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Mere Exposure and Racial Prejudice: Exposure to Other-Race Faces Increases Liking for Strangers of That Race

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Abstract

White participants were exposed to other-race or own-race faces to test the generalized mere exposure hypothesis in the domain of face perception, namely that exposure to a set of faces yields increased liking for similar faces that have never been seen. In Experiment 1, rapid supraliminal exposures to Asian faces increased White participants' subsequent liking for a different set of Asian faces. In Experiment 2, subliminal exposures to Black faces increased White participants' subsequent liking for a different set of Black faces. The findings are consistent with prominent explanations for mere exposure effects as well as with the familiar face overgeneralization hypothesis that prejudice derives in part from negative reactions to faces that deviate from the familiar own-race prototype,

Keywords

Mere exposure; familiar face overgeneralization; race; prejudice

The extensive research on ethnic and racial prejudice has paid scant attention to the variable of physical appearance despite the obvious fact that ethnic and racial groups tend to look different from one another. The lack of attention may reflect, in part, an ambivalence about appearance that researchers share. We are enjoined not to 'judge a book by its cover' and cautioned that 'beauty is only skin deep.' These warnings suggest both a natural proclivity to judge people by their appearance and the belief that to do so is wrong. Another factor contributing to the neglect of appearance has been the assumption that prejudice and stereotyping are category-driven (cf. Brewer, Feinstein, & Harasty, 1999; Fiske, Lin, & Neuberg, 1999). According to this view, the appearance of a particular person may help us to know the social category in which to place him or her – Black or White, old or young, male or female – but it is culturally learned associations to that category that account for prejudice and stereotyping, not appearance per se. Although learned associations certainly play a significant role, recent research discussed below reveals that appearance makes a contribution apart from its effect on categorization. A third factor that may contribute to the neglect of research on appearance is the belief that it cannot help us to ameliorate prejudice because targets' appearance is less mutable than the perceiver variables that have received greater attention. However, the research reported here demonstrates that considering the contribution of appearance provides useful information about how to reduce prejudice.

According to the familiar face overgeneralization hypothesis (FFO), racial prejudice derives in part from negative reactions to faces that deviate from the prototype of faces that one has experienced (Zebrowitz, 1997, 2001; Zebrowitz & Collins, 1997). This hypothesis is grounded in the assumption that the evolutionary and contemporary social importance of differentiating

known individuals from strangers and being wary of the latter may produce a tendency for responses to strangers to vary as a function of their facial resemblance to known individuals. Such an effect has been demonstrated for 'episodic' familiarity (Peskin & Newell, 2004), whereby responses to a particular individual are influenced by that person's physical resemblance to someone with whom the perceiver has interacted even when the perceiver is unaware of the resemblance (Hill, Lewicki, Czyzewska, & Schuller, 1990; Lewicki, 1985). The effect also has been demonstrated for 'general familiarity.' In particular, reactions to strangers depend on the racial prototypicality of their facial appearance, with physical features more prototypical of another race contributing to prejudiced responses over and above those resulting from racial categorization (Blair, Judd, & Chapleau, 2004; Blair, Judd, Sadler, & Jenkins, 2002; Eberhardt, Davies, & Purdie-Vaughns, 2006; Livingston & Brewer, 2002). Also, the higher familiarity of own- than other-race faces partially accounts for the ingroup favoritism shown in the likeability of strangers' faces reported by Koreans, Black Americans, and White Americans (Zebrowitz, Bronstad, & Lee, 2007).

The FFO hypothesis has implications not only for understanding the contribution of appearance to prejudice, but also for ameliorative interventions. In particular, since the unfamiliarity of other-race faces contributes to outgroup prejudice, increasing the familiarity of other-race faces should decrease prejudiced responses to strangers of that race. Such an effect would be consistent with previous research showing that mere exposure to stimuli, including faces, increases their likeability, an effect that occurs even when the exposure is subliminal (Ball & Cantor, 1974; Bornstein, 1989; Cantor, 1972; Hamm, Baum, & Nikels, 1975; Kunst-Wilson & Zajonc, 1980; Perlman & Oskamp, 1971; Seamon, Williams, Crowley, et al., 1995; Zajonc, 1968; Zajonc, Markus, & Wilson, 1974). The precise mechanism underlying the mere exposure effect remains an active research question, and it is not the focus of the present research. However, some conceptually related candidate mechanisms are compatible with FFO. These include an uncertainty reduction mechanism (Bornstein, 1989; Lee, 1991), increased perceptual fluency (Reber, Winkielman, & Schwarz, 1998), and reduced negative affect, such as apprehension (Zajonc, 2001), all of which, like FFO, need not be explicit. Interestingly, a meta-analysis of research investigating mere exposure to faces revealed that the effects are more than 50% larger for other-race than own- race faces (Bornstein, 1993). These results are consistent with the uncertainty reduction, perceptual fluency, and affect mechanisms, which are likely to be engaged more by exposure to other-race than own-race faces.

