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A Question of Belonging: Race, Social Fit, and Achievement

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Stigmatization can give rise to *belonging uncertainty*. In this state, people are sensitive to information diagnostic of the quality of their social connections. Two experiments tested how belonging uncertainty undermines the motivation and achievement of people whose group is negatively characterized in academic settings. In Experiment 1, students were led to believe that they might have few friends in an intellectual domain. Whereas White students were unaffected, Black students (stigmatized in academics) displayed a drop in their sense of belonging and potential. In Experiment 2, an intervention that mitigated doubts about social belonging in college raised the academic achievement (e.g., college grades) of Black students but not of White students. Implications for theories of achievement motivation and intervention are discussed.

Keywords: attributional retraining, academic achievement, social identity, stereotype threat, stigma or race

The need for *social belonging*—for seeing oneself as socially connected—is a basic human motivation (Baumeister & Leary, 1995; see also MacDonald & Leary, 2005). Indeed, a sense of social connectedness predicts favorable outcomes. Perceived availability of social support buffers mental and physical health (Bolger, Zuckerman, & Kessler, 2000; Spiegel, Bloom, Kraemer, & Gottheil, 1989), and feeling respected in the workplace predicts compliance with authority figures (Tyler & Blader, 2003; see also Baumeister, Twenge, & Nuss, 2002). In domains of achievement, we suggest, people are sensitive to the quality of their social bonds. In this article, we examine whether such sensitivity is heightened among people whose group is negatively characterized in a domain (Cohen & Steele, 2002; Steele, 1997; Steele, Spencer, & Aronson, 2002). We suggest that, in academic and professional settings, members of socially stigmatized groups are more uncertain of the quality of their social bonds and thus more sensitive to issues of social belonging. We call this state *belonging uncertainty*, and suggest that it contributes to racial disparities in achievement.

Predominant theories of achievement motivation emphasize needs for autonomy and self-efficacy (Deci & Ryan, 1985). By contrast, the present research emphasizes the mediating role of a sense of social connectedness (see also Furrer & Skinner, 2003; Goodenow, 1992; Ryan & Deci, 2000; Walton & Cohen, 2006). Previous research, much of it correlational, hints at its importance. Academically, at-risk students who participate in an extracurricular activity with friends—facilitating their social integration in school—are less likely to drop out of school (Mahoney & Cairns, 1997). People who have a trusting relationship with a teacher or mentor are better able to take advantage of critical feedback and other opportunities to learn (Brown & Campione, 1998; Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000; Cohen & Steele, 2002).

If social belonging is important to intellectual achievement, members of historically excluded ethnic groups may suffer a disadvantage. When Black Americans, Latino Americans, and Native Americans look at schools and workplaces in the United States, they see places in which members of their group are numerically under-represented (especially in positions of authority; Census Bureau, 2003), encounter overt and subtle forms of prejudice (Dovidio & Gaertner, 2000; Greenwald & Banaji, 1995; Harber, 1998; see also Uhlmann & Cohen, 2005), and receive lower grades and salaries (Grodsky & Pager, 2001; Steele, 1997). They see same-race peers who feel alienated on college campuses (Loo & Rolison, 1986) and who are cut off from the "insider" contacts and social capital that White students enjoy (Steinhorn & Diggs-Brown, 1999). They may perceive that some fellow group members succeed in mainstream institutions by downplaying their group identity (Cohen & Garcia, 2005; Pronin, Steele, & Ross,

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2004). Given this context, it is understandable and even adaptive for minority group members to be sensitive to the real and potential quality of their social relationships. This state of belonging uncertainty can prove especially pernicious, because it can manifest neither as perceived bias nor as a fear of being stereotyped—concerns tied to specific individuals (e.g., people who are plausibly racist) and evaluative contexts (e.g., performance examinations). Rather, belonging uncertainty may take the form of a broad-based hypothesis that "people like me do not belong here."

This uncertainty may be compounded by the psychological consequences of stigmatization. People targeted by negative stereotypes sometimes experience *attributional ambiguity*—mistrust of the motives behind other people's treatment of them (Crocker, Voelkl, Testa, & Major, 1991; see also Cohen, Steele, & Ross, 1999). In evaluative contexts, such individuals may experience *stereotype threat*—the fear of confirming a negative stereotype about the intelligence of their group (Aronson, 2002; Steele, 1997). Additionally, they may expect to be socially rejected on the basis of their race (Mendoza-Denton, Downey, Purdie, Davis, & Pietrzak, 2002; Shelton & Richeson, 2005). Finally, given the underrepresentation of their race in academic and professional settings, minority group members may suspect that they would not "fit in" in these settings—a perception that can increase stress and dissatisfaction (Lovelace & Rosen, 1996). Although different, these mechanisms can congeal to produce a global uncertainty about the actual and potential quality of one's social bonds.

Belonging uncertainty may take the form not of a *belief* but a *hypothesis*. In line with Darley and Gross's (1983) research on expectancy effects, this hypothesis guides perception and interpretation. Evidence consistent with the hypothesis "I do not belong" stands out in perception and serves as confirmation of the hypothesis. Evidence inconsistent with the hypothesis is viewed with skepticism. Insofar as people attribute hypothesis-consistent events (e.g., having few friends on campus) to factors linked to their racial identity (e.g., "my race is not welcome here"), they may believe that such events reflect a fixed rather than transitory problem (see Branscombe, Schmitt, & Harvey, 1999). Additionally, to minimize ambiguity, people in a state of belonging uncertainty may seek out hypothesis-relevant information (Festinger, 1954; Weary & Jacobson, 1997) and notice threatening cues that they would otherwise have overlooked (Kleck & Strenta, 1980; Mendoza-Denton et al., 2002).

Belonging uncertainty is a global concern about the quality of one's social ties, more general than attributional ambiguity (Crocker et al., 1991) and stereotype threat (Steele, 1997). As such, it can manifest in the absence of negative feedback (a trigger for perceived bias) or an evaluative test (a trigger for stereotype threat). All that is required is an event that implies a lack of social connectedness. Accordingly, the event predicted to trigger a detrimental response in our pilot study and in Experiment 1 was a threat to individuals' social connectedness.

Overview of Studies

Experiment 1 led students to believe that they might have few friends in a field of study. Students were either asked to generate eight friends who fit in well in the field or asked to generate two such friends (see Schwarz et al., 1991). We expected that generating eight friends would be difficult and would cause participants to question their social connectedness to the field. To the extent that minority students are more sensitive than majority students to issues of social belonging, they should suffer larger decrements in motivation and, more generally, in the sense that they could fit in and succeed in the field. Previous research supports the validity of this manipulation. People who feel insecure in a domain are more sensitive to meta-cognitive information (e.g., the cognitive availability of information relevant to their insecurity; Tormala, Petty, & Briñol, 2002). For instance, people high (but not low) in self-doubt evaluate themselves more negatively when they are asked to list many (rather than few) examples of their personal confidence (Hermann, Leonardelli, & Arkin, 2002). Given the subtle nature of our manipulation, an effect would reflect heightened sensitivity to issues of social belonging.

Experiment 2 tested an intervention aimed at mitigating belonging uncertainty. It examined whether normalizing doubts about social belonging would improve minority students' academic motivation and achievement. First-year college students were led to believe that doubts about belonging in school were unique neither to them nor to members of their racial group, but rather were common to all students regardless of race (see Steele, 1997). They were further told that these doubts lessen with time. This treatment was expected to lead minority students to view doubts about social belonging as non-diagnostic of a fixed problem linked to their racial identity. Relative to minority students in a control condition, they were expected to display higher levels of motivation, especially on days of high social adversity, and higher levels of achievement. White students, being non-stigmatized in academic settings, were expected to benefit from the intervention less.

Both studies examined whether a threat to social belonging—either in the form of an experimental manipulation (Experiment 1) or in the form of naturally-occurring social adversity (Experiment 2)—predicts greater motivational decrements for ethnic minority students than for ethnic majority students. Experiment 2 further tested whether experimentally altering people's subjective construal of naturally occurring social adversity—in particular, leading them to see such adversity as less of a threat to their social belonging—would buffer ethnic minority students' academic motivation and performance.

Pilot Study

Our pilot study and Experiment 1 examined belonging uncertainty in the context of computer science. Black Americans make up only 4% of computer scientists, Latino Americans only 2% (National Science Foundation, 1998), and members of both groups face negative stereotypes about their intellectual ability (Aronson, 2002; Steele, 1997). We predicted that such stigmatized individuals would respond more negatively than non-stigmatized students (White and Asian students) to evidence that they had few friends in computer science.

Participants (26 Black and Latino students, 51 White and Asian students) were either asked to generate eight friends who had "personal characteristics . . . that might make them likely to fit in well at [school name's] Computer Science Department" or asked to generate two such friends. Because our pretesting had found that students (n = 25) could generate an average of 3.44 such friends (SD = 1.95), we expected participants to find it difficult to generate eight friends, easy to generate two. Because similarity increases liking (Byrne, 1997), we strengthened the manipulation by asking participants to generate six similarities that they shared with each friend in the "list eight friends" condition and to generate two such similarities in the "list two friends" condition. Participants then completed dependent measures assessing relevant motivational outcomes—that is, their personal sense that they could fit in and succeed in the field in question. (The measures and cover story are described in detail in Study 1.)

