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Research article

Effects of role model deservingness on overcoming performance deficits induced by stereotype threat

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Abstract

Previous research has shown that exposure to successful role models can restore performance that had been impaired by stereotype threat, and that some role models are more effective than others. The present research examined the effects of role model deservingness on women's mathematics test performance after being placed under stereotype threat. In Experiment 1, a woman who attained success by herself (deserved) proved a more effective role model than an equally likable and successful woman whose success was handed to her (not deserved). In Experiment 2, women role models proved more effective at combating stereotype threat when their successes were attributable to internal-stable (deserved) than external-unstable (not deserved) causes, an effect that was partially mediated by reduction in extra-task thinking. The results are seen as having implications for theories of stereotype threat and causal attribution. Copyright © 2010 John Wiley & Sons, Ltd.

Rosa Parks is widely quoted as having said that ''each person must live their life as a model to others.'' When people find themselves in threatening situations, they often look to role models for reassurance and inspiration. The present research examined how thinking about role models (i.e., successful members of one's own group) can be used as an effective intervention into stereotype threat. Though previous research has examined how role models affect individuals, the results are mixed. Some research indicates that reminders of role models can be beneficial and lead to positive outcomes (Dasgupta & Asgari 2004; Lockwood & Kunda, 1997; Marx & Roman, 2002; Marx, Stapel, & Muller, 2005; McIntyre, Lord, Gresky, Ten Eyck, Frye, & Bond, 2005; McIntyre, Paulson, & Lord, 2003). Other research indicates that the salience of successful role models can also be a slippery slope leading to negative outcomes (Lockwood & Kunda, 1997; Martin, Suls, & Wheeler, 2002; Tesser, Millar, & Moore, 1988).

The difference may lie in causal attributions for a role model's success (Weiner, 1985). The present two experiments examined whether role models who are perceived as having deserved their success would prove more effective at alleviating women's mathematics stereotype threat than would role models who are perceived as not having deserved their success, and whether this effect of causal attributions on performance might be mediated, at least in part, by reduction of extra-task thoughts that might otherwise prove distracting (Schmader, Johns, & Forbes, 2008).

Much research supports the efficacy of role models (for reviews see Gibson, 2004; Lockwood & Kunda, 1999). Role models, for instance, have proven effective in providing behavioral cues for Hispanics in the work place (Rivera, Blumberg, Chen, Ponterotto, & Flores, 2007), increasing workplace identity for persons of color (Zirkel, 2002), boosting self-esteem (Wohlford, Lochman, & Barry, 2004), and increasing women's career aspirations (Nauta, Epperson, & Kahn, 1998). According to Bandura (2000), individuals may look to proxy agents (direct role models to which they compare) or to collective agents (in-group members) to help restore or create feelings of efficacy when available components of self-efficacy have been threatened or reduced. These external agents can be seen as useful in providing the individual with motivation and resilience to adversity. In threatening situations, individuals might be able to fall back on thinking about how specific members of their own group have succeeded (proxy agents) or how the group can take care of itself (collective agents). It seems plausible then, that role models can provide efficacy information and reassurance on both proxy (e.g., ''if she/he can do it, so can I'') and collective (e.g., ''my group can do it'') levels.

Stereotype threat constitutes a pervading ''sense that one can then be judged or treated in terms of the stereotype or that one might do something that would inadvertently confirm it'' (Steele, Spencer, & Aronson, 2002, p. 389). The threat is not specific to a particular type of task or a particular social category, but may be activated in any situation for which a negative stereotype exists regarding the efficacy of one's group, even if one does not believe the stereotype (Steele et al., 2002). Previous research has shown that stereotype threat

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impairs the performance of African Americans and lower income people on verbal tests (Croizet & Claire, 1998; Steele & Aronson, 1995), Latino students on spatial ability tests (Gonzales, Blanton, & Williams, 2002), athletes on sports-related tasks (Beilock, Jellison, Rydell, McConnell, & Carr, 2006; Stone & McWhinnie, 2008; Stone, Lynch, Sjomeling, & Darley, 1999), women on tests of political knowledge (McGlone, Aronson, & Kobrynowicz, 2006), and women on mathematics tests (Inzlicht & Ben-Zeev, 2000; Keller & Dauenheimer, 2003; Quinn & Spencer, 2001; Schmader, Johns, & Barquissau, 2004; Spencer, Steele, & Quinn, 1999).

Successful attempts to alleviate stereotype threat and improve performance might be characterized as restoring efficacy and relieving the distractive burden created by the negative stereotype, so that group members can relax, focus on the task, and perform up to their capabilities. One way to alleviate stereotype threat, for instance, involves telling participants that the test is not diagnostic (Croizet & Claire, 1998; Steele & Aronson, 1995). Other effective alleviation techniques include claiming that the test is not susceptible to stereotypic differences (Walsh, Hickey, & Duffy, 1999), providing excuses for poor performance (Brown & Josephs, 1999; Stone et al., 1999), convincing participants that performance levels are malleable rather than fixed (Aronson, Fried, & Good, 2002), and reminding participants of other roles in which they or members of their group usually succeed (Gresky, Ten Eyck, Lord, & McIntyre, 2005; McIntyre et al., 2003, Expt. 1).

Of particular relevance to the present research, several studies have shown that exposure to successful female role models can effectively overcome the performance deficits that are normally associated with women's mathematics stereotype threat (Marx & Roman, 2002; McIntyre et al., 2003). In these studies, women performed worse on math tests after being reminded of the stereotype that women are not as good as men at math, but their test performance improved to non-threat levels if they were exposed to a successful female role model between the induction of stereotype threat and taking the test.

Other studies have shown that some role models are more effective than others in restoring non-threat levels of performance (Lockwood & Kunda, 1997; Marx et al., 2005). People who are perceived as similar to the person, for instance, make more effective role models than do people who are perceived as dissimilar (Bandura, 1977; Marx et al., 2005). The present research investigated another characteristic of role models that might be important in determining their effectiveness—whether they are perceived as having deserved their success. Lockwood and Kunda (1997) suggested that it was not success itself that made role models effective, but rather the *cause* of that success. Role models who succeed through internal causes should be more effective than role models who succeed through external causes. For a role model to provide either proxy or collective efficacy (Bandura, 2000), individuals need to perceive the role model's success as resulting from dispositional ability as opposed to situational advantages. In order for that to happen, the role model's success needs to be attributed to internal and relatively stable factors rather than explained as coming from external or relatively unstable factors (Weiner, 1985). The present experiments to put that hypothesis to empirical test in the realm of actual test performance after women had been placed under mathematics stereotype threat.

The first experiment operationalized deservingness by comparing a successful role model who did it herself to a successful role model who had it done for her. The second experiment did so by comparing successful role models who had succeeded through internal-stable causes to ones who had succeeded through external-unstable causes.

EXPERIMENT 1

Overview

The goal of Experiment 1 was to test whether exposure to a deserving role model might overcome the performance deficits that are normally associated with stereotype threat more effectively than would exposure to an equally successful but undeserving role model. To that end, we first induced mathematics stereotype threat in women participants, then had them read about either a deserving or an undeserving successful woman, and then had all participants take a difficult math test. For comparison purposes, we also included separate control groups of women who were either threatened or not, and then exposed to no role models before taking a math test.

Method

Participants

A total of 123 women participated for course credit. Three participants were eliminated from analyses for failing to follow directions (explained below), leaving a final sample of 120 women.

