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BLACK AND WHITE: THE ROLE OF COLOR BIAS IN IMPLICIT RACE BIAS

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Research using the Implicit Association Test (IAT) has consistently shown that White participants demonstrate an implicit preference for White, race–related stimuli over similar Black stimuli. Scholars in many domains have also documented that people generally have more positive associations with the color white and more negative associations with the color black. The present research, consisting of three studies, examined the potential contribution of general implicit evaluative associations with the colors white and black to implicit race preferences as measured by the IAT. Across three studies, evaluative associations with the colors white and black were significantly related to evaluative racial associations. Nevertheless, implicit preferences for Whites relative to Blacks remained significant after controlling for the effect of implicit color preferences. Results support the position that racial IAT responses substantially reflect racial evaluative associations. Theoretical and methodological issues related to the assessment of implicit racial biases are discussed.

The Implicit Association Test (IAT: Greenwald, McGhee, & Schwartz, 1998) is a popular technique designed to measure the

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association between a target category (e.g., Blacks, elderly people, women) and other attributes, usually positive or negative adjectives (e.g., love, war). Using race IAT procedures, most White participants pair photographs of White faces, or stereotypically White names with positive words, and photographs of Black faces or stereotypically Black names with negative words much faster than they pair White stimuli with negative words and Black stimuli with positive words. This pattern of effects is interpreted as showing strong preferences for Whites (e.g., Cunningham, Preacher, & Banaji, 2001; Nosek, Banaji, & Greenwald, 2002).

Although the IAT represents one of the most widely used techniques for assessing implicit associations (Blair, 2001; Dovidio, Kawakami, & Beach, 2000; Fazio & Olson, 2003), the method is not without controversy. Some researchers have questioned whether IAT responses represent individual differences in personal implicit attitudes or cultural associations (Karpinski & Hilton, 2001). Others have investigated possible contamination by methodological artifacts in IAT procedures, such as task–switching effects (Mierke & Klauer, 2001) and familiarity with names reflecting racial categories (Dasgupta, McGhee, Greenwald, & Banaji, 2000; Rudman, Greenwald, Mellott, & Schwartz, 1999), as well as other potential limiting factors, such as the role of participant cognitive abilities (McFarland & Crouch, 2002), that can influence the accurate assessment of implicit associations. The present research, consisting of three studies, investigated the potential relationship between general evaluative associations with the colors black and white and IAT responses to race–related stimuli such as names stereotypically associated with Blacks and Whites, and photographs of Black and White faces that are commonly used to measure implicit racial associations.

COLOR BIAS IN CULTURAL ASSOCIATIONS

In the United States and many other cultures, the color white often carries more positive connotations than the color black (see Dovidio, Brigham, Johnson, & Gaertner, 1996; Frank & Gilovich, 1988, Williams, Morland, & Underwood, 1970). Examples of positive cultural associations with the color white and negative asso-

ciations with the color black are common. White is typically worn at weddings and black is worn at funerals, terms such as "Black Monday," "Black Plague," "black cats," and the "black market" all have negative connotations, and literature, television, and movies have traditionally portrayed heroes in white and villains in black. The empirical work of John E. Williams and others throughout the 1960s demonstrated that these positive and negative associations with the colors black and white, independent of any explicit connection to race, were evident among White and Black children as young as three years old (Williams & Rousseau, 1971), as well as among adults (Williams, Tucker, & Dunham, 1971).

Margaret Mead argued that the basis of these differential associations run "terribly, terribly deep" and stem from early "tribal" fears of the night, the dark, the unknown, and the unseen, all of which are dispelled by the light of a fire or of the moon or sun (Mead & Baldwin, 1971, pp. 28–33). More recently, Schaller, Park, and Mueller (2003) proposed that "ambient darkness can arouse fear and lead individuals to respond to others in fearful ways, (p. 639)" and they demonstrated empirically that being in darkness activated thoughts of danger and increased the activation of stereotypes of Blacks associated with violence and aggressiveness, particularly for individuals scoring relatively high on a measure of Belief in a Dangerous World (Altemeyer, 1988). Although it is difficult to identify their exact origin, these evaluative associations with the colors black and white appear to be learned at an early age and reinforced throughout the lifetime.

Even though the differential associations with the colors black and white have been found in contexts unrelated to race, the work of scholars from a number of disciplines suggests that color bias and race bias may be related. Russell, Wilson, and Hall (1992) presented a considerable body of evidence illustrating preferences observed throughout history and across many cultures for light–skinned over dark–skinned people (see also Iwawaki, Sonoo, Williams, & Best, 1978). For instance, data from the Human Relations Area Files, a large anthropological data set housed at Yale University, reveal that lighter skin tends to be judged as more beautiful in 47 of the 51 countries for which skin color has been identified as a criterion for beauty (see Russell et al., 1992).

Livingston and Brewer (2002) found that Whites had more negative associations with Blacks than with Whites, and particularly for Blacks with more prototypic features, including darker skin. Eberhardt, Goff, Purdie, and Davies (2004) further showed that college students and police officers implicitly associated criminality more with Blacks than with Whites, and these associations were again stronger for more prototypic Blacks who had darker skin. Also, Maddox and Gray (2002) demonstrated that both Black and White participants perceived stronger associations between darker–skinned Blacks and negative racial stereotypic characteristics (e.g., criminal, poor, aggressive) compared to lighter–skinned Blacks.

Williams (1966, 1969) directly investigated the relation between color preferences and racial biases in a series of studies in the 1960s. Williams (1969) reasoned, "since the evaluative meanings of color names have been shown to be conditionable to stimuli with which they are associated (Harbin & Williams, 1966; Filler, 1969), it has been hypothesized that the practice of designating racial groups by color names may influence the development and/or maintenance of attitudes toward racial groups" (p. 383). In a study investigating the relationship between evaluative judgments of color names and race categories, Williams (1966) found that color names were judged, from positive to negative, as white, yellow, red, brown, and black, and evaluations of racial categories made by a separate group of participants were ordered similarly from positive to negative as Caucasian (White), Oriental (Asian), American Indian (Native American), Asiatic Indian, and Negro (Black). Moreover, Williams (1969) found that individual differences in White participants' positive and negative judgments of colors were positively correlated with racial attitudes. In particular, the average correlation between judgments of the color black and several different explicit measures of racial attitudes was $r(300) = .22$, $p < .001$.

Taken together, the findings in the literature (a) indicate that people have more negative associations with the color black than with the color white; (b) reveal that Whites tend to associate more negative qualities with Blacks than with Whites, and both Blacks and Whites tend to associate more negative characteristics with darker–skinned Blacks; and (c) suggest a modest but significant

relationship between preferences for the colors black and white and explicit measures of racial bias.

