*****PRE-PRINT*****

Final and accepted version currently in press at
Personality and Social Psychology Bulletin

Implicit and Explicit Racial Attitudes Changed During Black Lives Matter

Jeremy Sawyer*

The Graduate Center, City University of New York (CUNY)

Anup Gampa*

University of Virginia

*Co-first authors

Word count: 11,032 (including notes, references, and abstract)

Correspondence regarding this article can be addressed to Jeremy Sawyer (present affiliation is Temple University: jeremy.sawyer@temple.edu) or Anup Gampa (anup@virginia.edu).

Acknowledgements

We thank Brian Nosek and the Nosek Lab for feedback on analysis, interpretation of the results, and pre-registration, and Robert Moulder for his assistance with data analysis.

Abstract

Lab-based interventions have been ineffective in changing individuals' implicit racial attitudes for more than brief durations, and exposure to high-status Black exemplars like Obama has proven ineffective in shifting societal-level racial attitudes. Anti-racist social movements, however, offer a potential societal-level alternative for reducing racial bias. Racial attitudes were examined before and during Black Lives Matter (BLM) and its high points of struggle with 1,369,204 participants from 2009 to 2016. After controlling for changes in participant demographics, overall implicit attitudes were less pro-White during BLM than pre-BLM, became increasingly less pro-White across BLM, and were less pro-White during most periods of high BLM struggle. Considering changes in implicit attitudes by participant race, Whites became less implicitly pro-White during BLM while Blacks showed little change. Regarding explicit attitudes, Whites became less pro-White and Blacks became less pro-Black during BLM, each moving toward an egalitarian "no preference" position.

Keywords: Implicit attitudes, racial bias, social movements, IAT, Black Lives Matter

Implicit and Explicit Racial Attitudes Changed During Black Lives Matter

The hashtag #BlackLivesMatter was created in July 2013 after George Zimmerman was acquitted in the killing of 17-year-old Trayvon Martin. The movement's initiators characterized it as a response to structural anti-Black racism pervading the U.S., and "an affirmation of Black folks' contributions to this society, our humanity, and our resilience in the face of deadly oppression" (Garza, 2014). "Black lives matter" became the rallying cry of a new social movement that shattered the notion of a "post-racial" America and reoriented national political conversation on anti-Black racism (Petersen-Smith, 2015). Over the past few years, Black Lives Matter (BLM) protests have taken place in every major U.S. city. While the movement has been Black-led, activists of multiple races have marched through neighborhoods and cities, disrupted presidential election campaign events, and occupied malls, police departments, and city halls. Public awareness of BLM is widespread, and nearly twice as many Americans support BLM (43%) as oppose it (22%) (Horowitz & Livingston, 2016). In response to this progressive movement, there have been attempts at counter-movements in the form of "All Lives Matter" or "Blue Lives Matter." These counter-movements, however, have been greatly outnumbered in the streets, and overshadowed in social media and online interest by BLM (Anderson & Hitlin, 2016; see comparison of BLM and counter-movement web trends here: <https://osf.io/kgqsz/>). What impact, if any, might this mass social movement against racism have had on racial attitudes in the U.S.?

Collectively, BLM has asserted that Black lives should have the same value as those of non-Blacks, and as those of Whites in particular (Chaney & Robertson, 2015). Many accounts of racism posit, as integral to its functioning, the social, political, and psychological construction of racial ingroups and outgroups (e.g. Marks, 1996; Omi and Winant, 2014; Tate & Audette, 2001).

Historically in the U.S., in an effort to cheaply produce cotton and other commodities, the enslavement of peoples from Africa led to the construction of Black and White racial groups, and the development of racist ideology in an effort to facilitate and justify slavery (Fields, 1990). Notwithstanding the genocide of Native Americans, Blacks and Whites have been the primary racial groups that have anchored racist ideology in the U.S., with anti-Black racism mirrored in the ideology of White supremacy (Alexander, 2010). Thus, the emergence of the BLM movement in the U.S. raises the specific question of what impact, if any, this anti-racist social movement has had on Whites' and Blacks' implicit and explicit racial attitudes vis a vis one another. This study examined whether implicit and explicit racial attitudes changed during the emergence and growth of BLM, as well as during high points of BLM struggle.

Implicit attitudes are generally held to be automatic affective evaluations (favorable or unfavorable) resulting from the associations that are activated automatically when one encounters a relevant stimulus (Gawronski & Bodenhausen, 2006). Thus, people can harbor implicit biases against social groups without explicitly endorsing them (Nosek, Hawkins, & Frazier, 2012). For instance, high levels of negative associations regarding Blacks may be activated even if these attitudes contrast with individuals' explicit attitudes (Devine, 1989). Consequently, implicit and explicit attitudes are understood to operate via largely distinct psychological mechanisms (De Houwer, Teige-Mocigemba, Spruyt, & Moors, 2009). In addition, they are generally thought to be subject to distinct formative experiences (Rydell & McConnell, 2006) and thus to entail distinct routes for change (Gawronski & Bodenhausen, 2006). Importantly, implicit racial biases predict negative interracial contact (McConnell & Leibold, 2001) and discriminatory behaviors, including in hiring, housing and education (Staats

et al., 2015). Thus, reducing implicit (and explicit) prejudice is of tremendous theoretical and practical interest (Gawronski & Bodenhausen, 2006).

Laboratory-based research indicates that implicit racial preferences can be shifted over short periods of time in several ways, including changes in emotional states (Dasgupta, DeSteno, Williams, & Hunsinger, 2009) and exposure to counter-stereotypical exemplars (Dasgupta & Greenwald, 2001). However, there is little evidence for interventions that reduce implicit prejudice over periods longer than a single lab session. One of the few studies tracking lasting changes in individual implicit attitudes found that none of the changes caused by nine effective short-term interventions (e.g. counter-stereotypical exemplars, priming multiculturalism, evaluative conditioning) endured after a couple days (Lai et al., 2016). The authors concluded that racial prejudices remain steadfast against efforts to change them, possibly because racially biased messages are so pervasive in U.S. society. Thus, while support exists for the short-term malleability of implicit evaluations, there is scant evidence for long-term individual shifts in evaluation (Lai, Hoffman & Nosek, 2013).

Similarly, there is little evidence for aggregate (i.e. societal-level) implicit attitude change. However, exploring how and when implicit attitudes change on a societal level is vitally important because even statistically small changes in aggregate attitudes can have impacts on discrimination that are societally meaningful (Greenwald, Banaji, & Nosek, 2015). In addition, aggregate racial attitudes have been found to relate to Black/White health disparities. For instance, counties in which Whites harbor greater implicit and explicit anti-Black bias show increased Black/White disparities in birth weight (Orchard & Price, 2017), decreased access to health care and poorer health outcomes for Blacks (Leitner, Hehman, Ayduk, & Mendoza-Denton, 2016). To determine the magnitude of changes in attitudes at the societal level,

researchers must examine aggregate shifts in mean bias over time. This societal impact may occur because attitude changes lead to changes in behavior that affect many people simultaneously or that affect individual people repeatedly (Greenwald et al., 2015). Note that use of the term “societal-level” in reference to attitude data in these studies (and the current study) should not be taken to imply that the data comes from a perfectly representative U.S. national sample, but rather that it contains a very large number of participants from across the nation.

Only four published studies have examined societal-level implicit attitude change (or lack thereof): two focusing on racial attitudes (Schmidt & Nosek, 2010; Schmidt & Axt, 2016) and two on attitudes toward sexual orientation (Westgate, Riskind, & Nosek, 2015; Inbar, Westgate, Pizarro & Nosek, 2016). The race-relevant studies on implicit attitudes investigated the society-level impact of the “Obama effect.” This effect posits that Barack Obama’s rise to the U.S. presidency represented the embodiment of a high-status Black exemplar, unprecedented in scope and visibility, that had the power to induce a societal shift in implicit racial attitudes (Plant et al., 2009). In some lab experiments with relatively small samples, exposure to Obama as a counter-stereotypic exemplar has been reported to reduce anti-Black implicit attitudes (Columb & Plant, 2011; Columb & Plant, 2016). However, after examining societal-level data from the Implicit Attitude Test (IAT) during the Obama era, and accounting for shifts in sample demographics over time, Schmidt and Nosek (2010) and Schmidt and Axt (2016) found that mean implicit and explicit attitudes did not change meaningfully during Obama’s campaign, nor over the length of his presidency. Given that such a seemingly potent exemplar could not be connected with shifts in aggregate attitudes, the authors suggested that racial attitudes may not be as malleable as previously thought. In the field of racial attitudes, implicit bias against Black people in particular appears tenacious. Anti-Black implicit bias has been found to emerge early in childhood (Baron

& Banaji, 2006), and to exist on average across every age, gender, racial and national group that has been studied, with the exception of Black people themselves, who tend to be closer to an egalitarian “no preference” implicit attitude when comparing Blacks and Whites (Nosek, Smyth et al., 2007).

In contrast to the lack of evidence for any changes in aggregate racial attitudes across Obama’s presidency after controlling for demographics, a reduction in societal-level anti-gay attitudes was found for both implicit and explicit attitudes between February, 2006 and August, 2013 (Westgate, Riskind, & Nosek, 2015). The authors characterized this period in terms of legal changes (e.g. recognition of same-sex marriage) and more favorable media representations of gay and lesbian people, and conjectured that reductions in anti-gay attitudes were due to these cultural changes. However, this period also included the mass LGBT rights movement, which was arguably the primary driving force behind these legislative and cultural changes (Kowal, 2015). Furthermore, it is well documented that White Americans’ explicit attitudes toward racial desegregation and toward Blacks in general changed in a progressive direction around the time of the Civil Rights and Black Power movements of the 1960s and early 1970s (Condran, 1979; Greeley & Sheatsley, 1971; Taylor, Sheatsley, & Greeley, 1978). This raises the question of whether mass social movements might be a more effective force for creating aggregate, societal-level attitude change than individual exemplars or lab-based interventions. In other words, given that lab studies targeting individual-level attitude change using a variety of interventions and high-status exemplars did not produce enduring or societal-level reductions in implicit bias, could social movements (and the cultural and media changes they produce) potentially contribute to such reductions in implicit bias?