Procedure

To avoid experimental demand, the laboratory session had three ostensibly separate parts: inducing stereotype threat; exposure to role models; and administering the test.

Inducing Stereotype Threat The experimenter told participants that the one-hour session consisted of two unrelated half-hour studies being conducted by two different graduate students. The first study was said to involve ''implicit understanding'' for foreign languages. The second study was said to be on developing new items for the quantitative section of the Graduate Record Exam (GRE-Q), the type of test on which some people believe that men score better than women. Such experimenter statements have proven effective for inducing stereotype threat and performance deficits in numerous experiments (e.g., McIntyre et al., 2003, 2005; Schmader & Johns, 2003; Spencer et al., 1999).

Exposure to Role Models The first experimenter then introduced what was supposedly a study of ''implicit

understanding'' for foreign languages. Participants received booklets that contained four passages printed in both English and a foreign language. The first three passages were included only to improve experimental realism of the final, critical passage. One passage described fly fishing in Italian with an English translation, one described how to twirl a baton in Spanish and English, and one described the Amazon River in Portuguese and English. In each of these passages, the narrative did not refer to any specific protagonist. The final passage introduced the role model manipulation. It described a successful woman in French and English. The (fictitious) woman, Lisa Dore, held patents on several inventions for environmentally friendly home heating.

The 30 participants who were randomly assigned to the *deserving role model* condition read that Lisa Dore had achieved her success through her own ability and hard work, and that the inventions were her own ideas. The 30 participants who were randomly assigned to the *undeserving role model* condition read that her deceased spouse was the actual inventor, who on his death bed made Lisa promise (reluctantly) that she would file the patents under her own name. The two versions of the Lisa Dore story were identical in their description of how much success she had achieved. They were also designed (through pre-testing) to portray Lisa as equally likable, so that deservingness would not be confounded with likability.

To enhance the cover story and promote active comprehension, for each of the passages, participants in both role model conditions were asked to guess which of the words or phrases in the foreign text corresponded with one of the words or phrases in the English version. To be sure that participants read the inventor passage in particular, participants were also asked factual questions about the passages. Although they still had the text in front of them and were told that they could look up the answers, three participants (one in the undeserving role model condition and two in the deserving role model condition) did not answer the factual questions correctly and so they were eliminated from later analyses.

An additional 30 women in a separate *threat/no role model* (threat only) condition were reminded of the stereotype but did not read about any role models. Finally, an additional 30 women in a separate *no threat/no role model* (test only) condition were neither reminded of the stereotype nor did they read about role models. These latter participants were simply given the GRE-Q test questions.[1]

Administering the Test After the ''implicit understanding'' materials had been collected, the experimenter conducted a bogus debriefing for that study and then introduced a supposedly separate study on developing new test questions for the GRE-Q. The second experimenter distributed a 26-item test booklet to all participants and told them to attempt as many questions as possible in 20 minutes, without skipping items.

After 20 minutes, the experimenter collected the tests, thanked the women for participating, and gave participants who read about the role models three additional questions about the four passages that they had read earlier. The questions about the Lisa Dore passage were manipulation checks on how much Lisa deserved her success, how successful she had been, and how likable she was (on scales from 0 = *not at all* to 10 = *very much*). During a subsequent funnel debriefing (Bargh & Chartrand, 2000), no participant guessed that reading about Lisa Dore was in any way connected with performance on the math test.

Results

Manipulation Checks

The foreign language translation passages were intended to expose participants to either a deserving or an undeserving role model named Lisa Dore. As shown in Table 1, when participants in the two role model conditions were asked how deserving Lisa was of her success, according to a one-way analysis of variance (ANOVA), women who had read the deserving role model passage in which Lisa made her own inventions rated her as more deserving of her success ($M = 9.10$) than did women who had read the undeserving role model passage in which her husband gave her the inventions ($M = 5.23$), $F(1, 58) = 53.74$, $p < .001$.

The passages were also intended to create this significant difference in perceived deservingness without creating differences in either perceived success or perceived likability. Consistent with these goals, women who read the undeserving role model passage found Lisa to be no less successful ($M = 8.30$) than did women who read the deserving role model passage ($M = 8.86$), $F(1, 58) = 1.68$, ns. Also, as intended, women who read the undeserving role model passage found Lisa to be no less likable ($M = 6.90$) than did women who read the deserving role model passage ($M = 7.47$), $F(1, 58) = 1.47$, ns.

Math Test Performance

Performance on the math test was assessed through percentage of attempted items correct.[2]

A one-way ANOVA of percent correct yielded a significant main effect of condition, $F(3, 116,) = 3.95$, $p = .01$. The means

Table 1. Mean rated deservingness, success, and likability of a female role model in the two role model conditions (Experiment 1)

	Undeserving role model	Deserving role model
Deservingness	5.23 (2.67)	9.10 (1.09)
Success	8.30 (2.09)	8.86 (1.16)
Likability	6.90 (1.90)	7.47 (1.72)

Note: All ratings on scales from 0 = not at all to 10 = very much. Standard deviations are in parentheses.

[1]Participants assigned to control conditions in both experiments were run at separate times from the role model conditions, but they were drawn from the same student population, and run in the same experimental setting as those in the experimental conditions. The results from these control conditions were very similar to those reported in nearly identical control conditions by Taylor, Lord, McIntyre, and Paulson (*in press*).

[2]No differences were seen between conditions for the number of math items attempted, $F(2, 87) = .53$, ns, in Experiment 1, and the same was true for Experiment 2, $F(5, 182) = 1.76$, ns. Differences in test performance, therefore, could not be attributed to greater motivation and/or willingness to take risks by answering more items.

Table 2. Mean percent of attempted items correct by women participants in four conditions (Experiment 1)

Threat/no role model	Threat/ undeserving role model	Threat/ deserving role model	No threat/ no role model
47.88 (15.48)	50.50 (13.30)	58.85 (17.39)	59.07 (16.78)

Note: Standard deviations are in parentheses.

are shown in Table 2. By Tukey's test ($p < .05$), the deserving role model and no threat/no role model (test only) conditions were the only two conditions in which participants outperformed women in the threat/no role model (threat only) condition. A focused contrast was conducted with contrast weights of -1 for the threat only and undeserving role model conditions, and 1 for the deserving role model and test only conditions. That contrast proved significant, $F(1, 116) = 11.14$, $p < .001$, and remained significant or marginally significant in additional analyses that controlled separately for the role model's perceived success, $F(1, 115) = 3.77$, $p = .055$, or likability, $F(1, 115) = 4.29$, $p = .04$.

Not only did women in the *threat only* condition perform worse than women in the *test only* condition, replicating numerous previous demonstrations of stereotype threat effects (Steele et al., 2002) but also women who read about one of the two different types of role models performed as would be predicted by theories of causal attribution (Weiner, 1985). Women who read about an undeserving role model performed as poorly on the math test as did women who had only the stereotype threat and no role model, whereas women who read about a deserving role model performed as well as women who were never placed under stereotype threat.

EXPERIMENT 2

In Experiment 1, deservingness was manipulated by exposing threatened women to a successful role model who had made inventions herself versus one who had been given the same inventions by her spouse. Women participants agreed that one role model was more deserving than the other. Doing something for oneself versus having it done for you, however, is not the only dimension that might be important in determining the deservingness of role models. In fact, voluminous research on causal attribution has identified and thoroughly examined several important dimensions that distinguish people who deserve versus do not deserve their success (for review see Weiner, 1985).

