

IMPLICIT AND EXPLICIT ATTITUDES TOWARD AFRICAN AMERICANS AND BARACK OBAMA DID NOT SUBSTANTIVELY CHANGE DURING OBAMA'S PRESIDENCY

Kathleen Schmidt*
Wesleyan University

Jordan R. Axt
University of Virginia

Barack Obama is perhaps the most well-known exemplar of African Americans. However, the extent to which he has impacted attitudes toward African Americans remains unclear. Using cross-sectional data ($N > 2,200,000$), the present study examined changes in racial attitudes and attitudes toward Obama during the first seven years of Obama's presidency. Attitudes showed no evidence of substantive change. After accounting for shifts in sample demographics, results showed an increase in implicit anti-Black attitudes and no change in explicit anti-Black attitudes. Participation date explained only 0.01% of the variance in implicit attitudes. Corresponding analyses of attitudes toward Obama ($N > 210,000$) indicated no change in implicit attitudes but increasing negativity toward Obama in explicit attitudes. Date accounted for only 0.01% of explicit attitude variance. Daily and monthly means across both samples were largely unrelated. Attitudes toward African Americans in general and Obama specifically showed little change or correspondence during Obama's presidency.

Keywords: Barack Obama, implicit attitudes, explicit attitudes, attitude malleability

From the academy to the newsroom, the 2008 election of Barack Obama as president of the United States has been regarded as proof of Americans' changing social attitudes. Aside from its political implications, Obama's election was perceived by

*Kathleen Schmidt and Jordan Axt contributed equally to this work.

Correspondence concerning this article should be addressed to Kathleen Schmidt, Department of Psychology, 45 Wyllys Ave., Wesleyan University, Middletown, CT 06459; E-mail: kschmidt@wesleyan.edu.

many as indicative of improving race relations in the United States. The day after Obama won the presidency in 2008, the *New York Times* wrote, "Obama Elected President as Racial Barrier Falls" (Nagourney, 2008). Abroad, the *Philippine Daily Inquirer* declared simply, "Black in White House" (2008). For some, Obama's election even signaled the end of racism in the United States: writing for *Forbes*, John McWhorter argued that Obama's presidency meant that racism in the United States was no longer a "serious problem" (McWhorter, 2008).

Whether or not Obama's election was reflective of racial progress in 2008, or his 2012 re-election a sign of continued progress, racial inequalities still exist in areas such as law enforcement, wages, and healthcare (for a review, see The Leadership Conference, 2014). However, the extent to which Obama has impacted racial attitudes remains unclear.

OBAMA AS BLACK EXEMPLAR

Given Obama's status as one of the world's most recognizable and powerful people who identifies as Black, many researchers have used opinions and perceptions of Obama to understand attitudes toward Black people in general (e.g., Hutchings, 2009; Welch & Sigelman, 2011). This work has focused on measures of both explicit attitudes, in which responses are controlled and within conscious awareness, and implicit attitudes, in which responses may be automatic and reflect unconscious associations (Greenwald & Banaji, 1995). For instance, previous work has found consistent relationships between implicit and explicit racial attitudes and opinions of Obama. In a sample of over 1,000 online participants during the week before the 2008 election (Greenwald, Smith, Sriram, Bar-Anan, & Nosek, 2009), willingness to vote for Obama was weakly but reliably related to more positive implicit attitudes toward African Americans, measured by both the Brief Implicit Association Test (BIAT; $r = .17$; Sriram & Greenwald, 2009) and the Affect Misattribution Procedure (AMP; $r = .11$; Payne, Cheng, Govorun, & Stewart, 2005). Voting intentions were also related to explicit racial attitudes, measured through feeling thermometers ($r = .21$) and Symbolic Racism ($r = .42$; Henry & Sears, 2012). Similarly, greater intentions to vote for Obama were associated with lower scores on a measure of racial resentment (Kinder & Sanders, 1996) in an online sample ($N = 1,177$; Craemer, Shaw, Edwards, & Jefferson, 2013).

Such work has revealed that implicit and explicit racial attitudes about Black people in general predict perceptions of Obama; individuals with more negative implicit and explicit attitudes toward Black people are also more likely to hold more negative opinions toward Obama. These analyses are only correlational, so determining causality is difficult. Participants may have used their attitudes toward Obama to partly form more general attitudes about all Black people. Alternatively, participants may have used their existing racial attitudes in the formation of their attitudes toward Obama. In support of this second interpretation, a recent study using panel data found that racial attitudes measured before Obama's election (assessed in January 2008) predicted later disapproval of Obama's presiden-

cy, even after controlling for political orientation (Lundberg, Payne, Krosnick, & Pasek, 2015). Moreover, racial attitudes measured in early 2008 became stronger predictors of perceptions of Obama further into his presidency. While previous research is not conclusive, racial attitudes about Black people in general likely preceded attitudes toward Obama. Thus the most plausible interpretation of existing data is that pre-existing general racial attitudes shaped specific attitudes about Obama (see Greenwald et al., 2009 for a similar interpretation). However, the reverse relationship is less clear: how has Obama shaped racial attitudes?

The current theoretical accounts and empirical studies concerning the influence of Obama on racial attitudes have produced mixed results. In fact, evidence has supported three seemingly inconsistent outcomes: that Obama's election has (1) reduced anti-Black racial attitudes, (2) increased anti-Black racial attitudes, or (3) left racial attitudes unaffected. In the following sections, we briefly review the existing literature supporting each of these outcomes.

OBAMA HAS REDUCED ANTI-BLACK RACIAL ATTITUDES

Studies that find Obama has reduced anti-Black racial attitudes are consistent with an exemplar-based model of social judgment (Smith & Zarate, 1992), in which perceptions of groups are influenced by the accessibility of individual exemplars. Exposure to a highly salient, positive exemplar from one group can then be expected to reduce negativity toward the group as a whole. Such exposure to positive, counter-stereotypic exemplars has previously been shown to reduce implicit racial bias against Black people. In one study (Dasgupta & Greenwald, 2001), participants read descriptions of positive Black and negative White figures (e.g., Denzel Washington and Timothy McVeigh). This manipulation reduced anti-Black bias on the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) both immediately and 24 hours after the session, but did not produce any changes in explicit racial attitudes. A large study comparing interventions on reducing implicit racial bias (Lai et al., 2014) also found that practicing the IAT with counter-stereotypic exemplars as stimuli reduced implicit bias against Black people on a standard race IAT taken immediately after the practice IAT ($d = 0.40$). Related studies investigating "social tuning" have shown that changes in implicit attitudes can occur in the absence of exposure to negative White exemplars; interactions with a friendly Black experimenter wearing an "Eracism" shirt reduced implicit bias against Black people on both an IAT and an evaluative priming task (Sinclair, Lowery, Hardin, & Colangelo, 2005).

These exposures to counter-stereotypic exemplars and Black experimenters were brief yet capable of shifting anti-Black implicit racial attitudes. The inference that Obama's presidency could have also influenced racial attitudes follows from such results. To the extent that Barack Obama is viewed as a positive exemplar of African Americans, the prolonged exposure to Obama that most Americans experienced may have potentially reduced anti-Black attitudes implicitly and perhaps explicitly.

Researchers have reported some evidence that exposure to Obama reduces anti-Black racial attitudes, a result often called the “Obama effect.” In Plant et al. (2009), undergraduates in two samples demonstrated no evidence of anti-Black implicit racial bias during the Fall 2008 semester, when Obama’s election campaign was at its height, despite strong anti-Black implicit biases being found in similar samples from earlier years. This reduction in implicit bias during the fall of 2008 was strongest for those participants who listed Obama or another positive Black exemplar when prompted to write down their first five thoughts about Black people. Similarly, anti-Black implicit bias (but not explicit bias) was significantly reduced following Obama’s win when participants completed measures of racial bias both the week before and the week after Obama’s first election (Bernstein, Young, & Claypool, 2010).

While these studies revealed changes in implicit but not explicit anti-Black attitudes during Obama’s election, separate work has found evidence of reduced explicit anti-Black prejudice during the same time period. Data from over 1,800 participants completing multiple interview sessions in a national, representative sample showed a small but reliable decrease in explicit racial bias between July 2008 and January 2009 ($d = 0.14$; Goldman, 2012). This result was found despite separate analyses that revealed no evidence of change in racial attitudes from samples covering the previous 16 years. Furthermore, this reduction in explicit racial bias during the second half of 2008 was strongest among participants who likely experienced more exposure to Obama (e.g., had a greater interest in politics, watched more television programs related to politics, or lived in states that aired more Obama-related commercials).

Finally, additional support for the “Obama effect” has come from follow-up studies that experimentally manipulated exposure to Obama. For instance, exposing participants to images of Obama was shown to offset the increased implicit racial bias created from viewing negative Black exemplars (e.g., O. J. Simpson; Columb & Plant, 2011; Columb & Plant, this issue). This experimental design provided causal evidence that exposure to Obama can lessen anti-Black implicit attitudes.

The “Obama effect” is an intuitive and optimistic finding. Even people who did not support Obama politically may be heartened by lowered explicit and implicit anti-Black attitudes resulting from his election. According to the “Obama effect” and theories concerning the influence of counter-stereotypic exemplars, implicit and explicit racial attitudes should have become less anti-Black during Obama’s presidency. However, the evidence supporting the idea that Obama’s election has created a reduction in racial prejudice must be interpreted alongside seemingly conflicting accounts indicating that Obama’s presidency has led to an *increase* in anti-Black bias and those that find no evidence of racial attitude change.

