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A particular resiliency to threatening environments ☆

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Abstract

Being in the numerical minority can impair intellectual performance. We suggest, however, that these negative effects need not extend to everyone because some people—specifically high self-monitors—can overcome the effects of situationally activated stereotypes. In two studies, we manipulated the race/sex composition of small groups and assessed intellectual performance. Results revealed that: (a) self-monitoring moderated the effects of group-composition on performance, such that it was positively related to performance in stressful minority settings, (b) the number of out-group members in a group caused a linear effect on performance that differed for high and low self-monitors, and (c) stereotype activation mediated self-monitoring's moderating effect on performance. Thus, high self-monitors may be resilient to threatening environments because they react to negative stereotypes with increased (and not decreased) performance. We discuss these results in relation to theories of inter-group contact, stereotype threat, and stress and coping.

Keywords: Minority environments; Solo status; Stereotype threat; Self-monitoring; Coping; Resiliency

Introduction

W.E.B. DuBois felt his race. As a Black man in America, widely acknowledged as the father of American social science and one of the founding members of the National Association of the Advancement of Colored People (NAACP), he learned that his world was fundamentally different from that of his White peers. His race marked him so that he expected to be treated with prejudice and was surprised when he was not (DuBois, 1944/1991). What makes Dubois's story compelling was that he succeeded. Despite living in a "White world that conditioned his own" (p. 112) and despite the special pressures of being one of the only Blacks on campus, Dubois became one of the first African Americans to be granted a Ph.D. from Harvard. In short, his story, like so many other stories of triumph over adversity, shows that some people can thrive where others struggle. But why did DuBois thrive? How do stigmatized individuals—facing the barriers of stereotypes and numerical inferiority—succeed?

Examining these questions can inform theories of stigmatization and educational practice. Unfortunately, however, psychology has focused almost exclusively on individuals who struggle and fall short, instead of on

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those who are resilient and succeed (Seligman, 2002). Thus, social psychology has taught us that stereotypes and being in the numerical minority can lead to failure and underperformance (Inzlicht & Ben-Zeev, 2000; Steele & Aronson, 1995), but has yet to fully address the individual differences that are associated with success and achievement (see Aronson & Steele, 2005). In this article, we begin to address this shortcoming by focusing on the individuals who are resilient to otherwise threatening environments and who may even thrive in them. We suggest that the individual difference variable of self-monitoring is a significant factor in resilience to the threats posed by stereotypes—specifically that high self-monitors are resilient to settings that are often threatening and disruptive to those in the numerical minority.

Threatening intellectual environments

Research on token, or solo, status has found that being in the numerical minority can lead to detrimental outcomes (e.g., Cohen & Swim, 1995; Fuegen & Biernat, 2002; Kanter, 1977; Niemann & Dovidio, 1998; Sackett, DuBois, & Noe, 1991; Sekaquaptewa & Thompson, 2003; Thompson & Sekaquaptewa, 2002; Yoder, Aniakudo, & Berendsen, 2002; Yoder et al., 1996).[1] Kanter (1977) suggested that individuals belonging to the numerical minority group are perceptually salient and thus receive disproportionate amounts of attention and scrutiny, which often result in group polarization and assimilation to negative stereotypic expectations. In one study, for instance, she found that women in the numerical minority were stereotyped as being less adept than men at business. This differential treatment of numerical minorities can lower their job satisfaction and performance. For example, as the proportion of women decreases in employment settings, they receive lower performance evaluations and are less likely than males to be promoted (Sackett et al., 1991). Further, Black, Latino, and Asian psychology professors report feeling more scrutinized and less satisfied with their jobs, the more they are outnumbered in their departments (Niemann & Dovidio, 1998).

Minority situations may be especially troubling to individuals belonging to socially devalued groups, such as females and racial or ethnic minorities. For instance, females who anticipated being outnumbered were more likely to express dissatisfaction with their group than male minorities (Cohen & Swim, 1995). Similarly, although businesswomen (Kanter, 1977) and policewomen (Ott, 1989) suffer as a result of being in the numerical minority, male nurses, librarians, and elementary school teachers do not (Williams, 1992).

Although it is self-evident that negative treatment of those in the numerical minority can result in worse performance, research has shown that numbers alone can make a difference—even when holding all environmental variables constant, minority status impairs the performance of those who are outnumbered (Saenz & Lord, 1989; Sekaquaptewa & Thompson, 2002). Using a procedure that led participants to believe that they were communicating with other participants via a video communication system (when they were in fact "interacting" with pre-recorded videotapes of research confederates), researchers have been able to determine that those in the numerical minority suffer more cognitive deficits than majority members even when they are treated no differently. For instance, race and gender minorities in otherwise homogeneous White and male groups, remembered less about their partners (Lord & Saenz, 1985) and performed worse on intellectual tests (Sekaquaptewa & Thompson, 2002) than those in the majority. Minority underperformance, therefore, is partly a numbers game.

How can numbers alone affect cognitive performance? One possibility is that minority situations activate stereotypes in the minds of the outnumbered. According to distinctiveness theory (McGuire & Padawer-Singer, 1976), being outnumbered in a setting can remind people of the group that makes them distinct. Thus, in a classroom of mostly White students, an African American student will tend to notice and think about being Black; in a more diverse classroom, however, she will be less likely to do so. Further, this tendency to notice one's social identity becomes more acute as one's group becomes less represented in the environment (McGuire, McGuire, & Winton, 1979). And, once primed, group membership may subsequently activate the stereotypes that are associated with the group (Devine, 1989; Inzlicht & Ben-Zeev, 2000). In short, being outnumbered can increase awareness of one's group and of the stereotypes associated with one's group, triggering a chain of events leading to underperformance (see Inzlicht & Good, in press).

Stereotype activation might lead to underperformance via a motivational phenomenon known as stereotype threat (Aronson, 2002; Spencer, Steele, & Quinn, 1999; Steele, 1997; Steele & Aronson, 1995; Steele, Spencer, & Aronson, 2002). Stereotype threat is the pressure individuals feel when they are at risk of confirming negative stereotypes about their group in their own and other people's eyes (Inzlicht & Ben-Zeev, 2003). This pressure

[1] Researchers have tended to use the terms "token," "solo-status, and "minority" somewhat interchangeably. Although similar, these terms have different meanings. Kanter defined (1977) the term "token" to denote individuals who belong to sub-groups that comprise less than 15% of the super-ordinate group. Furthermore, this term implies that one is chosen out of some symbolic gesture. "Solo-status" implies that one is the only member of one's group. Finally, although the term "minority" can denote numerical inferiority, it can also refer to any non-dominant ethnic or racial group. To prevent any confusion, we therefore use the term "numerical minority."

or threat can be felt as a physiological arousal (Ben-Zeev, Fein, & Inzlicht, 2005; Blascovich, Spencer, Quinn, & Steele, 2001; O'Brien & Crandall, 2003) that can result in sub-optimal performance, especially when individuals are highly identified with success and achievement in the stereotyped domain (Aronson et al., 1999). For instance, when faced with the stereotype that their group is not proficient in school and academic tests, African-Americans may feel performance-hindering anxiety related to being judged along stereotypical lines, resulting in the ironic confirmation of the very stereotype they were trying to refute. Interestingly, stereotype threat does not require being stereotyped or being treated badly by others. Simply holding a negative meta-stereotype about future treatment (Vorauer, Main, & O'Connell, 1998), or *expecting* to be stereotyped is sufficient to create disruptive levels of arousal.