Several theories of attitude change illuminate why social movements have the potential to drive societal-level changes in both implicit and explicit attitudes (Gawronski & Bodenhausen, 2006; Petty, Brinol, & DeMarree, 2007; Rydell & McConnell, 2006). One prominent framework, the associative-propositional evaluation model (APE), posits that implicit attitude change can result from changes in the structure of associative evaluations or temporary changes in activation patterns of preexisting associations (Gawronski & Bodenhausen, 2006 & 2014). The APE argues that exposure to familiar exemplars like Obama may activate specific preexisting associations with Obama (e.g. powerful, accomplished), which temporarily influences associative evaluations of Blacks in general. However, because the exemplar is individually specific, its activation may not fundamentally alter one's associative structure with Black people in general. In contrast, a social movement that repeatedly pairs Black people in general with positive words ("Black Lives Matter"), images, and traits (courageous, agentic) may systematically change the underlying valence of associations with Black people, thus causing more fundamental and lasting change on an aggregate, societal level. BLM may also change the social context in which evaluative associations are formed. For example, in contrast with a pervasive media and social narrative of Blacks as criminals, BLM has highlighted Black people as targets of racism and unlawful police brutality, who in turn are actively fighting for justice, which would appear to carry positive associations as well. In addition, BLM rallies, interviews, and media coverage have given Black people the opportunity to directly voice their opinions on racism and racial issues. This is potentially significant because listening to opinions expressed through speech seems to increase the likelihood that individuals will attribute humanlike qualities to those expressing the opinion – even if the opinion is not currently shared (Shroeder, Kardas, & Epley, 2017). Furthermore, the millions of individuals who attend BLM demonstrations or who come to politically identify with

the movement may create new associations between themselves and Blacks; such associations with the self are argued to produce more positive evaluations of the attitude object (Walther & Trasselli, 2003). Furthermore, through participation in or identification with BLM there is the possibility of creating a common ingroup identity (e.g. as anti-racists) that includes both Blacks and Whites, which evidence suggests can reduce racial bias (Gaertner & Dovidio, 2005).

In addition to changing implicit attitudes, an anti-racist movement may transform explicit attitudes by catalyzing widespread political discussion, thus generating and spreading persuasive arguments about the value of Black lives or the virtue of struggling against racism. According to APE, generating such arguments and propositions for reasoning can initiate proactive top-down construction of new associative evaluations, which further changes the structure of implicit attitudes. Through such propositional mechanisms, changes in explicit racial attitudes can alter implicit racial attitudes. Conversely, changes in implicit associations can have bottom-up effects that modify explicit evaluations. In the context of an ongoing, real-world social movement like BLM, it is likely that both processes operate reciprocally, amplifying the potential of the movement to shift implicit and explicit racial attitudes. Finally, although systemic racism can often seem an intractable problem, a mass movement like BLM can raise hopes that something can actually be done to ameliorate this problem. Such an increased sense of efficacy to reduce racial inequality has been found to not only increase Whites' engagement in anti-discriminatory action, but to also be associated with more positive explicit intergroup attitudes toward Blacks (Stewart, Latu, Branscombe, & Denney 2010). Of course, individuals' political orientations may affect how they respond to processes related to social movements. Further, it is possible that polarization of attitudes may occur between liberals and conservatives, or that conservatives might be more likely to undergo an attitudinal "backlash" to social movements in certain

contexts (Jost, Nosek, & Gosling, 2008), especially given the presence of counter-movements such as All Lives Matter and Blue Lives Matter. An interesting and important question in its own right, we also investigated whether observed attitude changes during BLM occurred among Americans of all political orientations, or just among those with certain orientations (e.g. liberals).

To investigate the possibility of a BLM effect on racial attitudes, we first delineated the overall period of time marked by the emergence, growth, and sustained activity of BLM (July 6th, 2013 to June 30th, 2016). We hypothesized that the BLM period would entail an aggregate reduction in implicit and explicit preference for Whites over Blacks, compared to the preceding years during the Obama administration. We also hypothesized an ongoing, cumulative influence of BLM on attitudes that would be reflected in gradual change in aggregate attitudes over time during BLM. Further, we expected that specific high points of BLM struggle within the overall BLM period would correspond to additional short-term decreases in pro-White/anti-Black bias. To test this hypothesis, we selected, a priori, empirically supported high points of BLM struggle and resulting media activity. Finally, we examined whether the magnitude of any observed attitude changes differed among liberals and conservatives. Of course, it is important to note that any relations found between BLM and societal-level attitude change is correlational in nature, and thus precludes causal conclusions. Nevertheless, examining attitudes during a predefined BLM period with specific high points of BLM struggle, specified a priori using historical, media, and social-media data, increases the likelihood that attitude changes corresponding to these periods are at least partially attributable to BLM.

Method

Selecting BLM Periods

The full range of the study spans from January 1st, 2009 to June 30th, 2016, beginning just prior to Obama’s inauguration and ending with the latest available Race IAT data at the time of analysis (Xu, Lofaro, Nosek, & Greenwald, 2016). This 7.5-year range was divided into two periods: a 4.5-year pre-BLM period before the BLM movement emerged (January 1st, 2009 to July 5th, 2013), and the 3-year period of the BLM movement (July 6th, 2013 to June 30th, 2016). The beginning of the BLM period was identified as July 6th, 2013, based on a dramatic spike in media citations during the week prior to the trial of George Zimmerman, and because the Zimmerman trial represented the initiation of the BLM movement and its associated hashtag (#BlackLivesMatter). Within the BLM period, consecutive weeks with substantially higher media citations around significant BLM protests were selected to represent periods of high BLM activity. The seven periods displayed in Table 1 were selected after reviewing BLM-related citation data from two sources: Factiva and LexisNexis, with social media data from “Beyond the Hashtags” (Freelon, McIlwain, & Clark, 2016) used as a cross-check. These surges in BLM activity were hypothesized to be associated with significant short-term decreases in implicit and explicit preferences for Whites over Blacks.

INSERT TABLE 1 ABOUT HERE

Full details for the a priori process of selecting BLM-periods can be found at:

<https://osf.io/uhwh3/>. The average number of media citations for search terms are displayed in Figure 1.

INSERT FIGURE 1 ABOUT HERE

Participants

Participants were visitors to the Project Implicit website (<https://implicit.harvard.edu>) who selected the “Race IAT” between January 1, 2009 and June 30, 2016. Participants completed the IAT, explicit attitude measures, and demographic questions. IAT sessions were included in the analysis if they reported being U.S. citizens. Only Black and White participants were included in our main analysis (81% of total participants) because they are the groups directly referenced by the IAT Race task, and because categories of White and Black have been the primary axis of racism in the U.S. from slavery to Jim Crow to modern mass incarceration (Alexander, 2010). Nevertheless, as a point of reference, a secondary analysis for participants of races other than Black and White (19% of total participants) is briefly summarized at the end of the Results section. As is typical in IAT research, sessions were excluded if they had one of the following: (a) overall error rates above 30%, (b) error rates above 40% for any response block, or (c) more than 10% of trials with latency less than 300 milliseconds (Greenwald, Nosek, & Banaji, 2003; 14.08% total sessions were excluded). The final sample included 1,369,204 participants, with an average of 509 sessions per day. See Table 2 for sample demographics.

INSERT TABLE 2 ABOUT HERE

Materials

The Race IAT measured implicit and explicit attitudes toward Whites (European Americans) and Blacks (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). To date, this item has been used as the measure of explicit attitudes in all studies of societal-level implicit and explicit racial attitudes (Inbar et al., 2016; Schmidt & Nosek, 2010; Schmidt & Axt, 2016;

Westgate et al., 2015), and thus is retained here. Some studies have shown effective single-item measures to have equal convergent and divergent validity to multiple-item measures (e.g., Gardner, Cummings, Dunham, & Pierce, 1998). In addition, explicit racial attitude measures that ask participants directly about their attitudes, like the one employed here, correlate more highly with implicit attitudes than less direct measures (Axt, 2017).

Implicit racial attitudes were assessed using a 7-block IAT that measured association strengths between racial categories (Whites and Blacks) and pleasant and unpleasant words (Nosek, Greenwald, & Banaji, 2007). If participants were faster to pair White with pleasant words and Black with unpleasant words than White with unpleasant words and Black with pleasant words, it was assumed that they implicitly preferred Whites over Blacks. The IAT was scored such that more positive values (D-score) indicated a stronger implicit association between Whites and pleasant and Blacks and unpleasant, while a score of zero indicated no preference (Greenwald, Nosek, & Banaji, 2003). The IAT is commonly used in research on implicit attitudes, has demonstrated robust validity for measuring relative association strengths (Greenwald & Nosek, 2001; Greenwald, Nosek, & Banaji, 2003; Jost et al., 2009; Nosek, Greenwald, & Banaji, 2007), correlates with other measures of implicit attitudes (Cunningham, Preacher & Banaji, 2001), and was found to show the best overall psychometric quality among seven implicit measures (Bar-Anan & Nosek, 2014). Some studies have found IAT measures to predict discriminatory behavior better than measures of explicit attitudes (Greenwald, Poehlman, Uhlmann, & Banaji, 2009), while others have reported that they are equally effective (Oswald et al., 2013). Finally, unlike other implicit and explicit attitude datasets, Race IAT data permits the tracking of aggregate attitude changes on a daily basis over multi-year spans, which is essential for conducting societal-level cross-sectional analyses such as the present study.

Procedure

To pursue convergent evidence that racial preferences for Whites over Blacks decreased during the BLM movement, five different statistical analyses were conducted on implicit and explicit attitudes using (a) all participants ($N = 1,369,204$), (b) White participants only ($N = 1,179,805$) and (c) Black participants only ($N = 189,399$). These analyses build upon the methods used to analyze societal changes in aggregate implicit and explicit attitudes in Westgate et al. (2015); Inbar et al. (2016); Schmidt and Nosek (2010); and Schmidt and Axt (2016). The pre-registration for these analyses, along with details of initial analysis can be found at: <https://osf.io/cbesf/>. Study data, materials and analysis syntax are available here: <https://osf.io/bq2dt/>. In accordance with this pre-registration, the following four analyses were conducted for implicit and explicit attitudes:

1. To investigate the potential cumulative influence of the BLM movement on aggregate attitude trajectories over time, hierarchical linear regression was conducted using a date variable that spanned the length of the BLM period. This hierarchical regression was conducted using the same methodology used in previous societal analyses of implicit and explicit attitudes (Schmidt & Nosek, 2010; Westgate et al., 2015; Schmidt & Axt, 2016). After controlling for demographic changes and their interactions across time, we expected a meaningful linear effect of date. The benchmark for a meaningful effect was set at $\eta_p^2 = .001$, the level identified as a socially meaningful benchmark for a similar hierarchical regression on aggregate, societal-level attitudes collected via Project Implicit in Westgate et al. (2015). Results exceeding this benchmark would indicate that racial attitudes changed at a meaningful, gradual rate during BLM. Note that the benchmark of $\eta_p^2 = .001$ applies only to hierarchical analyses, given the precedent.

