The individually-targeted habit-breaking intervention and group-level change

By

Patrick S. Forscher

A dissertation submitted in partial fulfillment of

the requirements of the degree of

Doctor of Philosophy

(Psychology)

at the

UNIVERSITY OF WISCONSIN-MADISON

2016

Date of final oral examination: 12/18/2015

The dissertation is approved by the following members of the Final Oral Committee:

Patricia G. Devine, Professor, Psychology

Markus Brauer, Professor, Psychology

Carol Ryff, Professor, Psychology

Kristin Shutts, Professor, Psychology

Molly Carnes, Professor, Medicine, Psychiatry, and Industrial & Systems Engineering

Acknowledgements

Science is a collective effort, and my experience has been no exception to this truism. I would like to acknowledge at least some of the numerous people who have contributed to my dissertation, and to my training more generally.

First, I would like to acknowledge the tireless efforts of my research assistants, including Anh Dang, Allie Kerr, Dahea (Dianne) Lee, Emily Kostuch, Quanfa (Frank) He, Ian Frutiger, Natalie Jaume, Matt Janowski, Neeraja Mohan, and, most especially, Nanzi Zheng. When I proposed my dissertation, I was confident that I would complete it despite its ambitious scope precisely because I knew how much you all rock.

Second, I would like to acknowledge my lab mates, Emily Dix, Chelsea Mitamura, and, most especially, Will Cox. You have formed the bulk of my day-to-day intellectual environment during graduate school. My interactions with you have contributed to my training as much as, if not more than, my formal coursework.

Third, I would like to acknowledge my advisor, Trish Devine. It is hard to overstate your influence on me, both as a scientist and as a person. I only hope that, as an independent scientist, I can live up to your scientific legacy.

Finally, I would like to acknowledge my wife and partner, Emily Forscher. You are the single best thing that has happened to me. My dissertation is dedicated to you.

Abstract

Psychologists wishing to resolve societal problems typically develop interventions that target individuals. However, many societal problems, such as disparities in hiring, are not caused solely by the actions of individuals operating independently. In two studies, including a field experiment in academic departments randomized at the cluster level and a lab experiment randomized at the individual level, my dissertation explores the relationship between the individual-level change produced by the individually-targeted, prejudice habit-breaking intervention (Devine et al., 2012) and group-level change. The results suggest that the effects of the habit-breaking intervention at the individual level can produce group-level change, at least in the context of the long-term collaborative relationships that characterize academic departments. However, the habit-breaking intervention can also lead its targets to view strangers as less credible sources of knowledge about social disparities. In addition to its considerable practical implications, the present findings highlight the utility of studying individual-level phenomena in group contexts and provide a potential roadmap for doing so.

The individually-targeted habit-breaking intervention and group-level change

Increasingly, psychologists have used psychological theory to develop interventions to address societal problems (e.g., Walton & Cohen, 2007; Hulleman & Harackiewicz, 2009; Devine, Forscher, Austin, & Cox, 2012). These interventions have typically taken an individually targeted approach. For example, in the domain of prejudice, Devine and her colleagues (Devine et al., 2012) used the prejudice habit-breaking model (Devine, 1989) to develop a self-paced slideshow that teaches people about unintentional bias, provides people with feedback about their measured level of unintentional bias, and teaches people strategies to reduce unintentional bias. This prejudice habit-breaking intervention produces enduring improvements in concern about discrimination, awareness of unintentional bias, and self-efficacy to promote group equity (Devine et al., 2012; Carnes et al., 2015; Forscher, Cox, Mitamura, Allison, Dix, & Devine, in preparation; Forscher, Mitamura, Dix, Cox, & Devine, in preparation).

The assumption behind individually targeted interventions like the habit-breaking intervention is that, insofar as societal-level problems are caused by the independent actions of individuals, changing processes at the individual level should be an effective route to resolving these problems. Unfortunately, at least two obstacles impede the effectiveness of this approach. First, researchers often lack direct access to the full population of people whose actions contribute to the target problem. For example, a researcher attempting to curb sexual harassment within a company may find that only a small fraction of employees are willing and able to complete an individually-targeted sexual harassment intervention. Second, many societal problems are not caused solely by collections of individuals acting independently. In the sexual

harassment example, sexual harassment is likely influenced by the structure and policies of the target company.

One method of overcoming the above two obstacles is to meld the individual-level approach with a group-level approach by encouraging the people who receive an individually-targeted intervention to exert social influence on others. To the extent that this social influence successfully changes other people, individually-targeted interventions can indirectly create change in the groups in which the target individuals are embedded. This approach has proven useful in promoting change medical organizations (Metlay et al., 2007; Poon et al., 2004) and businesses (Mustonen-Ollila & Lyytinen, 2003; Rogers, 2010). The success of this approach depends on the following factors: (1) the extent to which the targets of influence perceive the change as beneficial; (2) whether the change is compatible with existing values and practices; (3) the ease of implementing the change; (4) the ease of testing the change on a limited basis; and (5) whether the results of the change are easily observable (Rogers, 2010).

On the basis of these criteria, interventions to produce group-level change in race and gender bias through social influence face obstacles that are particularly acute. Not all people view bias reduction as an outcome that produces direct personal benefits (Plant & Devine, 1998). If either influencers or their targets believe a change does not produce personal benefit, successful influence is unlikely to occur. Biases are also difficult to observe directly, both because what makes something “biased” or “prejudiced” is subjective (Sommers & Norton, 2006) and because most people are motivated to avoid the “biased” or “prejudiced” label (O’Brien et al., 2010). This creates obstacles in evaluating both whether action is needed to address race and gender biases and whether any changes to address race and gender biases are actually effective.

Fortunately, one intervention in particular, prejudice habit-breaking intervention, may be positioned to overcome these obstacles. The prejudice habit-breaking intervention produces enduring changes in motivation by increasing people's concern about discrimination (Devine et al., 2012; Forscher et al., in preparation). Increased concern about discrimination should lead people to view the outcome of bias reduction as being more of a valuable goal. The habit-breaking intervention also increases people's awareness of bias, both directly (Devine et al., 2012; Forscher et al., in preparation), and because concern about discrimination is itself linked to awareness. Concern orients people to the behavior of others, increasing both the likelihood that they notice behavior that is biased and the likelihood that they label that behavior as biased (Forscher et al., in preparation). The increased awareness that results from the habit-breaking intervention should help people who receive it observe whether change is needed in the groups in which they are a part and track any changes that result from their influence attempts.

There is also some indirect evidence that people who receive the habit-breaking intervention may become more motivated to influence other people to reduce race and gender bias. In a pilot study involving 13 group discussions of 4 participants each ($N = 52$) about a race-related issue, concern about discrimination was associated with self- and other-rated participation in these discussions, $B = .23$, $F(1, 47.15) = 6.85$, $p = .012$ and $B = .19$, $F(1, 47.15) = 4.48$, $p = .040$, the probability of speaking first in the discussions, $B = .47$, $\chi^2(1, N = 52) = 5.38$, $p = .020$, the probability of voicing the first opinion about the race-related issue, $B = .64$, $\chi^2(1, N = 52) = 8.05$, $p = .005$, and the extent to which others perceived the contributions as valuable, $B = .12$, $F(1, 47.15) = 3.47$, $p = .069$. Making valuable contributions to discussions of race-related issues is one way of influencing others to take these issues seriously. In addition, in a cluster-randomized trial that used the habit-breaking intervention to improve climate for female faculty

in STEMM (Science, Technology, Engineering, Mathematics, and Medicine; Carnes et al., 2015), faculty who did not directly receive the intervention, but who worked in departments with other faculty who did, reported, three months after the intervention, an increased sensitivity to social pressure to promote gender equity. These findings suggest that, within the intervention departments, some of the faculty who directly received the intervention pressured their colleagues to reduce their gender bias.

However, even if a person notices the biased behavior of another and attempts to influence that person to correct the behavior in the future, the influencer may only be taken seriously if he or she is perceived as a credible source (Giffin, 1967; Czopp & Monteith, 2003; Chaiken, 1980; Gulker, Mark, & Monteith, 2013). Thus, although any sort of contact between people who do and do not receive the intervention may facilitate the spread of the intervention's influence, influence may only occur across relationships characterized by friendliness and trust (Paluck, 2011; Paluck & Shepherd, 2012).

Successful influence could take form in a number of ways. For example, an influencer could change the psychology of the target (Czopp & Monteith, 2003) by, for example, increasing the other person's awareness of his or her biases and/or level of concern about discrimination. On the other hand, perhaps the effects of the influence will be limited to modifications in behavior (at least in the presence of the influencer) without changing the underlying psychology of the target (Paluck, 2011). Indeed, insofar as the transmission of influence occurs by changing group norms, perhaps influencers will primarily affect behavior without affecting the psychology of those to whom they are connected (Tankard & Paluck, 2015).

In the following two studies, I tested whether the individually targeted habit-breaking intervention could create group-level change. Study 1 takes advantage of a cluster-randomized

field experiment (Carnes et al., 2015) conducted three years ago in which academic departments were randomly assigned to either receive an invitation to a workshop, based on the habit-breaking intervention, that aimed to improve the climate for female faculty in STEMM. Because not all faculty in experimental departments attended the workshop, this creates an opportunity to examine any influence processes that occur between attender faculty and non-attender faculty. In addition, because faculty within the same department typically work together over long periods of time, faculty have already established networks of trusted contacts within the department that could effectively spread influence.

However, Study 1 also has two limitations. First, individual faculty could choose to attend the workshop, and therefore certain types of faculty could self-select into attendance status. Second, because faculty already have strong networks of relationships prior to the workshop intervention, Study 1 does not afford the opportunity to study how the habit-breaking intervention could affect the formation of relationships between people. I attempted to address these limitations in Study 2 by experimentally creating small groups of strangers that work on a group project relevant to intergroup disparities over the course of two weeks. The groups are constructed such that some of them contain one person who has been previously exposed to the habit-breaking intervention. The group project therefore serves as a context in which the intervention-exposed person could create relationships with non-exposed people and, through these relationships, transmit social influence.

In both studies, I measured outcomes produced by the groups as a whole, individual-level outcomes, and the relationships between the group members. These different types of outcomes enabled me to assess whether intervention-exposed people differ from people who were not exposed to the intervention, whether people who interacted with intervention-exposed people

differ from people who did not, the relationships that best transmit the influence of intervention-exposed people, the characteristics of people who are most successful at influencing others, and whether the outcomes of groups that contain intervention-exposed participants are different from the outcomes of groups that do not.

Study 1

This study consists of a follow-up survey to a cluster-randomized field experiment in 92 academic departments in STEMM fields (Carnes et al., 2015). In the original field experiment, faculty from half of the participating departments were invited to complete a 2.5 hour workshop intervention, based on the prejudice habit-breaking intervention, that aimed to improve department climate for female faculty. As with the intervention developed by Devine and her colleagues (2012), this intervention made faculty aware of what implicit bias is, how implicit gender bias could contribute to unintentional discrimination, and the potential consequences for implicit gender bias for both science and the representation of women in science. Finally, the intervention taught the faculty the same five strategies for reducing implicit bias used by Devine and her colleagues (2012).

At a mean level, faculty from intervention departments experienced both increased awareness of gender bias and motivation, self-efficacy, and self-reported action to promote gender equity. Importantly, the intervention departments exhibited these changes despite the fact that only 31% of the faculty from these departments attended the workshop.

In a follow-up analysis comparing attending and non-attending faculty from the intervention departments, we found that the aforementioned effects were driven by changes among the workshop attendees. However, we also found that, after the workshop intervention, faculty who did not attend the workshop reported increased sensitivity to social pressure to

promote gender equity. These effects imply that although only the workshop attendees changed in the major study variables, the attendees may have exerted social influence on their colleagues, perhaps through the use of social pressure.

Now that three years have elapsed since the initial workshop intervention, I conducted a follow-up study to assess whether there are any sustained differences between experimental and control departments, and to assess whether workshop attenders influenced their colleagues to create these changes. Individual identifiers were not collected in the initial study, so no links to the previous bias literacy study were possible. I assessed two departmental characteristics that could plausibly have been impacted by the habit-breaking intervention, namely the proportion of new faculty that are female and the proportion of faculty who left the department that are women. I also administered a follow-up survey that assessed a variety of sociometric and individual-level variables that could shed light on the social influence processes within departments.

These sociometric variables included measures of collaboration on scientific and departmental matters, as well as measures of whether faculty respected and trusted each other on departmental matters. These sociometric measures allowed us to assess whether mere collaboration on scientific or department matters is sufficient to transmit the influence of the attender faculty or whether trust and/or respect relationships are necessary to transmit this influence.

The individual-level variables included several outcomes relevant to reducing gender bias, including the outcomes typically affected by the habit-breaking intervention, namely concern and awareness, and measures that had been affected by the workshop three months after the intervention, including department climate, self-efficacy to promote gender equity, and self-

reported action to promote gender equity. Finally, the individual-level measures included the motivations to respond without sexism for internal (value-driven) and external (normative) reasons. Combined, this assortment of department-level, sociometric, and individual-level measures should enable us to assess whether and how workshop attenders influenced their peers to create department-level change.

Method

Participants and procedure. As reported by Carnes and her colleagues (2015), departments were allocated to condition by creating pairs of departments of similar size, topic area, and school/college, then allocating one of each pair to each condition. This approach ensured that the departments were similar prior to the administration of the workshop intervention.

We gathered an initial list of faculty who were either faculty in one of the 92 participating departments in 2012 or who were listed as a faculty member on one of the department websites in Spring 2015. This list contained 2,299 faculty. Of these 2,299 faculty, 187 were faculty in 2012 but not in 2015, and 474 were faculty in 2015 but not in 2012. Thus, eligible participants included 2,112 people who were either listed as faculty in both 2012 and 2015 (1,638) or who were only listed in 2015 (474).

These 2,112 people received an invitation to complete a brief online survey (see Appendix 1 for the text of the invitation, Appendix 2 for the text of the survey). If, within one week of the initial invitation, a faculty member had not taken the survey, he or she received a reminder email, followed by a second reminder one week after the first reminder. At any time, the faculty could opt out of the study and reminders. Of the 2,112 people who received invitations, 438 (21%) consented to participate, and 353 (17%) completed the survey. This

response rate is somewhat low, but given that the faculty were not informed during the study invitations that the survey was linked to the bias literacy workshop, the low response rate should not have introduced a selection bias into the results.

Sociometric measures. Each participant saw a list of people who were listed as faculty on the department website. They were asked to nominate any faculty who fit the criteria listed in each of the four sociometric questions. They were told that they could nominate as many or as few people as they wished and that all their responses would be confidential. They were then asked which of the faculty they considered collaborators on scientific matters ($M = .11$), collaborators on department matters (e.g., curricular issues, award nominations, budget issues; $M = .22$), people whose opinions they respected on department matters ($M = .29$), and people whose opinions they valued on department matters ($M = .27$).

We coded nominations such that each nominee received a 1 if they were nominated by a given person and a 0 otherwise. Responses on the respect and value questions were highly correlated (polychoric $r = .89$), so we formed a composite influence measure by assigning people a 1 if they were nominated by a given person as someone who they both respected and valued and a 0 otherwise.

Self-efficacy and self-reported action. The self-efficacy items started with the stem “I am confident that [. . .]”, whereas the self-reported action items started with the stem “Within the past year [. . .]”. The self-efficacy and self-reported action items ended with five statements that were the same (except for a change in tense) for both the self-efficacy and self-reported action items. These statements were “[. . .] I can recognize when gender bias is occurring during a work-related interaction”, “[. . .] I can speak about gender equity in the workplace to my colleagues”, “When I have a response that is based on gender stereotypes, [. . .] I can replace the

stereotyped response with a non-stereotypic response”, “[. . .] I can adopt the perspective of a woman who is being evaluated for a position”, and “[. . .] challenge a personnel decision if I think it has been influenced by gender stereotypes”. The participants responded to each statement using a 1 (strongly disagree) to 7 (strongly agree) scale, and the sets of items were averaged together to form a self-efficacy index ($M = 5.19$, $SD = 1.03$, $skew = -.67$, Cronbach’s $\alpha = .69$) and a self-reported action index ($M = 4.35$, $SD = 1.49$, $skew = -.35$, Cronbach’s $\alpha = .80$) on which higher numbers indicate greater self-efficacy and more vigorous action, respectively.

Concern about gender discrimination. The concern scale consisted of 4 items directly adapted from Devine and colleagues (2012) for the gender context. Sample items include “I’m not personally concerned about discrimination against women” and “I consider gender discrimination to be a serious social problem”. The participants responded to each item using a 1 (strongly disagree) to 10 (strongly agree) scale, and items were averaged such that higher numbers indicate greater concern ($M = 8.20$, $SD = 1.65$, $skew = -1.23$, Cronbach’s $\alpha = .72$).

Should-would discrepancies. The should-would discrepancy scale (Monteith & Voils, 1998) consists of separate should and would subscales, each of which is measured using 1 (strongly disagree) to 7 (strongly agree) scales. The should subscale consists statements about how the participants feel they should act in some number of intergroup situations. The would subscale consists of parallel statements about how the participants think they would actually act in those situations.