Participants in the "list eight friends" condition reported greater difficulty in generating the requisite number of friends and similarities than did participants in the "list two friends" condition, $F(1, 73) = 22.67$, $p < .001$, and $F(1, 73) = 27.29$, $p < .001$, respectively. These effects did not vary by student race (Fs $<$ 1.25). What did vary by student race was the motivational consequence of the two tasks. An analysis of covariance (ANCOVA; with students' SAT score and the number of computer science courses taken serving as covariates) yielded a Race × Condition interaction, $F(1, 72) = 5.56$, $p = .021$. Minority students' sense that they could fit and succeed in computer science was lower in the "list eight friends" condition (adjusted M [M_{adj}] = −0.28) than in the "list two friends" condition ($M_{\text{adj}} = 0.47$), $t(72) = 2.02$, $p = .047$, $d = .78$. Consistent with our predictions, non-minority students displayed no effect of condition ($M_{\text{adjs}} = 0.07, -0.25$, respectively; $t < 1.25$).[1] (In all studies, effect sizes [d] were calculated using the mean-square error term from the ANCOVA, which represents the residual within-cell variability.)

Experiment 1

Experiment 1 purified the manipulation. Only the number of friends generated was manipulated. Additionally, a control condition was included to rule out the possibility that the easy, "list two friends" condition improved motivation.

Also included were measures to assess concerns linked to students' social (i.e., racial) identity. We assessed whether minority students in the "list eight friends" condition thought more about race and whether they discouraged a same-race peer from entering computer science. Measures assessing stereotype-based concern were also included—stereotype activation, self-doubt activation, and self-reported stereotype threat (Steele, 1997).

Method

Participants

Thirty-six Black and 34 White undergraduates attending a private Northeastern university participated in exchange for course credit or $7. One Black participant was excluded for failing to follow instructions (asked to list two friends, she listed six). The final sample included 29 men and 40 women.

Experimental Manipulation

As in the pilot study, participants either generated eight friends who would fit in well in the computer science department or generated two such friends. In addition, one third of Black participants were assigned to a control condition that required no friends to be generated. No White students were assigned to this new control condition, because its purpose was to disentangle the directionality of the condition effect documented in the pilot study, and that condition effect had been found only among minority students.

Procedure

Participants were told that the study concerned impressions of the computer science department. To buttress this cover story, we asked them to read a fabricated news report about the department "to ensure everyone has some background knowledge." Next they completed the manipulation, generating eight friends, two friends, or no friends who would fit in well in the computer science department. We recorded the time participants spent completing this task. Dependent measures, a manipulation check assessing the difficulty they had generating the requisite number of friends (1 = *not at all difficult,* 7 = *very difficult*) and a mood item (1 = *very negative,* 7 = *very positive*) followed. Two potential covariates were assessed—SAT score and the number of computer science classes taken.[2]

Measures

Sense of academic fit. Students completed several measures assessing their sense of fit in computer science. The measures, drawn from prior research, were defined a priori and tapped established motivational constructs. First, a 17-item inventory assessed students' sense of *social fit* in the department (e.g., "People in [the] computer science department like me"; "I [would] feel comfortable in [the] computer science department"; "People in [the] computer science department are a lot like me"; "I belong in [the] computer science department"; 1 = *strongly disagree*, 5 = *strongly agree*; for a validation study, see Walton & Cohen, 2005), α = .89. Also assessed were 2 items asking participants to rate their social fit "compared with most other students," α = .67. Students also completed 1 item assessing how much they *enjoyed* using computers (1 = *not at all,* 7 = *very much*; McAuley, Duncan, & Tammen, 1989), 3 items assessing *self-*

[1] Like ethnic minorities, women are underrepresented and negatively stereotyped in quantitative fields (Steele, 1997), but women showed no heightened responsiveness to the manipulation. No Gender × Condition interaction was found in the pilot study or in Experiment 1 ($Fs < 1$). One factor that may alleviate belonging uncertainty for women is that they contend with a stereotype targeted at their quantitative ability, not their social worth (e.g., women are stereotyped as "nice;" Glick & Fiske, 2001). This may buttress a sense of belonging even in quantitative fields but create uncertainty about one's quantitative ability (see Ehrlinger & Dunning, 2003; Tashakkori & Thompson, 1991). We tested this idea by re-running Experiment 1 with one critical modification: Instead of listing friends in computer science, participants (21 women, 18 men) listed either *two skills* or *eight skills* they had in this domain. As predicted, there was a Gender × Condition interaction, $F(1, 35) = 4.31$, $p = .045$. Women rated their fit lower after listing eight skills ($M_{\text{adj}} = -0.89$) than after listing two skills ($M_{\text{adj}} = -0.09$), $t(35) = 2.28$, $p = .029$, $d = .86$. Men were unaffected by condition ($M_{\text{adjs}} = 0.54, 0.27$, respectively; $t < 1$).

[2] Participants also took a brief test of "computer science ability" following some of the fit measures. No main or interaction effects involving race or condition were found (Fs < 1.50, ps $> .20$). (No differential impact of the manipulation was found on outcomes that preceded versus followed the test, Fs < 1.50, ps $> .20$.) One reason for the null effect on test performance involves the relative insensitivity of this measure to differences in the expenditure of effort and challenge-seeking. Participants were required to complete the test and were given the same amount of time to do so. After conducting this study, we suspected that a low sense of social belonging might discourage interest in the domain of study and deter people from pursuing academic challenges that carry a risk of rejection based on their social identity. This notion motivated the selection of achievement measures used in Experiment 2. In a sense, though, the test performance finding suggests the psychological potency of belonging uncertainty. When led to doubt their social connectedness to a field, minority students continued to perform at a high level, but nevertheless doubted whether they could fit and succeed there.

efficacy (e.g., "I am skilled at computer science"; 1 = *strongly disagree,* 7 = *strongly agree*; McAuley et al., 1989), α = .71, and 3 items assessing *identification* (e.g., "It is important to me to be good at computer science"; 1 = *strongly disagree,* 7 = *strongly agree*; Spencer, Steele, & Quinn, 1999), α = .57. They also completed 1 item asking them to rate their global "*potential* . . . to succeed in the computer science department" on a percentile scale (10% = *more computer science potential than 10% of students*, 90% = *more potential than 90% of students*).

These measures were assumed to tap different facets of an overall sense of fit in computer science. However, in a factor analysis, using varimax rotation, the enjoyment of computers measure failed to load on the first factor (<.45). After removing this item, all measures loaded on the first factor (≥.75), which accounted for 67% of the variance in the outcome (*eigenvalue* = 3.33). No other factor yielded an *eigenvalue* greater than 1. Each measure was standardized and averaged into a composite index, α = .87. Higher values represent greater self-perceived fit.[3]

Academic advising task. Next, participants were given profiles of three 1st-year students ostensibly attending their school—a Black man, a White man, and a White woman. Each profile included a photograph (to indicate race) and a description of the target person's interest in computer science and in another field (history, biology, or music). The pairing of the photographs and the descriptions was counterbalanced. Participants were told that each student had enrolled in a peer-advising program and had requested advice from other students about which course of study they should pursue. Participants were asked to provide their advice in a written note. Two coders, unaware of participants' condition and race, independently assessed whether each note encouraged or discouraged the target person to pursue computer science. Coders agreed on 87% of initial ratings. Discrepancies were resolved through discussion.

Activation of race-related cognitions. As in previous research (Cohen & Garcia, 2005; Steele & Aronson, 1995), activation of race-related cognitions was measured using a word-fragment completion task. Participants completed 40 word fragments (e.g., _ _ _ CK). Ten fragments could be completed with either a race-relevant word (e.g., *BLACK*) or a race-irrelevant word (e.g., *STACK*). The total number of race-relevant words generated served as the outcome. In contrast to previous research, we disentangled race activation from stereotype activation, on the assumption that people can think about their social identity without thinking about the negative stereotype targeted at it. Our measure of *race activation* encompassed words neutral in valence and relevant to race (*Black*, *color*, *race*, *soul*). Our measure of *stereotype activation* encompassed words negative in valence and relevant to the stereotype (*bias*, *class*, *lazy*, *poor*, *riot*, *welfare*).

We included two other measures of stereotype-based threat. As stereotype threat can activate self-doubt (Steele & Aronson, 1995), *self-doubt activation* was assessed, by including additional items on the word-fragment completion task (*dumb*, *inferior*, *loser*, *shame*, *weak*). *Self-perceived stereotype threat* was assessed with five self-report items (e.g., "In computer science . . . I would worry that people would draw conclusions about my racial group based on my performance"; 1 = *strongly disagree,* 7 = *strongly agree*; see Cohen & Garcia, 2005), α = .91. Because these items could prime racial stereotypes and thus contaminate responses to the primary outcome, we administered them at the end of the study (following the academic-advising task).