2. To confirm that attitude trajectories during BLM were different than attitude trajectories prior to BLM, regression discontinuity (RD) analysis (Thistlewaite & Campbell, 1960) was conducted, controlling for demographic changes and their interactions across time, for the full span of the study (January 1, 2009 to June 30, 2016) using a cut-off date of July 6, 2013 to mark the initiation of BLM. Significant results in hierarchical regression (analysis one) do not preclude the possibility that racial attitudes may have been decreasing prior to BLM, and therefore might not be attributable to BLM. RD examines discontinuities in attitudes, and allows the comparison of rates and trajectories of attitude change before BLM and during BLM. Significant results in RD would indicate a change in attitude trajectories such that (1) before the BLM cut-off date, in line with prior research (Schmidt & Axt, 2016), there was no decreasing trajectory (i.e. a flat or positive slope) in pro-White preferences; and (2) after the BLM cut-off date, in contrast to prior research, there is a decreasing trajectory (negative slope) in pro-White preferences.

2a. To examine aggregate differences in mean attitudes between the pre-BLM to BLM period, a one-way analysis of covariance (ANCOVA) was conducted to directly compare mean attitudes during each period, controlling for demographic variables as covariates.

3. To test whether attitudes changed during specific high points of BLM struggle, a set of ANCOVAs compared attitudes during the seven pre-identified periods of high BLM activity to attitudes during the preceding 30 days. Significant results in periods of high struggle would support the notion that these short-term shifts in attitudes are attributable to BLM, rather than representing a long-term historical trend. Thus, in addition to a gradual shift in attitudes over the length of the BLM period, shorter periods of very high

BLM activity should correspond to additional attitude change over the short-term. To determine whether short-term changes were unique to these pre-specified high points, a further check compared the high point analyses with other arbitrarily chosen short-term periods within BLM.

4. To rule out the possibility that any results observed in analysis three were due to seasonal fluctuations in the data, a set of ANCOVAs compared attitudes during the seven periods of high BLM activity to attitudes during the same periods averaged across the four years preceding BLM (2009 to 2012). Significant results would indicate that seasonal effects on attitudes do not account for attitude changes observed during high points of BLM struggle.

Results

For the 1,369,204 participant sessions across the full span of the study (January 1st, 2009 to June 30th, 2016), participants showed an overall preference for Whites over Blacks both implicitly ($M = 0.32$, $SD = 0.44$, $t[1,369,193] = 860.93$, $p < .001$, $d = .74$) and explicitly ($M = 0.31$, $SD = 1.06$, $t[1,256,693] = 329.14$, $p < .001$, $d = .29$). Implicit and explicit attitudes were positively correlated, $r(1,256,688) = .32$, $p < .001$, consistent with previous analyses (Bar-Anan & Nosek, 2014; Schmidt & Nosek, 2010).

Shifts in sample demographics over time

Inferring attitude change with cross-sectional data can be difficult. In particular, an inferential limitation would occur if the sample composition changed over time, and that change in composition accounted for observed shifts in attitudes. For instance, if liberals have less anti-Black attitudes than conservatives (Nosek et al., 2007), an increase in liberal participants in the Race IAT over time could cause a decrease in anti-Black attitudes that is merely a result of

demographic changes. To get a sense of the size of demographic shifts over the full span of our study, we regressed participants' date of participation on six key demographic variables identified in past studies of societal attitude change: age, race, Latino ethnicity status, education, political ideology, and gender. Results are displayed in Table 3.

INSERT TABLE 3 ABOUT HERE

The regression indicated change in overall demographic representation over the course of data collection ($R^2 = .016$) that was similar to levels found in Schmidt and Nosek (2010). By far the largest shift in individual demographics was that the sample became more liberal in political orientation over time. Though overall demographic representation was fairly stable across the study span, these six demographic variables were statistically controlled for as covariates in all analyses in order to guard against any demographic shifts from the pre-BLM to the BLM period. Results of these analyses were further checked against a sample that was weighted to ensure the sample was nationally representative in terms of political orientation and gender, which will be discussed later in this section. Finally, to further investigate whether any changes that occur during BLM are disproportionately driven by political orientation, we also report results of analyses broken down by political orientation subgroups.

The following section reports results for the total sample, with subgroup analyses for Whites and Blacks reported in a subsequent section. All ensuing tables present side-by-side results for the total sample, and White and Black subgroups. Because the IAT is a relational scale, in which attitudes becoming “pro-White” is the same as attitudes becoming more “pro-Black,” it is worthwhile to set some guidelines for how these terms will be used. For the sake of balancing terminological clarity and readability in discussing changes in attitudes, we will use the pre-BLM mean as an anchor for descriptions of attitude changes during BLM. Thus, if on

average White participants showed a pro-White (same as anti-Black) preference during the pre-BLM period, and this bias became less pronounced during BLM, we will say “pro-White bias decreased among Whites.” Conversely, if Black participants showed an overall pro-Black (same as anti-White) preference pre-BLM, and this preference became stronger during BLM, we will say “pro-Black preference increased during the BLM period.” Thus, movement in the same direction may sometimes be described using different terms (e.g. less pro-White/more pro-Black), depending on the average pre-BLM “starting point” for that attitude.

Analysis 1: Attitude change over time during BLM

Given the possibility that the cumulative influence of the BLM movement was related to gradual changes in racial attitudes over time, we conducted hierarchical linear regressions on implicit and explicit attitudes using a date variable that spanned the length of the BLM period, while controlling for demographic variables and their interactions.

Implicit attitudes. Regressing IAT score on participation date revealed that implicit pro-White bias decreased across the BLM period, $\eta_p^2 = .00090$, 95% CI [0.00075, 0.00107], but was slightly below .001, our socially meaningful benchmark for hierarchical regression. Results for implicit attitudes are summarized in Table 4a.

INSERT TABLE 4A ABOUT HERE

Explicit attitudes. Explicit pro-White bias decreased slightly over the BLM period, $\eta_p^2 = .00047$, 95% CI [0.00035, 0.00059], but the final effect size was well below .001, the socially meaningful benchmark for hierarchical regression. Results for explicit attitudes are summarized in Table 4b.

INSERT TABLE 4B ABOUT HERE

Analysis 2: Discontinuities in attitudes and their rate of change

To confirm that attitude trajectories during BLM were different than attitude trajectories prior to BLM, regression discontinuity analysis (RDA) was conducted, controlling for demographic changes and their interactions across time, for the full span of the study (January 1, 2009 to June 30, 2016) using a cut-off date of July 6, 2013 to mark the initiation of BLM.

Implicit attitudes. Fitted regression lines for implicit attitudes during pre-BLM and BLM are shown in Figure 2a. As hypothesized, RDA indicated that a trend of slightly increasing implicit pro-White bias over time during pre-BLM was reversed, resulting in decreasing implicit pro-White bias across the BLM period, $F(1,223,416) = 630.72, p < .001, B = -0.045, 95\% \text{ CI } [-0.045, -0.045]$.

INSERT FIGURE 2A ABOUT HERE

Explicit attitudes. Fitted regression lines for explicit attitudes during pre-BLM and BLM are shown in Figure 2b. RDA indicated that a trend of slightly decreasing explicit pro-White bias during pre-BLM decreased more steeply across BLM, $F(1,125,683) = 120.62, p < .001, B = -0.019, 95\% \text{ CI } [-0.019, -0.019]$, supporting the hypothesized change in trajectory of attitudes from pre-BLM to the BLM period.

INSERT FIGURE 2B ABOUT HERE

Analysis 2a: Comparing attitudes during BLM and pre-BLM

To directly compare mean implicit and explicit attitudes during BLM and the pre-BLM period, ANCOVA models were fit, controlling for demographic factors. Results are shown in Table 5.

Implicit attitudes. As hypothesized, implicit attitudes during BLM were less pro-White than during the pre-BLM period ($d = .07, 95\% \text{ CI } [0.06, 0.07]$).

Explicit attitudes. Also as expected, explicit attitudes were less pro-White during BLM than pre-BLM ($d = .06$, 95% CI [0.06, 0.06]).

INSERT TABLE 5 ABOUT HERE

Analysis 3: Attitude change during periods of high BLM struggle

To test whether attitudes changed during specific high points of BLM struggle, a set of ANCOVAs compared attitudes during the seven pre-identified periods of high BLM activity to attitudes during the preceding 30 days. As analyses were run, it was discovered that IAT participant data was missing for dates from August 31st, 2015 to September 9th, 2015, due to technical issues at Project Implicit. This precluded the analysis of one period of high BLM struggle (election campaign disruptions), leaving results from six ANCOVAs.

Implicit attitudes. The results for implicit attitudes are summarized in Table 6a. Four of six periods of high BLM activity showed statistically significant decreases in implicit pro-White bias (average $d = .06$), and two periods showed no change.

INSERT TABLE 6A ABOUT HERE

Explicit attitudes. Results for explicit attitudes are summarized in Table 6b. Two of six periods of high BLM activity showed statistically significant decreases in explicit pro-White bias (average $d = .05$), and four periods showed no change. Notably, all statistically significant changes in implicit and explicit attitudes were in the direction of being less pro-White.

INSERT TABLE 6B ABOUT HERE

Because racial attitudes for the overall sample were found to be decreasing in pro-White bias across the BLM period, it raised the question of whether attitude changes found during BLM

high points are unique to these preselected periods, or occur frequently across the BLM period. To verify that attitude changes found during high points of BLM struggle were unique, the same analyses (high point vs. preceding 30 days) were conducted using different, arbitrary dates within the BLM period. ANCOVA analyses for implicit and explicit racial attitudes showed a lack of effect for the arbitrary dates, suggesting that attitude changes observed during the pre-specified high points of BLM struggle were not due to chance, nor were they the result of a more general downward trend in pro-White bias during the larger BLM period. Details of these analyses can be found here: <https://osf.io/9xvu4/>.

