Questioning white losses and anti-white discrimination in the United States

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Political polarization and far-right movements across the West are thought to be partly driven by beliefs that white people face discrimination in societies that supposedly favour non-white people. We compared perceptions of racial discrimination with reported discrimination experiences in large, US national samples to shed light on the veracity of such beliefs. Regarding experiences, we find that white people consistently experienced less discrimination than black people, and that declines in anti-black discrimination have not coincided with increases in anti-white discrimination. Regarding perceptions, respondents overall did not express zero-sum discrimination beliefs. Moreover, black respondents and Democrats perceived that black people face much more discrimination than white people, whereas white respondents and Republicans perceived a smaller discrimination gap between black and white people, relative to reported discrimination experiences. Overall, improvements for black people do not seem to coincide with disadvantages for white people, and discrimination perceptions differ from reported discrimination experiences. Implications for racial attitudes, political polarization and voting behaviour are discussed.

The dogged persistence of prejudice against racial minorities, along with other disadvantaged social groups, is widely recognized by behavioural scientists[1]. Although most of these intergroup dynamics tend to reflect more pro-ingroup favouritism than anti-outgroup antagonism[2,3], their biasing effects nonetheless accumulate over time, resulting in systematic differences in access to resources and power[4,5] that can inflame intergroup tensions. Failure to recognize that disadvantaged groups (for example, black people) are discriminated against has itself been taken as a form of modern prejudice more insidious than old-fashioned anti-out-group antipathy[6,7]. Worryingly, the pendulum has swung even further, with some no longer content to simply deny the existence of discrimination against black people and other minorities. Growing voices assert that traditionally dominant groups (for example, white people) are now victims of a downward trajectory of social status and power. This position, characterized as 'reverse discrimination'[8], implies an underlying zero-sum belief whereby gains by minorities come at a direct cost to advantaged members.

This notion of reverse discrimination surfaced in the United States following gains made by black people in the civil rights era, particularly in opposition to affirmative action programmes that set quotas to ensure that non-white minorities had sufficient access to education and employment[8]. It was argued by some (primarily on the political right) that instead of combatting discrimination, these policies introduced another form of discrimination, shifting disadvantages from black people onto white people[9]. Such themes of white loss and perceived anti-white discrimination are also central in the emerging far-right populism and (white) nationalist movements in the United States and Europe in recent years[10–12], and reverse discrimination is believed to have played a role in the presidential election of Donald Trump[13]. Experiments have shown that reminding highly white-identified Americans of their future numerical minority status shifts their opinions in the pro-Trump direction[14]. Scholars have similarly concluded that Trump's victory was more attributable to a sense of loss and being left behind among traditionally high-status Americans (for example, white people) than to changes in financial well-being at the personal level[15].

The present investigation uses several large, national datasets to empirically consider perceptions of anti-white bias among different groups (white versus black people; Democrats versus Republicans) and to assess the veracity of such assertions by examining trajectories of the amount of discrimination experienced by white people and black people over time.

Researchers have recently begun to explore the zero-sum nature of beliefs about anti-white discrimination. In a well-known study, Norton and Sommers asked a small but national sample of 209 white Americans to reflect retrospectively about discrimination patterns over the past 6 decades[16]. Perceived biases against black people were seen to be declining, whereas biases against white people were seen to be increasing (and indeed now more problematic than anti-black bias). Moreover, these perceived biases were significantly correlated, such that lower percieved anti-black discrimination was associated with higher percieved anti-white discrimination; that is, they operated in a zero-sum fashion. Other research has shown that white participants who endorsed the legitimacy of the status quo expressed greater concern about anti-white bias, to the extent that they naturally believed or were induced to believe that racial progress (that is, equality) was becoming more real[17]. Research on motivated reasoning and hot cognition suggests that emotion can powerfully influence cognitive decisions, including those that are politically charged[18,19]. Given that one's ingroup position in the racial hierarchy can have a profound impact on responses to outgroups[20], affective reactions to cultural movements may also impact white people's racial discrimination perceptions. A considerable body of work suggests that fear of immigration and perceived threats from growing diversity profoundly impact white people's worldviews, including policy preferences, political identities (typically resulting in a conservative shift) and electoral decision-making[21,22]. Anti-white bias concerns, therefore, can reflect a reaction against changing social hierarchies (specifically, gains by other groups), whereby vocalizing concerns about anti-white bias is a strategy to manage anxiety over non-white racial progress[23].

Evidence of zero-sum thinking about racial progress, especially as pertains to white losses and non-white gains, is generally absent

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among black respondents[16,24]. Prospect theory offers a potential explanation, consistent with the general psychological principle that negativity tends to be more salient, potent and impactful than positivity[25]: people generally consider losses psychologically more impactful and meaningful than gains, a tendency that could apply to this intergroup domain[26]. Such asymmetries have been documented empirically, with changes from majority to minority being more psychologically jarring than changes from minority to majority are rewarding, at least in experimentally formed, non-racialized contexts[27]. In the real world, membership in a traditionally dominant group (for example, white people) should heighten focus on losses (versus gains), accentuating zero-sum beliefs; that is, the belief that their position at the top of the hierarchy is being surrendered to traditionally disadvantaged groups[17,24,28]. Whereas much work in this field argues that discrimination is not zero-sum, there has yet to be an empirical investigation of the veracity of these assertions by comparing perceptions of anti-white and anti-minority discrimination with the trajectories of discrimination experiences reported by different racial groups over time. The present investigation seeks to remedy this shortcoming in the literature. In doing so, we are cognizant that claims of reverse racism are more strongly linked not only to white people (versus black people) but also to right-leaning (versus left-leaning) ideologies[14,15], and that zero-sum beliefs are more strongly endorsed by those accepting inequality and hierarchies[29]. We thus examine differences in perceptions not only between races (white versus black) but also as a function of political ideology.

It is important to keep in mind that the cultural prevalence of 'white loss' discussions and expressed subjective concerns that white people are feeling 'left behind' in the public sphere do not speak to their veracity. Although people in advantaged groups (for example, white people) might vocalize concerns that 'things are getting worse' for their group, this may reflect a psychological reaction to a loss of privilege that is not necessarily aligned with discrimination experiences in their own lives. Recent detailed analyses of the United States and more global analyses have increasingly emphasized that the rising tide of progress is lifting all boats[30,31], particularly at the localized and personal levels[32]. From this perspective, zero-sum thinking that one's group is now being discriminated against might be relatively detached from people's lives as lived, and as such might reflect political messaging or posturing that is creating rather than reflecting a social reality.