We created 8 should and 8 parallel would statements based on situations in which gender bias might affect faculty responses. Sample should statements include “I should not assume women prioritize family over work” and “I should not assume that women who raise objections about the climate in my department are being overly sensitive”. Parallel would statements

include “If a female colleague took time off work, I would be quick to assume that she prioritizes her family over her work” and “I would be quick to assume that a woman who has concerns about the climate in my department is being oversensitive”.

We eliminated one should and its parallel would item (“I should feel more comfortable working with my male colleagues than my female colleagues” and “I would feel more comfortable collaborating with a male colleague than a female colleague”) because the should item had a low item-total correlation with the remainder of the scale ($r = .24$). The remaining should and would items were averaged together to create separate should and would indices, with higher numbers indicating that the participants believe they should and would act more bias in the hypothetical situations (should $M = 1.25$, $SD = .48$, $skew = 5.98$, Cronbach’s $\alpha = .71$; would $M = 1.87$, $SD = .68$, $skew = .94$, Cronbach’s $\alpha = .53$). We took the difference between the would and should indices to create a discrepancies index, which was scored such that higher numbers indicate the participants believe to a greater extent that would act with more bias than they feel is appropriate ($M = .62$, $SD = .72$, $skew = -.80$, Cronbach’s $\alpha = .52$).

Motivations to respond without prejudice. The Internal and External Motivations to Respond Without Sexism Scales (IMS and EMS; Klonis, Plant, & Devine, 2005) measure whether a person responds without sexism for either internal, value-driven reasons or external, social reasons. Both IMS and EMS consist of five items, each of which uses a 1 (strongly disagree) to 9 (strongly agree) scale. We modified the scale developed by Klonis and her colleagues (2005) to shorten each subscale to four items and to eliminate the term “sexism” from each statement because professors react strongly to items that directly reference sexism (Carnes et al., 2012). Sample items from our resulting scale include “Being non-biased toward women is important to my self-concept” (IMS) and “I attempt to appear non-biased toward women in order

to avoid disapproval from others” (EMS). We then averaged the two subscales such that higher scores indicate greater internal and external motivation (IMS $M = 8.27$, $SD = 1.12$, $skew = -2.30$, Cronbach’s $\alpha = .71$; EMS $M = 3.09$, $SD = 1.70$, $skew = .92$, Cronbach’s $\alpha = .69$).

Climate. The climate items consisted of 11 statements, to which the participants responded on a 1 (strongly disagree) to 7 (strongly agree). Two of these statements were “I feel pressured to conform to this department’s PC (politically correct) norms” and “I feel pressured in this department to behave in ways that are different from what I believe”. These items were averaged together to form a *PC norms* index such that higher numbers indicate a greater perception of PC norms ($M = 5.39$, $SD = 1.64$, $skew = -1.05$, Cronbach’s $\alpha = .84$).

The remaining nine statements regarded whether resources and responsibilities were distributed equitably, whether the participant’s felt comfortable and like he or she belonged in the department, and whether the participant’s professional development was supported in the department. These items were averaged together to form a *climate index* such that greater numbers indicate a climate that is perceived more positively ($M = 5.16$, $SD = 1.48$, $skew = -.95$, Cronbach’s $\alpha = .93$).

Results

Data analytic plan. We conducted all analyses using mixed effects models. Analyses with dichotomous outcomes were conducted using Generalized Linear Mixed Models (GLMMs) with logit links of the binomial family, whereas analyses with quantitative outcomes were conducted with Linear Mixed Models (LMMs). In each model we included a random intercept for department representing the clustering of respondents within departments.

Analyses of sociometric nominations had two additional random intercepts. Each survey respondent viewed j faculty names for each sociometric measure, where k is the number of

faculty in their department, and, for each faculty name, decided whether to nominate that person as a connection. Each faculty member saw their own name on the list, but was asked not to nominate themselves on any dimension. Thus, we represented each person's nominations as a vector of $j - 1$ responses for each respondent, each element of which was coded 1 if a particular faculty was nominated on a particular dimension and 0 otherwise. Because each respondent varies in their tendency to nominate others as connections, and because each nominee varies in their tendency to garner nominations, we included random intercepts for nominator and nominee.

We conducted our analyses on the general characteristics of each department, the sociometric nominations, and the survey outcomes. For the departmental characteristics, we merely compared the control and experimental departments. For the sociometric nominations, we made an additional set of comparisons, comparing the faculty in control departments to the faculty who did and did not attend the workshop intervention, respectively. We can also examine attenders and non-attenders as either nominators (to determine, for example, whether attenders are especially likely to nominate others as departmental collaborators) or as nominees (to determine, for example, whether attenders are especially likely to be nominated by others as department collaborators). We made these additional comparisons by creating two dummy-coded contrasts variables for faculty as nominators and nominees. The first contrast coded control faculty, attenders, and non-attenders $[0, 1, 0]$, whereas the second coded these groups $[0, 0, 1]$. Coefficients for these contrasts can therefore be interpreted as the difference between attenders and control faculty and non-attenders and control faculty, respectively. Holding constant network density, two faculty in a large network have a lower probability of being connected than two faculty in a smaller network; we therefore included department size as a covariate in these analyses.

For the individual-level outcomes, in addition to comparing attenders and non-attenders to the control faculty, we fit additional models that broke non-attenders into two further groups: faculty connected and unconnected to attenders. We could also define a connection to attenders either in terms of whether non-attending faculty were nominated by an attender on one of the three sociometric variables or in terms of whether non-attending faculty nominated an attender on one of the three sociometric variables. We made these additional comparisons by creating three dummy-coded contrast variables, the first of which coded control faculty, attender faculty, connected faculty, and unconnected faculty $[0, 1, 0, 0]$, the second of which coded these groups $[0, 0, 1, 0]$, and the third of which coded the groups $[0, 0, 0, 1]$. The second variable can therefore be interpreted as the difference between connected faculty and faculty in control departments, and the third contrast can be interpreted as the difference between unconnected faculty and faculty in control departments.

Finally, we examined the relationships between the sociometric and individual-level outcomes by fitting a series of models that let each individual-level outcome predict each sociometric outcome. Individual-level outcomes were group mean centered to eliminate between-department variation (Enders & Tofighi, 2007). These models examined both nominator and nominee individual-level outcomes; so, in the model examining the relationship between concern about discrimination and scientific connections between faculty, we estimated the effects of both nominator and nominee concern within the same model. We initially included random slopes for nominator, nominee, and department, but models with this maximal random effects structure would not converge. Our final models included only random slopes for each department. Correlations between the random slopes and intercepts were fixed to 0.

Departmental characteristics. As shown in Table 1, control and experimental departments were not different on most characteristics. The only exception was that a greater proportion of new faculty from experimental departments were women, $B = -.46$, $\chi^2(1, N = 474) = 4.06$, $p = .044$; as shown in Figure 1, whereas an estimated 31% of new faculty in control departments were women, an estimated 42% of faculty from experimental departments were women. This result suggests that experimental departments made a concerted effort to equalize the proportion of women that they hired. Importantly, there were no differences between control and experimental departments in the proportion of women that left the department since 2012, $B = .078$, $\chi^2(1, N = 187) = .055$, $p = .81$.

Sociometric outcomes. The results of the analyses of the sociometric outcomes are shown in Table 2. As shown in the table, there were no overall differences between the experimental and control departments on the probability of two faculty having a scientific, departmental, or trust connection. However, compared to faculty from control departments, attendee faculty had 2.56 times the odds of being nominated by their peers both a departmental collaborators, $B = .94$, $\chi^2(1, N = 455) = 12.99$, $p < .001$, and as a people who were trusted/respected on departmental affairs, $B = .77$, $\chi^2(1, N = 455) = 4.87$, $p < .001$. In addition, non-attendee faculty had 1.49 times the odds of nominating others as scientific collaborators, $B = .40$, $\chi^2(1, N = 455) = 5.24$, $p = .022$, though the peers of non-attenders had only a non-significant 1.31 times the odds of nominating attendees as scientific collaborators, $B = .27$, $\chi^2(1, N = 455) = 2.82$, $p = .093$.

Individual-level outcomes. The overall comparisons between the control and experimental departments on the survey outcomes, as well as the comparisons between control faculty, attendees, and non-attenders, are all shown in Table 3. As shown in the table, there were

no overall differences between faculty in the control and experimental departments. However, when comparing attender and non-attender faculty to control faculty, attender faculty tended to be higher in concern about gender discrimination than faculty in control departments, $B = .63$, $F(1, 174.12) = 5.26$, $p = .023$. These results are consistent with a large body of evidence suggesting that the habit-breaking intervention produces enduring changes in concern about discrimination (Forscher et al., in preparation). There were no other differences between attenders and people in control departments or non-attenders and people in control departments on the survey outcomes.

The results of our analyses of non-attenders who were either connected or unconnected to attender faculty are shown in Tables 4a through 4c. As shown in the tables, and as shown in Figures 2 and 3, across scientific, departmental, and trust nominations, the only difference between people nominated by attenders and people in control departments is that people nominated by attenders as departmental collaborators reported taking relatively more action to promote gender equity in their department, $B = .58$, $F(1, 98.28) = 5.36$, $p = .023$. People who were not nominated by attenders tended to be lower in IMS than people in control departments, and this was true for both scientific nominations, $B = -.32$, $F(1, 74.92.25) = 4.70$, $p = .033$, and department nominations, $B = -.36$, $F(1, 98.25) = 5.12$, $p = .023$.

People who nominated attenders as scientific collaborators tended to be lower in IMS, $B = -.37$, $F(1, 144.01) = 4.42$, $p = .037$, and higher in EMS, $B = .55$, $F(1, 138.41) = 3.91$, $p = .050$, than people in control departments. Finally, people who did not nominate attenders perceived their department climate as worse than people in control departments, whether these people failed to nominate attenders as department collaborators, $B = -.89$, $F(1, 210.13) = 9.02$, $p = .003$, or as people the trusted/respected on department matters, $B = -.65$, $F(1, 203.50) = 4.94$, $p = .027$.

Relationships between sociometric and individual-level outcomes. Table 5 shows the relationships between the individual-level and sociometric outcomes, broken down by the survey characteristics of nominators and nominees. Nominators who reported a positive department climate nominated a higher proportion of colleagues as scientific, $B = .33$, $\chi^2(1, N = 340) = 16.45$, $p < .001$, and department, $B = .24$, $\chi^2(1, N = 340) = 17.56$, $p < .001$, and trusted, $B = .61$, $\chi^2(1, N = 340) = 31.06$, $p < .001$, collaborators. Faculty who perceived the norms as relatively more politically correct also tended to nominate a greater proportion of colleagues on each of these three dimensions, scientific $B = .15$, $\chi^2(1, N = 340) = 4.95$, $p = .026$, department $B = .15$, $\chi^2(1, N = 340) = 4.05$, $p = .044$, trust $B = .24$, $\chi^2(1, N = 340) = 7.21$, $p = .007$. Finally, faculty who were higher in self-efficacy to promote gender equity nominated a relatively high proportion of faculty who they trusted, $B = .38$, $\chi^2(1, N = 331) = 6.42$, $p = .011$.

When considering the characteristics of nominees, faculty who perceived the climate in their department as more positive tended to be nominated at higher rates as scientific, $B = .15$, $\chi^2(1, N = 340) = 6.27$, $p = .012$, department, $B = .24$, $\chi^2(1, N = 340) = 7.31$, $p = .007$, and trusted, $B = .25$, $\chi^2(1, N = 340) = 6.71$, $p = .010$, collaborators. Faculty who reported they would act with more gender bias were less likely to be nominated as scientific collaborators, $B = -.35$, $\chi^2(1, N = 312) = 5.15$, $p = .023$, and a similar pattern pertained to faculty with larger discrepancies between their shoulds and woulds, $B = -.35$, $\chi^2(1, N = 312) = 6.64$, $p = .010$.

Discussion

The goal of Study 1 was to assess whether there were overall department-level differences between departments that were and were not assigned to receive the workshop intervention, and whether these differences might be linked to the influence of workshop attenders on non-attenders. Although there were no other differences between the control and

experimental conditions at the department level, we found that a greater proportion of new faculty in experimental departments were women. Workshop attenders also differed from faculty in control departments; compared to control faculty, attenders exhibited elevated levels of concern about gender discrimination and were especially likely to be nominated by their peers as both collaborators on department affairs and people who were trusted/respected on department affairs. Given that, in general, faculty who were high in concern about gender discrimination were relatively likely to nominate other faculty as collaborators on department matters, it is possible that one of the reasons attenders were well-connected in their departments was that their concern motivated them to become well-connected.

In addition, faculty who were nominated by attenders as departmental collaborators were different from control faculty in that they reported taking more action to promote gender equity in their department. Faculty high in self-reported action were, in general, relatively likely to be nominated by others as a collaborator on department matters. Considering that attenders were relatively more likely to be nominated as department collaborators and as trusted and respected on department matters, these findings suggest that attenders influenced their colleagues to take action to promote gender equity in their departments. Notably, faculty nominated by attenders as department collaborators were *not* different from control faculty on any of the psychological characteristics that we assessed, such as concern about discrimination or awareness of their personal levels of gender bias, suggesting that the influence of attenders did not necessarily extend to the psychological characteristics of the people to whom they were connected.

The action of connected faculty may have taken the form of bringing a greater proportion of female faculty to the department; indeed, within experimental departments, the mean level of self-reported action was positively related to the proportion of new faculty who were female, r

= .21, whereas the relationship was reversed in control departments, $r = -.34$, interaction $B = .17$, $t(76) = 2.37$, $p = .020$. Because faculty who did not nominate attenders as trusted/respected or as department collaborators reported worse climate in their department, perhaps the actions of workshop attenders came at the cost of making some faculty excluded or unwelcome from department life.

However, two features of this study complicate the interpretation of its results. First faculty in experimental departments chose whether to attend the workshop intervention, so it is ambiguous whether the differences between attenders and control faculty (and between faculty connected to attenders and control faculty) are due to the causal impact of the intervention on attenders or due to self-selection of faculty into the workshop intervention. For example, faculty who were particularly concerned about gender discrimination and/or who were particularly active in their departments may have chosen to attend the workshop intervention. Second, the workshop intervention occurred in the context of long-term, pre-existing relationships, so it is ambiguous whether the workshop intervention caused attenders to develop relationships with other faculty who might be susceptible to influence, or whether attenders exerted influence using their pre-existing relationships. Addressing some of these ambiguities was therefore the purpose of my second study.

Study 2

In Study 2, we sought to address the lack of random assignment of individual faculty to condition from Study 1 and conduct our study in the context of a group of relative strangers. We accomplished this by creating in the laboratory small groups of four strangers who worked together on a report about racial disparities over the course of two weeks and randomly assigning one person from half of the groups to be exposed to the habit-breaking intervention. We

measured group-level outcomes in the form of the content and quality of the reports and both individual-level and sociometric analogues to the outcomes assessed in Study 1.

Although four-person work groups are both smaller and work together for a shorter timespan than the academic departments from Study 1, these groups have the advantages of greater experimental control and random assignment of individuals to the habit-breaking intervention. Thus, to the extent that the results from Study 1 and Study 2 converge, Study 2 should give us greater confidence in interpreting the effects from Study 1 as causal impacts of the workshop intervention.

Method

Participants and procedure. Forty-six small groups (21 intervention, 25 control) composed of four White undergraduates each (total $N = 184$; 61% female) participated. At the beginning of the semester, all participants completed a large, online survey that contained baseline measurements of all measures. Later in the semester, the participants were asked to conduct a “committee investigation” of a race-related issue and write a committee report about the issue in return for 6 extra credit points and \$24. In addition, each small group (committee) was informed that they had a chance to win \$75 per committee member if their committee’s report was judged to be the highest among all the reports in quality.

Each committee met three times in the lab over the course of two weeks. Prior to the first committee meeting, one out of every eight participants completed a modified version of the prejudice habit-breaking intervention in an ostensibly unrelated online session. The remaining participants did not complete the habit-breaking intervention. From these pools of intervention and non-intervention participants, we constructed experimental and control committees such that

experimental committees contained one person who has received the intervention and control committees contained no people who have received the intervention

Modified prejudice habit-breaking intervention. In the habit-breaking intervention originally created by Devine and colleagues (2012), the participants are first made aware of their level of implicit (unintentional) race bias through completing a measure of implicit bias and receiving feedback about their performance on this measure. After receiving this feedback, the participants complete a 45 minute narrated, semi-interactive slideshow divided into education and training sections. In the education section, the participants learn what implicit bias is, how implicit bias is measured, and how implicit bias can cause otherwise well-meaning people to unwittingly perpetuate racial discrimination. The participants also learn some of the consequences of implicit bias in domains ranging from health to employment to well-being. In the training section, the participants are informed that, like an unwanted habit, implicit bias can be reduced through a combination of motivation, awareness, and the use of effective strategies to reduce implicit bias. Finally, they are taught five strategies that past research suggests are effective in reducing implicit bias, including stereotype replacement (Monteith, 1993), counter-stereotypic imaging (Dasgupta & Greenwald, 2001; Blair et al., 2001), individuating (Brewer, 1988; Fiske & Neuberg, 1990), perspective taking (Galinsky & Moskowitz, 2000; Todd et al., 2011), and increasing opportunities for contact (Pettigrew & Tropp, 2006).

