

He Said What? Physiological and Cognitive Responses to Imagining and Witnessing Outgroup Racism

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Responses to outgroup racism can have serious implications for the perpetuation of bias, yet research examining this process is rare. The present research investigated self-reported, physiological, and cognitive responses among “experiencers” who witnessed and “forecasters” who imagined a racist comment targeting an outgroup member. Although previous research indicates that experiencers self-reported less distress and chose a racist partner more often than forecasters, the present results explored the possibility that experiencers may actually be distressed in such situation but regulate their initial affective reactions. The results from Experiment 1 demonstrated that participants in both roles showed (a) no activation of the hypothalamic pituitary adrenal stress axis (decreased cortisol) and (b) activation of the sympathetic autonomic nervous system (increased skin conductance). However, experiencers but not forecasters displayed a physiological profile indicative of an orienting response (decreased heart rate and increased skin conductance) rather than a defensive response (increased heart rate and increased skin conductance). Furthermore, the results from Experiment 2 provided additional evidence that experiencers are not distressed or regulating their emotional responses. In particular, experiencers showed less cognitive impairment on a Stroop task than forecasters. Together these findings indicate that when people actually encounter outgroup bias, they respond with apathy and do not censure the racist.

Keywords: racism, discrimination, psychophysiology, affective forecasting

Given today’s strong egalitarian norms (Apfelbaum, Sommers, & Norton, 2008; Crandall & Eshleman, 2003; Dovidio, Kawakami, Smoak, & Gaertner, 2009; Fiske, 1998; O’Brien et al., 2010), one might assume that racism is received negatively by those who witness it. Empirical research examining this process, however, is relatively rare. Investigating reactions to racist acts toward outgroups nonetheless is vital because it can inform us about people’s tolerance for prejudice and the extent to which such bigots will be punished or rewarded for their biases.

One salient example of the importance of understanding our responses to racism is the campaign of Donald Trump, who in 2016 was the leading candidate for the Republican nominee for President. Despite explicitly denigrating a variety of ethnic and religious groups (e.g., Blacks, Hispanics, and Muslims) as well as other social categories (e.g., women, disabled people, and gays)

throughout the primaries, Trump rose to become the top GOP candidate from a field of 14 contenders. In his presidential campaign, he continued to use racial slurs and negative stereotypes to excite his base. On November 8, 2016, he was elected the 45th President of the United States.

This example suggests that in spite of current social norms that condemn inequality, people who espouse racism may not be penalized for their actions. In fact, past research on the impact of racism on perceptions of the targets of racism suggests that such acts may have negative consequences on impressions of the targets of such bias rather than the perpetrators (Kirkland, Greenberg, & Pyszczynski, 1987) and on antiracism policy in general (Blanchard, Crandall, Brigham, & Vaughn, 1994). Although together this example and these previous results suggest that people may not be offended when perceiving bias, the primary goal of the present research was to directly investigate responses to witnessing and imagining outgroup racism. Specifically, we sought to discover whether people are emotionally or cognitively affected by racist comments.

Forecasted and Actual Responses to Racism

In an initial set of studies, we found empirical evidence that people may not be distressed when experiencing outgroup racism (Kawakami, Dunn, Karmali, & Dovidio, 2009a). Specifically, in two experiments, participants were randomly assigned to the role of experiencers, who witnessed a White confederate make a racist comment about a Black confederate, or forecasters, who imagined themselves in this situation. The results from both experiments demonstrated that forecasters’ anticipated affective responses were

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more negative (more unhappy, uncomfortable, and angry) than experiencers' actual responses to witnessing the racist comment.

Furthermore, when asked to choose between the Black and White confederate for a partner task, forecasters overwhelmingly predicted that they would avoid the White confederate, choosing him approximately 20% of the time. Alternatively, experiencers preferred, although not significantly, the White over the Black confederate, choosing him approximately 70% of the time. In contrast, in a condition with no racist comment, both experiencers and forecasters displayed a nonsignificant preference for the White confederate, choosing him 53% and 68% of the time, respectively. These results suggest that although people who imagined themselves in an explicitly racist situation expected to be upset and eschew the perpetrator, the responses of those who actually experienced this situation were not influenced by the racism.

These findings are notable for two reasons. First, they demonstrate a stark contrast between participants' forecasted and actual responses to outgroup racism (Dunn, Forrin, & Ashton-James, 2009; Gilbert, Driver-Linn, & Wilson, 2002). Second, they suggest that people who experience racism show an unexpected apathy. Specifically, experiencers' affect ratings and partner choice after hearing a racist comment did not differ from a condition in which there was no racist comment. These initial findings thus provide preliminary support that experiencers are not emotionally or behaviorally affected by such violations of egalitarian norms.

It is conceivable, however, that participants may have been upset by these remarks but were regulating their responses. In particular, it is not clear whether reactions by participants who witnessed outgroup racism were related to apathy or to self-regulatory efforts. It is possible that when confronted by deviant behavior, people may attempt to control their responses (Dijker, 2009; Dijker & Koomen, 2007). Specifically, in contrast to being indifferent, it is possible that the participants were overwhelmed when confronted with racist and hurtful behavior toward others, and therefore, to cope with this situation, they did not report their initial reactions. One other potential explanation is that experiencers may have believed that it would not be appropriate to allow their reactions to the comment influence their responses on the affect questionnaire. They may have perceived this influence to be extraneous to what the researchers intended to measure. Although these explanations are plausible alternative accounts for results related to self-reported emotions, they do not reasonably explain results related to the choice of a White partner.

In our preliminary studies, it is difficult to rule out whether witnessing outgroup racism provoked initial distress that was inhibited. We, however, believe that these findings were driven more by the absence of an affective response rather than self-regulation in a stressful situation for several reasons (Kawakami, Dunn, Karmali, & Dovidio, 2009b). First, recent research provides strong and consistent evidence for the prevalence of negative nonconscious biases against Blacks (Greenwald, McGhee, & Schwartz, 1998; Kawakami, Amodio, & Hugenberg, 2017; Kawakami et al., 2014). Because of these biases, people may not be upset by negative racist acts. Second, even if people were able to inhibit their initial distress upon witnessing racism, it still does not explain why the comment did not deter the participants from choosing the person who made the racist comment as a partner. Nevertheless, it is important to explicitly investigate whether, as previously assumed, people

were not upset upon experiencing a racist act or whether they were initially distressed and regulated their emotional responses. To examine these possibilities, we conducted two experiments to measure physiological responses and executive functioning after imagining or witnessing outgroup bias.

Physiological Responses to Racism

Measuring physiological responses during intergroup interactions have several advantages over other indices (Blascovich, Mendes, & Seery, 2002). In particular, compared with self-reported affect, physiological responses are less influenced by demand characteristics and self-presentation concerns that may be especially problematic when investigating interracial situations (Mendes, 2009). Because these types of indices are more difficult to control and can be closely matched in time to particular events in a given context, if participants are upset upon hearing a racist comment, it should be reflected in their physiology.