Analysis 4: Ruling out seasonal effects

To rule out the possibility that changes in implicit and explicit attitudes during periods of high BLM struggle might be caused by seasonal effects, a set of ANCOVAs compared attitudes during six periods of high BLM activity (one period was dropped due to missing data) to attitudes averaged across the same time periods in the years preceding BLM (2009 to 2012). This data can be found in SI: <https://osf.io/jhzvm/>. In summary, virtually all periods of high struggle corresponded to less pro-White preference than the same period during preceding years, supporting the contention that seasonal effects do not explain attitude changes observed during high points of BLM struggle.

National representativeness of the sample

A primary consideration in societal-level attitude data is the extent to which the sample is nationally representative in terms of demographic variables. In comparison to the nationally representative data from General Social Survey (GSS; Smith, Marsden, Hout, & Kim, 2016), our sample was on average younger, more female, less Latino, and slightly more educated and liberal than the nation as a whole. In addition, our sample did not include participants identifying as

races other than White or Black. Because political orientation was the demographic variable that shifted the most over the course of the study, and which also bore the strongest relation to implicit and explicit racial attitudes (besides race, which was analyzed by subgroup), the sample was weighted to be nationally representative in terms of participants' political orientations. Using the weighting methods outlined in Lohr (2009), a nationally representative sample was created that contained proportions of the seven political orientation categories (from strongly liberal to strongly conservative) that were identical to proportions of similar categories in the GSS (Smith et al., 2016). After weighting the sample to make it representative on political orientation, overall effect sizes for the change in aggregate implicit attitudes from pre-BLM to BLM (Analysis 2a) was unchanged ($d = .07$), while the aggregate change in explicit attitudes was larger ($d = .10$). Because the gender composition of the sample was markedly different from that of the GSS (Smith et al., 2016), a further weighting based on gender, political orientation, and their interaction was conducted. For this weighted sample, overall effect sizes for the change in aggregate implicit attitudes for the total sample from pre-BLM to BLM (Analysis 2a) was larger ($d = .08$), while the aggregate change in explicit attitudes was unchanged ($d = .06$). These results suggest that aggregate attitude changes observed from the pre-BLM to BLM period are not driven by a lack of national representativeness in the study sample.

Subgroups analysis by political orientation

Because our results indicate that liberals tend to display less pro-White implicit and explicit bias than conservatives, it is plausible that reductions in pro-White bias during BLM might occur only among liberals, and not among conservatives. To explore such possibilities, we split the file on political orientation, and used an ANCOVA (Analysis 2a) to compare aggregate

implicit and explicit attitudes in the pre-BLM and BLM periods. The effect sizes for attitude change by political orientation for the total sample are displayed in Table 7.

INSERT TABLE 7 ABOUT HERE

For all political orientations, from strongly liberal to strongly conservative, there was a reduction in aggregate pro-White implicit and explicit bias. Effect sizes were strongest for the most liberal participants, and weakest for the most conservative participants, but were all in the same direction of less pro-White bias.

Subgroups analysis for Whites and Blacks

To examine whether Blacks and Whites showed similar patterns of attitude change, all study analyses were conducted separately for White and Black participant subgroups. For the full study span, Whites showed a pro-White preference both implicitly ($M = 0.38$, $SD = 0.41$, $t[1,179,798] = 1,012.17$, $p < .001$, $d = .93$) and explicitly ($M = 0.51$, $SD = 0.88$, $t[1,084,953] = 598.78$, $p < .001$, $d = .57$). In contrast, Blacks showed only a slight pro-Black preference implicitly ($M = -0.04$, $SD = 0.44$, $t[189,394] = -43.99$, $p < .001$, $d = .10$) and a stronger pro-Black preference explicitly ($M = -0.92$, $SD = 1.27$, $t[171,741] = -300.07$, $p < .001$, $d = .72$).

Analysis 1: Attitude change over time during BLM

Implicit Attitudes. Among Whites, implicit pro-White preference decreased across BLM ($\eta_p^2 = .00100$, 95% CI [0.00082, 0.00119]), reaching the meaningful effect size benchmark.

Among Blacks, implicit pro-Black preference increased slightly across BLM ($\eta_p^2 = .00062$, 95% CI [0.00029, 0.00107]), but was below the .001 benchmark.

Explicit attitudes. Among Whites, explicit pro-White bias decreased across BLM ($\eta_p^2 = .00122$, 95% CI [0.00102, 0.00144]), reaching a meaningful effect size. Among Blacks, explicit

pro-Black preference decreased across BLM ($\eta_p^2 = .00118$, 95% CI [0.00069, 0.00178]), also reaching a meaningful effect size.

In summary, implicit attitudes for Whites and Blacks moved in the same direction (less pro-White/more pro-Black) across the BLM period, as hypothesized. Unexpectedly, however, explicit attitudes for Whites and Blacks moved in opposite directions, toward an egalitarian “no preference” position.

Analysis 2: Discontinuities in attitudes and their rate of change

Implicit attitudes. Among Whites, a trend of slightly increasing implicit pro-White bias during pre-BLM was reversed, yielding decreasing implicit pro-White bias across the BLM period, $F(1,057,428) = 627.37$, $p < .001$, $B = -0.050$, 95% CI [-0.050, -0.050]. Among Blacks, a trend of slightly decreasing implicit pro-Black preference during pre-BLM was reversed, yielding increasing implicit pro-Black preference across BLM, $F(165,976) = 42.16$, $p < .001$, $B = -0.033$, 95% CI [-0.033, -0.033].

Explicit attitudes. Among Whites, a trend of slightly increasing explicit pro-White bias during pre-BLM was reversed, yielding decreasing explicit pro-White bias across BLM, $F(974,599) = 269.45$, $p < .001$, $B = -0.034$, 95% CI [-0.034, -0.034]. Among Blacks, a trend of slightly decreasing explicit pro-Black preference during pre-BLM decreased more steeply during BLM, $F(151,072) = 27.26$, $p < .001$, $B = 0.027$, 95% CI [0.027, 0.027].

In sum, for Whites, the hypothesized change in trajectory of implicit and explicit attitudes from pre-BLM to the BLM period was supported. Similarly, Blacks’ implicit attitudes shifted in hypothesized direction. Blacks’ explicit attitudes, however, showed a different pattern. A trend of slightly decreasing pro-Black attitudes in the pre-BLM period was intensified, with Blacks becoming even less explicitly pro-Black over time during BLM.

Analysis 2a: Comparing attitudes during BLM and pre-BLM

Implicit attitudes. Whites' implicit attitudes during BLM were less pro-White than pre-BLM, ($d = .08$, 95% CI [0.07, 0.08]). Blacks', implicit attitudes were slightly more pro-Black during BLM ($d = .02$, 95% CI [0.01, 0.03]).

Explicit attitudes. Whites' explicit attitudes were less pro-White during BLM than pre-BLM ($d = .10$, 95% CI [0.10, 0.10]). In contrast, Blacks' explicit attitudes were less pro-Black during BLM ($d = .10$, 95% CI [0.09, 0.11]).

In summary, as hypothesized, implicit attitudes for Whites and Blacks moved in the same direction (less pro-White/more pro-Black) during the BLM period compared with pre-BLM. Unexpectedly, however, explicit attitudes for both Whites and Blacks during BLM moved in opposite directions, closer to an egalitarian "no preference" position.

Analysis 3: Attitude change during periods of high BLM struggle

Implicit attitudes. Among Whites, four of six periods of high BLM activity showed statistically significant decreases in implicit pro-White bias (average $d = .07$), and two periods showed no change. Among Blacks, none of the six periods demonstrated change in implicit attitudes.

Explicit attitudes. Among Whites, two of six periods of high BLM activity showed statistically significant decreases in explicit pro-White bias (average $d = .06$), and four periods showed no change. Among Blacks, none of the six periods demonstrated changes in explicit attitudes. Thus, it appears that periods of high BLM struggle corresponded to a greater change in the attitudes of Whites than the attitudes of Blacks.

Analysis 4: Ruling out seasonal effects on attitudes

As evident in Supplemental Tables S2.1 – S2.2, for Whites, all periods of high struggle corresponded to less pro-White preference than the same period during preceding years, supporting the idea that seasonal effects do not explain the attitude changes observed during high points of BLM struggle. For Black participants, there were no observed changes in implicit or explicit attitudes during high points of struggle either in comparison to the preceding 30 days or previous years. Consequently, seasonal effects can be ruled out as an alternate explanation.

Subgroups analysis for other races

A secondary analysis for participants of races other than Black and White (e.g., East Asian, South Asian, Pacific Islander, American Indian, multiple races, and other races) was conducted as a point of comparison for our central analyses. These analyses and a demographic summary for participants who were not White or Black are presented in Supplemental Information, which includes Tables S3.1 – S3.5, and can be found here: <https://osf.io/zhrts/>. In sum, the results for all analyses were consistently in the same direction as those for White participants (becoming less pro-White during BLM), but the effects were not quite as strong. For example, overall effect sizes for the change in aggregate attitudes from pre-BLM to BLM (Analysis 2a) were slightly weaker than those of White participants for both implicit attitudes ($d = .07$, versus $d = .08$ for Whites) and explicit attitudes ($d = .09$, versus $d = .10$ for Whites). For all analyses, the strength of effects in pro-White bias reduction for participants of other races fell in between those of Whites and Blacks.

Discussion

Individually targeted lab-based interventions and exposure to high-status individual exemplars like Barack Obama have thus far proven ineffective in changing implicit racial attitudes, either on a long-term basis or on a societal level. In this context, anti-racist mass social

movements offer a potential alternative for reducing societal-level racial bias that has been virtually unexplored. The BLM movement in particular has collectively affirmed the value of Black lives, and could theoretically have influenced both implicit and explicit racial attitudes in the U.S. This study investigated what impact, if any, this anti-racist social movement may have had on Whites' and Blacks' attitudes in relation to these racial identities. We examined racial attitudes before and during BLM and its high points of struggle using 1,369,204 IAT sessions from 2009 to 2016. This was done to investigate the possible ongoing and cumulative influence of BLM on attitudes over time, as well as potentially more rapid, short-term impacts on attitudes associated with high points of movement activity.