Using large datasets nationally representative of the United States, we first examine perceptions of the amount of discrimination faced by white and black people among white (versus black), Republican (versus Democratic) and white Republican (versus white Democratic) respondents. Doing so allows us to examine perceptions of reverse discrimination not only among white people, but also among those on the political right. We then use three additional datasets containing large national samples of Americans to assess the amount of discrimination that white people (versus black people) report to have personally experienced over time. Such an analysis can shed light on the veracity of zero-sum discrimination—if discrimination were truly zero-sum, then we would expect declines in reported discrimination experiences among black people over the past several decades to be coupled with an increase in reported discrimination experiences among white people over the same time period. Last, we compare group discrimination perceptions with reported personal discrimination experiences to determine the extent to which beliefs about discrimination among different social groups (for example, white people and Republicans) line up with discrimination experiences reported by different races. Comparing discrimination experiences with discrimination perceptions across racial and political groups is crucial in providing a greater understanding of how groups perceive the world and the extent to which discrimination perceptions are in sync or out of sync with discrimination experiences.

Results

Perceptions of discrimination faced by white versus black people (Sample 1).

To assess perceptions of the amount of discrimination faced by white versus black people, we combined two large datasets nationally representative of the United States: Sample 1a ($n = 3,479$) and Sample 1b ($n = 2,443$) collected in 2012 and 2016, respectively (henceforth referred to collectively as Sample 1). Figure 1 shows the means, standard deviations and data spread for discrimination perceptions among white versus black respondents, Republican versus Democratic respondents and white Republican versus white Democratic respondents. We ran an analysis in which we examined discrimination (within subjects), race, and political party identification, as well as interactions between discrimination and respondent race and between discrimination and respondent political party affiliation. The results are shown in Table 1. Across respondent groups, participants perceived that black people face greater discrimination than white people ($M_{diff} = 1.37$, s.e.m. $= 0.02$, $P < 0.001$, 95% confidence interval (CI) (1.33, 1.42)). This effect was qualified by a significant interaction between discrimination perceptions and participant race, such that white respondents perceived less anti-black discrimination than black respondents (mean difference (M_{diff}) $= -0.59$, s.e.m. $= 0.04$, $P < 0.001$, 95% CI (-0.66, -0.52)), although there is little evidence to suggest that black people and white people differ in perceptions of anti-white discrimination ($M_{diff} = 0.12$, s.e.m. $= 0.03$, $P = 0.722$, 95% CI (-0.05, 0.08)). Furthermore, Republicans (versus Democrats) perceived less anti-black discrimination ($M_{diff} = -0.67$, s.e.m. $= 0.03$, $P < 0.001$, 95% CI (-0.72, -0.61)) and more anti-white discrimination ($M_{diff} = 0.35$, s.e.m. $= 0.03$, $P < 0.001$, 95% CI (0.30, 0.41)). In examining the perceived gap in discrimination against black people and white people, we found that white respondents perceived that the discrimination gap is smaller ($M_{diff} = 1.07$, s.e.m. $= 0.02$, $P < 0.001$, 95% CI (1.03, 1.11)), or that black and white people experience more similar amounts of discrimination, relative to perceptions held by black respondents ($M_{diff} = 1.67$, s.e.m. $= 0.04$, $P < 0.001$, 95% CI (1.59, 1.76)). Republicans also perceived a smaller gap ($M_{diff} = 0.87$, s.e.m. $= 0.04$, $P < 0.001$, 95% CI (0.79, 0.94)) relative to Democrats ($M_{diff} = 1.88$, s.e.m. $= 0.03$, $P < 0.001$, 95% CI (1.83, 1.93)).

To more directly address perceptions of white loss across political parties, we then examined discrimination perceptions and their interaction with respondent political party among white respondents only. The results suggest a significant effect of discrimination ($F(1, 4,169) = 2,989.37$, $P < 0.001$, partial $\eta^2 = 0.418$, 90% CI for partial η^2 (0.400, 0.434)), such that white respondents perceived that black people experience more discrimination than white people ($M_{diff} = 1.07$, s.e.m. $= 0.02$, $P < 0.001$, 95% CI (1.04, 1.11)). This was qualified by a significant interaction between discrimination and respondent political party ($F(1, 4,169) = 705.03$, $P < 0.001$, partial $\eta^2 = 0.145$, 90% CI for partial η^2 (0.129, 0.161)), such that white Republicans (versus white Democrats) perceived less anti-black discrimination ($M_{diff} = -0.37$, s.e.m. $= 0.03$, $P < 0.001$, 95% CI (-0.42, -0.32)) and more anti-white discrimination ($M_{diff} = 0.67$, s.e.m. $= 0.03$, $P < 0.001$, 95% CI (0.62, 0.73)). In assessing perceptions of the discrimination gap between black and white people, the results suggest that white Republicans perceived a smaller gap in discrimination faced by black and white people ($M_{diff} = 0.55$, s.e.m. $= 0.03$, $P < 0.001$, 95% CI (0.50, 0.61)) relative to perceptions held by white Democrats ($M_{diff} = 1.60$, s.e.m. $= 0.03$, $P < 0.001$, 95% CI (1.54, 1.65)).