THE PRESENT RESEARCH

In three Studies we used the IAT to examine the relation between *implicit* preferences for the color white over the color black and racial preferences (for White Americans and African Americans) among White participants. In particular, we tested the hypothesis that implicit race preferences may be partially explained by a more general preference for the color white over the color black. In order to enhance the influence of the race of the stimuli in the race IAT procedures, the race category labels for all race IAT procedures presented here are "African–American" and "White–American," the terms pilot testing revealed were most commonly used by participants in our subject pool to refer to these racial categories, rather than the color names "Black" and "White."

The impact of color preferences on race IAT scores may be particularly important for interpreting results from those studies using the labels "Black" and "White" as race category labels in IAT procedures (e.g., Dasgupta et al., 2000; Greenwald et al., 1998; McConnell & Leibold, 2001). Nevertheless, if positive associations with the color white and negative associations with the color black are related at a very basic level to positive and negative evaluations of different racial groups, then color preferences should also contribute to race preference scores in IAT tasks that use either faces or names as race category stimuli, and use race–specific labels like "African–American" and "White–American."

STUDY 1

Study 1 investigated the relationship between IAT measures of implicit preferences for the colors black and white and racial preferences among White college students, using photographs of Blacks and Whites as stimuli. In particular, we examined the correlation between these measures and tested whether color preference, as measured by the IAT, might account for IAT racial preferences assessed separately.

METHOD

Participants. In exchange for partial course credit, 91 undergraduates (22 men and 69 women), who were enrolled in introductory psychology classes, voluntarily participated in an experiment called "categorizing pictures and words." The primary analyses for the present research focused on the data from 68 self–identified White–American college students (49 women, 19 men). Data from one White participant whose error rate (21%) exceeded the a priori criterion of 20% were excluded from the analyses.

Procedure. In the experimental session, participants engaged in a number of separate tasks associated with different investigations. Two of the tasks, IAT procedures, are the focus of the present study. (See Greenwald et al., 1998, for a complete description of IAT procedures.) The first IAT task assessed implicit racial preferences. The procedure replicated that used by Nosek et al. (2002), which used grayscale images of the center portions of White and Black faces as the race stimuli, and words with positive and negative connotations as evaluative stimuli (Grayscale Photo Race IAT). The second IAT task measured implicit preferences for the colors black and white (Colors IAT). The Colors IAT used the same positive and negative evaluative words as the Grayscale Photo Race IAT, but replaced the photographs of Black and White faces with black and white squares as stimuli. Similar to other IAT studies, participants were asked to respond as quickly as possible to the pictures and words presented on the computer screen while minimizing errors.

As in all three studies reported here, participants arrived at the testing area in groups of one to five persons. After some brief instructions and signing a certificate of informed consent, each participant was seated individually in a cubicle measuring approximately 196 cm by 228 cm in size that was equipped with a desk, chair, PC computer, and 40.64 cm monitor, which was viewed from a distance of approximately 50 cm. Each participant completed the tasks individually in these separate rooms.

The photographic stimuli were those used in prior IAT research (Cunningham et al., 2001; Nosek et al., 2002), as were the positive words (laughter, peace, joy, friend, wonderful, love, happy and, pleasure), and negative words (terrible, failure, horrible, evil, agony, war, nasty and, awful) (Nosek et al., 2002). The race category

labels that appeared in the upper corners of the computer screen to remind participants of their response options for the photographs were "White–American" and "African–American." These terms were selected because pilot testing revealed that they were the descriptors most commonly used by White students in the participant pool to identify people in these racial groups. The reminder labels used for the positive and negative words were "good" and "bad." Participants responded using the "Z" and "M" keys on the computer keyboard. For each IAT task, participants were presented with a total of 20 practice and 40 critical trials in the White preference blocks, and 20 practice and 40 critical trials in the Black preference blocks, for a total of 40 practice and 80 critical trials. Within each IAT in this study (as well as in Study 2 and Study 3) the order in which participants saw Black preference blocks (Black + good and White + bad) and White preference (White + good and Black + bad) blocks was counterbalanced.

IAT Calculations and Error Rates. Preference scores were calculated using the *D* score algorithm (the "approximately equivalent" algorithm) described in Greenwald, Nosek, and Banaji (2003), adjusted for the number of practice relative to test trials. The *D* statistic is an effect size estimate (Laurie A. Rudman, personal communication, August 26, 2005). Mean preference scores are referred to as M_D. Responses faster than 400 ms and slower than 10,000 ms were omitted from the calculations. Because the IAT procedure required participants to correct their incorrect responses, no error penalties were assessed.

RESULTS

Preliminary analyses revealed no effects associated with participant gender; therefore, this factor is not considered further in the analyses that are reported. For the race IAT, the error rate averaged 6.49%, with a range of 0% to 16.67%. The error rate in the colors IAT averaged 7.02%, with a range of 1.67% to 19.17%.

Implicit preferences were calculated such that higher scores indicate stronger positive associations with white stimuli compared to black stimuli. Table 1 presents the means, standard deviations, and correlations for the IAT measures used in this study.

TABLE 1. Means, Standard Deviations, and Correlations for IAT Tasks in Studies 1–3

		Mean *D*		Correlations	
IAT Task	*N*	Score	*SD*	1	2
Study 1					
1. Grayscale Photo Race IAT	67	0.45	0.36		
2. Colors IAT	67	0.48	0.30	.35**	
Study 2					
1. Color Photo Race IAT	47	0.32	0.33		
2. Grayscale Photo Race IAT	47	0.41	0.36	.12	
3. Colors IAT	47	0.58	0.42	.33*	.31*
Study 3					
1. Stereotypic Names IAT	81	0.49	0.37		
2. Grayscale Photo Race Faces IAT	77	0.46	0.28	n/a	
3. Colors IAT	158	0.54	0.42	.37***	.24**

Note. Mean IAT scores are calculated such that more positive scores represent more implicit preference for white than black stimuli.

White participants' responses on the Grayscale Photo Race IAT revealed a significant overall preference for Whites relative to Blacks, $M_D = 0.45$, (66) = 10.41, $p < .001$, replicating prior findings using the IAT demonstrating a general race bias. Similarly, in the Colors IAT, in which faces were replaced with black and white squares, participants showed a preference for the color white over black, $M_D = 0.48$, $t(66) = 12.90$, $p < .001$.

To test the relationship between color and racial preferences, we first computed the correlation between the two preference scores (see Table 1) and then used one IAT score to predict the other in regression analyses. The significance of the beta weight associated with the IAT predictor variable indicates whether it explained a significant amount of variance in the IAT criterion variable. The significance value of the intercept indicates whether or not the value of the dependent variable IAT score is significantly different from zero when the effect of the independent variable IAT score is zero (see Judd, Kenny, & McClelland, 2001; D.A. Kenny, personal communication, November, 2001).