One such dimension involves internal versus external attributions: whether the success was caused by factors internal to the person (such as ability or effort), or by factors external to the person (such as luck or an easy task) (see Heider, 1958; Weiner, 1985). In a relevant study, Fontaine (1974) told students that either members of their own group (fellow students) or a member of a different group (businessmen) had performed well. Those who learned that fellow students did well were more likely to say they expected to perform well themselves, especially if their own group's members had done well because of their ability and effort (internal causes). According to Weiner (1985) internal attributions are necessary conditions to see another's behaviors as intentional. It seems possible that role models who succeeded through ability and/or effort might be seen as more deserving of their success than role models who succeeded through an easy task and/or luck.

Another seemingly relevant dimension involves stable versus unstable attributions: whether the success is consistent or inconsistent (see Rotter, 1966; Weiner, Frieze, Kukla, Reed, Rest, & Rosenbaum, 1971). Success that is repeated is also regarded as stable. ''Repeated success or failure, in part, indicates whether an individual can or cannot'' (Weiner, 1985, p. 329). In one study, for instance, stable performers were attributed as being more intelligent than were random performers, holding average level of performance constant (Jones, Rock, Shaver, Goethals, & Ward, 1968). It seems likely that role models who succeeded through consistent (stable) causes might be seen as more deserving than role models who succeeded through inconsistent (unstable) causes.

If both internality and stability are important to perceived deservingness, as attribution theories and research have shown repeatedly (Weiner, 2008), then one would predict that role models who succeeded through ability (internal-stable) might be seen as most deserving, and role models who succeeded through sheer luck (external-unstable) might be perceived as least deserving. It is an open empirical question, however, whether these theoretically derived differences in perceived deservingness would translate into differing degrees of effectiveness in overcoming the performance deficits that are normally associated with stereotype threat. Would role models who succeeded through ability restore non-threat levels of performance completely, role models who succeeded through effort or an easy task restore non-threat levels of performance only partially, and role models who succeeded through sheer luck not at all? The primary goal of Experiment 2 was to put that question to the test.

Experiment 2 also had a secondary goal. Previous research has shown that deficits in performance under stereotype threat occur because individuals who feel threatened divide their attention between the task at hand and vigilance regarding extra-task concerns such as thoughts about the stereotype and the negative consequences of confirming that stereotype (Schmader et al., 2008). One way to conceptualize stereotype threat is that threat causes individuals to direct their focus of attention away from tasks that require effortful processing, to concerns about their self-concept and/or their group's image or reputation (Schmader, Forbes, Zhang, & Mendes, 2009). In their integrated model of stereotype threat, Schmader et al. (2008) argue that performance situations cause stigmatized group members to become vigilant about concerns tangential to performing the tasks set before them. These extra-task thoughts deplete cognitive resources necessary for optimal performance. That is, the threat to one's identity throws one's sense of competence out of balance. To restore balance people who feel threatened attempt to control, monitor, or worry about these issues while simultaneously attempting to attend to the tasks that triggered the thinking in the first place.

According to Steele (1997; see also Steele et al., 2002) members of stigmatized groups must contend with their blemished group identity during such tasks. Similarly, Marx

and Roman (2002) argue that stigmatized group members might worry about how their groups, and they themselves, are perceived. Thus, individuals of the threatened group can be expected to worry that they ''represent'' their group, and have the challenge to either disprove the stereotype, or in failing to do so, further perpetuate the stigma for their group. Interventions aimed at reducing stereotype threat, then, keep group members from being vigilant about extra-task concerns at the expense of focusing on the task at hand (Schmader et al., 2008), thus allowing them to function as they would without any threat. If the deservingness of successful role models acts in the same way as other proven interventions to overcome stereotype threat, then the relationship between role model deservingness and test performance might be mediated by corresponding differences in extra-test thoughts during the test, and exposure to a role model who succeeded through internal-stable causes might restore non-threat levels of performance most because it most reduces extra-test vigilance. In contrast, exposure to role models who succeeded through external-unstable causes might restore non-threat levels of performance least because it least reduces extra-test thoughts during the test.

Method

Participants

One-hundred eighty-eight women participated for course credit, in groups of 5–24.

Procedure

Experiment 2 used a similar two-phase procedure as was used in Experiment 1, with one experimenter providing the manipulations and the second assessing the dependent variables of interest. The first experimenter told students that they would read and critique biographical sketches to be used in future studies. As in the present Experiment 1, the experimenter also mentioned that the students would later complete a 20-minute math test for another experimenter and referred to the stereotype to induce threat (McIntyre et al., 2003).

The experimenter then gave students in the role model conditions three brief biographical sketches to read (see McIntyre et al., 2005). These biographical sketches were fictitious accounts, supposedly taken from such publications as *Entrepreneur* and *Who's Who*, of three women who had succeeded in the fields of architecture, law, and invention. In reality, the sketches had been taken almost verbatim from biographical sketches that had been used in previous research (see McIntyre et al., 2005). There were four different sets of biographical sketches, corresponding to four different attribution combinations created when crossing internality of success (internal, external) with stability of success (stable, unstable). The four sets of sketches differed only in the attributions implied for the women's success. Fictitious women were used to increase control over the stated causes for the women's successes.

The 31 participants in the *internal-stable* role model condition read about three women who had succeeded for internal-stable reasons. One of the women, for instance, was a successful architect who held degrees from the University of Houston and the Minnesota School of Design, was the only woman in her entering class for the master's degree, and worked for a large firm in New York and London before going out on her own. She struggled to make it for some time and when she was almost bankrupt, ''she got her big break to design the Tate Museum in Stratford-on-Avon because of recognition of her innate talent for design'' (an internal cause) and ''since then had shown a consistent track record creating brilliant designs'' (a stable cause).

For 28 participants in the *internal-unstable* role model condition, the cause of success for each woman was explicitly stated to be internal (e.g., ''because of an innate talent for design'') and unstable (e.g., ''sometimes shown flashes of brilliance but at other times created only average designs''). For 27 participants in the *external-stable* role model condition, the cause of success for each woman was explicitly stated to be external (e.g., ''won the lottery'') and stable (e.g., ''since then had shown a consistent track record''). For 25 participants in the *external-unstable* role model condition, the cause of success for each woman was explicitly stated to be external (e.g., ''won the lottery'') and unstable (''sometimes shown flashes of brilliance but at other times created only average designs'').

In addition to the four conditions with successful women role models, two control groups were also used. Forty-five participants were assigned to the *threat no role model* (threat only) condition, who read three ''biographical sketches'' of corporations that were identical to the three sketches in the internal-stable condition, except that the protagonists were corporations (e.g., ''ART-itechtural Associates'') and not specific people. This control group was included to establish a baseline of how women might perform on the math test if they were reminded of the stereotype and thus placed under the same stereotype threat as participants in the four role model groups, but given no salient information about any role models. Alleviation of women's stereotype threat would be measured by improvement over math test scores in this control condition, which has been used as a baseline ''threat only'' control group in previous research by McIntyre et al. (2003, 2005). The second separate control condition of 32 participants were assigned to the *no threat/no role model* (test only) condition simply took the test, with no mention of either the stereotype or any role models. This control group was included to establish a baseline of how women might perform on the math test when they are not under stereotype threat and do not read of any role models.