Converging evidence from the multiple analyses presented here suggests that pro-White implicit racial bias has decreased concurrent with BLM and its high points of struggle. Although effect sizes across analyses were very small (Sawilowsky, 2009), for the full sample, aggregate implicit attitudes were less pro-White during BLM than pre-BLM and became increasingly less pro-White over time during the BLM period. Furthermore, RDA indicated that these results were not due to an historical trend toward decreasing pro-White bias over the full study span. Rather, before shifting to a decreasing trend during the BLM movement, pro-White implicit bias was actually *increasing* during the years of the Obama administration prior to BLM. Implicit attitudes were less pro-White during four of the six periods of high BLM struggle in comparison with the preceding 30 days, with two periods showing no change in either direction. In addition to ruling out seasonal effects, the finding that implicit attitudes did not undergo short-term changes for arbitrary selected periods within BLM suggests that attitude changes during high points of BLM struggle were not the result of a general downward trend in pro-White bias during the BLM period. Moreover, participants of all political orientations (from strongly liberal to strongly

conservative) displayed reductions in pro-White implicit and explicit bias, with the largest effects for the most liberal participants and the weakest effects for the most conservative participants.

In contrast to implicit attitudes, evidence for changes in explicit racial attitudes in the full sample was more mixed. Explicit attitudes were slightly less pro-White during BLM than pre-BLM, but did not become meaningfully less pro-White over time during BLM. Explicit attitudes were less pro-White during two of six periods of high BLM struggle, with other periods showing no change in either direction. These seemingly weaker effects, however, appear to be due to the fact that Whites' and Blacks' explicit attitudes changed in opposite directions, obscuring these effects in the full sample.

The attitude patterns evident in the full sample, while suggestive, are more accurately characterized as divergent patterns of attitude change among White and Black subgroups. Whites' implicit attitudes were less pro-White during BLM than pre-BLM, became meaningfully less pro-White across BLM, and were less pro-White during four of six periods of high BLM struggle. In contrast, Blacks' implicit attitudes showed relatively little difference between the pre-BLM and BLM periods, did not become meaningfully more pro-Black over time during the BLM period, and did not change during any periods of high BLM struggle. Thus, while multiple analyses provide evidence that Whites became less implicitly pro-White in relation to BLM, Blacks' implicit attitudes did not appear to change. This suggests that the BLM period entailed a greater change in the implicit attitudes of Whites than Blacks. One of several potential explanations for this is that anti-racist social movements like BLM may have an effect of moving all racial groups toward more egalitarian racial attitudes. Thus, because Blacks demonstrated little implicit bias prior to BLM (being close to "no preference"), while Whites exhibited a

greater degree of implicit bias, the larger change among Whites may reflect a greater room for bias reduction.

In terms of explicit attitudes, Whites and Blacks demonstrated generally opposite directions of change. Whites' explicit attitudes were less pro-White during BLM than pre-BLM, became meaningfully less pro-White over time during BLM, and were less pro-White during two of six periods of high BLM struggle (other periods showed no change). Conversely, Blacks' explicit attitudes were *less* pro-Black during BLM, became meaningfully *less* pro-Black across BLM, and showed no change during periods of high BLM struggle. At first glance, these appear to be opposing trends in Blacks' and Whites' explicit attitudes, but they can also be viewed as a mutual shift toward an egalitarian, no preference position. Such a shift in explicit attitudes could be considered consistent with the movement's egalitarian emphasis. Though these results were not anticipated, several papers have argued that oppressed groups often express strong explicit ingroup preferences to counteract hostile outgroup attitudes, and these ingroup preferences are likely to weaken if societal attitudes become less hostile (Livingston, 2002; Gawronski & Bodenhausen, 2006; Westgate et al., 2015). While this is post-hoc speculation, one possibility is that decreasing bias on the part of Whites during BLM may have slightly lessened the need for Blacks (oppressed group) to maintain explicitly pro-Black preferences. In summary, while further research on such possibilities is needed, the shifts in attitudes for both Whites and Blacks are consistent with the prospect that social movements may move attitudes closer to an egalitarian position, unless those attitudes are already close to egalitarian to begin with. For Blacks, this means that implicit attitudes (which were initially close to no preference) showed little change during BLM, while explicit attitudes (which were solidly pro-Black) showed a much larger shift toward an egalitarian, no preference position. Thus, these results at least raise

the possibility that anti-racist social movements, rather than inevitably polarizing Whites and Blacks against each other, may instead be capable of moving both groups toward more egalitarian explicit racial attitudes.

This study focused on the historically constructed racial groups (Blacks and Whites) that have been and continue to be central to the workings of racism in the U.S. However, a secondary analysis for participants of races other than Black and White was conducted as a point of comparison. Results were consistently in the same direction as those for White participants (becoming less pro-White during BLM), but the effects were slightly weaker, falling between those of Whites and Blacks (though generally closer to Whites). This is perhaps understandable given a U.S. context in which races other than Blacks and Whites have often not been accorded status as “races” per se, but are conceptualized more along the lines of geography (e.g. Asian, Middle Eastern) or language (e.g. Hispanic) (Fields, 1990). In other words, with Whites and Blacks anchoring U.S. racial relations, changes in the racial preferences of other racial groups (for Whites relative to Blacks) may tend to fall somewhere in between the divergent patterns of Blacks and Whites. Given that empirical research exploring these relations is in its infancy, such hypotheses about the effects of anti-racist movement in relation to the attitudes of various racial groups are certainly speculative.

This study offers the first empirical evidence connecting a social movement to concurrent societal-level changes in implicit and explicit attitudes. While the BLM-related effect sizes found across the present analyses are quite small, such effects across many individuals can represent shifts in attitudes with impacts on discrimination that are societally meaningful (Greenwald et al., 2015). These effects are potentially noteworthy given the tenacious persistence of racism in the U.S. and the society-wide scope of BLM. Moreover, unlike laboratory interventions, BLM

was not designed for the express purpose of targeting implicit attitudes. By comparison, the effectiveness of the Civil Rights movement in radically changing attitudes on desegregation and other racial questions may derive in part from the success of the movement in winning tangible structural reforms in the form of sweeping legal changes (e.g., legal desegregation, voting rights). In contrast, BLM has not succeeded in winning such legal or structural reforms, which may be a factor in the very small size of the effects observed during the BLM period.

In addition, the present study opens preliminary investigation into two potentially different types of attitude change that may be associated with social movements. The first type is an ongoing, cumulative influence of movements that may be reflected in gradual, aggregate attitude change over lengthy periods of time. The second type is a relatively concentrated burst of high movement activity that may lead to more rapid, short-term changes in aggregate attitudes. This study presented evidence that potentially supports both forms of attitude change in relation to BLM. While the present study predicted that attitude changes related to concentrated periods of high BLM activity would be precisely contemporaneous with those periods, this does not preclude the possibility of a time lag between intensive movement activity and corresponding attitude changes. Moreover, the time scale for attitude change in relation to a social movement may depend on the type of attitude in question (e.g. sexuality, gender, race) as well as social and historical factors bound up with specific movements within specific societies. It is likely that multiple forms and time scales of attitude change are operating during successful social movements, and this should be explored in future work.

A major limitation on the generalizability of this study is that participants were self-selected. Although results are robust after controlling for key demographic changes from pre-BLM to BLM, the possibility that individuals with particular attitudes (e.g. more pro-Black)

were more likely to take the IAT during the BLM period and its high points of struggle cannot be ruled out. In addition, many other social and political events were occurring around the time of BLM that could have played a role in the societal attitude shifts reported here, which cannot be ruled out by a correlational study such as the present one. Consequently, changes in racial attitudes that are concurrent with BLM and its high points of struggle cannot be taken as evidence that BLM caused these changes. We have made our data and analyses publicly available so that third variables that may account for these correlations between BLM and racial attitudes can be investigated. Nevertheless, the changes corresponding to the a priori selection of the overall BLM period and specific short-term periods of high BLM struggle – using a chronology of BLM combined with BLM media citation data – adds credibility to the notion that BLM may have contributed to observed attitude changes. In addition, the lack of attitude changes during arbitrarily selected short-term periods during BLM supports the hypothesized BLM-related effects of the pre-specified periods of high struggle. Although difficult to achieve, future studies should attempt experimental manipulations of exposure to or participation in social struggle to directly examine these potential causal effects. In addition, direct participation in the BLM movement may have had a stronger impact on attitudes than mere exposure to BLM-related media coverage, which may be disentangled in future work.

Although evidence suggests that Project Implicit participants show similar patterns of bias as those in nationally representative samples (Pinkston, 2015), another constraint on the generalizability of this study is that the sample was not nationally representative. In particular, the sample had proportionally more liberal participants than the national population, a concern because political ideology has the strongest effect on racial attitudes (other than race itself, for which we conducted subgroups analysis). In addition, the gender balance of the sample was

particularly more heavily female than the national average. We attempted to address this issue by weighting our sample to be nationally representative on political ideology and gender, and found either no change or an increase in effect size of aggregate attitude changes from pre-BLM to BLM, suggesting that attitude changes during BLM are not attributable to a lack of national representativeness in the sample. Furthermore, participants of all political orientations showed decreased pro-White implicit and explicit bias, supporting the possibility that BLM has had a progressive effect across the political spectrum, with the greatest effects among liberals and the smallest effects among conservatives.

The relation between BLM and racial attitudes studied here is potentially generalizable to connections between other biases (e.g. anti-LGBT biases) and the specific social movements fighting those biases (e.g. LGBT rights movement). There is, however, no empirical evidence to support such a hypothesis at present, as no similar studies have been published. Furthermore, generalizability may depend on the strength of a given social movement in relation to countervailing social movements, as well as the degree of legal reforms or structural changes the movement is able to win. In the case of BLM, the finding of decreased pro-White bias across political orientations may indicate that counter-movements against BLM during the span of the study were not strong enough to change its overall effect, even among the most conservative participants. In other words, because “All Lives Matter” and “Blue Lives Matter” counter-movements have been weaker in the streets as well as less resonant in social media and web trends, it suggests that counter-movements might have dampened but not reversed the overall effects of BLM. While potentially surprising, there appears to be precedent for this finding in the efficacy of the American Civil Rights Movement to create widespread changes in societal-level

explicit racial attitudes despite violent backlash and counter-movements (e.g., Condran, 1979; Taylor, Sheatsley, & Greeley, 1978).