We made the following modifications to the original prejudice habit-breaking intervention (see Appendix 3). First, to reduce the total time commitment to the participants (and thus the required compensation to participants), we reduced the total length of time required to complete the intervention by removing the narration from the intervention, which, according to pilot testing, reduces the time required to complete the intervention to 15 minutes. To ensure

that the participants still pay attention to the slideshow, we conducted a five-question, multiple-choice quiz at the end of the slideshow and informed the participants about this quiz at the slideshow's beginning. Second, consistent with modifications made in our follow-up work on the habit-breaking intervention (Forscher et al., in preparation), we moved the point at which we give the participants feedback about their personal level of implicit bias to the point after the participants have learned what implicit bias is, how implicit bias is measured, and the consequences of implicit bias for racial minorities. We made this sequencing change so that the participants have more context to understand the meaning of the implicit bias feedback. Third, in our examples of the consequences of implicit bias for racial minorities, we placed a sharper emphasis on how implicit bias can contribute to societal disparities to increase the match between the content of the habit-breaking intervention and the topic of the report prepared by the participant committees. Fourth, and finally, we removed the counterstereotypic imaging strategy from the intervention on the basis of evidence that the use of this strategy is associated with decreases in concern about discrimination (Forscher et al., in preparation). To further encourage intervention participants to actively participate in their committees, we replaced this strategy with a "conversations" strategy encouraging the participants to initiate race-related conversations with others.

Committee meetings. At session 1, each group was informed that, as the university's representative in national organizations for universities, the Dean of Students is interested in student opinions on issues that affect students. Because of its access to a large pool of students, Psychology Department is assisting with gathering these opinions. To this end, the Psychology Department is organizing small committees of four students each that are each tasked with

investigating a topic in-depth and writing a report based on these investigations. These reports would be submitted to the Dean's office at the end of the study.

Each group was informed that their task is to investigate racial disparities in education. Thus, the groups should evaluate the strength of the evidence that racial disparities exist in education, how these disparities affect students, and what, if anything, universities should do to address these disparities. Each group should compile these findings into a report over the course of two weeks. This report could be did not have to be any particular length, but we told the groups that we imagined each report would be about 4 – 6 double-spaced pages long, not including references.

The participants were told that they would be have two sessions (session 1 and session 2) to meet with their group about issues related to the project. Finally, the participants were given an email account for study-related communication, which was linked to an account for an online time-tracking tool to track time spent outside the lab on project-related business. All participants were given an information sheet detailing the above information (see Appendix 4).

In session 1, the participants were given half an hour for their first meeting, and they were given an additional hour to meet in session 1. Both meetings were videotaped using a hidden camera. At the beginning of session 1, at the end of session 2, and at the beginning of session 3, the participants were asked to complete a questionnaire (see Appendix 5). In session 1, this questionnaire contained the *race-relevant measures*, described in more detail below. In sessions 2 and 3, the questionnaire also contained the *sociometric* and *personal* measures. At the end of session 3, the participants turned in their group reports and were debriefed.

Report variables. We used a word count program to assess the length of each report. In addition, the reports were coded by a team of eight people. The coding categories included the

quality of the report, the degree of concern the report exhibits about racial disparities in education, and various aspects of the report's recommended course of action. Each person coded a quarter of the reports, which means that all reports were coded twice; these two separate codings were used to assess the reliability of the coding scheme. Discrepancies between coders were resolved through discussion.

Report quality was assessed in four separate dimensions, all of which were judged using a 0 (*poor*), 1 (*average*), 2 (*good*), 3 (*excellent*). These dimensions include the structure of the report (use of introduction and conclusion, etc., $M = 1.59$, $SD = .79$, weighted Cohen's $\kappa = .87$), the quality of the arguments ($M = 1.57$, $SD = .85$, weighted Cohen's $\kappa = .86$), the quality of the evidence ($M = 1.73$, $SD = .82$, weighted Cohen's $\kappa = .85$), and the quality of the writing ($M = 1.84$, $SD = .83$, weighted Cohen's $\kappa = .86$). These four dimensions were averaged together to create an overall *quality index* ($M = 1.68$, $SD = .65$, $\alpha = .79$).

Concern about educational disparities was assessed using two dimensions, including the pervasiveness of racial disparities that are described and the described seriousness of the problem. Pervasiveness was judged using a 0 (*no disparities*), 1 (*limited disparities*) 2 (*pervasive disparities*) scale ($M = 1.82$, $SD = .39$, weighted Cohen's $\kappa = .89$), whereas seriousness was judged using a 0 (*not at all serious*), 1 (*somewhat serious*), 2 (*very serious*) scale ($M = 1.59$, $SD = .58$, weighted Cohen's $\kappa = .84$). Pervasiveness and seriousness were averaged to form an *education concern index* ($M = 1.70$, $SD = .45$, $\alpha = .78$).

The coders counted the number of recommendations given by each report ($M = 2.18$, $SD = 1.93$, weighted Cohen's $\kappa = .84$). They also rated the overall ease of implementing the recommendations using a 0 (*difficult*), 1 (*neither easy nor difficult*), 2 (*easy*) scale ($M = .72$, $SD = .60$, weighted Cohen's $\kappa = .75$) and the degree to which, if implemented, the recommendations

might effectively reduce racial disparities using a 0 (*ineffective*), 1 (*neither ineffective nor effective*), 2 (*effective*) scale ($M = 1.29$, $SD = .69$, weighted Cohen's $\kappa = .79$). Finally, they tracked whether the reports recommended addressing racial disparities through Affirmative Action policies (27%, Cohen's $\kappa = .89$), colorblindness (18%, Cohen's $\kappa = .91$), or multiculturalism (25%, Cohen's $\kappa = .91$).

Sociometric measures. The participants viewed pictures of each other member of their committee one at a time and rated each person on a number of variables using 1 to 7 scales. On the basis of exploratory factor analysis, we grouped these variables into *trust*, *perceived knowledge*, *perceived contributions*, and *concern about disparities in education*.

The trust index consisted of two items, including the degree to which the rater liked working with the target and the degree to which the rater trusted the target. Higher numbers indicate greater trust ($M = 5.54$, $SD = 1.48$, $skew = -1.21$, Cronbach's $\alpha = .91$).

The perceived knowledge index consisted of a single item measuring the degree to which the rater perceived the target as knowledgeable about racial disparities in education. Higher numbers indicate greater perceived knowledge ($M = 5.12$, $SD = 1.58$, $skew = -.77$).

The perceived contribution index consisted of two items measuring the amount the rater perceived the target to contribute to the group project and the degree to which the rater perceived these contributions as valuable. Higher numbers indicate greater perceived contributions ($M = 5.40$, $SD = 1.73$, $skew = -1.15$, Cronbach's $\alpha = .97$).

The concern about educational disparities index consisted of three items measuring the degree to which the rater perceived that the target believed that racial disparities exist and are a problem in education, and how concerned the target is overall about racial disparities in

education. Higher numbers indicate greater perceived concern about disparities in education ($M = 5.17$, $SD = 1.40$, $skew = -.73$, Cronbach's $\alpha = .91$).

Race-relevant measures. These measures included concern about racial discrimination (Devine et al., 2012), internal and external motivations to respond without prejudice (Plant & Devine, 1998), and awareness of one's own race bias (Monteith & Voils, 1998). At baseline, these measures also included a measure of attitudes toward Black people.

Concern about racial discrimination was measured using a 1 (strongly disagree) to 10 (strongly agree) scale. A sample item is "I consider racial discrimination to be a serious social problem". Items are scored and averaged such that higher numbers indicate higher concern (baseline $M = 7.08$, $SD = 2.07$, $skew = -.43$, Cronbach's $\alpha = .86$).

Awareness was measured through separate should and would subscales. On each subscale, the participants rate on 1 (strongly disagree) to 7 (strongly agree) scales how they feel they should and would act in race-related situations. A sample should item is "I should not feel uncomfortable about having a Black roommate" whereas its corresponding would item is "I would feel uncomfortable if I was assigned a Black roommate". Awareness is measured by taking the difference between the average ratings on the should and would subscales. Higher should scores indicate less stringent standards in regulating one's behavior (baseline $M = 1.34$, $SD = .67$, $skew = 2.68$, Cronbach's $\alpha = .82$), higher would scores indicate that one believes one would act with greater bias in the indicated situations (baseline $M = 2.27$, $SD = 1.08$, $skew = .88$, Cronbach's $\alpha = .82$), and larger differences between the should and would scales indicate a greater awareness that there is a difference between how one thinks one should and would act in the situations (baseline $M = .93$, $SD = 1.05$, $skew = .03$, Cronbach's $\alpha = .75$).

Internal and external motivations to respond without prejudice were measured by asking participants to rate using 1 (strongly disagree) to 9 (strongly agree) scales the extent to which they are motivated for internal (i.e., value-driven) or external (i.e., normative) reasons to respond without prejudice towards Blacks. Higher numbers indicate greater presence of the target motivation (IMS baseline $M = 7.46$, $SD = 1.64$, $skew = -1.10$, Cronbach's $\alpha = .83$; EMS baseline $M = 4.18$, $SD = 2.09$, $skew = .34$, Cronbach's $\alpha = .81$).

Attitudes toward Black people were measured using the feelings thermometer, in which the participants are asked to simultaneously rate their feelings toward a number of groups using a 0 (*very cold*) to 100 (*very warm*) scale (baseline $M = 78.61$, $SD = 19.09$, $skew = -.85$).

Personal measures. These measures were all measured using 1 to 7 scales. On the basis of exploratory factor analysis, we grouped these variables into *perceived contributions*, *concern about disparities in education*, *enjoyment*, *pressure*, and *satisfaction with outcome*.

The personal contributions index paralleled the sociometric measure of contributions, and consisted of two items measuring the degree to which each participant felt they contributed to the project and the degree to which these contributions were valued (session two $M = 5.37$, $SD = 1.17$, $skew = -.67$, Cronbach's $\alpha = .82$).

The concern about educational disparities index also paralleled the sociometric measure of the same name, and consisted of three items measuring the extent to which the participants believed there are disparities in education, the extent to which they believed these disparities are a problem, and the degree to which, overall, they were concerned about racial disparities in education. Higher numbers indicate greater concern about disparities in education (session two $M = 5.57$, $SD = 1.31$, $skew = -.99$, Cronbach's $\alpha = .94$).

The pressure index consisted of a single item measuring the degree to which the participants felt pressured to withhold their views about racial disparities from their fellow group members. Higher numbers indicate greater perceived pressure (session two $M = 2.19$, $SD = 1.59$, skew = 1.31).

The enjoyment index consisted of a single item measuring the degree to which the participants enjoyed the group project. Higher numbers indicate greater enjoyment (session two $M = 4.03$, $SD = 1.77$, skew = -.03).

The satisfaction index consisted of a single item measuring the degree to which the participants were satisfied with their group's recommendations. Higher numbers indicate greater satisfaction (session two $M = 5.13$, $SD = 1.50$, skew = -.73).

Time spent on the group project. All participants are asked to track the amount of time they spend on the project outside the lab sessions using an online time-tracking tool. This tool consists of a stopwatch, which the participant clicks at the beginning and end of a block of work.

In some blocks of work, the participants neglected to press stop upon completing their work. We identified these incidents as any block of time over four hours long ($N = 12$) and replaced these with the median block of tracked time (median = .65 hours). A total of 117 people tracked any time using the time-tracking tool ($M = 2.04$ hours, $SD = 1.66$, skew = 2.09).

Results

Data analytic plan. We conducted analyses on the report variables using either a General Linear Model if the outcome could be considered quantitative or a Generalized Linear Model if the outcome could not. For dichotomous outcomes, the Generalized Linear Model used a logit link of the binomial family; for ordered categorical variables, the Generalized Linear

Model was a proportional odds model with a logit link of the binomial family; for count variables, the Generalized Linear Model used a log link of the Poisson family.

Analyses of the sociometric and individual-level variables used Linear Mixed Effects Models. In each model we included a random intercept for committee representing the clustering of participants within groups. The sociometric analyses had two additional random intercepts for the source and target of the ratings. These additional random intercepts represent differences in peoples' tendency to give and receive high or low ratings.

For each variable, we conducted two sets of analyses. The first set of analyses compared the control and experimental committees. The second set of analyses broke the experimental committees into the intervention participant and the non-intervention participants (i.e., the potential targets of influence within the experimental committees). For the sociometric ratings, we could also examine intervention and non-intervention participants as both raters and as the targets of others' ratings. We conducted this second set of analyses using two dummy-coded contrast variables, the first of which coded the control, intervention, and non-intervention participants [0, 1, 0], and the second of which coded these participants [0, 0, 1]. Coefficients for these contrasts can therefore be interpreted as the difference between the intervention and control participants and the non-intervention and control participants, respectively.

Finally, we examined the relationships between the sociometric and individual-level outcomes by fitting a series of models that let each individual-level outcome predict each sociometric outcome. Individual-level outcomes were group mean centered to eliminate between-committee variation (Enders & Tofighi, 2007). These models examined both nominator and nominee individual-level outcomes. We initially included random slopes for nominator,

nominee, and committee, but models with this maximal random effects structure would not converge. Our final models included no random slopes.

Baseline comparisons. Before conducting the main analyses, we compared the control, intervention, and non-intervention participants on their baseline characteristics, as measured during the large, online survey, using a series of linear models. The results of these comparisons are shown in Table 6. Although participants in experimental committees did not differ from participants in control committees on other characteristics, non-intervention participants experimental committees were somewhat higher than control participants in baseline EMS, $B = .37$, $t(179) = 2.17$, $p = .03$.

Report analyses. The results of the analyses of the coded report characteristics are shown in Table 7. As shown in the table, the only major difference between the reports was that experimental reports were less likely to recommend using colorblindness as a strategy to address racial disparities; whereas 28% of control reports advocated this strategy, only 5% of experimental reports did, $B = -1.95$, $\chi^2(1, N = 44) = 4.24$, $p = .039$.

Sociometric analyses. The comparisons between the control and experimental committees on the sociometric variables are shown in Table 8. As shown in the table, the control and experimental committees had different rates of change on their ratings of perceived knowledge, $B = .32$, $F(1, 45.61) = 4.66$, $p = .036$; whereas in control committees, participants rated each other as increasingly knowledgeable from session 2 to session 3, $B = .24$, $F(1, 43.92) = 5.81$, $p = .020$, the rate of change in knowledge ratings in experimental committees was relatively flat and even slightly negative, $B = -.084$, $F(1, 46.99) = .56$, $p = .46$. There were no other overall differences between the experimental and control committees.

We also examined the intervention and non-intervention participants separately as both the source and target of others' ratings. The results of these analyses are shown in Table 8. As shown in the table and Figures 4 and 5, the difference in the rate of change in knowledge ratings between experimental and control committees was driven primarily by decreases in knowledge ratings given by the intervention participants to their fellow group members, $B = -.49$, $F(1, 152.03) = 4.61$, $p = .033$ (though, notably, the knowledge ratings received by intervention participants also decreased, albeit by a nonsignificant amount). In addition, the trust ratings given by the intervention participants to their fellow group members decreased relative to those in the control group from session 2 to session 3, $B = -.61$, $F(1, 118.38) = 6.57$, $p = .012$.

Individual-level analyses. The overall comparisons between the control and experimental committees on the race-related variables and personal ratings are shown in Table 9. As shown in the table, people in both control and experimental committees grew in concern about discrimination, $B = .16$, $F(1, 43.79) = 11.17$, $p = .002$, and EMS, $B = .32$, $F(1, 43.72) = 34.40$, $p < .001$. Across timepoints, people in experimental committees were also higher in EMS than people in control committees, $B = .92$, $F(1, 44.14) = 9.26$, $p = .004$. Finally, people in experimental committees grew in woulds compared to people in control committees, $B = .10$, $F(1, 45.96) = 3.86$, $p = .056$, and, overall, reported greater discrepancies than did people in control committees, $B = .40$, $F(1, 49.18) = 10.38$, $p = .002$. The overall differences in EMS and discrepancies between the experimental and control committees are likely due to the differences between the committees in these variables at baseline.

Surprisingly, and inconsistent with Study 1, when dividing experimental committees into people who did and did not receive the intervention, intervention participants did not have a higher rate of growth in concern than control participants, $B = .16$, $F(1, 147.04) = 1.26$, $p = .26$.