Whereas the basic mere exposure effect can influence the likeability of previously seen other-race faces, research also has revealed a *generalized* mere exposure effect that has broader ramifications. For example, subliminal repeated exposures to Chinese idiographs, polygons, or complex visual patterns increased the judged likeability not only of previously seen stimuli but also novel ones, with liking for novel *similar* stimuli greater than liking for novel *dissimilar* stimuli (Gordon & Holyoak, 1983; Monahan, Murphy, & Zajonc, 2000). Research also has shown greater liking and incipient smiling when viewing prototypes of seen patterns or geometric stimuli even though those prototypes have never themselves been seen but are merely similar to the exposed stimuli (Winkielman, Halberstadt, Fazendeiro, & Catty, 2006). Similarly, in the domain of face perception, 6-month-old infants who were familiarized with a set of faces attended to an averaged composite of these faces as if it were familiar (Rubenstein, Kalkanis, & Langlois, 1999). Also, brief, supraliminal exposure to a series of faces of one's own race or another race increased likeability ratings for averaged composites of the seen faces compared with averaged composites of unseen faces even though neither composite had itself been seen (Rhodes, Halberstadt, & Brajkovich, 2001).

The present research builds on the findings that the lesser familiarity of other-race faces mediates ingroup favoritism in likeability judgments (Zebrowitz et al., 2007) and that exposure to a set of faces increases the likeability of a never-seen composite of those specific faces

(Rhodes et al., 2001). In particular, we investigated whether exposure to other-race faces can increase the likeability of never-seen *real* faces from that racial category. Such a demonstration has both theoretical and practical significance, because composite faces differ from real faces in two significant ways. First, composite faces are higher in structural similarity to the exposed faces than a random set of real faces from the same racial category. Second, the computer generated composite faces are rated relatively high in attractiveness (e.g., Langlois & Roggman, 1990; Zebrowitz & Rhodes, 2002). Examining real faces will reveal whether these two qualities are necessary for the generalization of exposure effects. Demonstrating the effect with real faces will also have implications for interventions designed to reduce outgroup prejudice, since it is reactions to real faces that are socially significant.

Experiment 1 investigated the effects of supraliminal exposure to Korean or White faces on White perceivers' liking for Korean and White faces that had not been previously seen. Experiment 2 investigated the effects of subliminal exposure to Black or White faces on White perceivers' liking for Black and White faces that had not been previously seen. Whereas the supraliminal exposure manipulation has the advantage of generalizability to real world exposures, the subliminal exposure manipulation enabled us to determine whether a generalized mere exposure effect for faces is an implicit process, as has been demonstrated for other stimuli (Gordon & Holyoak, 1983; Monahan et al., 2000). We examined only generalized exposure effects both because they have greater implications for ameliorating other-race prejudice than do changes in the likeability of previously exposed faces, and also because the basic mere exposure effect is not shown within a generalized mere exposure paradigm. Rather, previously exposed stimuli and novel stimuli from the same category are liked equally well (Monahan, Murphy, & Zajonc, 2000; Smith, Dijksterhuis, & Chaiken, 2007).

We predicted that either supraliminal or subliminal exposure to other-race faces would increase the likeability of a different set of other-race faces as compared with either exposure to own-race faces or no exposure to faces of either race. We predicted that supraliminal exposure to other-race faces would also yield an increase in the judged familiarity of a different set of other-race faces, and that that the effects on familiarity would mediate likeability judgments. We also predicted a generalized effect on liking following the subliminal exposure manipulation without any increase in the explicit familiarity of unseen other-race faces, because previously documented basic and generalized exposure effects for subliminal stimuli indicate that the mechanism responsible does not require explicit recognition processes. Finally, based on Bornstein's (1993) meta-analysis of basic mere exposure effects for own- and other-race faces, we expected the foregoing exposure effects to be weaker for own-race faces.

Experiment 1

Method

Participants—81 undergraduates from Brandeis University were randomly assigned to one of two exposure conditions (Korean or White faces). Only data from Caucasian participants who were born in the United States were used, yielding a sample of 39 participants in the Korean exposure condition (17 men, 22 women) and 30 participants in the White exposure condition (13 men, 17 women). All participants signed an informed consent form and received either ten dollars or credit toward the research requirement of an introductory psychology class for their participation.