As indicated in Table 1, color preferences and racial preferences in Study 1 were significantly correlated, $r(65) = .35$, $p < .01$. To examine whether preferences for the colors black and white can explain racial preferences on the IAT using grayscale photographs of Black and White faces, we first performed a regression predicting Grayscale Photo Race IAT scores from Colors IAT scores. Results showed that implicit color preferences significantly predicted race preferences ($\beta = 0.35$, $p = .004$). The intercept of this model representing the Grayscale Photo Race IAT effect when the Colors IAT effect is zero was B = 0.26 and differed significantly from zero, $t(66) = 3.34$, $p = .001$. In other words, if participants did not demonstrate a preference for the color white, then the original race IAT effect of 0.45 (see Table 1) was reduced to 0.26, a 42% reduction in the original race IAT effect (i.e., 0.45–.26 divided by .45), yet still would have produced a statistically significant race effect.

When race preferences were used to predict color preferences, racial preference on the IAT significantly predicted color preference, $\beta = 0.35$, $p = .004$, and the intercept was significant (B = 0.34, $t(65) = 6.04$, $p < 001$). The significant intercept indicates that for participants with no race preferences the predicted color preference is 0.34, which is 29% lower than the original effect of 0.48 (see Table 1), yet still significant.

DISCUSSION

This study represents an initial demonstration of implicit preference for the color white over the color black, as represented by responses to black and white squares on the Colors IAT. Further, this implicit color preference was significantly related to implicit racial preferences on the IAT, using grayscale photographs of Black and White faces and labels that reflected the race–specific category names, African–American and White–American, rather than color names. The correlation between these implicit measures of $r = .35$, was comparable to, and slightly higher than the correlation between explicit (self–report) measures of color preferences and racial bias of $r = .22$ reported by Williams (1969) over 35 years ago. Importantly, although color preferences on the IAT

significantly predicted implicit racial preferences, they did not entirely account for implicit race preferences. White participants' preference for the racial category remained significant after accounting for the relationship with implicit color preferences. Thus, IAT responses significantly represented implicit associations that appeared to be uniquely racial in origin.

The pervasiveness of preference for the color white over the color black across cultures and time, as well as the hypothesized evolutionary basis related to danger associated with darkness (Mead & Baldwin, 1971; Schaller et al., 2003), might suggest that color preference is a more fundamental form of bias than is racial preference. Although our data do not speak to this issue, they do answer questions regarding whether general implicit color preferences are related to implicit racial preferences, and whether implicit racial preferences involve effects over and above associations with colors. The answer in each case was "yes." These results are also consistent with the findings cited earlier that racial categorization and skin color can contribute jointly to preferences and biases, both implicit and explicit. That is, although Whites demonstrated consistent biases favoring Whites over Blacks (e.g., Dovidio et al., 2000), both Blacks and Whites evaluated darker skinned Blacks more negatively (Maddox & Gray, 2002; Russell et al., 1992). Study 2 further explored the relationship between implicit color preferences and implicit racial preferences and addressed certain methodological factors that might have contributed to the effects found in this study.

STUDY 2

Despite the straightforwardness of the results of Study 1, there are methodological factors that might have contributed to these effects. One factor that could inflate the correlation between the measure of implicit color preference and implicit racial preference is the similarity of the stimuli in terms of color dimension. In particular, the photographs used to represent racial categories, from Nosek et al. (2002), were grayscale pictures cropped to show only the center portions of the faces, varying in color along a white–black dimension. The common emphasis on the black–white dimension of the squares used in the IAT to assess

color preference and the grayscale photographs used to measure implicit racial preference might have spuriously inflated the correlation between these two responses. Thus, in addition to completing an IAT task assessing implicit preferences for the colors black and white, participants in Study 2 performed two different versions of an IAT task measuring racial preferences. One version measured implicit racial preferences using the same grayscale photographs used in Study 1; the other version employed an identical procedure but used color photographs of Blacks and Whites. Another difference between the photographs used in the two implicit racial preference IAT tasks was that, whereas the grayscale images used by Nosek et al. (2002) were cropped to limit exposure only to facial features and exclude extraneous elements (such as hair color and style), the color photographs used in the new implicit racial preference task presented faces more naturally (i.e., including their hair). Finally, whereas Study 1 presented the IAT tasks in a fixed order, the racial preference IAT followed by the color preference IAT, in Study 2 the order of the IAT tasks was randomized across participants.

As in Study 1, the primary question of interest was whether implicit preferences for the color white over the color black would relate to, and possibly account for, implicit racial preferences.

METHOD

Participants. As in Study 1, 49 self–identified White undergraduate volunteers (29 women, and 20 men) who were enrolled in introductory psychology classes, participated in an experiment called, "categorizing pictures and words." Participants received partial course credit for their involvement in the study.

Procedure. As in Study 1, participants arrived at the testing area in groups of one to five and were seated individually in cubicles where they completed all measures on computers. The Colors IAT and two racial preference IAT tasks were administered in random order. One of the racial preference IAT tasks used the grayscale, cropped photographs from Nosek et al. (2002) as stimuli (the Grayscale Photo Race IAT task), identical to that used in Study 1. To explore the potential impact of variations in racial stimuli, the other race IAT task used non–cropped, color photographs selected from various internet sites as stimuli (the Color Photo Race IAT task). Participants were randomly assigned to one of two variations of the IAT task measuring implicit racial preferences using color photographs differing in attractiveness, another potential factor that could affect IAT racial preference responses (Smith–McLallen et al., 2005).

One of these procedures used Black faces that on a 9–point scale (1 = very unattractive; 9 = very attractive) were judged to be attractive ($M = 6.85$) and White faces judged to be unattractive ($M = 2.33$). The other procedure used attractive White faces ($M = 7.66$) and unattractive Black faces ($M = 2.12$). Because both procedures produced significant White racial preference IAT scores, and because the present results were unaffected when attractiveness was used as a factor in the analyses ($p = .44$), scores on these procedures were collapsed into one measure: the Color Photo Race IAT. Also, in order to examine hypotheses regarding the effects of stimuli attractiveness that are not discussed here, the Color Photo Race IAT included fewer practice trials, 20 total (10 in the White preference block and 10 in the Black preference block), and more critical trials (196 total, 98 in each preference block). The Colors IAT and Grayscale Photo Race IAT each consisted of a total of 40 practice trials and 80 critical trials.

IAT Calculations and Error Rates. As in Study 1, IAT scores were calculated using *D* scores. After removing data from two participants with error rates in excess of 20%, the average error rate for the color faces IAT was 7.41%, with a range of 0.46% to 19.9%. For the race IAT the average error rate was 6.08%, and ranged from 0.83% to 13.3%. The average error rate for the colors IAT was 6.08%, with a range of 0.83% to 19.2%.