Women must also deal with the burden of negative stereotypes. In math and science, for example, women have to contend with stereotypes alleging inferiority to men (Davies, Spencer, Quinn, & Gerhardstein, 2002; Quinn & Spencer, 2001; Spencer et al., 1999). Because they can activate negative stereotypes, then, minority situations may elicit stereotype threat and create threatening intellectual environments for women in math. For example, Inzlicht and Ben-Zeev (2000) found that females performed worse on an intellectual task when they were tested in the mere presence of males rather than other females (see also Inzlicht & Ben-Zeev, 2003; Sekaquaptewa & Thompson, 2003). This was only the case, however, for math tests; performance on verbal tests was unaffected, which underscores the specificity of numerical minority deficits to stereotyped domains.

Thus, stereotype threat helps explain why being outnumbered leads to underperformance. As DuBois's case shows, however, not all stigmatized individuals are debilitated by minority situations. Focusing the research spotlight on the aggregate effects of stereotype threat has obscured the possibility that it need not always result in underperformance. For example, some studies have found that stereotype-relevant individual differences, such as identification with the threatened domain (Aronson et al., 1999), identification with the threatened group (Schmader, 2002), or sensitivity to prejudice (Aronson & Inzlicht, 2004; Brown & Pinel, 2003) predicts vulnerability to stereotype threat. To our knowledge, however, no one has examined individual resiliencies to numerical minority pressures or investigated the power of other more general dispositional tendencies.

The moderating effects of self-monitoring

One general individual difference that may help distinguish between the stigmatized individuals who are susceptible to minority pressure from those who are resilient is self-monitoring. According to Snyder (1974), people differ in the extent to which they engage in *self-monitoring*, the desire and ability to control one's self-expressions in order to cultivate a desired public image. High self-monitors are sensitive to the demands of social situations and adept at regulating their expressive behavior and self-presentation to project desired public appearances. In contrast, low self-monitors have relatively little concern for the situational appropriateness of their behavior and are accordingly less likely to regulate and monitor their expressive behavior and self-presentation. Instead, their behavior tends to reflect their inner attitudes, emotions, and dispositions (Gangestad & Snyder, 2000; Snyder, 1974).

The literature on self-monitoring is voluminous, as research has shown that the self-monitoring construct is related to many diverse psychological phenomena. Some studies, for instance, have demonstrated that high self-monitors are more likely to make external attributions for their own emotional states than low self-monitors (Graziano & Bryant, 1998). Others have shown that self-monitoring is related to self-presentation and impression management (e.g., Danheiser & Graziano, 1982; Snyder & Monson, 1975).[2] In this article, we predict that high (but not low) self-monitors will be resilient to the stresses posed by threatening intellectual environments.

On first glance, our hypothesis seems counter-intuitive: high self-monitors, after all, are the ones who care about the impressions they make. One might reasonably assume, therefore, that they would be more worried than low self-monitors about the possibility of having others judge them stereotypically. However, being in the numerical minority involves public scrutiny; it can compel a person to manage the impressions they project. In these situations, people who habitually manage their impressions—say high self-monitors—may find it easier to cope because they are more accustomed to dealing with self-presentational concerns, and this may be reflected in their resiliency to threat and, ultimately, in their performance (for a similar argument regarding self-consciousness, see Baumeister, 1984).

Stress and coping models suggest that when encountering potential stress, people engage in a mental calculus that intervenes between the initial perception and subsequent experience of a stressful situation

[2] There is debate over the factorial structure of the Self-Monitoring Scale (e.g., Briggs & Cheek, 1988; Briggs, Cheek, & Buss, 1980). Specifically, the Self-Monitoring Scale and the Revised Self-Monitoring Scale may be multidimensional and so broken down into at least two components—"other-directedness" and "public-performing" (Briggs & Cheek, 1988). That said, the most recent analysis has shown that a wide range of external criteria tap the unitary self-monitoring construct better than either of the components, and that the Self-Monitoring Scale measures a single, mathematically defined dimension with simple structure (Gangestad & Snyder, 2000).

(Lazarus & Folkman, 1984). Thus, the same potential stressor may be cognitively appraised and experienced in different ways, depending upon: (1) the perception of risk and danger relative to (2) the perception of one's ability to cope. If perceptions of danger exceed those of coping resources, individuals may perceive the situation as an unmanageable stress, appraise the situation as a threat, and experience performance deficits as a result. If, in contrast, perceptions of coping abilities surpass the apparent danger, individuals may recognize the potential for gain, appraise the situation as a challenge, and experience performance boosts (cf. Major, Quinton, & McCoy, 2002; Tomaka, Blascovich, Kelsey, & Leitten, 1993). We suggest that high self-monitors likely construe public minority situations as challenges rather than threats because their coping resources, developed through frequent practice of self-monitoring, are likely to exceed their perceptions of stress.

Interestingly, Snyder may have anticipated our hypothesis when he suggested that minority situations, over time, might drive people to become high self-monitors (Snyder, 1987). People who chronically find themselves in the numerical minority may cope with it by developing their skills in reading situational cues and managing their impressions that those in majority situations do not need to develop. There is precedent, therefore, for our hypothesis that being a high self-monitor is adaptive in minority situations.

The present experiments

Considering the model above, we reason that the effects of being outnumbered may differ for high versus low self-monitors. The two experiments we report in this article were designed to provide a test of our hypothesis relating numerical minority-status, self-monitoring, and underperformance. In both of our studies, participants belonging to stereotyped groups (e.g., women or African Americans) took a test of intellectual ability in the presence of two other individuals—either with two people who belong to the same racial or gender group (same-sex or same-race conditions) or with people belonging to a different racial or gender group (numerical minority condition). Self-monitoring was assessed for each participant. In accordance with past research (e.g., Inzlicht & Ben-Zeev, 2000; Sekaquaptewa & Thompson, 2002), we expect stereotyped participants to perform worse in the numerical minority than in the same-group conditions. If self-monitoring moderates minority-underperformance, however, we expect to find performance deficits only among low self-monitors; high self-monitors, in contrast, will be unaffected or will experience enhanced performance. In Experiment 1, we tested this hypothesis with highly math-identified female participants. In Experiment 2, we examined it with Black participants and tested whether stereotype activation could mediate the effect.

Experiment 1: Self-monitoring, minority-status, and female math performance

The primary purpose of this experiment was to test whether self-monitoring moderates the effects of minority environments on the math performance of highly math-identified female undergraduates. We gave participants a 20-min test composed of difficult items from the quantitative portion of the Graduate Record Examination (GRE). Female participants took the test in groups of one female and two males or groups of three females.

Method

Participants and design

A total of 28 female undergraduates who were enrolled in an Introduction to Psychology course participated in partial fulfillment of a course requirement. Because research has shown that stereotype threat is most disruptive to those individuals who care most about the threatened domain (Aronson et al., 1999), only those students who were motivated and identified with math were eligible to participate. Identification with math was assessed at the beginning of the semester with a mass testing session that asked participants to report their SAT math scores and to complete the Mathematics Identification Questionnaire (MIQ; Brown, 2000). Only those students who scored above the theoretical midpoint of the MIQ and had scores of 570 or higher on the math SAT were eligible to participate. Participants were randomly assigned to either a same-sex or numerical minority group, and individual differences in self-monitoring were examined as a continuous variable in the design. Thus, the complete design of the study included: (1) SAT, (2) a sex-composition manipulation, (3) individual differences in self-monitoring, and (4) the interaction between sex-composition and self-monitoring as predictors of math performance. SAT was used as a covariate in the analysis, not as a way of adjusting for pre-existing differences in SAT, but as a way to increase power (see Yzerbyt, Muller, & Judd, 2004).

