Research Report

Racial Discrimination by Low-Prejudiced Whites

Facial Movements as Implicit Measures of Attitudes Related to Behavior

Eric J. Vanman, Jessica L. Saltz, Laurie R. Nathan, and Jennifer A. Warren

Emory University

ABSTRACT—*We investigated the relationship of implicit racial prejudice to discriminatory behavior. White university students chose the best of three applicants (two were White and one was Black) for a prestigious teaching fellowship. They then completed the Implicit Association Test (IAT), a measure of implicit racial bias. Three weeks later, participants completed a second implicit measure of racial bias by viewing photos of Whites and Blacks while facial electromyography (EMG) was recorded from sites corresponding to the muscles used in smiling and frowning. Analyses revealed that bias in cheek EMG activity was related to the race of the chosen applicant, whereas bias on the IAT was not. Motivations to control prejudiced reactions were not related to EMG activity or the race of the applicant chosen, but were related to IAT bias. The findings indicate that facial EMG can be used as an implicit measure of prejudice related to discrimination.*

Some recent conceptualizations of prejudice have focused on the distinction between implicit and explicit attitudes (Greenwald & Banaji, 1995; Wilson, Lindsey, & Schooler, 2000), a distinction similar to the one between automatic and controlled processes (Devine, 1989; Fazio & Towles-Schwen, 1999). Explicit attitudes are often measured by questionnaires, which require conscious mediation and are thus more susceptible to social pressures. People are not necessarily aware of their implicit attitudes, but several methods to measure them exist (see Fazio & Olson, 2003, for a review). Among these is a form of the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998). In the critical phase of the IAT, participants use two keys to signal their categorization of stimuli as either pleasant or unpleasant, on the one hand, or White or Black, on the other. If the participants' attitude toward Whites (or Blacks) is congruent with the assignment of the keys for the pleasantness ratings, then performance should be facilitated. However, if the mapping of the keys is incongruent (e.g., pleasantness is paired with the racial group associated with a negative attitude), then the task should be more difficult and response latency should increase. Indeed, White participants exhibit a longer response latency when one response key is assigned to Blacks or pleasant stimuli and the other to Whites or unpleasant stimuli than when the assignment is the reverse (e.g., Dasgupta, McGhee, Greenwald, & Banaji, 2000; Greenwald et al., 1998).

Facial electromyography (EMG), which reflects activity of muscles used in facial expressions, is another method for measuring implicit attitudes. In contrast to reaction time measures, facial EMG can be recorded without interrupting the participant's engagement in other tasks. Several studies have demonstrated that facial EMG recorded at the cheek (i.e., smiling) and brow (i.e., frowning) can reliably index changes in positive and negative affect, respectively (for a review, see Tassinary & Cacioppo, 2000). Facial EMG is sensitive to affective responses elicited by group memberships of target individuals. For example, when White participants looked at pictures of White and Black faces and rated each person's apparent friendliness, the explicit measure of racial attitudes (i.e., ratings of friendliness for Whites vs. Blacks) revealed bias in favor of Blacks, but facial EMG activity revealed bias against Blacks (Vanman, Paul, Ito, & Miller, 1997).

One question we addressed in the present study was whether implicit racial attitudes are related to explicit, discriminatory behavior. According to the MODE (Motivation and Opportunity as DEterminants) model of attitude-behavior processes (Fazio, 1990; Fazio & Towles-Schwen, 1999), automatically activated (i.e., implicit) attitudes should be directly related to behavior in

Address correspondence to Eric J. Vanman, Department of Psychology, MSC 2A1155, Georgia State University, Gilmer St. SE Unit 2, Atlanta, GA 30303-3082; e-mail: evanman@gsu.edu.

those situations in which motivations to control one's responses are low. Thus, according to this perspective, some behaviors will be better predicted by implicit attitudes, whereas others (primarily those that are susceptible to concerns about social desirability) will be better predicted by explicit ones.

Therefore, we examined the relationship of racial discrimination to two measures of implicit attitudes, the IAT and facial EMG. Although the use of the IAT to measure racial attitudes is widespread, no study has yet demonstrated its relation to deliberate, discriminatory behavior. Neither has facial EMG been shown to predict behavior. In this study, White participants evaluated applications for a prestigious fellowship at their university. The qualifications of the applicants were nearly identical; however, photos of White applicants were attached to two of the applications, and a photo of a Black applicant was attached to the third. The participants were instructed to choose the best applicant. They then completed the IAT and were later recruited for a second study, ostensibly unrelated to the first, in which facial EMG was recorded while they looked at pictures of White and Black faces.

