals experience stereotype threat, they activate thoughts about the stereotype and concerns about performance, and this activation predicts underperformance on a subsequent test. Steele and Aronson (1995) demonstrated this activation effect with black students writing verbal ability tests. Davies et al. (2002) illustrated this effect with women taking math tests. Participants watched television commercials that either featured women behaving stereotypically or did not feature women, and then completed a lexical decision task assessing the accessibility of the negative stereotype about women's math ability. Women who had watched the stereotypic commercials activated the stereotype, and this activation predicted underperformance on a subsequent math test.

Why would activation of a negative stereotype before taking a test contribute to poorer performance? We suggest that once a test begins, women under stereotype threat feel motivated, consciously or unconsciously, to suppress thoughts associated with the stereotype so that they can concentrate on the difficult test questions. The more strongly a stereotype is activated, the more effort they will expend to suppress it. Wegner and colleagues (Wegner, 1994; Wegner, Carter, Schneider, & White, 1987; Wegner, Erber, & Zanakos, 1993) suggest that in order to suppress a thought, people must consciously avoid thinking about the thought while at the same time unconsciously monitoring the environment for the presence of the thought. This complex process of suppressing thoughts of the stereotype would leave few mental resources for solving difficult test problems, resulting in fewer correct test answers and lower test scores.

The effortful process of thought suppression could explain findings that stereotype threat depletes working memory. Schmader and Johns (2003) found that women experiencing stereotype threat displayed deficits in short-term memory capacity, and these memory deficits mediated underperformance on a math test. Croizet and colleagues found that when stereotype threat was high, participants had greater heart rate variability, an indicator of increased mental load, and this was also associated with poorer performance on an intelligence test (Croizet et al., 2004). It seems likely that it was the effort of suppressing thoughts and worries about the negative stereotype that depleted mental resources in these studies.

The present research

Based on this research, we suggest that when women take math tests under stereotype threat, they attempt to suppress thoughts of the negative stereotype, which increases their mental load, and, consequently, impairs their math performance. This hypothesis extends prior stereotype threat research to investigate more closely why and how stereotype threat leads to underperformance by members of stereotyped groups. In addition, it allows us to develop and test a thought suppression strategy to reduce the negative effects of stereotype threat.

Previous studies have already demonstrated that women experiencing stereotype threat activate thoughts about the stereotype, and that the extent to which they activate these thoughts predicts the degree to which they underperform on a subsequent math test (e.g., Davies et al., 2002). Studies have also shown that stereotype threat causes working memory deficits (Croizet et al., 2004; Schmader & Johns, 2003). Thus, it is our goal in the present studies to make the case that thought suppression plays a key role in these and other stereotype threat results. We do this by showing evidence for thought suppression under stereotype threat in four different ways, described in the subsequent paragraphs. Having demonstrated women's need to suppress thoughts of the stereotype, we then test a psychological tool to help women to overcome the underperformance that arises from the difficult task of suppressing thoughts.

First, we test our theory by examining postsuppressional rebound. Research has shown that once individuals are no longer required to suppress particular thoughts, they show a rebound effect, in which the formerly suppressed thoughts become hyperaccessible (Wegner et al., 1987, Study 2). Thus, if women suppress thoughts about math-related gender stereotypes while they are working on a math test under stereotype threat, then they should show a postsuppressional rebound of these stereotypes once the test has been completed and they are no longer required to suppress the thought. Hence, in each study, we predict that women who write a math test under stereotype threat will underperform on the test and show a postsuppressional increase in the activation of the gender stereotype after the test. However, women who are not under stereotype threat, and men, for whom the stereotype does not apply, will not underperform on the test and will show no such rebound.

Second, we directly measure women's thoughts about the stereotype as they take a test. In Study 2, we measure the activation of math-related gender stereotypes as women are beginning a difficult math test under stereotype threat. We expect that these women will show evidence of suppression of thoughts related to the stereotype, and that this will predict the degree to which they underperform on the math test. This pattern will not be evident for men, who should have no such thoughts to suppress.

Third, we test whether reducing the need to suppress thoughts of the stereotype restores women's abilities to succeed on math tests. Thus, in Study 3 we manipulate the relevance of the negative gender stereotype to women's performance. We expect that when women believe that they cannot be judged by the stereotype about their gender, they will not need to suppress the stereotype, and thus will neither underperform nor suppress the stereotype.

Finally, we test whether alleviating the mental effort of thought suppression allows women to perform better. Research by Wegner and his colleagues (1987) shows that using a thought-substitution task makes thought suppression easier. Therefore, in Studies 4 and 5, we give women a thought-substitution strategy, and test whether it eliminates stereotype threat effects on performance.