Correlations between anti-white discrimination and anti-black discrimination perceptions were non-significant or approximated zero among white respondents ($r = -0.02$, $P = 0.200$), black respondents ($r = -0.07$, $P = 0.011$), Democratic respondents ($r = -0.07$, $P < 0.001$) and white Democratic respondents ($r = -0.06$, $P = 0.007$); and correlations between discrimination perceptions were weak but positive among Republican respondents ($r = 0.12$, $P < 0.001$) and
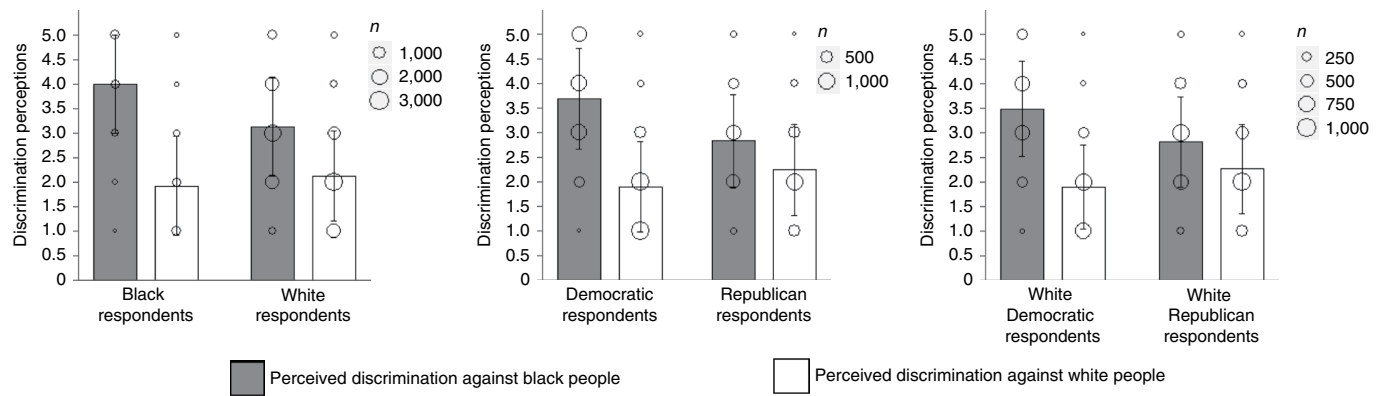
Fig. 1 | Mean amounts of discrimination perceived to be faced by black and white people among different respondent groups. Error bars reflect standard deviations. Dot sizes reflect the number of participants at each scale point. Black respondents, $n = 1,070$; white respondents, $n = 4,171$; Democratic respondents, $n = 3,067$; Republican respondents, $n = 2,174$; white Democratic respondents, $n = 2,043$; white Republican respondents, $n = 2,128$. White respondents perceived less anti-black discrimination than black respondents ($M_{diff} = -0.59$, s.e.m. $= 0.04$, $P < 0.001$, 95% CI (-0.66, -0.52)). There is little evidence to suggest that black and white people differ in perceptions of anti-white discrimination ($M_{diff} = 0.12$, s.e.m. $= 0.03$, $P = 0.722$, 95% CI (-0.05, 0.08)). White respondents perceived a smaller discrimination gap between black and white people ($M_{diff} = 1.07$, s.e.m. $= 0.02$, $P < 0.001$, 95% CI (1.03, 1.11)) relative to perceptions held by black respondents ($M_{diff} = 1.67$, s.e.m. $= 0.04$, $P < 0.001$, 95% CI (1.59, 1.76)). Republicans (versus Democrats) perceived less anti-black discrimination ($M_{diff} = -0.67$, s.e.m. $= 0.03$, $P < 0.001$, 95% CI (-0.72, -0.61)) and more anti-white discrimination ($M_{diff} = 0.35$, s.e.m. $= 0.03$, $P < 0.001$, 95% CI (0.30, 0.41)). Republicans perceived a smaller discrimination gap between black and white people ($M_{diff} = 0.87$, s.e.m. $= 0.04$, $P < 0.001$, 95% CI (0.79, 0.94)) relative to Democrats ($M_{diff} = 1.88$, s.e.m. $= 0.03$, $P < 0.001$, 95% CI (1.83, 1.93)). White Republicans (versus white Democrats) perceived less anti-black discrimination ($M_{diff} = -0.37$, s.e.m. $= 0.03$, $P < 0.001$, 95% CI (-0.42, -0.32)) and more anti-white discrimination ($M_{diff} = 0.67$, s.e.m. $= 0.03$, $P < 0.001$, 95% CI (0.62, 0.73)). White Republicans perceived that the gap in discrimination faced by black and white people is smaller ($M_{diff} = 0.55$, s.e.m. $= 0.03$, $P < 0.001$, 95% CI (0.50, 0.61)) relative to perceptions held by white Democrats ($M_{diff} = 1.60$, s.e.m. $= 0.03$, $P < 0.001$, 95% CI (1.54, 1.65)).

Table 1 | Discrimination perceptions as a function of race and ideology in Sample 1

Variable	d.f.	F	P	Partial η^2 (90% CI)
Between subjects				
Race	1	137.44	<0.001	0.026 (0.019, 0.033)
Party	1	62.23	<0.001	0.012 (0.007, 0.017)
Error	5,238	(0.875)		
Within subjects				
Discrimination	1	3,204.30	<0.001	0.380 (0.364, 0.395)
Discrimination × race	1	150.54	<0.001	0.028 (0.021, 0.036)
Discrimination × party	1	648.02	<0.001	0.110 (0.097, 0.123)
Error(discrimination)	5,238	(0.867)		

Discrimination refers to anti-black versus anti-white discrimination perceptions. Race refers to participant race (black or white). Party refers to participant political party affiliation (Democrat or Republican). d.f. = degrees of freedom. Partial η^2 is a measure of effect size. Black respondents, $n = 1,070$; white respondents, $n = 4,171$; Democratic respondents, $n = 3,067$; Republican respondents, $n = 2,174$. Values in parentheses for the error terms reflect mean square errors.

white Republican respondents ($r = 0.13$, $P < 0.001$), providing little evidence for zero-sum discrimination beliefs among any respondent group.

Changes in discrimination experienced by racial groups over time. We next assessed, using three datasets, the veracity of zero-sum discrimination beliefs by testing whether a decline in anti-black discrimination coincides with an increase in anti-white discrimination. The first cross-sectional dataset assessed reported experiences with racially motivated workplace discrimination among a large number of black and white people across 16 years (2002–2018; Sample 2). We then used cross-sectional data from the US Federal Bureau of Investigation (FBI) to assess reported numbers of anti-black and anti-white hate crime victims across the United States

over a period of 21 years (1996–2017; Sample 3). Hate crimes are arguably a more objective indicator of personal discrimination experiences because observers who have not experienced the event themselves (for example, law enforcement) play a role in determining whether an offence was racially motivated (that is, whether discrimination has occurred). Finally, we used longitudinal data from a large, national sample of white and black people (Sample 4) who reported personal experiences with daily discrimination at three different times (Wave 1 (1995–1996), Wave 2 (2004–2006) and Wave 3 (2013–2014)).