In the present research, we explored two major stress axes, the sympathetic-adrenal stress axis, measured with the galvanic skin response (GSR), and the hypothalamic pituitary adrenal (HPA) stress response, measured with the hormone cortisol. The sympathetic-adrenal stress axis is mediated through both the nervous system and hormones, which makes it very labile and responsive to stressful events. Although sympathetic stress responses have been observed during psychologically distressing events such as giving an evaluated speech, watching a stress-inducing movie or anticipating painful shocks (Lazarus, Speisman, & Mordkoff, 1963; Lazarus, Speisman, Mordkoff, & Davison, 1962; Penzien, Hursey, Kotses, & Beazel, 1982; Thackray & Pearson, 1968), it is also activated in response to intensely pleasant stimuli (Christie & Friedman, 2004; Miller, Patrick, & Levenston, 2002; Sabatinelli, Bradley, & Lang, 2001). The responsiveness of the sympathetic axis to both negative and positive stimuli demonstrate its motivational component because it is activated when people are engaged in a task and motivated to achieve goals (Blascovich, Mendes, Tomaka, Salomon, & Seery, 2003).

The HPA stress response is primarily mediated through hormones, so it is less fast acting and responsive than the sympathetic stress axis. Perhaps as a result, activation of the HPA is more closely tied to responses to psychological threat (Henry, 1992; McEwen, 1998), and cortisol is released as one of its primary end-products (McEwen, 1998; Sapolsky, 1999). Because cortisol typically decreases over the day because of diurnal rhythms (Fries, Dettenborn, & Kirschbaum, 2009; Kirschbaum, Pirke, & Hellhammer, 1993; Miller, Chen, & Zhou, 2007), an increase in cortisol is indicative of activation of the HPA stress response. Notably, past research has demonstrated HPA responsivity to threatening interracial interactions (Amodio, 2009; Trawalter, Adam, Chase-Lansdale, & Richeson, 2012). In the present context, if participants are motivationally engaged by outgroup racism, we would expect only a sympathetic stress response. However, if participants feel threatened by a racist comment, we would expect activation of both the sympathetic and HPA stress axes.

GSR is solely innervated by the sympathetic axis, and thus, increases in GSR are a prerequisite to infer the activation of a sympathetic stress response. However, given the sympathetic responses' many-to-one relationship with positive and negative psychological states (Cacioppo & Tassinari, 1990), if GSR increases

are detected, whether sympathetic arousal has been recruited to handle an aversive stressor or to simply guide attention to interesting stimuli (i.e., defensive vs. appetitive motivational circuits, Bradley & Lang, 2007; Bradley, 2009; Lang, 1993) must be distinguished by measuring concurrent changes in other physiological measures. In particular, heart rate (HR) change is commonly measured in concordance with GSR to help disambiguate the purpose of a sympathetic activation response (Berntson, Cacioppo, & Quigley, 1991). In the present context, monitoring GSR together with HR will allow us to test two competing reflexive psychophysiological responses to outgroup racism: the orienting response (Cacioppo et al., 1998) and the defensive response (Hare & Blevings, 1975). In short, it is the combined pattern of GSR and HR responses that differentiates orienting from more defensive responses.

Orienting and defensive responses are among the most basic physiological responses to external events (Turpin, 1986; Stern, Ray, & Quigley, 2001). The orienting response directs attention toward novel or unexpected stimuli (Graham & Clifton, 1966) and habituates quickly because identifying unfamiliar stimuli subsequently becomes less important. This orienting response is characterized by increased GSR and decreased HR. If participants are not distressed but simply surprised when exposed to an inappropriate racist comment, we would expect a pattern consistent with the orienting response. A defensive response to potentially threatening stimuli, alternatively, is thought to precede the stress responses (Viken, Johnson, & Knutson, 1991). In contrast to the orienting response, this type of response is marked by increased GSR as well as increased HR. If participants feel distressed by a racist comment, we would expect a pattern consistent with this defensive response. If, however, after witnessing racism, participants experienced apathy rather than distress, an increase in GSR and a decrease in HR would be expected.

Impaired Cognition Functioning Following Racism

The present research also measured cognitive functioning to examine the possibility that participants did not report upset after hearing a racist comment because they were regulating their affective responses. Recent research has demonstrated that controlling emotional responses (Johns, Inzlicht, & Schmader, 2008), especially during interracial interactions (Richeson & Shelton, 2003; Schmader & Johns, 2003), can come with cognitive costs. In particular, after regulating affect, participants performed worse on subsequent tasks related to executive functioning.

Furthermore, exposure to unpredictable and uncontrollable aversive stressors (Cohen, 1980; Hartley & Adams, 1974) can also produce decrements in executive functioning. Specifically, participants exposed to stress-inducing noise and electric shocks performed worse than controls on a Stroop task (Glass & Singer, 1972; Glass et al., 1973). In the present context, if people regulated their affective responses or felt stress upon witnessing a racist comment, we would expect worse performance on a measure of executive functioning. However, if imagining a racist act is more distressing than actually experiencing it, forecasters should show greater impairment than experiencers on this task.

Overview of Present Experiments

The primary goal of Experiment 1 was to investigate affective, behavioral, and physiological responses to witnessing and imagining outgroup racism. In accordance with previous research, participants were asked to provide self-report ratings of emotional distress and to choose an interaction partner. To measure defensive and orienting responses, we also measured HR, GSR, and cortisol levels before and after a racist comment.

Based on earlier findings (Kawakami et al., 2009a), we expected that forecasters would anticipate higher levels of distress and would be less likely to select the racist confederate as a partner than participants who experienced racism. Furthermore, if forecasters are distressed, as indicated by their predicted self-report responses, they should demonstrate a defensive response (increased HR, increased GSR) and potentially also a threat response (increased cortisol). Alternatively, if participants who actually witness racism do indeed respond with apathy, these experiencers should demonstrate more of an orienting response (decreased HR, increased GSR) and decreases in cortisol.

The primary goal of Experiment 2 was to investigate the cognitive costs of witnessing racism. In this study, we examined responses on a Stroop task by experiencers and forecasters. Importantly, we also manipulated whether an offensive comment was made toward either a Black or White target. If participants who imagine a racist comment are more distressed than participants who actually witness racism, forecasters should demonstrate greater impairment than experiencers on the Stroop task.

It is important to note that the present research differs in important ways from past research demonstrating that close interracial interactions can produce physiological evidence of distress (Mendes, Blascovich, Lickel, & Hunter, 2002; Trawalter et al., 2012) and cognitive impairment (Richeson & Shelton, 2003; Richeson & Trawalter, 2005). Because in the current experiments participants do not directly interact with a Black confederate and are passively sitting in a room waiting for a study to begin, concerns that are typically hypothesized to drive these effects such as anxiety about appearing prejudice and self-presentation are not as relevant to these participants (Blascovich et al., 2002). In contrast to earlier studies in which interactions were self-relevant "motivated performance situations" (e.g., giving a speech; engaging in conversation; Blascovich et al., 2002), responses by experiencers are more likely to be driven by unfiltered reactions to the racist comment rather than self-presentation. Indeed, if apprehension about appearing prejudice was an issue in this context, these participants would not select the White confederate as a partner (Kawakami et al., 2009a).