Procedure

Six males served as confederates in the numerical minority conditions. They were trained to act like subjects and instructed to limit interactions with the real participants. In addition, one female served as a "back-up confederate" for the same-sex condition and "participated" in the study if one of the three scheduled participants failed to show up. The experiment began

once all three females (same-sex condition) or one female and two male confederates (numerical minority condition) arrived in the lab. Participants began by completing the 18-item Revised Self-Monitoring Scale (Snyder & Gangestad, 1986), which was presented as a pre-measure for our study. The experimenter then played an audio recording of the instructions and cover story. Participants learned that the goal of the "focus-group study of effective test-taking strategies" was to develop a new educational training program to improve student performance on standardized tests. They also learned that as part of the study they would take a math test and then compare and discuss their test scores with their "focus-group" partners. Participants therefore believed that they were under public scrutiny. However, participants never actually got an opportunity to interact (i.e., the study was terminated before the discussion was to ensue) and were in fact instructed to limit any interaction or conversation with one another.

All students were then asked to look over three sample math problems. This procedure was done to inform students of the difficulty of the task and of the possibility of performing poorly (e.g., Spencer et al., 1999). However, to ensure that performance on these items would not affect subsequent measures, students were neither instructed nor given enough time to actually solve these items. The experimenter then passed out a math test and gave participants 20 min to complete the test and informed them when there were 5 and 2 min remaining. Finally, participants filled out a demographic sheet that asked them to report their mathematical SAT score. To minimize any effects of the experimenter's presence, experimenters were only present in the lab when absolutely necessary (e.g., to play the audio recording, pass out materials, etc.).

Math test

The primary dependent variable was participants' performance on a 20-item math test. The test consisted of multiple-choice items taken from the GRE test guide (Educational Testing Service, 1994). Past samples reveal that each question was answered correctly by an average of only 36.6% of test-takers. Performance was calculated by the standard Educational Testing Service formula for scoring and is computed by giving one point for correct items, no points for items left blank, and a deduction of a quarter point for incorrect items (e.g., Davies et al., 2002; Spencer et al., 1999).

Results and discussion

Data were analyzed via multiple regression analysis, with the full model including participants' centered SAT math scores as a covariate,[3] the main effects for sex-composition (contrast coded as −1 for the numerical minority group and +1 for the same-sex group) and self-monitoring (centered on its mean), and the interaction between self-monitoring and sex-composition. One participant failed to complete the self-monitoring scale and was thus excluded from all analyses. In addition, as suggested by Neter, Kutner, Nachtsheim, and Wasserman (1996), one case—a participant in the numerical minority group—was excluded from the analyses because her absolute difference between fits (DFFITS) value exceeded 1, thus indicating that she was an outlier. This left a total of 11 participants in the numerical minority condition and 15 in the same-sex condition.

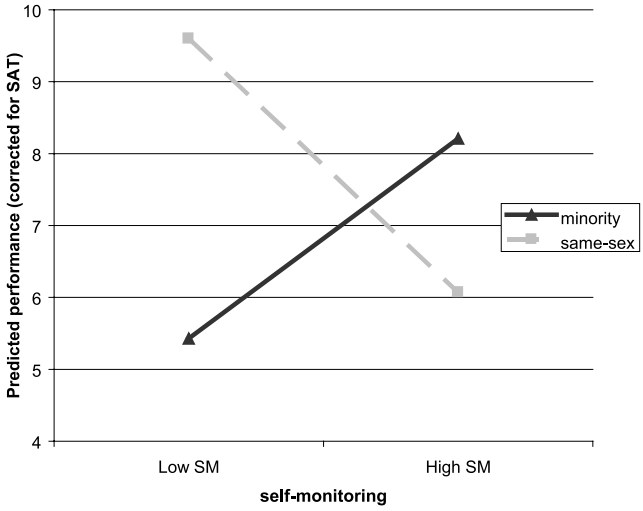

Fig. 1. The relationship between self-monitoring and predicted performance as a function of sex-composition.

We predicted that high self-monitors would perform better than low self-monitors in the numerical minority condition, but no different from them in the same-sex condition. As can be seen in Fig. 1, analysis of performance yielded the predicted two-way interaction between self-monitoring and sex-composition of the

[3] Self-reported SAT scores were collected from each student twice, once during the screening of high math identified students at the beginning of the semester, and a second time after the experiment. In the case of eight students (28.57% of total students), these two self-reported SAT scores differed. As a result of these discrepant self-reports and of research indicating that a significant proportion of students may overestimate their SAT scores (Shepperd, 1993), analyses throughout this experiment used the lower of the two self-reported SAT scores. Because only a minority of students had discrepant SAT scores and because the two SAT scores were not significantly different from one another ($F(1,26) < 1$, *ns*) and highly correlated $r(27) = .94$, $p < .001$, it is not surprising that analyses using other SAT measures (e.g., averaging the two SAT scores) yielded results that were virtually identical to those reported here.

group, $\beta = -.34$, $t(21) = -2.34$, $p < .03$.[4] This corresponds to a large effect size, Cohen's $d = 1.02$. Quantitative SAT scores were a significant predictor of performance, $\beta = .61$, $t(21) = 4.33$, $p < .001$. No other effects were significant or close to significant. The significant interaction indicates, as predicted, that self-monitoring moderated the effect of group-composition on performance.

Using procedures outlined by Aiken and West (1991), this interaction was examined using simple slope analyses. These analyses tested the simple slopes representing the effect of self-monitoring on performance in the numerical minority and same-sex conditions. Results show that high self-monitors outperformed low self-monitors in the numerical minority condition with medium effect ($d = .57$). However, this trend did not reach traditional levels of significance, $\beta = .30$, $t(21) = 1.31$, $p = .20$. Surprisingly, low-self-monitors outperformed high self-monitors in the same-sex condition, $\beta = -.38$, $t(21) = -2.26$, $p < .04$, $d = .98$. Thus, although higher self-monitoring tended to act as a buffer against the negative performance consequences of stressful minority settings, in non-stressful same-sex settings, low self-monitors actually performed better than high self-monitors.

The results of this first experiment provide partial support for our hypothesis that self-monitoring moderates the effects of group composition on intellectual performance. Rather than replicating past research (e.g., Inzlicht & Ben-Zeev, 2000; Sekaquaptewa & Thompson, 2003) showing a main effect of sex-composition on performance, we found more nuanced results.[5] High self-monitors—those individuals who are dispositionally concerned with and able to monitor and control their behaviors—tended to perform better than low self-monitors in the numerical minority. We note, however, that this effect did not reach traditional levels of significance and wonder if our very small sample size played a role. Surprisingly, high self-monitors performed significantly worse than low self-monitors under low stress same-sex situations. These results provide only partial support for our moderation hypothesis: although the expected moderation was partially driven by high self-monitors outperforming low self-monitors in the numerical minority, it was primarily driven by them underperforming low self-monitors in the same-sex condition. We did not predict this crossover interaction effect; however, it is not necessarily inconsistent with our model. We examine the generality of this effect in Study 2 and discuss what it might mean in the General discussion.

To provide more unqualified support of our hypothesis, we replicated Experiment 1. This time, however, we tested African-Americans to see if our results would generalize to other stigmatized groups. We also examined whether there was a linear relationship between performance effects and the representation of one's group. According to distinctiveness theory, people have a greater tendency to notice their social group when there are fewer in-group members present in the environment (McGuire et al., 1979). We thus added an additional mixed-race majority condition (2 Blacks and 1 White) to see if Black participants' test performance would change as a function of the number of White participants in their three-person group. Finally, we examined the role of stereotype activation in mediating the moderation of minority-performance effects by self-monitoring.

Experiment 2: Self-monitoring, race-composition, and stereotype activation

To understand how self-monitoring moderates the effects of group-composition on performance, we examined the role of stereotype activation. Research has shown that activated stereotypes can mediate the effects of stereotype threat on performance (Davies et al., 2002). We therefore have reason to believe that stereotypes, and the different way high and low self-monitors react to them can play a role in mediating the effects of minority environments. If high self-monitors are resilient to stressful minority environments, they should not react poorly to negative stereotypes about their group; to the contrary, they should be motivated by the challenge of disproving it. Low self-monitors, on the other hand, are unaccustomed to managing the impressions they make and may wilt under the pressure of disconfirming threatening stereotypes.