This occurred, perhaps, because control participants were also growing in concern, perhaps because of the topic of the report that they were preparing. Intervention participants also had a relatively strong growth rate in woulds, $B = .21$, $F(1, 142.48) = 7.56$, $p = .006$, mirroring results from past studies of the effects of the habit-breaking intervention, though intervention participants did not also grow in discrepancies. Finally, intervention participants grew in EMS compared to participants in control committees, $B = .10$, $F(1, 149.13) = 1.09$, $p = .30$. Mirroring the differences that we found at baseline, non-intervention participants had higher overall levels of EMS, $B = .97$, $F(1, 60.97) = 8.68$, $p = .005$, compared to participants in control committees. Finally, non-intervention participants were less satisfied with the recommendations of their committees than were control participants, $B = -.59$, $F(1, 53.72) = 3.97$, $p = .051$.

Time spent on the group project. Non-responses on the measure of outside time spent on the group project are ambiguous in that they can either indicate that the participant forgot to track his or her time or that the participant spent no time at all on the group project outside of the lab. There were no differences in either the probability of non-response in experimental vs control committees, $B = 1.07$, $\chi^2(1, N = 184) = 2.50$, $p = .11$, nor, among people who tracked their time, the amount of time tracked, $B = -.31$, $F(1, 35.15) = .68$, $p = .41$. These lack of differences extended to the control vs intervention comparisons, probability of non-response $B = .92$, $\chi^2(1, N = 184) = 1.21$, $p = .27$, time tracked $B = -.37$, $F(1, 92.87) = .48$, $p = .49$, and the control vs non-intervention comparisons, probability of non-response $B = 1.12$, $\chi^2(1, N = 184) = 2.59$, $p = .11$, time tracked $B = -.29$, $F(1, 92.87) = .52$, $p = .47$.

Relationships between race-related variables and the sociometric variables. The results of the analyses of the relationships between the race-related and sociometric variables are shown in Table 9. As shown in the table, when considering participants as raters, participants

high in IMS rated their peers as contributing more to the project, $B = .17$, $F(1, 236.75) = 13.46$, $p < .001$, and as more concerned about educational disparities, $B = .14$, $F(1, 480.42) = 11.64$, $p < .001$. Participants who reported a greater difference between how they should and would act perceived their peers as less knowledgeable about racial disparities, $B = -.13$, $F(1, 477.72) = 4.88$, $p = .028$. Finally, participants who were higher in concern rated their peers as being more concerned about educational disparities, $B = .10$, $F(1, 426.89) = 10.69$, $p = .001$, and participants who were higher in EMS rated their peers as less concerned about educational disparities, $B = -.051$, $F(1, 385.79) = 4.37$, $p = .037$.

Only concern about discrimination was related to the ratings of their peers. Participants who were more concerned about discrimination were rated by others as more concerned about educational disparities, $B = .067$, $F(1, 205.15) = 10.12$, $p = .002$.

Discussion

Compared to people in control committees, people in experimental committees rated each other as less knowledgeable about racial disparities over time. This relative decrease in perceived knowledge was driven primarily by a decrease in the degree to which intervention participants perceived their peers as knowledgeable. Moreover, in addition to rating their peers as less knowledgeable, intervention participants decreased in the extent to which they trusted their peers, suggesting that intervention participants lost confidence in their peers as credible sources of information.

The fact that intervention participants disliked and distrusted their peers perhaps explains why intervention participants generally failed to influence them – they may not have wanted to go through the trouble of influencing people with whom they did not like working. Indeed, experimental committees produced reports that were relatively similar to those produced by

control committees, with the exception that experimental committees were less likely to advocate for colorblind policies as solutions to racial disparities. In addition, non-intervention participants did not grow in any individual characteristic, suggesting that intervention participants did not necessarily attempt to persuade their peers to adopt different views.

However, the fact that experimental committees grew in external motivation to respond without prejudice may suggest that intervention participants helped establish a strong norm to respond without prejudice. This strong norm, combined with the fact that intervention participants did exert some influence on the content of their committee's report, may explain why non-intervention participants ended the study less satisfied with their committee's recommendations than did control participants – although intervention participants may not have attempted to actively persuade their peers to adopt different views, they may have helped set strong norms for what was discussed in the committee meetings, and may have exercised some control over the recommendations that made their way into the final report

There was an ambiguity in the results of this study – namely, the fact that non-intervention participants were higher in EMS at baseline than control participants. Thus, it is possible that the decrements in trust and perceived knowledge were caused by the high levels of these participants' EMS rather than the fact that the intervention participant received the intervention. However, given that EMS was unrelated trust and perceived knowledge, we believe that this interpretation is unlikely.

General discussion

In Study 1, I found that faculty who had attended a workshop based on the habit-breaking intervention reported relatively high levels of concern about discrimination, and the colleagues that they nominated as department collaborators were relatively likely to report taking action to

promote gender equity in their department. Faculty connected to attenders did not differ from control faculty on any psychological variable; they only differed in their level of self-reported action. Finally, departments in which the attenders worked had a relatively high proportion of new female faculty, perhaps suggesting that attenders and their colleagues had worked to change department policies in a way that would lead to more female hires.

In contrast to the apparent evidence of influence in Study 1, in Study 2, intervention participants grew to distrust their fellow group members and view these group members as relatively poor sources of information about racial disparities. The actions of intervention participants may have led to final reports that were less likely to advocate in favor of colorblind strategies, which past evidence suggests do indeed have generally negative consequences for minorities (for a review, see Apfelbaum, Norton, & Sommers, 2012). However, the students who worked with intervention participants ended the study less satisfied with the report's recommendations than did control participants, suggesting that they were not entirely in agreement with the changes to the reports instigated by the intervention participants. Although the intervention participants may have influenced the content of the report, they did not necessarily cause changes among their peers.

The results of Studies 1 and 2 strike an interesting contrast with each other, though the reasons for the differences are ambiguous. Studies 1 and 2 differ in participants (faculty vs college students) setting (academic departments vs the lab), design (cluster-randomized vs individually randomized), topic (gender bias in STEMM vs racial disparities in education), the relationships between group members (colleagues vs strangers), and the number of people within each group that received the intervention (greater than one vs one only). Any one of these

differences could plausibly explain the differences between the results. The last three of these explanations are perhaps the most interesting.

In Study 1, the cluster-randomized design resulted in faculty who were both respected and well-connected in their departments in attending the workshop intervention. These faculty may have been well-positioned to act as champions of the bias literacy intervention within their departments. Given the important role of leaders in promoting changes in medical and other organizations (Aagaard et al., 2010; Paluck, Shepherd, & Aranow, 2016), the lack of individual randomization may have been critical to the bias literacy intervention's success. This analysis suggests that, had the intervention in Study 2 been assigned to student leaders who could act as champions of the intervention within their committees, we might have observed a greater level of influence within the student committees.

Another, not mutually exclusive explanation relies on the greater levels of pre-established trust that were present among the faculty participants of Study 1 and not present among the student participants of Study 2. Trust is critical to the success of persuasive communication (Giffin, 1967; Chaiken, 1980) and social influence more generally (Paluck, 2011). Perhaps the intervention participants from Study 2 would have been more successful at influencing their peers had they been experimentally induced to become friends with their peers (through a fast friends manipulation, for example; Page-Gould, Mendoza-Denton, & Tropp, 2008) prior to the intervention manipulation. Alternatively, introducing the intervention manipulation in the second week of the project may have given the participants enough time to develop mutual trust, paving the way for successful influence in the final weeks of the study.

Yet another possibility for the failure of influence in Study 2 is the fact that intervention participants were alone and outnumbered in their committees. Minority influence is difficult and

only occurs when a minority offers a consistent, clearly articulated alternative to the majority view (Wood et al., 1994). Given the normative pressures to conform to the views of the majority, it should perhaps be unsurprising that intervention participants only had a limited influence on their committees. Perhaps successful influence is only possible in the presence of at least one ally who has also received similar intervention content.

The results of my dissertation suggest that the habit-breaking intervention can increase the proportion of women who reach faculty positions in STEMM departments, a goal of considerable contemporary interest. However, my results also suggest that the habit-breaking intervention is not a panacea; influence may only occur in settings characterized by close, ongoing relationships. A provocative implication of Study 2 is that, if the members of a group do not know each other well, exposing one (or perhaps a few) group members to the habit-breaking intervention may sow distrust and discord among the group.

Finally, my dissertation highlights the importance of understanding the relationships between members of collaboratively working groups and provides a useful framework for probing their psychology. The insights of my two dissertation studies would not have been possible without measuring the relationships between people. Similar insights may be possible if we examine how other individual-level phenomena are affected by the networks of relationships that characterize many settings. The general method I developed in Study 2 could provide a springboard for such future studies. For example, the method of Study 2 could be easily adapted to examine how the how norms to prohibit or express prejudice develop in collaboratively working groups, how the presence of multiple intervention-exposed people in a collaboratively working group affects sociometric and group outcomes, or how variability in the group members' motivations to respond without prejudice affect these outcomes. Exploring these

issues may be essential for people who wish to resolve societal problems that are affected by the dynamics within groups.

Overall, my dissertation represents at least a small step forward in understand the relationship between individual- and group-level phenomena. My dissertation highlights some of the promise of exploring this area. Hopefully, it will inspire other researchers to do the same.

References

- Aagaard, E. M., Gonzales, R., Camargo, C. A., Auten, R., Levin, S. K., Maselli, J., & Metlay, J. (2010). Physician champions are key to improving antibiotic prescribing quality. *Joint Commission Journal on Quality and Patient Safety / Joint Commission Resources*, 36, 109–116.
- Apfelbaum, E. P., Norton, M. I., & Sommers, S. R. (2012). Racial colorblindness: Emergence, practice, and implications. *Current Directions in Psychological Science*, 21, 205-209.
- Blair, I. V., Ma, J. E., & Lenton, A. P. (2001). Imagining stereotypes away: The moderation of implicit stereotypes through mental imagery. *Journal of Personality and Social Psychology*, 81, 828–841. <http://doi.org/10.1037/0022-3514.81.5.828>
- Brewer, M. (1988). A dual-process model of impression formation. In T. Srull & R. Wyer (Eds.), *Advances in social cognition* (pp. 1–36). Hillsdale N.J.: L. Erlbaum Associates.
- Carnes, M., Devine, P. G., Isaac, C., Manwell, L. B., Ford, C. E., Byars-Winston, A., ... Sheridan, J. (2012). Promoting institutional change through bias literacy. *Journal of Diversity in Higher Education*, 5, 63–77. <http://doi.org/10.1037/a0028128>
- Carnes, M., Devine, P. G., Baier Manwell, L., Byars-Winston, A., Fine, E., Ford, C. E., ... Sheridan, J. (2015). The effect of an intervention to break the gender bias habit for faculty at one institution: A cluster randomized, controlled trial. *Academic Medicine*, 90, 221–230. <http://doi.org/10.1097/ACM.0000000000000552>
- Chaiken, S. (1980). Heuristic versus systematic information processing and the use of source versus message cues in persuasion. *Journal of Personality and Social Psychology*, 39, 752–766. <http://doi.org/10.1037/0022-3514.39.5.752>

- Czopp, A. M., & Monteith, M. J. (2003). Confronting prejudice (literally): Reactions to confrontations of racial and gender bias. *Personality and Social Psychology Bulletin*, 29, 532–544. <http://doi.org/10.1177/0146167202250923>
- Devine, P. G., Forscher, P. S., Austin, A. J., & Cox, W. T. L. (2012). Long-term reduction in implicit race bias: A prejudice habit-breaking intervention. *Journal of Experimental Social Psychology*, 48, 1267–1278. <http://doi.org/10.1016/j.jesp.2012.06.003>
- Enders, C. K., & Tofighi, D. (2007). Centering predictor variables in cross-sectional multilevel models: A new look at an old issue. *Psychological Methods*, 12, 121–138. <http://doi.org/10.1037/1082-989X.12.2.121>
- Forscher, P. S., Cox, W. T. L., Mitamura, C., Allison, C., Dix, E., & Devine, P. G. Manuscript in preparation. The robustness of the prejudice habit-breaking intervention.
- Forscher, P. S., Mitamura, C., Dix, E., Cox, W. T. L., & Devine, P. G. Manuscript in preparation. The mechanisms and timecourse of the prejudice habit-breaking process.
- Fiske, S. T., & Neuberg, S. L. (1990). A continuum of impression formation, from category-based to individuating processes: Influences of information and motivation on attention and interpretation. In M. P. Zanna (Ed.), *Advances in Experimental Social Psychology* (Vol. 23, pp. 1–74). Elsevier.
- Galinsky, A. D., & Moskowitz, G. B. (2000). Perspective-taking: Decreasing stereotype expression, stereotype accessibility, and in-group favoritism. *Journal of Personality and Social Psychology*, 78, 708–724. <http://doi.org/10.1037/0022-3514.78.4.708>
- Giffin, K. (1967). The contribution of studies of source credibility to a theory of interpersonal trust in the communication process. *Psychological Bulletin*, 68, 104–120. <http://doi.org/10.1037/h0024833>

- Gulker, J. E., Mark, A. Y., & Monteith, M. J. (2013). Confronting prejudice: The who, what, and why of confrontation effectiveness. *Social Influence*, 8, 280–293.
<http://doi.org/10.1080/15534510.2012.736879>
- Hulleman, C. S., & Harackiewicz, J. M. (2009). Promoting interest and performance in high school science classes. *Science*, 326, 1410–1412. <http://doi.org/10.1126/science.1177067>
- Klonis, S. C., Plant, E. A., & Devine, P. G. (2005). Internal and external motivation to respond without sexism. *Personality and Social Psychology Bulletin*, 31, 1237–1249.
<http://doi.org/10.1177/0146167205275304>
- Metlay, J. P., Camargo, C. A., MacKenzie, T., McCulloch, C., Maselli, J., Levin, S. K., ... IMPAACT Investigators. (2007). Cluster-randomized trial to improve antibiotic use for adults with acute respiratory infections treated in emergency departments. *Annals of Emergency Medicine*, 50, 221–230. <http://doi.org/10.1016/j.annemergmed.2007.03.022>
- Monteith, M. J. (1993). Self-regulation of prejudiced responses: Implications for progress in prejudice-reduction efforts. *Journal of Personality and Social Psychology*, 65, 469–485.
<http://doi.org/10.1037/0022-3514.65.3.469>
- Monteith, M. J., & Voils, C. I. (1998). Proneness to prejudiced responses: toward understanding the authenticity of self-reported discrepancies. *Journal of Personality and Social Psychology*, 75, 901–916. <http://doi.org/10.1037/0022-3514.75.4.901>
- Mustonen-Ollila, E., & Lyytinen, K. (2003). Why organizations adopt information system process innovations: a longitudinal study using Diffusion of Innovation theory. *Information Systems Journal*, 13, 275–297. <http://doi.org/10.1046/j.1365-2575.2003.00141.x>

- O'Brien, L. T., Crandall, C. S., Horstman-Reser, A., Warner, R., Alsbrooks, A., & Blodorn, A. (2010). But I'm no bigot: How prejudiced White Americans maintain unprejudiced self-images. *Journal of Applied Social Psychology, 40*, 917–946.
<http://doi.org/10.1111/j.1559-1816.2010.00604.x>
- Page-Gould, E., Mendoza-Denton, R., & Tropp, L. R. (2008). With a little help from my cross-group friend: Reducing anxiety in intergroup contexts through cross-group friendship. *Journal of Personality and Social Psychology, 95*, 1080–1094.
<http://doi.org/10.1037/0022-3514.95.5.1080>
- Paluck, E. L. (2010). Is it better not to talk? Group polarization, extended contact, and perspective taking in Eastern Democratic Republic of Congo. *Personality and Social Psychology Bulletin, 36*, 1170–1185. <http://doi.org/10.1177/0146167210379868>
- Paluck, E. L. (2011). Peer pressure against prejudice: A high school field experiment examining social network change. *Journal of Experimental Social Psychology, 47*, 350–358.
<http://doi.org/10.1016/j.jesp.2010.11.017>
- Paluck, E. L., & Shepherd, H. (2012). The salience of social referents: A field experiment on collective norms and harassment behavior in a school social network. *Journal of Personality and Social Psychology, 103*, 899–915. <http://doi.org/10.1037/a0030015>
- Paluck, E. L., Shepherd, H., & Aronow, P. M. (2016). Changing climates of conflict: A social network experiment in 56 schools. *Proceedings of the National Academy of Sciences, 113*, 566–571. <http://doi.org/10.1073/pnas.1514483113>
- Pettigrew, T. F., & Tropp, L. R. (2006). A meta-analytic test of intergroup contact theory. *Journal of Personality and Social Psychology, 90*, 751–783. <http://doi.org/10.1037/0022-3514.90.5.751>

- Plant, E. A., & Devine, P. G. (1998). Internal and external motivation to respond without prejudice. *Journal of personality and social psychology*, 75, 811-832.
- Poon, E. G., Blumenthal, D., Jaggi, T., Honour, M. M., Bates, D. W., & Kaushal, R. (2004). Overcoming Barriers To Adopting And Implementing Computerized Physician Order Entry Systems In U.S. Hospitals. *Health Affairs*, 23, 184–190.
<http://doi.org/10.1377/hlthaff.23.4.184>
- Rogers, E. M. (2010). *Diffusion of Innovations* (Fourth). New York: The Free Press.
- Scheier, M. F., & Carver, C. S. (1983). Self-directed attention and the comparison of self with standards. *Journal of Experimental Social Psychology*, 19, 205–222.
[http://doi.org/10.1016/0022-1031\(83\)90038-0](http://doi.org/10.1016/0022-1031(83)90038-0)
- Sommers, S. R., & Norton, M. I. (2006). Lay theories about White racists: What constitutes racism (and what doesn't). *Group Processes & Intergroup Relations*, 9, 117–138.
<http://doi.org/10.1177/1368430206059881>
- Tankard, M. E., & Paluck, E. L. (2015). Norm perception as a vehicle for social change. *Social Issues and Policy Review*.
- Todd, A. R., Bodenhausen, G. V., Richeson, J. A., & Galinsky, A. D. (2011). Perspective taking combats automatic expressions of racial bias. *Journal of Personality and Social Psychology*, 100, 1027–1042. <http://doi.org/10.1037/a0022308>
- Walton, G. M., & Cohen, G. L. (2007). A question of belonging: Race, social fit, and achievement. *Journal of Personality and Social Psychology*, 92, 82–96.
<http://doi.org/10.1037/0022-3514.92.1.82>

Wood, W., Lundgren, S., Ouellette, J. A., Busceme, S., & et al. (1994). Minority influence: A meta-analytic review of social influence processes. *Psychological Bulletin*, 115, 323–345.
<http://doi.org/10.1037/0033-2909.115.3.323>

Table 1. Comparisons between the experimental and control departments on department characteristics. Estimates within the control and experimental departments for all variables except size were obtained using Generalized Linear Mixed Models, and can be interpreted as the estimated probability that a faculty has a given characteristic within the control or experimental department. For all variables except size, the difference between the control and experimental departments is an odds ratio along with a profile likelihood 95% confidence interval for the odds ratio.