An important feature of our study was that it was conducted at a university where the White student population held fairly positive attitudes about African Americans. Thus, by recruiting participants from this population, we employed a strong test of the relation between implicit attitudes and explicit behavior. We predicted that more negative implicit attitudes about Blacks, as assessed by the IAT and facial EMG, would be associated with increased likelihood of choosing a White applicant for the teaching fellowship, even though such "negative" attitudes would still be fairly positive in comparison with those of most Whites in the U.S. population. In addition, we included a measure of participants' motivation to control prejudice to assess its relation to the IAT and facial EMG measures, as well as the discrimination task.

METHOD

White undergraduate university students (30 women and 6 men) participated for credit in an introductory psychology course.[1] All initially participated in a group administration of several questionnaires. Among these were two scales used in this study: (a) the Modern Racism Scale (MRS; McConahay, 1986), which has been used in various studies as an explicit measure of attitudes toward African Americans, and (b) the Motivation to Control Prejudiced Reactions Scale (MCPRS; Dunton & Fazio, 1997), which has a two-factor structure. The Concern factor measures concern with acting prejudiced, whereas the Restraint factor measures restraint to avoid dispute with or about Blacks.

[1]Given that the majority of participants were women, it will be important to use a more balanced sample to test whether gender is related to any of these findings.

Participants were recruited for a study on person perception and decision making. The ostensible purpose of the study was to determine the extent to which students and professors agree on the selection of graduate students for teaching fellowships. Participants were given three folders containing modified material from actual applications. The names of the applicants were said to have been changed to protect their privacy. In addition, because the professors knew what the actual applicants looked like, the participants were told that the applications included photos of similar-looking students found on the Internet.

Each folder contained a letter of recommendation by a fictional professor. An information sheet that was included contained the applicant's grade point average and Graduate Record Examination scores, plus information on relevant courses taken and teaching experience. Development of these materials was based on pilot testing. Additional pilot testing of a set of 32 photos of students led to a final stimulus set that included two Black males, three White males, two Black females, and three White females who were rated as equivalent in attractiveness. From this stimulus set, two photos of White students and one photo of a Black student were randomly chosen for each participant (with the restriction that these students matched the gender of the participant). Across participants, photo-applicant combinations were counterbalanced, as was the order of the folders stacked on the desk.

Participants were instructed to read the folders carefully and to evaluate each candidate for teaching potential, academic ability, and personality. Finally, they were asked to choose the most qualified applicant for the teaching fellowship.

Because the IAT was not part of the original study design, it was added only during the second semester of data collection, just at the point after the participant had finished evaluating the applicants. A series of pictures was presented, and the participant was asked to respond to each with one of two keys, depending on the picture's category membership (i.e., White, Black, pleasant, unpleasant). Stimuli were presented in blocks of 50 forced-choice trials. The order of the blocks was counterbalanced in four orders across participants (see Greenwald et al., 1998, for more details).

Approximately 3 weeks after they participated in the evaluation phase, participants were recruited by a different experimenter for the second session of the study, which was ostensibly unrelated to the first session. The room for this session was three floors below the room for the first session and contained no indications that the activities taking place were somehow related to that earlier session. Electrodes were attached to record surface EMG activity from the brow and cheek regions, following previous recommendations regarding these sites (Fridlund & Cacioppo, 1986). A ground electrode was attached to the right forehead, and a pair of dummy electrodes was attached to the back of the neck. The ostensible purpose of these electrodes was "to record involuntary neural responses that emanate from the

head." Thus, the experimenter did not inform participants that the activity of muscles used in facial expressions was being measured.

The participants then viewed a set of 16 photos of students (8 Black, 8 White) selected from high school yearbooks. Each slide was presented for 6 s and was followed by a prompt for the participant to make a friendliness rating orally. This rating was followed by a 10-s intertrial interval. The slides were presented on a 27-in. television located approximately 1.0 m from participants. The mean amplitude of EMG activity was later computed for each trial, and these mean amplitudes were averaged across the artifact-free trials within a condition and within participants to obtain more reliable and normally distributed estimates of effects.

RESULTS

For all analyses, alpha was .05, and two-tailed tests were used. The brow EMG data from 2 participants (both women) were not analyzed because of procedural artifacts. The remaining data from these participants were included in the rest of the analyses. Because the IAT procedure was added to the end of the first session after data collection had begun, only 22 participants (16 women and 6 men) completed both the IAT and EMG measures.