After reading the biographical sketches, participants in the role model conditions rated how much they perceived each protagonist's success as being due to ''something about the person,'' how ''successful this person will continue to be in the future,'' and ''how successful they feel this person was,'' on scales from 1 = not at all to 6 = very much. These ratings were included as manipulation checks for the intended manipulation of internality and stability, as well as to examine how successful participants perceived each role model to be. After collecting these ratings and the biographical sketches, the first experimenter thanked participants and left the room. The second experimenter, who was blind to which biographical sketches participants had received, entered, and

administered the same 26-item mathematics test that was used in Experiment 1. Students were given exactly 20 minutes to complete the items and were strongly advised not to skip any items and to avoid random guessing.

In order to examine how much women ruminated about extra-task issues during the study, a self-report measure of extra-test thinking (modeled after Petty, Wells, & Brock, 1976) was taken immediately following the math test. Based on previous research (Marx & Roman, 2002; Schmader & Johns, 2003) that measure had two items that assessed thinking about the stereotype (''How often while taking the test did you think about the stereotype that women are worse at math compared to men?''; ''How much do you think that the stereotype that women do poorly at math compared to men affected your performance on the math test?''), two items that assessed thinking about performance (''How often did you think about performing poorly while you took the math test?'' and, ''How often did you think about how members of your gender might have performed while you took the math test?''), and two items that assessed concerns with image (''I was concerned that the researcher will women as a whole, based on my performance on this test'' and, ''I worried that the researcher will think that women as a whole have less math ability because of how I did on this test''). All these ratings were made on scales from 1 = not at all to 7 = very much. After that, participants in the role model conditions also answered factual questions concerning the role model they read about. All participants answered these questions correctly. Finally, in a funnel debriefing (Bargh & Chartrand, 2000), no participant correctly guessed the experimental hypothesis.

Results

Manipulation Checks

The four different types of role models were designed to depict women who differed in whether their success was due to either internal or external factors, and whose success was either stable or unstable. To ensure that the intended attributional factors were perceived without affecting the judgments of role model successfulness, we compared the average internality attributions, stability attributions, and successfulness attributions using separate 2 (internality of role model success: internal, external) × 2 (stability of role model success: stable, unstable) ANOVAs. The means are displayed in Table 3.

Table 3. Mean rated internality of success, stability of success, and successfulness ratings of role models by participants who read about role models (Experiment 2)

	Causes of role model success			
	External-unstable	External-stable	Internal-unstable	Internal-stable
Internality attributions	4.38 (.81)	4.40 (.80)	4.82 (.79)	5.16 (.72)
Stability attributions	4.11 (.65)	4.36 (.77)	4.21 (.69)	4.45 (.66)
Successfulness ratings	4.79 (.62)	4.86 (.71)	4.86 (.76)	5.07 (.61)

Note: Standard deviations are in parentheses.

As the top row of Table 3 shows, for mean internality attributions only the main effect of internality proved to be significant, $F(1, 107) = 15.99$, $p < .001$; no other effects or interactions were significant. Women who read about role models that succeeded because of internal causes rated the success of the role models as having ''more to do with the person'' ($M = 5.00$) than did women who read about role models that succeeded because of external causes ($M = 4.39$).

As the second row of Table 3 shows, for stability attributions (''how successful will this person continue to be'') the only effect that was even marginally significant was the main effect of stability, $F(1, 107) = 3.40$, $p = .067$. Women in the stable groups made higher stability attributions ($M = 4.41$) than did women in the unstable groups ($M = 4.16$). As shown in the third row of Table 3, for perceptions of successfulness of the role models (''how successful was this person''), no differences of internality or stability (or the interaction) were significant, all Fs < 1.99, ns. In summary then, the manipulations can be characterized as having portrayed the role models in the expected fashion without causing differences in how participants viewed the successfulness of these role models.

Math Test Performance

As in Experiment 1, math test performance was assessed through percentage of attempted items correct. Table 4 shows the means.

A one-way ANOVA of percent correct yielded a significant main effect of condition, $F(5, 182) = 3.182$, $p = .009$. By Tukey's test ($p < .05$), the internal-stable role model and no threat/no role model (test only) conditions were the only two conditions in which participants out-performed women in the threat/no role model (threat only) condition. A focused contrast was conducted with contrast weights of −1 for the threat only and external-unstable role model conditions, 0 for the external-stable and internal-unstable conditions, and 1 for the internal-stable and test only conditions.[3] That contrast proved significant, $F(1, 182) = 13.65$, $p < .001$.[4] Not only did women in the *threat only* condition perform worse than women in the *test only* condition (replicating numerous previous demonstrations of stereotype threat effects) but also women who got each of the four types of role models performed as would be predicted by theories of causal attribution (Weiner, 1985). The more deserving the role models, the better the performance, with women who received the stereotype threat performing as well as though they had no threat, but only when they read about a female role model whose success they attributed to relatively internal-stable causes.

[3]These contrast weights were selected because according to theories of causal attribution (Weiner, 1985) attributions for success differ on at least two important dimensions: internal-external and stable-unstable. The most positive attribution is high on both dimensions (e.g., internal-stable) whereas the most negative attribution is low on both dimensions (e.g., external-unstable). Attributions that are high on one dimension but low on another (e.g., internal-unstable or external-stable) are seen as intermediate.

[4]This contrast remained significant when controlling for perceptions of success, which were available only for the five conditions that read about role models or corporations, $F(1, 153) = 8.08$, $p < .01$.

Table 4. Mean percent of attempted items correct by women participants in six conditions (Experiment 2)

Threat/no role model	Threat/external-unstable role model	Threat/external-stable role model	Threat/internal-unstable role model	Threat/internal-stable role model	No threat/no role model
45.80 (15.71)	48.39 (12.64)	51.47 (18.07)	52.09 (17.80)	56.60 (15.55)	58.10 (13.49)

Note: Standard deviations are in parentheses.

Mediation

The six questions about extra-test vigilance (thinking of performing poorly, the group performing poorly, the stereotype, the stereotyping hurting performance, being judged on poor performance, and having the group thought to be inept) were subjected to a principal components analysis. In that analysis, all six questions loaded at least .534 on a first factor with eigenvalue of 2.57 that explained 42.67% of the variance. Scores on the six items were averaged to form one scale of extra-test thoughts, with $\alpha = .773$.[5]

The mediation analysis proceeded as described by Baron and Kenny (1986). First, the contrast weights described above were used in a regression analysis to predict percent correct from the role model contrast weights described above. As shown by the coefficient on the direct path from role model to percent correct in Figure 1, the role model contrast was a significant predictor of percent correct, $\beta = .278$, $t(186) = 3.95$, $p < .001$. Second, the role model contrast was a significant predictor of the extra-test thoughts that women reported experiencing during the test, $\beta = -.211$, $t(186) = -2.94$, $p = .004$. As shown in Figure 1, the effect of extra-test thoughts on percent correct was significant by itself, $\beta = -.410$, $t(186) = -6.12$, $p < .001$ and remained significant controlling for the contrast, $\beta = -.367$, $t(186) = -5.48$, $p < .001$. Finally, the effect of role model was reduced but still significant when controlling for extra-test thoughts, $\beta = .201$, $t(186) = 2.99$, $p = .003$. A Sobel test of the reduction in the direct effect of the role model contrast proved significant, $Z = 2.59$, $p = .009$. The mediation analysis thus established extra-task thoughts as a partial but not complete mediator.[6] The finding of partial mediation by extra-task thoughts replicates previous results (Schmader et al., 2008), but also suggests that deserving role models may bring an additional benefit for alleviating stereotype threat, such as inspiration (Lockwood, 2006; Lockwood & Kunda, 1997).