Experiment 1

The primary goal of Experiment 1 was to examine self-reported affect, behavior, and physiological responses to outgroup racism by forecasters and experiencers. Specifically, in this experiment we measured self-reported negative emotions, partner choice, and changes in HR, GSR, and cortisol levels in response to imagining or witnessing a racist comment.

Method

Participants and design. Sixty-eight non-Black (46 female) undergraduates who participated for course credit were randomly assigned to the role of forecaster or experiencer in a between-subjects design. In determining sample size, we examined past research related to the effect of forecaster versus experiencer role on behavior and affect (Kawakami et al., 2009a), as well as cardiovascular responses in intergroup contexts (Mendes et al., 2002), and found effect sizes ranging from $r = .34$ to $r = .47$. As recommended (Funder et al., 2014), we conducted analysis in G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) by rounding down the smallest of these effect sizes ($r = .30$). According to this power analysis, we required at least 62 participants to achieve 80% power. To ensure adequate power and to account for potential dropout related to prescreening for inclusion criteria related to physical and psychological health and other factors, we aimed to recruit at least 80 participants.¹ Our “stop rule” was to end recruitment on the last day of the week in which we reached 80 participants.

Procedure. Upon arrival, all participants were led to a private room. On an initial informed consent form, participants learned that the goal of the study was to investigate the “connection between mind and body” and that they would complete a questionnaire related to their feelings and a word partner task (experiencers) or imagine themselves in a scenario (forecasters) while recording physiological responses. To establish a resting baseline, the experimenter waited 15 min before collecting baseline measures. During this time, participants completed a “Health Intake” questionnaire. Participants were then suited in an ambulatory cardiovascular monitoring system, LifeShirt (Vivonoetics). HR was measured with three electrocardiography leads in a Modified Lead II placement to participants’ left and right upper chest and lower left abdomen. To collect GSR, a two-finger strap with stainless steel electrodes was placed on the third and fourth fingers of the nondominant hand. The leads from the fingers, chest, and abdomen were connected to a recording device that contained a SanDisk memory card. All participants were required to sit quietly for 3 min to collect cardiovascular and GSR baselines after which a measure of cortisol by passive drool of saliva was collected.

Experiencers. Participants in the experiencer condition were then led to a waiting room in which a Black and White confederate, who were posing as participants and also wearing LifeShirts, were sitting. The “participants” were introduced to each other by name. Shortly thereafter, the Black confederate remarked that his cell phone was in the hallway. On his way out to retrieve his phone, he gently bumped the White confederate’s leg. Once the Black confederate was out of the room, the White confederate remarked, “Clumsy [N-word].” A research assistant, monitoring the room via video equipment, made a note of the exact time of the comment. The Black confederate then reentered the room with his cell phone followed by the experimenter.

Participants were escorted to individual cubicles to ostensibly begin the study and were presented with a self-report affect questionnaire and instructed to rate how happy, angry, and comfortable they felt “right now, at that moment” on a scale from 1 (not at all) to 9 (extremely). After completing the measures, they were told to wait for further instructions. Eighteen minutes after the racist comment, the duration for circulating cortisol levels to be evident

in saliva (Amodio, 2009; Kirschbaum, Pirke, & Hellhammer, 1993; Page-Gould & Akinola, 2015), a second saliva sample was collected.

Next, the experimenter described an upcoming anagram task in which two partners would work together. Although the experimenter stated that a fourth (fictitious) participant was expected momentarily, in the interest of time, the experimenter asked the participant to choose a partner (either the White student who made the racist comment or the Black student) to begin the task. After recording the choice, the experimenter left the room to ostensibly prepare the task but soon returned to inform participants that there was a problem in the setup. Participants were therefore asked to return to the individual cubicles to complete another questionnaire. In this exit questionnaire, participants were probed for suspicion and knowledge of the hypotheses and were instructed to answer a set of demographic questions.

Forecasters. Participants assigned to the role of forecaster were led into the same waiting room used by experiencers. These participants, however, were asked to read a detailed description of the events in the experiencer condition on a computer monitor and to imagine themselves in the situation. A research assistant monitored the room via video equipment and recorded the time that the forecasters continued to the page with the racist comment. Next, forecasters were escorted to individual cubicles and presented with the same affect questionnaire and asked to predict how happy, angry, and comfortable they would feel at that moment. Eighteen minutes after reading the racist comment, a second saliva sample was collected.

Forecasters were then asked to predict who they would choose as a partner (the White student who made the racist comment or the Black student) for an anagram task by stating a name. Although no explicit racial demographic information about the confederates was provided, the two confederates were initially introduced with race-specific names (Jamal and Daniel), and it was also obvious after reading the scenario that Jamal was Black. After making their choice, forecasters were led back to individual cubicles and completed the same exit questionnaire.

Results and Discussion

Self-reported affect. To investigate self-reported affect, participants’ ratings of happiness and comfort were reverse coded and averaged with anger ($\alpha = .66$). Higher scores indicated more distress. A t test revealed a significant effect of Role, $t(66) = 3.62$, $p = .001$; 95% confidence interval (CI) [0.50, 1.74], $d = 0.89$. Forecasters, who imagined themselves witnessing a racist comment, anticipated more emotional distress ($M = 4.62$, $SD = 1.39$)

¹ Although 82 undergraduates were recruited, one student who identified as Black, four students who did not meet prescreening criteria, three students with experimenter errors (e.g., failure to report time of comment), and six students who were suspicious of the cover story (three of whom did not hear the racist comment) were excluded. The prescreening criteria were as follows: (a) body mass index between 18 and 27 kg/m²; (b) not diagnosed with a psychological condition; (c) no heart condition or pacemaker; (d) nonsmoker; and (e) not pregnant or nursing. All female participants were scheduled to participate within 10 days of the first day of their menstruation and all participants were instructed to: (a) avoid dairy, caffeine, and flossing on the study day; (b) avoid exercise and smoking nicotine 4 hours leading up to the study; and (c) get plenty of sleep the night before the experiment.

than experiencers' actual reported affect in this context ($M = 3.50$, $SD = 1.15$).²

Partner choice. A χ^2 analysis performed on choice of a White versus Black partner by forecasters and experiencers was significant, $\chi^2(1, N = 68) = 27.16$, $p < .001$, $d = .64$. An extended mosaic plot was created not only to visually present the proportion of experiencers and forecasters who chose either the White or Black confederate but also to display whether within each cell, observed frequencies differed from expected frequencies estimated by the null hypothesis. Specifically, standardized residuals (se) greater than ± 2 indicate that observed frequencies are significantly greater than (darker shade on mosaic plot) or less than (lighter shade on mosaic plot) frequencies expected by the null hypothesis (Agresti, 2007; Friendly, 1994). Standardized residuals were significant in all cells of the mosaic plot, revealing that whereas the majority of forecasters chose the Black confederate as a partner (forecaster/chose Black cell, $se = 2.17$; forecaster/chose White cell, $se = -3.04$), most experiencers chose the White confederate (experiencer/chose Black cell, $se = -2.11$; experiencer/chose White cell, $se = 2.95$; see Figure 1). Furthermore, calculations of odds ratios revealed that experiencers were 54.15 times more likely to choose the White confederate (odds_{chose White} = 1.69; White 63%, Black 37%) than forecasters (odds_{chose White} = .03; White 3%, Black 97%).