Experiences with racial discrimination in the workplace (Sample 2). In surveys conducted between 2002 and 2018, participants reported whether they had experienced racial discrimination in the workplace (yes/no). The percentages of participants who reported having experienced workplace racial discrimination can be seen in Fig. 2. The results suggest that black people experienced a significant decline in discrimination (standardized beta coefficient (β) $= -0.10$, s.e.m. $= 0.04$, $P = 0.025$, 95% CI (-0.17, -0.03)), whereas there is little evidence to suggest that white people experienced change in racially motivated workplace discrimination ($\beta = 0.04$, s.e.m. $= 0.04$, $P = 0.367$, 95% CI (-0.03, 0.11)) between 2002 and 2018. Declines in anti-black discrimination therefore do not seem to coincide with increases in anti-white discrimination, providing little evidence for zero-sum discrimination. We then compared a model in which parameter estimates for white and black respondents were freely estimated (log-likelihood (LL) $= -4,781.27$) with a model in which the intercepts for the groups were constrained to be equal (LL $= -4,845.87$) and with a model in which the slopes were constrained to be equal (LL $= -4,783.82$). There was a significant decrease in model fit after constraining the intercepts to equality (χ^2 (1) $= 129.32$, $P < 0.001$) and after constraining the slopes to equality (χ^2 (1) $= 4.99$, $P = 0.025$), suggesting that black people initially experienced more racially motivated workplace discrimination in 2002 and a greater decline in discrimination over time, relative to white people.
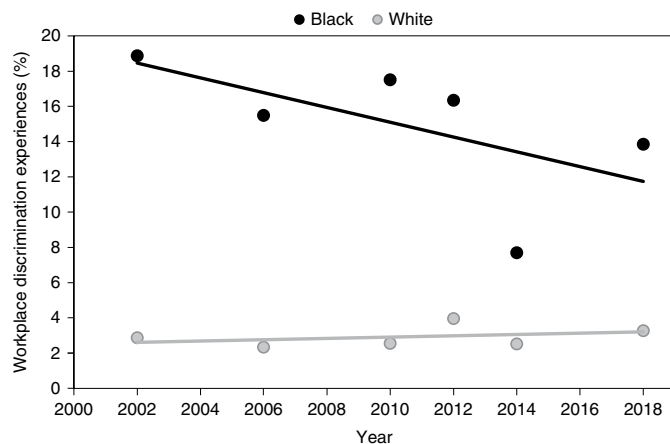
Fig. 2 | Percentages of black and white participants who reported having experienced workplace discrimination between 2002 and 2018. Lines reflect lines of best fit for black and white people. White $n = 6,356$, black $n = 1,262$. The slope for black people is significantly negative ($\beta = -0.10$, s.e.m. $= 0.04$, $P = 0.025$, 95% CI (-0.17, -0.03)), whereas there is little evidence to suggest that the slope for white people differs from 0 ($\beta = 0.04$, s.e.m. $= 0.04$, $P = 0.367$, 95% CI (-0.03, 0.11)). There was a significant decrease in model fit after constraining the intercepts to equality ($\chi^2 (1) = 129.32$, $P < 0.001$) and after constraining the slopes to equality ($\chi^2 (1) = 4.99$, $P = 0.025$).

Fig. 3 | Number of hate crime victims between 1996 and 2017. Lines reflect lines of best fit for black and white people. Intercepts for both white and black people are significant (white intercept $= 5.98$, s.e.m. $= 0.75$, $P < 0.001$; black intercept $= 6.24$, s.e.m. $= 0.63$, $P < 0.001$). Slopes for both groups are significantly negative (black $\beta = -0.91$, s.e.m. $= 0.03$, $P < 0.001$, 95% CI (-0.96, -0.86); white $\beta = -0.77$, s.e.m. $= 0.08$, $P < 0.001$, 95% CI (-0.89, -0.64)). There was a significant decrease in model fit after constraining the intercepts to equality ($\Delta\chi^2 (1) = 40.84$, $P < 0.001$) and after constraining the slopes to equality ($\Delta\chi^2 (1) = 29.53$, $P < 0.001$).

Experiences with racially motivated hate crimes (Sample 3). Using data provided by the FBI, Fig. 3 shows the number of victims of racially motivated hate crimes between 1996 and 2017. The results reveal that the intercepts for both white and black people were significant (white intercept $= 5.98$, s.e.m. $= 0.75$, $P < 0.001$; black intercept $= 6.24$, s.e.m. $= 0.63$, $P < 0.001$), suggesting that both groups experienced a significant number of hate crimes in 1996. Furthermore, the slopes for both groups were significantly negative, suggesting that there have been fewer victims of both anti-black ($\beta = -0.91$, s.e.m. $= 0.03$, $P < 0.001$, 95% CI (-0.96, -0.86)) and anti-white ($\beta = -0.77$, s.e.m. $= 0.08$, $P < 0.001$, 95% CI (-0.89, -0.64)) hate crimes over time, again providing little evidence for zero-sum discrimination. We then compared a model in which parameter estimates for white and black victims were freely estimated (d.f. $= 0$) with a model in which the intercepts for the groups were constrained to be equal ($\chi^2 (1) = 40.84$, $P < 0.001$, comparative fit index (CFI) $= 0.18$, standardized root mean square residual (SRMR) $= 2.08$) and with a model in which the slopes were constrained to be equal ($\chi^2 (1) = 29.53$, $P < 0.001$, CFI $= 0.41$, SRMR $= 0.45$). There was a significant decrease in model fit after constraining the intercepts to equality ($\Delta\chi^2 (1) = 40.84$, $P < 0.001$) and after constraining the slopes to equality ($\Delta\chi^2 (1) = 29.53$, $P < 0.001$), suggesting that black people (versus white people) initially experienced more racially motivated hate crimes in 1996 and have experienced a steeper decline in racially motivated hate crimes since then.

Daily discrimination experiences (Sample 4). We used longitudinal data from a large, national sample of white and black people who reported their experiences with daily discrimination (for example, being treated with less courtesy than other people) at three points spaced over 20 years. Unlike the previous analyses, the same participants were assessed at each wave. Means and standard errors can be seen in Fig. 4. We specified latent growth models to assess changes in black and white respondents' discrimination experiences over time. Although the slope for black people seems to slightly level off between Wave 2 and Wave 3, freely estimating the slope at Wave 3 did not
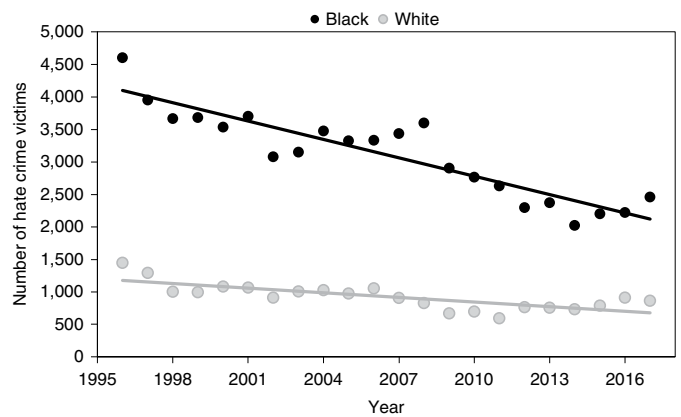
significantly improve the model fit ($\Delta\chi^2 (1) = 2.19$, $P = 0.139$), and as such, we report a model specifying linear change for both groups over time. The latent intercepts for both white and black people were significant (white intercept $= 1.38$, s.e.m. $= 0.01$, $P < 0.001$; black intercept $= 2.11$, s.e.m. $= 0.04$, $P < 0.001$), and the latent slopes for both groups were significantly negative (white $= -0.01$, s.e.m. < 0.01, $P = 0.018$, black $= -0.11$, s.e.m. $= 0.03$, $P < 0.001$). Both white and black people therefore experienced a significant amount of discrimination in the 1990s, as well as a decline in discrimination experiences throughout the 2000s and 2010s, providing little evidence for zero-sum discrimination. We next tested for differences between groups by comparing a model in which parameter estimates for white and black respondents were freely estimated ($\chi^2 (2) = 27.53$, $P < 0.001$, root mean square error of approximation (RMSEA) $= 0.07$, CFI $= 0.98$, SRMR $= 0.02$) with a model in which the intercepts for the groups were constrained to be equal ($\chi^2 (3) = 318.65$, $P < 0.001$, RMSEA $= 0.19$, CFI $= 0.78$, SRMR $= 0.21$) and a model in which the slopes were constrained to be equal ($\chi^2 (3) = 36.54$, $P < 0.001$, RMSEA $= 0.06$, CFI $= 0.98$, SRMR $= 0.03$). There was a significant decrease in model fit after constraining the intercept means to equality ($\Delta\chi^2 (1) = 330.49$, $P < 0.001$) and after constraining the slopes to equality ($\Delta\chi^2 (1) = 9.59$, $P = 0.002$). This indicates that, relative to white people, black people experienced a greater amount of discrimination at Wave 1, as well as a more pronounced decline in discrimination over time. It should be noted that this measure of discrimination asked participants to report on their experiences compared with those of other people, not specific to race. However, the results from this sample are strikingly similar to those drawn from Sample 2 and Sample 3, both of which asked about discrimination specific to race. The pattern of results is thus largely consistent across samples, regardless of how discrimination is measured.