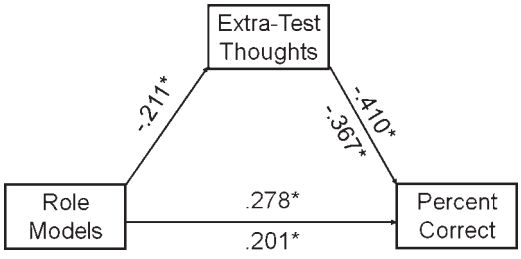

Figure 1. Mediational analysis of attribution condition, extra-test vigilance, and percent correct (Experiment 2). *Note*: * indicates a significant difference of $p < .05$; indirect weights are displayed below the paths

GENERAL DISCUSSION

In two experiments, we found that it is beneficial for women who have been placed under stereotype threat to be exposed to other women who have been successful, but only if those other women are perceived as having deserved their success. In Experiment 1, deservingness was manipulated by having participants read about a woman who had either made inventions herself or had the inventions given to her. In Experiment 2, deservingness was manipulated by having participants read about women who had succeeded through internal-stable, internal-unstable, external-stable, or external-unstable causes. In both experiments, perceived deservingness of these potential role models affected performance on a subsequent math test. Finally, Experiment 2 also helped to increase our understanding of how successful role models can restore performance that would otherwise be impaired by stereotype threat. Individuals who are experiencing stereotype threat split their attention between the task and extra-task thoughts related to stereotypes, their group's reputation, or the consequences of poor performance, thus impairing working memory (Schmader & Johns, 2003). When they read about undeserving role models, they continue to divide their attention between the test and such extra-test thoughts. When they read about deserving role models, in contrast, they engage in less extra-test thinking, and also score better on the test.

These findings add empirical support (from actual test performance under threat) to previous theoretically derived predictions. According to Lockwood and Kunda (1999), role models can be inspirational or deflating, depending on how the role models have achieved their success. The results of the present experiments are consistent with Lockwood and Kunda (1999) reasoning. When role models are perceived as having achieved their success through dispositional ability as opposed to situational advantages, other members of their group begin to perceive themselves as able to overcome negative stereotypes and perform up to their usual levels. One plausible mechanism for this alleviation of stereotype threat is that deserving role models provide proxy or collective efficacy (Bandura, 2000). Deserving role models may not completely

[5]The pattern of means for the extra-test thoughts was similar to that for percent correct scores (threat only $M = 3.26$; threat external-unstable $M = 3.66$; threat external-stable $M = 3.00$; threat internal-unstable $M = 3.01$; threat internal-stable $M = 2.96$; test only $M = 2.80$). These means differed significantly in a one-way ANOVA $(5, 182) = 2.44$, $p < .05$. In addition, the contrast weighting that was used for percent correct was also significant when applied to the extra-test thoughts, $F(1, 182) = 9.99$, $p < .001$.

[6]A test of reverse mediation also demonstrated a significant Sobel test, $Z = 3.27$, $p = .002$, so it is also plausible that test performance affected self-report of extra-test thoughts.

contradict the stereotype, but belief in the stereotype is not a prerequisite for stereotype threat (Steele, 1997). Deserving role models may instead inspire group members to believe that their group *can* achieve success through internal and stable attributes. The present findings, paired with other research on using role models to alleviate stereotype threat (see Marx et al., 2005), suggest that not all role models are created equal. Effective role models are those that have achieved success through means that might be available to our future selves (Oyserman, Bybee, & Terry, 2006; Oyserman & Markus, 1990).

These results also suggest the importance of role models for alleviating threat in general. For instance, research has shown that role models can help members of underrepresented groups aspire to higher positions, or at least reduce negative uncontrollable biases that might hinder their group (Dasgupta & Asgari, 2004). Specifically, that research showed that women who were exposed to more women role models (tenured/tenure track Ph.D.s) had reduced negative sex biases for women. Most recently, Marx, Ko, and Friedman, (2009) demonstrated that Barack Obama's historic campaign (and eventual win) for the presidency benefited the performance of African Americans on a verbal task. Might the same have happened for women, however, had Sarah Palin been elected Vice President? Possibly, but past research on political role models has demonstrated that women would have needed to see Palin as viable, as similar to them, and as having earned her successes (Campbell & Wolbrecht, 2004). The results of the present Experiment 1 suggest that it would not matter to her effectiveness as a role model whether women like or dislike Sarah Palin, but only whether they perceived her as having deserved her success.

Limitations

It would be premature, however, to generalize the present results to Sarah Palin or to other women politicians as role models, given that both Experiment 1 and Experiment 2 investigated only performance under *mathematics* stereotype threat. Neither study attempted to test the relationship between causal attributions and performance under any other type of threat, such as threats of social inclusion (Baumeister, DeWall, Ciarocco, & Twenge, 2005), mortality salience (Pyszcynski, Greenberg, Solomon, & Maxfield, 2006), ego threat (Leary, Terry, Allen, & Tate, 2009), or threats to relationships (Cavallo, Fitsimmons, & Holmes, 2009). It would be interesting, for instance, to see if using role models could be used as an intervention for social exclusion and ostracism by informing victims that being ostracized is something that one can overcome. Perhaps future research might provide role model reminders prior to, or immediately after, being excluded by others. Perhaps the role models would serve to bolster the individual's esteem, sense of control and belongingness, and improve their moods. For the present findings, however, we are restricted to saying that role models are effective, at the least, as a possible intervention for stereotype threat.

In addition, the present results examined only the domain of mathematics. Women in the present two experiments might have had their math test performance affected by whether they perceived a salient role model as having deserved her success, but that does not necessarily mean that African Americans would find President Obama a less inspiring role model if they could somehow be convinced that his success was relatively external and unstable. Scoring well on standardized tests of verbal or quantitative skills may be affected by recently activated deserving role models, but many other types of performance may be viewed as more fluid, dynamic and extended in time (Gardner, 2006; Salovey, Brackett, & Mayer, 2004; Sternberg, 2003), thus not as susceptible to momentary influence by a specific successful exemplar from within one's own group (Beilock, Rydell, & McConnell, 2007). It is encouraging for generalizability that research on stereotype threat has found so many parallels among different types of performance under stereotype threat (e.g., Davies, Spencer, Quinn, & Gerhardstein, 2002; Johns, Inzlicht, & Schmader, 2008; McGlone et al., 2006; Steele et al., 2002; Stone et al., 1999), and that future research might also seek out novel ways to use role models to improve performance or identification in domains such as computing, engineering, or for domains that are negatively stigmatized.

Also, although the results of Experiment 2 showed that extra-task thoughts partially mediate the effects of role model deservingness on math test performance, it is important to note that extra-task thoughts were measured after-the-fact, by asking participants how often during the test they thought about the stereotype and the implications of their performance for themselves and for women as a group. Because these ratings were made after the test, it is possible that participants who sensed that they did poorly on the test took this as an opportunity to excuse their poor performance. Retrospective self-reports of cognitive processes, however, have been used in many studies of attitude change (see Brock, 1967; Greenwald, 1968; Petty, Wheeler, & Tormala, 2003), which have found the same relationship between experimental manipulations and thoughts reported either during or after a persuasive message (Calder, Insko, & Yandell, 1974; Petty et al., 1976). In addition, retrospective self-reports of thoughts during a task correlate with electrophysiological measures taken during the task (Cacioppo & Petty, 1979). In addition, the present results are entirely consistent with measures of working memory taken during task performance with versus without stereotype threat (Schmader & Johns, 2003; Schmader et al., 2008).