To examine the relationships between the EMG activity and the other measures, we computed cheek and brow bias scores for each participant at each muscle site by subtracting the mean EMG amplitude during the Black trials from the mean EMG amplitude during the White trials. That is, for cheek EMG bias, a higher score indicated more cheek activity for White targets than Black targets, and for brow EMG bias, a higher score indicated more brow activity for White targets than Black targets. Analyses revealed that a White applicant was more likely to be chosen the higher the cheek EMG bias against Blacks, $r(34) = .401$, $p = .015$, $d = 0.88$. Brow EMG bias and IAT bias were not related to the race of the chosen applicant, but IAT bias was related to the Concern factor of the MCPRS, $r(20) = .537$, $p = .012$, $d = 1.27$. It is important to note, however, that the power of these correlational analyses may have been somewhat compromised because the race of the applicant chosen was twice as likely to be White than Black simply by chance. We therefore conducted chi-square analyses in which the expected values were modified to take this into consideration. For each of the bias measures, participants were dichotomized into two groups—those who displayed a bias against Blacks and those who did not. These analyses confirmed that only cheek EMG bias was related to the choice of applicant, $\chi^2(1, N = 36) = 24.37$, $p < .001$, $d = 2.98$ (see Fig. 1).

We also analyzed the data from a larger set of participants ($N = 82$) who were recruited for the first session but did not necessarily participate in the second. These analyses revealed that the IAT and MCPRS were related, $r(80) = .31$, $p = .003$, $d = 0.65$, indicating that IAT bias was greater for participants with a higher motivation to control prejudice. In addition, IAT bias was not related to the choice of the race of the teaching applicant, $r(80) = .094$, $p = .398$, $d = 0.19$, which suggests that the lack of an association between these measures in the smaller sample was not due simply to a lack of power.

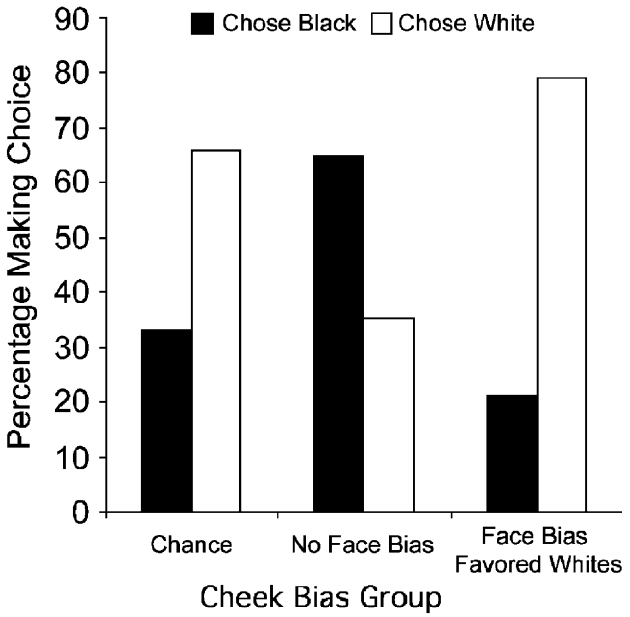

Fig. 1. Percentage of participants choosing a Black or White applicant as a function of racial bias exhibited in cheek electromyographic activity. The "chance" bars show the expected percentages if the race of the applicant had no impact on participants' choices.

No other correlations between measures were significant.

DISCUSSION

This research demonstrated that facial EMG, when used as an implicit measure of racial attitudes, is related to discrimination. Specifically, the extent to which participants exhibited higher levels of activity at the cheek region when they viewed pictures of Whites rather than Blacks was related to the race of the applicant they chose for the teaching fellowship. The race of the applicant was only one of several pieces of information that the participants could have considered when making their selection, so they should have been unconcerned about the social desirability of their choices. Indeed, the participants' motivations to control prejudice reactions, as measured by the MCPRS, were not related to their fellowship choices. However, the other implicit measure of prejudice in this study, the IAT, was not related to the race of the chosen applicant, but was related to motivations to control prejudice (particularly the Concern subscale of the MCPRS).

These results were obtained using a sample of White students who exhibited relatively little prejudice against African Americans. In fact, those participants who did not display EMG bias against Blacks were much more likely to choose the

African American applicant than a White applicant. In contrast, in a sample with a greater range of MRS scores, the MRS moderated the EMG bias measures for both cheek and brow activity (Vanman et al., 1997). Thus, in the current study, both the failure of the brow EMG activity to be related to discrimination and the lack of a relation between the MRS and the EMG measures was likely due to a restricted-range problem. By not including participants who were more prejudiced against African Americans, we may have merely tapped into participants' differences in positive affect (as measured by the cheek EMG activity) toward the outgroup. In fact, compared with brow EMG activity, EMG activity recorded at the cheek may offer greater specificity for positive states, as it is affected by the positivity but not the negativity of a stimulus (Larsen, Norris, & Cacioppo, 2003).