Comparing perceptions of group discrimination to reported discrimination experiences. To test whether group discrimination perceptions differ from reported personal discrimination experiences, we first analysed data regarding discrimination experiences using the years 2012–2018 from Sample 2 (workplace discrimination), the years 2012–2016 from Sample 3 (FBI hate crime statistics) and Wave 3 (2013–2014) of Sample 4 (daily discrimination).
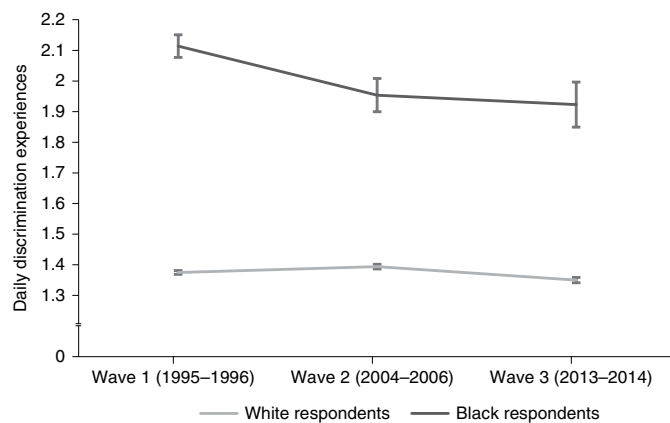
Fig. 4 | Mean discrimination experiences reported by white and black people estimated using full information maximum likelihood. Error bars reflect standard errors of the mean. White $n = 5,626$, black $n = 340$. The latent intercepts for both white and black people are significant (white intercept $= 1.38$, s.e.m. $= 0.01$, $P < 0.001$; black intercept $= 2.11$, s.e.m. $= 0.04$, $P < 0.001$), and the latent slopes for both groups are significantly negative (white $= -0.01$, s.e.m. < 0.01, $P = 0.018$, black $= -0.11$, s.e.m. $= 0.03$, $P < 0.001$). There was a significant decrease in model fit after constraining the intercept means to equality ($\Delta\chi^2$ (1) $= 330.49$, $P < 0.001$) and after constraining the slopes to equality ($\Delta\chi^2$ (1) $= 9.59$, $P = 0.002$).

In these samples, we compared discrimination experiences among white and black people (separately) against zero (or 0.001 for dichotomous data; see Methods for more details) and computed the corresponding d scores to capture the standardized magnitude of the amount of discrimination experienced by each group. We then computed a meta-analytic average and corresponding confidence interval for these three effect sizes (see Personal discrim. experiences in Table 2). Next, we computed the difference in reported discrimination experiences between white and black respondents in each dataset, computed corresponding d scores and then computed a meta-analytic average of these effect sizes and the corresponding confidence interval (see Gap in discrim. experiences between black and white people in Table 2).

We next analysed discrimination perceptions (Sample 1, 2012 and 2016). For each respondent group, we compared perceptions of anti-white and anti-black discrimination against zero, computing corresponding the d scores and confidence intervals to quantify the amount of discrimination perceived to be experienced by black and white people. We then assessed the difference between anti-white and anti-black discrimination perceptions, computing the corresponding d scores and confidence intervals to capture the standardized magnitude of the perceived gap in anti-black and anti-white discrimination. See the sections of Table 2 that refer to Sample 1 (S1) for the results. Computing standardized effects allows for meaningful comparisons between perceptions and experiences, taking into account differences in scale range and variability between samples.

Comparing confidence intervals for d scores suggests that white people, Republicans and white Republicans perceived that there was less discrimination against black people than is reportedly experienced by black people. In contrast, there is no credible evidence to suggest that black people's, Democrats' or white Democrats' perceptions of anti-black discrimination differ from reported experiences (see Discrimination against black people in Table 2). All respondent groups perceived less anti-white discrimination than white people reportedly experience (see Discrimination against white people in Table 2). With regard to the discrimination gap between black and white people (see Gap in discrimination against black versus white people in Table 2), Republicans and white Republicans perceived

that this gap was smaller (that is, that the amount of discrimination faced by black and white people is more comparable) than is suggested by reported personal experiences. In contrast, black, Democratic and white Democratic respondents reported that this gap was larger (that is, that black people face much more discrimination relative to white people) than is suggested by these groups' reported personal discrimination experiences.

Discussion

Perceptions of reverse racism or anti-white discrimination have been a part of US political discourse, policy decisions and voting behaviour for decades. Such beliefs are often tied to perceptions that historically advantaged group members (for example, white people) lose out when disadvantaged group members make social gains[16,17,24]. Using a large sample nationally representative of the United States, our work compares perceptions of anti-white and anti-black biases, thereby examining perceptions of reverse racism across several social groups. We also directly test speculations regarding the relation between anti-white and anti-black prejudice by assessing whether decreases in prejudice for one group coincide with increases in prejudice for the other.