Results

Preliminary Data Analytic Issues

No outliers were observed (defined, for our sample size, as values 2.50 standard deviations from the grand mean and 2.25 standard deviations from the relevant cell mean; Van Selst & Jolicoeur, 1994). The fit composite was submitted to a 2 (participant race: Black or White) × 2 (condition: list eight friends or list two friends) ANCOVA. Only SAT score proved a significant covariate. Main effects and interactions involving gender were also tested. Only the main effect proved significant—women displayed lower fit ($M_{adj} = -0.37$) than men ($M_{adj} = 0.38$), $F(1, 52) = 12.79$, $p < .001$. We used focused contrasts to compare Black students' sense of fit in the "list no friends" condition with their sense of fit in each of the two other conditions. Because some participants failed to complete all measures, degrees of freedom vary slightly for different analyses.

Manipulation Checks

Generating eight friends was rated as more difficult ($M = 4.14$) than generating two friends ($M = 2.02$), $F(1, 54) = 26.58$, $p < .001$. It also took longer (*Ms* = 3 min 16 s vs. 0 min 52 s), $F(1, 53) = 80.08$, $p < .001$. Black and White students responded similarly to each manipulation check. Neither the main effect of race nor the Race × Condition interaction was significant on either measure (*F*s < 1).

Sense of Fit in Computer Science

Replicating the pilot study, Experiment 1 yielded a Race × Condition interaction, $F(1, 52) = 4.16$, $p = .046$. Black students had a lower sense of fit after they had generated eight friends in computer science ($M_{adj} = -0.28$) than after they had generated two such friends ($M_{adj} = 0.34$), $t(52) = 2.07$, $p = .043$, $d = .85$. White students displayed no effect of condition ($M_{adjs} = -0.02, -0.23$, respectively; $t < 1$).

As expected, Black students' sense of fit in the "list no friends" control condition ($M_{adj} = 0.35$) did not differ from their sense of fit in the "list two friends" condition ($t < 1$). However, it was higher than Black students' sense of fit in the "list eight friends" condition, $t(62) = 1.97$, $p = .053$, $d = .82$. There was thus no evidence that the "list two friends" condition enhanced Black students' sense of fit. Rather, the "list eight friends" condition undermined it.[4]

[3] In the interest of brevity, we do not report results along individual measures. There was no consistent pattern in which measures showed the effect most strongly across studies. Additionally, the direction of the effect among minority students was in the predicted direction for every measure in every study. Multivariate analyses of variance indicated that in no study did the Race × Condition interaction vary by measure (*F*s < 1.90, *p*s > .13).

[4] The rated difficulty of generating friends should mediate the effect of condition on minority students' sense of fit. However, three factors limited our ability to test this mediational account statistically. First, common statistical tests of mediation have low power with small sample sizes (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2004). Second, because the manipulation was highly correlated with the mediator ($r = .64$, $p = .001$), collinearity could undermine the analysis (estimated coefficients for highly correlated predictors are unstable, Mosteller & Tukey, 1977). Third, the reliability and validity of the mediational measure may have been weakened by (a) social desirability pressures (e.g., participants may have been unwilling to admit high levels of difficulty generating friends), (b) the fact that it was assessed with a single item, and (c) its placement after several outcomes rather than immediately following the manipulation. We combined data from the pilot study and Experiment 1 to increase

An intuitive barometer of the manipulation's impact can be found in students' global assessment of their potential (relative to their peers) to succeed in computer science. The relevant means are displayed in Figure 1. The Race × Condition interaction was significant, $F(1, 53) = 9.18$, $p = .004$. Whereas Black students rated their potential as average in the "list two friends" condition and in the "list no friends" condition, they rated it as far worse than average in the "list eight friends" condition, $t(53) = 3.57$, $p < .001$, $d = 1.46$, and $t(63) = 2.63$, $p = .011$, $d = 1.10$, respectively. White students displayed no effect of condition ($t < 1$).[5]

Academic Advice Proffered to Black Peer

Because Black students in the "list no friends" condition and Black students in the "list two friends" condition did not differ along our primary outcome, we combined these conditions to maximize statistical power in the secondary analyses reported below. In none of these analyses did Black students in the two control conditions differ (ts and χ^2s < 1).

Black students in the "list eight friends" condition not only felt discouraged from pursuing computer science, they also discouraged a same-race peer from doing so. A logistic regression yielded a marginal Race × Condition interaction ($\Delta\chi^2 = 3.47$, $p = .062$). Fewer Black students encouraged the Black peer to pursue computer science in the "list eight friends" condition (30% did so) than in the control conditions (77% did so; $\Delta\chi^2 = 9.23$, $p = .002$). White students showed no effect of condition (80% and 86%, respectively; $\Delta\chi^2 < 1$). For neither racial group did condition affect participants' likelihood of encouraging the White target persons to pursue computer science (ts < 1).[6]

Race-Related Cognitions

There was a main effect of condition, $F(1, 65) = 6.03$, $p = .017$. Black students displayed higher race activation in the "list eight friends" condition ($M_{adj} = 1.27$) than in the control conditions ($M_{adj} = 0.70$), $t(65) = 2.21$, $p = .031$. Although the Race × Condition interaction was non-significant ($F < 1$), this was because White students displayed a weak trend in the same direction ($M_{adjs} = 0.75$, 0.41, respectively), $t(65) = 1.25$, $p = .22$.

Although the manipulation increased the salience of Black students' social identity, it did not increase the salience of the stereotype targeted at it. No effect was found on stereotype activation, self-doubt activation, or self-reported stereotype threat (Fs < 1).

Alternative Explanations

Perhaps the manipulation induced negative affect. However, no effect was observed on self-reported mood (Fs < 1.15). Alternatively, perhaps minority students listed more non-minority friends in the "list eight friends" condition than in the "list two friends" condition, making their minority status salient. To examine this possibility, we asked participants at the study's end to indicate the ethnicity of each friend they had listed. The proportion of non-minority friends that Black students had listed did not vary by condition (list eight friends: $M = 68\%$; list two friends: $M = 83\%$; $t < 1.25$). Additionally, Black students who had listed more non-minority friends did not report lower fit, overall or within either condition (rs $< |.20|$, *ns*).

Discussion

In Experiment 1, minority and majority students found it difficult to generate eight friends who fit in well in a field of study. But only minority students responded with decrements in their sense of fit and potential. These results support the claim that members of minority groups are uncertain about the quality of their social bonds in achievement settings. As a result, subtle events that confirm a lack of social connectedness have disproportionately large impacts. They may do so even in the absence of prejudice, fears of confirming the stereotype, or an anticipated intellectual evaluation (Purdie-Vaughns, Steele, Davies, & Randall-Crosby, 2004). These results are consistent with correlational evidence that

statistical power (the two experiments did not differ in terms of the relationship between the mediator and the outcome, $F < 1$; 1 minority participant from the pilot study was excluded from analyses because her sense of fit was 2.48 standard deviations below its estimated value based on her difficulty rating). Controlling for the mediator eliminated the condition effect on minority students' level of fit, $t(46) = 1.09$, $p = .28$. As assessed by the Sobel test, this reduction was a statistical trend, $Z = 1.31$, $p = .19$. However, even with this combined sample size, this test has low power (36% chance of detecting a medium-size effect, 0.6% chance of detecting a small one). Accordingly, we conducted a second test described by MacKinnon et al. (2004) that has greater power (90% chance of detecting a medium-size effect, 21% chance of detecting a small one), albeit a correspondingly higher Type I error rate (29% vs. 1% for the Sobel test). This test was significant, $Z' = 1.31$, $p < .05$. For a relevant discussion of the merits and shortcomings of statistical tests of mediation, see Spencer, Zanna, and Fong (2005).

[5] An interesting pattern emerged in the "list two friends" condition. Black students reported *higher* levels of fit than White students, $t(52) = 2.06$, $p = .045$. Additional data suggest that this race difference at baseline is valid and not the result of experimental artifact. It was not the case, for example, that the friend-listing tasks artificially depressed White students' fit. A second group of undergraduates (105 Whites, 18 Blacks), who had been exposed to no manipulation, showed the race difference favoring Black students, $t(184) = 2.20$, $p = .029$. As expected, White students in this new sample displayed a level of fit that did not differ from that of White students in either experimental condition (ts < 1). As further expected, Black students in this new sample displayed a marginally higher sense of fit than did Black students in the "list eight friends" condition, $t(184) = 1.66$, $p = .098$, and did not differ from Black students in the two control conditions (ts < 1). These comparisons should be viewed tentatively, as students were not randomly assigned to the baseline sample. But they provide further evidence that even when minority students' level of motivation is relatively high, it may nevertheless prove more fragile (Aronson & Inzlicht, 2004; Cohen et al., 1999).