HR and GSR. To create a baseline measure of HR, we calculated the mean HR in beats per minute (bpm) across the 3-min baseline.³ A second measure of HR was related to beats per minute 1 minute after the comment. We conducted a 2 (Time: baseline vs. after comment) \times 2 (Role: experiencer vs. forecaster) analysis of variance (ANOVA) on HR with Time as a repeated variable and Role as a between-subjects variable (see Figure 2).

Only the two-way Time by Role interaction was significant, $F(1, 63) = 6.82$, $p = .01$, $\eta_p^2 = 0.10$. Simple effects analysis

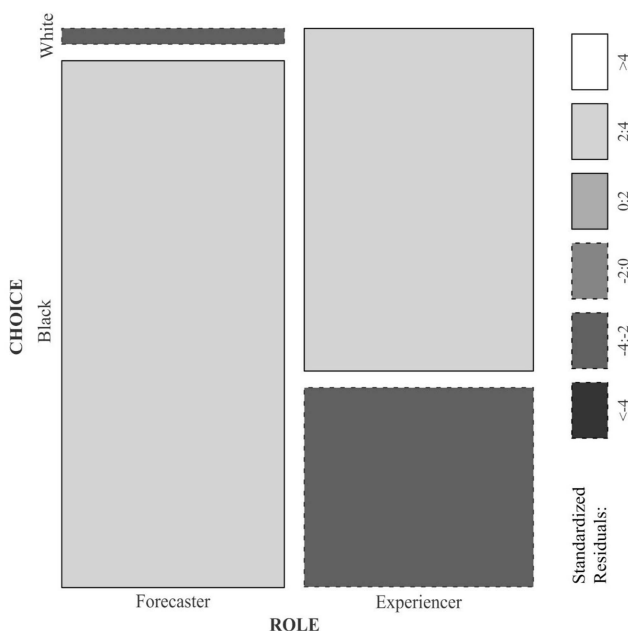


Figure 1. Extended mosaic plot displaying the dependence of partner choice on Role. The two levels of shading density correspond to standardized residuals greater than 2 and 4 in absolute value.

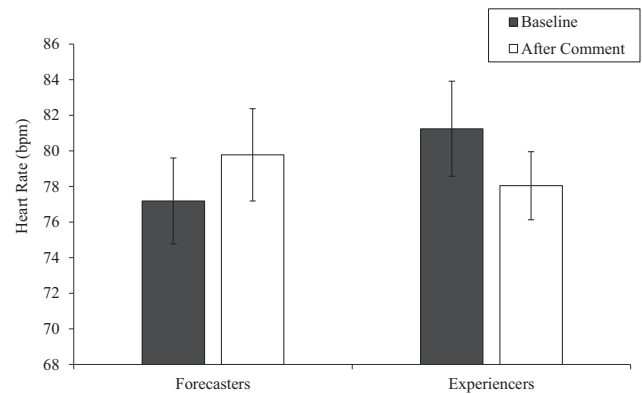


Figure 2. Changes in heart rate (bpm = beats per minute) from baseline to after the racist comment by experiencers and forecasters. Error bars reflect standard errors.

revealed that experiencers displayed a significant decrease in HR from baseline ($M = 81.24$, $SD = 14.17$) after hearing the comment ($M = 78.04$, $SD = 10.25$), $F(1, 63) = 4.23$, $p = .04$, 95% CI [0.09, 6.31], $\eta_p^2 = 0.06$. In contrast, forecasters did not show a decrease in HR between baseline ($M = 77.19$, $SD = 12.20$) and after the comment ($M = 79.78$, $SD = 13.16$) but rather a nonsignificant increase, $F(1, 63) = 2.69$, $p = .11$, 95% CI [-5.75, 0.57], $\eta_p^2 = 0.04$.

To create a baseline measure of GSR, we calculated the mean GSR level in microsiemens (μS) across the 3-min baseline.⁴ A second measure of GSR was related to 1 minute after the comment. We conducted a 2 (Time: baseline vs. after comment) \times 2 (Role: experiencer vs. forecaster) ANOVA on GSR responses with Time as a repeated variable and Role as a between-subjects variable (see Figure 3).

The main effect of Time was significant, $F(1, 61) = 72.51$, $p < .001$, $\eta_p^2 = 0.54$. GSR increased from baseline to after the comment for both experiencers ($Ms = 7.89$ and 12.72 , $SDs = 4.61$ and 6.22), $F(1, 61) = 50.06$, $p < .001$, 95% CI [3.48, 6.18], $\eta_p^2 = 0.46$, and forecasters ($Ms = 7.62$ and 11.13 , $SDs = 3.90$ and 5.18), $F(1,$

² It is important to note that whereas none of the participants in Experiment 1 were Black, our sample included both White and non-White participants. Therefore, although some of the participants' racial identity overlapped with the confederate who made the racist comment (i.e., they were both White), some of the participants' race did not overlap with this confederate. To investigate whether a common ingroup identity qualified the present pattern of results, we categorized participants as White ($n = 30$) and non-White ($n = 38$) based on demographic information provided by the participant in the exit questionnaire. We then conducted exploratory analyses to examine the effects of participant race on all dependent variables. Notably, participant race did not qualify any of the reported interactions. Specifically, the interaction between Participant Race and Role was not significant on self-reported affect, $F(1, 64) = .30$, $p = .68$, $\eta_p^2 = 0.003$. A χ^2 of independence suggested that participant race did not moderate partner choice for either forecasters, $\chi^2(1) = .86$, $p = .35$, or experiencers, $\chi^2(1) = 1.15$, $p = .28$. Furthermore, the interactions between Participant Race \times Time \times Role on HR, $F(1, 61) = .32$, $p = .58$, $\eta_p^2 = 0.005$, on GSR, $F(1, 59) = .002$, $p = .97$, $\eta_p^2 < 0.001$, and on cortisol levels, $F(1, 55) = 1.93$, $p = .17$, $\eta_p^2 < 0.03$, were not significant.

³ HR data were missing for three participants, leaving 65 participants.

⁴ GSR data were missing for five participants, leaving a total of 63 participants.