Faces—Facial stimuli were digitized 3.54 × 3.54 inch color images of the neck and face of 30 White and 30 Korean college-aged individuals, with men and women equally represented in each group. White facial images were selected from three different databases: the AR face database (Martinez & Benavente, 1998), NIM-STIM¹ (<http://www.macbrain.org/faces/index.htm>), and University of Stirling PICS database

(<http://pics.psych.stir.ac.uk/>). Korean facial images were selected randomly from a Korean university yearbook. Four criteria were used for image selection: no head tilt, no eyeglasses, neutral expression, and no facial hair. All 60 faces had been previously rated within a larger set of 120 faces in a study of cross-race trait impressions (Zebrowitz et al., 2007).² Mean attractiveness ratings on 7-point scales from that study revealed that the 20 Korean faces and the 20 White faces selected for the exposure manipulation did not differ significantly, $M_{\text{korean}} = 3.31$, $SD = .45$, $M_{\text{White}} = 3.61$, $SD = .83$, $t(38) = 1.43$, $p = .16$, and neither did the 10 additional Korean faces and the 10 additional White faces selected for rating, $M_{\text{korean}} = 3.26$, $SD = .47$, $M_{\text{White}} = 3.18$, $SD = .64$, $t < 1$. Mean likeability ratings on 7-point scales from that study also revealed that the exposure manipulation faces did not differ significantly on that dimension, $M_{\text{korean}} = 3.81$, $SD = .53$, $M_{\text{White}} = 4.06$, $SD = .59$, $t(38) = 1.40$, $p = .17$, and neither did the rated faces, $M_{\text{korean}} = 3.48$, $SD = .49$, $M_{\text{White}} = 3.68$, $SD = .79$, $t < 1$.

Procedure

Mere exposure manipulation: Participants in the White exposure condition were exposed to ten 50 ms repetitions of 20 White faces. Those in the Korean exposure condition were exposed to ten 50 ms repetitions of 20 Korean faces. Male and female faces were equally represented in both exposure conditions. Faces were presented in a different random order for each repetition, with the constraint that no face was presented twice in succession. Between each face presentation there was a 1 s inter-stimulus interval during which participants were asked to fixate on an asterisk (*) at the center of the screen. The number and duration of exposures was based a study by Bornstein and D'Agostino (1992), who reported that photographs of faces achieved maximal likeability at 10 presentations at both 5 ms and 500 ms exposure durations. We used an exposure duration of 50 ms to limit habituation and boredom (Bornstein, Kale, & Cornell, 1990).

A cover story was supplied to participants to prevent them from guessing the experimental hypothesis. Specifically, they were told that an aim of the experiment was to determine whether certain qualities of faces might affect reaction times and that their task while watching the faces was to press the "R" key whenever they saw a red cross appear on the computer screen and to press the "Y" key whenever they saw a yellow cross. A total of 15 red and 15 yellow 1" × 1" crosses were interspersed with the face presentations, each remaining onscreen for 50 ms. The crosses were created in Photoshop and presented in a gray box that matched the background screen color. Participants were told to try to respond as quickly as possible, but not to worry if they made a mistake. Stimuli and target crosses were presented on a 19 inch Dell M992 CRT using MatLab Software (MatLab 6.1, 2001) and Psychophysics toolbox (Brainard, 1997) for a desktop computer.

Face Ratings: In part 2 of the experiment, Media Lab software (Jarvis, 2004) was used to present faces on a computer screen. Participants first rated all faces on a 7-point likeability scale (not at all likeable/ very likeable) after which each face was presented a second time and rated on a 7-point familiarity scale (not at all familiar/ very familiar). Faces were presented for up to 2 seconds, disappearing as soon as a rating was made. Rating scales remained on the screen until the participant made a response even if that took more than 2 seconds. Participants in both conditions rated 14 Korean and 14 White faces that included 4 faces shown during the Korean exposure manipulation and 4 shown during the White exposure manipulation, with

¹Development of the MacBrain Face Stimulus Set was overseen by Nim Tottenham and supported by the John D. and Catherine T. MacArthur Foundation Research Network on Early Experience and Brain Development. Please contact Nim Tottenham at tott0006@tc.umn.edu for more information concerning the stimulus set.

²We excluded eight faces from the larger set from this experiment because they were being used in another lab during the same semester, which meant that some participants may have had exposure to them outside of the present experiment. We also excluded White faces with red or blonde hair to prevent any one face from being too salient to participants.

male and female faces equally represented. After completing the face ratings, participants were debriefed.