	Control ($k = 46$)	Experimental ($k = 46$)	Difference	
Size	24.37	21.54	-2.83 [-9.25, 2.59]	
New faculty	0.19	0.17	0.86 [.62, 1.19]	
Left department	0.07	0.05	0.72 [.43, 1.29]	
Consented	0.19	0.22	1.20 [.91, 1.59]	
Finished survey	0.15	0.18	1.25 [.93, 1.68]	
Women	0.26	0.30	1.21 [.87, 1.70]	
New women	0.31	0.42	1.58 [1.02, 2.56]	*
Women who left	0.30	0.32	1.08 [.55, 2.14]	

Table 2. Model estimates and profile likelihood 95% confidence intervals for the comparisons between faculty from control departments and faculty from experimental departments, attender faculty, and non-attender faculty on the sociometric outcomes. Estimates within each group can be interpreted as the estimated probability that a tie of the given type exists between a faculty member of the given group and another faculty member. Differences are odds ratios; 1:1 odds indicate that two faculty in experimental departments are no more likely to have a connection than faculty in control departments.

	Control (<i>N</i> = 226)		Experimental (<i>N</i> = 229)		Difference				
Scientific connections	0.10		0.12		1.30 [.94, 1.80]				
Departmental connections	0.19		0.24		1.32 [.83, 2.09]				
Trust/respect connections	0.16		0.20		1.37 [.72, 2.58]				
	Attenders (<i>N</i> = 67)				Non-attenders (<i>N</i> = 162)				
	As nominators		As nominees		As nominators		As nominees		
	<i>Estimate</i>	<i>Vs control</i>	<i>Estimate</i>	<i>Vs control</i>	<i>Estimate</i>	<i>Vs control</i>	<i>Estimate</i>	<i>Vs control</i>	
Scientific connections	0.09	0.91 [.59, 1.42]	0.12	1.23 [.86, 1.77]	0.14	1.49 [1.06, 2.09]	*	0.13	1.31 [.96, 1.80]
Departmental connections	0.22	1.19 [.83, 2.25]	0.38	2.56 [1.54, 4.27]	*	0.25	1.37 [.84, 2.25]	0.20	1.07 [.67, 1.70]
Trust/respect connections	0.15	1.92 [.37, 2.28]	0.29	2.15 [1.09, 4.26]	*	0.23	1.59 [.81, 3.13]	0.18	1.19 [.63, 2.25]

Table 3. Model estimates and profile likelihood 95% confidence intervals for comparisons between faculty from control departments and faculty from experimental departments, attender faculty, and non-attender faculty on the individual-level measures.

Outcome	Control (N = 226)		Experimental (N = 229)	Difference	
Self-efficacy	5.23		5.17	-0.07	[-.30, .17]
Self-reported action	4.23		4.46	0.23	[-.09, .55]
Concern	8.02		8.33	0.31	[-.07, .68]
Shoulds	1.23		1.28	0.05	[-.07, .16]
Woulds	1.83		1.91	0.08	[-.06, .23]
Discrepancies	0.60		0.64	0.04	[-.12, .19]
IMS	8.35		8.18	-0.17	[-.42, .08]
EMS	2.99		3.16	0.16	[-.24, .57]
Climate	5.18		5.20	0.02	[-.34, .38]
PC norms	5.40		5.45	0.05	[-.35, .45]

Attenders (N = 67)			Non-attenders (N = 162)		
	<i>Estimate</i>	<i>Vs control</i>		<i>Estimate</i>	<i>Vs control</i>
Self-efficacy	5.23	0.00 [-.33, .33]	*	5.14	-0.09 [-.34, .16]
Self-reported action	4.34	0.11 [-.38, .59]		4.51	-0.07 [-.07, .63]
Concern	8.66	0.63 [.10, 1.16]		8.21	0.18 [-.22, .58]
Shoulds	1.25	0.02 [-.14, .18]		1.29	0.06 [-.07, .18]
Woulds	1.94	1.94 [-.11, .33]		1.90	0.07 [-.09, .23]
Discrepancies	0.69	0.09 [-.14, .33]		0.61	0.01 [-.15, .18]
IMS	8.29	-0.06 [-.42, .30]		8.14	-0.22 [-.48, .06]
EMS	2.95	-0.04 [.61, .53]		3.24	0.25 [-.19, .70]
Climate	5.12	-0.06 [-.55, .44]		5.22	0.05 [-.33, .44]
PC norms	5.59	0.19 [-.36, .73]		5.40	0.00 [-.43, .43]

Table 4a. Model estimates and profile likelihood 95% confidence intervals for comparisons between faculty from control departments, attender faculty, faculty connected to attenders through scientific connections, and faculty unconnected to attenders through scientific connections.

Scientific connections with attenders								
<i>Outcome</i>	Nominee (<i>N</i> = 31)		Not a nominee (<i>N</i> = 131)		Nominator (<i>N</i> = 67)		Not a nominator (<i>N</i> = 95)	
	<i>Estimate</i>	<i>Vs control</i>	<i>Estimate</i>	<i>Vs control</i>	<i>Estimate</i>	<i>Vs control</i>	<i>Estimate</i>	<i>Vs control</i>
Self-efficacy	5.31	0.08 [-.34, .50]	5.09	-0.09 [-.34, .16]	5.17	0.06 [-.37, .25]	5.10	-0.13 [-.43, .18]
Self-reported action	4.82	0.59 [-.06, 1.23]	4.43	0.20 [-.17, .58]	4.44	0.21 [-.23, .65]	4.58	0.34 [-.10, .79]
Concern	8.22	0.19 [-.48, .87]	8.21	0.18 [-.24, .61]	8.25	0.22 [-.27, .72]	8.18	0.14 [-.33, .63]
Shoulds	1.12	-0.11 [-.31, .10]	1.33	0.10 [-.03, .24]	1.27	0.04 [-.11, .19]	1.31	0.07 [-.08, .23]
Woulds	1.70	0.12 [-.40, .15]	1.95	0.12 [-.05, .30]	1.90	0.07 [-.13, .27]	1.90	0.07 [-.13, .27]
Discrepancies	0.59	-0.01 [-.31, .28]	0.62	0.02 [-.16, .20]	0.63	0.03 [-.18, .24]	0.60	0.00 [-.22, .21]
IMS	8.55	0.20 [-.28, .67]	8.03	-0.32 [-.61, -.04]	7.99	-0.37 [-.71, -.03]	8.27	0.08 [-.41, .24]
EMS	2.85	-0.14 [-.90, .62]	3.35	0.36 [-.11, .83]	3.54	0.55 [.01, 1.08]	2.95	-0.04 [-.58, .49]
Climate	5.09	-0.09 [-.72, .55]	5.27	0.09 [-.32, .50]	5.12	0.24 [-.23, .70]	5.22	-0.11 [-.57, .33]
PC norms	5.27	-0.14 [-.82, .55]	5.44	0.04 [-.41, .49]	5.51	0.10 [-.41, .61]	5.31	-0.09 [-.59, .40]

Table 4b. Model estimates and profile likelihood 95% confidence intervals for comparisons between faculty from control departments, attender faculty, faculty connected to attenders through departmental connections, and faculty unconnected to attenders through departmental connections.

Departmental connections with attenders								
<i>Outcome</i>	Nominee (<i>N</i> = 62)		Not a nominee (<i>N</i> = 100)		Nominator (<i>N</i> = 110)		Not a nominator (<i>N</i> = 52)	
	<i>Estimate</i>	<i>Vs control</i>	<i>Estimate</i>	<i>Vs control</i>	<i>Estimate</i>	<i>Vs control</i>	<i>Estimate</i>	<i>Vs control</i>
Self-efficacy	5.27	0.04 [-.29, .37]	5.04	-0.19 [-.48, .11]	5.22	-0.01 [-.28, .26]	4.88	-0.35 [-.75, .05]
Self-reported action	4.81	0.58 [.10, 1.05]	4.31	0.08 [-.33, .49]	4.47	0.23 [-.15, .61]	4.65	0.42 [-.18, 1.02]
Concern	8.43	0.40 [-.13, .92]	8.07	0.04 [-.43, .50]	8.16	0.13 [-.30, .56]	8.39	0.36 [-.29, 1.00]
Shoulds	1.18	-0.05 [-.23, .12]	1.36	0.12 [-.02, .27]	1.26	0.03 [-.11, .16]	1.39	0.16 [-.04, .35]
Woulds	1.79	-0.04 [-.25, .17]	1.97	0.15 [-.04, .33]	1.90	0.07 [-.10, .24]	1.89	0.07 [-.21, .34]
Discrepancies	0.60	0.00 [-.23, .23]	0.62	0.02 [-.18, .22]	0.66	0.06 [-.12, .24]	0.45	-0.15 [-.44, .14]
IMS	8.36	0.01 [-.36, .37]	7.99	-0.36 [-.67, -.05]	8.15	-0.20 [-.49, .09]	8.10	-0.26 [-.70, .18]
EMS	3.34	0.35 [-.26, .95]	3.19	0.20 [-.31, .70]	3.34	0.35 [-.12, .83]	2.93	-0.06 [-.78, .65]
Climate	5.41	0.23 [-.27, .74]	5.11	-0.06 [-.50, .37]	5.53	0.35 [-.05, .75]	4.28	-0.89 [-1.47, -.32]
PC norms	5.44	0.03 [-.53, .59]	5.38	-0.02 [-.50, .46]	5.53	0.13 [-.32, .58]	5.00	-0.40 [-1.04, .24]

Table 4c. Model estimates and profile likelihood 95% confidence intervals for comparisons between faculty from control

departments, attender faculty, faculty connected to attenders through trust connections, and faculty unconnected to attenders through trust connections.

Trust/respect connections with attenders								
<i>Outcome</i>	Nominee (<i>N</i> = 59)		Not a nominee (<i>N</i> = 103)		Nominator (<i>N</i> = 104)		Not a nominator (<i>N</i> = 58)	
	<i>Estimate</i>	<i>Vs control</i>	<i>Estimate</i>	<i>Vs control</i>	<i>Estimate</i>	<i>Vs control</i>	<i>Estimate</i>	<i>Vs control</i>
Self-efficacy	5.15	-0.08 [-.42, .26]	5.13	-0.10 [-.39, .19]	5.15	-0.08 [-.36, .19]	5.12	-0.12 [-.51, .27]
Self-reported action	4.55	0.32 [-.17, .81]	4.48	0.25 [-.15, .66]	4.56	0.33 [-.05, .71]	4.35	0.12 [-.45, .70]
Concern	8.17	0.14 [-.42, .70]	8.24	0.21 [-.64, .68]	8.34	0.30 [-.12, .73]	7.87	0.16 [-.78, .46]
Shoulds	1.25	0.02 [-.16, .19]	1.31	0.08 [-.06, .23]	1.31	0.07 [-.06, .21]	1.24	0.01 [-.18, .20]
Woulds	1.82	0.00 [-.22, .21]	1.94	0.12 [-.07, .30]	1.88	0.05 [-.12, .22]	1.96	0.13 [-.13, .40]
Discrepancies	0.58	-0.02 [-.26, .21]	0.63	0.04 [-.16, .23]	0.59	-0.01 [-.20, .17]	0.69	0.09 [-.19, .38]
IMS	8.22	-0.13 [-.51, .24]	8.09	-0.27 [-.58, .04]	8.18	-0.17 [-.47, .11]	8.02	-0.34 [-.77, .10]
EMS	3.34	0.34 [-.28, .97]	3.20	0.20 [-.30, .71]	3.30	0.31 [-.17, .78]	3.09	0.09 [-.17, .78]
Climate	5.34	0.16 [-.37, .70]	5.17	0.00 [-.44, .43]	5.48	0.31 [-.10, .72]	4.53	-0.65 [-1.21, -.08] *
PC norms	5.49	0.08 [-.50, .67]	5.36	-0.05 [-.52, .43]	5.58	0.18 [-.28, .64]	4.93	-0.47 [-1.09, .15]

Table 5. Model estimates and profile likelihood 95% confidence intervals for the relationships between the individual-level and sociometric measures.

Predictor		Outcome			
		<i>Scientific</i>	<i>Department</i>	<i>Trust/respect</i>	
As nominator	Self-efficacy	1.17 [.93, 1.50]	1.12 [.85, 1.52]	1.46 [1.09, 1.98]	*
	Self-reported action	1.03 [.88, 1.23]	1.07 [.90, 1.30]	1.12 [.91, 1.38]	
	Concern	1.01 [.89, 1.15]	1.13 [.96, 1.35]	1.13 [.94, 1.39]	
	Shoulds	1.55 [.95, 2.54]	0.77 [.40, 1.48]	0.95 [.45, 2.01]	
	Woulds	0.91 [.67, 1.27]	1.08 [.76, 1.54]	0.95 [.62, 1.43]	
	Discrepancies	0.79 [.56, 1.13]	1.17 [.81, 1.70]	0.93 [.60, 1.41]	
	IMS	1.01 [.85, 1.09]	1.02 [.82, 1.29]	1.20 [.94, 1.55]	
	EMS	0.97 [.86, 1.10]	1.07 [.92, 1.26]	1.15 [.97, 1.35]	
	Climate	1.39 [1.19, 1.63]	* 1.46 [1.23, 1.75]	* 1.85 [1.50, 2.35]	*
	PC norms	1.16 [1.02, 1.33]	* 1.17 [1.01, 1.37]	* 1.27 [1.07, 1.52]	*
As nominee	Self-efficacy	1.11 [.92, 1.36]	0.88 [.69, 1.13]	1.10 [.89, 1.37]	
	Self-reported action	1.09 [.97, 1.25]	1.10 [.97, 1.27]	1.08 [.93, 1.26]	
	Concern	1.01 [.91, 1.12]	0.92 [.82, 1.04]	0.93 [.82, 1.06]	
	Shoulds	1.16 [.68, 1.79]	0.83 [.49, 1.41]	0.72 [.39, 1.30]	
	Woulds	0.70 [.51, .96]	* 0.93 [.69, 1.23]	0.87 [.63, 1.19]	
	Discrepancies	0.71 [.52, .93]	* 1.00 [.74, 1.34]	0.96 [.69, 1.32]	
	IMS	1.10 [.95, 1.29]	1.04 [.87, 1.25]	0.92 [.76, 1.14]	
	EMS	0.96 [.85, 1.09]	1.09 [.97, 1.23]	1.05 [.91, 1.20]	
	Climate	1.16 [1.03, 1.31]	* 1.28 [1.06, 1.53]	* 1.28 [1.06, 1.56]	*
	PC norms	1.02 [.93, 1.13]	1.15 [.99, 1.36]	1.05 [.90, 1.23]	

Table 6. Baseline characteristics of people assigned to control and experimental committees, with and without the intervention.