Future Directions

Future research might try to extend these results to matching role models with participants on other identity relevant traits. Marx (Marx & Roman, 2002; Marx et al., 2005) has shown that role models who match the sex of the participants, or are perceived to be similar, are more effective at reducing threat than those less similar. To what extent, then, might role models who match individuals based on race, or even on implicit theories of ability, affect how well individuals identify with, and benefit from such role models? The ''Obama effect'' as identified by Marx et al. (2009) demonstrates that race-based role models matter. Moreover, research has similarly demonstrated that individuals who see ability as malleable benefit from role models more than do people who view ability as fixed (Lockwood & Kunda, 1997). What remains unknown, given the present findings, is whether fixed or malleable

mindsets are related to causal attributions for the success of role models (Dweck, 2006). It is possible that when mindset is taken into consideration, those with malleable mindsets would be even more impressed by role models who demonstrate their abilities via hard work and effort, whereas individuals with fixed mindsets would be inspired only by demonstrations of sheer ability.

The findings of Experiment 2 are also seen as important in helping to identify specific extra-task concerns that affect performance (Beilock et al., 2006; Schmader et al., 2008). According to Schmader et al. (2008), stereotype threat motivates self-image/self-integrity relevant focus that contributes to cognitive deficits. That is, individuals spend valuable cognitive resources thinking about how they and their group might be perceived, instead of focusing on the task at hand. The present Experiment 2 helps to identify what those concerns might be, how they might lead to associated performance deficits, and how the deservingness of role models might alleviate extra-task concerns in otherwise threatening situations. A meditational analysis in the present Experiment 2 suggested that successful role models can reduce vigilance about the stereotype and thus lift the cognitive burden imposed by stereotype threat, exactly as theorized by Schmader et al. (2008).

Monitoring processes are also seen as relevant contributors to stereotype threat deficits (Beilock et al., 2006; Schmader et al., 2008). Individuals who experience stereotype threat actively monitor their performance rather than focusing on relevant strategies and outcomes involved in the task. In a related study, when women golfers were threatened they began to focus on ''proceduralized processes'' relevant to their putting. This extra monitoring led to significant decreases in performance (more strokes before a successful putt; Beilock et al., 2006). In the present results effective role models may have reduced performance monitoring on a cognitive as opposed to a physical task. In Experiment 2, women participants who read about women role models who succeeded because of internal-stable reasons were less concerned, on average, with how they or their group performed. Too much monitoring of one's performance has been postulated to cause performance deficits directly on motor tasks, and to affect performance less directly on cognitive tasks by reducing working memory efficiency (Schmader et al., 2008). Presumably, decreases in extra-task vigilance lead to increases in working memory efficiency, which allows non-threat levels of math test performance.

Perhaps in future research this assumption could be tested directly. Individuals might be placed in a threatening situation, then exposed to successful role models of varying deservingness, and then complete measures of working memory. Schmader and Johns (2003) for instance used a dual task to measure working memory and found that threat causes memory deficits. Thus, if deserving role models effectively reduce ruminative processes, individuals exposed to them might display greater working memory than similarly threatened individuals exposed to no role models, or undeserving role models. Previous research has shown that constructs associated with the stereotype are made more accessible when participants are placed under stereotype threat, and that heightened activation of such constructs can impair performance on math tests (Davies et al., 2002). It might be possible in future studies to develop to-be-remembered items that have to do specifically with the stereotyped group's reputation and how it might be affected by the participant's performance. Relevant mediational analyses that involve memory for the to-be-remembered items could then test whether reading internal-stable, as opposed to external-unstable, success stories can divert attention away from such thoughts and in the process improve test scores under stereotype threat.

In a more general vein, it might prove useful to pinpoint the exact types of extra-task thoughts that are rendered especially accessible and intrusive by stereotype threat. It would then be possible to examine several techniques that have proven effective in reducing stereotype threat, such as lessening the importance of the task (Croizet & Claire, 1998; Steele & Aronson, 1995); reducing the salience of the stereotype (Spencer et al., 1999); claiming the test is not susceptible to the stereotype (Walsh et al., 1999); providing excuses for poor performance (Brown & Josephs, 1999; Stone et al., 1999); reducing opportunities to self-handicap (Keller, 2002); and altering intelligence conceptions from static to fluid (Aronson et al., 2002), to determine whether the same mechanism of alleviation might operate in each. It seems at least plausible that these effective techniques for alleviating stereotype threat all work by allowing individuals to withdraw attention from extra-task thoughts about letting the group down, and to direct cognitive capacity where it belongs—on the task itself (Schmader et al., 2009). In addition, deservingness of successful role models might interact in interesting and perhaps unexpected ways with different types of vigilance.

Schmader et al. (2008) have also argued that threat relevant situations affect performance by inducing physiological reactions consistent with worry, anxiousness, and fear. The present studies did not measure such reactions, but there is reason to believe that role models who deserve their success might reduce anxiety more than would role models who do not deserve their success. In a relevant study, adolescents who read biographies of culturally relevant role models showed decreases in trait anxiety compared to matched adolescents who did not read of such role models (Malgady, Rogler, & Costantino, 1990). Admittedly, the anxiety was self-reported, but past studies have demonstrated similarity of reactions between self-report and physiological measures of anxiety in threatening situations (Mendes, Blascovich, Hunter, Lickel, & Jost, 2007). Future research, then, might examine the extent to which deserving and non-deserving role models reduce these reactions and improve performance for individuals who are experiencing stereotype threat.

Concluding Remarks

The present experiments, of course, illuminate only a small part of what promises to be a complex process. When individuals feel threatened by a situation, they presumably look to successful role models, assess whether those role models deserved their success, draw inferences from the role model's perceived deservingness to their own likelihood of attaining success, and either continue to strive or give up. Role models, like Rosa Parks, inspire others who are victims of stereotyping to persevere even in the face of challenging circumstances.

REFERENCES

Aronson, J., Fried, C. B., & Good, C. (2002). Reducing the effects of stereotype threat on African American college students by shaping theories of intelligence. *Journal of Experimental Social Psychology*, *38*, 113–125. DOI: 10.1006/jesp.2001.1491

Bandura, A. (1977). *Social learning theory.* Oxford, England: Prentice-Hall.

Bandura, A. (2000). Exercise of human agency through collective efficacy. *Current Directions in Psychological Science*, *9*, 75–78.

Bargh, J. A., & Chartrand, T. L. (2000). The mind in the middle: A practical guide to priming and automaticity research. In H. T. Reis, & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 253–285). NY: Cambridge University Press.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*, 1173–1182. DOI: 10.1037/ 0022-3514.51.6.1173

Baumeister, R. F., DeWall, N. C., Ciarocco, N. J., & Twenge, J. M. (2005). Social exclusion impairs self-regulation. *Journal of Personality and Social Psychology*, *88*, 589–604.

Beilock, S. L., Jellison, W. A., Rydell. R. J., McConnell, A. R., & Carr, T. H. (2006). On the causal mechanisms of stereotype threat: Can skills that don't rely heavily on working memory still be threatened? *Personality & Social Psychology Bulletin*, *32*, 1059–1071.