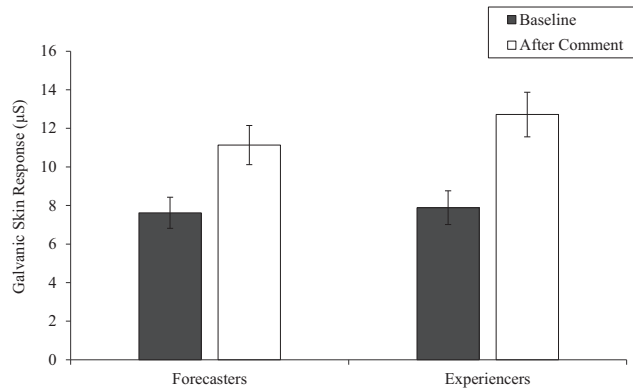


Figure 3. A comparison of GSR (μS = microsiemens) change from baseline to after the racist comment among experiencers and forecasters. Error bars reflect standard errors.

61) = 24.52, $p < .001$, 95% CI [2.09, 4.93], $\eta_p^2 = 0.29$. This effect was not qualified by Role; the two-way interaction was not significant, $F(1, 61) = 1.82$, $p = .18$, $\eta_p^2 = 0.03$.

Cortisol. We collected cortisol (nanomoles per liter) at baseline and 18 min after the comment.⁵ We conducted a 2 (Time: baseline vs. after comment) \times 2 (Role: experiencer vs. forecaster) ANOVA on cortisol levels with Time as a repeated variable and Role as a between-subjects variable (see Figure 4).

The main effect of Time was significant, $F(1, 57) = 16.61$, $p < .001$, $\eta_p^2 = 0.23$. Cortisol levels decreased after the comment for both experiencers ($M_s = 13.93$ and 11.52 , $SD_s = 11.04$ and 9.29), $F(1, 57) = 6.02$, $p = .02$, 95% CI [0.44, 4.38], $\eta_p^2 = 0.10$, and forecasters ($M_s = 11.58$ and 8.28 , $SD_s = 11.83$ and 6.27), $F(1, 57) = 10.92$, $p = .002$, 95% CI [1.30, 5.30], $\eta_p^2 = 0.16$. This effect was not qualified by Role; the two-way interaction was not significant, $F(1, 57) = .41$, $p = .53$, $\eta_p^2 = 0.007$.

In summary, the findings suggest different patterns of responses for people who imagine versus actually witness a racist comment. Replicating previous research (Kawakami et al., 2009a), forecasters anticipated substantial negative affect in response to outgroup racism and predicted that they would not select the racist as a partner. Furthermore, whereas forecasters demonstrated an increase in GSR, suggesting a sympathetic stress response after imagining the comment, a decrease in cortisol levels, and a non-significant increase in HR indicate a lack of HPA stress response or orienting or defensive reflexes when imagining racist comments.

Notably, because HPA responses are typically reserved for more physically present or impending self-threats (Henry, 1992; McEwen, 1998) and because forecasters imagine rather than actually experience the racist scenario, the probability of finding significant changes in cortisol among forecasters was small. Thus, the present pattern provides some evidence for a mild activation of the sympathetic stress response among forecasters.

The results related to experiencers also replicated previous findings. Specifically, participants who witnessed outgroup racism self-reported relatively little negative affect and chose the White racist as a partner more often than the Black confederate. Furthermore, although experiencers demonstrated an increase in GSR, suggesting a sympathetic stress response, a decrease in cortisol

indicated a lack of HPA activation. It is important to note that experiencers also exhibited decreases in HR. If participants were not distressed but simply surprised when exposed to an inappropriate comment, we would expect this type of orienting response with increases in GSR in tandem with decreases in HR. Notably, surprise can come in varying degrees and the nature of the current pattern of the orienting response related to the mild activation of the sympathetic stress response indicate that experiencers responded with some interest to an unanticipated, yet unthreatening, comment (Berntson et al., 1991; Bradley, Codispoti, Cuthbert, & Lang, 2001). In other words, this physiological pattern suggests that although experiencers heard the comment and attended to the racial slur, they did not show physiological signs of preparing themselves for a defensive response to a threatening stimulus or a full-blown state of physiological threat (e.g., no HPA activation). In summary, although none of the psychophysiological responses of experiencers suggest any distress, responses by forecasters indicate some distress.

It is important to note that to limit the cost of Experiment 1, this study did not include a no-comment control condition. Previous research, however, has demonstrated that whereas forecasters predicted significantly greater negative affective and avoidance of the racist in conditions that included a racial slur compared with a no-comment condition, experiencers demonstrated no differences on these dependent variables across comment conditions (Kawakami et al., 2009a). Furthermore, in Experiment 1, we collected physiological responses both before and after the racist comment and focused our analyses on the pattern of change by experiencers and forecasters from baseline to after the comment. This strategy allowed us to examine whether the experience of witnessing or imagining the racist act impacted physiological responses.

Nonetheless, to further investigate the impact of potential self-regulation in this process, we included a no-comment condition in Experiment 2. In accordance with our previous findings (Kawakami et al., 2009a) and the first experiment, we expected differences in responding between forecaster and experiencer in conditions in which a racist comment targets a Black confederate but not in the no-comment condition.

Experiment 2

The primary goal of Experiment 2 was to investigate the consequences of forecaster or experiencer role on executive functioning using a standard cognitive inhibition task. Specifically, whereas half of the participants either imagined or actually witnessed a racist comment directed toward a Black target or a negative comment toward a White target before performing a Stroop task, the other half of the participants either imagined or actually experienced a situation wherein there was no negative comment toward a Black or White target before performing a Stroop task.

⁵ Cortisol data were missing for nine participants, leaving a total of 59 participants.

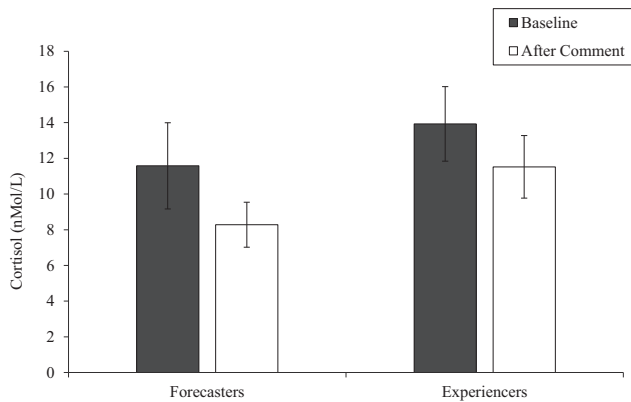


Figure 4. Changes in cortisol (nMol/L = nanomoles per liter) from baseline to after the racist comment among experiencers and forecasters. Error bars reflect standard errors.

Method

Participants and design. Two hundred sixty-five non-Black undergraduates were recruited as participants for course credit and were randomly assigned to condition in a 2 (Role: experiencer vs. forecaster) \times 2 (Race of Target: Black vs. White) \times 2 (Comment: comment vs. no comment) between-subjects design. Because effect sizes related to the impact of role, target race, and comment on Stroop interference effects are unknown, we relied on typical published effect sizes in social psychology ($r = .20$; Fraley & Vazire, 2014; Funder et al., 2014; Richard, Bond, & Stokes-Zoota, 2003) in determining the sample size. Power analyses using G*Power (Faul et al., 2007) indicated that we would require 191 participants to reach 80% power. However, because we were interested in the effects of social context on reaction latencies in a Stroop Task that could potentially be related to smaller effect sizes (Richeson & Trawalter, 2005), we aimed to run more participants. To ensure adequate power and to account for potential dropout, our goal was to recruit at least 280 participants.⁶ Our “stop rule” was to end recruitment on the last day of the week in which we reached 280 participants.