OBAMA HAS INCREASED ANTI-BLACK RACIAL ATTITUDES

Group Threat Theory (Blumer, 1958) presents an alternative account of attitude change, in which prejudice increases when out-groups are either perceived as posing economic threats or growing in size (Quillian, 1995). Previous research provides some support for this conception of intergroup relations; for instance, higher estimates of Black and Hispanic populations were associated with more explicit bias toward these groups (Alba, Rumbaut, & Marotz, 2005). Likewise, one experiment found that presenting White participants with an article stating that ethnic and racial minorities will outnumber White people in 30 years increased explicit and implicit racial bias (Craig & Richeson, 2014; see also Skinner & Cheadle, this issue). Another study found that White participants had higher levels of in-group bias in a dictator game after reading about the rising Hispanic population (Abascal, 2015). From this perspective, Obama's election (and re-election) could have signaled that White people were losing influence, prompting greater negativity toward Black people.

Indeed, studies focusing on Obama specifically have found heightened racial bias during his election and presidency. Survey data from 2008 to 2012 found small increases in anti-Black bias both implicitly (on the AMP) and explicitly (on Symbolic Racism; Pasek, Stark, Krosnick, Tompson, & Payne, 2014). Higher negativity toward Black people on both attitude measures was also related to lower support of Obama and lower intention to vote for his re-election. A separate study found that endorsement of race-related equality programs such as affirmative action were lower in the weeks following Obama's re-election (Gaither, Wilton, & Young, 2014). These results indicate that Obama's election may have been perceived among some White people as signaling a reduction in their political or social power, leading to greater prejudice against Black people in general (see Skinner & Cheadle, this issue, for evidence suggesting that exposure to Obama can increase implicit racial bias among those low in motivation to respond without prejudice).

Negative evaluations of Obama himself could also negatively influence racial attitudes. For some groups (e.g., conservatives), Obama may be a counter-stereotypic exemplar of African Americans but is certainly not viewed positively (e.g., Maxwell & Parent, 2012). Obama's political position precludes universal positivity. To the degree that he is negatively evaluated more than African Americans in general, Obama could be increasing anti-Black implicit and explicit bias among certain groups. Given that those same groups may already have higher than average anti-Black bias (Nosek et al., 2007), Obama could merely be strengthening existing negative attitudes. Moreover, with national approval ratings of Obama decreasing during his presidency for even liberals and African Americans (data analyzed from Gallup, 2015), groups with initially positive associations with Obama could be decreasing in their positivity toward him and consequently toward African Americans in general. According to Group Threat Theory, implicit and explicit

racial attitudes should have become more anti-Black during Obama's presidency, particularly given the reported negative trends in perceptions of Obama.

OBAMA HAS LEFT ANTI-BLACK RACIAL ATTITUDES UNAFFECTED

A final perspective regarding the impact of Obama's presidency on racial attitudes comes from work on subtyping (e.g., Weber & Crocker, 1983). Subtyping occurs when people protect their existing beliefs about groups by interpreting contradictory information as not applicable to the group as a whole (Fiske, Neuberg, Beattie, & Milberg, 1987). For instance, a positive exemplar from a negatively stereotyped group may be placed into a subcategory of that group to avoid re-evaluating the group as a whole. This account would predict that even repeated exposure to a positive Black figure such as Obama may be ineffective in changing an individual's racial attitudes because Obama will be "subtyped" and not believed to exemplify Black people in general.

This process of subtyping may help explain recent evidence that the effectiveness of exposure to counter-stereotypic exemplars in reducing implicit racial bias was perhaps initially overstated. While four studies using over 1,500 online and undergraduate participants (Joy-Gaba & Nosek, 2010) replicated the effect that viewing counter-stereotypic race exemplars reduced implicit racial bias, the magnitude of the effect ($d = 0.13$) was less than one sixth the size of that found in the original study ($d = 0.82$; Dasgupta & Greenwald, 2001). Though the studies used different stimuli and scoring methods, the drastically reduced effect of exposure to counter-stereotypic exemplars could be the result of such exemplars not being encoded by participants as representative of Black people in general. Similarly, other forms of subtyping could lead the race of an exemplar to become secondary to his or her more salient features. If Obama were considered as non-representative of Black people or his position as president prevented him from being strongly associated with "Black," then exposure to Obama may be ineffective at changing racial attitudes.

Related work has shown that even when positive exemplars are encoded as representative of the Black population, changes in implicit racial attitudes from viewing positive Black exemplars may not persist over time. A follow-up to the Lai et al. (2014) experiment mentioned earlier compared multiple interventions aimed at lowering implicit bias and replicated the reduction of implicit bias following practice with counter-stereotypic exemplars ($d = 0.38$). However, the interventions were no longer reliably effective when implicit attitudes were measured more than 24 hours later ($d = 0.11$; Lai et al., 2016). These more recent results suggest that exposure to counter-stereotypic exemplars may prove ineffective at changing racial attitudes when exemplars are not perceived as representative of the larger group. Even when attitudinal change occurs in the short term, it may not persist in the absence of recent and salient exposure to exemplars.

Other experiments concerning the impact of exposure to Obama have also found mixed or no evidence for behavioral or attitude change. For example, in a

test of “stereotype lift” (in which reminders of positive stereotypes increase relevant task performance; Walton & Cohen, 2003), Black participants prompted to think of Obama showed no improvement on tests of verbal ability compared to a control condition (Aronson, Jannone, McGlone, & Johnson-Campbell, 2009). This experimental result contradicted earlier correlational research suggesting that greater exposure to Obama was associated with increased verbal ability among Black participants (Marx, Ko, & Friedman, 2009). In a study concerning racial attitudes specifically, non-Black participants primed to think about Obama showed no differences in implicit racial bias compared to participants primed with Oprah or nature (Lybarger & Monteith, 2011).

Finally, in the largest investigation of racial attitudes during Obama’s presidential campaign (Schmidt & Nosek, 2010), cross-sectional data from over 400,000 online participants showed no evidence of meaningful change in explicit or implicit racial attitudes between September 2006 and May 2009. Though the effects were statistically significant given the sample size, date accounted for only 0.001% of the variance in implicit attitudes and 0.01% of the variance in explicit attitudes. Moreover, implicit and explicit racial attitudes were unrelated to greater mentions of Obama in the media and did not substantively change during salient moments in Obama’s campaign (e.g., earning the Democratic nomination, winning the election).

A number of plausible explanations may account for such null results. For example, participants may have “subtyped” Obama as not representative of Black people in general. Or, even if Obama were perceived as representative of Black people, the biggest moments of his campaign may still have not been salient enough to alter racial attitudes (i.e., participants were not explicitly reminded of Obama during the study session). Lastly, the malleability of racial attitudes created by exposure to Obama may be confined to short-term laboratory interventions. As a result of such factors, implicit and explicit racial attitudes should have shown no change during subsequent years in Obama’s presidency.

THE PRESENT WORK

Previous studies have provided conflicting correlational and experimental evidence to suggest that Obama has reduced anti-black bias, increased bias, or left racial attitudes unchanged. In the present work, we explored explicit and implicit racial attitudes using a large convenience sample of American visitors to the Project Implicit website ($N > 2,200,000$). First, we investigated whether evidence of change in either implicit or explicit racial attitudes can be found during the first seven years of Obama’s presidency, from January 2009 to December 2015. The Schmidt and Nosek (2010) analyses stopped at May 11, 2009, seven months after Obama was elected and four months after he took office. Though these early analyses found no evidence of substantive explicit or implicit racial attitude change during Obama’s campaign and first election, changes in racial attitudes may have occurred further into Obama’s presidency.

In a separate sample ($N > 210,000$), we also investigated changes in responses to implicit and explicit measures that specifically focused on attitudes toward Obama (e.g., a presidential preference IAT measuring evaluations toward Obama relative to recent presidents). We examined these measures for evidence of change in attitudes toward Obama over the seven years of data collection.

For both the race task and presidents task, we analyzed the impact of select demographics on attitudes. Political orientation could be a key determinant of the impact Obama has had on individual racial attitudes. For instance, a lack of change in the aggregate could be the result of reduced anti-Black attitudes among liberals, who likely view Obama as a positive Black exemplar, and increased anti-Black attitudes among conservatives, who likely evaluate Obama negatively or view Obama's election as a political or even social threat. Including participant political orientation in the analysis may help uncover the psychological processes underlying individual changes in racial attitudes. We also analyzed whether changes in racial attitudes and attitudes toward Obama were moderated by participant race; for example, White participants may have shown larger attitude change than Black participants given their higher initial anti-Black attitudes. Alternatively, racially identifying with Obama could increase his impact on racial attitudes.

Finally, we investigated relationships between racial attitudes and attitudes toward Obama more directly. By creating datasets with the daily means for both tasks, we can see if implicit and explicit attitudes toward Obama are correlated with implicit and explicit racial attitudes. Given an exemplar model of attitude change, variation in evaluations of Obama, whether positive or negative, may be associated with related changes in racial attitudes.

The methods outlined above allow us to leverage a large and diverse sample of participants to examine changes in attitude measures over a notable time span. Having a Black president serves as a naturalistic test of the influence of exemplars on racial attitudes. By examining attitudes toward Obama and those toward Black people concurrently, we may capture an important cultural shift in attitudes. However, such correlational methods will not imply causality if attitudes do appear to change over time. Additionally, our convenience sample does not represent the nation as a whole. Nonetheless, our analyses can shed light on the question of how racial attitudes have changed during Obama's presidency.