	Control (<i>N</i> = 100)			Experimental (<i>N</i> = 84)						Comparison vs control			
	<i>Mean</i>	<i>SD</i>	<i>Skew</i>	Non-intervention			Intervention			Non-intervention		Intervention	
				<i>Mean</i>	<i>SD</i>	<i>Skew</i>	<i>Mean</i>	<i>SD</i>	<i>Skew</i>	<i>B</i>	<i>p</i>	<i>B</i>	<i>p</i>
Concern	7.07	2.20	-0.38	7.21	1.94	-0.51	6.75	1.83	-0.46	0.13	0.69	-0.32	0.52
Shoulds	1.41	0.74	2.30	1.31	0.64	2.95	1.12	0.29	2.11	0.10	0.36	-0.29	0.07
Woulds	2.20	1.04	0.69	2.40	1.17	1.04	2.25	0.94	0.56	0.20	0.25	0.05	0.85
Discrepancies	0.79	1.10	-0.46	1.09	0.98	1.14	1.13	1.01	0.44	0.30	0.08	0.34	0.18
IMS	7.44	1.65	-1.06	7.61	1.46	-1.17	7.09	2.05	-0.73	0.17	0.53	-0.35	0.37
EMS	3.93	1.97	-1.13	4.65	2.20	0.12	3.98	2.16	0.56	0.72	0.03	0.05	0.92
Black thermometer	79.92	19.62	-0.38	76.76	19.30	-0.51	77.90	15.95	-0.19	-3.16	0.31	-2.02	0.66

Table 7. Comparisons between the essay outcomes for the control and experimental committees. Comparisons are mean differences for the quality and education concern variables and odds ratios for the remaining variables.

	Control (<i>k</i> = 25)			Experimental (<i>k</i> = 19)			Comparison
	<i>Mean</i>	<i>SD</i>	<i>Skew</i>	<i>Mean</i>	<i>SD</i>	<i>Skew</i>	
Word count	1272	337	0.32	1321	549	-0.05	48 [-221, 319]
Quality	1.69	0.62	-0.15	1.67	0.70	0.08	-0.12 [-.40, .15]
Education concern	1.76	0.41	-1.57	1.63	0.50	-0.83	-0.13 [-.40, .15]
# recommendations	2.00	2.00	-1.57	2.42	1.87	0.43	1.21 [.71, 2.06]
Implementability	0.70	0.63	0.30	0.75	0.58	0.00	1.25 [.36, 4.49]
Efficacy	1.32	0.65	-0.35	1.25	0.77	-0.40	0.89 [.26, 3.09]
Affirmative Action	0.24	--	--	0.32	--	--	1.46 [.38, 5.68]
Colorblindness	0.28	--	--	0.05	--	--	0.14 [.01, .92]
Multiculturalism	0.24	--	--	0.26	--	--	1.13 [.28, 4.51]

*

Table 8. Model estimates and profile likelihood 95% confidence intervals comparing the experimental and control committees and, within the experimental committees, the intervention and non-intervention participants on the sociometric variables.

		Control		Experimental		Difference	
<i>Outcome</i>		<i>Estimate</i>	<i>Growth</i>	<i>Estimate</i>	<i>Growth</i>	<i>Estimate</i>	<i>Growth</i>
Trust		5.72	-0.11 [-.35, .13]	5.32	-0.40 [-.66, -.13] *	-0.40 [-.82, .03]	-0.29 [-.65, .07]
Knowledge		5.23	0.24 [.04, .43] *	5.01	-0.08 [-.30, .14]	-0.23 [-.69, .23]	-0.32 [-.61, -.03] *
Contributions		5.56	0.14 [-.13, .41]	5.24	-0.24 [-.64, .16]	-0.32 [-.78, .13]	-0.23 [-.64, .18]
Education concern		5.25	0.09 [-.06, .23]	5.13	-0.09 [-.25, .08]	-0.12 [-.56, .31]	-0.17 [-.40, .05]
		Intervention vs control		Non-intervention vs control			
<i>Outcome</i>		<i>Estimate</i>	<i>Growth</i>	<i>Estimate</i>	<i>Growth</i>		
As source	Trust	0.06 [-.47, .58]	-0.61 [-1.08, -.15] *	-0.35 [-.77, .07]	-0.18 [-.54, .18]		
	Knowledge	0.02 [-.60, .64]	-0.49 [-.93, -.04] *	-0.09 [-.57, .39]	-0.26 [-.58, .05]		
	Contributions	-0.17 [-.74, .41]	-0.33 [-.82, .17]	-0.22 [-.69, .25]	-0.21 [-.62, .20]		
	Education concern	0.27 [-.32, .86]	-0.29 [-.63, .06]	-0.13 [-.59, .33]	-0.13 [-.36, .10]		
As target	Trust	-0.51 [-1.06, .06]	-0.34 [-.71, .02]	-0.17 [-.60, .25]	-0.12 [-.71, .02]		
	Knowledge	-0.36 [-.95, .24]	-0.30 [-.72, .11]	0.03 [-.45, .51]	-0.33 [-.64, -.02] *		
	Contributions	-0.58 [-1.27, .11]	-0.04 [-.56, .47]	-0.09 [-.57, .40]	-0.31 [-.72, .10]		
	Education concern	-0.15 [-.69, .39]	-0.22 [-.53, .09]	0.01 [-.45, .46]	-0.15 [-.38, .07]		

Table 9. Model estimates and profile likelihood 95% confidence intervals for the individual-level variables.

		Control			Experimental			Difference		
	Outcome	Estimate	Growth		Estimate	Growth		Estimate	Growth	
Race-related variables	Concern	7.29	0.17 [.05, .39]	*	7.28	0.15 [.01, .29]	*	-0.01 [-.57, .56]	-0.02 [-.21, .16]	
	Shoulds	1.37	0.00 [-.06, .05]		1.32	0.04 [-.01, .10]		-0.05 [-.21, .11]	0.05 [-.02, .11]	
	Woulds	2.35	0.03 [-.04, .09]		2.63	0.14 [.07, .21]	*	0.28 [-.01, .58]	0.11 [.01, .21]	*
	Discrepancies	0.98	0.03 [-.05, .11]		1.32	0.10 [.01, .20]	*	0.34 [.09, .59]	*	0.07 [-.04, .19]
	IMS	7.70	0.10 [-.02, .22]		7.65	0.08 [-.05, .21]		-0.03 [-.39, .32]		-0.01 [-.16, .14]
	EMS	4.64	0.23 [.09, .38]	*	5.55	0.42 [.26, .58]	*	0.92 [.33, 1.51]	*	0.18 [-.06, .41]
Personal ratings	Enjoyment	4.06	-0.08 [-.37, .21]		3.78	-0.36 [-.69, -.02]	*	-0.28 [-.81, .26]		-0.27 [-.72, .17]
	Perceived pressure	2.15	-0.12 [-.40, .16]		2.11	-0.10 [-.42, .22]		-0.04 [-.50, .41]		0.02 [-.40, .44]
	Contributions	5.60	0.33 [.14, .53]	*	5.38	0.14 [-.10, .37]		-0.22 [-.58, .15]		-0.19 [-.49, .11]
	Education concern	5.61	-0.04 [-.20, .13]		5.46	-0.11 [-.29, .08]		-0.16 [-.61, .30]		-0.07 [-.32, .18]
	Satisfaction	5.33	--		4.83	--		-0.50 [-1.04, .05]		--
Intervention vs control					Non-intervention vs control					
	Outcome	Estimate	Growth		Estimate	Growth		Estimate	Growth	
Race-related variables	Concern	-0.10 [-.95, .76]	0.16 [-.12, .44]		0.02 [-.28, .12]	-0.08 [-.28, .12]				
	Shoulds	-0.07 [-.33, .18]	0.10 [-.01, .21]		-0.04 [-.22, .13]	0.03 [-.05, .10]				
	Woulds	0.21 [-.26, .69]	*	0.20 [.05, .35]	*	0.31 [-.01, .63]	0.07 [-.02, .18]			
	Discrepancies	0.29 [-.12, .69]		0.10 [-.09, .29]		0.36 [.09, .63]	*	0.06 [-.06, .19]		
	IMS	-0.31 [-.94, .32]		0.13 [-.09, .36]		0.09 [-.34, .52]		-0.06 [-.22, .11]		
	EMS	0.77 [-.19, 1.73]		0.40 [.01, .78]	*	0.97 [.33, 1.61]	*	0.10 [-.15, .36]		
Personal ratings	Enjoyment	-0.37 [-1.17, .42]	-0.57 [-1.24, .09]		-0.24 [-.81, .32]	-0.17 [-.64, .30]				
	Perceived pressure	-0.11 [-.82, .60]	0.01 [-.68, .69]		-0.02 [-.51, .46]	0.03 [-.43, .48]				
	Contributions	-0.22 [-.78, .34]	-0.06 [-.54, .42]		-0.22 [-.60, .17]	-0.23 [-.56, .09]				
	Education concern	-0.32 [-.99, .34]	0.00 [-.39, .39]		-0.10 [-.58, .38]	-0.10 [-.37, .17]				
	Satisfaction	-0.23 [-1.00, .55]	--		-0.59 [-1.16, -.01]	*	--			

Table 10. Model estimates and profile likelihood 95% confidence intervals for the relationships between the race-related individual-level variables and sociometric variables.

Predictor		Outcome				
		<i>Trust</i>	<i>Knowledge</i>	<i>Contributions</i>	<i>E concern</i>	
As source	Concern	0.013 [-.049, .075]	0.053 [-.019, .123]	0.048 [-.017, .113]	0.100 [.040, .160]	*
	Shoulds	-0.117 [-.266, .032]	0.034 [-.139, .208]	-0.097 [-.263, .070]	-0.017 [-.158, .124]	
	Woulds	-0.022 [-.120, .077]	-0.097 [-.209, .016]	-0.058 [-.161, .026]	-0.070 [-.167, .029]	
	Discrepancies	0.015 [-.083, .113]	-0.126 [-.237, -.015]	* -0.033 [-.139, .072]	-0.075 [-.167, .017]	
	IMS	0.081 [-.005, .167]	0.061 [-.041, .161]	0.173 [.085, .261]	* 0.143 [.060, .225]	*
	EMS	-0.021 [-.069, .027]	-0.031 [-.086, .024]	0.043 [-.094, .007]	-0.051 [-.098, -.003]	*
As target	Concern	0.025 [-.030, .082]	0.052 [-.005, .109]	0.067 [-.002, .137]	0.067 [.026, .108]	*
	Shoulds	0.024 [-.114, .163]	-0.062 [-.211, .086]	0.019 [-.151, .189]	-0.092 [-.199, .017]	
	Woulds	0.012 [-.075, .099]	-0.025 [-.117, .066]	0.017 [-.093, .126]	-0.032 [-.099, .034]	
	Discrepancies	-0.009 [-.099, .081]	0.008 [-.086, .103]	0.000 [-.111, .110]	0.006 [-.063, .075]	
	IMS	0.012 [-.066, .090]	0.028 [-.053, .110]	0.025 [-.072, .122]	0.031 [-.027, .090]	
	EMS	0.009 [-.032, .051]	0.006 [-.037, .049]	0.012 [-.041, .064]	0.018 [-.013, .050]	

Figure 1. The relative proportions of new faculty in experimental and control departments that are female.

Figure 2. Sample departmental collaboration networks for experimental and control departments. Arrows represent nominations between faculty; “A” represent attending faculty, and node colors represent the levels of self-reported action reported by each faculty member. Networks are laid out using the Fruchterman-Reingold force-directed algorithm.

Figure 3. Self-reported action for control faculty, attender faculty, faculty nominated as department collaborators by attender faculty, and faculty not nominated as department collaborators by attender faculty.

Figure 4. Sociometric ratings of perceived knowledge in the small groups. Each group was sorted according to their ranking on others' perceptions of their knowledge; 1 = first ranked, 4 = lowest ranked. The ratings to and from the intervention person were always averaged together. All perceived knowledge ratings were then averaged using these rankings. The grey node is the person who received the intervention.

Figure 5. Sociometric ratings of trust in the small groups. Each group was sorted according to their ranking on others' trust; 1 = first ranked, 4 = lowest ranked. The ratings to and from the intervention person were always averaged together. All trust ratings were then averaged using these rankings. The grey node is the person who received the intervention.

Appendix 1: Study 1 survey invitation

We are conducting a study on department climate and its effects on individual faculty. As a faculty in [department], you are eligible to participate in our study. We hope that you would be willing to spend 15 – 20 minutes completing a brief survey. Your time could help us identify the ways in which department climate supports or impedes faculty success.

If you wish to participate in our study, please follow the link below. You will be asked to read a consent form, which will provide a few more details about our study. If you would like additional information before making a decision about participating, please contact any of us using the contact information below.

[link]

If you do not wish to participate, you can opt out of this study using the link below. If you follow this link, we will not contact you again.

[opt out link]

Thank you for your time.

Regards,

Patricia G. Devine, PhD
Professor, Department of Psychology, University of Wisconsin - Madison
1202 W Johnson St; Madison, WI 53706
Email: pgdevine@wisc.edu
Phone: (608) 262-2815

Molly Carnes, MD, MS
Professor, Departments of Medicine, Psychiatry, and Industrial & Systems Engineering
700 Regent Street, Suite 301; Madison, WI 53715
Email: carnesresearch@cwhr.wisc.edu
Phone: (608) 263-9770

Appendix 2: Study 1 faculty survey

We are interested in the factors that contribute to faculty success in STEMM (science, technology, engineering, mathematics, and medicine) departments. Therefore, we will be asking you a series of questions about the climate in your department or administrative unit, your social connections to your colleagues, and your perceptions of issues relating to gender in your department. At the very end of the survey, we will also ask you for a recent copy of your CV. We anticipate that this survey should take you about 15 - 20 minutes.

Throughout this survey, when we refer to “your department”, we mean [department].

As you answer the following questions, please remember that everything you tell us will be kept confidential and that you can skip any questions you are uncomfortable answering. In addition, we wish to emphasize that there are no right or wrong answers. For us to learn anything useful from this survey, it is critical that you provide candid, forthright responses.

Sociometric measures

An important element of department climate is one's relationships with one's fellow faculty. In the following five questions, we will ask you about your perceptions of and relationships with your fellow faculty in [department].

For each of the questions, we will ask you to nominate other faculty in [department] who fit specific criteria (e.g., collaborator on scientific matters). You can nominate as many or as few faculty as you wish. For reference, we will provide you with a list of the faculty in [department].

As you answer these questions, remember that your responses are confidential. In order for us to learn something from this survey, it is very important that you answer openly and honestly.

Which of the following faculty do you consider a *collaborator on scientific matters*?

[Faculty name]

[Faculty name]

[Faculty name]

Which of the following faculty do you consider a *collaborator on department matters* (e.g., curricular issues, award nominations, budget issues, etc.)?

[Faculty name]

[Faculty name]

[Faculty name]

On matters related to the department, such as the allocation of resources, nominations for awards, and promotion decisions, *whose opinions do you respect*?

[Faculty name]

[Faculty name]

[Faculty name]

On matters related to the department, such as the allocation of resources, nominations for awards, and promotion decisions, *whose opinions do you value*?

[Faculty name]

[Faculty name]

[Faculty name]

Climate; PC norms

The following questions are about your feelings and perceptions about the climate in [department]. Please read and respond to each of the following questions using the scale provided.

1	2	3	4	5	6	7
strongly disagree						strongly agree

1. Resources (e.g., salaries, rooms) are assigned equitably in this department.
2. Responsibilities (e.g., committee assignments, teaching assignments, clinical assignments) are assigned equitably in this department.
3. My professional development is supported in this department.
4. My contributions to this department are valued.
5. I do not feel welcome in this department.
6. I feel like I belong in this department.
7. I do not feel like I can succeed in this department.
8. This department is a comfortable work environment.
9. I feel pressured to conform to this department's PC (politically correct) norms.
10. I feel pressured in this department to behave in ways that are different from what I believe.
11. I can be myself in this department.

Self-efficacy; self-reported action

The following questions address issues related to potential gender bias in [department]. Please read the following questions and respond using the scale provided.

1	2	3	4	5	6	7
strongly
disagree						strongly
agree
1. I am confident that I can recognize when gender bias is occurring during a work-related interaction.
 2. I am confident that I can speak about gender equity in the workplace to my colleagues.
 3. When I have a response that is based on gender stereotypes, I am confident that I can replace the stereotyped response with a non-stereotypic response.
 4. I am confident that I can adopt the perspective of a woman who is being evaluated for a position.
 5. I am confident that I can challenge a personnel decision if I think it has been influenced by gender stereotypes.

Whereas the previous items concerned your confidence that you could perform various actions with regard to gender bias, the following questions concern whether you did those actions. As you answer the following questions, consider your actions over the previous year. Please read the following questions and respond using the scale provided.

1	2	3	4	5	6	7
strongly
disagree						strongly
agree
1. Over the past year, I have recognized when gender bias was occurring during a work-related interaction.
 2. Over the past year, I have spoken about gender equity in the workplace to my colleagues.
 3. Over the past year, when I have detected that I have had a response based on gender stereotypes, I have replaced the stereotyped response with a non-stereotypic response.
 4. Over the past year, I have adopted the perspective of a woman who was being evaluated for a position.
 5. Over the past year, I have challenged personnel decisions that I have thought were influenced by gender stereotypes.

Concern about discrimination

The following questions will present a series of statements about gender discrimination that you may agree or disagree with. These items are general and are not linked specifically to your department. Based on how you are feeling right now, please read the statements and rate your agreement with them using the scale provided.