Results

Analyses of Variance—To test the experimental hypotheses, we averaged each participant's likeability and familiarity ratings across the 10 previously unseen Korean faces and across the 10 previously unseen White faces. These ratings were subjected to $2 \times 2 \times 2$ analyses of variance with exposure (White exposure, Korean exposure) and participant sex as between-subjects variables, and face race (Korean, White) a within-subjects variable. The predicted Exposure Condition $\times$ Face Race interaction effects were followed by planned comparisons to assess support for the specific hypotheses.

Likeability: There were no significant effects on the likeability of strangers' faces of either face race, $F(1, 65) = 1.31, p = .26, \eta^2 = .02$, exposure condition $F(1, 65) = 1.18, p = .28, \eta^2 = .02$, or perceiver sex, $F < 1, \eta^2 = .01$. However, as predicted, there was a significant Face Race $\times$ Exposure interaction, $F(1, 65) = 4.50, p = .04, \eta^2 = .06$ (Figure 1).³

Planned comparisons revealed the predicted generalized mere exposure effect for Korean faces. Faces of Korean strangers were liked more in the Korean exposure condition ($M = 3.97, SD = .79$) than in the White exposure condition ($M = 3.59, SD = .90$), $t(67) = 2.11, p = .04$. Whereas the Korean exposure manipulation increased our White participants' liking for faces of Korean strangers, the White exposure manipulation did not increase their liking for faces of White strangers, consistent with previous evidence that basic mere exposure effects are weaker for own-race faces (Korean exposure: $M = 3.65, SD = .76$; White exposure: $M = 3.68, SD = .69$, $t < 1$. Additional planned comparisons within exposure conditions revealed that not only were Korean faces liked better in the Korean than the White exposure condition, but also Korean faces were liked better than White faces in the Korean exposure condition, $t(38) = 2.42, p = .02$. In contrast, Korean and White faces were equally liked in the White exposure condition, $t < 1$.

Familiarity: A significant main effect of face race revealed that, as expected, our White participants rated faces of White strangers ($M = 4.37, SD = 1.15$) as more familiar than faces of Korean strangers ($M = 3.82, SD = 1.35$), $F(1, 65) = 15.50, p < .001, \eta^2 = .19$. There was also a marginally significant main effect of exposure, $F(1, 65) = 3.42, p = .07, \eta^2 = .05$, with faces of strangers rated as marginally more familiar in the Korean exposure condition ($M = 4.34, SD = 1.25$) than in the White exposure condition ($M = 3.85, SD = 1.20$). Although the Face Race $\times$ Exposure effect was not significant, $F(1, 65) = 2.30, p = .13, \eta^2 = .03$, planned comparisons supported the predicted pattern of effects (Figure 2). Specifically, faces of Korean strangers were judged significantly more familiar in the Korean exposure condition ($M = 4.18, SD = 1.36$) than in the White exposure condition ($M = 3.47, SD = 1.27$), $t(67) = 2.16, p = .04$. On the other hand, faces of White strangers were judged equally familiar in the Korean ($M = 4.51, SD = 1.15$) and White ($M = 4.22, SD = 1.14$) exposure conditions, $t(67) = 1.13, p = .26$. Additional planned comparisons within each exposure condition revealed that not only were Korean faces judged more familiar in the Korean than the White exposure condition, but also Korean faces were only marginally less familiar than White faces in the Korean exposure condition, $t(38) = 1.66, p = .10$. In contrast, there was a highly significant tendency to perceive Korean faces as less familiar than White ones in the White exposure condition, $t(29) = 5.48, p < .001$.

³There was no significant triple order interaction with participant sex in Experiment 1, $F < 1, \eta^2 = .01$ or Experiment 2, $F(2, 98) = 1.97, p = .15, \eta^2 = .04$

Regression Analyses—Multiple regression analyses were performed within Korean faces to determine whether the effect of Korean vs. White exposure on likeability ratings was mediated by its effect on the familiarity of novel faces. Exposure was entered into the first step of the regression analysis, coded as -1 for White exposure, $+1$ for Korean exposure, creating a dummy variable that contrasted White with Korean exposure. Familiarity was entered at the second step, and we followed the procedure outlined by Baron and Kenny (1986) to determine whether it mediated the likeability effects. In testing mediation with the Sobel test, we used the bootstrap method developed by Preacher and Hayes (2004), which is more appropriate for small sample sizes. Consistent with the ANOVA results, exposure to Korean faces yielded more liking for faces of never seen Korean strangers than did exposure to White faces, $\beta = .25$, $t = 2.11$, $p = .04$. The effect of familiarity in Step 2 of the regression was also significant, $\beta = .38$, $t = 3.33$, $p = .001$, indicating more liking for faces rated as more familiar. In addition, the exposure effect on likeability lost significance when familiarity was controlled in step 2, $\beta = .15$, $t = 1.34$, $p = .18$, and the mediation effect was significant, $z = 2.77$, $p = .006$.⁴