METHOD

PARTICIPANTS

Participants included all visitors to the Project Implicit demonstration website who were U.S. citizens and completed relevant measures for the "Race IAT" ($N = 2,289,796$) or "Presidents IAT" ($N = 219,170$) tasks between January 20, 2009 and December 31, 2015.¹ This date range represents the day of Barack Obama's inauguration until nearly seven years into his presidency (2,536 days). The end date was

1. Relevant measures for the presidents task did not appear until June 15, 2009.

TABLE 1. Demographics of the Race Task and Presidents Task Samples

	Race Task				Presidents Task			
	<i>M</i>	<i>SD</i>	<i>n</i>	%	<i>M</i>	<i>SD</i>	<i>n</i>	%
Age	26.49	11.62			29.52	13.62		
0–17			696227	30.41			60938	27.80
18–29			1056097	46.12			90246	41.18
30–49			411504	17.97			46425	21.18
50–69			119949	5.24			20299	9.26
70 and above			6019	0.26			1262	0.58
Gender								
Male			776749	40.57			93892	51.03
Female			1138038	59.43			90119	48.97
Race								
American Indian/Alaskan Native			12632	0.67			1181	0.65
East Asian			63812	3.37			4778	2.62
South Asian			49382	2.60			3910	2.15
Native Hawaiian/Pacific Islander			11603	0.61			714	0.39
Black/African American			213628	11.27			12419	6.81
White			1319164	69.57			143707	78.84
Multiracial–White/Black			49429	2.61			2198	1.21
Multiracial–Other			104770	5.53			7068	3.88
Other/Unknown			71747	3.78			6296	3.45
Ethnicity								
Hispanic/Latino			193218	10.39			14101	7.96
Not Hispanic/Latino			1541911	82.90			154340	87.15
Unknown			124828	6.71			8654	4.89
Education	5.71	2.14			6.24	2.28		
Some High School or Less			325972	17.01			22688	12.53
High School Degree			151159	7.89			13560	7.49
Some College			683623	35.67			50762	28.06
College Degree			376164	19.63			45157	24.95
Some Advanced Schooling			131185	6.85			13100	7.24
Advanced Degree			243664	12.71			35716	19.72
Political Ideology	4.50	1.61			4.51	1.83		
Strongly Conservative			72995	3.85			11815	6.50
Moderately Conservative			186093	9.82			23288	12.82
Slightly Conservative			147800	7.80			15257	8.40
Neutral			666246	35.15			40755	22.43
Slightly Liberal			197216	10.40			20179	11.10
Moderately Liberal			395576	20.87			42241	23.25
Strongly Liberal			229658	12.12			28176	15.51

selected to match the most recent public posting of the Project Implicit demonstration data (Xu, Nosek, & Greenwald, 2014).

The race task averaged 913 sessions per day; the minimum number of sessions per day was 0 (due to server errors and updates), and the maximum number of sessions per day was 47,375. For the presidents task, sessions per day ranged from 5 to 3,322 with a mean of 92. The middle 80% of daily sample sizes ranged from 285 to 1,500 for the race task, and from 31 to 153 for the presidents task.

See Table 1 for a demographic breakdown of both samples. Likely due to the extremely large sample sizes, all demographic variables in both samples demonstrated significant change over the course of the data collection. Notably, the race task sample became more liberal ($\eta_p^2 = .01$), more educated ($\eta_p^2 = .004$), and younger ($\eta_p^2 = .004$) over time; the presidents task sample became more liberal ($\eta_p^2 = .004$) and educated ($\eta_p^2 = .002$) over time.

MATERIALS

Race Task. The race task included explicit and implicit attitude measures evaluating European Americans and African Americans. Explicit attitudes were measured on a 7-point Likert scale ranging from “I strongly prefer African Americans to European Americans” (scored as -3) to “I strongly prefer European Americans to African Americans” (scored as 3), with a midpoint of “I like European Americans and African Americans equally” (scored as 0).

Implicit racial attitudes were assessed using a 7-block IAT measuring association strengths between the concepts African American and European American and the attributes pleasant and unpleasant. Participants categorized words and pictures that represented the concepts and categories using two response keys. In the critical blocks, either White faces were paired with pleasant words and Black faces were paired with unpleasant words, or White faces were paired with unpleasant words and Black faces were paired with pleasant words. The response latencies for the two different pairing combinations were compared. If participants were faster to pair White with pleasant and Black with unpleasant than White with unpleasant and Black with pleasant, we assumed that they implicitly preferred European Americans over African Americans.

The pairing order of the critical blocks was randomized between subjects. This procedure follows the recommendations of Nosek, Greenwald, and Banaji (2007). The IAT was scored following the guidelines of Greenwald, Nosek, and Banaji (2003) such that more positive values indicated a stronger implicit association between European American and pleasant and African American and unpleasant. IAT scores were retained if fewer than 10% of the response trials had a latency less than 300 milliseconds and error rates were below 30% overall or 40% for any response block, as recommended in Greenwald, Nosek, and Banaji (2003; 14.59% total scores were excluded from the race IAT).

Presidents Task. The presidents task included explicit and implicit attitude measures evaluating Barack Obama and former presidents. Participants were ran-

domly assigned to compare Obama individually to either Bush, Clinton, Jefferson, Kennedy, Lincoln, Nixon, Reagan, or Roosevelt; or to compare Obama to recent presidents as a category (Clinton, Ford, Nixon, Carter, and Reagan). For the explicit measure, the response options ranged from 3, indicating a strong preference for the other president or presidents (e.g., "I strongly prefer George W. Bush to Barack Obama"), to -3, indicating a strong preference for Obama (e.g., "I strongly prefer Barack Obama to George W. Bush"), with 0 as the midpoint on the 7-point Likert scale (e.g., "I like Barack Obama and George W. Bush equally").

The layout and scoring of the presidents IAT were identical to the race IAT. Participants sorted photos representing Obama and another president or presidents at the same time as words representing good and bad. The category labels for the task included each president's first and last names (e.g., "Barack Obama"), "Recent Presidents," and "Good" and "Bad."² The presidents task was scored such that more positive scores on implicit and explicit attitudes measures indicated more positive implicit associations with Obama. Based on exclusion criteria, 15.49% of scores were not included in analyses.

Demographics and Date. As part of both tasks, participants responded to items assessing their age, gender, race, ethnicity, education level, political orientation, and country/region of primary citizenship. Age was measured in years. The gender item initially included Male and Female, but additional options were added near the end of data collection; for consistency, we chose to represent only "Male" and "Female" responses in analyses. The race item included the following responses: American Indian/Alaska Native, East Asian, South Asian, Native Hawaiian or other Pacific Islander, Black or African American, White, More than one race-Black/White, More than one race-Other, and Other or Unknown. The responses on the ethnicity item were: Hispanic or Latino, Not Hispanic or Latino, and Unknown. Political orientation was measured with a 7-point scale ranging from "Strongly conservative" to "Strongly liberal," with "Neutral" as a midpoint. For subgroup analyses, liberals were defined as anyone who identified as slightly, moderately, or strongly liberal and conservatives as those who identified as slightly, moderately, or strongly conservative. Education included the options: elementary school, junior high, some high school, high school graduate, some college; associate's degree, bachelor's degree, some graduate school, master's degree, M.B.A., J.D., M.D., Ph.D., and other advanced degree.³ The citizenship item was used to exclude participants who were not U.S. citizens. Finally, date was automatically coded to the second that the session was started and used in analyses as a by-second continuous variable.

2. While the category labels were not race relevant, the stimulus pictures may have highlighted the racial differences between Obama and any comparison president or presidents. Using less or more race relevant stimuli or categories would likely influence how implicit attitudes toward Obama correspond to racial attitudes more generally. However, since the focus of our article is change over time, this impact is not a methodological concern.

3. While technically a categorical measure, education was recoded to reflect increasing educational attainment and added to regression models as a continuous variable. This treatment has been used in other analyses of Project Implicit data (e.g., Nosek et al., 2007; Westgate, Riskind, & Nosek, 2015).

PROCEDURE

Participants visited <https://implicit.harvard.edu/> and chose to take the “Race IAT” or “Presidents IAT” test. Those who chose the presidents task were randomly assigned to a comparison president or presidents. Order of the IAT, explicit attitude measures, and demographics were randomized.

RESULTS

All data, materials, and analysis syntax are available at <https://osf.io/6t53f/>.

RACIAL ATTITUDES

Participants showed an overall preference for European Americans over African Americans on both implicit ($M = 0.32$; $SD = 0.43$; $t[1802933] = 987.85$, $p < .001$, $d = 0.74$, 95% CI [0.318, 0.319]) and explicit attitude measures ($M = 0.29$; $SD = 1.06$; $t[1994213] = 389.33$, $p < .001$, $d = 0.27$, 95% CI [0.29, 0.30]). Implicit and explicit racial attitudes were positively correlated, $r = .31$, 95% CI [0.311, 0.313], a level of implicit-explicit correspondence similar to previous analyses (e.g., Bar-Anan & Nosek, 2014; Nosek et al., 2007; Schmidt & Nosek, 2010).

Variation Over Time. To test whether the magnitude of implicit racial attitudes changed as a function of time during Obama’s presidency, we regressed session date on IAT score. The results indicated that implicit racial bias decreased over time, $F(1, 1802932) = 1876.73$, $p < .001$, $B = -2 \times 10^{-10}$, $R^2 = .001$ (see Figure 1). Explicit racial bias also decreased over time, $F(1, 1994211) = 3192.03$, $p < .001$, $B = -1 \times 10^{-10}$, $R^2 = .002$.⁴ While statistically significant, these effects were small, as date accounted for only 0.1% of the variance in implicit and 0.2% of the variance in explicit attitudes.