RESULTS

IAT Effects. Preliminary analyses showed no significant effects for participant gender or for the order of performing the IAT tasks. Therefore, these factors were not considered in subsequent analyses. The mean response time difference between the Grayscale and Color Photo Race IAT did not differ, $t(46) = 1.11$, $p = .272$. The Colors IAT also did not differ from either version of the Race IAT, both ps $> .10$.

The means for the three IAT tasks and their correlations are presented in Table 1. Consistent with our previous results, participants showed significant implicit preference for the color white over the color black $M_D = 0.58$, $t(46) = 9.50$, $p < .001$, as well as implicit preferences for White over Black faces on the Grayscale Photo Race IAT $M_D = 0.41$, $t(46) = 7.74$, $p < .001$. Participants also demonstrated a significant racial preference for Whites over Blacks on the Color Photo Race IAT task $M_D = 0.32$, $t(46) = 6.68$, $p < .001$.

Relations Among the IATs. The analyses performed parallel those for Study 1. First, the correlations between color preference IAT scores and the two racial preference IAT scores were examined. Second, regression analyses were used to test whether implicit color preferences accounted for implicit racial preferences. Third, additional regressions were performed to determine whether implicit racial preferences accounted for implicit color preferences. Finally, we explore the relation between the two IAT racial preference tasks used in Study 2.

As presented in Table 1, implicit color preference scores (Colors IAT) were significantly correlated with scores on the Grayscale Photo Race IAT task, with a magnitude comparable to that observed in Study 1, $r(45) = .31$, $p < .05$. The correlation between color preference IAT scores and color photograph race IAT scores was similar in magnitude and also significant, $r(45) = .33$, $p < .05$.

When the Colors IAT scores were used to predict Grayscale Photo Race IAT scores (the same task used in Study 1), we again found that implicit color preference significantly predicted implicit racial preference, $\beta = 0.31$, $p = .032$, and the intercept representing the predicted effect of race when there is no color preference was significantly different from zero, $B = 0.25$, $t(45) = 2.89$, $p = .006$. That is, when controlling for general preferences for the color white over the color black, the original race IAT effect of 0.41 was reduced to 0.25 (a 39% reduction), but remained significant. Similarly, Colors IAT scores were predictive of scores on the Color Photo Race IAT, $\beta = 0.33$, $p = .025$, and the intercept representing the remaining race effect differed from zero $B = 0.17$, $t(45) = 2.17$, $p = .035$. Thus, if participants showed no preference for the color white, the race IAT effect would be reduced from 0.32 to 0.17 (a 47% reduction), but would still represent a significant preference for White–Americans. Although implicit color preferences were related to implicit racial preferences, as assessed by both the grayscale and color photograph race IAT tasks, paralleling the results of Study 1, they did not fully account for the preference of Whites over Blacks on either measure.

Regression analyses using Grayscale and Color Photo Race IAT scores individually to predict implicit color preferences revealed that each racial preference IAT significantly predicted implicit color preference but did not account fully for the preference for the color white over the color black. In particular, when scores on the Grayscale Photo Race IAT task was the predictor variable, the effect of both the predictor, $\beta = 0.31$, $p = .032$, and the intercept, $B = 0.43$, $t(45) = 4.86$, $p < .001$, were significant, indicating that the Colors IAT effect was reduced from 0.58 to 0.43 (a 26% reduction) when accounting for the effect of race as measured by the Grayscale Photo Race IAT, but remained significant. Parallel results were obtained when scores on the Color Photo Race IAT task were used to predict implicit color preference, $\beta = 0.33$, $p = .025$; $B = 0.45$, $t(45) = 5.46$, $p < .001$. Accounting for race preferences as measured by the Grayscale Photo Race IAT reduced color preference scores by 22%, from 0.58 to 0.45, but did not affect the significance of the Colors IAT effect. In addition, as illustrated in Table 1, scores on the Grayscale and Color Photo Race IAT tasks were positively but not significantly correlated, $r(45) = .12$. (This unexpected finding is discussed below).

DISCUSSION

Study 2 included several methodological variations from Study 1 but replicated the findings quite faithfully. In particular, Study 2 presented the tasks in random, rather than fixed order, and used non–cropped (full–featured) color images of faces varying in attractiveness, as well as grayscale photographs of the center portions of White and Black faces, as racial stimuli. Despite these variations, the conclusions of Study 2 converged with those of Study 1. White participants exhibited systematic implicit preferences for the color white over the color black and for the racial group Whites over the racial group Blacks. In addition, although

implicit color preferences were moderately correlated with implicit racial preferences across Studies 1 and 2 (in the range of .31 to .35), the preference for Whites over Blacks occurred independently, beyond variance associated with color preference.

We note that, unexpectedly, implicit racial preferences based on the Grayscale Photo Race IAT and the Color Photo Race IAT were not significantly correlated. The fact that the photographic images differed in fundamental ways, including color and the inclusion of other physical features, and the possibility that there were other differences between the sets of images (e.g., attractiveness of the stimuli) may have weakened the relationship between these two particular instantiations of implicit racial preference. Nevertheless, they both showed significant preference for Whites over Blacks and related to color preferences in the same way, suggesting that the two measures tapped some common elements of implicit racial preference. The absence of significant direct correlation, however, suggests the importance of identifying and controlling for other factors (e.g., attractiveness; see Smith–McLallen et al., 2005) that can contribute to race preference IAT effects to better isolate racial preferences *per se*. That is, the relationship may be stronger when the attractiveness of the Black and White photographs are better equated. Consistent with this reasoning, the correlation between the Grayscale Photo IAT and the Color Photo Race IAT which used photographs of relatively attractive Blacks and relatively unattractive Whites was $r(21) = .33$, $p = .12$; yet in the IAT procedure in which relatively attractive Whites and relatively unattractive Blacks were used as stimuli $r(22) = -.21$, $p = .34$.

Despite the consistency of results from Studies 1 and 2, our conclusions about the relationship between color preferences and racial preferences on the IAT may be limited to one type of IAT, those using faces of Blacks and Whites as stimuli. As the modest correlation between the grayscale and color photograph IATs in Study 2 suggests, there may be differences in racial IAT effects when different types of stimuli are used. For example, many race IAT studies use stereotypic Black and White names as race category stimuli rather than faces (e.g., Dasgupta et al., 2000; Greenwald et al., 1998).