Taken as a whole, the findings here suggest the possibility that anti-racist social movements may contribute to societal-level changes in implicit and explicit racial attitudes. Viewed through the lens of the APE framework, social movements have the potential to influence implicit and explicit attitudes through a variety of associational and propositional mechanisms, in addition to redefining ingroup identities (e.g. as anti-racists of all races), and enhancing feelings of efficacy to collectively ameliorate racism. While very little work to date has addressed social movements in relation to implicit attitudes, Zerhounie, Rougier and Miller (2016) found that municipal-level implicit attitudes predicted city-wide participation in protest activity. This raises the possibility that social movements and aggregate attitude change could be mutually reinforcing. In one such scenario, social struggle may change attitudes, thereby promoting further protest activity, which in turn would further transform attitudes. Envisioned as part of such an ongoing process, the collective organization of social movements presents a potential societal-scale alternative to laboratory-based, individual attitude-change interventions. It is our hope that further research exploring the connection between social movements and societal-scale attitude change will help to evaluate these prospects.

References

- Anderson, M., & Hitlin, P. (2016). The hashtag #BlackLivesMatter emerges: Social activism on Twitter. Pew Research Report. Retrieved from <http://www.pewinternet.org/2016/08/15/the-hashtag-blacklivesmatter-emerges-social-activism-on-twitter/>.
- Axt, J.R. (2017). The best way to measure explicit racial attitudes is to ask about them. Manuscript in preparation.
- Alexander, M. (2012). *The New Jim Crow: Mass Incarceration in The Age of Colorblindness*. New York: The New Press.
- Bar-Anan, Y., & Nosek, B. A. (2014). A comparative investigation of seven indirect attitude measures. *Behavior Research Methods*, 46, 668–688. doi:10.3758/S13428-013-0410-6
- Baron, A. S., & Banaji, M. R. (2006). The development of implicit attitudes: Evidence of race evaluations from ages 6 and 10 and adulthood. *Psychological science*, 17(1), 53-58. doi: 10.1111/j.1467-9280.2005.01664.x
- Chaney, C., & Robertson, R. V. (2015). Armed and dangerous? An examination of fatal shootings of unarmed Black people by police. *Journal of Pan African Studies*, 8(4), 45-78.
- Columb, C., & Plant, E. A. (2016). The Obama effect six years later: The effect of exposure to Obama on implicit anti-Black evaluative bias and implicit racial stereotyping. *Social Cognition*, 34, 523–543. doi: 10.1521/soco.2016.34.6.523
- Condran, J. G. (1979). Changes in white attitudes toward blacks: 1963-1977. *Public Opinion Quarterly*, 43(4), 463-476.

- Cunningham, W. A., Preacher, K. J., & Banaji, M. R. (2001). Implicit attitude measures: Consistency, stability, and convergent validity. *Psychological science*, 12(2), 163-170. doi: 10.1111/1467-9280.00328
- Dasgupta, N., Desteno, D., Williams, L. A., & Hunsinger, M. (2009). Fanning the flames of prejudice: The influence of specific incidental emotions on implicit prejudice. *Emotion*, 9, 585–591. doi:10.1037/A0015961
- Dasgupta, N., & G, G. A. (2001). On the malleability of automatic attitudes: Combating automatic prejudice with images of admired and disliked individuals. *Journal of Personality and Social Psychology*, 81, 800–814. doi:10.1037//0022-3514.81.5.800
- Fields, B. J. (1990). Slavery, race and ideology in the United States of America. *New Left Review*, (181), 95.
- Freelon, D., McIlwain, C. D., & Clark, M. D. (2016). Beyond the hashtags: #Ferguson, #Blacklivesmatter, and the online struggle for offline justice. *Center for Media and Social Impact*, 5–92. Retrieved from http://cmsimpact.org/wp-content/uploads/2016/03/beyond_the_hashtags_2016.pdf
- Gaertner, S. L., & Dovidio, J. F. (2005). Understanding and addressing contemporary racism: From aversive racism to the common ingroup identity model. *Journal of Social issues*, 61(3), 615-639.
- Gardner, D. G., Cummings, L. L., Dunham, R. B., & Pierce, J. L. (1998). Single-item versus multiple-item measurement scales: An empirical comparison. *Educational and Psychological Measurement*, 58(6), 898-915.
- Garza, A. (2014). A herstory of the #Blacklivesmatter movement. Retrieved from <http://blacklivesmatter.com/herstory/>

- Gawronski, B., & Bodenhausen, G. V. (2006). Associative and propositional processes in evaluation: An integrative review of implicit and explicit attitude change. *Psychological Bulletin*, 132, 692–731. doi:10.1037/0033-2909.132.5.692
- Greeley, A. M., & Sheatsley, P. B. (1971). Attitudes Toward Desegregation. National Opinion Research Center, Chicago, IL.
- Greenwald, A. G., & Banaji, M. R. (1995). Implicit social cognition: Attitudes, self-esteem, and stereotypes. *Psychological Review*, 102, 4–27. doi:10.1037/0033-295X.102.1.4
- Greenwald, A. G., Banaji, M. R., & Nosek, B. A. (2015). Statistically small effects of the Implicit Association Test can have societally large effects. *Journal of Personality and Social Psychology*, 108(4), 553–561. <http://dx.doi.org/10.1037/pspa0000016>
- Greenwald, A. G., & Nosek, B. A. (2001). Health of the implicit association test at age 3. *Zeitschrift für Experimentelle Psychologie*, 48, 85–93.
- 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 and Social Psychology*, 85, 197–216. doi:10.1037/0022-3514.85.2.197
- Horowitz, J. M., & Livingston, G. (2016). How Americans view the Black Lives Matter Movement. Pew Research Report. Retrieved from <http://www.pewresearch.org/fact-tank/2016/07/08/how-americans-view-the-black-lives-matter-movement/>
- Inbar, Y., Westgate, E. C., Pizarro, D. A., & Nosek, B. A. (2016). Can a naturally occurring pathogen threat change social attitudes? Evaluations of gay men and lesbians during the 2014 Ebola epidemic. *Social Psychological and Personality Science*, 1, 1–8. doi:10.1177/1948550616639651

- Jost, J. T., Rudman, L. A., Blair, I. V., Carney, D. R., Dasgupta, N., Glaser, J., & Hardin, C. D. (2009). The existence of implicit bias is beyond reasonable doubt: A refutation of ideological and methodological objections and executive summary of ten studies that no manager should ignore. *Research in Organizational Behavior*, 29, 39–69.
<https://doi.org/10.1016/j.riob.2009.10.001>
- Jost, J. T., Nosek, B. A., & Gosling, S. D. (2008). Ideology: Its resurgence in social, personality, and political psychology. *Perspectives on Psychological Science*, 3(2), 126-136.
- Kowal, J. F. (2015). The improbable victory of marriage equality. In J. Weiss-Wolf & J. Plant-Chirlin (Eds.), *Legal change: Lessons from America's social movements* (pp. 25–44). New York. Retrieved from <https://www.brennancenter.org/publication/legal-change-lessons-americas-social-movements>
- Lai, C. K., Hoffman, K. M., & Nosek, B. A. (2013). Reducing implicit prejudice. *Social and Personality Psychology Compass*, 7, 315–330. doi:10.1111/Spc3.12023
- Lai, C. K., Marini, M., Lehr, S. A, Cerruti, C., Shin, J.-E. L., Joy-Gaba, J. A, ... Nosek, B. A. (2014). Reducing implicit racial preferences: I. A comparative investigation of 17 interventions. *Journal of Experimental Psychology. General*, 143, 1765–85.
doi:10.1037/A0036260
- Lai, C. K., Skinner, A. L., Cooley, E., Murrar, S., Brauer, M., Devos, T., ... Nosek, B. A. (2016). Reducing implicit racial preferences: II. Intervention effectiveness across time. *Journal of Experimental Psychology: General*, 145, 1001–1016. doi:10.1037/Xge0000179
- Leitner, J. B., Hehman, E., Ayduk, O., & Mendoza-Denton, R. (2016). Blacks' death rate due to circulatory diseases is positively related to whites' explicit racial bias: A nationwide investigation using project implicit. *Psychological science*, 27(10), 1299-1311.

- Livingston, R. W. (2002). The role of perceived negativity in the moderation of African Americans' implicit and explicit racial attitudes. *Journal of Experimental Social Psychology*, 38(4), 405–413. [https://doi.org/10.1016/S0022-1031\(02\)00002-1](https://doi.org/10.1016/S0022-1031(02)00002-1)
- Lohr, S. L. (2010). *Sampling: design and analysis*. Boston, MA: Brooks/Cole.
- Marks, J. (1996). Science and race. *American Behavioral Scientist*, 40(2), 123–133.
- 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. doi:10.1006/Jesp.2000.1470
- McPherson, James M. (1988). *Battle Cry of Freedom: The Civil War Era*. Oxford University Press.
- Nosek, B. A., Greenwald, A. G., & Banaji, M. R. (2007). The Implicit Association Test at age 7: A methodological and conceptual review. In J. A. Bargh (Ed.), *Social Psychology and the Unconscious: The Automaticity of Higher Mental Processes* (pp. 265–292). New York: Psychology Press
- Nosek, B. A., Hawkins, C. B., & Frazier, R. S. (2011). Implicit social cognition: From measures to mechanisms. *Trends in Cognitive Sciences*, 15, 152–159. doi:10.1016/J.Tics.2011.01.005
- Nosek, B. A., Smyth, F. L., Hansen, J. J., Devos, T., Lindner, N. M., Ranganath, K. A., ... Banaji, M. R. (2007). Pervasiveness and correlates of implicit attitudes and stereotypes. *European Review of Social Psychology*, 18, 36–88. doi:10.1080/10463280701489053
- Omi, M., & Winant, H. (2014). *Racial formation in the United States*. Routledge.