We thus examined if stereotype activation mediates self-monitoring's moderation of group-composition on performance. One possibility is for direct mediation: although stereotype activation leads to performance deficits for everyone, self-monitoring may influence the degree to which people perceive stereotypes in the first place. Indirect mediation is a second possibility:

[4] Before proceeding further with our analysis, we needed to address the possibility that we violated the assumption of independent observations. Because the same-sex condition consisted of multiple participants, the responses and behaviors of these participants may have affected one another and thus their performances may have been non-independent. We were skeptical of this possibility, however, because we instructed all participants to limit interaction with one another. Nonetheless, we examined this possibility by analyzing the performance of same-sex participants with session as a between subject variable. As expected, this analysis showed a non-significant effect, $F(5, 8) = 1.40$, *ns*, which indicates that there is no systematic variance between sessions in performance and justifies our use of individual performance as the unit of analysis.

[5] Although our analysis did not find a significant main effect for sex-composition, before concluding that we did not replicate past results, we need to test the same model used in the past—a model examining the effect of sex-composition without controlling for self-monitoring. This analysis confirms our suspicions: after controlling for SAT, the effect for sex-composition was non-significant, $\beta = .10$, $t(24) < 1$, *ns*, $d = .31$.

although minority environments activate negative stereotypes for everyone, self-monitoring influences the appraisal and meaning of perceived stereotypes and so changes the relationship between stereotypes and performance (for a discussion of mediated moderation, see Muller, Judd, & Yzerbyt, 2004). We expect to find evidence for the latter possibility.

We have hypothesized that self-monitoring affects cognitive appraisals such that high self-monitors are challenged and low self-monitors threatened by minority situations. We therefore suspect that self-monitoring moderates performance by transforming the effects of stereotype activation on performance. In other words, all participants will tend to think about stereotypes associated with their group when they are in the numerical minority, but self-monitoring will moderate their impact on performance—high self-monitors will perform well when thinking about stereotypes, low self-monitors not so well. We examine this possibility in Experiment 2.

The procedures of Experiment 2 were very similar to those of Experiment 1, except that: (a) we tested Black undergraduates and manipulated the race-composition of groups, (b) participants completed items from the verbal portion of the GRE, (c) before taking the test, participants completed a word-fragment completion task (Steele & Aronson, 1995) that measured stereotype activation, and (d) we included a condition in which Black participants were in a mixed-race majority group (two Blacks and one White).

We made three predictions. First, we expected self-monitoring to moderate the effect of race-composition on performance, with high self-monitors outperforming low self-monitors in the numerical minority condition. Second, we predicted that Black participants' performance would decrease as a function of the number of Whites were in the room, but only if they were low in self-monitoring; we did not expect high self-monitors to show the same pattern of results. Finally, we predicted that this moderation of the minority-underperformance link by self-monitoring would be mediated by stereotype activation. Specifically, we expected the performance effects to be produced by the different relationship that exists between stereotype activation and performance for high and low self-monitors.

Method

Participants and design

Forty-four Black female undergraduates participated in this study in exchange for partial fulfillment of a course requirement or a payment of $15. Participants were randomly assigned to one of three race-composition conditions: numerical minority condition (one Black and two Whites), mixed-race majority condition (two Blacks and one White), and same-race condition (three Blacks). Because we were interested in investigating whether there was a linear relationship between race-composition and performance, we entered a linear contrast in race-composition, using the coefficients −1, 0, and +1, respectively; we also entered the quadratic contrast, using the coefficients, −1, +2, and −1, respectively. Thus, the complete design of the study included: (1) SAT, (2) individual differences in self-monitoring, (3) the linear contrast for race-composition, (4) the quadratic contrast for race-composition, (5) the interaction between the linear contrast and self-monitoring, and (6) the interaction between the quadratic contrast and self-monitoring as predictors of verbal performance. As with Experiment 1, SAT was used as a covariate as a way to increase power (see Yzerbyt et al., 2004).

Procedure

The procedure of Experiment 2 was nearly identical to that of Experiment 1. Participants were randomly assigned to one of three race-composition conditions, and were paired with two other participants/confederates. As with Experiment 1, one Black student served as a "back-up confederate" for the same-race or mixed-race conditions and "participated" in the study if one of the scheduled participants failed to show. The study began once all three Black students (same-race condition), two Black and one White student (mixed-race majority condition), or one Black and two White students (numerical minority condition) arrived in the lab. Participants completed the Revised Self-Monitoring Scale, heard an audiotape with the instructions, and completed the stereotype activation measure. They were then given 25 min to complete the verbal GRE test and were informed when there were 5 and 2 min remaining. Participants completed the study by filling out a demographic sheet that asked them to report their verbal SAT score. The experimenter then debriefed all participants and probed them for suspicion.

Materials

In this experiment, participants completed a 25-item verbal test adapted from a test by Steele and Aronson (1995), which consisted of multiple-choice items taken from GRE study guides. Performance was measured as the raw score adjusted for guessing. As in Experiment 1, participants began the study by completing the 18-item Revised Self-Monitoring Scale (Snyder & Gangestad, 1986).

The stereotype activation task was adapted from Steele and Aronson (1995, Study 3) and was administered immediately before the verbal test. The task was a word-fragment completion task (Gilbert & Hixon, 1991), which consisted of a list of 36 word fragments with missing letters specified as blank spaces (e.g., __ __ C E). Twelve of these fragments had as one possible solution a word reflecting a race-related construct or an image stereotypically associated with African-Ameri-

cans. The premise behind this task is that participants for whom the Black stereotype is activated should be more likely to make stereotypic completions than participants for whom the stereotype is not activated. The 12 stereotypic words in this study were taken from Steele and Aronson (1995, Study 3), who pre-tested them with a group of undergraduate students for stereotypicality. The 12 words were *race*, *lazy*, *black*, *poor*, *class*, *brother*, *white*, *minority*, *welfare*, *color*, and *token*. Participants were given 5 min to complete the task.

Results and discussion

Two participants failed to complete the self-monitoring scale and one failed to provide her SAT score; they were thus excluded from all analyses. This left a total of 15 participants in the numerical minority condition, 13 in the mixed-race majority condition, and 13 in the same-race condition. As in Experiment 1, we analyzed the data using multiple regression procedures, with the full model including, centered verbal SAT scores as a covariate, main effects for self-monitoring (centered on its mean), the linear and quadratic contrasts, and the interaction between the linear contrast and self-monitoring and between the quadratic contrast and self-monitoring.[6]

Self-monitoring's moderating muscle

We first examined our main hypothesis: that self-monitoring would moderate the effects of race-composition on performance, such that high self-monitors would perform better than low self-monitors in the numerical minority condition, but no different from them in the same-sex condition. Performance results replicated findings from Experiment 1 showing a significant two-way interaction between self-monitoring and the linear contrast of race-composition, $\beta = -.30$, $t(34) = -2.52$, $p < .02$, $d = 0.86$. Verbal SAT scores were a significant predictor of performance, $\beta = .824$, $t(34) = 7.52$, $p < .001$, and were entered as a covariate in the analysis. No other effects were significant, including the quadratic by self-monitoring interaction, $\beta = -.12$, $t(34) = -1.02$, *ns*.

[6] As with Experiment 1, we needed to investigate whether we violated the assumption of independent observations. Because we have two conditions with possible dependence (the same-race and mixed-race conditions), we asked whether there was above chance variance between sessions for each of the two conditions. Even though we were skeptical of this possibility because of the limited interaction participants had with one another, we analyzed the performance of same-race and mixed-race participants with session as a between subject variable. As expected, this analysis showed a non-significant effect for the same-race condition, $F(5,6) = 1.40$, *ns*, and the mixed-race condition, $F(6,5) = 2.97$, *ns*, which indicates that there is no systematic variance between sessions in performance and justifies our use of individual performance as the unit of analysis.