1	2	3	4	5	6	7	8	9	10
strongly disagree									strongly agree

1. I'm not personally concerned about discrimination against women.
2. People need to stop focusing so much time and energy worrying about gender discrimination.
3. People make more fuss about gender discrimination than is necessary.
4. I consider gender discrimination to be a serious social problem.

Should

The following items concern your beliefs about women. We would like you to respond to the following items based on the beliefs that you hold, regardless of whether the way you actually act is always consistent with those beliefs. Please indicate the degree to which you agree or disagree with each of the statements using the scale provided.

1	2	3	4	5	6	7
strongly
disagree						strongly
agree
1. I think that men and women should have an equal opportunity to be hired by my department.
 2. I should not think about women in stereotypical ways.
 3. I should assume that my female colleagues are just as capable of rigorous scientific scholarship as my male colleagues.
 4. I should not assume that women prioritize family over work.
 5. I should feel more comfortable working with my male colleagues than my female colleagues.
 6. I should not feel resentment towards my successful female colleagues.
 7. I should not assume that women who raise objections about the climate in my department are being overly sensitive.
 8. I believe that women should be encouraged to pursue leadership positions in the university just as much as men.

Would

Sometimes the way we actually respond in a situation is consistent with our beliefs, and other times we find ourselves acting in a way that is inconsistent with our beliefs. For each item below, we are interested in your initial, gut-level reactions, which may or may not be consistent with how you believe you should react. Please indicate the degree to which you agree or disagree with each of the statements using the scale provided.

1	2	3	4	5	6	7
strongly
disagree						strongly
agree
1. I would not feel resentment towards a female colleague who is more successful than I am.						
2. I would be quick to assume that a woman who has concerns about the climate in my department is being oversensitive.						
3. If a female colleague took time off work, I would be quick to assume that she prioritizes her family over her work.						
4. I would feel more comfortable collaborating with a male colleague than a female colleague.						
5. I would be more likely to encourage a male colleague to pursue a leadership position than a female colleague.						
6. If I were on a hiring committee, I would be hesitant to support a female candidate over a male candidate.						
7. I sometimes have stereotypical thoughts about women.						
8. I have sometimes been surprised when I have discovered that a respected scientist in my field is female.						

IMS/EMS

The following questions concern various reasons or motivations people might have for responding in various ways towards women. Some of these ways of responding reflect internal - personal motivations whereas others reflect more external – social motivations. We wish to emphasize that neither source is better than the other – we are simply interested in why people respond the way they do towards women.

Please indicate the degree to which you agree or disagree with each of the following statements using the scale below.

1	2	3	4	5	6	7	8	9
strongly disagree								strongly agree

1. According to my personal values, using stereotypes about women is OK. (*ims*)
2. It is personally important to me to respond in non-biased ways toward women. (*ims*)
3. Being non-biased toward women is important to my self-concept. (*ims*)
4. Because of my personal values, I believe that using stereotypes about women is wrong. (*ims*)
5. I avoid negative thoughts about women to prevent negative reactions from others. (*ems*)
6. If I acted biased toward women, I would be concerned that others would be angry with me. (*ems*)
7. I attempt to appear non-biased toward women in order to avoid disapproval from others. (*ems*)
8. I try to act in non-biased ways toward women because of pressure from others. (*ems*)

Demographics

What is your race / ethnicity?

White

Black

Hispanic

East Asian

Asian Indian

Native American

Other

Multiple

What is your gender?

Male

Female

CV upload

We are interested in your accomplishments, such as awards, grants, and so on, over the past several years. If you are willing to share your accomplishments with us, please upload the most recent version of your CV using the button below. Alternatively, you can type the email address of a person whom we can contact with your permission for a copy of your CV.

If you wish to upload a copy of your CV (pdf or Word document), please do so below.

If you wish to type the email address of a person we can contact for your CV, please do so below.

Appendix 3: Study 2 prejudice habit-breaking intervention

Participants take the IAT

The measure that you just completed is called the Implicit Association Test (IAT). We will now show you a presentation that describes

- 1) some background that will help you understand the IAT
- 2) what the IAT measures
- 3) some examples of behavior related to the IAT

We will then tell you your own IAT score, after which we will describe some strategies people can use to change both their IAT scores and behaviors related to the IAT.

At the end of this presentation, we will give you a short quiz on the material that we presented. Please feel free to take notes during the presentation in preparation for this quiz.

Background: Unintentional race bias

Sometimes in everyday life, people experience spontaneous thoughts, feelings, and behaviors that are different from what they desire. Like well-learned habits, these spontaneous reactions can be extremely difficult to control because they occur automatically, before a person even notices them or has time to reflect on them.

These spontaneous reactions vary from person to person, depending on the specifics of where one grew up. However, because people are exposed to many of the same environmental factors, such as the same movies and television shows, many people experience the same unwanted reactions.

Imagine that it's past midnight on a Friday night. Pete and Joe are walking down State Street on their way home from a friend's house. The light is poor, and it's late enough that they only meet an occasional person on the darkened sidewalk.

Pete and Joe see a person in the distance walking towards them. As the person gets closer, Pete sees through the dim light that the person is a middle-aged Black man carrying a small duffel bag.

Pete thinks, "Maybe I should cross the street so this guy can't hit me up for money. Whatever, Joe's with me, and we can just ignore him if he asks."

They keep walking and, as the man approaches, Pete starts to feel a little tense. He shifts a bag he was holding in his left hand to his right so that it's farther away from the man. He feels even tenser as he makes eye contact with the man.

Nothing happens.

As the man passes, Pete thinks, “That was weird. He must not have wanted to ask me for money after all.”

As Pete and Joe walk away, Joe says to Pete, “Did you see that guy’s shoes? Those were the ones that I saw in the store the other day but were too expensive to buy.”

Pete feels confused. Why would a homeless man have expensive shoes? Pete looks back, only to see the man getting into a BMW.

Pete thinks, “Wow, I guess I just assumed he was homeless. Why did I do that? Now that I think about it, he was wearing pretty nice clothes.”

In this example, Pete was quick to expect that the Black man was homeless. His initial expectation led to spontaneous, inaccurate thoughts and unwarranted tense feelings. If Pete would have seen this man for longer than 15 seconds, he may have realized that the man was not homeless because he was wearing nice clothes.

However, it was late at night, somewhat hard to see, and Pete had to make a quick judgment. This judgment turned out to be inaccurate.

Why did Pete jump to the conclusion that the Black man was homeless?

The origins of unintentional race bias

Stereotypes that Black people are poor or homeless likely influenced Pete’s initial expectations about the man. Stereotypes are pervasive in our society, so we all learn about them whether we want to or not. For example, Black people are often portrayed as criminal or unintelligent in movies, TV shows, and in other mass media.

Because stereotypes are all around us, we can’t help but learn them and come to associate Black people with negative racial stereotypes.

The prevalence of stereotypic representations of Black people is likely greater than you imagine, and can sometimes be quite subtle. Consider this example from two different press reports following Hurricane Katrina.

Notice that, whereas the reports criminalize the actions of the Black man by describing him as “looting” food, they justify the actions of the White couple by describing them as “finding” food.

Can you think of specific times when you noticed the media portraying Black people stereotypically? Please briefly describe any instances that come to mind.

It is hard to avoid negative reactions to Black people when we are so frequently exposed to stereotypes in everyday life. We see them so often that they become firmly ingrained in our minds. Without intending it, we learn to associate Black people with negative stereotypes.

As a result, when people think about or interact with Black people, the negative stereotypes spring to mind, even among people who disagree with the stereotypes. Once in mind, these stereotypes can influence people's thoughts, feelings, expectations, and behavior.

In this way, stereotypes are like bad habits in that they can occur without thought or intention. Because people often don't realize when stereotypes influence their reactions to Black people, avoiding the influence of stereotypes can be very difficult.

Now think back to the situation with Pete and Joe that we described in the beginning of this presentation. Why do you think that Pete automatically assumed that the Black man was homeless, despite a lack of clear evidence? Perhaps Pete's judgment was influenced by the stereotype that Black people are poor and homeless. This stereotype may have led him to expect that the man was homeless solely because of his race.

How would you have reacted in Pete's situation? Is it possible that you, too, would have been quick to think that the Black man was homeless?

The example with Pete demonstrates how one's reactions can be racially biased without any awareness of the bias. If not for Joe's comments about the man's shoes, it is very likely that Pete would not have realized that his assumption that the man was homeless was inaccurate. These types of automatic and unintentional associations can lead to expressions of racial bias that are so subtle that people often fail to detect the bias in their thoughts, feelings, and behavior.

Can you think of any times in the past where you had an automatic response that was influenced by stereotypes? Please briefly describe any instances that come to mind.

Measuring automatic stereotypes: The Implicit Associations Task

Recent research has found that the degree to which one has learned automatic stereotypes about Blacks can reliably be measured by the Implicit Associations Task (IAT). The IAT measures how easily you pair a White or a Black face with pleasant vs. unpleasant words. The idea underlying the IAT is that people find it easier to pair two concepts, such as Black faces and unpleasant words, if they are already associated in memory. Because stereotypes about Blacks are often negative, people who have learned stereotypes about Blacks to a greater degree find it easier to pair Black faces with unpleasant words than the Black faces with positive words.

Think about your own performance on the IAT. Did you find it relatively easy to do the task when Black faces were paired with negative words and White faces with positive words?

If so, you are not alone.

Extensive research with people all over the country suggests that about 85% of all non-Black people in the United States show an anti-Black bias on the IAT. This means that most people favor Whites over Blacks at an automatic level, regardless of what they believe on a conscious level.

It may be hard to believe that a simple task like the IAT could measure one's automatic stereotypes. There are three main ways in which people question the validity of the IAT.

First, people often think that how they performed on the test was influenced by the order in which they did the pairings. Several studies show that bias favoring Whites over Blacks consistently occurs no matter what order the pairings are completed.

Second, some people feel that the IAT just measures more general associations unrelated to race that link the color black with evil and the color white with good. This occurs, for example, in Westerns where good guys wear white hats and bad guys black hats. This issue has also been investigated and the research shows that these general color associations are unrelated to performance on the IAT.

Third, people often wonder whether millisecond differences in reaction time on the task really matter in the grand scheme of things. This is an important question; after all, if IAT performance was unrelated to behavior in real-world situations, there would be no reason to care about the IAT. However, research suggests that performance on the IAT is related to a wide range of outcomes, from subtle things like thoughts and feelings during an everyday interaction, to behavior in high-stakes settings, such as interviews, classrooms, and hospital emergency rooms.

Consequences of automatic stereotypes

Medical decisions

Public health specialists have noted that there are substantial disparities in the quality of healthcare received by White and Black people. For example, even when researchers equate such factors as socioeconomic status, Black patients with heart problems are less likely than White patients to receive either appropriate cardiac medications or appropriate heart surgery. Scientists have speculated these healthcare disparities might be caused in part by unintentional bias.

Research evidence supports this speculation. When doctors and medical residents are faced with Black and White patients suffering from the same heart symptoms, they are more likely to prescribe expensive and potentially lifesaving treatments to the White patients. The extent to which physicians show this treatment bias is related to their bias on the IAT.

Employment decisions

Economists have noted that Black people consistently have worse employment outcomes than White people. In particular, Black workers suffer twice the unemployment rate of White workers, a disparity is constant across all levels of educational attainment. These findings have led some to wonder whether unintentional bias might contribute to disparities in employment outcomes.

Again, the research evidence supports this speculation. Resumes with White-sounding names receive one and a half times the number of call-backs from employers as the same resumes with Black-sounding names. People are also more likely to give low ratings to the resumes of Black applicants with ambiguous qualifications than to the resumes of White applicants with the same qualifications. These disparities in call-backs and application ratings are related to bias on the IAT.

Schooling

Educators have long noted the existence of the racial achievement gap, whereby, from elementary school all the way through college, Black students underperform on standardized tests relative to White students, even when researchers equates such factors as student socioeconomic status. Related to this achievement gap is the discipline gap, whereby, in elementary school through college, Black students are three times as likely to receive an out-of-school suspension or expulsion as White students. Scientists have wondered whether these gaps might be caused in part by unintentional bias among teachers and other educators.

Once again, the research evidence supports this expectation. Compared to White students, teachers are more likely to interpret the ambiguous behaviors of Black students as aggressive, have lower expectations that their Black students will succeed in school, and give their Black students less individualized feedback and fewer opportunities to participate in class. These biased behaviors are related to decreased performance of Black students. Moreover, these biased behaviors are related to bias on the IAT.

Everyday interactions

Physicians, educators, and employers are not the only ones who show habitual and unintentional biases. College students show biases in the way they interact with Black students compared to White students in everyday settings. These students show an avoidant interaction style, making less eye contact, sitting further away, showing more nervous behaviors, and cutting interactions short. Once again, the degree to which the students show these avoidant behaviors is related to bias on the IAT.

An important aspect of all these studies on unintentional race bias is that the participants in these studies are unaware that they have acted with bias. In fact, many of the participants report that they do not want to treat Black people differently from White people and that they believe that prejudice is wrong. Yet, despite the best intentions, the biases occur.

Recall that you completed an IAT at the beginning of this session. We will now calculate your IAT score and show you both your score and a short verbal interpretation of the score. Your score should be interpreted as the degree to which, at an automatic, unintentional level, you showed a relative preference for White people versus Black people on the IAT.

Calculating . . .

Your IAT score is _____. This indicates that you have a ____ automatic preference for _____ people over _____ people.

We are interested in how you feel about your IAT score. We will present a series of emotion-related words. Please indicate the degree to which each word describes your feelings using a 1 (not at all) to 7 (very much) scale.

1	2	3	4	5	6	7
not at all						very much

calm
 angry at myself
 uncomfortable
 guilty
 friendly
 angry at others
 uneasy
 depressed
 happy
 embarrassed
 bothered
 satisfied with myself
 anxious
 frustrated
 annoyed with myself
 energetic
 regretful
 irritated at others
 disappointed with myself
 tense
 disgusted with myself
 threatened
 optimistic
 disgusted with others
 content
 low
 pleased with myself
 sad
 helpless
 ashamed
 relaxed
 self-critical
 good

Breaking the prejudice habit

In many ways, the research that we just reviewed is discouraging because it suggests that even people who want to treat Black people fairly can act in racially biased ways. This has led some researchers to explore whether it is possible to reduce unintentional biases resulting from automatic stereotypes. Here there is some good news. If a few conditions are met, it is possible to reduce unintentional race bias.

Specifically, people can reduce unintentional race bias if they:

- (1) are motivated to overcome the bias
- (2) become aware of their bias and why it exists
- (3) are able to detect the subtle influence of stereotypes
- (4) learn and practice strategies that help reduce the bias

Being motivated to reduce unintentional race biases is a necessary first step. Without motivation, people will be unlikely to expend the effort needed to eliminate the effects of these biases. Being motivated is a personal decision that people must make for themselves.

Even if people are motivated to reduce their bias, they still need to become aware of it and why it exists. Much of what we have discussed early in the presentation explains why so many people are affected by unintentional bias, even when they believe that prejudice is wrong. In what follows, we outline how to detect the influence of automatic stereotypes and describe strategies that, if learned and practiced, will help you rid yourself of unintentional bias.

Detecting the influence of stereotypes

Before we can overcome the negative effects of automatic stereotypes, we must be able to detect stereotypical depictions of Black people in our environment and when our own responses are affected by these depictions. Detecting these biases creates the opportunity to do something about them.

Because our social environment plays such a large role in perpetuating stereotypes, we must first learn to detect biased portrayals, whether they occur in the media or in interactions with others. While we may not be able to stop how others portray Black people, we can choose how we react to those portrayals by recognizing when a biased portrayal occurs and expressing disapproval of it. As we demonstrated with the Hurricane Katrina news report, sometimes bias can be quite subtle, so we must be vigilant to detect this bias.

Equally important as the detection of bias in our external environment is the detection of bias within ourselves. This involves figuring out the situations in which we are most likely to be subtly influenced by automatic stereotypes and monitoring our responses in these situations. We must take similar steps to break other kinds of habits, like biting nails; to stop biting nails, we must figure out the situations that trigger nail-biting behavior.

After we have figured out how stereotypes are reinforced by our environment and when stereotypes are likely to pop to mind, we can work to prevent the influence of stereotypes by training ourselves to behave in different, unbiased ways. In what follows, we outline five strategies that research has shown to be effective at reducing automatic stereotypes, and, therefore, their influence on people's behavior. Practicing these strategies can help break the prejudice habit.

Bias reducing strategies

Strategy 1: Stereotype replacement

Stereotype replacement involves replacing stereotypic responses with non-stereotypic responses. This strategy can be used in two contexts: when you detect stereotypic portrayals of Blacks in your environment and when you detect a stereotypic response within yourself. After the influence of a stereotype has been detected, this strategy involves

- (1) Labeling the response or portrayal as stereotypical
- (2) Evaluating the situation to determine how the response or portrayal occurred and how it might be prevented in the future, and
- (3) Replacing the stereotypical response or portrayal with one that is non-stereotypical.

