

# Research Report

## WHEN PREJUDICE DOES NOT PAY: Effects of Interracial Contact on Executive Function

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**Abstract**—This study examined the influence of interracial interaction on the cognitive functioning of members of a dominant racial group. White participants had a brief interaction with either a White or a Black confederate, and then completed an ostensibly unrelated Stroop color-naming test. Prior to the interaction, participants' racial attitudes regarding Whites and Blacks were measured via the Implicit Association Test. Racial attitudes were predictive of impairment on the Stroop test for individuals who participated in interracial interactions, but not for those who participated in same-race interactions. The results are consistent with recently proposed resource models of self-regulation and executive control in that interracial interaction, a particularly taxing exercise of self-regulation for highly prejudiced individuals, negatively affected performance on a subsequent, yet unrelated, test of executive function.

Prejudice is a ubiquitous social phenomenon for which interpersonal, intergroup contact may be the only viable antidote (Allport, 1954; Pettigrew, 1998). Research suggests, however, that intergroup interaction is often a source of anxiety and distress for members of dominant groups (Devine, Evett, & Vasquez-Suson, 1996; Ickes, 1984; Stephan & Stephan, 1985). Intergroup contact may even evoke a state of "physiological threat" in some people (Blascovich, Mendes, Hunter, Lickel, & Kowai-Bell, 2001). The purpose of the current work was to examine potential cognitive consequences of intergroup contact. Specifically, we considered whether interracial interactions affect the cognitive functioning of members of a dominant racial group (i.e., White Americans).

The current investigation builds on research examining the effects of exposure to aversive stimuli on cognition (Cohen, 1980; Glass & Singer, 1972). In both humans (Hartley & Adams, 1974) and monkeys (Arnsten & Goldman-Rakic, 1998), performance on tasks that require executive attentional capacity has been shown to suffer after exposure to high-intensity noise. If intergroup interactions are stressful, then they too should temporarily impair executive components of cognitive functioning. Furthermore, the extent of cognitive impairment should differ depending on the extent to which individuals find the interactions stressful. Interacting with a Black person may be a high-intensity stressor for high-prejudice Whites, but quite benign for low-prejudice Whites. Results reported by Blascovich et al. (2001) are consistent with this sentiment: The degree of physiological threat experienced by nonstigmatized individuals during an intergroup interaction was negatively correlated with the quantity of prior intergroup contact they had experienced. Because quantity of intergroup contact tends to correlate negatively with prejudice, this work suggests that high-prejudice indi-

viduals are likely to find intergroup contact more aversive than low-prejudice individuals, and therefore should reveal greater executive dysfunction after such contact.

This hypothesis is also consistent with recent theoretical work in support of a resource model of executive attention (Engle, Conway, Tuholski, & Shisler, 1995; Muraven & Baumeister, 2000). Specifically, executive function is thought to be a limited, albeit renewable, resource. Engagement in one task that taps the "self-regulatory" resource (e.g., controlling emotional reactions) impairs performance on a subsequent task requiring similar resources (e.g., an endurance test; see Baumeister, Muraven, & Tice, 2000). There is ample evidence suggesting that intergroup interactions often require behavioral control, self-regulation, and, perhaps, thought suppression (Devine, 1989; Dovidio & Gaertner, 1998; von Hippel, Silver, & Lynch, 2000). Consequently, intergroup contact should deplete executive resources and temporarily attenuate executive functioning.

Taken together, both the research examining cognitive aftereffects of acute stress and work on self-regulation suggest that intergroup interactions will impair subsequent cognitive function. To investigate this question, we examined the performance of White participants on the color-naming Stroop (1935) paradigm after they engaged in an interaction with either a White or a Black person. Because the Stroop paradigm involves the inhibition of prepotent responses, it requires executive attentional capacity (Engle, 2002; Macleod, 1991), and should, therefore, be susceptible to the predicted influence of interracial contact. Specifically, we predicted that relative to same-race interactions, interactions with Blacks would impair Stroop performance, as a function of participants' level of prejudice.

## METHOD

### Participants

Fifty White students (29 males, 21 females) participated for partial course credit. They had previously participated in a session during which the Affective Prejudice Scale was administered (Pettigrew & Meertens, 1995). On this instrument, individuals indicate "how often" they feel admiration and respect for Blacks and for Whites on separate 5-point scales (1 = *never*, 5 = *always*). The items were reverse-scored and averaged for each race. These averages reflect explicit negative affect regarding each group.

### Procedure

Participants came into the laboratory individually for a study "investigating the influence of one cognitive task on a subsequent task when there is a delay between the two." They were told, "The first task that you will be working on is a word categorization task. The instructions will be presented by the computer." The experimenter left the room while participants completed the Implicit Association Test (IAT);

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Greenwald, McGhee, & Schwartz, 1998), which assessed automatic racial prejudice.