Any effects of date on implicit and explicit attitudes could potentially be explained by demographic changes in our convenience sample over time. For instance, liberals tend to have less anti-Black implicit and explicit attitudes than conservatives (e.g., Nosek et al., 2007). As a result, an increase in the number of liberal participants over time could lead to a general decrease in anti-Black attitudes that was only the result of demographic changes in our sample and not of changes in attitudes. As noted earlier, the race task participants became younger, more educated, and more liberal over the course of data collection. Importantly, youth, education, and liberalism all predict lower implicit and explicit anti-Black bias (Nosek et al., 2007). To control for such changes in sample demographics

4. Adding political ideology and race to the model predicting implicit attitudes from date increased model fit ($R^2 = .10$) but did not impact the effect of date, $F(1, 1802932) = 1106.11$, $p < .001$, $B = -2 \times 10^{-10}$, $\eta_p^2 = .001$. Similarly, the fit of the model predicting explicit attitudes from date increased with the addition of political ideology and race, $R^2 = .20$. However, the effect of date remained the same, $F(1, 1994211) = 1729.15$, $p < .001$, $B = -1 \times 10^{-10}$, $\eta_p^2 = .001$.

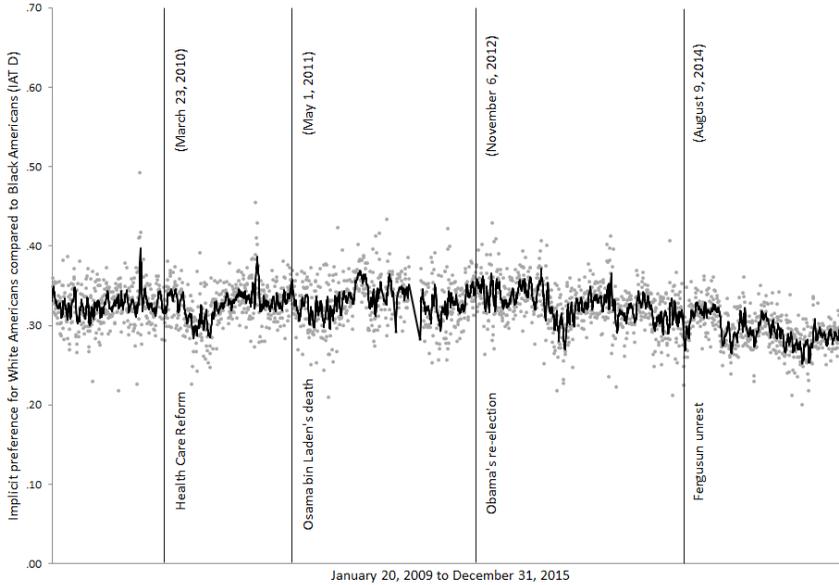


FIGURE 1. Mean daily Race IAT effects and during Obama's presidency where $n > 10$.
 Note. Gray dots indicate daily means and the black line represents a 7-day moving average.

across data collection, we employed hierarchical linear regression. In the model predicting implicit attitudes from date, we added demographics in Step 2 and date by demographics interactions in Step 3.⁵ Including these predictors reversed the main effect of date, $F(1, 1802932) = 127.71$, $B < 5 \times 10^{-10}$, $p < .001$, $\eta_p^2 = .0001$. In other words, after controlling for changing sample demographics, implicit anti-Black bias increased during the Obama presidency, but this effect was small (date explained an additional 0.01% of the variance in implicit attitudes). See Table 2 for a summary of the hierarchical model.

Next, we examined whether changes in sample demographics influenced the variation in explicit racial attitudes over time. After adding demographics and date by demographic interactions into the regression predicting explicit racial attitudes from date, the overall effect of date on explicit racial attitudes was no longer significant, $F(1, 1994211) = 2.72$, $p = .099$, $\eta_p^2 < .0001$. Explicit racial attitudes no longer appeared to be becoming less anti-Black once we controlled for potential demographic shifts. See Table 3 for a model summary.

Demographic Moderators. Given the small overall variation in racial attitudes we observed over time, we next investigated whether those attitudes were more malleable within sample subgroups. We examined main effects and relationships with date for Black ($n = 213,628$) and White ($n = 1,319,164$) participants. Black participants demonstrated weak pro-Black attitudes implicitly ($M = -0.04$, $SD = 0.44$, $t[171609] = -34.40$, $p < .001$, $d = 0.09$, 95% CI [-0.038, -0.034]) and stronger pro-Black attitudes explicitly ($M = -0.89$, $SD = 1.29$, $t[195757] = -305.82$, $p < .001$, $d = 0.69$, 95% CI [-0.90, -0.89]), while White participants demonstrated anti-Black attitudes

5. In all of our hierarchical models, age, political ideology, and education were included as continuous variables; gender, race, and ethnicity were included as categorical variables.

TABLE 2. Hierarchical Linear Regression ($n = 1,802,934$) Predicting Implicit Racial Attitudes from January 20, 2009 to December 31, 2015 (Step 1), Demographic Variables (added in Step 2), and their Interactions (added in Step 3)

Predictor	<i>df</i>	η^2	<i>F</i>	<i>p</i>	<i>R</i> ²
Step 1					0.0010
Date	1	0.001040	1876.73	< 0.0001	
Step 2					0.1066
Date	1	0.000486	975.43	< 0.0001	
Age	1	0.000241	481.47	< 0.0001	
Gender	1	0.001441	2892.83	< 0.0001	
Ethnicity	2	0.000351	352.04	< 0.0001	
Race	8	0.064875	17382.6	< 0.0001	
Political Orientation	1	0.005172	10421.0	< 0.0001	
Education	1	0.000008	15.64	< 0.0001	
Step 3					0.1073
Date	1	0.000064	127.71	< 0.0001	
Age	1	0.000003	5.52	0.0168	
Gender	1	< 0.000005	0.67	0.4114	
Ethnicity	2	0.000006	6.41	0.0016	
Race	8	0.000644	161.62	< 0.0001	
Political Orientation	1	0.000109	218.71	< 0.0001	
Education	1	0.000026	51.66	< 0.0001	
Date × Age	1	0.000001	2.16	0.1417	
Date × Gender	1	0.000005	9.33	0.0023	
Date × Ethnicity	2	0.000004	3.61	0.0271	
Date × Race	8	0.000284	71.11	< 0.0001	
Date × Political Orientation	1	0.000182	364.33	< 0.0001	
Date × Education	1	0.000025	49.41	< 0.0001	

Note. Numbers indicate summary statistics across the sample. Age, political ideology, and education were included in the model as continuous variables; gender, race, and ethnicity were included as categorical variables.

both implicitly ($M = 0.39$, $SD = 0.41$, $t[1089142] = 992.88$, $p < .001$, $d = 0.95$, 95% CI [0.387, 0.389]) and explicitly ($M = 0.51$, $SD = 0.89$, $t[1222912] = 698.55$, $p < .001$, $d = 0.57$, 95% CI [0.507, 0.510]). Comparisons between Black and White participants showed large differences on implicit, $t(220966) = -376.25$, $p < .001$, $d = 1.60$, 95% CI [-0.43, -0.42], and explicit racial attitudes, $t(226727) = -462.76$, $p < .001$, $d = 1.94$, 95% CI [-1.41, -1.40].

Black participants showed no change in implicit bias over time, $F(1, 171608) = 0.86$, $p = .354$, and a decrease in explicit pro-Black attitudes over time, $F(1, 195756) = 710.32$, $p < .001$, $B = 1 \times 10^{-9}$, $R^2 = .004$. However, these results appear to be artifacts of demographic shifts. Including demographics and date by demographic interactions in the model revealed an increase in anti-Black attitudes over time for Black participants both implicitly, $F(1, 171608) = 22.29$, $p < .001$, $B = 5 \times 10^{-10}$, $\eta_p^2 = .0001$, and explicitly, $F(1, 195756) = 114.74$, $p < .001$, $B = 3 \times 10^{-9}$, $\eta_p^2 = .001$.

In the first step of a hierarchical regression, White participants showed a decrease in implicit anti-Black bias over time, $F(1, 1089142) = 2338.08$, $p < .001$, $B = -2 \times 10^{-10}$, $R^2 = .002$. Including demographics and their interactions with date into the model reversed the direction of the effect, such that anti-Black implicit attitudes increased over time, $F(1, 1089141) = 38.22$, $p < .001$, $B = 2 \times 10^{-10}$, $\eta_p^2 = .00004$. White

TABLE 3. Hierarchical Linear Regression ($n=1,994,213$) Predicting Explicit Racial Attitudes from January 20, 2009 to December 31, 2015 (Step 1), Demographic Variables (added in Step 2), and their Interactions (added in Step 3)

Predictor	<i>df</i>	ηp^2	<i>F</i>	<i>p</i>	<i>R</i> ²
Step 1					0.0016
Date	1	0.00160	3192.03	< 0.0001	
Step 2					0.2021
Date	1	0.00057	1417.16	< 0.0001	
Age	1	0.00010	243.94	< 0.0001	
Gender	1	0.00406	10190.1	< 0.0001	
Ethnicity	2	0.00041	514.17	< 0.0001	
Race	8	0.11367	40110.9	< 0.0001	
Political Orientation	1	0.01459	37055.5	< 0.0001	
Education	1	0.00018	440.63	< 0.0001	
Step 3					0.2040
Date	1	< 0.000005	2.72	0.0992	
Age	1	0.00005	126.37	< 0.0001	
Gender	1	0.00024	590.82	< 0.0001	
Ethnicity	2	0.00002	22.04	< 0.0001	
Race	8	0.00227	714.82	< 0.0001	
Political Orientation	1	0.00001	15.09	0.0001	
Education	1	0.00004	97.59	< 0.0001	
Date × Age	1	0.00005	113.98	< 0.0001	
Date × Gender	1	0.00016	404.28	< 0.0001	
Date × Ethnicity	2	0.00002	19.47	< 0.0001	
Date × Race	8	0.00112	352.90	< 0.0001	
Date × Political Orientation	1	0.00006	145.74	< 0.0001	
Date × Education	1	0.00003	82.33	< 0.0001	

Note. Numbers indicate summary statistics across the sample. Age, political ideology, and education were included in the model as continuous variables; gender, race, and ethnicity were included as categorical variables.

participants demonstrated a decrease in explicit anti-Black attitudes over time, $F(1, 1222911) = 6439.43$, $p < .001$, $B = -1 \times 10^{-9}$, $R^2 = .005$, and this effect persisted after including demographics and their interactions with date into the regression, $F(1, 1222910) = 57.44$, $p < .001$, $B = -1 \times 10^{-9}$, $\eta_p^2 = .0001$.