Using multiple national datasets and analytic strategies, our work provides knowledge crucial to understanding the role of discrimination perceptions in politics. We found that correlations between perceptions of anti-white and anti-black discrimination approximated zero (or were even positive) across respondent groups. This reveals that, on average, Americans do not perceive discrimination in zero-sum terms, which would have been represented by sizeable negative correlations (that is, perceptions of lower discrimination against black people would have been associated with perceptions that white people face greater discrimination). We also found that all respondent groups in Sample 1 (white people, black people, Democrats, and Republicans) perceived that black people experience greater discrimination than white people. This finding suggests that public discourse regarding white people's belief in reverse discrimination may be exaggerated and not reflective of the average white American or Republican. These findings differ from work by Norton and Sommers[16], who found evidence of zero-sum racial discrimination perceptions. It should be noted, however, that their participants retrospectively reported anti-black and anti-white discrimination perceptions for decades between the 1950s and the 2000s[16], and such methodological differences may account for differences in results between this previous work and the present investigation.

Nonetheless, in the present investigation, white people, Republicans and white Republicans perceived that there is a smaller gap between anti-black and anti-white discrimination, compared with beliefs held by black people, Democrats and white Democrats, respectively. These findings support much journalistic speculation and social scientific research showing that differences in perceptions of discrimination and race relations may be driving political behaviour, election decisions and political polarization[10-12,14,15]. Although past work has examined political ideology as a moderator of gender zero-sum beliefs[33] or treated political ideology as a covariate[24], research on zero-sum discrimination perceptions with regard to race has thus far largely focused on comparing perceptions of white people to those of racial minorities. Future work should consider political ideology an important predictor of racial discrimination perceptions, rather than simply focus on racial group membership. Moreover, the small sample of black Republicans ($n = 46$) in the present study limited our capacity to examine discrimination perceptions among this group. Future work may explore differences between black Democrats and black Republicans with larger samples, as these groups may have unique perceptions of anti-black and anti-white discrimination that differ from those of white Democrats and white Republicans.

Table 2 | Personal discrimination experiences compared with perceptions of discrimination

	d	95% CI		Perceptions versus experiences	n
		lower	upper		
Discrimination against black people					
Personal discrim. experiences among black people (S2, S3, S4)	3.76	3.45	4.10		679
Perceived group discrimination against black people (S1)					
White respondents	3.14	3.08	3.20	below experiences	4,194
Black respondents	3.99	3.84	4.15	overlap with experiences	1,078
Republican respondents	3.04	2.94	3.14	below experiences	2,186
Democratic respondents	3.61	3.51	3.70	overlap with experiences	3,086
White Republican respondents	3.09	2.99	3.19	below experiences	2,140
White Democratic respondents	3.58	3.46	3.69	overlap with experiences	2,054
Discrimination against white people					
Personal discrim. experiences among white people (S2, S3, S4)	2.92	2.83	3.02		5,233
Perceived group discrimination against white people (S1)					
White respondents	2.31	2.26	2.35	below experiences	4,191
Black respondents	1.90	1.81	1.98	below experiences	1,075
Republican respondents	2.41	2.33	2.49	below experiences	2,183
Democratic respondents	2.05	1.99	2.11	below experiences	3,083
White Republican respondents	2.47	2.39	2.56	below experiences	2,137
White Democratic Respondents	2.19	2.11	2.27	below experiences	2,054
Gap in discrimination against black versus white people					
Gap in discrim. experiences between black and white people (S2, S3, S4)	0.86	0.78	0.94		5,912
Gap in perceived discrim. against black versus white people (S1)					
White respondents	1.05	1.00	1.09	above experiences	6,752
Black respondents	2.06	1.93	2.20	above experiences	1,424
Republican respondents	0.64	0.58	0.70	below experiences	2,291
Democratic respondents	1.84	1.76	1.92	above experiences	3,369
White Republican respondents	0.61	0.55	0.67	below experiences	2,128
White Democratic respondents	1.74	1.64	1.84	above experiences	2,043

Discrim., discrimination; S1, Sample 1 (discrimination perceptions); S2, Sample 2 (workplace discrimination); S3, Sample 3 (hate crimes); S4, Sample 4 (daily discrimination). Discrimination against black people and discrimination against white people compare personal discrimination experiences (Sample 2, Sample 3 and Sample 4) or perceptions of group discrimination (Sample 1) against zero (or 0.001 for Sample 2 dichotomous data). Gaps in discrimination against black versus white people reflect differences between white and black people in discrimination experiences (Sample 2, Sample 3 and Sample 4) or differences in perceived anti-white and anti-black discrimination (Sample 1).

We also employed three additional datasets to assess how discrimination experiences (workplace discrimination, hate crimes and daily discrimination) have changed for black and white people over time. Across datasets, we consistently found that black people faced significantly more discrimination than white people in the late 1990s and early 2000s, although the intercepts for white and black people were both statistically significant, suggesting that both groups faced some degree of discrimination during this time. This is consistent with the claim that, whereas reverse racism may sometimes occur, it tends to be 'rare, mild, and confined to a restricted set of circumstances'[34,35]. Furthermore, we found no credible evidence to suggest that discrimination against white people has increased, or that discrimination operates in a zero-sum fashion. Indeed, we found evidence for the opposite pattern, such that improvements for black people often coincide with improvements for white people, with one dataset showing no change in anti-white discrimination over time and two datasets showing that discrimination against both black and white people has been declining. The 'rising tide' hypothesis theorized by other social scientists[30,32] has considerable merit based on these datasets that track discrimination across time.

Nonetheless, it should be recognized that, whereas overarching long-term trends suggest a decline in discrimination experiences, discrimination experiences for both races seem to fluctuate from year to year. Particularly troubling is an apparent uptick in hate crime victims in recent years (for example. 2015–2017), especially among black people (Fig. 2). Future work may examine specific social or political events that may foster fluctuations in discrimination experiences over shorter periods of time.

We also compared discrimination experiences in Samples 2 though 4 with discrimination perceptions in Sample 1. All respondent groups (white people, black people, Democrats and Republicans) reported discrimination perceptions that differ to some degree from personal discrimination experiences. White people, Republicans and white Republicans perceived that black people face less discrimination than that suggested by black people's reported personal experiences with discrimination. All respondent groups also perceived that white people face less discrimination than white people's reported experiences suggest. Most striking, however, are differences regarding the gap between discrimination faced by black people and that faced by white people. Black people,

Democrats and white Democrats perceived that this discrimination gap is larger than that suggested by reported discrimination experiences. In contrast, Republicans and white Republicans perceived this gap to be smaller than that suggested by white and black people's reported discrimination experiences. Republicans thus seem to underestimate the gap between anti-black and anti-white discrimination, whereas Democrats seem to overestimate the gap.