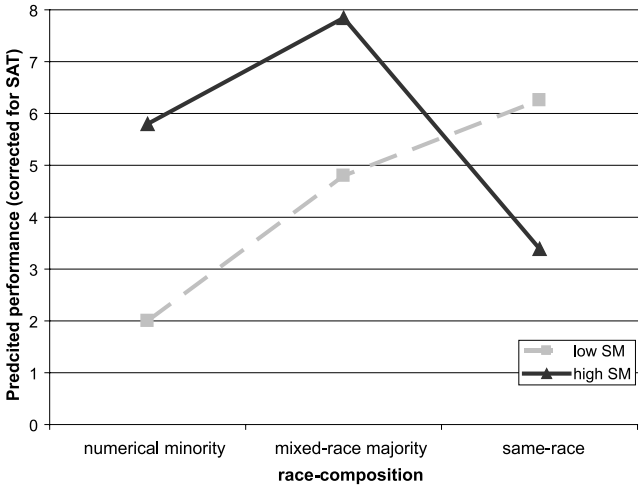

Fig. 2. The relationship between race-composition and predicted performance as a function of self-monitoring.

To further understand this significant interaction, we analyzed the simple slopes representing the effect of self-monitoring on performance in the numerical minority, same-race, and mixed-race majority conditions. Results confirmed our predictions (see Fig. 2). The simple slope relating self-monitoring and performance in the numerical minority condition was significant and positive, $\beta = .41$, $t(34) = 2.65$, $p = .01$, suggesting, as predicted, that high self-monitors outperformed low self-monitors in the numerical minority condition. This corresponds to a large effect size $d = .91$. In contrast, the slope in the same-race condition, was not significantly different from zero, $\beta = -.31$, $t(34) = -1.26$, $p = .22$, and as a result rather small ($d = .43$). Although the slope in the mixed-race majority condition was positive, it did not reach traditional levels of significance, $\beta = .33$, $t(34) = 1.43$, $p = .16$, $d = .49$. Nonetheless, this suggests that self-monitoring has similar effects in the mixed-race majority and numerical minority conditions—positively affecting performance. Thus, high levels of self-monitoring can buffer people from the adverse performance consequences of being in the numerical minority or even in the presence of one White person. It does not buffer performance, though, in the same-race group. These results support our main hypothesis that self-monitoring moderates the effects of group-composition on intellectual performance, and do so with a different stigmatized group—African-Americans.

Next, we turned to how the relative number of White people in the environment affected the performance of Black participants—whether performance would decrease as a function of the number of Whites for low self-monitors and increase for high self-monitors. The significant interaction between the linear effect of race-composition and self-monitoring shows a relationship between performance and the number of White people in the room that differed for high and low self-monitors. To

further understand the nature of these trends, we analyzed our data using another set of orthogonal contrasts.

The first contrast compared the effect of the same-race condition with that of the minority and mixed-race majority conditions using the coefficients −1, −1, and +2 for minority, mixed-race, and same-race conditions, respectively. This contrast tested whether there was an effect for leaving a homogeneous all-Black environment for a heterogeneous mixed-race one. This is of some interest because it can teach us whether any intergroup contact—be it with Blacks in the majority or minority—can affect Black participants, and if so, whether this effect is moderated by self-monitoring. The second orthogonal contrast compared the effect of the minority and mixed-race conditions using coefficients −1, +1, and 0, respectively. This contrast explored whether the addition of one White to the three-person group would have an effect on Black participants if one White person was already present. This model thus included SAT, self-monitoring, the two contrasts, and the relevant interactions.

Analysis of this new model indicated a significant interaction between contrast 1 (same race vs. minority and mixed-race conditions) and self-monitoring, $\beta = -.27$, $t(34) = -2.43$, $p = .02$, $d = .83$. Based on Fig. 2, it appears that self-monitoring is a protective factor for Black participants entering heterogeneous mixed-race environments, be it with Blacks in a mixed-race majority or in a numerical minority. The only other effect to approach significance is the main effect of contrast 2 (minority vs. mixed race), $\beta = .21$, $t(34) = 1.88$, $p < .07$, $d = .65$. This marginal effect indicates that all participants tended to do worse in the numerical minority than in the mixed-race majority conditions. This effect did not differ across levels of self-monitoring; the interaction between self-monitoring and the contrast was non-significant, $\beta = -.03$, $t(34) = -.29$, *ns*. This suggests that once Whites are there, the more Whites present the worse both high and low self-monitors do. Taken together, these results suggest that when leaving a homogeneous all Black setting to a heterogeneous mixed-race setting (with Blacks in the majority or minority), level of self-monitoring can determine whether Black participants do better or do worse; however, once in a heterogeneous mixed-race environment, all Black participants (both high and low self-monitors) do worse the less their race is represented.

Mediated moderation: The role of stereotype activation

Through what process does self-monitoring moderate the effects of group-composition on performance? We expected stereotype activation, as measured by the number of stereotype word completions, to play a key role. Specifically, we predicted that responses to activated stereotypes would depend on level of self-monitoring—with high self-monitors having challenged responses and low self-monitors threatened ones—and that this would account for the effects of group composition. We tested this prediction following the mediated moderation procedures specified by Muller and co-workers (2004). To correct for observed violations of normality of the stereotype activation measure, we transformed them via a square root transformation, a common transformation for counts (see McClelland, 2000). When we conducted analyses on untransformed data, though, the results were similar.

As can be seen in Table 1, our first regression equation examined whether self-monitoring was a significant moderator of the linear effects of race-composition on performance. As stated above, it was, $\beta = -.30$, $t(34) = -2.52$, $p < .02$, $d = 0.86$. Our second regression equation examined the effects of self-monitoring, race-composition (both linear and quadratic components), and the interactions between the two race-composition contrasts and self-monitoring on stereotype activation. Consistent with predictions—and in accordance with distinctiveness theory (McGuire et al., 1979)—stereotypes tended to be more active for Black participants the more Whites were in the room. That is, there was a mar-

Table 1
Regression results testing for mediated moderation: stereotype activation as a mediator of the self-monitoring moderation effect

Criterion:	Equation 1 Performance		Equation 2 Stereotype activation		Equation 3 Performance	
Predictor:	β	t	β	t	β	t
Verbal SAT	0.82	7.52**	−0.16	−0.99	0.79	7.72**
Self-monitoring	0.14	1.15	−0.23	−1.23	0.22	1.92*
Linear contrast for race-composition	0.08	0.77	−0.28	−1.73*	0.04	0.35
Linear contrast × self-monitoring	−0.30	−2.52**	0.14	0.80	−0.18	−1.53
Quadratic contrast for race-composition	−0.20	−1.66	0.06	0.34	−0.15	−1.41
Quadratic contrast × self-monitoring	−0.12	−1.02	−0.27	−1.62	−0.09	−0.88
Stereotype activation					0.11	1.06
Stereotype activation × self-monitoring					.30	2.88**

Note. All continuous variables are centered on their respective means. The stereotype activation measure was transformed by a square-root transformation.

* $p < .10$.

** $p < .01$.

ginal linear effect of race-composition on stereotype activation, $\beta = -.28$, $t(34) = -1.73$, $p < .10$, $d = 0.59$. Importantly, the interaction between the linear contrast and self-monitoring was non-significant, $\beta = .14$, $t(34) < 1$, *ns*.