Next, we investigated if malleability of racial attitudes varied among liberal ($n = 822,450$) and conservative ($n = 738,971$) participants. Liberals demonstrated anti-Black implicit ($M = 0.29$, $SD = 0.44$, $t[677250] = 541.02$, $p < .001$, $d = 0.66$, 95% CI [0.290, 0.291]) and explicit attitudes ($M = 0.19$, $SD = 0.98$, $t[769297] = 169.85$, $p < .001$, $d = 0.19$, 95% CI [0.187, 0.192]) as did conservatives (Implicit: $M = 0.36$, $SD = 0.43$, $t[589317] = 651.84$, $p < .001$, $d = 0.84$, 95% CI [0.360, 0.362]; Explicit: $M = 0.49$, $SD = 1.14$, $t[610862] = 335.17$, $p < .001$, $d = 0.42$, 95% CI [0.485, 0.491]). Conservatives showed stronger anti-Black attitudes than liberals both implicitly, ($t[1.25 \times 10^6] = -93.00$, $p < .001$, $d = -0.17$, 95% CI [-0.073, -0.070]) and explicitly ($t[1.21 \times 10^6] = -162.84$, $p < .001$, $d = -0.30$, 95% CI [-0.302, -0.295]).

For liberals, implicit racial bias seemed to decrease over time, $F(1, 677249) = 1249.19$, $p < .001$, $B = -3 \times 10^{-10}$, $R^2 = .002$, but this effect reversed to indicate a slight increase over time when demographics and their interactions with date were included in the regression, $F(1, 677249) = 18.74$, $p < .001$, $B < 5 \times 10^{-10}$, $\eta_p^2 = .00002$.

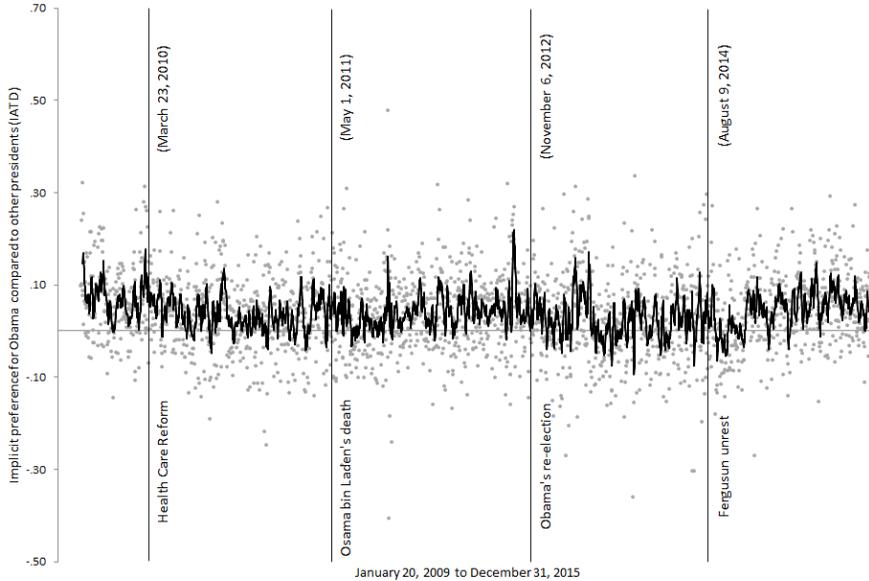


FIGURE 2. Mean daily Presidents' IAT effects during Obama's presidency.
 Note: Gray dots indicate daily means and the black line represents a 7-day moving average.

Liberals' explicit racial attitudes similarly appeared to become less anti-Black over time, $F(1, 769296) = 1584.33, p < .001, B = -1 \times 10^{-10}, R^2 = .002$, but this effect was no longer significant when demographics and demographic by date interactions were included in the model, $F(1, 769296) = 1.40, p = .251, \eta_p^2 < .00001$.

Regressions initially indicated that conservatives' implicit anti-Black bias decreased over time, $F(1, 589316) = 477.62, B = -2 \times 10^{-10}, p < .001, R^2 = .001$, as did their explicit anti-Black bias, $F(1, 610860) = 3011.53, p < .001, B = -1 \times 10^{-9}, R^2 = .005$. When demographics and date by demographic interactions were included in the models, conservatives demonstrated the opposite effect for implicit attitudes, showing an increase in anti-Black bias, $F(1, 589316) = 16.86, p < .001, B = 1 \times 10^{-10}, \eta_p^2 = .00003$, but explicit attitudes still showed a slight decrease in anti-Black bias, $F(1, 610860) = 6.64, p = .006, B > -5 \times 10^{-10}, \eta_p^2 = .00001$.

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Participants displayed a small overall preference for Obama compared to other presidents both implicitly ($M = 0.05, SD = 0.46, t[171021] = 42.53, p < .001, d = 0.11, 95\% \text{ CI } [0.04, 0.05]$) and explicitly ($M = 0.23, SD = 2.05, t[188239] = 48.76, p < .001, d = 0.11, 95\% \text{ CI } [0.22, 0.24]$). Implicit and explicit attitudes toward Obama were positively correlated ($r = .54, p < .001, 95\% \text{ CI } [0.54, 0.55]$).

Variation Over Time. Regressing session date on IAT D score suggested that implicit attitudes toward Obama became more positive over time, $F(1, 171020) = 17.46, p < .001, B = 1 \times 10^{-10}, R^2 = .0001$ (see Figure 2). A regression predicting ex-

TABLE 4. Hierarchical Linear Regression ($n = 171,022$) Predicting Implicit Attitudes Toward Obama from June 15, 2009 to December 31, 2015 (Step 1), Demographic Variables (added in Step 2), and their Interactions (added in Step 3)

Predictor	<i>df</i>	η_p^2	<i>F</i>	<i>p</i>	<i>R</i> ²
Step 1					0.000102
Date	1	0.00010	17.46	< 0.0001	
Step 2					0.209505
Date	1	0.00023	49.62	< 0.0001	
Age	1	0.00034	72.57	< 0.0001	
Gender	1	0.00026	54.90	< 0.0001	
Ethnicity	2	0.00006	6.18	0.0021	
Race	8	0.01393	376.86	< 0.0001	
Political Orientation	1	0.12256	29801.4	< 0.0001	
Education	1	0.00018	38.57	< 0.0001	
Step 3					0.209641
Date	1	< 0.000005	0.15	0.6977	
Age	1	0.00001	1.30	0.2548	
Gender	1	0.00004	8.47	0.0036	
Ethnicity	2	0.00002	2.13	0.1191	
Race	8	0.00005	1.36	0.2088	
Political Orientation	1	0.00017	37.19	< 0.0001	
Education	1	< 0.000005	0.30	0.5819	
Date × Age	1	< 0.000005	0.66	0.4163	
Date × Gender	1	0.00003	6.94	0.0084	
Date × Ethnicity	2	0.00002	2.38	0.0928	
Date × Race	8	0.00003	0.78	0.6165	
Date × Political Orientation	1	< 0.000005	0.17	0.6822	
Date × Education	1	< 0.000005	0.10	0.7526	

Note. Numbers indicate summary statistics across the sample. Age, political ideology, and education were included in the model as continuous variables; gender, race, and ethnicity were included as categorical variables.

implicit attitudes from date suggested that explicit attitudes toward Obama did not change over time, $F(1, 188238) = 0.07, p = .790, R^2 < .0001$.⁶

Given that the stability or change in attitudes toward Obama could potentially be impacted by demographic shifts in our sample, we included demographics in Step 2 and demographic by date interactions in Step 3 of hierarchical regressions predicting attitudes from date. Including demographics and their interactions with date in the model at Step 3 eliminated the effect of date on implicit attitudes, $F(1, 171020) = 0.15, p = .698, \eta_p^2 < .00001$. See Table 4 for a model summary.

We found a decrease in explicit positivity toward Obama over time after demographics and their interactions were included in the model in Step 3, $F(1, 188238) = 33.70, p < .001, B = -2 \times 10^{-9}, \eta_p^2 = .0001$. Controlling for demographic shifts revealed that explicit attitudes toward Obama became slightly more negative over time. See Table 5 for a summary of the hierarchical model statistics.

6. Adding political ideology and race to the model predicting attitudes toward Obama increased model fit both implicitly ($R^2 = .21$) and explicitly ($R^2 = .37$). Both effects of date were slightly impacted by this addition (Implicit: $F[1, 171020] = 49.18, p < .001, B = -1 \times 10^{-10}, \eta_p^2 = .0002$; Explicit: $F[1, 188238] = 359.54, p < .001, B = -1 \times 10^{-9}, \eta_p^2 = .001$.)