It is possible that disadvantaged groups underestimate how much discrimination they personally experience[36–39]. For instance, the personal/group discrimination discrepancy effect suggests that disadvantaged groups tend to perceive that they experience less discrimination on the personal level relative to the discrimination faced by their group as a whole[40]. If this is the case, the gap in discrimination experiences between black and white people may be underestimated in the current study, meaning that white people, and especially white Republicans, may have more inaccurate discrimination perceptions than our current findings suggest. However, this limitation is mitigated by the inclusion of FBI hate crime statistics, in which individuals who have not personally experienced the offense play a role in determining whether the incident was racially motivated, arguably making for a more objective indicator of discrimination experiences. Furthermore, the results suggest that black people's perceptions of discrimination faced by their group overlap with personal discrimination experiences reported by black people (see the section Discrimination against black people in Table 2), thus suggesting little discrepancy between personal and group discrimination perceptions in this case and rendering it unlikely that the current findings are fully accounted for by the personal/group discrepancy effect. Nonetheless, the present investigation focuses on discrimination perceptions and experiences among black and white people exclusively, limiting the generalizability of these findings to other marginalized groups (for example, Asians and Native Americans) or subgroups within racial categories (for example, English-speaking Hispanics versus non-English-speaking Hispanics). Future work can explore and compare discrimination perceptions and experiences over time using different groups, different survey methods and objective measures of discrimination experiences.

Perceptions of zero-sum discrimination and reverse racism permeate discussions of political polarization, far-right political movements and voting behaviour. Understanding how discrimination perceptions differ from discrimination experiences lays the foundation for future discoveries regarding the processes by which people develop erroneous, or accurate, discrimination perceptions and how these perceptions affect broad racial and political divides. Our findings suggest that most people do not perceive racial discrimination as zero-sum; moreover, the examination of discrimination experiences over the past several decades suggests that discrimination did not act in a zero-sum manner. Instead of suggesting that white people are losing out to black people in the discrimination game, these results largely indicate that conditions for both black and white people are generally improving. However, the results also reveal that group discrimination perceptions can be substantially out of sync with reported discrimination experiences. Our findings suggest that progress towards eliminating discrimination has been made, but in no way has discrimination against black people ceased. Indeed, these data suggest that there is a sizeable gap between white and black people in experienced discrimination, which is more sizeable than Republicans, and specifically white Republicans, acknowledge or perceive. Future research can focus on the role of political beliefs, as ideology may be a greater contributor to zero-sum thinking and reverse discrimination than simple demographics (that is, race) alone. Increasing accuracy in perceptions of progress towards racial equality may be crucial in reducing political polarization and radicalization of the political right in the United States and across the Western world.

Methods

Discrimination perceptions (Sample 1). *Participants and procedure.* Nationally representative samples were collected by the American National Election Studies as part of their Time Series Studies[41,42]. Surveys administered in 2012 (Sample 1a) and 2016 (Sample 1b) contained identical items regarding group discrimination perceptions and were thus combined for the purpose of this study. Responses from those identifying as White or Black, and Democratic or Republican, were retained, leaving 5,922 participants ($M_{age} = 50.80$, s.d. $= 17.09$; 54.7% female, 45.0% male), 79.6% of whom were white and 20.4% of whom were black. All participants in this sample were included in the analyses.

Materials. Political party identification. Participants were asked to indicate whether they consider themselves a Democrat, a Republican, an Independent or something else.

Group discrimination perceptions. To assess perceptions of discrimination faced by different groups, participants responded to the following item: 'How much discrimination is there in the United States today against each of the following groups?' with regard to black and white people, on a five-point Likert scale ($1 =$ a great deal, $5 =$ none at all). Scores were reverse coded such that higher scores reflect perceptions that a given group faces greater discrimination.

Workplace discrimination based on race (Sample 2). *Participants and procedure.* Responses from large national samples of US adults were collected by the National Opinion Research Center at the University of Chicago[43]. Surveys administered in 2002, 2006, 2010, 2012, 2014 and 2018 contained an item asking whether participants had experienced racial discrimination in the workplace; we used these surveys in the current research. Responses from those identifying as white or black were retained, leaving 14,509 participants across all years ($M_{age} = 48.61$, s.d. $= 17.55$; 55.8% female, 44.2% male), 83.3% of whom were white and 16.7% of whom were black. All participants in this sample were included in the analyses.

Materials. Workplace discrimination experiences. To assess experiences with racially motivated workplace discrimination, participants were asked, 'Do you feel in any way discriminated against on your job because of your race or ethnic origin?' (yes/no).

Racially motivated hate crimes (Sample 3). Data were collected by the FBI as part of their Uniform Crime Reporting Program, which works with local, state and federal law enforcement agencies to identify and compile hate crime statistics[44]. The number of victims of anti-black and anti-white hate crimes across the United States is provided for every year between 1996 and 2017. Across years, 88,738 victims of racially motivated hate crimes were identified, 77.05% of whom were victims of anti-black hate crimes and 22.95% of whom were victims of anti-white hate crimes.

Longitudinal daily discrimination (Sample 4). *Participants and procedure.* Responses from a national sample were collected by the MacArthur Foundation Research Network on Successful Midlife Development as part of their Midlife Development in the United States longitudinal study[45–47]. As with the other samples, we retained respondents who identified as white or black. The sample at Wave 1, collected in 1995–1996, comprised 5,914 participants ($M_{age} = 46.92$, s.d. $= 12.85$; 52.5% female, 47.5% male), 94.4% of whom were white and 5.6% of whom were black. Wave 2, collected in 2004–2006, comprised 3,754 participants ($M_{age} = 47.37$, s.d. $= 12.39$; 55.3% female, 44.7% male), 96.0% of whom were white and 4.0% of whom were black. Wave 3, collected in 2013–2014, comprised 2,538 participants ($M_{age} = 46.52$, s.d. $= 11.22$; 55.3% female, 44.7% male), 96.5% of whom were white and 3.5% of whom were black. All participants in this sample were included in the analyses. The results from Little's test suggest that data were not missing completely at random ($\chi^2 (16) = 91.51$, $P < 0.001$). Follow-up tests revealed that participants who dropped out of the study by Wave 3 reported more discrimination at Wave 1 ($t(5,912) = 3.43$, $P = 0.001$) and were more likely to be black ($\chi^2 (1) = 41.57$, $P < 0.001$).