To go back to the story we presented earlier with Pete and Joe, Pete could have used this technique after he saw the man approaching him by recognizing that his feelings of tension were partly by stereotypes linking Black men to poverty and criminality. He could have then labeled his response as stereotypical, recognized that he jumped to a quick assumption, and replaced his feelings of tension with calmer feelings.

Please think of a situation in your everyday life in which you could use the stereotype replacement strategy and describe that situation below.

In a given week, how many opportunities do you think you would have to use the stereotype replacement strategy?

1	2	3	4	5	6	7
very few						very many

When you have the opportunity, how likely are you to use the stereotype replacement strategy?

1	2	3	4	5	6	7
not at all likely						very likely

To what degree do you intend to use the stereotype replacement strategy?

1	2	3	4	5	6	7
not at all						very much

Strategy 2: Individuating instead of generalizing

Using a stereotype involves generalizing a set of characteristics to all members of a particular racial group. This generalization leads people to ignore the individual characteristics of each person within that racial group, leading to inaccurate and faulty conclusions.

Individuating involves going beyond racial categories by attending to the individual characteristics of others. Gathering this individual information allows you to get to know others on a personal basis and thus make judgments on the basis of their personal, rather than group, characteristics.

Individuating does not involve ignoring race or being “color blind”. For many racial minorities, racial identity and culture are an important part of life. Being color blind ignores and denies the importance of racial identity and culture. Individuating involves recognizing that race is just one facet of other people that makes each person unique.

Pete could have used this technique by paying more attention to the Black man’s clothing and recognizing that he was wearing nice shoes and other nice clothing. This information would have indicated that assumptions based on stereotypes are inaccurate.

Please think of a situation in your everyday life in which you could use the individuating strategy and describe that situation below.

In a given week, how many opportunities do you think you would have to use the individuating strategy?

1	2	3	4	5	6	7
very few						very many

When you have the opportunity, how likely are you to use the individuating strategy?

1	2	3	4	5	6	7
not at all likely						very likely

To what degree do you intend to use the individuating strategy?

1	2	3	4	5	6	7
not at all						very much

Strategy 3: Perspective taking

Perspective taking involves imagining what it would feel like to be in another person's situation. By using this strategy, you can imagine how it would feel to have your abilities called into question or to be viewed as lazy and potentially violent on the basis of race. This strategy can be used either proactively, without any prompting from outside sources, or reactively, after a stereotypic response or portrayal has been detected. Perspective taking, especially perspective taking that occurs after the detection of a stereotypic response or portrayal, is very useful in assessing the emotional impact of stereotyping on others.

Pete could have used this strategy by thinking about what it would feel like to have others assume that he was dangerous or homeless based on his race. This strategy may have helped him realize the unfairness of automatic race-based expectations and assumptions.

Please think of a situation in your everyday life in which you could use the perspective taking strategy and describe that situation below.

In a given week, how many opportunities do you think you would have to use the perspective taking strategy?

1	2	3	4	5	6	7
very few						very many

When you have the opportunity, how likely are you to use the perspective taking strategy?

1	2	3	4	5	6	7
not at all likely						very likely

To what degree do you intend to use the perspective taking strategy?

1	2	3	4	5	6	7
not at all						very much

Strategy 4: Increasing opportunities for contact

Living in Madison, you may find that you don't have much of a chance to interact with Black people. You can make up for this lack of opportunities by actively seeking situations where you are likely to have positive interactions with Black people. You can do this by taking particular classes, joining particular clubs, and / or participating in particular events. Seeking out interactions will allow you to meet Black people who disconfirm stereotypes.

In addition to seeking personal contact with Black people, you can modify your visual environment by watching movies, TV, and news that portray Black people in non-stereotypical ways.

This strategy does not transfer directly to our story with Pete and Joe. However, if Pete had previously made an effort to make Black friends and acquaintances, he would have had more experience to draw upon in individuating instead of generalizing, for example.

Please think of a situation in your everyday life in which you could use the seeking opportunities for contact strategy and describe that situation below.

In a given week, how many opportunities do you think you would have to use the contact strategy?

1	2	3	4	5	6	7
very few						very many

When you have the opportunity, how likely are you to use the contact strategy?

1	2	3	4	5	6	7
not at all likely						very likely

To what degree do you intend to use the contact strategy?

1	2	3	4	5	6	7
not at all						very much

Strategy 5: Discussions about race

The final strategy involves openly discussing issues relevant to race with others. Having these conversations can be challenging because race can be such a sensitive topic for some people. However, the more you have these conversations, the more confident you become about your abilities to speak with others about race. Having these conversations can also give you confidence in your abilities to challenge stereotypic reactions and portrayals when they do occur. Finally, these conversations are great opportunities to help others begin the process of breaking the habit of unintentional bias.

Pete could have used the discussions strategy after he noticed his own stereotypic reactions by starting a conversation with Joe about why he had these reactions. Together, Pete and Joe could then have helped each other figure out the source of the reactions and what do about these reactions in future situations.

Please think of a situation in your everyday life in which you could use the discussions strategy and describe that situation below.

In a given week, how many opportunities do you think you would have to use the discussions strategy?

1	2	3	4	5	6	7
very few						very many

When you have the opportunity, how likely are you to use the discussions strategy?

1	2	3	4	5	6	7
not at all likely						very likely

To what degree do you intend to use the discussions strategy?

1	2	3	4	5	6	7
not at all						very much

Our goal in this presentation was to explain how stereotypes are automatically activated, even among people who believe that stereotypes are wrong. We also explained how automatic stereotypes can be measured and how these stereotypes can lead to unintended discrimination. Finally we explained how, through a combination of motivation, awareness, and strategies, people can reduce automatic race bias and break the prejudice habit.

Although we described the strategies separately, practicing one strategy can make practicing the others easier. For example, when seeking opportunities for contact with Black people, you can come to know more about the individual characteristics of your Black acquaintances. Likewise, individuating your Black acquaintances by attending to their personal characteristics can help you identify the situations in which you are at risk for having stereotypes come to mind, allowing you to more easily replace these stereotypes in similar future situations.

Over time, if the techniques are practiced, you may find that they require less effort and less time. With enough motivation, awareness, and effort, you will break the prejudice habit.

1. Which of the following are true about stereotypes?
 - (a) Only people who believe in racial stereotypes are influenced by them.
 - (b) Knowledge of stereotypes is acquired through exposure to popular culture.
 - (c) Stereotypes about racial minorities can influence our expectations, thoughts, feelings, and behaviors towards those minorities
 - (d) Both (b) and (c)

2. Please select the statement that best describes the Implicit Associations Test (IAT).
 - (a) One's score on the IAT is influenced by the general associations people have about the colors Black and White.
 - (b) The IAT measures the unintentional associations that are acquired through exposure to popular stereotypes.
 - (c) Anyone who believes that prejudice is wrong will have a low score on the IAT.
 - (d) One's IAT score is influenced by the order in which the trial types are presented.

3. Which of the following phenomena have been linked to unintentional racial bias?
 - (a) The racial achievement gap in schools
 - (b) Disparities in call-backs for interviews
 - (c) Avoidant behavior during interracial interactions
 - (d) All of the above

4. What must be true about a person for that person to reduce his or her unintentional bias?
 - (a) That person must be motivated to reduce his or her bias
 - (b) That person must be aware of his or her bias
 - (c) That person must practice strategies that help reduce unintentional bias
 - (d) All of the above

5. Which of the following is NOT an effective strategy for reducing unintentional bias?
 - (a) Stereotype replacement
 - (b) Being colorblind
 - (c) Seeking opportunities for contact
 - (d) Having discussions with others about racial issues

Appendix 4: Study 2 participant information sheet

Study overview

Your study coordinator:

Your study coordinator's email:

General study description

The Dean of Students has asked the Psychology Department to assist with gathering student opinions about issues that affect university students. The Psychology Department is therefore organizing small committees of four students each that are each tasked with investigating a topic in-depth and writing a report based on these investigations. The reports will be submitted to the Dean's office at the end of the study.

Your group has been asked to investigate **racial disparities between Black and White students in education**, including disparities in admission, performance, and graduation. The Dean of Students would like to know how strong the evidence is that racial disparities exist in education, why these disparities exist, how these disparities affect students, and what, if anything, universities should do to address them. Therefore, we would like your committee to evaluate the evidence about the nature of racial disparities in education and draft a set of recommendations for what, if anything, universities should do to address racial disparities in education. Your group should then write a report that describes the evidence that you uncovered and your group's recommendations.

Report guidelines

When evaluating the evidence about the nature of racial disparities in education, your group can do whatever research you wish and consult whatever resources you wish. These resources could be research journals, popular press articles, internet research, personal consultations with relevant experts, and so on. You should follow these guidelines when writing the report:

- (1) The report should have an introduction that describes the topic, a section that reviews and evaluates the evidence, and a section that gives your group's recommendations. The report should evaluate the evidence that bears on whether racial disparities exist in education, why these disparities exist, how racial disparities affect university students (if at all), and include a set of recommendations about what, if anything, universities should do to address racial disparities in education. A high quality report will describe evidence from multiple sources and use this evidence to help make its recommendations.
- (2) You should include a references page at the end of your report. The references page can be formatted however you wish, but you can use APA style if it's convenient for you.
- (3) The report can be however long you wish, but we imagine that each report will be about 4 – 6 pages long, not including references.
- (4) The report should be written in 12 point Times New Roman font, and should be double-spaced.
- (5) Your finished report should be drafted in a Word document and emailed to your study coordinator by _____. Your study coordinator's email is listed at the top of this document.

Study timetable

You will have two weeks to prepare your group report. During this time, you will have a total of two hour-long lab sessions. In your first session next week, you will have some time for your group to meet to coordinate your report. In both lab sessions, you will complete a brief survey about this process. Your scheduled meeting times are:

Date and time	Event
	Meeting 2 @ Psychology 253
	Report turned into your study coordinator, survey @ Psychology 253

Study compensation

Because we expect that you will need to spend some time on the report outside the lab, we are paying you a total of \$12 for each week of the study in addition to the extra credit that you will receive for each of the three hour-long lab sessions. Thus, if you complete the full project, you will receive \$24 and 6 points of extra credit.

In addition, to help ensure that the reports written by each committee are thorough, we will judge the quality of the reports written by each student committee. The members of the committee that writes the highest quality report will each be awarded an additional \$75 on top of the \$24 that everyone receives.

Study emails

We have created email accounts for each of you to use for this project (see the table below). During the two weeks of the project, you should use email accounts to communicate with each other about the project. We have uploaded your pictures to these email accounts to help you remember who is in your group. We have also created an account for you on an online time-tracking website called www.toggl.com, which we would like you to use to track the amount of time that you spend on your group project. The time-tracking website account is linked to your email account. Your username and password for the email account and the Toggl account are the same and are both written below.

Name	Email
------	-------

Your username (Gmail and Toggl):

Your password:

Appendix 5: Study 2 questionnaires

Concern about discrimination [baseline; session 1; session 2; session 3]

The following questions will present a series of statements which you may agree or disagree with. You may have seen and responded to these statements before, but your current reaction to these statements may be either the same or different to your previous reaction. Based on how you are feeling right now, please read the statements and rate your agreement with them using the scale provided.

1	2	3	4	5	6	7	8	9	10
strongly									strongly
disagree									agree

1. I'm not personally concerned about discrimination against Blacks.
2. People need to stop focusing so much time and energy worrying about racial discrimination.
3. People make more fuss about discrimination against Blacks than is necessary.
4. I consider racial discrimination to be a serious social problem.

Should [baseline; session 1; session 2; session 3]

The following items concern your beliefs about Blacks. We would like you to respond to the following items based on the beliefs that you hold, regardless of whether the way you actually act is always consistent with those beliefs. As before, your responses may be the same or different from what you have indicated before. Please indicate the degree to which you agree or disagree with each of the statements using the scale provided.

1	2	3	4	5	6	7
strongly disagree						strongly agree

1. I think that Blacks and Whites should have an equal opportunity to be hired by an employer.
2. I believe that I should not think of Blacks in stereotypical ways.
3. If I had a Black classmate, I should assume that he/she is just as capable of completing intellectually challenging tasks as my White classmates.
4. I should not feel uncomfortable about having a Black roommate.
5. I believe that I should never avoid interacting with someone just because he/she is Black.
6. I should not feel uncomfortable shaking the hand of a Black person.

Would [baseline; session 1; session 2; session 3]

Sometimes the way we actually respond in a situation is consistent with our beliefs, and other times we find ourselves acting in a way that is inconsistent with our beliefs. For each item below, we are interested in your initial, gut-level reactions, which may or may not be consistent with how you believe you should react. Once again, your reactions right now may be the same or different from what you have indicated before. Please indicate the degree to which you agree or disagree with each of the statements using the scale provided.

1	2	3	4	5	6	7
strongly disagree						strongly agree

1. I would feel uncomfortable if I were the only White person in a group of Black people.
2. I would feel uncomfortable if I was assigned a Black roommate.
3. On occasion, I have avoided interactions with people because they were Black.
4. If I were an employer, I would initially hesitate to hire someone who was Black.
5. I sometimes have stereotypical racial thoughts.
6. If I were choosing a classmate to complete a difficult in-class assignment with me, I would be more likely to choose a White than a Black classmate.

IMS/EMS (baseline; session 1; session 2; session 3)

The following questions concern various reasons or motivations people might have for responding in various ways towards Black people. Some of these ways of responding reflect internal - personal motivations whereas others reflect more external – social motivations. We wish to emphasize that neither source is better than the other – we are simply interested in why people respond the way they do towards Black people.

Please indicate the degree to which you agree or disagree with each of the following statements using the scale below.

1	2	3	4	5	6	7	8	9
strongly disagree								strongly agree

1. Because of today's PC (politically correct) standards I try to appear non-prejudiced toward Black people. (*ems*)
2. I try to hide any negative thoughts about Black people in order to avoid negative reactions from others. (*ems*)
3. If I acted prejudiced toward Black people, I would be concerned that others would be angry with me. (*ems*)
4. I attempt to appear non-prejudiced toward Black people in order to avoid disapproval from others. (*ems*)
5. I try to act non-prejudiced toward Black people because of pressure from others. (*ems*)
6. I attempt to act in non-prejudiced ways toward Black people because it is personally important to me. (*ims*)
7. According to my personal values, using stereotypes about Black people is OK. (*ims*)
8. I am personally motivated by my beliefs to be non-prejudiced toward Black people. (*ims*)
9. Because of my personal values, I believe that using stereotypes about Black people is wrong. (*ims*)
10. Being non-prejudiced toward Black people is important to my self-concept. (*ims*)

Sociometric questions (session 2; session 3)

For the following questions, we are interested in your impressions of the other members of your group. For each set of questions, we will show you a picture of one of the other members of your group and ask you to answer some questions regarding your impressions of that group member. Please think carefully about your impressions of the other group members and, based on how you feel right now, respond to each of the following questions.

There are no right or wrong answers for these questions. We are simply interested in your impressions of the other members of your group.

(First asks the participant to respond about person 1, then person 2, then person 3)

How much do you like working with this person?

1	2	3	4	5	6	7
Not at all						Very much

How much do you trust this person?

1	2	3	4	5	6	7
Not at all						Very much

How knowledgeable is this person about racial disparities in education?

1	2	3	4	5	6	7
Not at all						Very much

How much did this person contribute to the group project?

1	2	3	4	5	6	7
Not at all						A lot

How valuable were this person's contributions to the group project?

1	2	3	4	5	6	7
Not at all valuable						Very valuable

To what extent does this person believe that racial disparities exist in education?

1	2	3	4	5	6	7
Not at all						Very much

To what extent does this person believe that racial disparities are a problem in education?

1	2	3	4	5	6	7
Not at all						Very much

How concerned is this person about racial disparities in education?

1	2	3	4	5	6	7
Not at all						Very much

Personal measures (session 2; session 3)

The following questions are about your own opinions and impressions during the group project. Please read each question and answer it using the scale provided.

To what extent did you felt pressured to withhold your views about racial disparities from the other group members?

1	2	3	4	5	6	7
Not at all						Very much

How much did you contributed to the group project?

1	2	3	4	5	6	7
Not at all						Very much

How much do you feel like your contributions to the group project were valued?

1	2	3	4	5	6	7
Not at all						Very much

How much did you enjoy the group project?

1	2	3	4	5	6	7
Not at all						Very much

To what extent do you believe that racial disparities exist in education?

1	2	3	4	5	6	7
Not at all						Very much

To what extent do you believe that racial disparities are a problem in education?

1	2	3	4	5	6	7
Not at all						Very much

How concerned are you about racial disparities in education?

1	2	3	4	5	6	7
Not at all						Very much

How satisfied are you with your group's recommendation? [*session 3 only*]

1	2	3	4	5	6	7
Not at all						Very much

Open-ended question [session 3 only]

We are interested in your general thoughts about the group project. What did you like and what didn't you like about working on the group project?