Procedure. On an initial informed consent form, participants learned that the name of the study was “Affect and Words” and that they would complete a partner task (experiencers) or imagine themselves in a scenario (forecasters) and then complete a color naming reaction time task. Participants were exposed to one of eight conditions. In the *Experiencer/Black target/Comment* condition, the experiencer situation was similar to Experiment 1 in that while ostensibly waiting for the experiment to begin, participants witnessed a Black confederate gently bump a White confederate’s leg, after which a racist comment was made by the White confederate. In the *Experiencer/Black target/No-comment* condition, participants experienced the same events; however, after the gentle bump, no comment was made.

In the *Experiencer/White target/Comment* condition, participants experienced the same events described in the first condition above but with two White confederates posing as participants. Specifically, the scenario unfolded in a similar fashion except that a White confederate gently bumped another White confederate’s leg, after which the White confederate remarked “Clumsy [F-word].” In

the *Experiencer/White target/No-comment* condition, participants experienced the same events; however, after the gentle bump, no comment was made.

Forecasters read one of four detailed descriptions of the occurrences in the experiencer conditions and were asked to imagine themselves in that situation. Specifically, forecasters in the comment conditions read a description in which a Black student was the target of a racist comment or a White student was the target of a derogatory comment. Alternatively, forecasters in the no-comment conditions read a scenario in which there was no comment.

Finally, all participants completed a Stroop color-naming task in which color words or strings of Xs were presented in one of four colors on a computer screen. Participants were instructed to identify the color of the stimuli by pressing the appropriate color-coded key. For incompatible trials, the words ORANGE, GREEN, YELLOW, or BLUE were presented in a color different from the semantic meaning of the word. Alternatively, on control trials, participants were instructed to identify the color of strings of five Xs. Because the semantic meaning of these stimuli did not interfere with the color-naming task, less executive functioning is needed to complete these trials (Richeson & Trawalter, 2005). After eight practice trials, stimuli from three blocks of 24 trials (12 incompatible trials and 12 control trials) were separately presented in the middle of the screen in a random order until participants responded. Before beginning the task, all participants were instructed to respond as quickly and as accurately as possible.

Results and Discussion

Before calculating Stroop scores, error trials (3.3%) were recoded as missing and outlier latencies greater than 2.5 *SD* above the mean (i.e., 1523 ms) were recoded as 1523 ms, and latencies less than 200 ms were recoded as 200 ms (Richeson & Shelton, 2003; Trawalter & Richeson, 2006). Next, mean latencies for the control trials were subtracted from mean latencies for incompatible trials with higher values reflecting greater Stroop interference. We conducted a 2 (Role: experiencer vs. forecaster) \times 2 (Comment: comment vs. no comment) \times 2 (Target Race: Black vs. White) between-subjects ANOVA on Stroop scores (see Figure 5).

Only the three-way interaction was significant, $F(1, 257) = 4.42, p = .04, \eta_p^2 = 0.02$. Simple effects analyses demonstrated a significant Role \times Target Race interaction in the comment condition, $F(1, 257) = 3.91, p = .049, \eta_p^2 = 0.02$, but not in the no-comment condition, $F(1, 257) = 0.97, p = .33, \eta_p^2 = 0.004$. Simple effects analyses related to the comment condition demonstrated that forecasters who imagined a racist comment ($M = 86.20$ ms, $SD = 57.36$) performed marginally worse on a Stroop task than experiencers who witnessed the remark ($M = 57.81$ ms, $SD = 43.67$), $F(1, 257) = 3.33, p = .07, \eta_p^2 = 0.01$. Alternatively, Stroop interference scores for forecasters who imagined ($M =$

⁶ Although 285 undergraduates were recruited, one student who identified as Black, 11 students with computer errors (e.g., computer froze), two students who participated during a fire alarm, two students with Stroop error rates greater than 25%, one student who did not follow instructions, and three students who were suspicious of the cover story (one of whom did not hear the comment) were excluded.

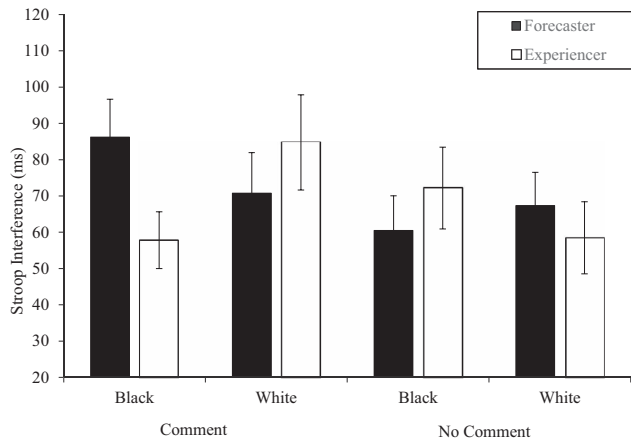


Figure 5. Stroop interference scores among experiencers and forecaster exposed to a derogatory comment against a Black or White confederate or no comment. Error bars reflect standard errors.

70.75 ms, $SD = 64.25$) and experiencers who witnessed ($M = 84.74$ ms, $SD = 77.61$) a derogatory comment directed at a White target did not differ, $F(1, 257) = 0.90$, $p = .34$, $\eta_p^2 = 0.003$.⁷

For exploratory purposes, we examined alternative simple effects analyses to further compare responses in the comment and no-comment conditions for forecasters and experiencers. As expected, forecasters who imagined a racist comment ($M = 86.20$ ms, $SD = 57.36$) compared with no comment ($M = 60.50$ ms, $SD = 57.22$) against a Black target performed marginally worse on a Stroop task, $F(1, 257) = 2.93$, $p = .09$, $\eta_p^2 = 0.01$. Alternatively, forecasters who imagined a derogatory comment ($M = 70.75$ ms, $SD = 64.25$) compared with no comment ($M = 67.33$ ms, $SD = 51.86$) against a White target did not differ in their Stroop interference effects, $F(1, 257) = 0.05$, $p = .82$, $\eta_p^2 < 0.001$. In contrast, experiencers who witnessed a racist comment against a Black target ($M = 57.81$ ms, $SD = 43.67$) compared with no comment ($M = 72.17$ ms, $SD = 68.58$) did not differ in their Stroop interference effects, $F(1, 257) = 0.94$, $p = .33$, $\eta_p^2 < 0.01$. Alternatively, experiencers who witnessed a derogatory comment against a White target ($M = 84.74$ ms, $SD = 77.61$) compared with no comment ($M = 58.47$ ms, $SD = 55.29$) performed marginally worse on a Stroop task, $F(1, 257) = 3.07$, $p = .08$, $\eta_p^2 = 0.01$.