In a step analogous to the examination of simple mediation (Baron & Kenny, 1986), the third step involved entering stereotype activation and the interaction between it and self-monitoring into the original regression equation examining the effects of self-monitoring and group composition on performance. As predicted, we found a significant mediator by moderator interaction—that is a significant interaction between stereotype activation and self-monitoring, $\beta = .30$, $t(32) = 2.88$, $p < .01$. This constitutes a large effect size, Cohen's $d = 1.02$. This means that the effect of stereotype activation on performance differed for high and low self-monitors: simple effects revealed that high self-monitors reacted to increased stereotype activation with rising performance, $\beta = .39$, $t(32) = 2.58$, $p < .02$, $d = .91$, whereas low self-monitors showed a non-significant trend to respond with declining performance, $\beta = -.16$, $t(32) = -1.22$, $p = .23$, $d = .43$. Importantly, when stereotype activation and the interaction between it and self-monitoring were entered into the model, the interaction between the linear effect of race-composition and self-monitoring was no longer significant, $\beta = -.18$, $t(32) = -1.53$, $p > .13$. Thus, we have evidence for marginally mediated moderation.

The mediated moderation analysis indicated that self-monitoring might have moderated the linear effects of race-composition by affecting the relationship between stereotype activation and performance. Minority environments tend to activate negative stereotypes (albeit with only marginal reliability), which then affect levels of performance. But the direction and magnitude of this performance change depends on individual differences in self-monitoring: high self-monitors were positively affected and low self-monitors, unaffected. This is evidence for indirect mediation (Muller et al., 2004). There was little evidence, however, for direct mediation: self-monitoring did not affect the degree to which people in the numerical minority perceived stereotypes, and stereotypes did not affect performance uniformly. Rather, self-monitoring changed the way people reacted to stereotypes that tended to become more activated in minority settings. High and low self-monitors, in other words, were just as likely to think about stereotypes when they were in the numerical minority. The difference between them, then, was in their reaction to stereotypes: low self-monitors tended to be susceptible to underperformance and high self-monitors, resilient.

This experiment provided additional evidence for three ideas. First, we re-confirmed our main hypothesis that self-monitoring moderates the effects of group-composition on intellectual performance. Although minority situations can harm intellectual performance, their effect is not universal. Rather, high self-monitors are unaffected and possibly challenged by being outnumbered. In addition, unlike the effects of Experiment 1, high self-monitors outperformed low self-monitors when they were the only Black in the room and were no different from them when they were in an all Black setting. This bolsters our claim that high levels of self-monitoring are related to resilience in stressful intergroup settings. Second, intellectual performance can change (increase or decrease) with an increase in the relative number of out-group members in the environment. Specifically, when going from a homogeneous same-race environment to a heterogeneous mixed-race one, self-monitoring can determine whether people are susceptible to performance deficits (low self-monitors) or resilient to them (high self-monitors). Once in a heterogeneous mixed-race environment, however, Black students do worse the less their race is represented in the environment. Third, stereotype activation might be marginally responsible for self-monitoring's ability to moderate the effects of group-composition on performance. Stereotypes tend to become activated as a function of the racial-composition of a room, but performance as a reaction to these stereotypes varies according to level of self-monitoring. This provides evidence that individuals differ in their reactions to minority environments and supports the utility of looking at stereotype activation to understand these differences.

General discussion

Research on group-composition has emphasized the threats inherent in minority situations. It has taught us that when stigmatized individuals are outnumbered, they become aware of the negative stereotypes about their group and perform worse as a result. Yet this research has neglected individuals who, in fact, experience success and achievement in minority situations. The research presented here addressed this limitation by exploring the resiliency of high self-monitors. Across two studies using two different groups and two domains of intellectual performance, the effects of group-composition on performance were moderated by self-monitoring. The same situations that threatened intellectual performance in prior research (i.e., being outnumbered) produced no performance deficits for high self-monitors.

This research provided evidence that self-monitoring could moderate the effects of group-composition on the intellectual performance of women in math and African-Americans more generally. With some exceptions (e.g., Pollak & Niemann, 1998; Sekaquaptewa & Thompson, 2002), empirical research has tended to emphasize the effects of group-composition on women. This stands in sharp contrast to the possibility that the problems

associated with being outnumbered may be more prevalent for disadvantaged ethnic or racial groups such as African-Americans. Recent census data, for example, reveals that Blacks consist of only 12.3% of the US population (US Census Bureau, 2001), which means that they must regularly find themselves in the numerical minority and so chronically confronted with stereotypes about their group. Experiment 2 was therefore conducted to assess whether the moderation of the group-composition effect could generalize to Black students. Our results indicate that they do.

Process: Why are high self-monitors resilient?

Both studies suggest that high self-monitors are resilient to the pressures posed by minority situations. These situations, in other words, can threaten some people's performance and facilitate others'. But how precisely does this happen? Our findings offer some clues.

The results of our mediated moderation analysis suggest that self-monitoring transformed the effects of group composition by changing reactions to activated stereotypes. Although both high and low self-monitors tended to think about the stereotypes associated with their group when in the numerical minority, these activated stereotypes resulted in different patterns of performance for the two groups. Specifically, although high self-monitors thought about stereotypes when they were in the numerical minority, unlike low self-monitors, they appeared undaunted by them. In other words, not only did activated stereotypes not hamper their performance, it actually facilitated it. When they were in a same-race group, however, they did not think about stereotypes and thus had little to motivate and push their performance.

We suspect that high self-monitors construe public minority situations as challenges rather than threats because their coping resources are likely to exceed their perceptions of stress. High self-monitors might be better able to cope for a number of reasons. First, high self-monitors have enhanced coping skills, including an adaptive coping style: when dealing with stress, they report using active coping and planning, and are less likely to disengage mentally or behaviorally (Miller, Omens, & Delvadia, 1991). Second, high self-monitors have greater reserves of self-regulatory strength (Seeley & Gardner, 2003), which can be defined as the mental effort individuals use to control their behavior and cope with stress. Research on self-regulation shows that people have only a limited supply of self-regulatory strength that depletes quickly after use (e.g., Muraven & Baumeister, 2000); high self-monitors, however, have larger amounts of coping resources (Seeley & Gardner, 2003) and are less likely to experience complete depletion when forced to cope with stressful regulatory-draining events such as stereotype threat (see Inzlicht, McKay, & Aronson, 2005, for a review). Third, high self-monitors are experts at controlling the impressions they project (Danheiser & Graziano, 1982) and so may believe that they are able to prevent others from making negative stereotypic impressions of them[7]—precisely the demands we presume are posed by stereotype threat (Aronson, 2002; Inzlicht & Ben-Zeev, 2003).

Ultimately, these appraisals may lead them to see the possibility for positive gains and to be highly motivated, which can result in superior performance. Low self-monitors, in contrast, may not have the necessary coping resources at their disposal and so make threat appraisals that undermine performance.

We hasten to add that, for the moment at least, we have no direct measures of these process variables. Before reaching such a conclusion, therefore, future research would need to find definitive markers of the appraisal process among high and low self-monitors. For instance, recent research has illustrated that there are psychophysiological markers for challenge and threat, such that challenge is marked by the activation of the sympathetic–adrenal–medullary axis that enhances cardiac output, whereas threat is marked by the activation of the pituitary–adrenal–cortical axis that inhibits decreases in systematic vascular resistance (Blascovich, Mendes, Hunter, Lickel, & Kowai-Bell, 2001). To more fully investigate the possibility that self-monitoring affects the appraisal process, then, it would be wise for future investigators to explicitly measure cardiovascular reactivity, which, unlike self-reports, can provide on-line and unambiguous measures of psychological states (Andreassi, 2000).

Limitations and alternative explanations

Finding that self-monitoring moderates the effects of group-composition on performance comes with a number of limitations and alternative explanations for which we must account. First, although we found that low self-monitors underperform in the numerical minority, we did not find an overall main effect for group composition on performance. This is inconsistent with past research showing that those in the numerical minority underperform (e.g., Lord & Saenz, 1985; Sekaquaptewa & Thompson, 2003) and was unexpected. Even though our main predictions centered on self-monitoring, we still expected to find a main effect for group-composition.