Beilock, S. L., Rydell, R. J., & McConnell, A. R. (2007). Stereotype threat and working memory: Mechanisms, alleviation, and spillover. *Journal of Experimental Psychology: General*, *136*, 256–276.

Brock, T. C. (1967). Communication discrepancy and intent to persuade as determinants of counterargument production. *Journal of Experimental Social Psychology*, *3*, 296–309.

Brown, R. P., & Josephs, R. A. (1999). A burden of proof: Stereotype relevance and gender differences in math performance. *Journal of Personality and Social Psychology*, *76*, 246–257.

Cacioppo, J. T., & Petty, R. E. (1979). Attitudes and cognitive response: An electrophysiological approach. *Journal of Personality and Social Psychology*, *37*, 2181–2199.

Calder, B. J., Insko, C. A., & Yandell, B. (1974). The relation of cognitive and memorial processes to persuasion in a simulated jury trial. *Journal of Applied Social Psychology*, *4*, 62–93.

Campbell, D. E., & Wolbrecht, C. (2004). See Jane run: Women politicians as role models for adolescents. *The Journal of Politics*, *68*, 233–247.

Cavallo, J. V., Fitzsimons, G. M., & Holmes, J. G. (2009). When self-protection overreaches: Relationship-specific threat activates domain-general avoidance motivation. *Journal of Experimental Social Psychology*, in press.

Croizet, J. C., & Claire, T. (1998). Extending the concept of stereotype threat to social class: The intellectual underperformance of students from low socioeconomic backgrounds. *Personality and Social Psychology Bulletin*, *24*, 588–594.

Dasgupta, N., & Asgari, S. (2004). Seeing is believing: Exposure to counterstereotypic leaders and its effects on the malleability of automatic gender stereotyping. *Journal of Experimental Social Psychology*, *40*, 642–658.

Davies, P. G., Spencer, S. J., Quinn, D. M., & Gerhardstein, R. (2002). Consuming images: How television commercials that elicit stereotype threat can restrain women academically and professionally. *Personality and Social Psychology Bulletin*, *28*, 1615–1628.

Dweck, C. S. (2006). *Mindset: The New Psychology of Success*. New York, NY: Random House.

Fontaine, G. (1974). Social comparison and some determinants of expected personal control and expected performance in a novel task situation. *Journal of Personality and Social Psychology*, *29*, 487–496.

Gardner, H. (2006). *Multiple intelligences: New horizons in theory and practice*. New York: Basic Books.

Gibson, D. (2004). Role models in career development: New directions for theory and research. *Journal of Vocational Behavior*, *65*, 134–156. DOI: 10.1016/S0001-8791(03)00051-4

Gonzales, P. M., Blanton, H., & Williams, K. J. (2002). The effects of stereotype threat and double-minority status on the test performance of Latino women. *Personality and Social Psychology Bulletin*, *28*, 659–670. DOI: 10.1177/0146167202288010

Greenwald, A. G. (1968). Cognitive learning, cognitive response to persuasion, and attitude change. In A. G. Greenwald, T. C. Brock, & T. M. Ostrom (Eds.), *Psychological Foundation of Attitudes*. New York: Academic Press.

Gresky, D. M., Ten Eyck, L. L., Lord, C. G., & McIntyre, R. M. (2005). Effects of salient multiple identities on women's performance under mathematics stereotype threat. *Sex Roles*, *53*, 703–716. DOI: 10.1007/s11199-005-7735-2

Heider, F. (1958). *The Psychology of interpersonal relations*. Hoboken, NJ: John Wiley & Sons. DOI: 10.1037/10628-000

Inzlicht, M., & Ben-Zeev, T. (2000). A threatening intellectual environment: Why females are susceptible to experiencing problem-solving deficits in the presence of males. *Psychological Science*, *11*, 365–371. DOI: 10.1111/ 1467-9280.00272

Johns, M., Inzlicht, M., & Schmader, T. (2008). Stereotype threat and executive resource depletion: Examining the influence of emotion regulation. *Journal of Experimental Psychology: General*, *137*, 691–705. DOI: 10.1037/ a0013834

Jones, E. E., Rock, L., Shaver, K. G., Goethals, G. E., & Ward, L. W. (1968). Pattern of performance and ability attribution an unexpected primacy effect. *Journal of Personality and Social Psychology*, *10*, 317–340. DOI: 10.1037/ h0026818

Keller, J. (2002). Blatant stereotype threat and women's math performance: Self-handicapping as a strategic means to cope with obtrusive negative performance expectations. *Sex Roles*, *47*, 193–198. DOI: 10.1023/ A:1021003307511

Keller, J., & Dauenheimer, D. (2003). Stereotype threat in the classroom: Dejection mediates the disrupting threat effect on women's math performance. *Personality and Social Psychology Bulletin*, *29*, 371–381. DOI: 10.1177/0146167202250218

Leary, M. R., Terry, M. L., Allen, A. B., & Tate, E. B. (2009). The concept of ego threat in social and personality psychology: Is ego threat a viable scientific construct? *Personality and Social Psychology Review*, *13*, 151–164. DOI: 10.1177/1088868309342595

Lockwood, P. (2006). Someone like me can be successful: Do college students need same gender role models? *Psychology of Women Quarterly*, *30*, 36–46. DOI: 10.1111/j. 1471-6402. 2006.00260.x

Lockwood, P., & Kunda, Z. (1997). Superstars and me: Predicting the impact of role models on the self. *Journal of Personality and Social Psychology*, *73*, 91–103. DOI: 10.1037/0022-3514.73.1.91

Lockwood, P., & Kunda, Z. (1999). Outstanding role models: Do they inspire or demoralize us?. In A. Tesser, R. B. Felson, & J. M. Suls (Eds.), *Psychological perspectives on self and identity* (pp. 147–171). Washington DC: APA Press.

Malgady, R. G., Rogler, L. H., & Costantino, G. (1990). Culturally sensitive psychotherapy for Puerto Rican children and adolescents: A program of treatment outcome research. *Journal of Consulting and Clinical Psychology*, *58*, 704–712. DOI: 10.1037/0022-006X.58.6.704

Martin, R., Suls, J., & Wheeler, L. (2002). Ability evaluation by proxy: Role of maximal performance and related attributes in social comparison. *Journal of Personality and Social Psychology*, *82*, 781–791. DOI: 10.1037/0022-3514.82.5.781

Marx, D. M., Ko, S. J., & Friedman, R. A. (2009). The ''Obama effect'': How a salient role model reduces race-based performance differences. *Journal of Experimental Social Psychology*, *45*, 953–956. DOI: 10.1016/ j.jesp.2009.03.012

Marx, D. M., & Roman, J. S. (2002). Female role models: Protecting women's math test performance. *Personality and Social Psychology Bulletin*, *28*, 1183–1193. DOI: 10.1177/01461672022812004

Marx, D. M., Stapel, D. A., & Muller, D. (2005). We can do it. The interplay of construal orientation and social comparisons under threat. *Journal of Personality and Social Psychology*, *88*, 432–446. DOI: 10.1037/0022-3514.88.3.432

McGlone, M. S., Aronson, J., & Kobrynowicz, D. (2006). Stereotype threat and the gender gap in political knowledge. *Psychology of Women Quarterly*, *30*, 392–398. DOI: 10.1111/j.1471-6402.2006.00314.x

McIntyre, R. B., Lord, C. G., Gresky, D. M., Ten Eck, L. L., Frye, J. G. D., & Bond, C. F. (2005). A Social impact trend in the effects of role models on alleviating women's mathematics stereotype threat. *Current Research in Social Psychology*, *10*, 116–136.