Together the findings in Experiment 2 suggest once again that racism differentially impacted forecasters and experiencers. Specifically, forecasters who imagined a racist comment demonstrated somewhat poorer performance on a task of executive functioning than participants who experienced the racist situation or who imagined a no-comment situation. However, when the no negative comment was made or when the target of the comment was White, forecasters and experiencers did not differ in Stroop performance.

In summary, the pattern of results suggest that experiencers did not experience cognitive deficits related to self-regulation and stress after imagining a racist slur. In accordance with the findings of Experiment 1, these results provide additional evidence that experiencers were not overwhelmed by negative affective responses to a racist or deviant situation and in fact were not influenced by racism.

General Discussion

In accordance with previous research (Dunn et al., 2009; Gilbert et al., 2002), the present findings indicate that people can be poor predictors of their affective and behavioral responses. Specifically, in the present context related to reactions to a racist comment, how people imagined that they would respond and how they actually responded differed dramatically. For people who experienced outgroup racism, there was no evidence of emotional upset in self-reported affective ratings, behavioral reactions, or more involuntary physiological and cognitive responses. Instead, these participants demonstrated a pattern indicative of an orienting response to a novel situation with no impairment in executive functioning.

The pattern of findings for people who imagined racism was notably different. Although some of the results were indicative of distress, this pattern was not consistent across various methodologies. Whereas the results related to cortisol reactivity suggests that forecasters were not responding to an extreme threat, the pattern of results related to the other psychophysiological measures and the cognitive and behavioral responses provides at least initial evidence that these participants were impacted by the racial slur. Specifically, people who imagined a racist comment self-reported negative affect, expected to avoid the racist, and demonstrated an increase in GSR and a nonsignificant increase in HR as well as deficits in executive control on the Stroop task.

Notably, forecasters, unlike experiencers, were probably aware that the experiments were about racism, potentially leading to socially desirable responding on self-report measures of affect and behavior. Specifically, because of social norms against expressions of racism (Apfelbaum et al., 2008; Dovidio et al., 2009; Norton, Sommers, Apfelbaum, Pura, & Ariely, 2006), forecasters may have felt obliged to report expectations of upset. However, we believe that forecaster-experiencer discrepancies do not simply stem from social desirability responding for several reasons. First, forecasters were assured complete anonymity and provided their responses in a private cubicle on a computer with an identity code. They were also informed that their responses were kept in complete confidentiality. Second, in our previous work (Kawakami et al., 2009a), we tested for an association between forecaster's responses and individual differences in social evaluative concerns and found no relationship. Finally, responses on physiological measures and cognitive impairment on the Stroop task are often less amenable to momentary contextual motivations such as social desirability. Furthermore, past research has demonstrated that the act of imagining can be potent enough to generate corresponding physiological responses (Blascovich, Seery, Mugridge, Norris, & Weisbuch, 2004). Thus, in accordance with the explicit self-report affect measure and partner choice, these findings suggest that forecasters may have responded with at least mild distress to imagined racism. Nonetheless, because of inconsistencies across

⁷ In Experiment 2, we also conducted exploratory analyses to examine the effects of participant race on Stroop interference scores. First, we categorized participants as White ($n = 107$) and non-White ($n = 155$) based on demographic information provided by the participant in the exit questionnaire (three participants did not report their race). As expected based on the results of Experiment 1, Participant Race did not qualify the primary Role \times Comment \times Target Race interaction, $F(1, 257) = 1.30$, $p = .26$, $\eta_p^2 = 0.005$.

the pattern of results, more research is recommended to resolutely discern whether imagining a racist comment results in physiological stress, simple engagement with the role, or even socially desirable responding to egalitarian norms. Although the cognitive, behavioral, and physiological responses of forecasters require further investigation, the results related to experiencers that are likely less tainted by social desirable responding provide important insights into reactions to outgroup racism.

Importantly, the focus of the present research was on witnessing racism toward a member of an outgroup, not an ingroup, and we believe these processes to be quite distinct. Whereas rejecting prejudice against one's own group can have clear benefits for the self, the implications for rejecting outgroup prejudice is less direct. Whereas the former action can decrease future bias and discrimination against the self, the latter action has less obvious benefits to the self and therefore may be seen as less self-serving. Objections from members of nontarget compared with target groups, therefore, may be taken more seriously (Czopp & Monteith, 2003) and be more impactful. Moreover, objections to racism by a nontarget group member may be particularly important, given that social groups often have different ideas of what constitutes racism (Carter & Murphy, 2015). New research suggests that nontarget group members may be more respected after confronting bias, particularly when racism is highly offensive (Dickter, Kittel, & Gyurovski, 2012).

Still, negative repercussions when combating such behavior is a real possibility for targeted and nontargeted confronters (Cadieux & Chasteen, 2015; Dickter & Newton, 2013; Shelton & Stewart, 2004). Normative pressures to not respond and retaliation concerns, for example, limited the extent to which women challenged sexism in one study (Swim & Hyers, 1999). Future research should continue examining how potential costs and benefits of challenging bias might impact behavior differently for members of targeted and nontargeted group members. Notably, in the present paradigm, potential costs such as fear of retaliation does not readily explain our results because we created a design in which there was very little cost associated with demonstrating distress either physiologically, on a self-report affect measure, or when selecting a partner. Our goal was to examine reactions to, rather than the tendency to confront, outgroup racism.

In the present context, it is unclear whether behavioral responses were driven by reactions to the White confederate or the Black confederate. Although we initially assumed that response would be related to censuring the White confederate who demonstrated strong antiegalitarian behavior, it is conceivable that partner selection may be determined by responses to the Black confederate. In particular, it is possible that some participants may avoid the Black outgroup student, regardless of the behavior of the White student (i.e., whether he utters a racial slur or not). Although in the present experiments and in our previous research, experiencers did not self-report emotional distress or show signs of physiological distress that could potentially drive partner choice and avoidance of the Black confederate (Kawakami et al., 2009a), the thought of interacting with a Black person may lead some participants to assume that they would experience more discomfort than interacting with a White person (Mendes et al., 2002; Trawalter et al., 2012). One potential reason for this assumed discomfort may be related to implicit negative attitudes and stereotypes about Blacks.

Specifically, recent research suggests that although forecasters' responses may be influenced by explicit biases (Dunn et al., 2009; McConnell, Dunn, Austin, & Rawn, 2011), experiencer responses may be driven by implicit biases. Because people's implicit attitudes and stereotypes are generally more negative than their explicit attitudes, forecaster and experiencer reactions to racism may diverge. This may be especially the case for aversive racists who are defined by nonconscious negative feelings toward Blacks and explicitly held strong egalitarian self-views (Gaertner & Dovidio, 1986; Son Hing, Chung-Yan, Hamilton, & Zanna, 2008). In particular, although in the present context aversive racists may think that they would be offended when witnessing racism, they may actually demonstrate apathy. We therefore recommend that future research investigates the relationship between aversive racism and individual differences in implicit and explicit prejudice and forecasters' and experiencers' responses to racism.