After completing the IAT, participants were led to a different room, where a second experimenter (E2) was waiting for them. They were told that there would be a delay before the second cognitive task, and they were asked to help with the creation of stimulus materials for a different experiment. For half of the participants, E2 was White, and for the other half, E2 was Black. E2 explained that he would ask participants a few questions, and that their responses would be videotaped. Participants were first asked to spend about 1 min introducing themselves. Next, they were asked to comment on two relatively controversial issues for about 2 min each (in counterbalanced order): (a) the college's fraternity system and (b) racial profiling in light of the September 11th attacks. Other than asking the questions, E2 did not converse with participants. After the videotaping session, participants were met by the first experimenter, who took them to another room to complete the Stroop task. They were subsequently debriefed and thanked.

## Measures

### IAT

The IAT is a measure of automatic associations, often employed to assess unconscious bias (see Greenwald et al., 1998, for details). In the current study, participants completed an IAT in which they were required to categorize White names, Black names, pleasant words, and unpleasant words as quickly as possible by pressing one of two marked response keys. In one block of 40 trials, White names and pleasant words shared a response key, and Black names and unpleasant words shared a key (*White+/Black-* phase). In another block<sup>1</sup> of 40 trials, the associations were reversed—White was associated with unpleasant, and Black with pleasant (*White-/Black+* phase). The difference between response latencies in the two phases provides an index of the degree to which a person implicitly favors one category over the other (i.e., racial bias).

### Stroop task

The Stroop task was conducted with a four-button response box. Instructions explained that participants were to report the color in which a stimulus word or string of Xs appeared as quickly as they could, by pressing the appropriate key on the response box (the keys were color-coded). On each trial, the word "yellow," "red," "green," or "blue" or a row of four Xs appeared on the screen, in one of the four colors (yellow, red, green, or blue). On *incompatible* trials, a color name appeared in a color other than its semantic meaning (e.g., "red" appearing in blue type). On *control* trials, in contrast, the string of Xs appeared in blue type. The difference between latencies associated with incompatible trials and control trials forms an index of Stroop interference. Each word or control stimulus appeared for a maximum of 2,000 ms, preceded by a fixation cross (+). The intertrial interval was 1,500 ms. The task consisted of 20 practice trials followed by seven blocks of 12 trials each, for a total of 84 experimental trials.

1. Block order was counterbalanced across participants.

## RESULTS

### Preliminary Analyses

#### *Explicit prejudice*

We formed an index of *explicit racial bias* from responses to the Affective Prejudice Scale,<sup>2</sup> by subtracting participants' self-reported affective prejudice for Whites from their self-reported affective prejudice for Blacks.

#### *Automatic prejudice*

All IAT latencies under 300 ms and over 3,000 ms were recoded in a manner consistent with the procedures of Greenwald et al. (1998). Next, mean latencies for the *White+/Black-* phase were subtracted from mean latencies for the *White-/Black+* phase in order to index each participant's automatic *racial prejudice*.<sup>3</sup> Greater values reflect greater racial prejudice against Blacks.

#### *Stroop interference*

Mean response times for responses to control trials were subtracted from mean response times for the incompatible trials to assess *Stroop interference*.<sup>4</sup>