Another methodological feature of Studies 1 and 2 that may limit the strength of our conclusions was that the color preference IAT used in both studies consisted of only black and white squares as color exemplars, whereas most other IAT procedures use multiple exemplars of each category, potentially limiting the reliability of comparisons across these measures. In addition, the IAT tasks in Studies 1 and 2 were presented in immediate succession, thus introducing the possibility of carry–over effects from one task to the other. Although the nonsignificant correlation between the Grayscale Photo Race IAT and the Color Photo Race IAT tasks in this Study suggests that the relations we observed were likely not due to carry–over effects, it is a potential limitation that is addressed in Study 3.

STUDY 3

In this study, three IATs were employed to further examine the extent to which race IAT procedures capitalize on more general cultural preferences for the color white over the color black. Participants completed a color preference IAT task similar to the one employed in Studies 1 and 2, and one of two different racial preference IAT tasks. One racial preference IAT task used grayscale, non–cropped images (including several derived from the images used in the Color Photo Race IAT in Study 2) as race category stimuli (matched on attractiveness). The other racial preference IAT task used stereotypically Black or White names as race category stimuli rather than faces (Greenwald et al., 1998; Dasgupta et al., 2000).

In addition to including an IAT task measuring evaluative associations with race–stereotypic names, Study 3 incorporated two additional methodological refinements: the use of multiple exemplars in the Color IAT, and the separation of color and race IAT tasks into ostensibly separate studies to minimize potential carry–over effects. Most IAT tasks, including the race tasks in these studies, use multiple exemplars of each target category. In Study 3 we used multiple exemplars of the colors white and black to make the colors IAT procedure more comparable methodologically and conceptually to other IAT tasks. Also, in Studies 1 and 2, the different IATs were administered in immediate succession

thereby introducing potential carry–over effects from one IAT to the next. Study 3 presented the color preference and racial preference IAT tasks as separate studies, and were separated in time by another, non race–related task. We hypothesized that, to the extent that our previous race preference IATs tapped racial preferences, the results for the stereotypic names IAT would be similar to the findings for IATs using photographs to represent the racial categories. That is, color preferences should contribute to, but not fully account for, racial preferences in the IAT.

METHOD

Participants. There were 195 undergraduate volunteers (159 women and 36 men), enrolled in introductory psychology classes, who participated in Study 3 for partial course credit. The session was introduced as a series of different "judgment" studies. Among these were 158 participants who identified as White American (132 women, 26 men). Data from six White participants with error rates in excess of 20% on at least one of the IAT tasks were excluded from the analyses.

Procedure. All participants completed the color preference IAT task (Colors IAT). In addition, approximately half (n = 77) completed the photograph race preference IAT task (Grayscale Photo Race Faces IAT), and the other half (n = 81) completed the stereotypic names race preference IAT task (Stereotypic Names IAT). The order of presentation of the color preference and race preference IAT tasks was randomized. Upon arriving at the testing facility, participants were told that in order to maximize participant pool resources, the current testing session would consist of several short studies conducted by different experimenters in different rooms. They were then shown to the cubicles as they were in Studies 1 and 2. After completing the first IAT task, participants took part in another, unrelated study in which they read a non–race–related news article and completed a 15–item questionnaire related to the article. The second IAT task was then administered, followed by a series of questionnaires and an impression formation task. After completing the computerized tasks, participants were escorted to another room in which another pair of experimenters administered several other short questionnaires.

The color preference IAT task that all participants performed was similar to that used in Studies 1 and 2, except for the inclusion of black and white circles, triangles and diamonds, in addition to the previously used squares as color stimuli. The procedure incorporated a total of 40 practice trials and 80 critical trials. The photograph race preference IAT task included elements of the grayscale and color photograph IAT tasks used in Study 2. The photographs were non–cropped, full–featured images, like those used in the Color Photo Race IAT of Study 2, but were converted into grayscale images. Black and White race photographs of men and women were chosen to be matched for attractiveness. The race preference blocks each consisted of 10 practice trials and 98 critical trials, for a total of 20 practice and 196 critical trials.

The stereotypic name race preference IAT task was modeled after the procedure used by Greenwald et al. (1998). In particular, this task incorporated 40 practice and 80 critical trials (20 practice and 40 critical in both the White and Black preference blocks). Stereotypic White names (Meredith, Peggy, Brandon, Todd, Heather, Ralph, Walter, and Colleen) and Black names (Tyrone, Malik, Leroy, Jamal, Latisha, Shaniqua, Temeka, and Tawanda) were taken from Greenwald et al. (1998). As in Studies 1 and 2, the reminder labels were "African–American," "White–American" for the race categories, and "good," and "bad" for the evaluative categories.

IAT Calculations and Error Rates. As in Studies 1 and 2, IAT scores were calculated using *D* scores. After removing data from six participants with error rates in excess of 20%, the average error rate for the Grayscale Photo Race Faces IAT was 6.67% with a range of 0.36% to 18.94%. For the Stereotypic Names IAT, the average error rate was 7.54%, and ranged from 0.83% to 18.33%. The average error rate for the Colors IAT was 6.09% with a range of 0% to 17.5%.

RESULTS

IAT Effects. As in Studies 1 and 2, no significant effects for participant gender were found, and there were no effects for task order. Therefore, these factors were not included in subsequent analyses. The average response times did not differ between the

Grayscale Photo Race Face IAT and the Stereotypic Names IAT tasks, $p > .50$.

The mean *D* scores for the three IAT tasks and their correlations are presented in Table 1.

All three IAT procedures produced effects favoring white stimuli. The Colors IAT effect was significant, $M_D = 0.54$, $t(157) = 16.54$, $p < .001$, as was the Grayscale Photo Race Face IAT effect, $M_D = 0.46$, $t(76) = 14.20$, $p < .001$, and the Stereotypic Names IAT effect, $M_D = 0.49$, $t(80) = 11.76$, $p < .001$.

Relations Among the IATs. A comparable analysis strategy to that used in the first two studies was employed in Study 3. First, the correlations between color preference IAT scores and the two racial preference IAT scores, based on photographs and stereotypic names, were examined. Second, regression analyses were used to test whether implicit color preferences accounted for implicit racial preferences using photographs of Blacks and Whites or stereotypical names to represent the race categories. Third, additional regressions were performed to determine whether implicit racial preferences accounted for implicit color preferences. Because participants performed either the Grayscale Photo Race Face IAT or the Stereotypic Names IAT, the direct correlation between these two IATs could not be tested.

As illustrated in Table 1, the Colors IAT was significantly correlated with the Grayscale Photo Race Face IAT, $r(75) = .24$, $p < .01$. This correlation was not significantly weaker than the correlations obtained in Studies 1 and 2 (*z* values for all pairwise comparisons < .81; see Table 1). The Colors IAT also correlated significantly with the Stereotypic Names IAT, $r(79) = .37$, $p < .001$. Thus, the relationship between the colors IAT and the race IAT was not dependent on using skin color as stimuli.