TABLE 5. Hierarchical Linear Regression ($n = 188,240$) Predicting Explicit Attitudes Toward Obama from June 15, 2009 to December 31, 2015 (Step 1), Demographic Variables (added in Step 2), and their Interactions (added in Step 3)

Predictor	<i>df</i>	η^2	<i>F</i>	<i>p</i>	<i>R</i> ²
Step 1					< 0.0000005
Date	1	< 0.000005	0.07	0.7904	
Step 2					0.378152
Date	1	0.00117	354.23	< 0.0001	
Age	1	0.00005	15.51	< 0.0001	
Gender	1	0.00167	507.85	< 0.0001	
Ethnicity	2	0.00062	93.91	< 0.0001	
Race	8	0.02917	1137.59	< 0.0001	
Political Orientation	1	0.20099	76184.9	< 0.0001	
Education	1	0.00074	223.83	< 0.0001	
Step 3					0.378318
Date	1	0.00011	33.70	< 0.0001	
Age	1	< 0.000005	0.10	0.7571	
Gender	1	< 0.000005	0.07	0.7925	
Ethnicity	2	0.00004	5.47	0.0042	
Race	8	0.00013	5.08	< 0.0001	
Political Orientation	1	0.00026	78.29	< 0.0001	
Education	1	< 0.000005	0.47	0.4938	
Date × Age	1	< 0.000005	0.03	0.8732	
Date × Gender	1	< 0.000005	1.23	0.2680	
Date × Ethnicity	2	0.00005	6.87	0.0010	
Date × Race	8	0.00005	2.06	0.0355	
Date × Political Orientation	1	0.00001	2.44	0.1180	
Date × Education	1	0.00001	1.56	0.2121	

Note. Numbers indicate summary statistics across the sample. Age, political ideology, and education were included in the model as continuous variables; gender, race, and ethnicity were included as categorical variables.

Demographic Moderators. To see if variation in attitudes toward Obama showed more malleability within sub-demographic samples, we next explored implicit and explicit attitude change for Black ($n = 12,419$) and White ($n = 143,707$) participants separately. Black participants demonstrated a strong implicit preference for Obama over other presidents ($M = 0.30$, $SD = 0.40$, $t[9820] = 73.09$, $p < .001$, $d = 0.75$, 95% CI [0.29, 0.30]), and White participants demonstrated a slight implicit preference for Obama ($M = 0.02$, $SD = 0.46$, $t[116755] = 14.95$, $p < .001$, $d = 0.04$, 95% CI [0.004, 0.010]). Implicit attitudes toward Obama were more positive for Black than for White participants, $t(12097) = 64.61$, $p < .001$, $d = 1.17$, 95% CI [0.27, 0.28]. Black participants explicitly preferred Obama over other presidents ($M = 1.75$, $SD = 1.53$, $t[11366] = 121.76$, $p < .001$, $d = 1.14$, 95% CI [1.72, 1.78]), while White participants demonstrated a slight explicit preference for Obama ($M = 0.03$, $SD = 2.06$, $t[132087] = 5.83$, $p < .001$, $d = 0.01$, 95% CI [-0.06, -0.03]). Explicit attitudes toward Obama were more positive for Black than for White participants, $t(15133) = 111.16$, $p < .001$, $d = 1.81$, 95% CI [1.69, 1.75].

In a regression predicting implicit attitudes from date, Black participants' attitudes were not impacted by date, $F(1, 9809) = 1.27$, $p = .259$, $R^2 = .0001$. This effect remained nonsignificant when demographics and date by demographic in-

teractions were included in the regression, $F(1, 9809) = 1.33, p = .249, \eta_p^2 = .00001$. Explicitly, Black participants showed a decrease in positivity toward Obama over time, $F(1, 11365) = 34.41, p < .001, B = -1 \times 10^{-9}, R^2 = .003$; this effect remained once we accounted for demographics and date by demographic interactions, $F(1, 11365) = 6.18, p = .013, B > -5 \times 10^{-9}, \eta_p^2 = .0005$. White participants demonstrated slight increasing positivity toward Obama over time implicitly ($F[1, 116754] = 23.85, p < .001, B = 1 \times 10^{-10}, R^2 = .0001$) and explicitly ($F[1, 132086] = 4.63, p = .031, B < 5 \times 10^{-10}, R^2 = .00004$). When including demographics and date by demographic interactions, the implicit effect was no longer reliable, $F(1, 116754) = 0.15, p = .696, \eta_p^2 < .00001$, while the explicit effect reversed to show that White participants were becoming more negative toward Obama over time, $F(1, 132086) = 15.09, p < .001, B = -2 \times 10^{-10}, \eta_p^2 = .0001$.

Finally, we investigated the patterns of stability and change in attitudes toward Obama among liberals ($n = 90,596$) and conservatives ($n = 87,819$). Overall, liberals implicitly preferred Obama over other presidents ($M = 0.22, SD = 0.41, t[73630] = 145.65, p < .001, d = 0.54, 95\% \text{ CI } [0.218, 0.223]$), while conservatives implicitly preferred other presidents to Obama ($M = -0.13, SD = 0.42, t[65353] = -76.97, p < .001, d = 0.31, 95\% \text{ CI } [-0.14, -0.13]$). Explicitly, liberals preferred Obama ($M = 1.24, SD = 1.66, t[83699] = 216.50, p < .001, d = 0.75, 95\% \text{ CI } [1.23, 1.26]$), while conservatives preferred other presidents ($M = -0.94, SD = 1.98, t[67145] = -122.71, p < .001, d = 0.47, 95\% \text{ CI } [-1.53, -1.50]$). Liberals held more positive attitudes toward Obama than conservatives both implicitly ($t[133219] = 153.37, p < .001, d = 0.84, 95\% \text{ CI } [0.35, 0.36]$) and explicitly ($t[130792] = 228.10, p < .001, d = 1.26, 95\% \text{ CI } [2.16, 2.20]$).

Liberals showed a small decrease in implicit positivity toward Obama over time, $F(1, 73629) = 18.85, p < .001, B = -1 \times 10^{-10}, R^2 = .0003$, but conservatives remained unchanged in their implicit attitudes, $F(1, 65351) = 1.09, p < .001, R^2 = .00002$. Date was not significant in predicting implicit attitudes for liberals or conservatives when demographics and date by demographics interactions were included in the models, all $ps > .100$, and all $\eta_p^2s < .00003$. Explicit attitudes decreased in positivity for liberals, $F(1, 83698) = 83.14, p < .001, B = -1 \times 10^{-8}, R^2 = .003$, but not for conservatives, who slightly increased in positivity toward Obama explicitly, $F(1, 67143) = 5.81, p < .001, B < 1 \times 10^{-9}, R^2 = .0001$. Once we accounted for demographic shifts, date was no longer significant in predicting implicit attitudes for conservatives, $F(1, 65351) = 0.90, p = .342, \eta_p^2 < .00001$, but the liberal decrease in explicit positivity remained reliable, $F(1, 83698) = 23.27, p < .001, B = -1 \times 10^{-8}, \eta_p^2 = .0003$.

RELATIONSHIP BETWEEN RACIAL ATTITUDES AND OBAMA ATTITUDES

To further explore the relationship between attitudes toward African Americans and those toward Obama, we calculated daily means for both the race and Obama tasks. Then, we ran a series of regressions predicting daily racial attitudes from the date of the study session. Daily implicit attitudes toward Obama negatively predicted daily implicit racial attitudes, $F(1, 2356) = 14.42, p = .0002, B = -0.05, 95\% \text{ CI } [-0.07, -0.02], R^2 = .010$. Daily explicit attitudes to-

TABLE 6. Hierarchical Linear Regression ($n = 2,358$) Predicting Daily Implicit Racial Attitudes from Attitudes Toward Obama from June 15, 2009 to December 31, 2015 (Step 1) and Daily Demographics (added in Step 2)

Predictor	ηp^2	F	p	R^2
Step 1				0.006082
Implicit Attitude toward Obama	0.00608	14.42	0.0002	
Step 2				0.323607
Implicit Attitude toward Obama	0.00044	1.51	0.2187	
Age (Presidents Task)	0.00029	0.98	0.3233	
Gender (Presidents Task)	0.00036	1.22	0.2693	
Ethnicity - Hispanic (Presidents Task)	0.00001	0.02	0.8868	
Ethnicity - Non-Hispanic (Presidents Task)	< 0.000005	0.01	0.9101	
Race - American Indian (Presidents Task)	0.00008	0.28	0.5952	
Race - East Asian (Presidents Task)	0.00042	1.45	0.2291	
Race - American Indian (Presidents Task)	0.00001	0.02	0.8759	
Race - Pacific Islander (Presidents Task)	0.00002	0.05	0.8163	
Race - Black (Presidents Task)	0.00001	0.02	0.8916	
Race - White (Presidents Task)	0.00003	0.10	0.7542	
Race - Black/White Biracial (Presidents Task)	0.00008	0.29	0.5909	
Race - Other Multiracial (Presidents Task)	< 0.000005	0.01	0.9298	
Political Orientation (Presidents Task)	0.00001	0.03	0.8739	
Education (Presidents Task)	< 0.000005	0.00	0.9732	
Age (Race Task)	0.00137	4.67	0.0307	
Gender (Race Task)	0.01939	67.60	< 0.0001	
Ethnicity - Hispanic (Race Task)	0.00752	25.92	< 0.0001	
Ethnicity - Non-Hispanic (Race Task)	0.02651	93.12	< 0.0001	
Race - American Indian (Race Task)	0.00110	3.78	0.0521	
Race - East Asian (Race Task)	0.04700	168.63	< 0.0001	
Race - South Asian (Race Task)	0.06474	236.65	< 0.0001	
Race - Pacific Islander (Race Task)	0.00338	11.61	0.0007	
Race - Black (Race Task)	0.00995	34.38	< 0.0001	
Race - White (Race Task)	0.09851	373.60	< 0.0001	
Race - Black/White (Race Task)	0.00582	20.02	< 0.0001	
Race - Other Multiracial (Race Task)	0.01638	56.95	< 0.0001	
Political Orientation (Race Task)	0.03383	119.73	< 0.0001	
Education (Race Task)	0.00281	9.62	0.0019	