### Primary Analyses

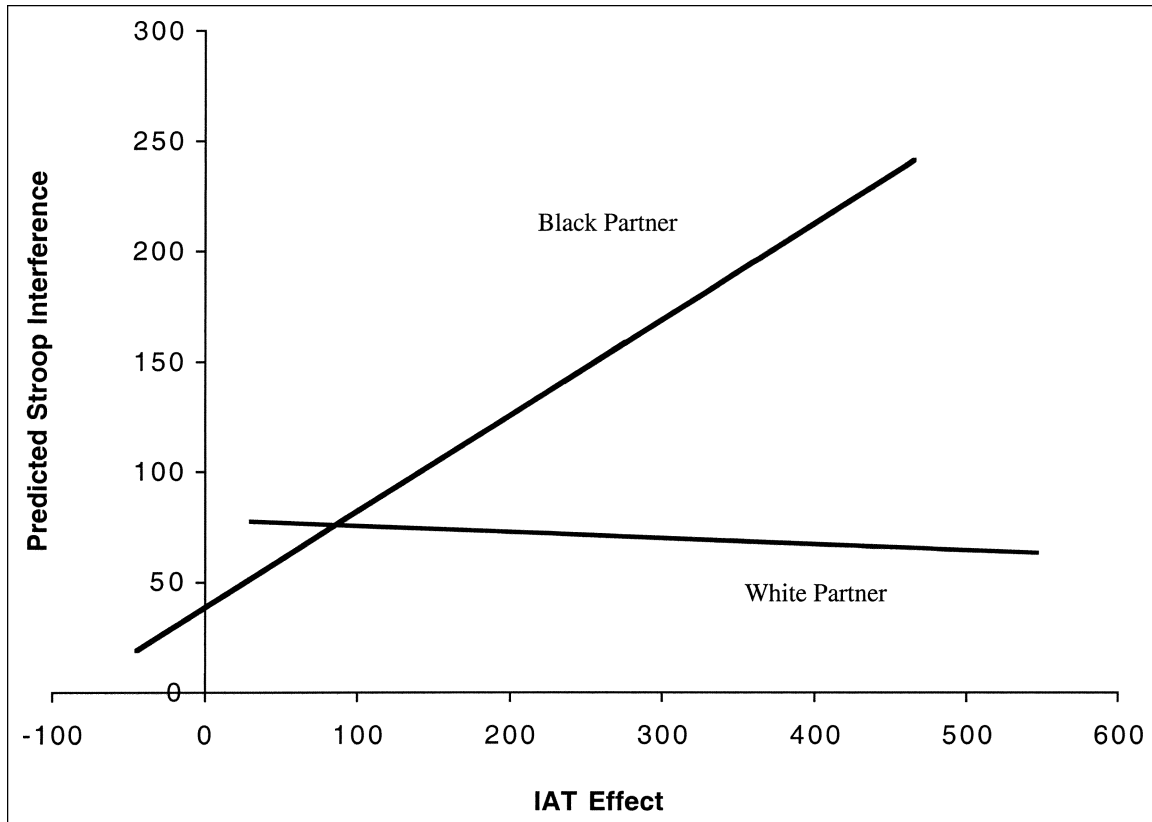
To assess whether the estimates of racial attitude predicted interference on the Stroop task after participants interacted with a Black, rather than a White, person (i.e., E2), we first regressed interference scores on IAT scores (centered), E2 race, and the interaction of IAT and E2 race. Results revealed a main effect of E2 race ( $b = 95, p < .002$ ) that was moderated by an interaction between E2 race and IAT bias ( $b = 0.49, p < .02$ ). Automatic prejudice predicted Stroop interference after interactions with a Black person,  $b = 0.53, p < .02$ , but not after interactions with a White person,  $b = -0.03, n.s.$  (see Fig. 1). Furthermore, participants with IAT bias scores above the mean (i.e., participants with relatively high prejudice) revealed greater Stroop interference after interacting with a Black than with a White person,  $b = 66.1, p < .005$ , whereas the Stroop interference of participants with IAT scores below the mean did not differ as a function of the experimenter's race,  $b = 15, n.s.$

A parallel regression using explicit bias yielded similar findings. Specifically, both the main effect of E2 race and the interaction between bias and E2 race were significant,  $b = 41, p < .005$ , and  $b = 46, p < .02$ , respectively. Additional analyses revealed, however, that the effects of explicit bias did not remain reliable in regression models that included automatic bias scores ( $ps > .12$ ). In contrast, the interaction between IAT bias and the experimenter's race did remain reliable

2. Only 41 participants had completed the scale. Bias scores ranged from  $-2.50$  to  $+1.50$  ( $Mdn = -0.57$ ).

3. One extreme score was recoded as missing. Scores ranged from  $-44$  ms to  $+556$  ms ( $Mdn = 315$ ).

4. Scores ranged from  $+17$  ms to  $+413$  ms ( $Mdn = 69.2$ ).



**Fig. 1.** Predicted Stroop interference as a function of Implicit Association Test (IAT) bias, after interaction with a White or Black partner.

with explicit bias included in the model,  $b = 0.25$ ,  $p < .05$ , as did the effect of IAT bias on Stroop interference after interracial interactions,  $b = 0.39$ ,  $p < .04$ .

### Supplementary Analyses

So that we could investigate the possibility that the observed results were attributable to the discussion of the racially sensitive topic, two independent observers coded the videotapes of participants' responses to each topic (i.e., fraternities and racial profiling) for evidence of behavioral control and response modulation.<sup>5</sup> Previous research suggested that lack of movement during an interracial interaction often signals an attempt to control behavior for fear of appearing prejudiced (see, e.g., Shelton, in press). In order to index *behavioral control*, therefore, coders rated the extent to which participants moved their body while answering, moved their hands, and looked around the room (all reverse-scored). To index *response modulation*, coders rated the extent to which participants apologized for their response, had a hard time answering, paused while answering, asked the experimenter for clarification of the question, needed to be prompted by the experimenter, and seemed to be concealing their true opinions. Ratings were made on 7-point scales (1 = *not at all*, 7 = *very much*). The variables for each composite were averaged sepa-

rately for the profiling footage (intraclass  $r_s = .72$  and  $.91$  for behavioral control and response modulation, respectively) and for the fraternity footage (respective  $r_s = .71$  and  $.79$ ).