The results of regression analyses predicting race preferences from color preferences were consistent with the results of Studies 1 and 2. Colors IAT scores reliably predicted Grayscale Photo Race Face IAT scores, $\beta = 0.24$, $p = .035$. The intercept for this model remained significant, $B = 0.37$, $t(76) = -7.35$, $p < .001$, indicating that for participants with no color preference, the effect of race preference as measured by the Grayscale Photo Race Face IAT was reduced from 0.46 to 0.37 (a 20% reduction), yet remained significant. Similarly, Colors IAT scores were predictive of Stereotypic Names IAT scores, $\beta = 0.37$, $p = .001$, and the intercept was significant, $B = 0.31$, $t(75) = 4.81$, $p < .001$. That is, for participants with no color preference the effect of race preference as measured by the Stereotypic Names IAT was reduced from 0.49 to 0.31 (a 37% reduction) and was still significant.

As in Studies 1 and 2, photograph race preference IAT scores were predictive of color preference IAT scores $\beta = 0.25$, $p = .028$, and the intercept remained significant, $B = 0.37$, $t(76) = 4.05$, $p < .001$. This result indicates that when racial preference was controlled using the photograph IAT, the color preference effect was reduced from 0.54 to 0.37 (a 32% reduction) but remained significant. Similarly, race preferences as measured by the Stereotypic Names IAT were predictive of color preferences, $\beta = 0.52$, $p < .001$, and the intercept again remained significant, $B = 0.27$, $t(81) = 4.13$, $p < .001$, indicating that if participants showed no race preference as measured by the Stereotypic Names IAT task, the predicted color preference score would be reduced from 0.54 to 0.27 (a 50% reduction), but would still be significant.

DISCUSSION

Like Studies 1 and 2, Study 3 showed that implicit color preferences are related to implicit race preferences as measured by the IAT, yet a significant implicit racial preference for Whites relative to Blacks remains over and above the contribution of color preference, for our White participants. Moreover, Study 3 replicated this pattern of results even when we separated the IAT tasks in time, used a different set of racial photographs as stimuli, and used stereotypic names instead of photographs of group members as stimuli.

GENERAL DISCUSSION

The key question addressed by the present research—whether Whites would show implicit preferences for Whites relative to Blacks on racial preference IATs after controlling for color preferences—was answered similarly and affirmatively across the three studies. Although Whites' implicit preferences for the color white

over the color black were consistently correlated with their racial preferences, implicit racial preferences remained significant beyond any effect of color preferences. This finding was quite robust; it was obtained across a range of different IAT tasks using color and grayscale photographs, photographs of full images above the shoulders or cropped to show only facial features and skin color, and stereotypic names as stimuli. Taken together, these findings support the assertion that IATs of these types systematically assess racial preferences and associations (Cunningham, et al., 2001; Dasgupta et al., 2000; Greenwald et al., 1998; Nosek et al., 2002).

The finding that White participants showed implicit preferences for the color white over the color black in our three studies is consistent with previous research on explicit color preferences (Williams, 1966). Just as Williams (1969) demonstrated correlations between *explicit* color and race preferences, we found that *implicit* color preferences correlated systematically with implicit racial preferences. Methodologically, our findings suggest that researchers should be cautious about using the labels "Blacks" and "Whites" as race descriptors (Wittenbrink, Judd, & Park, 1997), even when emphasizing that these labels refer to group names (Dovidio, Evans, & Tyler, 1986; Gaertner & McLaughlin, 1983), in studies of implicit or explicit racial bias.

With respect to the present set of studies, one alternative explanation is that color preferences may contribute more integrally to racial preferences because they are embedded in perceptions of the groups. Specifically, with photographs, whether grayscale (Studies 1–3) or in color (Study 2), darker skin color of the model may convey the general appearance of darker (i.e., more black and less white) stimuli. Thus White participants' implicit associations may be a function of both general responses to darker stimuli (the variance related to implicit color preferences) and racial categorization (the variance independent of that related to color preferences). This interpretation is consistent with previous research showing that Whites have more negative associations with Blacks than with Whites, and particularly for Blacks with more prototypic features, including darker skin (Livingston & Brewer, 2002; Maddox & Gray, 2002). Although this explanation is plausible, it does not account for the relationship between implicit color preferences and implicit race preferences when stereotypical names, not photographs, were used as stimuli in the IAT. In fact, the correlations between implicit color preferences and race preferences were not significantly stronger when stereotypic names were used as stimuli than when photographs were employed as stimuli (Study 3).

Another possible explanation for the correlation between implicit color preferences and implicit race preferences focuses on a methodological aspect of the present research. Across all three studies, the race category labels of "African–American" and "White–Americans" were used in the IAT task to remind participants about the categories of stimuli in the present set of studies. We note, however, that pretesting indicated that these labels best evoked these two racial categories. Furthermore, when participants completed two different race preference IATs using these same labels but different photographic stimuli in Study 2, the correlation between the two measures was only .12, and nonsignificant. If participants were responding primarily to the labels, or if other forms of common method variance were primary influences, then a much stronger correlation between these two measures should be expected. One benefit of using the new scoring algorithm is that the IAT effects represented by *D* scores appear to be less sensitive to method variance than are scores derived from the original algorithm (Greenwald et al., 2003).

Theoretically, the intriguing question remains about why color preferences and race preferences are related both explicitly, as in the Williams (1966, 1969) research, and implicitly, as in the present studies. As noted earlier, Williams (1969) suggested that, through conditioning, evaluative responses to the colors black and white contribute to "the development and/or maintenance of attitudes toward racial groups" (p. 383). However, Williams et al. (1971) also found that changes in cultural attitudes toward racial categories may influence the evaluative connotations of the colors white and black. Specifically, for Black students in the mid to late 1960s who were strongly committed to the Black identity movement, the color white became less positive, and the color black became more positive. If color names and race descriptors are closely associated in memory, as is perhaps most clearly seen in the relation between the color preference and name preference

IATs in Study 3, then modifications to the evaluative nature of one should at least moderately impact the evaluation of the other. To test this hypothesis with implicit measures, an experiment might be devised in which the strength of evaluative associations with the colors black and white are manipulated by providing extensive training to associate positive concepts with the color black and negative concepts with the color white (Kawakami, Dovidio, Moll, Hermsen, & Russin, 2000) and then changes in implicit evaluative racial preferences (e.g., on an IAT) are assessed. Reductions in implicit racial preferences as a function of training to associate more positive characteristics with the color black than the color white would provide evidence for color preferences as a basis for racial preferences. To further explore the possibility of bi–directional causality, future research could also examine the effect of training people to associate positive characteristics with Blacks and negative characteristics with Whites on implicit color preferences.