Discussion

Whereas past research demonstrated that exposure to a set of own- or other-race faces increased the likeability of those specific faces (e.g., Bornstein, 1989; 1993; Hamm, Baum, & Nikels, 1975; Perlman & Oskamp, 1971; Zajonc, 1968; Zajonc, Markus, & Wilson, 1974) or a composite of those specific faces (Rhodes et al., 2001), the present findings revealed that exposure to faces of an other-race can also increase the likeability of *novel* faces from that racial category. This generalized mere exposure effect parallels findings with subliminal exposure to non-social stimuli (Gordon & Holyoak, 1983; Monahan et al., 2000). The fact that the effect was shown only for other-race faces in the present study is consistent with Bornstein's (1993) finding that other-race mere exposure effects were more than 50% larger than own-race effects in his meta-analysis of 8 other-race and 24-own-race effects as well as with a recent study by Smith, et al., (2007), which found no generalized mere exposure effects of White exposure vs. no exposure on liking for novel White faces. Although limited to other-race faces, the results of Experiment 1 demonstrate the robustness of the generalized mere exposure effect on the likeability of faces, since it required neither the high attractiveness nor the strong structural similarity to exposed faces that characterize the computer-generated composite faces studied in previous research.

Although this research did not aim to elucidate the precise mechanism for mere exposure effects, the finding that exposure to other-race faces increased the likeability of novel faces of that race together with the mediation of this effect by increased subjective feelings of familiarity is compatible with several prominent explanations, including a reduction in uncertainty, increased perceptual fluency, and decreased apprehension (Bornstein, 1989; Lee, 2001; Reber et al., 1998; Zajonc, 2001). In addition, our findings strengthen the FFO hypothesis that prejudice derives in part from negative reactions to faces that deviate from the familiar own-race facial prototype by demonstrating a link between manipulated familiarity and consequent likeability of other-race faces that augments previous correlational data (Zebrowitz et al., 2007).

The mediation of the likeability of other-race faces by variations in subjective familiarity created by the exposure manipulations raises the question of whether the likeability effect requires that exposure to a set of other-race faces create an *explicit* feeling of increased familiarity with a different set of other-race faces. Since there is considerable evidence that the effect of exposure to faces on liking for the same faces is *not* dependent on conscious

⁴Consistent with the ANOVA results, regression analyses on liking for White faces revealed no exposure effect for familiarity to mediate. However, the effect of familiarity was significant, $\beta = .28$, $t = 2.38$, $p = .02$, indicating more liking for White faces rated as more familiar.

recognition of stimuli or their subjective familiarity (e.g., Kunst-Wilson & Zajonc, 1980; Reber, Winkielman, & Schwarz, 1998; Seamon et al., 1995), it seems reasonable to predict that the generalized mere exposure effect on liking for racially similar, but never seen faces also would not depend on explicit feelings of familiarity. Demonstrating such an effect would be consistent with evidence that FFO effects can be implicit (Hill et al., 1990; Lewicki, 1985). It would also rule out the possibility that increased liking for novel other-race faces after other-race exposure merely reflects a failure to differentiate the new faces from those shown during the exposure manipulation.

Experiment 2 examined the necessity of explicit familiarity for producing a generalized mere exposure effect by substituting a subliminal exposure manipulation for the supraliminal manipulation used in Experiment 1. Experiment 2 also differed from Experiment 1 in incorporating a no exposure condition. Given recent evidence that White exposure decreased the likeability of Black faces as compared with a no exposure condition (Smith et al., 2007), one may question whether Korean exposure increased the likeability of Korean faces and/or whether White exposure decreased the likeability of Korean faces. Comparisons with pretest Korean face likeability ratings suggest that only the former was true: Pretest vs. Korean exposure, $t(57) = 2.59, p = .01$; Pretest vs. White exposure, $t < 1$. However, there were differences in the procedure for collecting pretest and exposure condition ratings that make these comparisons indecisive. Experiment 2 addressed this issue with an integrated no exposure condition that was procedurally identical to the exposure conditions. In addition, Experiment 2 examined generalized mere exposure effects using White and Black faces rather than White and Korean faces. We predicted that the generalized mere exposure effects would be replicated in Experiment 2 despite these changes in methodology.