### Response modulation

Regression analyses revealed that E2 race predicted response modulation for the fraternity question ( $M_s = 1.5$  and  $1.1$  for Black and White experimenters),  $b = 0.30$ ,  $p < .0005$ , and marginally predicted response modulation for the profiling question (respective  $M_s = 1.8$  and  $1.5$ ),  $b = 0.19$ ,  $p < .10$ . However, neither implicit nor explicit bias nor their interactions with E2 race had reliable effects on response modulation for either question ( $p_s > .30$ ). Furthermore, regression analyses revealed no effects of response modulation (during either question) on Stroop impairment ( $p_s > .40$ ).

### Behavioral control

Results for the profiling footage revealed that only automatic prejudice had a reliable effect on behavioral control,  $b = 0.0017$ ,  $p = .05$ . Participants with higher prejudice scores controlled their behavior more than participants with lower scores. Analyses of behavioral control during the fraternity clips also revealed the main effect of IAT bias,  $b = 0.002$ ,  $p < .05$ , as well as a main effect of E2 race,  $b = 0.35$ ,  $p = .05$ . Participants controlled their behavior more with Black ( $M = 6.1$ ) than White ( $M = 5.8$ ) experimenters. The interaction between E2 race and

5. These composite variables emerged from a principal components analysis with Varimax rotation.

IAT bias was not reliable, nor were any effects of explicit bias ( $ps > .5$ ). The final set of analyses, using behavioral control to predict Stroop interference, suggested no effects of behavioral control during the profiling question ( $ps > .3$ ). By contrast, the interaction between E2 race and behavioral control during the fraternity footage was a reliable predictor of Stroop interference,  $b = 157, p < .05$ . Specifically, the more that participants controlled their behavior while answering the race-neutral, fraternity question with a Black experimenter, the worse they tended to perform on the Stroop task ( $p < .10$ ). Behavioral control, however, did not predict Stroop interference after same-race interactions ( $p > .40$ ). Taken together, these results suggest that low- and high-prejudice persons may differ in the extent to which they attempt to control behavior during relatively benign, race-neutral interracial interactions, but not during racially sensitive encounters. Consequently, the primary finding of the current work—that automatic prejudice predicted Stroop impairment after interracial interactions—is not attributable to the prior discussion of a racially charged topic.

## DISCUSSION

Intergroup contact is becoming increasingly common in the United States. Recent research suggests that such contact may be challenging, if not threatening, for members of dominant groups (Blascovich et al., 2001), particularly when they harbor prejudiced attitudes toward their interaction partners (Vorauer & Kumhyr, 2001). In addition, the results of the current study suggest that after leaving intergroup interactions, prejudiced individuals may be more likely than others to underperform on tasks that require executive control. Specifically, we found that high-prejudice White participants who engaged in an interracial interaction had impaired performance on the Stroop task—a task requiring executive control—compared with both high-prejudice participants who interacted with a White person and low-prejudice participants. These data support recently proposed resource models of executive function (Engle et al., 1995). Specifically, engaging in one exercise of self-regulation (i.e., the interracial interaction) seems to have temporarily depleted participants' capacity to engage in a second (i.e., the Stroop task).

The current findings also suggest a number of practical implications. Most notably, they reveal one potential negative consequence of harboring prejudice, at least when interracial contact is unavoidable. That is, after interracial interactions, high-prejudice persons are more likely than low-prejudice persons to underperform on tasks that require inhibitory ability. Although the prospect of impaired performance on the Stroop task may not particularly concern individuals with high automatic-prejudice scores, the present findings suggest that performance on any activity that requires response inhibition may also be at risk. In light of these larger implications, we believe that these findings must be interpreted conservatively. The negative effect of intergroup contact on cognitive functioning may dissipate after repeated interactions with the same stigmatized persons. Furthermore, in many cases, the motives and roles of participants during an interaction will shape their contact experiences (Gilbert & Hixon, 1991; Sinclair & Kunda, 1999) and, therefore, the effect (if any) on subsequent executive capacity. Additional research is necessary to investigate the boundary conditions of the observed effects. Nevertheless, the current work contributes to a growing literature examining the dynamics of

intergroup encounters, revealing at least one circumstance in which it does not pay to be prejudiced.

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