Even if the evaluative conditioning explanation appears to be the most plausible and parsimonious explanation for the present results, as well as for Williams's (1966, 1969) findings, it still begs the question *why* people have a consistent color preference for white over black. We note that the fact that our primary focus was on White participants may be one obvious factor. Because of ingroup favoritism processes (Tajfel & Turner, 1979) and the differential inferences and expectations related to the traditionally higher status of Whites relative to Blacks in the United States (Berger, Wagner, & Zelditch, 1985), Whites may evaluate stimuli that are perceived to be more representative of their group more highly. However, Blacks as well as Whites tend to have more positive associations with lighter–skinned Blacks (Maddox & Gray, 2002; Russell et al., 1992).

Although comparisons across studies should be made cautiously, we examined the possibility that common influences, not simply ingroup favoritism, may be determining these cultural color associations by combining the data for self–identified Black (African–American and Black Caribbean) participants who were omitted from analyses in Studies 1 and 3. In these two studies, 22 Black participants performed the color preference IAT tasks; 19 of these participants also performed some version of a race preference IAT task using faces as stimuli, whereas three performed the version of the race preference IAT using names as stimuli. These ancillary analyses revealed that on the color preference IAT, Blacks showed a preference for the color white over the color black, $M_D = 0.33$, $SD = 0.39$, $t(21) = 3.94$, $p = .001$. The correlation between face IAT and color IAT scores was $r(17) = .72$, $p < 001$. Nevertheless, perhaps because of a countervailing influence of ingroup favoritism, Blacks did not show a significant preference for White or Black faces, $M_D = 0.04$, $SD = 0.40$, $t(18) = 0.41$, $p = .685$. Consistent with the suggestion that color preference and ingroup favoritism are both influential, albeit in different directions for Blacks, regression analyses showed that colors IAT scores significantly predicted race IAT scores $\beta = 0.72$, $p = .001$, and that the intercept was significant $B = –0.20$, $t(18) = –2.26$, $p = .037$. It is important to note that the negative sign of the intercept indicates that if the Black participants had shown no preference for the *color* white, they would be predicted to demonstrate a significant preference for Black faces. Nevertheless, we caution against over–interpretation of the results from these exploratory analyses given that the sample was relatively small and the data were aggregated across several studies, each differing slightly in their procedures.

It is possible that very basic negative associations with the color black and positive associations with the color white, which may be rooted in innate responses to darkness and light (Mead & Baldwin, 1971; Schaller et al., 2003) and reinforced through socialization (Williams & Rousseau, 1971), contribute to racial prejudices. This perspective implies that color preferences form a primary basis for racial preferences. Consistent with this reasoning, Williams and Rousseau (1971) found that preference for the color white over the color black was already well established by age three. Although children as young as three years old are aware of racial differences (Ramsey, 1991), the consequences of this categorization in terms of prejudice and stereotyping are not consistently evident until age five (Aboud, 1993). Rudman (2004) argued that "[m]uch of what is learned early in life is preverbal and taught indirectly. These lessons form the foundation on which later learning is built and may also serve as a nonconscious source for related evaluations and actions" (p. 80). Thus, color

preferences may precede and, at least in part, form a basis for the development of subsequent racial preferences. Future research might productively investigate, using a longitudinal design, the initial appearance of color and racial preferences, as well as the relationship between these two biases, among Black and White children to elucidate better the potential developmental sequence.

Beyond the possibilities the present research implicates for why implicit color and race preferences may be associated, these three studies suggest important consequences and practical considerations for how groups are labeled and how they label themselves. It is worth noting that using the color names "black" and "white" as race descriptors is not only inaccurate, but may also facilitate the development of racial biases. Whites are not truly "white" and Blacks are not truly "black." Russell et al. (1992) noted that "[t]o young children, 'black' is foremost a color, not an abstract racial category—and to be told that they are black when they can see for themselves that they are not can be quite puzzling" (p. 65). Moreover, evaluative associations with the colors white and black may have a different impact on the self–images of White (European-American) and Black (African-American) children. For White children, color evaluations are compatible with intergroup and racial preferences that emerge in the early elementary school years (Killen & Stangor, 2001). For Black children, color connotations may be at odds with the development of ingroup preferences, producing stress and potentially adversely influencing their sense of well being, at least temporarily (Nyborg & Curry, 2003). However, the effects may be limited; Twenge and Crocker (2002) demonstrated that between the ages of 5 and 10, White and Black children show no differences in overall explicit self–esteem, and between the ages of 11 and 60 Blacks have higher levels of self–esteem than do Whites.

Although one might suspect that over time these types of associations might systematically decrease as expressions of overt racial prejudice decline (Dovidio & Gaertner, 1998), the correlations that we observed between implicit color and race preferences were between .24 and .35 (see Table 1), and were similar to the overall correlation of .22 obtained by Williams (1969) between explicit color preferences and racial bias. Thus, our research underscores the earlier work of Williams (1966, 1969) suggesting how labels and language can contribute to and reinforce the ways people think about and relate to different social groups.

REFERENCES

Aboud, F. E. (1993). The developmental psychology of prejudice. *Transcultural Psychiatric Research Review, 30*, 229–242.

Altemeyer, B. (1988). *Enemies of freedom: Understanding right–wing authoritarianism.* San Francisco: Jossey–Bass.

Berger, J., Wagner, D. G., & Zelditch, M., Jr. (1985). Introduction: Expectations states theory. In J. Berger & M. Zelditch, Jr. (Eds.), *Status, rewards, and influence* (pp. 1–71). San Francisco, CA: Jossey–Bass.

Blair, I. V. (2001). Implicit stereotypes and prejudice. In G. B. Moskowitz (Ed.), *Cognitive social psychology: The Princeton Symposium on the Legacy and Future of Social Cognition* (pp. 359–374). Mahwah, NJ: Erlbaum.

Cunningham, W. A., Preacher, K. J., & Banaji, M. R. (2001). Implicit attitude measures: Consistency, stability, and convergent validity. *Psychological Science, 12*, 163–170.

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

Dovidio, J. F., Brigham, J. C., Johnson, B. T., & Gaertner, S. L. (1996). Stereotyping, prejudice, and discrimination: Another look. In C. N. Macrae, C. Stangor, & M. Hewstone (Eds.), *Stereotypes and stereotyping* (pp. 276–319). New York: Guilford.

Dovidio, J. F., Evans, N., & Tyler, R. (1986). Racial stereotypes: The contents of their cognitive representations. *Journal of Experimental Social Psychology, 22*, 22–37.

Dovidio, J. F., & Gaertner, S. L. (1998). On the nature of contemporary prejudice: The causes, consequences, and challenges of aversive racism. In: J. L. Eberhardt, & Fiske, S. T. Fiske (Eds.), *Confronting racism: The problem and the response* (pp. 3–32). Thousand Oaks, CA: Sage.