Note. Numbers indicate summary statistics across the sample. Categorical demographic variables were dummy coded then averaged by day to create new variables.

ward Obama also negatively predicted daily explicit racial attitudes, $F(1, 2360) = 7.08$, $p = .008$, $B = -0.02$, 95% CI [-0.02, -0.004], $R^2 = .003$. Given our scoring, these results indicate that more positive attitudes toward Obama were weakly associated with more positive attitudes toward Black people in general. We used the same analysis strategy with monthly means for implicit and explicit racial and Obama attitudes. Monthly implicit attitudes toward Obama negatively predicted monthly implicit racial attitudes, $F(1, 78) = 12.96$, $p = .0006$, $B = -0.26$, 95% CI [-0.41, -0.12], $R^2 = .14$. However, monthly explicit attitudes toward Obama did not predict monthly explicit racial attitudes, $F(1, 78) = 2.81$, $p = .098$. On a month-by-month scale, implicit but not explicit positivity to-

TABLE 7. Hierarchical Linear Regression ($n = 2,361$) Predicting Daily Explicit Racial Attitudes from Attitudes Toward Obama from June 15, 2009 to December 31, 2015 (Step 1) and Daily Demographics (added in Step 2)

Predictor	η^2	F	p	R^2
Step 1				0.002994
Explicit Attitude toward Obama	0.00299	7.08	0.0078	
Step 2				0.407566
Explicit Attitude toward Obama	0.00090	4.49	0.0341	
Age (Presidents Task)	0.00011	0.58	0.4482	
Gender (Presidents Task)	0.00016	3.21	0.0733	
Ethnicity - Hispanic (Presidents Task)	0.00017	0.86	0.3541	
Ethnicity - Non-Hispanic (Presidents Task)	0.00011	0.01	0.4507	
Race - American Indian (Presidents Task)	0.00040	1.99	0.1583	
Race - East Asian (Presidents Task)	0.00011	0.57	0.4501	
Race - American Indian (Presidents Task)	0.00003	0.16	0.6900	
Race - Pacific Islander (Presidents Task)	0.00003	0.16	0.6909	
Race - Black (Presidents Task)	0.00021	0.60	0.4382	
Race - White (Presidents Task)	0.00008	0.42	0.5164	
Race - Black/White Biracial (Presidents Task)	0.00005	0.25	0.6167	
Race - Other Multiracial (Presidents Task)	0.00006	0.28	0.5940	
Political Orientation (Presidents Task)	0.00040	2.01	0.1559	
Education (Presidents Task)	0.00037	1.83	0.1758	
Age (Race Task)	0.00059	2.97	0.0849	
Gender (Race Task)	0.00016	0.81	0.3697	
Ethnicity - Hispanic (Race Task)	0.00066	3.33	0.0681	
Ethnicity - Non-Hispanic (Race Task)	0.00625	31.51	< 0.0001	
Race - American Indian (Race Task)	< 0.000005	0.00	0.9795	
Race - East Asian (Race Task)	0.01028	52.03	< 0.0001	
Race - South Asian (Race Task)	0.01114	56.43	< 0.0001	
Race - Pacific Islander (Race Task)	0.00002	0.10	0.7509	
Race - Black (Race Task)	0.07478	404.78	< 0.0001	
Race - White (Race Task)	0.00056	2.81	0.0940	
Race - Black/White (Race Task)	0.02624	134.95	< 0.0001	
Race - Other Multiracial (Race Task)	0.00135	6.77	0.0093	
Political Orientation (Race Task)	0.01925	98.30	< 0.0001	
Education (Race Task)	0.00439	22.09	< 0.0001	

Note. Numbers indicate summary statistics across the sample. Categorical demographic variables were dummy coded then averaged by day to create new variables.

ward Obama was associated with more positive attitudes toward Black people. Notably, these analyses between mean daily and monthly racial and Obama attitudes do not account for parallel demographic shifts in each sample. For instance, days on which larger numbers of liberal participants visited the Project Implicit website would have resulted in both more positive attitudes toward Obama and less negative attitudes toward African Americans in general (Nosek et al., 2007), a selection bias that could create a relationship in means between the two tasks that is only caused by changes in sample demographics. To control for possible changes in sample demographics across data collection, we derived daily and monthly means or proportions from our demographic variables

in both samples. Specifically, we ran hierarchical linear regressions predicting each day's mean racial attitudes from that day's Obama attitudes in Step 1. We included each day's average age, political orientation, educational attainment, and proportion of participants from each gender, racial, or ethnic category across both study samples in Step 2. We ran the same analyses for monthly means. After adding these demographic variables, the relationship between daily implicit attitudes became nonsignificant, $F(1, 2356) = 1.51, p = .219, \eta_p^2 = .0004$, while explicit daily Obama attitudes *positively* predicted explicit daily racial attitudes, $F(1, 2359) = 4.49, p = .034, B = 0.01, 95\% \text{ CI } [0.001, 0.023], \eta_p^2 = .001$, reversing the direction of the earlier effect. See Table 6 and Table 7 for a summary of these results. The analysis of monthly means produced similar effects. After controlling for sample demographics, implicit monthly attitudes were no longer reliably related, $F(1, 77) = 1.87, p = .178, \eta_p^2 = .004$, and explicit monthly Obama attitudes positively predicted explicit monthly racial attitudes, $F(1, 77) = 6.68, p = .013, B = 0.07, 95\% \text{ CI } [0.02, 0.12], \eta_p^2 = .01$. These analyses suggest that once accounting for changes in sample demographics, there was no relationship between daily and monthly means for implicit attitudes, but that days or months with more positive explicit attitudes toward Obama were associated with more negative attitudes toward Black people in general.

GENERAL DISCUSSION

Using a large online convenience sample, we tested whether implicit and explicit attitudes toward Black people in general and Obama specifically changed over almost seven years following Obama's first presidential election. After accounting for shifts in sample demographics, we found evidence that implicit negativity toward African Americans slightly increased over time. These findings held for Black participants, White participants, liberals, and conservatives. Across the entire sample, explicit racial attitudes showed no change in negativity toward African Americans once we accounted for demographic shifts. However, White and conservative participants decreased in explicit anti-Black bias, while Black participants became less pro-Black and liberals showed no change.

A similar analysis of implicit attitudes toward Obama showed little evidence of change over the course of data collection. Overall, implicit attitudes toward Obama did not change over time after accounting for demographic shifts. Black, White, and conservative participants' implicit attitudes likewise remained the same. Only liberals showed an effect—a slight decrease in implicit positivity toward Obama. We found a small but reliable effect indicating that explicit attitudes toward Obama became more negative over the course of his presidency. Black participants, White participants, and liberals also demonstrated decreasing explicit positivity toward Obama, but conservatives did not.

While statistically significant, any observed changes in implicit or explicit attitudes were small. For instance, the largest effect of time on attitudes toward Obama or Black people explained only 0.06% of the variance in attitudes. When

we controlled for changes in sample demographics, the average significant effect explained only an additional 0.02% of the variance in attitudes. To place this effect size in context, one would need roughly 50,000 participants to achieve 80% power in a two-condition, between-subjects design for detecting an effect of equal size. Such small effects support the interpretation that implicit and explicit attitudes, both toward Black people in general and Obama specifically, did not substantively change over time in our data.

Finally, daily and monthly means of implicit and explicit positivity toward Obama were associated with daily and monthly means of anti-Black implicit and explicit bias. These results initially appear consistent with a possible “Obama effect,” as more positive attitudes toward Obama predicted more positive attitudes toward Black people in general. However, these results should not be overstated. First, this regression analysis cannot determine causality; just as Obama may have altered attitudes toward Black people, perhaps attitudes toward Black people in general created changes in attitudes toward Obama specifically. Second, including daily or monthly demographics in the regression analyses eliminated (for implicit attitudes) or reversed (for explicit attitudes) the relationships between daily and monthly means in attitudes. In fact, this analysis strategy supported a reversal of the “Obama effect” for explicit attitudes, as days and months with more positive attitudes toward Obama were related to days and months with more negative attitudes toward Black people.

EXPLICIT AND IMPLICIT ATTITUDES CAN AND DO CHANGE

The lack of substantive change in racial attitudes found in this study does not qualify attitude malleability in general. Implicit and explicit changes in racial attitudes can be found consistently in previous research (see Lai, Hoffman, & Nosek, 2013 for a review). Our findings are particularly interesting in light of recent work showing reductions in implicit and explicit anti-gay attitudes over time (Westgate, Riskind, & Nosek, 2015). Participants from a large, cross-sectional convenience sample ($N = 683,976$) showed a 13% reduction in implicit and 26% reduction in explicit anti-gay attitudes between February 2006 and August 2013. Relative to our own analyses, these results show that attitudes toward gay people changed at over 10 times the rate implicitly and 100 times the rate explicitly as attitudes toward Black people over a comparable length of time.⁷

Substantive changes in attitudes toward homosexuals from a similar sample and time period naturally leads to the question of why parallel change was not found in racial attitudes during Obama’s presidency. Several cultural explanations for this discrepancy are plausible. First, large cultural shifts in racial attitudes may have occurred before our data collection started. As was pointed out in the Schmidt and Nosek (2010) investigation of racial attitudes during Obama’s first

7. Comparisons based on effects from Step 3 hierarchical regressions including date and date by demographic interactions.

presidential campaign, the mere fact that Obama was elected indicates that Americans' attitudes toward Black people have changed significantly over time. Indeed, analyses of racial attitudes in previous decades showed large changes in evaluations of Black people (e.g., Madon et al., 2001). For example, while 4% of White people approved of Black-White marriages in 1958, 75% approved them in 2007 (Gallup, 2007). These transformations in racial attitudes may have been caused by (or caused) large societal changes in the treatment of African Americans, such as the Civil Rights Act of 1964. A similar cultural shift may be occurring over the past decade in attitudes toward homosexuals, a time period that has also brought changes in the rights afforded to gay people.