[6] Participants also evaluated each target's suitability for computer science along eight scale items (e.g., "Do you think this student would fit in well in computer science?"; 1 = *fit in not at all well,* 7 = *fit in extremely well*), αs $> .88$. No effect was found on a composite index (Fs < 1). Several processes may account for the discrepancy with the results obtained for participants' written notes—(a) participants may have been more motivated to provide clear feedback in a note to a fellow student than in rating scales for researchers; (b) Black students may have avoided assigning low numerical assessments to a same-race peer, as doing so could reinforce the racial stereotype, but been willing to provide "practical advice" discouraging that peer from entering the field; and (c) scale-referencing effects may have obscured effects along the rating scales, with the Black peer in the "list eight friends" condition viewed as fitting in well in computer science "for a Black student" (Biernat, 2003).

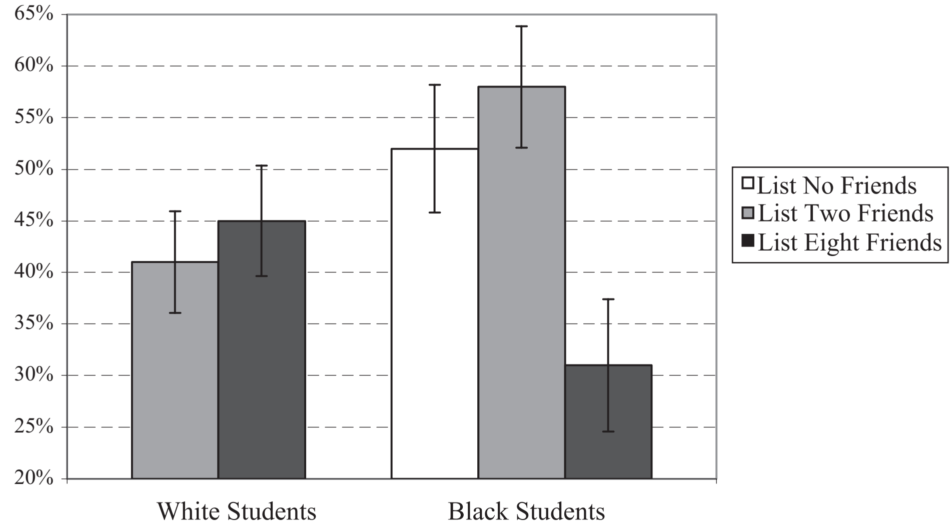

Figure 1. Experiment 1: Self-perceived potential to succeed in computer science. Means represent students' percentile estimates of their potential relative to their peers. No White students were assigned to the "list no friends" condition. Error bars represent + 1/−1 standard errors.

social isolation in school is more strongly associated with low academic interest for ethnic minority students than for ethnic majority students (Zirkel, 2004).

Results involving cognitions and concerns linked to participants' social identity proved informative. Consistent with our theoretical analysis, minority students led to believe that they had few friends in a field subsequently thought more about their race and discouraged a same-race peer from entering that field. But they did not evidence thoughts or concerns pertaining to the racial stereotype. These results suggest that belonging uncertainty need not involve a fear of being stereotyped or subjected to racial bias. Rather, it can take the form of a broader concern that "people in my group do not belong." Future research could profitably zero in on underlying mechanisms by recruiting a larger sample to provide greater statistical power, and by using more precisely timed and reliable mediating measures (see Footnote 4).

Even though the manipulation in Experiment 1 was subtle, its effect was large ($d = .85$). If our laboratory situation captures how minority group members respond to adversity in actual academic contexts, real-world analogues of our manipulation—such as social isolation on campus—may have larger effects. If true, minority students' sense of fit in school should prove fragile (Aronson & Inzlicht, 2004), falling in response to adversity and returning to baseline once the adversity has passed. Indeed, a cardinal symptom of self-uncertainty is the extent to which self-perceptions shift with external events (Campbell et al., 1996). We explored this possibility in a second pilot study and in a longitudinal intervention experiment.

Pilot Study for Experiment 2

The pilot study examined whether minority students in academic settings have chronically high levels of uncertainty in their sense of belonging. A total of 34 ethnic minority students (i.e., Black or Latino) and 155 White students enrolled in an introductory psychology course completed survey items on separate 7-point scales (1 = *strongly disagree,* 7 = *strongly agree*). *Level of belonging* was assessed with the item "I belong at [college name]." *Belonging uncertainty* was assessed with three items ("Sometimes I feel that I belong at [college name], and sometimes I feel that I don't belong"; "When something bad happens, I feel that maybe I don't belong at [college name]"; "When something good happens, I feel that I really belong at [college name]"), $\alpha = .63$. As expected, minority and majority students reported similar levels of belonging ($Ms = 5.62, 5.80$, respectively; $t < 1$), but minority students reported more belonging uncertainty ($M = 5.14$) than did White students ($M = 4.49$), $t(187) = 2.54$, $p = .012$, $d = .47$. The Race × Type of Belonging interaction was significant, $F(1, 187) = 4.09$, $p = .045$.

Consistent with Experiment 1, these results suggest that minority students are more uncertain of their belonging than are majority students. As a consequence, their sense of belonging is more debilitated by adversity. To test this hypothesis formally, Experiment 2 monitored minority students' responses to adversity on a daily basis. Most important, it also tested an intervention aimed at alleviating belonging uncertainty. Additionally, Experiment 2 complements self-report measures with behavioral outcomes, including academic challenge-seeking and performance (i.e., college grade point average [GPA]).

Experiment 2

In Experiment 2, we provided minority students with an alternative hypothesis to use to interpret academic hardship. Black 1st-year college students were encouraged to attribute doubt about belonging in school to factors irrelevant to their social identity—in particular, to the struggles faced by students of all ethnicities during the transition to college. They learned through a presented survey that upperclassmen of all ethnic groups had worried in their 1st year of college about whether they were accepted. They further learned that this worry lessened with time (see Wilson, Damiani, & Shelton, 2002). The message was intended to de-racialize both objective adversity and the subjective doubts about belonging it instigates—to portray hardship and feelings of non-belonging as common to all students regardless of race and as non-diagnostic of actual belonging (see Wyer, Clore, & Isbell, 1999). Our intervention differs from virtually all past attributional retraining treatments, which focus on shoring up self-perceived ability rather than social belonging. Such interventions benefit Black and White students equally (Aronson, Fried, & Good, 2002; Wilson et al., 2002). By contrast, our intervention, because it focused on *social belonging*, was expected to benefit Black students *more* than White students and thus to reduce group-based inequality.

The intervention might confer immediate benefit if it leads minority students to re-interpret previous academic hardships as less racially significant. It might also buffer minority students against future hardship. To test this prediction, we asked students to report, on each of the 7 days following the intervention, how much adversity they had experienced that day and their sense of fit in college. We expected minority students in the control condition to evaluate their fit more negatively on adverse days than on non-adverse days (see Mendoza-Denton et al., 2002). We expected minority students in the treatment condition to exhibit this pattern less. To the extent that minority students in the treatment condition have a more secure sense of belonging, they might also undertake more academic challenges (e.g., send more e-mail queries to professors; Cohen & Garcia, 2005; Mendoza-Denton et al., 2002). We also assessed the impact of the intervention on students' GPA in the semester following the study, although we suspected that the impact of a brief (1 hr), single-shot intervention might be confined to short-term consequences. On the other hand, it seemed possible that our intervention might have long-term effects if it interrupted a recursive cycle wherein belonging uncertainty undermines performance and lower performance, in turn, exacerbates belonging uncertainty, ad infinitum (Storms & McCaul, 1976).

We expected the intervention to have little effect on White students. This may be the case if such individuals *assume* as a default that they belong in academic settings (Cohen et al., 1999). On the other hand, the intervention might benefit at least some White students—such as first-generation college students wondering whether they belong in an elite institution. Alternatively, the intervention might prove detrimental for some White students. For example, it might disabuse prejudiced White students of their racial superiority (by conveying that White students question their belonging as much as Black students do). If so, it could undermine the effect of stereotype lift—the achievement boost that arises from the belief that an out-group is inferior to one's own (Walton & Cohen, 2003).

Method

Overview

Experiment 2 took place in three stages. In Stage 1, students completed a 5-minute questionnaire assessing pre-manipulation individual differences for potential use as covariates. A second experimenter then invited students to participate in an ostensibly unrelated study comprising Stages 2 and 3. In Stage 2, students came to a laboratory, were randomly assigned to either the treatment or the control condition, and completed dependent measures. In Stage 3, students reported, on each of the 7 days after participating in the laboratory, how much adversity they had encountered on campus, their sense of fit in school, and how much they had engaged in various achievement behaviors.

Stage 1: Premanipulation Assessment of Individual Differences

Participants and procedure. Twenty-five Black and 30 White 1st-year students participated in Stage 1. One month before the end of the academic year, students were phoned (by an African American experimenter) and asked to complete a 5-minute questionnaire about their "attitudes and experiences at [school name]." The questionnaires were distributed and collected via e-mail. Students were assured that their responses would be kept confidential.