- Oswald, F. L., Mitchell, G., Blanton, H., Jaccard, J., & Tetlock, P. E. (2013). Predicting ethnic and racial discrimination: A meta-analysis of IAT criterion studies. *Journal of Personality and Social Psychology*, 105(2), 171. doi: 10.1037/a0032734
- Petersen-Smith, K. (2015). Black Lives Matter. *International Socialist Review*, 96. Available at <http://isreview.org/issue/96/black-lives-matter>
- Petty, R. E., Briñol, P., & Demarree, K. G. (2007). The Meta-Cognitive model (MCM) of attitudes: Implications for attitude measurement, change, and strength. *Social Cognition*, 25, 657–686. doi:10.1521/Soco.2007.25.5.657
- Pinkston, K. (2015). The Black-white malleability gap in implicit racial evaluations: A nationally representative study. *The Journal of Social Psychology*, 155(3). <http://dx.doi.org/10.1080/00224545.2014.987200>
- Rivera, L. M., & Benitez, S. (2016). The roles of in-group exemplars and ethnic- racial identification in self-stereotyping. *Social Cognition*, 34, 604–623. doi:10.1521/soco.2007.25.5.657
- Rydell, R. J., & McConnell, A. R. (2006). Understanding implicit and explicit attitude change: A systems of reasoning analysis. *Journal of Personality and Social Psychology*, 91. doi:10.1037/0022-3514.91.6.995
- Sawilowsky, S. S. (2009). New effect size rules of thumb. *Journal of Modern Applied Statistical Methods*, 8, 597–599.
- Schmidt, K., & Axt, J. R. (2016). Implicit and explicit attitudes toward African Americans and Barack Obama did not substantively change during Obama’s presidency. *Social Cognition*, 34, 559–588. doi:10.1521/soco.2016.34.6.559

- Schmidt, K., & Nosek, B. A. (2010). Implicit (and explicit) racial attitudes barely changed during Barack Obama's presidential campaign and early presidency. *Journal of Experimental Social Psychology*, 46, 308–314. doi:10.1016/J.Jesp.2009.12.003
- Schroeder, J., Kardas, M., & Epley, N. (2017). The humanizing voice: Speech reveals, and text conceals, a more thoughtful mind in the midst of disagreement. *Psychological science*, 0956797617713798.
- Smith, T. W., Marsden, P. V., Hout, M., & Kim, J. (1972–2016). *General Social Surveys, 1972–2012* Chicago: NORC at the University of Chicago. Data accessed from the GSS Data Explorer: [gssdataexplorer.norc.org](http://gssdataexplorer.norc.umd.edu)
- Staats, C., Capatosto, K., Wright, R. A., & Contractor, D. (2015). State of the science: Implicit bias review 2015. Retrieved from <http://kirwaninstitute.osu.edu/wp-content/uploads/2015/05/2015-kirwan-implicit-bias.pdf>
- Stewart, T. L., Latu, I. M., Branscombe, N. R., & Denney, H. T. (2010). Yes we can! Prejudice reduction through seeing (inequality) and believing (in social change). *Psychological Science*, 21(11), 1557-1562.
- Tate, C., & Audette, D. (2001). Theory and Research on Race as a Natural Kind Variable in Psychology. *Theory & Psychology*, 11(4), 495-520.
- Taylor, D. G., Sheatsley, P. B., & Greeley, A. M. (1978). Attitudes toward racial integration. *Scientific American*, 238(6), 42-49.
- Thistlethwaite, D. L., & Campbell, D. T. (1960). Regression-discontinuity analysis: An alternative to the ex post facto experiment. *Journal of Educational Psychology*, 51, 309–317. doi:10.1037/H0044319

- Walther, E., & Trasselli, C. (2003). I like her, because I like myself: Self-evaluation as a source of interpersonal attitudes. *Experimental Psychology*, 50, 239–246. doi:10.1026//1618-3169.50.4.239
- Westgate, E., Riskind, R. G., & Nosek, B. A. (2015). Implicit preferences for straight people over lesbian women and gay men weakened from 2006 to 2013. *Collabra*, 1, 1–10. <http://doi.org/10.1525/collabra.18>
- Xu, K., Lofaro, N., Nosek, B. A., & Greenwald, A. G. (2016). Race IAT 2002-2015. Retrieved from osf.io/52qxl
- Zerhouni, O., Rougier, M., & Muller, D. (2016). “Who (really) is Charlie?” French cities with lower implicit prejudice toward Arabs demonstrated larger participation rates in Charlie Hebdo rallies. *International Review of Social Psychology*, 29, 69-76. <http://doi.org/10.5334/irsp.50>

Tables

Table 1

The seven identified periods of high BLM activity and their date ranges.

Period	Dates
1. Acquittal of George Zimmerman in the killing of Trayvon Martin	July 6 to August 2, 2013
2. Uprising in Ferguson, MO in response to killing of Michael Brown	August 9 to September 5, 2014
3. Protests of the non-indictments of police in the killings of Michael Brown and Eric Garner	November 22 to December 27, 2014
4. Protests in response to the police-involved death of Freddie Gray	April 18 to May 15, 2015
5. Mass shooting at a Black church in Charleston, SC, and subsequent protests including removing the Confederate flag from SC Capitol	June 13 to July 3, 2015
6. BLM disruptions of Presidential Election campaign events, subsequent Democratic National Committee (DNC) resolution on BLM	August 8 to September 5, 2015
7. Shooting of BLM activists in Minnesota and associated protests	November 21 to December 4, 2015

Table 2

Demographics for the full study, pre-BLM period and BLM period.

	Full Study (N=1,369,204)				Pre-BLM (N=755,050)				BLM (N=614,154)			
	<i>M</i>	<i>SD</i>	<i>n</i>	%	<i>M</i>	<i>SD</i>	<i>n</i>	%	<i>M</i>	<i>SD</i>	<i>n</i>	%
Age	27.64	12.24			27.51	11.91			27.81	12.64		
0-17			191,465	13.98			108,194	14.33			83,271	13.56
18-29			737,157	53.84			404,947	53.64			332,210	54.09
30-49			314,437	22.96			180,909	23.96			133,528	21.74
50-69			104,173	7.61			53,454	7.08			50,719	8.26
70 & Above			5,424	0.40			2,229	0.30			3,195	0.52
Gender												
Men			527,765	38.55			303,332	40.17			224,433	36.54
Women			804,367	58.75			448,421	59.39			355,946	57.96
Race												
Whites			1,179,805	86.17			643,631	85.24			536,174	87.30
Blacks			189,399	13.83			111,419	14.76			77,980	12.70
Latino												
Yes			61,346	4.48			27,812	3.68			33,534	5.46
No			1,250,339	91.32			698,551	92.52			551,788	89.85
Unknown			57,506	4.20			28,687	3.80			28,832	4.70
Education												
Some High School or less			209,704	15.32			103,903	13.76			105,801	17.23
High School Degree			151,539	11.07			67,496	8.94			84,043	13.68
Some College			532,681	38.90			350,457	46.42			182,224	29.67
College Degree			176,156	12.87			97,699	12.94			78,457	12.77
Some Advanced Schooling			92,383	6.75			43,593	5.77			48,790	7.94
Advanced Degree			181,607	13.26			87,101	11.54			94,506	15.39
Political Ideology	4.44	1.67			4.27	1.64			4.66	1.68		
Strongly Conservative			58,344	4.26			38,082	5.04			20,262	3.30
Moderately Conservative			154,198	11.26			93,228	12.35			60,970	9.93
Slightly Conservative			113,246	8.27			63,545	8.42			49,701	8.09
Neutral			432,566	31.59			261,945	34.69			170,621	27.78
Slightly Liberal			135,193	9.87			73,990	9.79			61,203	9.97
Moderately Liberal			278,930	20.37			139,741	18.51			139,189	22.66
Strongly Liberal			165,846	12.11			71,124	9.42			94,722	15.42

Table 3

Demographic shifts examined by regressing date of participation on demographic variables for the full study.

Demographics	Full Study (N=1,369,204)			
	η_p^2	F	β	R^2
All variables				.01579
Race	.00065	629.96	0.03	
Latino Status	.00233	3,232.93	0.05	
Political Orientation	.01130	14,066.01	0.11	
Education	.00005	138.37	0.01	
Gender	.00033	948.10	-0.02	
Age	.00005	619.71	-0.03	

Note: $p < .001$ for all variables in the model

Table 4a

Hierarchical linear regression by racial categories predicting implicit racial attitudes during the BLM period, controlling for changes in demographic variables and their interactions over time.

	Total Sample (N=614,154)				Whites (N=536,714)				Blacks (N=77,980)			
	η_p^2	<i>F</i>	<i>p</i>	<i>R</i> ²	η_p^2	<i>F</i>	<i>p</i>	<i>R</i> ²	η_p^2	<i>F</i>	<i>p</i>	<i>R</i> ²
				.10552				.01793				.00258
Date	.00090	555.44	<.001		.00100	700.13	<.001		.00062	38.41	<.001	
Race	.00908	53,764.80	<.001		--	--	--		--	--	--	
Latino Status	.00016	104.57	<.001		.00032	174.90	<.001		.00074	55.96	<.001	
Political Orientation	.00941	4,990.08	<.001		.01172	5,445.16	<.001		<.00001	3.82	.051	
Education	<.00001	719.05	<.001		.00013	699.79	<.001		<.00001	32.00	<.001	
Gender	.00133	-1,081.28	<.001		.00170	1,241.21	<.001		<.00001	0.00	.992	
Age	<.00001	29.38	<.001		<.00001	6.58	.010		.00058	37.54	<.001	
Date x Race	<.00001	11.21	<.001		--	--	--		--	--	--	
Date x Latino Status	<.00001	5.20	.023		<.00001	2.93	.089		<.00001	3.69	.055	
Date x Political Orientation	<.00001	1.63	.201		<.00001	6.69	.010		<.00001	5.19	.023	
Date x Education	<.00001	2.36	.125		<.00001	3.09	.079		<.00001	0.00	.985	
Date x Gender	<.00001	8.71	<.001		<.00001	8.76	.003		<.00001	0.00	.965	
Date x Age	<.00001	37.34	<.001		<.00001	25.34	<.001		.00013	8.29	.004	

Table 4b

Hierarchical linear regression by racial categories predicting explicit racial attitudes during the BLM period, controlling for changes in demographic variables and their interactions over time.