Experiment 2

Method

Participants

104 White undergraduates from Brandeis University were randomly assigned to one of three exposure conditions with 36 (16 men, 20 women) in the White exposure condition, 36 (13 men, 23 women) in the Black exposure condition, and 32 (12 men, 20 women) in the no exposure condition. All participants signed an informed consent form and received five dollars, ten dollars, or credit toward the research requirement of an introductory psychology class for their participation.

Faces

Facial stimuli were selected from digitized 5.5×7 inch Black and White photographs of 48 White and 48 Black college-aged men with neutral facial expressions that had been used in previous research on cross-race face recognition (Malpass & Kravitz, 1969). Twenty four faces of each race were randomly selected for the exposure manipulations, and ten additional faces of each race were chosen for rating. Mean ratings of faces in the latter set provided by a separate group of participants revealed that the Black and White faces were matched on attractiveness ($M_{\text{Black}} = 2.84, SD = .60, M_{\text{White}} = 2.74, SD = .62, t < 1$, and likeability ($M_{\text{Black}} = 3.52, SD = .77$ and $M_{\text{White}} = 3.62, SD = .54, t < 1$, both of which were rated on 7-point scales).

Procedure

Subliminal mere exposure manipulation—As in Experiment 1, the procedure was based on that employed by Bornstein and D'Agostino (1992). Participants in the White exposure condition were exposed to ten 17 ms repetitions of 24 White male faces. Those in the Black exposure condition were exposed to ten 17 ms repetitions of 24 Black male faces. The 24 faces appeared in a different random order for each repetition. Immediately preceding each

subliminal face there was a 2 second exposure to a black fixation cross at the center of the screen. Following each subliminal face exposure, there was a .1 second masking stimulus, which consisted of a 5.5×7 inch array of white and gray dots of 1.0 to 0.6 white to black luminance. The masking stimuli, which were different for each face exposure, were controlled for after images and color contrast. Before the first face exposure and following the last face exposure, 5 additional masking stimuli were presented. Those in the no exposure control condition viewed 10 repetitions of the same 24 masking stimuli shown in the experimental conditions. The faces were projected on a 19 inch Dell M992 CRT computer monitor for 17 ms using MatLab Software (MatLab 6.1, 2001) and the Psychophysics toolbox (Brainard, 1997) for a desktop computer

Face ratings—In part 2 of the experiment, the same software and scales were used as in Experiment 1. Participants in all three conditions viewed a random order of 14 Black and 14 White faces that included 4 Black and 4 White faces shown during the exposure manipulation. Faces were shown on the computer screen for up to 3 seconds while participants made the familiarity rating, after which they were shown for up to 2 seconds for the likeability rating. Participants were instructed that after the face disappeared they were to rate the last face that they viewed, until a new face appeared. After completing the face ratings, participants were debriefed.⁵

Results

Following the procedure in Experiment 1, mean ratings of the likeability and familiarity of faces of White and Black strangers were created by averaging participant's ratings across the 10 previously unseen faces of each race. These ratings were subjected to $3 \times 2 \times 2$ analyses of variance with exposure (White exposure, Black exposure, No exposure) and participant sex (Male, Female) as between-subjects variables, and face race (Black, White) as a within-subjects variable.

Likeability—There was no significant main effect on the likeability of strangers' faces of either face race, $F < 1$, $\eta^2 < .01$, exposure condition, $F(2, 98) = 1.50$, $p = .22$, $\eta^2 = .03$ or perceiver sex, $F(1, 98) = 2.23$, $p = .14$, $\eta^2 = .02$. However, as predicted, there was a significant Exposure X Face Race interaction, $F(2, 98) = 3.93$, $p = .02$, $\eta^2 = .07$ (Figure 3).

Planned comparisons revealed the predicted generalized mere exposure effect for Black faces. Faces of Black strangers were liked significantly more in the Black ($M = 3.93$, $SD = .74$) than the White ($M = 3.47$, $SD = .94$) exposure condition, $t(70) = 2.04$, $p = .05$, and there was a non-significant trend in the same direction for the Black exposure compared with the no exposure condition ($M = 3.58$, $SD = .65$), $t(66) = 1.49$, $p = .14$, with no difference between the White and no exposure conditions, $t < 1$. Whereas the Black exposure manipulation increased the likeability of faces of Black strangers, the likeability of White strangers did not differ across the three exposure conditions, consistent with previous evidence that basic mere exposure effects are weaker for own-race faces (Black exposure: $M = 3.63$, $SD = .75$; White exposure; $M = 3.50$, $SD = .83$; no exposure: $M = 3.69$, $SD = .71$), $t(66) = 1.12$, $p = .27$ for White exposure vs. no exposure, and $ts < 1$ for Black exposure vs. White exposure or no exposure. Additional planned comparisons within exposure conditions revealed that not only were Black faces liked