Measures. Participants completed two items assessing *academic identification* (e.g., "How important is it to you to do well at [school name]?"; 1 = *not at all important*, 7 = *essential to who I am*), $\alpha = .95$. They then reported the average number of hours they studied each day, how often they attended review sessions before tests (1 = *never,* 7 = *every time*) and spoke in class (1 = *never,* 7 = *always*), and how many times each week they attended office hours, e-mailed a teaching fellow or professor, and met with a study group. Finally, participants completed the *Sensitivity to Race-Based Rejection Questionnaire* (Mendoza-Denton et al., 2002). This instrument assesses how readily people perceive and how intensely they react to race-based rejection. It predicts Black students' disengagement from predominately White universities.

Stage 2: Laboratory Session

Participants. Three to 10 days after participating in Stage 1, students were invited (by a White experimenter) to participate in an ostensibly unrelated study. Eighteen Black and 19 White students (12 men, 25 women) agreed to participate in exchange for $30.

Procedure and manipulation. Students were told that the purpose of the study was to investigate "the experiences and attitudes of freshmen" and "to create materials to distribute to future [school name] students to help them form accurate expectations about college." Participants then read the putative findings of an "upperclassmen survey." Quantitative summary statistics were presented with nine illustrative quotations purportedly provided by survey respondents. Participants were told that the survey results were "consistent . . . across racial and gender groups" and typical of students' "experience at [school name], and how this experience has changed since freshman year."

In the treatment condition, the survey communicated that most students, regardless of race, worry during their first year of college about whether they belong on campus, and that these worries lessen with time. For example, quantitative statistics indicated that most upperclassmen had "worried [as 1st-year students] whether other students would accept them," but that now most are sure "that other students accept them." One survey respondent (an Asian male) was quoted as stating:

> Freshman year, even though I met large numbers of people, I didn't have a small group of close friends. I had to work to find lab partners and people to be in study groups with. I was pretty homesick, and I had to remind myself that making close friends takes time. Since then . . . I have met people, some of whom are now just as close as my friends in high school were.

The quotations were based upon a small survey of actual upperclassmen.

Like the treatment condition, the control condition provided survey results and respondent quotations. However, rather than addressing social belonging, the control survey conveyed in a generic manner that students' social–political views grow more sophisticated with time.[7]

As dissonance and self-perception theorists have shown, people who freely advocate a message to a receptive audience tend to internalize that message and exhibit long-term behavior change consistent with it (Cooper & Fazio, 1984; e.g., Aronson et al., 2002). To drive home the message featured in each condition, participants were asked to write an essay and to deliver a speech to a video camera. They were asked to explain, using examples from their own lives, why people's experience in college changes as the survey had described. Participants were told that their testimonials would be viewed by future students at their school "so they know what college will be like." The experimenter emphasized that participants were free to choose whether to provide a testimonial and to have their testimonial videotaped. All participants agreed to provide a testimonial; 84% agreed to be videotaped (agreement varied by neither race nor condition, and all participants were retained in analyses).

Measures. After their testimonials, students completed measures assessing self-perceived academic fit. These measures were similar to those used in Experiment 1 but were re-worded to refer to school generally rather than to computer science. Students completed a 17-item *social fit* scale, 2 items assessing *academic identification*, 3 items assessing *enjoyment of academic work*, 2 items assessing *self-efficacy*, and 1 item assessing *potential to succeed* in college. Students also completed two new fit measures, assessing *possible academic selves* (3 items, e.g., "In the future I could see myself being successful at [school name]"; 1 = *strongly disagree,* 7 = *strongly agree*; Markus & Nurius, 1987), $\alpha = .84$, and *evaluative anxiety* (3 items, e.g., "How anxious would you be about asking a question or making a comment in a large lecture class?"; 1 = *extremely comfortable,* 7 = *extremely anxious*; see Sarason, 1991), $\alpha = .79$.

Participants then completed a measure of *academic challenge-seeking*. They indicated which of 12 courses offered by their school they would like to take. The description of each course included past students' ratings (along 10-point scales) of the difficulty of the course and the amount they learned from it. Six courses were rated as hard (7.8–8.9) and as highly educational (7.7–9.1), whereas 6 were rated as easy (2.6–4.2) and as modestly educational (5.4–6.6). The 6 courses designated as hard (vs. easy) were counterbalanced across condition.

Students then provided demographic information and their SAT score. They were also asked to authorize the release of their college transcript (after the subsequent semester). A total of 92% of students consented, and the authorization rate was similar across all four cells. Finally, students were instructed on how to complete the Stage 3 questionnaires. In total, they spent 1 hour in the laboratory.

Stage 3: Daily Diaries

Overview and compliance. On each of 7 days after participating in the laboratory, students completed 2 questionnaires. Students who missed 2 or more questionnaires were asked to complete make-up questionnaires on subsequent days. Seventy-six percent of students completed all 14 questionnaires; all but 1 completed at least 7. (The number of questionnaires completed did not vary by race or condition.) The non-complying participant (a White student in the treatment condition) completed only 2 questionnaires; accordingly, her data were eliminated from analyses involving these measures.

Procedure. Each day participants were e-mailed an "afternoon" questionnaire at 11 a.m. and asked to return it by dinnertime. They were e-mailed an "evening" questionnaire at 6 p.m. and asked to return it before going to bed.

Afternoon questionnaire. The afternoon questionnaire consisted of three key fit measures: the social fit, self-efficacy, and academic potential scales. To focus participants on their current feelings, each item requested that they report how they felt "right now."

Evening questionnaire. The evening questionnaire again assessed social fit, self-efficacy, and potential. Additionally, it asked participants to report whether they had engaged that day in the *achievement behaviors* assessed at Stage 1—whether they had attended a review session, office hours appointment, or study group meeting; how many e-mail queries they had sent to professors, questions they had asked in class, and hours they had studied. Also included was an inventory assessing the day's level of adversity. This measurement procedure was informed by research suggesting that the validity of subjective reports of well-being can be enhanced by having respondents review specific events in their day (Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004). Participants first listed important events they had experienced and rated the negativity of each (1 = *very negative,* 10 = *very positive*). Then, using the same scale, they rated the day's overall negativity.

Results

Creation of Composite Measures

We conducted a series of factor analyses to consolidate data into four composite variables. We created two composite variables summarizing self-perceived academic fit, one for the Stage 2 assessment (provided in the laboratory) and one for the Stage 3 assessment (provided in the daily diaries). We also created two composite variables summarizing students' achievement behavior, one for the Stage 1 assessment (pre-intervention) and one for the Stage 3 assessment (post-intervention). After removing a few measures that did not load on the first factor of each composite ($<.45$), all indices proved reliable, $\alpha s > .65$. (Retaining the non-loading measures did not alter the significance of any reported analysis.) Both achievement behavior composites were skewed (zs > 2.25, ps $< .025$). Accordingly, each was subjected to a square root transformation, which reduced skew to non-problematic levels (zs < 1.25, ps $> .20$).

Stage 1 Assessment: Pre-Intervention Differences Between Black Students and White Students

Analyses of the Stage 1 measures (pre-intervention) revealed two participant race effects. Black students reported more academic identification ($M = 5.79$) and greater sensitivity to race-based rejection ($M = 7.66$) than did White students ($Ms = 5.21$, 1.80, respectively), $t(53) = 2.41$, $p = .020$, and $t(51) = 5.62$, $p < .001$, respectively. Both effects have been documented in previous research (Graham, 1994; Mendoza-Denton et al., 2002). Confirming the success of random assignment, analyses found no effect of condition on any Stage 1 measure or on participants' reported SAT score (Fs < 2.85, ps $> .10$) and no Race × Condition interaction (Fs < 1).

Stage 2 and 3 Assessment: Preliminary Data Analytic Issues

Data were analyzed in a series of 2 (participant race: Black or White) × 2 (experimental condition: treatment or control) ANCOVAs. Participants' SAT scores and pre-intervention levels of academic identification and race-based rejection sensitivity were tested as covariates and included if significant. In analyses of post-intervention achievement behavior, we included pre-intervention achievement behavior as a covariate. Main effects and

[7] Materials for both conditions are available upon request.

interactions involving participant gender were included if significant. (No three-way interaction between participant race, participant gender, and condition was found.) The only outlier occurred for the course selection measure. One participant (a Black student in the control condition) fell 3.09 standard deviations below the grand mean, 2.29 standard deviations below the cell mean. To prevent this value from disproportionately affecting significance tests, it was changed to .10 standard deviations from the next most extreme value in its cell (Tabachnick & Fidell, 1996).

Stage 2 Assessment: Treatment Effects Immediately After Intervention

Sense of academic fit. Black students evaluated their fit more positively ($M_{adj} = 0.31$) than did White students ($M_{adj} = -0.32$), $F(1, 28) = 7.51$, $p = .011$. This main effect was qualified by the predicted Race × Condition interaction, $F(1, 28) = 12.44$, $p = .001$. Black students evaluated their fit more positively in the treatment condition ($M_{adj} = 0.71$) than in the control condition ($M_{adj} = -0.09$), $t(28) = 2.63$, $p = .014$, $d = 1.37$. Unexpectedly, White students displayed the opposite effect ($M_{adjs} = -0.67, 0.04$, respectively), $t(28) = 2.36$, $p = .025$, $d = 1.22$.