Another potentially fruitful avenue to investigate is whether implicit stereotypes influence responses to racism. Classic research suggests that because of associations between Blacks and hostile, relatively neutral behaviors by members of this group may be perceived to be aggressive (Duncan, 1976; Sagar & Schofield, 1980). For example, even a gentle bump by a Black compared with a White person may be seen as more aggressive by people who actually witness the event compared with participants who simply imagine the event. If this is true, then future research may productively investigate strategies that help dispel such negative stereotypes through training (Kawakami, Dovidio, Moll, Hermsen, & Russin, 2000; Kawakami et al., 2017) or with specific behaviors that disarm the Black confederate (e.g., apologizing). If negative implicit stereotypes are driving differences between forecasters and experiencers in partner selection, then reducing this bias should result in more similar responses by forecasters and experiencers and less avoidance of the Black confederate in both roles.

In general, future research should further investigate characteristics and behaviors associated with the outgroup target as well as the perpetrator of the racial slur. For example, the race of the target of the racial slur, the racist, and the participant may all influence responses to racial slurs. Although in the present research, the outgroup target was Black and the racist was White, our sample of participants included both White and non-White/non-Black participants. Therefore, although some participants' racial identity overlapped with the confederate who made the racist comment (i.e., they were both White), some participants' racial identity did not (i.e., White racist and non-White participant). Additional analyses demonstrated that in both experiments, participant race did not qualify the reported interactions (see Footnotes 2 and 7), suggesting that the pattern of findings is not limited to responses to racists who are part of the ingroup. It is important to note, however, the exploratory nature of these analyses and the restricted sample size. Future research is therefore necessary to fully understand the impact of overlapping social identities between the racist and the participant. In particular, further studies should manipulate the race of the racist to match and not match the ethnicity of the participant. By varying the identity of the racist, including participants with a variety of racial identities, and by manipulating characteristics related to the target of the comment to include not only other racial groups but also other

types of social categories (e.g., women, gays, and the elderly), useful information can be garnered on the generalizability of these processes and how they may or may not be related to ingroup biases and implicit attitudes and stereotypes.

Although the present research focused on a fairly extreme, explicit racial slur, one might wonder whether more subtle forms of racism would produce similar results. Our original findings (Kawakami et al., 2009a) suggest that this might indeed be the case. In particular, in an initial experiment, participants either imagined or witnesses a situation in which a White confederate made the same extremely racist comment used in the present research or a more moderately racist comment ("Typical, I hate it when Black people do that") or no comment. Whereas forecasters imagined that they would be upset and avoid the racist in both the extreme and moderately racist conditions more than the control condition, experiencers did not differ in their affect ratings or partner choice across all comment conditions. Notably, forecasters responses to the extreme and moderately racist comments did not differ, suggesting that they expected both slurs to be offensive and to impact their reactions to the racist. Moreover, given that even extreme forms of racism are met with apathy, more subtle forms of racism may be even less effective in eliciting distress or censure by witnesses (Gaertner & Dovidio, 1986).

Although subtle forms of prejudice and microaggressions are considered to be more common in current society than overt forms of bias (Gaertner & Dovidio, 1986; Wong, Derthick, David, Saw, & Okazaki, 2014), even overt expressions of racism, such as the use of racial slurs are widespread (Forscher, Cox, Graetz, & Devine, 2015). Degrading racial comments have not only been documented in backstage settings among friends socializing (Bonilla-Silva, 2003, 2014; Picca & Feagin, 2007) but even within workplace and educational settings (Fox & Stallworth, 2005; Harwood, Hunt, Mendenhall, & Lewis, 2012; Rosette, Carton, Bowes-Sperry, & Hewlin, 2013). For example, in one study, 35% of White people reported overhearing racist remarks in their workplace (Novations, 2007). We also opened our manuscript with an especially concerning and disheartening example of overt expressions of racism perpetrated publicly by a presidential candidate.

The damage of this type of overt racism to egalitarian social norms and intergroup relations is obvious. Not responding in negative ways to people who express these beliefs can normalize racial slurs, can encourage other racists to speak up, and can contribute to a divisive society. Furthermore, failing to confront racism, can perpetuate bias (Czopp, Monteith, & Mark, 2006) because not responding tacitly rewards the racist. Indeed, Donald Trump's initial controversial remarks against Mexicans in the United States when he announced his intention to run for the presidency were followed during his candidacy by disparaging remarks about a variety of other social categories that targeted not only ethnic groups but also women and disabled people. In the weeks following his election, racist incidents across the country increased, many of which were based in racist rhetoric from his campaign (Reilly, 2016). Although egalitarian norms may be a first step toward reducing racism, negative reactions to violations of this norm may be critical to maintaining these norms and building a society in which racism and prejudice are thwarted.

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Correction to Lewis, Lefevre, and Young (2016)

In the article “Functional Architecture of Visual Emotion Recognition Ability: A Latent Variable Approach” by Gary J. Lewis, Carmen E. Lefevre, and Andrew W. Young (*Journal of Experimental Psychology: General*, 2016, Vol. 145, No. 5, 589–602. <http://dx.doi.org/10.1037/xge0000160>), there were several errors in Table 5. The correlations between the AQ-10 and both the supramodal and face-specific latent ability factors were set as positive. They should have been negative. The correct values are shown in the table below.

Table 5

Associations Between the Face-Specific/Supramodal Emotion-General Recognition Factors and Autism-Like Traits, Alexithymia, Empathy, and General Intelligence in Study 2

Variable	Supramodal		Face specific	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
AQ-10	–.12 (.00)	.04 (.95)	–.36 (–.27)	<.001 (<.01)
IRI	.07 (.05)	.24 (.38)	.24 (.22)	<.01 (<.01)
IRI-EC	.10	.07	.30	<.001
IRI-PT	.07	.22	.26	.002
IRI-PD	–.10	.07	–.06	.46
IRI-FS	.11	.05	.13	.12
TAS-20	–.21 (–.16)	<.001 (<.01)	–.32 (–.16)	<.001 (.05)
TAS-Describe	–.12	.04	–.24	.004
TAS-Identify	–.19	<.001	–.21	.01
TAS-External	–.21	<.001	–.36	<.001
Intelligence	.43 (.42)	<.001 (<.001)	.15 (.13)	.06 (.12)

Note. Values in parentheses reflect correlations/*p* values when AQ-10, IRI, TAS-20, and intelligence were modeled simultaneously: Model fit $\chi^2(df) = 378.97 (216)$, comparative fit index = .93, root square error of approximation = .04 [90% CI: .04, .05], Akaike information criterion = 594.97. AQ-10 = Autism-Spectrum Quotient (10-items); IRI = Interpersonal Reactivity Index; EC = empathic concern; PT = perspective taking; PD = personal distress; FS = fantasy seeking; TAS = Toronto Alexithymia Scale.

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