⁵After rating likeability and familiarity, participants in Experiments 1 and 2 also rated attractiveness and a set of personality traits. These results are not reported because no significant generalized mere exposure effects were obtained. However, it is noteworthy that significant effects were found for likeability, but not attractiveness. Similar results were reported by Rhodes and colleagues, who found increased likeability but not increased attractiveness of composite faces after exposure to the individual component faces (Rhodes et al., 2001; Rhodes et al., 2005). The specificity of the effect may reflect a closer link between the positive affect created by mere exposure and subjective judgments of likeability than more objective judgments of attractiveness that are tied to specific stimulus qualities (Zebrowitz & Rhodes, 2004). The dissociation of likeability judgments from other impressions was also demonstrated by Zebrowitz et al. (2007).

better in the Black exposure condition than the White exposure condition, but also Black faces were liked better than White faces in the Black exposure condition, $t(35) = 2.19, p = .04$. In contrast, Black and White faces were equally liked in the White and no exposure conditions, $t_s < 1$.

Familiarity—Consistent with previous evidence that subliminally exposed stimuli are not recognized despite exposure effects on likeability, the Exposure x Face Race interaction effect was not significant for familiarity ratings, $F < 1, \eta^2 = .01$ (Figure 4). There was also no significant main effect of exposure condition, $F < 1, \eta^2 < .01$ or perceiver sex, $F(1, 98) = 2.34, p = .13, \eta^2 = .02$. However, there was a face race main effect, with the White participants rating faces of White strangers as more familiar ($M = 3.25, SD = 1.13$) than faces of Black strangers ($M = 3.12, SD = 1.01$), $F(1, 98) = 4.08, p < .05, \eta^2 = .04$.

Discussion

White participants' subliminal exposure to one set of Black faces increased liking for a novel set of Black faces that they had never seen as compared with subliminal exposure to White faces. Although comparisons with the no exposure condition did not attain statistical significance, the trends indicated enhanced liking of Black faces following Black exposure rather than diminished liking following White exposure (cf. Smith et al., 2007). As in Experiment 1, this generalized mere exposure effect was not found for own-race faces, paralleling previous evidence for stronger other-race basic mere exposure effects (Bornstein, 1993), as well as failures to find generalized mere exposure effects on liking for own-race faces (Smith et al., 2007). As expected, the faces of Black strangers were not rated as more familiar by participants who had been subliminally exposed to other Black faces, despite being better liked. The fact that a generalized mere exposure effect was demonstrated when participants were unaware that they were previously exposed to faces of one or another race argues against the possibility that the effects were due to experimental demand characteristics or to a tendency to misremember the novel faces as being one of the previously exposed faces.

The results of Experiment 2 are consistent with research on basic and generalized mere exposure effects, which has shown a preference for exposed stimuli even when there is no recollection of exposure to them (e.g., Kunst-Wilson & Zajonc, 1980; Monahan et al., 2001; Seamon, Williams, Crowley, Kim, Langer, Orne, & Wishengrad, 1995). However, our research is the first to demonstrate that an *implicit* process is also sufficient to induce generalized mere exposure effects involving faces. Such a process can be accommodated by the uncertainty reduction, perceptual fluency, or reduced apprehension explanations for mere exposure effects (Bornstein, 1989; Lee, 2001; Reber et al., 1998; Zajonc, 2001). An implicit process also is consistent with the FFO hypothesis that has been offered as a partial explanation for other-race prejudice and stereotyping in situations that do not involve mere exposure manipulations (Zebrowitz et al., 2007). Although the effects of face familiarity on social judgments may be explicit (Zebrowitz et al., 2007), they can also be implicit (DeBruine, 2002; Hill et al., 1990; Lewicki, 1985).

General Discussion

Increasing White participants' familiarity with an other-race facial prototype through exposure to Korean or Black faces increased the likeability of a different set of Korean or Black faces. Moreover, this increase was sufficiently great that it led to higher likeability ratings of other-race than own-race faces in contrast to equal or greater preference for own-race faces following exposure to White faces or no exposure manipulation. Although the generalized mere exposure effect was mediated by increases in the explicit familiarity of other-race faces when exposure was supraliminal, a subliminal exposure manipulation was equally effective.