Materials. Personal discrimination experiences. To indicate their experiences with discrimination, participants responded to the following: 'How often on a day-to-day basis do you experience each of the of the following types of discrimination' with regard to 'being treated with less courtesy than other people', 'being treated with less respect than other people', 'receive poorer service than other people at restaurants or stores', 'people act as if they think you are not smart', 'people act as if they are afraid of you', 'people act as if they think you are dishonest', 'people act as if they think you are not as good as they are', 'called names or insulted' and 'are threatened or harassed' on four-point Likert scales ($1 =$ often, $4 =$ never). Scores were reversed and averaged such that higher scores indicate greater experiences with discrimination (Wave 1, $\alpha = 0.92$; Wave 2, $\alpha = 0.91$; Wave 3, $\alpha = 0.91$).

Statistical approach. One key strength of the present investigation is the use of multiple analytic strategies to test for the presence of zero-sum discrimination. Data distributions for continuous variables in all samples were visually inspected, and skewness and kurtosis values were examined. On the basis of this information,

distributions were assumed to be normal, although this was not formally tested. The data distribution for Sample 1 can be seen in Fig. 1, and the data distributions for Sample 3 (hate crimes) and Sample 4 (daily discrimination) can be seen in Supplementary Fig. 1 and Supplementary Fig. 2, respectively. All tests were two-tailed. To assess differences between perceptions of anti-white discrimination and perceptions of anti-black discrimination, we first used data from Sample 1 to conduct a general linear model in SPSS to assess whether black or Democratic participants differ in their perceptions of anti-black or anti-white discrimination compared with white or Republican respondents, respectively. We then assessed whether anti-white discrimination perceptions differ from anti-black discrimination perceptions (that is, the perceived gap between anti-black and anti-white discrimination) and whether the size of this difference depends on participant race or participant political party affiliation. The results from Levene's test suggest that variances were unequal for anti-black discrimination ($F(1, 5,237) = 17.95$, $P < 0.001$) and anti-white discrimination ($F(1, 5,237) = 12.69$, $P < 0.001$). Examining white participants only, we then used a general linear model to assess whether white Republicans differ from white Democrats in their perceptions of anti-black or anti-white discrimination, and we assessed whether these groups differ in their perceptions of the gap between anti-black and anti-white discrimination. The results from Levene's test suggest that variances were unequal for anti-black discrimination ($F(1, 5,658) = 44.95$, $P < 0.001$) and anti-white discrimination ($F(1, 4,169) = 14.69$, $P < 0.001$). However, Levene's test is more likely to be significant in large samples[48], so following field guidelines[49,50] we interpret results that are significant at $P < 0.001$.

To assess whether racially motivated workplace discrimination experiences have differed between black and white people over time, we used data from Sample 2 and centred the year at 2002 (the first year that assessed discrimination experiences in the dataset). Using MLR in MPlus v.7.4 (ref.[51]), we then specified a logistic regression in which the year was specified as the predictor of discrimination experiences and used multiple groups analysis to test whether the intercept or slope differed between black and white participants. Model fit indices were compared for models in which the slope and intercept were freely estimated and for models in which the slope or intercept was constrained to be equal across black and white people. A significant decrease in model fit after constraining the parameters to equality provided evidence that the intercept or slope significantly differs between black and white people.

To assess whether the numbers of victims of racially motivated hate crimes differed between black and white people over time, we used data from Sample 3 and centred the year at 1996 (the first year for which hate crime data were available). Using MLR in MPlus v.7.4, we then specified a regression analysis in which the year was the predictor of the number of hate crime victims and used multiple groups analysis to test whether the intercept or slope differed between black and white people. Model fit indices were compared for models in which the slope and intercept were freely estimated to models in which the slope or intercept was constrained to be equal across black and white people. A significant decrease in model fit after constraining the parameters to equality provided evidence that the intercept or slope significantly differs between black and white people.

To assess change in daily discrimination experiences among black and white people over time, we used longitudinal data from Sample 4 and specified latent growth models for black and white people separately using MLR in Mplus v.7.4. Missing data were estimated using full information maximum likelihood. In latent growth modelling, repeated measures are used to estimate intercept factors, which reflect the starting point of a trajectory for a given variable in our case, and slope factors, which reflect the trajectory of change in a variable over time. These factors are thought to give rise to the repeated measures[52,53]. Intercept factors for discrimination experiences were specified with path coefficients to each of the repeated measures (Wave 1, Wave 2 and Wave 3) fixed to 1. The slopes were specified as linear with path coefficients to Wave 1 discrimination experiences, Wave 2 experiences and Wave 3 experiences, fixed to 0, 1 and 2 respectively. To compare intercepts and slopes between groups, we then conducted a multiple groups analysis in which we compared the fit of an unconstrained (baseline) model with the fit of a model in which intercepts or slopes for white and black people were constrained to equality. If model fit worsened after constraining the intercepts or slopes, this suggested that that the intercepts or slopes differ between groups.

To compare group discrimination perceptions with personal discrimination experiences, we first used data from Sample 1 to compare anti-white and anti-black discrimination perceptions (separately) against zero and computed d scores and corresponding confidence intervals to obtain standardized effect sizes. To assess discrimination gap perceptions, we computed the difference between anti-white discrimination perceptions and anti-black discrimination perceptions for each response group and computed d scores and corresponding confidence intervals for each of these differences. To compare these perceptions with reported discrimination experiences, we selected data from specific years in Samples 2, 3 and 4 that were comparable to the years available in Sample 1 (which was collected in 2012 and 2016) while attempting to maintain large sample sizes. Thus, we combined years 2012–2018 in Sample 2 (racially motivated workplace discrimination), combined years 2012–2016 in Sample 3 (racially motivated hate crimes) and used data from Wave 3 of Sample 4, which took place in 2013–2014. We compared discrimination experiences reported by black or white people against zero (in the case of Sample 2, which contained a dichotomous

measure, we compared discrimination experiences against 0.001[54]) and computed corresponding d scores. We then computed meta-analytic averages of these effect sizes and their corresponding confidence intervals. We also computed the difference between white and black people in discrimination experiences and computed the corresponding d scores to obtain measures of the discrimination gap between black and white people. We then computed a meta-analytic average of these effect sizes and its corresponding confidence interval. The d scores and corresponding confidence intervals for discrimination perceptions in Sample 1 were then compared with the meta-analytic averages of effect sizes and confidence intervals for discrimination experiences obtained from Samples 2, 3 and 4.

Reporting Summary. Further information on research design is available in the Nature Research Reporting Summary linked to this article.

Data availability
All data are publicly accessible online. Data from Sample 1 can be found at https://electionstudies.org/. Data from Sample 2 can be found at http://www.gss.norc.org/Get-The-Data. Data from Sample 3 can be found at https://ucr.fbi.gov/hate-crime. Data from Sample 4 can be found at http://midus.wisc.edu/. Names for variables used in the present investigation are listed as they appear in the datasets in the Supplementary Information.

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Competing interests
The authors declare no competing interests.

Additional information
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