[7] Of course, even though high self-monitors may believe themselves capable of controlling the stereotypic impressions that others make of them, they are unlikely to be successful. Decades of research have shown that person perception is shaped by the perceivers' own lenses and stereotypes and less with the actual qualities of the individual at hand. Our point here, though, is not whether high self-monitors are successful in shaping impressions or not. It is whether they *believe* they can shape impressions and *expect* to be seen stereotypically. In this regard, high self-monitors may have more positive expectations of their own impression-management abilities than low self-monitors.

One possible explanation is the small number of subjects used; that is, both studies may have suffered from low power. This is especially true of Experiment 1 where only 28 females participated. Nonetheless, our failure to replicate past results is troubling and may suggest that the threatening minority effect is less reliable than previously thought.

The lack of main effect for Experiment 2 may reflect a different phenomenon, however. It is possible that minority situations do not threaten ethnic and racial minorities the same way they threaten women; stereotype threat, after all, may operate differently for different groups (Steele et al., 2002). Given the dearth of this type of research for groups other than women, we may have wrongly assumed that minority situations result in a general underperformance for all racial and ethnic groups. As stated above, African-Americans comprise only a small part of the general population and so must regularly find themselves in the numerical minority. As a result, some people (i.e., high self-monitors) may become habituated to being outnumbered, and so inured and resilient to its effects. Exploring the generalizability of the minority underperformance effect to other groups is therefore of some import.

Second is the unanticipated finding in Experiment 1 showing that the crossover interaction between self-monitoring and group-composition was driven primarily by high self-monitors performing worse than low self-monitors in the same-group condition and less so by them outperforming low self-monitors in the numerical minority condition. Why might high self-monitoring be disadvantageous in same-group settings? One possibility is that high self-monitors are not physiologically aroused by these situations. Given their skills at monitoring situations and altering their behavior, same-sex or same-race situations may not motivate them to perform (e.g., Yerkes & Dodson, 1908). Being in the numerical minority, on the other hand, is arousing (Ben-Zeev et al., 2005) and may thus present high self-monitors with an opportunity to shine. In other words, they may find it challenging, may be extra motivated to disconfirm negative stereotypes, and given their skills at impression management, coping, and self-regulation, they may succeed. The difference between the two situations, then, might be the presence and absence of challenge. Once again, getting definite markers of challenge and threat will go a long way toward confirming (or disconfirming) these speculations.

Conclusion

Given its protective function, it is important to understand whether self-monitoring's resiliency can be cultivated. Recent theorizing points to the role of emotional self-regulation in its development: self-monitoring differences may partly emerge from differential exposure to socialization environments that tutor emotional self-control (Graziano & Bryant, 1998). Eisenberg, Fabes, Schaller, Carlo, and Miller (1991), for example, found that parents who encouraged their third grade children to control and regulate their negative emotions had children who were higher in self-monitoring. High self-monitors may therefore have social learning histories associated with issues of control, and as adults have larger pools of self-regulatory strength (Seeley & Gardner, 2003). The good news is that self-regulation can be taught, and self-control strength developed and expanded (Muraven, Baumeister, & Tice, 1999). Cultivating self-control strength, therefore, may offer a tractable way to mitigate the effects of threatening environments (see Inzlicht et al., 2005).

Past research has established that placing stigmatized students in situations where they are in contact with even one out-group member can lead them to perform below their potential. As DuBois's case shows, however, different people react to the same situation in different ways. Focusing the research spotlight on those who are threatened, in our view, has obscured the possibility that minority situations need not always result in underperformance and has distracted researchers from learning from those who succeed. The current research focused on those stigmatized people that are successful despite being outnumbered, and is encouraging because it demonstrates that at least one individual difference—in this case, self-monitoring—is associated with success and resiliency rather than failure and susceptibility (Seligman, 2002). Future investigators may be able to harness the power of this individual difference and perhaps design effective interventions that results in resiliency for all stigmatized students, and so gives reason for some optimism.

References

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park: Sage Publications.

Andreassi, J. L. (2000). *Psychophysiology: Human behavior and physiological response* (4th ed.). Mahwah, NJ: Lawrence Erlbaum Associates Inc.

Aronson, J. (2002). Stereotype threat: Contending and coping with unnerving expectations. In J. Aronson (Ed.), *Improving academic achievement: Impact of psychological factors on education*. San Diego: Academic Press.

Aronson, J., & Inzlicht, M. (2004). The ups and downs of attributional ambiguity: Stereotype vulnerability and the academic self-knowledge of African-American students. *Psychological Science, 15*, 829–836.

Aronson, J., Lustina, M. J., Good, C., Keough, K., Steele, C. M., & Brown, J. (1999). When white men can't do math: Necessary and sufficient factors in stereotype threat. *Journal of Experimental Social Psychology, 35*, 29–46.

Aronson, J., & Steele, C. M. (2005). Stereotypes and the fragility of human competence, motivation, and self-concept. In C. Dweck & E. Elliot (Eds.), *Handbook of competence and motivation*. New York: Guilford.

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.

Baumeister, R. F. (1984). Choking under pressure: Self-consciousness and paradoxical effects of incentives on skillful performance. *Journal of Personality and Social Psychology, 46*, 610–620.

Ben-Zeev, T., Fein, S., & Inzlicht, M. (2005). Does arousal mediate stereotype threat? *Journal of Experimental Social Psychology, 41*, 174–181.

Blascovich, J., Mendes, W. B., Hunter, S. B., Lickel, B., & Kowai-Bell, N. (2001). Perceiver threat in social interactions with stigmatized others. *Journal of Personality and Social Psychology, 80*, 253–267.

Blascovich, J., Spencer, S. J., Quinn, D. M., & Steele, C. M. (2001). African Americans and high blood pressure: The role of stereotype threat. *Psychological Science, 12*, 225–229.

Briggs, S. R., & Cheek, J. M. (1988). On the nature of self-monitoring: Problems with assessment, problems with validity. *Journal of Personality and Social Psychology, 54*, 663–678.

Briggs, S. R., Cheek, J. M., & Buss, A. H. (1980). An analysis of the Self-Monitoring Scale. *Journal of Personality and Social Psychology, 38*, 679–686.

Brown, R. P. (2000). *The importance of importance: Factor-analytic conclusions about domain identification*. Unpublished Manuscript, University of Oklahoma.

Brown, R. P., & Pinel, E. C. (2003). Stigma on my mind: Individual differences in the experience of stereotype threat. *Journal of Experimental Social Psychology, 39*, 626–633.

Cohen, L. L., & Swim, J. K. (1995). The differential impact of gender ratios on women and men: Tokenism, self-confidence, and expectations. *Personality and Social Psychology Bulletin, 21*, 876–884.

Danheiser, P. R., & Graziano, W. G. (1982). Self-monitoring and cooperation as a self-presentational strategy. *Journal of Personality and Social Psychology, 42*, 497–505.

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.

Devine, P. (1989). Stereotypes and prejudice: Their automatic and controlled components. *Journal of Personality and Social Psychology, 56*, 5–18.

DuBois, W. E. B. (1944/1991). What the Negro wants? In H. L. Gates Jr. (Ed.), *Bearing witness: Selections from African-American autobiography in the twentieth century* (pp. 103–114). New York: Pantheon Books.

Educational Testing Service (1994). *GRE: Practicing to take the general test* (9th ed.). Princeton, NJ: Author.

Eisenberg, N., Fabes, R., Schaller, M., Carlo, G., & Miller, P. A. (1991). The relation of parental characteristics and practices to children's vicarious emotional responding. *Child Development, 62*, 1393–1408.