The stronger effect for other race faces and the generalization of the effect to subliminal exposure are both consistent with existing explanations for mere exposure effects, which have attributed them to uncertainty reduction, increased perceptual fluency, and reduced negative affect to a novel stimulus (cf. Bornstein, 1989; Lee, 2001; Reber et al., 1998; Zajonc, 2001). These reactions can be implicit, and they should be stronger for other-race faces. The present findings are also consistent with the FFO hypothesis. It should be emphasized that this hypothesis is not an alternative explanation for mere exposure effects. Rather, it has been offered as a partial explanation for other-race prejudice and stereotyping in situations that do not involve mere exposure manipulations (Zebrowitz et al., 2007), and it is compatible with the effects of mere exposure documented in the present research. More specifically, the assumption that racial prejudice derives in part from negative reactions to faces that deviate from the familiar own-race prototype is consistent with the finding that increasing that familiarity through mere exposure serves to reduce prejudice. The fact that the increased familiarity need not be explicit is also compatible with the FFO hypothesis. Effects of face familiarity on social judgments can be either explicit (Zebrowitz et al., 2007) or implicit (DeBruine, 2002; Hill et al., 1990; Lewicki, 1985).

Neural activation to other-race faces has provided some data pertinent to the FFO assumption that an adaptive wariness of unfamiliar-looking strangers contributes to negative evaluations of other races. In particular, there is greater amygdala activation when viewing novel other-race than own-race faces (Hart, Whalen, Shin, McInerney, Fischer, & Rauch, 2000; Phelps, O'Connor, Cunningham, Funayama, Gatenby, Gore, & Banaji, 2001). Insofar as amygdala activation is associated with threatening stimuli (LeDoux, 1998), these data are consistent with the FFO hypothesis. However, recent work shows that the amygdala is activated by emotionally salient stimuli whether they are positive or negative (Fitzgerald, Angstadt, Jelsone, Nathan, & Phan, 2006; Hamann, 2002; Sander, 2003; Winston et al., 2006), in which case greater amygdala activation to other race faces does not necessarily indicate wariness. Nevertheless, it would be instructive to investigate whether mere exposure to other-race faces not only increases liking for novel faces of that race, as shown in the present experiments, but also decreases amygdala activation to those faces.

Some similarities and differences between the present findings and those recently reported by Smith et al. (2007) are worthy of note. Those authors compared effects of exposure vs. no exposure to White faces on White raters' evaluations of Black and White faces that had not been previously seen. Like the present experiments, they found no generalized exposure effects on liking for White faces. However, unlike the present research, they found that exposure to White faces decreased liking for other-race Black faces as compared with the no exposure condition. The one exception to that effect was shown for White raters who had weak attitudes toward Whites, as assessed by measures of certainty and centrality of the attitude to their own identity. For those with weak attitudes, exposure to White faces did not decrease liking for Black faces, paralleling the results in our experiments. Thus, one might speculate that our participants had relatively weak attitudes toward Whites, such that viewing White faces did not elicit the ingroup identification that Smith et al. (2007) suggested might account for decreased liking for Black faces following exposure to White ones.

The present findings would seem to have significant applied value. First, the documentation of an effect using supraliminal faces demonstrates the generalizability of the results to real world exposures. Second, other research has shown that basic mere exposure effects are non-trivial, extending beyond marks on a rating scale. For example, mere exposure has been shown to increase incipient smiles toward previously exposed faces (Harmon-Jones & Allen, 2001), more willingness to help an individual to whom one was exposed (Burger, Soroka, Conzago, Murphy, & Somervell, 2001), and more agreement with the judgments of an individual whose face had been subliminally exposed (Bornstein, Leone, & Galley, 1987). Generalized mere

exposure effects are likely to have similar consequences. If so, then simple interventions, such as showing more racial minority faces on television and public billboards, could enhance White people's initial evaluative reactions toward unknown members of racial outgroups as well as positive behavioral responses toward newly encountered individuals of that race. It could also temper the negative reactions that accrue to individuals who, regardless of race, have a more prototypical other-race appearance. Such effects are not trivial, including both longer prison sentences and more frequent death sentences for convicted criminals who have a more prototypical Black appearance (Blair et al., 2004; Eberhardt et al., 2006). Interventions designed to increase exposure to other-race faces would seem particularly important given the finding that repeated exposure to own-race faces can foster decreased liking for faces of another race (Smith et al. 2007). Ameliorative effects of other-race exposure would be consistent with recent evidence that inter-group contact can reduce prejudice even when the ideal conditions specified by Allport (1954) are not met (Pettigrew & Tropp, 2006).

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Figure 1.
Likeability of Novel Korean and White faces following supraliminal exposure to Korean or White faces.

Figure 2.
Familiarity of Novel Korean and White faces following supraliminal exposure to Korean or White faces.

Figure 3.
Likeability of Novel Black and White faces following subliminal exposure to Black, White, or no faces.

Figure 4.
Familiarity of Novel Black and White faces following subliminal exposure to Black, White, or no faces.