	Total Sample (N=614,154)				Whites (N=536,714)				Blacks (N=77,980)			
	η_p^2	<i>F</i>	<i>p</i>	<i>R</i> ²	η_p^2	<i>F</i>	<i>p</i>	<i>R</i> ²	η_p^2	<i>F</i>	<i>p</i>	<i>R</i> ²
				.21881				.04726				.03736
Date	.00047	408.54	<.001		.00122	1,115.80	<.001		.00118	76.24	<.001	
Race	.18669	119,067.29	<.001		--	--	--		--	--	--	
Latino Status	.00061	395.11	<.001		.00111	605.50	<.001		.00045	45.92	<.001	
Political Orientation	.00308	15,808.46	<.001		.00388	17,485.10	<.001		.00291	559.28	<.001	
Education	<.00001	333.65	<.001		.00022	19.60	<.001		.00520	959.11	<.001	
Gender	.00306	2,595.77	<.001		.00250	2,147.88	<.001		.00669	461.40	<.001	
Age	.00010	44.38	<.001		.00038	162.44	<.001		.00016	98.13	<.001	
Date x Race	.00099	515.52	<.001		--	--	--		--	--	--	
Date x Latino Status	.00005	28.72	<.001		.00004	17.07	<.001		.00012	13.02	<.001	
Date x Political Orientation	<.00001	3.07	.080		<.00001	3.71	.054		.00099	72.90	<.001	
Date x Education	<.00001	4.89	.027		<.00001	0.37	.543		.00013	5.72	.017	
Date x Gender	.00004	20.68	<.001		.00009	40.58	<.001		.00010	9.20	.002	
Date x Age	.00006	32.07	<.001		<.00001	1.37	.242		.00183	113.62	<.001	

Note. BLM = Black Lives Matter movement.

Table 5

Implicit and explicit attitude adjusted means and standard deviations (SD) for BLM period versus pre-BLM period, with ANCOVA results (demographic variables as covariates) and effect sizes by racial category.

	Total Sample				Whites				Blacks			
	Mean (SD)	<i>n</i>	<i>F</i>	<i>d</i> [95% CI]	Mean (SD)	<i>n</i>	<i>F</i>	<i>d</i> [95% CI]	Mean (SD)	<i>n</i>	<i>F</i>	<i>d</i> [95% CI]
Implicit Attitudes												
BLM period	0.310 (0.412)	519,596	1419.65***	0.07 [0.06, 0.07]	0.366 (0.407)	454,717	1564.42***	0.08 [0.07, 0.08]	-0.048 (0.438)	64,879	21.73***	0.02 [0.01, 0.03]
Pre-BLM period	0.338 (0.411)	703,836			0.398 (0.407)	602,725			-0.038 (0.437)	101,111		
Explicit Attitudes												
BLM period	0.289 (0.929)	497,113	1001.30***	0.06 [0.06, 0.06]	0.465 (0.864)	435,185	2371.50***	0.10 [0.10, 0.10]	-0.848 (1.256)	61,928	331.06***	0.10 [0.09, 0.11]
Pre-BLM period	0.345 (0.928)	628,586			0.551 (0.863)	539,428			-0.968 (1.254)	89,158		

Note. BLM = Black Lives Matter movement. * $p < .05$, ** $p < .01$, *** $p < .001$

Table 6a

Implicit attitude adjusted means and standard deviations (SD) for six periods of high struggle versus the preceding 30 days, with ANCOVA results (demographic variables as covariates) and effect sizes by racial category.

	Total Sample				Whites				Blacks			
	Mean (SD)	<i>n</i>	<i>F</i>	<i>d</i> [95% CI]	Mean (SD)	<i>n</i>	<i>F</i>	<i>d</i> [95% CI]	Mean (SD)	<i>n</i>	<i>F</i>	<i>d</i> [95% CI]
1. Zimmerman decision (Martin)	0.298 (0.431)	4,876	4.15*	0.04 [0.00, 0.09]	0.361 (0.428)	4,106	4.22*	0.05 [0.00, 0.09]	-0.064 (0.444)	770	0.56	--
Preceding 30 days	0.317 (0.431)	3,803			0.382 (0.429)	3,271			-0.045 (0.438)	532		
2. Ferguson uprising (Brown)	0.306 (0.429)	9,270	5.58*	0.04 [0.01, 0.07]	0.361 (0.424)	8,097	10.27**	0.06 [0.02, 0.09]	-0.024 (0.445)	1,173	1.46	--
Preceding 30 days	0.323 (0.429)	6,912			0.385 (0.425)	5,781			-0.047 (0.437)	1,131		
3. Non-indictments (Brown/Garner)	0.332 (0.431)	39,038	94.20***	0.09 [0.07, 0.11]	0.325 (0.428)	36,046	122.88***	0.11 [0.09, 0.13]	-0.028 (0.438)	2,992	3.31	--
Preceding 30 days	0.292 (0.442)	16,484			0.374 (0.439)	14,267			-0.051 (0.471)	2,217		
4. Baltimore rebellion (Gray)	0.318 (0.458)	13,096	0.05	--	0.365 (0.431)	11,588	0.65	--	-0.048 (0.427)	1,508	2.03	--
Preceding 30 days	0.317 (0.391)	16,959			0.361 (0.368)	15,057			-0.026 (0.436)	1,902		
5. Charleston shooting, flag removal	0.279 (0.429)	5,757	8.84**	0.05 [0.01, 0.08]	0.325 (0.426)	5,139	9.71**	0.06 [0.02, 0.09]	-0.047 (0.447)	618	<0.01	--
Preceding 30 days	0.301 (0.428)	8,111			0.349 (0.426)	7,025			-0.046 (0.428)	1,086		
6. MN shooting, Mall of U.S. protest	0.304 (.430)	7,402	0.02	--	0.354 (0.402)	6,477	0.02	--	-0.056 (0.325)	925	0.38	--
Preceding 30 days	0.305 (0.434)	20,900			0.353 (0.406)	18,359			-0.045 (0.454)	2,541		

Note. MN = Minnesota. * $p < .05$, ** $p < .01$, *** $p < .001$

Table 6b

Explicit attitude adjusted means and standard deviations (SD) for six periods of high struggle versus the preceding 30 days, with ANCOVA results (demographic variables as covariates) and effect sizes by racial category.

	Total Sample				Whites				Blacks			
	Mean (SD)	<i>n</i>	<i>F</i>	<i>d</i> [95% CI]	Mean (SD)	<i>n</i>	<i>F</i>	<i>d</i> [95% CI]	Mean (SD)	<i>n</i>	<i>F</i>	<i>d</i> [95% CI]
1. Zimmerman decision (Martin)	0.232 (0.920)	4,572	9.68**	0.07 [0.03, 0.11]	0.454 (0.843)	3,844	9.16**	0.07 [0.03, 0.12]	-1.041 (1.241)	728	1.45	--
Preceding 30 days	0.296 (0.921)	3,574			0.516 (0.844)	3,087			-0.951 (1.258)	487		
2. Ferguson uprising (Brown)	0.274 (0.937)	8,777	0.73	--	0.482 (0.788)	7,671	0.46	--	-1.007 (1.297)	1,106	0.77	--
Preceding 30 days	0.286 (0.890)	6,542			0.492 (0.815)	5,493			-0.958 (1.296)	1,049		
3. Non-indictments (Brown/Garner)	0.299 (0.853)	37,399	7.69**	0.03 [0.01, 0.05]	0.404 (0.809)	34,534	12.01***	0.04 [0.02, 0.05]	-0.709 (1.176)	2,856	0.37	--
Preceding 30 days	0.323 (0.874)	15,868			0.433 (0.830)	13,742			-0.730 (1.199)	2,126		
4. Baltimore rebellion (Gray)	0.310 (0.901)	12,683	1.55	--	0.446 (0.848)	11,224	2.66	--	-0.760 (1.146)	1,459	0.12	--
Preceding 30 days	0.323 (0.899)	16,497			0.463 (0.847)	14,647			-0.774 (1.161)	1,850		
5. Charleston shooting, flag removal	0.280 (0.822)	5,588	1.05	--	0.431 (0.777)	4,988	2.93	--	-0.833 (1.127)	600	3.37	--
Preceding 30 days	0.265 (0.887)	7,867			0.406 (0.825)	6,814			-0.727 (1.136)	1,053		
6. MN shooting, Mall of U.S. protest	0.267 (0.847)	7,175	1.39	--	0.413 (0.793)	6,282	0.93	--	-0.781 (1.165)	893	0.45	--
Preceding 30 days	0.253 (0.851)	20,099			0.402 (0.797)	17,656			-0.812 (1.186)	2,443		

Note: MN = Minnesota. * $p < .05$, ** $p < .01$, *** $p < .001$

Table 7

Effect sizes by political orientation for change in implicit and explicit attitudes from pre-BLM to BLM, based on full sample ANCOVA controlling for demographics

Political Orientation	Implicit Attitudes <i>d</i> [95% CI]	Explicit Attitudes <i>d</i> [95% CI]
Strongly conservative	.04 [.02, .06]	.05 [.03, .07]
Somewhat conservative	.05 [.04, .06]	.08 [.07, .09]
Slightly conservative	.05 [.03, .06]	.08 [.06, .09]
Neutral	.05 [.04, .05]	.02 [.01, .03]
Slightly liberal	.08 [.07, .09]	.09 [.08, .10]
Somewhat liberal	.09 [.09, .10]	.09 [.08, .10]
Strongly liberal	.11 [.10, .12]	.13 [.12, .14]

Figures

Figure 1. Average number of media citations for search terms from Factiva and Lexis-Nexis by week during BLM period. Numbers above peaks correspond to the seven periods of high struggle in Table 1.

Figure 2a. Average daily IAT D scores (implicit attitudes) for January 1st, 2009 to June 30th, 2016 with separate regression lines for pre-BLM and BLM period overlaid on the scatter plot. of the seven high points of BLM struggle are labeled on vertical gray lines.

Figure 2b. Average daily explicit attitude scores for January 1st, 2009 to June 30th, 2016 with separate regression lines for pre-BLM and BLM period overlaid on the scatter plot. Dates of the seven high points of BLM struggle are labeled on vertical gray lines.

Stimulus Materials for

Implicit and Explicit Racial Attitudes Changed During Black Lives Matter

General materials for running the Race IAT are available here: <https://osf.io/xdwhb/>

Study data and analysis syntax are available here: <https://osf.io/bq2dt/>