McIntyre, R. B., Paulson, R. M., & Lord, C. G. (2003). Alleviating women's mathematics stereotype threat through salience of positive group characteristics. *Journal of Experimental Social Psychology*, *39*, 83–90. DOI: 10.1016/S0022-1031(02)00513-9

Mendes, W., Blascovich, J., Hunter, S. B., Lickel, B., & Jost, J. T. (2007). Threatened by the unexpected: Physiological responses during social interactions with expectancy-violating partners. *Journal of Personality and Social Psychology*, *92*, 698–716. DOI: 10.1037/0022-3514. 92.4.698

Nauta, M. M., Epperson, D. L., & Kahn, J. H. (1988). A multiple-groups analysis of predictors of higher-level career aspirations among women in mathematics, science, and engineering majors. *Journal of Counseling Psychology*, *45*, 483–496. DOI: 10.1037/0022-0167.45.4.483

Oyserman, D., Bybee, D., & Terry, K. (2006). Possible selves and academic outcomes: How and when possible selves impel action. *Journal of Personality and Social Psychology*, *91*, 188–204. DOI: 10.1037/0022-3514.91.1.188

Oyserman, D., & Markus, H. (1990). Reflections on the history of attribution theory and research: People, personalities, publications, problems. *Journal of Social Issues*, *46*, 141–157.

Petty, R. E., Wells, G. L., & Brock, T. C. (1976). Distraction can enhance or reduce yielding to propaganda: Thought disruption versus effort justification. *Journal of Personality and Social Psychology*, *34*, 874–884.

Petty, R. E. Wheeler, S. C., & Tormala, Z. L. (2003). Persuasion and attitude change. In T. Millon, & M. J. Lerner (eds.), *Handbook of psychology: Personality and Social Psychology* (vol. 5, pp. 353–382). Hoboken, NJ: John Wiley & Sons Inc.

Pyszcynski, T., Greenberg, J., Solomon, S., & Maxfield, M. (2006). On the unique psychological import of the human awareness of mortality: Theme and variations. *Psychological Inquiry*, *17*, 328–356. DOI: 10.1080/10478400701369542

Quinn, D. M., & Spencer, S. J. (2001). The interference of stereotype threat with women's generation of math problem-solving strategies. *Journal of Social Issues*, *57*, 55–71. DOI: 10.1111/0022-4537.00201

Rivera, L. M., Chen, E. C., Flores, L. Y., Blumberg, F., & Ponterotto, J. G. (2007). The effects of perceived barriers, role models, and acculturation on the career self-efficacy and career consideration of Hispanics. *The Career Development Quarterly*, *56*, 47–61.

Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General & Applied*, *80*, 1–28.

Salovey, P., Brackett, M. A., & Mayer, J. D. (2004). *Emotional intelligence: Key readings on the Mayer and Salovey Model*. Port Chester, NY: NPR Inc.

Schmader, T., Forbes, C. E., Zhang, S., & Mendes, W. B. (2009). A metacognitive perspective on the cognitive deficits experienced in intellectually threatening environments. *Personality and Social Psychology Bulletin*, *35*, 584–596. DOI: 10.1177/0146167208330450

Schmader, T., & Johns, M. (2003). Converging evidence that stereotype threat reduces working memory capacity. *Journal of Personality and Social Psychology*, *85*, 440–452. DOI: 10.1037/0022-3514.85.3.440

Schmader, T., Johns, M., & Barquissau, M. (2004). The costs of accepting gender differences: The role of stereotype endorsement in women's experience in the math domain. *Sex Roles*, *50*, 835–850. DOI: 10.1023/B:SERS.0000029101.74557.a0

Schmader, T., Johns, M., & Forbes, C. (2008). An integrated process model of stereotype threat effects on performance. *Psychological Review*, *115*, 336–356. DOI: 10.1037/0033-295X.115.2.336

Spencer, S. J., Steele, C. M., & Quinn, D. M. (1999). Stereotype threat and women's math performance. *Journal of Experimental Social Psychology*, *35*, 4–28. DOI: 10.1006/jesp.1998.1373

Steele, C. M. (1997). A threat in the air: How stereotypes shape intellectual identity and performance. *American Psychologist*, *52*, 613–629. DOI: 10.1037/0003-066X.52.6.613

Steele, C. M., & Aronson, J. (1995). Stereotype threat and the intellectual test performance of African Americans. *Journal of Personality and Social Psychology*, *69*, 797–811. DOI: 10.1037/0022-3514.69.5.797

Steele, C. M., Spencer, S. J., & Aronson, J. (2002). Contending with group image: The psychology of stereotype and social identity threat. In M. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 34, pp. 379–440). New York: Academic Press.

Sternberg, R. J. (2003). *Wisdom, intelligence, and creativity synthesized*. New York: Cambridge University Press.

Stone, J., Lynch, C. I., Sjomeling, M., & Darley, J. M. (1999). Stereotype threat effects on Black and White athletic performance. *Journal of Personality and Social Psychology*, *77*, 1213–1227. DOI: 10.1037/0022-3514.77.6.1213

Stone, J., & McWhinnie, C. (2008). Evidence that blatant versus subtle stereotype threat cues impact performance through dual processes. *Journal of Experimental Social Psychology*, *44*, 445–452. DOI: 10.1016/j.jesp.2007.02.006

Taylor, C. A., Lord, C. G., McIntyre, R. B., & Paulson, R. M. (in press). The Hillary Clinton effect: When the same role model inspires or fails to inspire improved performance under stereotype threat. *Group Processes and Intergroup Relations*.

Tesser, A., Millar, M., & Moore, J. (1988). Some affective consequences of social comparison and reflection process: The pain and pleasure of being close. *Journal of Personality and Social Psychology*, *54*, 49–61. DOI: 10.1037/0022-3514.54.1.49

Walsh, M., Hickey, C., & Duffy, J. (1999). Influence of item content and stereotype situation on gender differences in mathematical problem solving. *Sex Roles*, *41*, 219–240. DOI: 10.1023/A:1018854212358

Weiner, B. (1985). An attribution theory of achievement motivation and emotion. *Psychological Review*, *92*, 548–573. DOI: 10.1037/0033-295X.92.4.548

Weiner, B. (2008). Reflections on the history of attribution theory and research: People, personalities, publications, problems. *Social Psychology*, *39*, 151–156. DOI: 10.1027/1864-9335.39.3.151

Weiner, B., Frieze, I., Kukla, A., Reed, L., Rest, S., & Rosenbaum, R. M. (1971). Perceiving the causes of success and failure. In E. E. Jones, D. E. Kanouse, H. H. Kelley, R. E. Nisbett, S. Valins, & B. Weiner (Eds.), *Attribution: Perceiving the causes of behavior.* Morristown, NJ: General Learning Press.

Wohlford, K. E., Lochman, J. E., & Barry, T. D. (2004). The relation between the chosen role models and self-esteem for men and women. *Sex Roles*, *50*, 575–582. DOI: 10.1023/B:SERS.0000023076.54504.ca

Zirkel, S. (2002). Is there a place for me? Role models and Academic identity among White students and students of color. *Teachers College Record*, *104*, 357–376. DOI: 10.1111/1467-9620.00166