Fuegen, K., & Biernat, M. (2002). Reexamining the effects of solo status for women and men. *Personality and Social Psychology Bulletin, 28*, 913–925.

Gangestad, S. W., & Snyder, M. (2000). Self-monitoring: Appraisal and reappraisal. *Psychological Bulletin, 126*, 530–555.

Gilbert, D. T., & Hixon, J. G. (1991). The trouble of thinking: Activation and application of stereotypic beliefs. *Journal of Personality and Social Psychology, 60*, 509–517.

Graziano, W. G., & Bryant, W. H. M. (1998). Self-monitoring and the self-attribution of positive emotions. *Journal of Personality and Social Psychology, 74*, 250–261.

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.

Inzlicht, M., & Ben-Zeev, T. (2003). Do high-achieving female students underperform in private? The implications of threatening environments on intellectual processing. *Journal of Educational Psychology, 95*.

Inzlicht, M., & Good, C. (in press). How environments threaten academic performance, self-knowledge, and sense of belonging. In S. Levin & C. van Laar (Eds.), *Stigma and group inequality: Social psychological approaches*. Mahwah, NJ: Erlbaum.

Inzlicht, M., McKay, L., & Aronson, J. (2005). Stigma as ego-depletion: How being the target of prejudice affects self-control. Manuscript under Review.

Kanter, R. M. (1977). *Men and women of the corporation*. New York: Basic Books.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer.

Lord, C. G., & Saenz, D. S. (1985). Memory deficits and memory surfeits: Differential cognitive consequences of tokenism for tokens and observer. *Journal of Personality and Social Psychology, 49*, 918–926.

Major, B., Quinton, W. J., & McCoy, S. K. (2002). Antecedents and consequences of attributions to discrimination: Theoretical and empirical advances. In M. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 34, pp. 251–330). San Diego: Academic Press.

McGuire, W. J., McGuire, C. V., & Winton, W. (1979). Effects of household sex composition on the salience of one's gender in the spontaneous self-concept. *Journal of Experimental Social Psychology, 15*, 77–90.

McGuire, W. J., & Padawer-Singer, A. (1976). Trait salience in the spontaneous self-concept. *Journal of Personality and Social Psychology, 33*, 743–754.

McClelland, G. H. (2000). Nasty data: Unruly, ill-mannered observations can ruin your analysis. In H. T. Reis & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology*. Cambridge, UK: Cambridge University Press.

Miller, M. L., Omens, R. S., & Delvadia, R. (1991). Dimensions of social competence: Personality and coping style correlates. *Personality and Individual Differences, 12*, 955–964.

Muller, D., Judd, C. M., & Yzerbyt, V. (2004). *When mediation is moderated and moderation is mediated*. Unpublished manuscript, University of Colorado.

Muraven, M., & Baumeister, R. F. (2000). Self-regulation and depletion of limited resources: Does self-control resemble a muscle? *Psychological Bulletin, 126*, 247–259.

Muraven, M., Baumeister, R. F., & Tice, D. M. (1999). Longitudinal Improvement of self-regulation through practice: Building self-control strength through repeated exercise. *The Journal of Social Psychology, 139*, 446–457.

Niemann, Y. F., & Dovidio, J. F. (1998). Relationship of solo status, academic rank, and perceived distinctiveness to job satisfaction or racial/ethnic minorities. *Journal of Applied Psychology, 83*, 55–71.

Neter, J., Kutner, M. H., Nachtsheim, C. J., & Wasserman, W. (1996). *Applied linear regression models* (3rd ed.). Chicago: Irwin Book Team.

O'Brien, L. T., & Crandall, C. S. (2003). Stereotype threat and arousal: Effects on women's math performance. *Personality and Social Psychology Bulletin, 29*, 782–789.

Ott, E. M. (1989). Effects of the male-female ratio at work. *Psychology of Women Quarterly, 13*, 41–57.

Pollak, K. I., & Niemann, Y. F. (1998). Black and white tokens in academia: A difference of chronic versus acute distinctiveness. *Journal of Applied Social Psychology, 28*, 954–972.

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

Sackett, P. R., DuBois, C. L. Z., & Noe, A. W. (1991). Tokenism in performance evaluation: The effects of work group representation on male–female and White–Black differences in performance ratings. *Journal of Applied Psychology, 76*, 263–267.

Saenz, D. S., & Lord, C. G. (1989). Reversing roles: A cognitive strategy for undoing memory deficits associated with token status. *Journal of Personality and Social Psychology, 56*, 698–708.

Schmader, T. (2002). Gender identification moderates stereotype threat effects on women's math performance. *Journal of Experimental Social Psychology, 38*, 194–201.

Seeley, E. A., & Gardner, W. L. (2003). The "selfless" and self-regulation: The role of chronic other-orientation in averting self-regulatory depletion. *Self and Identity, 2*, 1–15.

Sekaquaptewa, D., & Thompson, M. (2002). The differential effects of solo status on members of high and low-status groups. *Personality and Social Psychology Bulletin, 28*, 694–707.

Sekaquaptewa, D., & Thompson, M. (2003). Solo status, stereotype threat, and performance expectancies: Their effects on women's performance. *Journal of Experimental Social Psychology, 39*, 68–74.

Seligman, M. E. P. (2002). Positive psychology, positive prevention, and positive therapy. In C. R. Snyder & S. Lopez (Eds.), *Handbook of positive psychology* (pp. 3–12). Oxford, UK: Oxford University Press.

Shepperd, J. A. (1993). Student derogation of the scholastic aptitude test: Biases in perceptions and presentations of college board scores. *Basic and Applied Social Psychology, 14*, 455–473.

Snyder, M. (1974). The self-monitoring of expressive behavior. *Journal of Personality and Social Psychology, 30*, 526–537.

Snyder, M. (1987). *Public appearances/public realities: The psychology of self-monitoring*. New York: Freeman.

Snyder, M., & Gangestad, S. (1986). On the nature of self-monitoring: Matters of assessment, matters of validity. *Journal of Personality and Social Psychology, 51*, 125–139.

Snyder, M., & Monson, T. C. (1975). Persons, situations, and the control of social behavior. *Journal of Personality and Social Psychology, 32*, 632–637.

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

Steele, C. M. (1997). A threat in the air. How stereotypes shape intellectual identity and performance. *American Psychologist, 52*, 613–629.

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.

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

Thompson, M., & Sekaquaptewa, D. (2002). When being different is detrimental: Solo status and the performance of women and racial minorities. *Analyses of Social Issues and Public Policy, 2*, 183–203.

Tomaka, J., Blascovich, J., Kelsey, R. M., & Leitten, C. L. (1993). Subjective, physiological, and behavioral effects of threat and challenge appraisal. *Journal of Personality and Social Psychology, 65*, 248–260.

US Census Bureau (2001). Population by race and hispanic or latino origin for the United States: 1990 and 2000. *United States Census 2000*. Washington, DC: Author.

Vorauer, J. D., Main, K. J., & O'Connell, G. B. (1998). How do individuals expect to be viewed by members of lower status groups? Content and implications of meta-stereotypes. *Journal of Personality and Social Psychology, 75*, 917–937.

Williams, C. L. (1992). The glass escalator: Hidden advantages for men in the "female" professions. *Social Problems, 39*, 253–267.

Yerkes, R. M., & Dodson, J. D. (1908). The relationship of strength of stimulus to rapidity of habit-formation. *Journal of Comparative Neurology of Psychology, 18*, 459–482.

Yoder, J. D., Aniakudo, P., & Berendsen, L. (1996). Looking beyond gender: The effects of racial differences on tokenism perceptions of women. *Sex Roles, 35*, 389–400.

Yzerbyt, V. Y., Muller, D., & Judd, C. M. (2004). Adjusting researchers' approach to adjustment: On the use of covariates when testing interactions. *Journal of Experimental Social Psychology, 40*, 424–431.