Second, Obama's impact on perceived racial progress may have been initially overstated. Whereas Obama has become the world's most powerful Black politician, his election was preceded by the appointment of several other prominent Black figures (e.g., Condoleezza Rice, Clarence Thomas, and Colin Powell). Changes in racial attitudes may have occurred after many Americans realized that Black people occupied some of the highest positions in government. As a result, Obama's election may not have been as effective at changing racial attitudes as it might have been in the absence of these earlier instances of salient Black political figures.

Third, Obama may not have changed attitudes toward Black people in general over time because attitudes toward Obama himself showed little change over time. If positivity toward Obama does impact positivity toward African Americans generally, and positivity toward Obama is not changing, neither should positivity toward African Americans. Further, given the research demonstrating that Obama's rise to power also had little impact on racial attitudes (Schmidt & Nosek, 2010), we cannot claim that any positivity toward Obama had already influenced racial attitudes before his first election. Evidence of lasting change in racial attitudes that could be attributed to Obama may take significantly longer than the time period investigated here to emerge. Indeed, many presidents see a sizable increase in approval once they leave office (Gallup, 2013). As perceptions of Obama potentially become more positive in the years to come, so too may attitudes toward African Americans in general.

Finally, Obama's presidency did not change attitudes toward Black people because many people may not view Obama as representative of Black people in general. Some people may view Obama as Black, but subtype him (Weber & Crocker, 1983), thereby preventing evaluations of Obama from generalizing to Black people as a category. Others may *literally* not view Obama as Black. One recent survey found that 52% of White respondents preferred to label Obama as "mixed race" instead of Black (Pew Research Center, 2010), compared to the 55% of Black respondents who labeled Obama as Black. Perceiving Obama as not fully belonging to the category of Black people would severely limit his capacity to change attitudes toward Black people in general.

THEORETICAL IMPLICATIONS

As discussed in the Introduction, racial attitudes during Obama's presidency may have: (1) become less anti-Black, (2) become more anti-Black, or (3) remained the same. Evidence for each of these predictions implies a different perspective regarding the process of attitude change. Given the nature of our data (a cross-sectional convenience sample), reaching any conclusions about these predictions is difficult. Much of the research reviewed in support of each of these three predictions was experimental in design, so the same processes may not apply to our correlational study. Further, a nearly null result should not be interpreted as confirmatory of any one model of attitude change.

So, what, if anything, can we conclude from these data? An exemplar-based account of attitude change would predict a decrease in anti-Black attitudes, but we can generate competing predictions over whether this change should have occurred among liberals (whose positive opinion toward Obama could then lead to attitudinal changes toward Black people in general) or conservatives (who are more likely to hold negative perceptions of Black people in general, meaning exposure to Obama countered racial expectations and led to greater attitude change; Goldman, 2012). Regardless, we found no evidence of substantive attitude change in liberals' or conservatives' explicit or implicit racial attitudes, with the largest influence of time in these analyses explaining .003% of the variance in attitudes. Exposure to Obama as a counter-stereotypic exemplar did not produce the type of change (substantively more positivity toward African Americans) in this study that has been found in previous investigations (e.g., Columb & Plant, 2011; Columb & Plant, this issue). This analysis of the impact of the Obama presidency on racial attitudes suggests that attitudes toward both groups and individuals may not be as malleable as often assumed. If anything, our findings appear to support a subtyping account of attitude change, wherein Obama is not impacting racial attitudes because he is not judged to be representative of African Americans. However, given other possible interpretations of our results, we cannot offer this mechanism definitively.

FUTURE DIRECTIONS

These data offer several avenues for future research. Perhaps most obviously, our analysis ends 13 months before Obama will leave office, while our key measures continue to collect data. Though a larger change in attitudes toward African Americans during this last period of Obama's presidency may occur, we have no reason to anticipate unprecedented malleability.

One potentially promising avenue for future work would involve investigating whether heightened change in racial attitudes occurred among children raised during Obama's presidency. In a recent analysis of anti-Semitic attitudes among Germans alive during the Third Reich, children between the ages of 6 and 15 were the most likely to express negative opinions toward Jews when measured more

than 50 years later (Voigtländer & Voth, 2015). These findings are consistent with developmental research illustrating a similar critical period for intergroup attitude formation (e.g., Enesco, Navarro, Paradela, & Guerrero, 2005). Our sample included some participants from the upper end of this age range (8.6% of race task participants were 15 or younger when Obama was first elected), but future work may look for evidence of change in racial attitudes among a larger sample of younger participants who grew up during Obama's presidency.

LIMITATIONS

The correlational and cross-sectional nature of our analyses prevents any discussion of either causality or the lack thereof. Moreover, these data did not come from a representative sample of Americans, and whether the same results would occur in a more representative sample is unclear. In addition, our participants likely completed these measures knowing that they were participating in studies dealing with implicit bias, and in the case of the race IAT, were aware that most participants show implicit preferences for White people over Black people. This information certainly skewed our sample toward individuals more interested in and comfortable with the notion of implicit bias, and may have also altered participants' motivation during the task. While these factors likely altered mean-level implicit and explicit attitudes, they are less likely to have impacted attitude change over time because they were present throughout data collection.

In addition, the near-null results observed here could actually be masking real but conflicting influences on racial attitudes. For example, the weakened economy that existed during much of Obama's two terms may have increased anti-Black attitudes even as Obama's presidency itself reduced anti-Black attitudes. Alternatively, our unpromising results may have been produced from both weaker anti-Black attitudes created through positive exemplar effects (Dasgupta & Greenwald, 2001) among some participants and stronger anti-Black attitudes created through perceived group threat (Blumer, 1958) among other participants.

These concerns can be partly addressed by our inclusion of demographic variables and their interactions with date. Any large-scale influence that reliably altered racial attitudes would most likely differentially influence the demographic groups included in our analysis (such as people of differing education levels, ages, races, or political orientations). However, our examination of subgroup trends revealed only small or absent effects. Additionally, the largest effect size for any of the date by demographic interactions included in the analyses was $\eta_p^2 = .001$. In short, changes within the demographic groups analyzed here do not seem to matter much in determining the overall change (or lack thereof) in explicit or implicit racial attitudes.

However, variables not present in our analyses (e.g., indicators of the economic climate, feelings of personal safety) may have shown competing effects of increases and decreases on racial attitudes had they been included. Indeed, other articles in this special issue point toward such variables that may be key to understanding

when changes in racial attitudes occur, such as negative media exposure to Obama (March, Kendrick, Fritzen, & Olson, this issue) or threats to one's status (Skinner & Cheadle, this issue). Including such variables in future data collection will be informative in determining whether influences that create racial attitude change in an experimental context are also associated with attitude changes in correlational data.

A final limitation is that we cannot know the extent to which Obama was accessible when participants completed the racial attitude measures. We attempted to address this concern by analyzing attitudes before and after major events in Obama's presidency, and again found no substantial changes in implicit or explicit evaluations of Black people or Obama specifically. We compared implicit and explicit attitudes around important dates in the Obama presidency (e.g., the death of Osama bin Laden, the passing of healthcare reform, his 2012 re-election), and found no evidence for substantive change in attitudes (for analyses, see the online supplement at <https://osf.io/h26ux/>). Although Obama was likely to be more salient on such days, these events may still not be as influential as experimental manipulations that directly expose participants to Obama and then assess racial attitudes (e.g., Columb & Plant, 2011). While changes in attitudes toward Black people may arise when Obama is made highly accessible, this requirement would severely limit the generalizability of such findings.

THE LEGACY OF BARACK OBAMA

While the election of Barack Obama has not heralded the end of racism in America, the symbolic impact of the first Black president is nevertheless powerful. For generations to come, Obama will likely serve as a role model for African Americans; despite widespread anti-Black implicit and explicit attitudes, a Black person can attain "the highest office in the land." Though Obama has undoubtedly changed the public discourse about race, our findings call into question whether Obama has fundamentally changed individual social cognitive processes.

For the individuals in our sample, racial evaluations did not substantively change during the first seven years of Obama's presidency. The presidency of Obama served as a naturalistic study of whether prolonged exposure to a counter-stereotypic exemplar can influence implicit and explicit attitudes. According to our data, such malleability is highly limited. Based on our findings alone, Obama's impact on social cognition appears minimal. However, these data have limitations that may constrain the generalizability of our results to other domains of social cognition research.

Barack Obama's election signaled that Americans' racial attitudes have undergone a large transformation over the past several decades. However, the enduring presence of explicit and implicit anti-Black attitudes throughout his presidency suggests that further interventions are needed before the nation is free of racial bias. Our data suggest that Obama's election may be remembered less as a catalyst and more as a byproduct of changes in attitudes toward Black people. Racial

bias remains a continual, prominent part of the national conversation. The current state of race relations in the United States may ignite further efforts to enact changes to policies and attitudes in the future. These forces, combined with the cultural changes that allowed for Obama's election, may further erode prevailing anti-Black attitudes in the decades to come.

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