As in Experiment 1, we analyzed students' global assessment of their potential to succeed in college relative to their peers. We found the same Race × Condition interaction, $F(1, 31) = 6.93$, $p = .013$. Black students rated their potential higher in the treatment condition ($M_{adj} = 72\%$) than in the control condition ($M_{adj} = 50\%$), $t(31) = 3.46$, $p = .002$, $d = 1.63$. White students displayed no effect of condition ($M_{adjs} = 51\%, 53\%$, respectively; $t < 1$).

Challenge-seeking in course selection. The number of difficult but educational courses each participant selected was divided by the total number of courses he or she selected. The resulting index represents the percentage of challenging (rather than easy) courses selected. Analysis of this percentage yielded only a main effect of condition, $F(1, 33) = 10.09$, $p = .003$, $d = .95$. More challenging courses were selected in the treatment condition ($M_{adj} = 57\%$) than in the control condition ($M_{adj} = 41\%$). This effect was significant for Black students ($M_{adjs} = 57\%, 36\%$, respectively), $t(33) = 2.60$, $p = .014$, $d = 1.11$, marginal for White students ($M_{adjs} = 58\%, 45\%$, respectively), $t(33) = 1.88$, $p = .068$, $d = .77$.

Stage 3 Assessment: Treatment Effects Over 7 Days Following Intervention

For self-perceived academic fit as reported on the 7 days following the intervention, analysis again yielded a Race × Condition interaction, $F(1, 31) = 6.04$, $p = .020$. Contrary to predictions, the difference between Black students in the treatment condition ($M_{adj} = 0.33$) and in the control condition ($M_{adj} = 0.06$), although in the predicted direction, was not significant ($t < 1$). White students again displayed the opposite pattern ($M_{adjs} = -0.70, 0.31$, respectively), $t(31) = 2.80$ $p = .009$, $d = 1.32$.

Means representing students' global assessment of their potential to succeed in college (relative to their peers) are displayed in Figure 2. Analysis yielded a marginal Race × Condition interaction, $F(1, 30) = 2.80$, $p = .10$. Black students rated their potential to succeed more highly in the treatment condition ($M_{adj} = 68\%$) than in the control condition ($M_{adj} = 56\%$), $t(30) = 2.05$, $p = .049$. White students showed no effect of condition ($M_{adjs} = 53\%, 55\%$, respectively; $t < 1$).

Does the Intervention Buffer Black Students' Sense of Academic Fit Against Adversity?

We had a precise prediction concerning the impact of the intervention. We expected it to buffer Black students' sense of fit against daily adversity. If so, in the control condition Black students should have a lower sense of fit on days of severe adversity than on days of modest adversity. This should be less the case in the treatment condition. As described below, we test these predictions by assessing whether the within-subject correlation between daily adversity and daily sense of fit varies with race, condition, and the interaction between them.

Data analysis. First, we created, for each participant, a composite index of each day's adversity level. As noted previously, students reported on each of the 7 days following the intervention the negative (vs. positive) events they had experienced, the negativity of each, and the overall negativity of the day. Most events involved the quality of students' social relationships in school (60% of all events; e.g., "I walked with my professor after class to my next class and had a great discussion"; "Everyone is going out without me, and they didn't consider me when making their plans"). The only other type of event mentioned with any frequency (i.e., >3%) involved academic experiences (e.g., "stress over a paper"; 17%). Because intellectual performance is a dimension of social evaluation in academic settings (Cohen & Steele, 2002; Steele, 1997), all events were retained in analyses. The number of negative events cited each day was subtracted from the number of positive events cited (after weighting each event by its rated negativity). This measure correlated with participants' global assessment of each day's negativity (median $r = .60$). Accordingly, we standardized both measures and averaged them into a separate composite index of each day's adversity level (with lower values representing higher adversity levels).

Black and White students did not differ in their level of reported adversity. Adversity averaged over the 7 days did not vary by race or condition (Fs < 2.60, ps $> .10$). Even confining analysis to students' worst 2 days yielded no effects on rated adversity (Fs < 1.60, ps $> .20$). Just as Black students and White students in Experiment 1 experienced comparable difficulty in generating friends, they experienced comparable adversity in their daily academic lives. As in Experiment 1, what was expected to vary with student race was the motivational *consequence* of that adversity.

We created composite indices assessing self-perceived academic fit on each day. Because we wanted a measure of students' fit as felt *after* any adversity encountered on that day, these composites were based on responses to the evening questionnaire.

Next, we calculated, for each participant, the correlation between the participant's sense of academic fit on a given day and that day's adversity level. As is appropriate, before conducting significance tests, we transformed each correlation coefficient into a Fisher's Z score. Reported means are calculated by reconverting each Fisher's Z mean back into a correlation coefficient and then squaring it. Means represent the percentage of day-to-day variance in students' sense of fit that can be accounted for by daily adversity level.

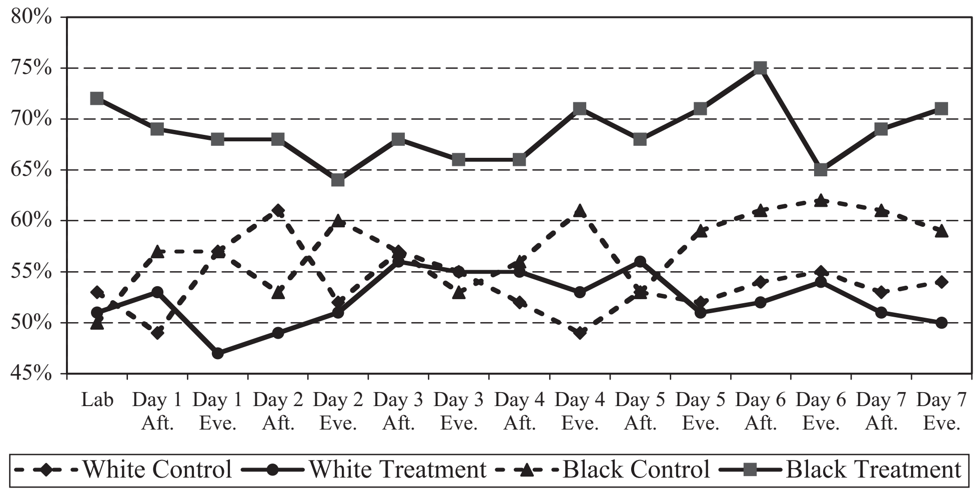

Figure 2. Experiment 2: Self-perceived potential to succeed in college over time. Means represent students' percentile estimates of their potential relative to their peers.

Results. Daily adversity level accounted for more day-to-day fluctuation in Black students' sense of fit in college (42%) than in White students' sense of fit in college (3%), $F(1, 30) = 9.49$, $p = .004$, $d = 1.26$. There was also a Race × Condition interaction, $F(1, 30) = 3.88$, $p = .058$. As predicted, the intervention reduced the extent to which Black students' sense of fit varied with the adversity level of their day, from 59% to 24%, $t(30) = 2.16$, $p = .039$, $d = 1.02$. No effect was found for White students, whose sense of fit was relatively independent of each day's adversity level in both conditions (M_{adjs} = 1%, 7%, respectively; $t < 1$).

Specifically, the intervention sustained Black students' sense of fit on adverse days. We averaged students' sense of fit on the 2 days for which they reported the most adversity, on the 3 days for which they reported moderate adversity, and on the 2 days for which they reported the least adversity. As displayed in Figure 3, the self-perceived fit of Black students in the control condition fell on highly adverse days compared with their sense of fit on days of moderate adversity, $t(8) = 2.56$, $p = .034$, $d = .51$, and on days of little adversity, $t(8) = 3.04$, $p = .016$, $d = .63$. By contrast, in the treatment condition, the self-perceived fit of Black students remained high regardless of the day's adversity level (ts < 1.15).[8]

Treatment Effects on Achievement Behavior and GPA

Achievement behavior. The relevant means are displayed in Figure 4. Once again, there was a Race × Condition interaction, $F(1, 26) = 7.96$, $p = .009$. In the week following the intervention, Black students reported engaging in more achievement behavior in the treatment condition than in the control condition, $t(26) = 2.83$, $p = .009$, $d = 1.47$. White students did not vary by condition ($t < 1.20$). Separate analysis of each measure indicated that the treatment effect—although in the predicted direction on five of six measures—was strongest for two. Black students reported studying an average of 1 hour and 22 minutes longer each day in the treatment condition (M_{adj} = 4 hr 35 min) than in the control condition (M_{adj} = 3 hr 13 min), $t(26) = 2.95$, $p = .007$, $d = 1.54$. They also reported sending, over the course of the week, three times more e-mail queries to professors in the treatment condition ($M_{\text{adj}} = 2.69$) than in the control condition ($M_{\text{adj}} = 0.88$), $t(30) = 3.60$, $p = .001$, $d = 1.70$.