Dovidio, J. F., Kawakami, K., & Beach, K. R. (2000). Implicit and explicit attitudes: Examination of the relationship between measures of intergroup bias. In R. Brown & S. L. Gaertner (Eds.), *Blackwell handbook of social psychology*, Vol. 4: Intergroup Processes. Oxford, England: Blackwell.

Eberhardt, J. L., Goff, P. A., Purdie, V. J., & Davies, P. G. (2004). Seeing Black: Race, Crime, and Visual Processing. *Journal of Personality and Social Psychology, 6*, 876–893.

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

Filler, J. W. (1969). *Conditioning of the connotative meanings of color names to draw-*

ings of human figures. Unpublished Master's thesis, Department of Psychology, Wake Forest University.

Frank, M. G., & Gilovich, T. (1988). The dark side of self– and social perception: Black uniforms and aggression in professional sports. *Journal of Personality and Social Psychology, 1*, 74–85.

Gaertner, S. L., & McLaughlin, J. P. (1983). Racial stereotypes: Associations and ascriptions of positive and negative characteristics. *Social Psychology Quarterly, 46*, 23–30.

Greenwald, A. G., McGhee, D. E., & Schwartz, J. L., (1998). Measuring individual differences in implicit cognition: The implicit association test. *Journal of Personality and Social Psychology, 74*, 1464–80.

Greenwald, A. G., Nosek, B. A., & Banaji, M. R. (2003). Understanding and using the Implicit Association Test: I. An improved scoring algorithm. *Journal of Personality & Social Psychology, 2*, 197–216.

Harbin, S. P., & Williams, J. E. (1966). Conditioning of color connotations. *Perceptual and Motor Skills, 22*, 217–218.

Iwawaki, S., Sonoo, K., Williams, J. E., & Best, D. L. (1978). *Color bias among young Japanese children., Journal of Cross–Cultural Psychology, 1*, 61–73.

Judd, C. M., Kenny, D. A., & McClelland, G. H. (2001). Estimating and testing mediation and moderation in within–subjects designs. *Psychological Methods, 6*, 115–134.

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

Kawakami, K., Dovidio, J. F., Moll, J., Hermsen, S., & Russin, A. (2000). Just say no (to stereotyping): Effects of training in the negation of stereotypic associations on stereotype activation. *Journal of Personality & Social Psychology, 78*, 871–888.

Killen, M., & Stangor, C. (2001). Children's social reasoning about inclusion and exclusion in gender and race peer group contexts. *Child Development. 72*, 174–186.

Livingston, R. W., & Brewer, M. B. (2002). What are we really priming? Cue–based versus category–based processing of facial stimuli. *Journal of Personality and Social Psychology, 82*, 5–18.

Maddox, K. B., & Gray, S. A. (2002). Cognitive representations of Black Americans: Reexploring the role of skin tone. *Personality and Social Psychology Bulletin, 2*, 250–259.

McConnell, A. R., & Leibold, J. M. (2001). Relations among the Implicit Association Test, discriminatory behavior, and explicit measures of racial attitudes. *Journal of Experimental Social Psychology, 37*, 435–442.

McFarland, S. G., & Crouch, Z. (2002). A cognitive skill confound on the Implicit Association Test. *Social Cognition, 20*, 483–510.

Mead, M., & Baldwin, J. (1971). *A rap on race.* New York: J. B. Lippincott.

Mierke, J., & Klauer, K. C. (2001). Implicit association measurement with the IAT: Evidence for effects of executive control processes. *Zeitschrift für Experimentelle Psychologie*, *48*, 107–122.

Nosek, B. A., Banaji, M. R., & Greenwald, A. G. (2002). Harvesting group attitudes and beliefs from a demonstration website. *Group Dynamics: Theory, Research and Practice, 6*, 101–115.

Nyborg, V. & Curry, J. (2003). Perceived racism and psychological well–being in African American boys. *Journal of Clinical Child and Adolescent Psychology, 32*, 258–266.

Ramsey, P. G. (1991). The salience of race in young children growing up in an all–White community. *Journal of Educational Psychology, 83*, 28–34.

Rudman, L. A. (2004). Sources of implicit attitudes. *Current Directions in Social Psychology*, *13*, 80–83.

Rudman, L. A., Greenwald, A. G., Mellott, D. S., & Schwartz, J. L. K. (1999). Measuring the automatic components of prejudice: Flexibility and generality of the Implicit Association Test. *Social Cognition, 17*, 437–465.

Russell, K., Wilson, M., & Hall, R. (1992). *The color complex: The politics of skin color among African Americans.* New York: Harcourt Brace Jovanovish.

Schaller, M., Park, J. H., & Mueller, A. (2003). Fear of the dark: Interactive effects of beliefs about danger and ambient darkness on ethnic stereotypes. *Personality and Social Psychology Bulletin, 5*, 637–649.

Smith–McLallen, A., Johnson, B. T., Dovidio, J. F., & Pearson, A. R. (2005). The effect of stimuli attractiveness on IAT race preferences. *Unpublished Manuscript.*

Tajfel, H., & Turner, J. C. (1979). An integrative theory of intergroup conflict. In W. G. Austin & S. Worchel (Eds.), *The social psychology of intergroup relations* (pp. 33–48). Monterey, CA: Brooks/Cole.

Twenge, J. M., & Crocker, J. (2002). Race and self–esteem: Meta–analyses comparing Whites, Blacks, Hispanics, Asians, and American Indians and comment on Gray–Little and Hafdahl (2000). *Psychological Bulletin, 128*, 371–408.

Williams, J. E. (1966). Connotations of racial concepts and color names. *Journal of Personality and Social Psychology, 3*, 531–540.

Williams, J. E. (1969). Individual differences in color–name connotations as related to measures of racial attitudes. *Perceptual and Motor Skills, 29*, 383–386.

Williams, J. E., Moreland, J. K., & Underwood, W. L. (1970). Connotations of color names in the United States, Europe, and Asia. *Journal of Social Psychology, 82*, 3–14.

Williams, J. E., & Rousseau, C. A. (1971). Evaluation and identification responses of Negro preschoolers to the colors black and white. *Perceptual and Motor Skills, 33*, 587–599.

Williams, J. E., Tucker, R. D., & Dunham, F. Y. (1971). Changes in the connotations of color names among Negroes and Caucasians. *Journal of Personality and Social Psychology, 19*, 22–228.

Wittenbrink, B., Judd, C. M., & Park, B. (1997). Evidence for racial prejudice at the implicit level and its relationship with questionnaire measures. *Journal of Personality and Social Psychology, 72*, 262–274.