The ability of facial EMG to serve as a measure of implicit prejudice that is also related to discriminatory behavior makes it unusual in the rapidly growing list of implicit measures of prejudice currently used by social psychologists (Fazio & Olson, 2003). The rise in interest in implicit measures of prejudice has coincided with changing social norms about open expressions of prejudice. Evidence that implicit measures of prejudice or stereotypes are related to discrimination has been scant, however. Many implicit measures tap into cognitions or beliefs, but not the affect that may underlie discrimination. As Karpinski and Hilton (2001) concluded, some of these implicit measures may be measuring associations that a person has been exposed to (e.g., "candy is not good for me") but that do not necessarily mediate evaluative thought or action (e.g., when offered the candy, one still eats it). Interestingly, IAT bias was unrelated to facial EMG in this study, but was related to the MCPRS, suggesting that some participants were aware of their biased associations to Blacks (see also Devine, Plant, Amodio, Harmon-Jones, & Vance, 2002, who reported a similar relationship between the IAT and motivations to control prejudice). At the same time, however, participants may have been unaware of their automatic and differentiated *affective* reactions to Whites and Blacks, which, in turn, had some bearing on what happened when they were given an opportunity to discriminate between the two groups.

Acknowledgments—This research was supported by grants to E.J.V. from the National Institute of Mental Health (1R03MH061321-01) and from the University Research Committee at Emory University.

REFERENCES

Dasgupta, N., McGhee, D.E., Greenwald, A.G., & Banaji, M.R. (2000). Automatic preference for White Americans: Eliminating the familiarity explanation. *Journal of Experimental Social Psychology*, *36*, 316–328.

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

Devine, P.G., Plant, E.A., Amodio, D.M., Harmon-Jones, E., & Vance, S.L. (2002). The regulation of explicit and implicit race bias: The role of motivations to respond without prejudice. *Journal of Personality and Social Psychology*, *82*, 835–848.

Dunton, B.C., & Fazio, R.H. (1997). An individual difference measure of motivation to control prejudiced reactions. *Personality and Social Psychology Bulletin*, *23*, 316–326.

Fazio, R.H. (1990). Multiple processes by which attitudes guide behavior: The MODE model as an integrative framework. In M.P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 23, pp. 75–109). San Diego, CA: Academic Press.

Fazio, R.H., & Olson, M.A. (2003). Implicit measures in social cognition research: Their meaning and use. *Annual Review of Psychology*, *54*, 297–327.

Fazio, R.H., & Towles-Schwen, T. (1999). The MODE model of attitude-behavior processes. In S. Chaiken & Y. Trope (Eds.), *Dual process theories in social psychology* (pp. 97–116). New York: Guilford.

Fridlund, A.J., & Cacioppo, J.T. (1986). Guidelines for human electromyographic research. *Psychophysiology*, *23*, 567–589.

Greenwald, A.G., & Banaji, M.R. (1995). Implicit social cognition: Attitudes, self-esteem, and stereotypes. *Psychological Review*, *102*, 4–27.

Greenwald, A.G., McGhee, D.E., & Schwartz, J.L.K. (1998). Measuring individual differences in implicit cognition: The implicit association task. *Journal of Personality and Social Psychology*, *74*, 1464–1480.

Karpinski, A., & Hilton, J.L. (2001). Attitudes and the implicit association test. *Journal of Personality and Social Psychology*, *81*, 774–788.

Larsen, J.T., Norris, C.J., & Cacioppo, J.T. (2003). Effects of positive and negative affect on electromyographic activity over *zygomaticus major* and *corrugator supercilii*. *Psychophysiology*, *40*, 776–785.

McConahay, J.B. (1986). Modern racism, ambivalence, and the Modern Racism Scale. In J.F. Dovidio & S.L. Gaertner (Eds.), *Prejudice, discrimination and racism* (pp. 91–125). Orlando, FL: Academic Press.

Tassinary, L.G., & Cacioppo, J.T. (2000). The skeletomotor system: Surface electromyography. In J.T. Cacioppo, L.G. Tassinary, & G.G. Berntson (Eds.), *Handbook of psychophysiology* (2nd ed., pp. 163–199). Cambridge, England: Cambridge University Press.

Vanman, E.J., Paul, B.Y., Ito, T.A., & Miller, N. (1997). The modern face of prejudice and structural features that moderate the effect of cooperation on affect. *Journal of Personality and Social Psychology*, *73*, 941–959.

Wilson, T.D., Lindsey, S., & Schooler, T.Y. (2000). A model of dual attitudes. *Psychological Review*, *107*, 101–126.

(RECEIVED 10/22/03; REVISION ACCEPTED 1/30/04)