GPA. To examine how race and condition affected the trajectory of college performance over time, we wanted a measure of change in GPA. Accordingly, we computed a residual change score. Specifically, we regressed students' GPA in the fall semester of their 2nd year of college (i.e., post-intervention) on their GPA in the fall semester of their 1st year (i.e., pre-intervention). We used the unstandardized residuals as the dependent measure. This outcome represents the difference between students' actual post-intervention GPA and their expected GPA as based on their prior grades. It is analogous to a change score, but without the associated statistical problems. Positive values reflect improvement, negative values decline. (Simply using pre-intervention GPA as a covariate in an ANCOVA yields virtually identical results.)

Confirming the success of random assignment, there was no effect of condition or Race × Condition interaction on pre-intervention GPA (Fs < 1.80, ps > .15). However, analysis of the change score yielded the same Race × Condition interaction documented along each previous measure, $F(1, 30) = 10.04$, $p =$

[8] Two follow-up analyses provide evidence for the robustness of these treatment effects, despite the relative insensitivity of these analyses. First, the benefits of the intervention on days of severe adversity occurred even controlling for participants' level of fit as reported on the previous evening. Black students evaluated their fit on days of severe adversity marginally more positively in the treatment condition ($M_{\text{adj}} = -0.04$) than in the control condition ($M_{\text{adj}} = -0.24$), $t(30) = 1.77$, $p = .090$, with no effect for White students, $t < 1$, Race × Condition interaction: $F(1, 30) = 3.07$, $p = .090$. Second, the benefits of the intervention extended to the day *after* an adverse day. Again controlling for participants' level of fit on the previous evening, analysis indicated that Black students evaluated their fit on the afternoon after an adverse day more positively in the treatment condition ($M_{\text{adj}} = 0.21$) than in the control condition ($M_{\text{adj}} = -0.14$), $t(30) = 2.09$, $p = .045$, again with no effect for White students, $t < 1$, Race × Condition interaction: $F(1, 30) = 3.05$, $p = .091$. As expected, in neither analysis were condition effects found on non-adverse days (ts < 1).

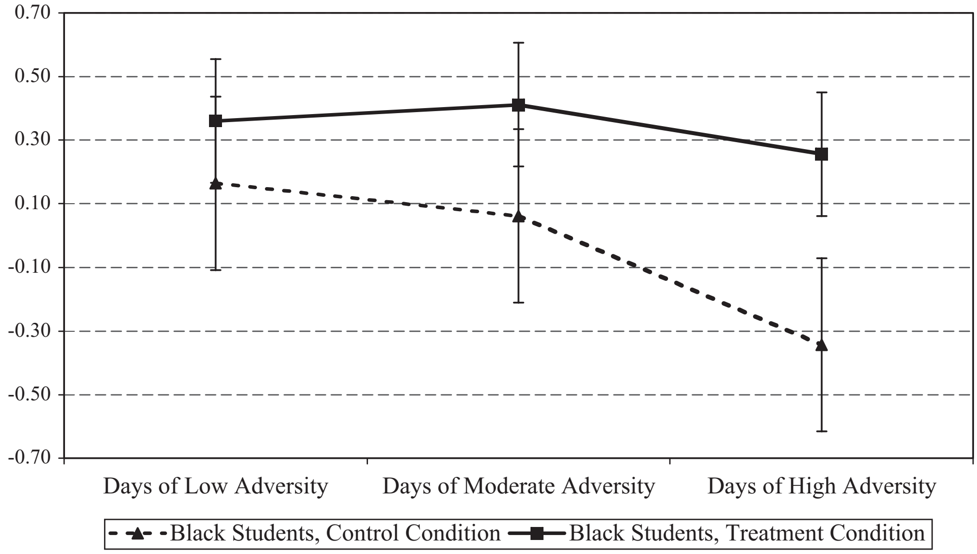

Figure 3. Experiment 2: Black students' sense of academic fit on days of low, moderate, and high adversity. Error bars represent + 1/−1 standard errors.

.004. Black students displayed greater improvement in their college GPA in the treatment condition (M_{adj} = 0.12) than in the control condition (M_{adj} = −0.22), $t(30)$ = 2.42, p = .022, d = 1.10. Indeed, in the control condition, Black students underperformed (relative to what would be expected on the basis of their prior grades), but in the treatment condition they performed slightly better than expected. By contrast, White students tended to perform better in the control condition (M_{adj} = 0.23) than in the treatment condition (M_{adj} = −0.14), $t(30)$ = 2.05, p = .050, d = .88.

Did Black students in our treatment condition perform better than Black students campus-wide? The answer is yes. We assessed how students in our study performed relative to their Black and White peers campus-wide. To do so, we acquired from the university registrar the same residual change scores for all students in the same college year as our participants who had not participated

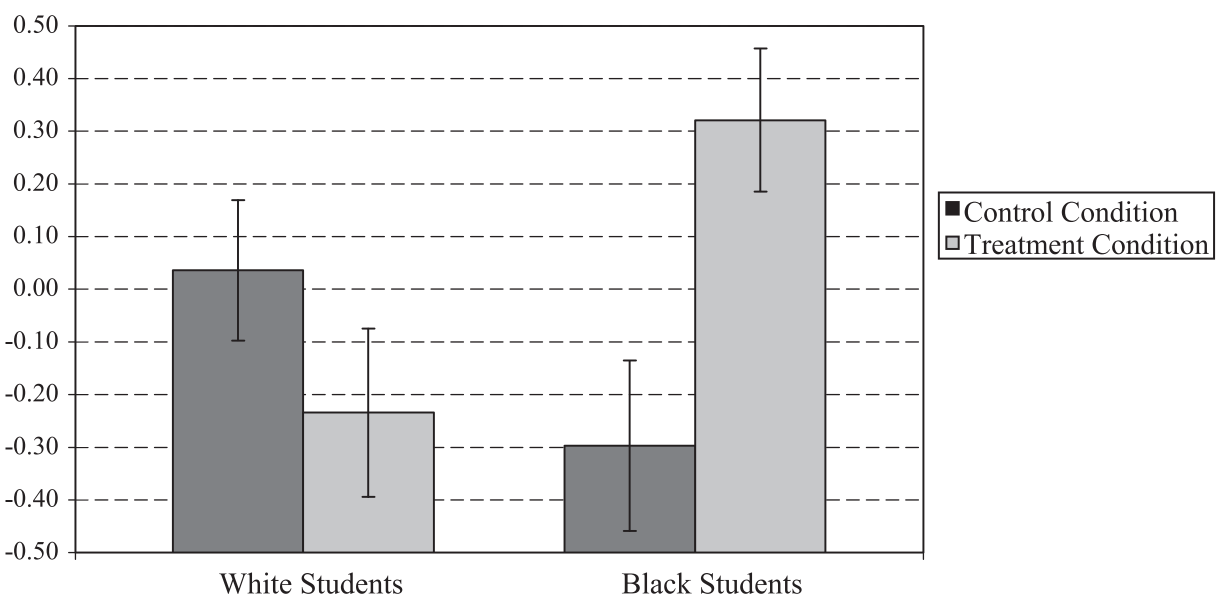

Figure 4. Experiment 2: Composite achievement behavior. Means reflect the average of the standardized indices of the number of review sessions, office hours appointments, and study group meetings attended, e-mail queries sent to professors, hours spent studying, and questions asked in classes. Error bars represent + 1/−1 standard errors.

in our study. The relevant means are displayed in Figure 5. Black students across campus showed a "drop" in GPA almost identical in magnitude to the drop observed among Black students in our control condition ($M = -0.14$). The two groups did not differ ($t < 1$). By contrast, Black students across campus performed worse than Black students in our treatment condition, $t(801) = 2.49$, $p = .013$, $d = .72$.

Did White students in our treatment condition perform worse than White students campus-wide? The answer is no. The GPA change score of White students across campus ($M = 0.02$) fell between that of White students in the two experimental conditions and did not differ significantly from either (ts < 1.40, ps $> .15$). It is thus unclear whether our intervention lowered White students' GPA, whether our control condition improved it (perhaps by generating optimism about their prospects for intellectual growth), or whether the between-condition difference is due to chance. Because of this ambiguity and because no condition difference was predicted among White students, this effect should be viewed tentatively. What is clear is that the intervention benefited Black students but not White students.

Discussion

Experiment 2 yielded two major findings. First, as in Experiment 1, it seems that Black students globalized the implications of social hardship into a conclusion about their potential to fit and succeed in an academic setting. On days of high stress, Black students' sense of fit in college dropped. Almost 60% of the day-to-day variance in their sense of fit could be accounted for by the adversity level of their day. By contrast, White students' sense of fit was independent of the adversity level of their day. Because these data are correlational, we cannot definitively conclude that daily adversity caused the decrements observed among Black students. But the evidence supports this interpretation. The correlational pattern was moderated, as expected, by an intervention aimed at changing the construal of social adversity. It also replicates the experimentally manipulated effect obtained in Experiment 1. In both studies, a threat to belonging disproportionately impacted minority students' motivation. This was in spite of the fact that the "objective" trigger of the threat (difficulty listing friends in Experiment 1, naturally-occurring adversity in Experiment 2) did not differ in severity for the two racial groups.

Second, a small but theory-driven intervention buffered Black students' sense of fit against academic adversity and improved their achievement. This intervention was attuned to resolving the question of belonging that, we have suggested, is more acute for Black students than for White students. Simply normalizing doubts about social belonging—presenting them as common across racial groups—and portraying such doubts as temporary rather than stable made Black students' sense of fit less dependent on the quality of their day, increased their engagement in achievement behavior (e.g., time spent studying) and, it seems, improved their GPA.

The intervention had no significant positive effect on White students. On some measures, it may have had a negative one. As noted previously, the intervention may have disabused more prejudiced students of a belief in their racial superiority, reducing the effects of stereotype lift (Walton & Cohen, 2003). Alternatively, it may be unwise to assure people that they belong when they need no such assurance. Doing so may communicate that one *should* be concerned with one's belonging, or that one is viewed as *in need*

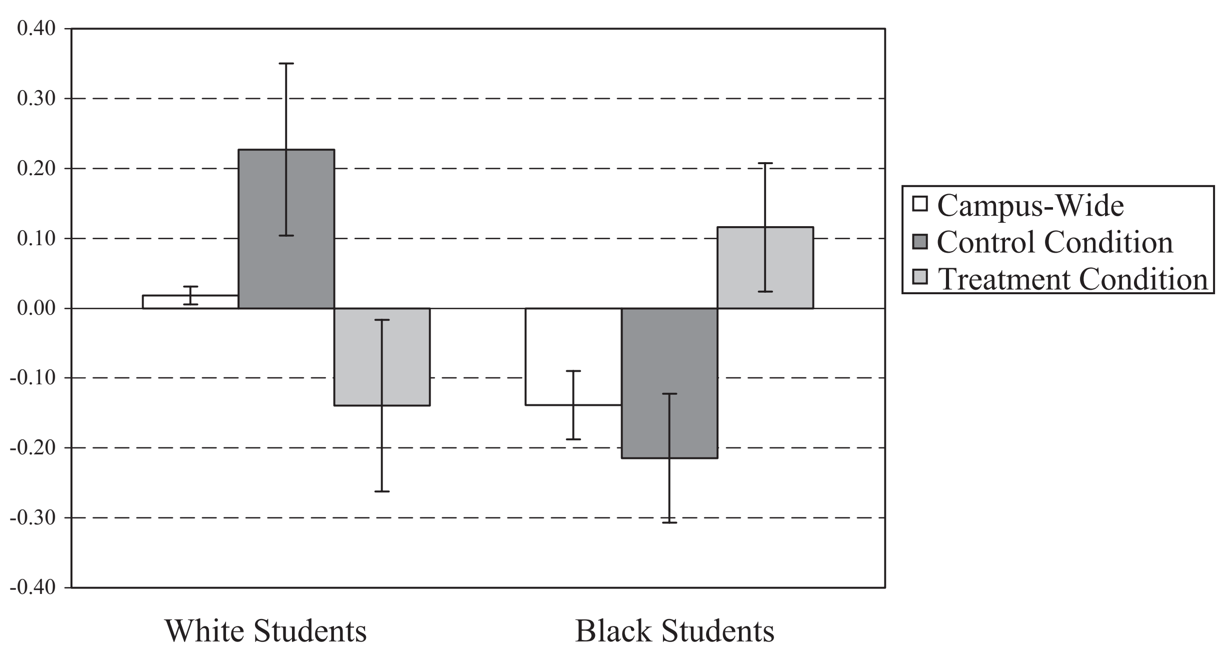

Figure 5. Experiment 2: Unstandardized residuals of post-intervention grade point average (GPA) regressed on pre-intervention GPA (i.e., the difference between actual post-intervention GPA and expected post-intervention GPA as based on prior grades). Positive values reflect improvement in GPA; negative values reflect decline. Error bars represent + 1/−1 standard errors.

of such assurance (Cohen et al., 1999; Schneider, Major, Luhtanen, & Crocker, 1996). Such a process may explain why trauma counseling sometimes does more harm than good (Rose, Bisson, Churchill, & Wessely, 2002).

Our study raises ethical concerns. Although the treatment message was based on actual responses from a small sample of undergraduates, the quotations used were altered and the statistics reported were fabricated. These deceptive elements purified the experimental manipulation, but presenting such data as authentic may be unethical, particularly if such data are misleading. One way to resolve this dilemma in future studies is to use responses from actual student surveys (such as the testimonials generated by our participants). Additionally, we hasten to add that, although the information used in our intervention was partially fabricated, it reinforced a general truth that, our results suggest, is important and perhaps ethically pressing to propagate—that most university students, regardless of race, question their belonging, particularly during the demanding 1st year of college (see Cantor, Norem, Niedenthal, Langston, & Brower, 1987).

General Discussion

One of the most important questions that people ask themselves in deciding to enter, continue, or abandon a pursuit is, "Do I belong?" Among socially stigmatized individuals, this question may be visited and revisited. Stigmatization can create a global uncertainty about the quality of one's social bonds in academic and professional domains—a state of *belonging uncertainty*. As a consequence, events that threaten one's social connectedness, although seen as minor by other individuals, can have large effects on the motivation of those contending with a threatened social identity.

In Experiment 1, students were led to believe that they might have few friends in a field of study. Whereas White students were unaffected, Black students' sense of fit and potential in that field fell by nearly a standard deviation. In Experiment 2, days of severe adversity predicted a drop in Black students' sense of fit in college. Almost 60% of the day-to-day variance in their sense of fit could be accounted for by the adversity level of their day (compared with only 4% for White students). These effects occurred in spite of the fact that neither the difficulty of listing friends (Experiment 1) nor the level of adversity experienced in college (Experiment 2) varied by student race. These results dovetail with evidence that the lability of emotional states, beyond their absolute level, predicts important outcomes (Crocker, Karpinski, Quinn, & Chase, 2003; Kernis & Waschull, 1995). Additionally, for members of socially stigmatized groups, the question "Do I belong?" appears to go hand in hand with the question "Does my group belong?" (Cohen & Garcia, 2005). In Experiment 1, Black students led to believe that they might have few friends in a field displayed higher race activation and even discouraged a same-race peer from entering that field.

The response of minority students is a case not of biased perception but of gestalt perception. As Asch (1952) observed, the meaning of a stimulus depends on its context. Minority individuals are aware that their group is under-represented and stigmatized both in academic settings and elsewhere. Given this context, members of minority and majority groups may understandably perceive their social worlds differently. Indeed, in many circumstances such differences in subjective perception may be adaptive.

Experiment 2 tested an intervention designed to de-racialize the meaning of hardship in college and the doubt about belonging that it can trigger. First-year students learned that hardship and doubt were unique neither to them nor to members of their racial group but rather were common to all 1st-year students regardless of race. On nearly every outcome assessed, this intervention benefited Black students. Immediately afterward it improved their sense of fit on campus. It boosted Black students' belief in their potential to succeed in college by 20 percentile points. Such optimism, regardless of its accuracy, can be beneficial (Taylor & Brown, 1988). The intervention may have also interrupted a recursive cycle wherein belonging uncertainty undermined academic performance and lower academic performance, in turn, exacerbated belonging uncertainty, ad infinitum (Storms & McCaul, 1976). Black students in the treatment condition no longer globalized the implications of a bad day into a conclusion about their fitness for college. Additionally, whereas Black students in the control condition showed a "sophomore slump" in their earned (relative to expected) GPA, Black students in the treatment condition did not.

Study 2 is among the first psychologically-based intervention studies—aimed solely at altering subjective experience—to reduce the racial achievement gap in actual classroom performance. The intervention conferred its various benefits only to Black students not to White students. In contrast to many interventions, it uniquely advantaged those individuals who are most in "need" (see Ceci & Papierno, 2005). In fact, our intervention was associated with roughly a 90% reduction in the racial achievement gap in our sample. Would these effects generalize to a larger or less select student sample? We cannot answer this question, but it is an important one to address before making strong claims about applications.

These results do *not* imply that a sense of social belonging is more important to the motivation of ethnic minority students than to the motivation of majority students. Rather, majority students may benefit from an assumed sense of social belonging in intellectually evaluative contexts (Cohen et al., 1999). When this sense is *explicitly* challenged, its importance in the maintenance of motivation and performance among majority group members becomes apparent (Walton & Cohen, 2003; see also Baumeister et al., 2002).

Future research could draw on theory and methodology developed in research on close relationships (see Mendoza-Denton et al., 2002). For example, the psychological process examined here parallels one outlined by Murray, Rose, Bellavia, Holmes, and Kusche (2002) in the context of romantic relationships. People who are uncertain of their partner's affection may scrutinize their partner's treatment of them, interpret ambiguous behavior as evidence of the lack of affection they suspect, and withdraw from the relationship.

Our research invites us to reconsider the nature of social inequality. Inequality, as we know, can take the form of disparities in objective treatment and resources. But it can also take the form of disparities in subjective construal. When such disparities persist, social–psychological intervention can help people to resolve pressing subjective questions that if left unresolved would undermine their comfort in mainstream institutions and their prospects for success.

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