UvA-DARE (Digital Academic Repository)

Infectious Disease Prevalence, Not Race Exposure, Predicts Both Implicit and Explicit Racial Prejudice Across the United States

O'Shea, B.A.; Watson, D.G.; Brown, G.D.A.; Fincher, C.L.

DOI

[10.1177/1948550619862319](https://doi.org/10.1177/1948550619862319)

Publication date

2020

Document Version

Final published version

Published in

Social Psychological and Personality Science

License

Article 25fa Dutch Copyright Act

[Link to publication](#)

Citation for published version (APA):

O'Shea, B. A., Watson, D. G., Brown, G. D. A., & Fincher, C. L. (2020). Infectious Disease Prevalence, Not Race Exposure, Predicts Both Implicit and Explicit Racial Prejudice Across the United States. *Social Psychological and Personality Science*, 11(3), 345-355.
<https://doi.org/10.1177/1948550619862319>

General rights

It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations

If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: <https://uba.uva.nl/en/contact>, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.

UvA-DARE is a service provided by the library of the University of Amsterdam (<https://dare.uva.nl>)

Infectious Disease Prevalence, Not Race Exposure, Predicts Both Implicit and Explicit Racial Prejudice Across the United States

Social Psychological and
Personality Science
2020, Vol. 11(3) 345-355
© The Author(s) 2019
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/1948550619862319
journals.sagepub.com/home/spp

Brian A. O'Shea^{1,2}, Derrick G. Watson³, Gordon D. A. Brown³ ,
and Corey L. Fincher³

Abstract

What factors increase racial prejudice? Across the United States, increased exposure to Black Americans has been hypothesized to increase White Americans' prejudicial attitudes toward Black Americans. Here we test an alternative explanation: People living in regions with higher infectious disease rates have a greater tendency to avoid out-groups because such avoidance reduces their perceived likelihood of contracting illnesses. Consistent with this parasite-stress hypothesis, we show that both White and Black individuals ($N > 77,000$) living in U.S. states in which disease rates are higher display increased implicit (automatic) and explicit (conscious) racial prejudice. These results survived the inclusion of several individual- and state-level controls previously used to explain variability in prejudice. Furthermore, showing disease-related primes to White individuals with strong germ aversion increased their explicit, but not implicit, anti-Black/pro-White prejudice. Domestic out-groups, not just foreigners, may therefore experience increased overt forms of prejudice when disease rates are high.

Keywords

parasite-stress theory, behavioral immune system, implicit association test, racial prejudice, Bayesian racism

Infectious diseases have been a leading cause of human death worldwide throughout much of history, and hence strategies to minimize their impact have evolved (Dobson & Carper, 1996; Jones et al., 2008). One such strategy is an immunological response to salient threats—the immune system reacts to protect itself from invading pathogens (Chaplin, 2010). Other strategies, such as hypervigilance toward out-groups, reflect the operation of the behavioral immune system (BIS) which evolved to protect an individual from exposure to infectious diseases and potentially threatening stimuli (e.g., decaying food or infected individuals: Murray & Schaller, 2016; Schaller & Park, 2011). Based on the BIS framework, the parasite-stress hypothesis (Thornhill & Fincher, 2014) predicts that (a) people will tend to avoid apparently infected individuals (Crandall & Moriarty, 1995; Kurzban & Leary, 2001) and (b) increasing disease salience (e.g., with disease-related picture primes) will increase prejudice toward groups that are associated with diseases (e.g., old people: Duncan & Schaller, 2009; Park, Faulkner, & Schaller, 2003; Park, Schaller, & Crandall, 2007), especially among those with high germ aversion (GA; Makhanova, Miller, & Maner, 2015).

The parasite-stress hypothesis also predicts that people exposed to more diseases will avoid, and express more negative attitudes toward dissimilar others, such as people with foreign accents (Reid et al., 2012) or those who are from

distant regions (Faulkner, Schaller, Park, & Duncan, 2004; Navarrete & Fessler, 2006), because of their potentially different pathogens. Lastly, it predicts that when infectious diseases are salient, increased prejudice will be expressed toward groups with different physical features (e.g., skin color), even if these groups are from the local region, because individuals treat unfamiliar appearance as an infectious disease cue (Makhanova et al., 2015; Petersen, 2017).

For example, if a White American encounters a Black American and a Black Briton at a bus stop, they will likely classify both as out-group members (Cosmides, Tooby, & Kurzban, 2003). This disaffiliation classification will become more pronounced when disease rates are high, and hence expressions of prejudice will increase toward out-group members. If the two Black individuals initiate a conversation, the White American can then use another feature (accent) to

¹ Harvard University, Cambridge, MA, USA

² University of Amsterdam, Amsterdam, the Netherlands

³ University of Warwick, Coventry, United Kingdom

Corresponding Author:

Brian A. O'Shea, Harvard University, 33 Kirkland Street, Cambridge, MA 02138, USA.

Email: boshea@fas.harvard.edu

reassess these individuals' group membership. Consequently, if disease rates are low, the Black American may get reclassified as an in-group member relative to the Black Briton, but if disease rates are high, both the Black individuals will likely remain out-group members. To our knowledge, the prediction that disease prevalence may explain variability in prejudice across the United States has never been tested. Instead, researchers have mainly used race exposure as the crucial variable to account for variability in race-related prejudice across the United States (Putnam, 2007; Rae, Newheiser, & Olson, 2015; Taylor, 1998).

According to one idea about variation in prejudice—the contact hypothesis (MacInnis & Page-Gould, 2015; Pettigrew & Tropp, 2006)—increased exposure to out-groups reduces prejudice toward those groups. Consistent with this hypothesis, Black individuals in U.S. states who have more contact with White people are *less* prejudiced toward Whites (Rae et al., 2015). However, inconsistent with the contact hypothesis, White individuals who have more contact with Black Americans are *more* prejudiced toward Blacks (Putnam, 2007; Rae et al., 2015; Taylor, 1998). But why is there this discrepancy between Blacks' and Whites' attitudes toward their out-groups? Post hoc explanations have used differential group status (i.e., Whites' higher status position relative to Blacks' position across the United States) as a potential mechanism for this discrepancy (Rae et al., 2015). For example, exposure to more low status members in society is expected to generate greater animosity toward those members (Rae et al., 2015), while being exposed to more higher status group members is believed to increase positive dispositions toward them (e.g., Jost, Banaji, & Nosek, 2004).

Crucially from a parasite-stress perspective, disease rates are typically higher in U.S. states that have more Black Americans (Eppig, Fincher, & Thornhill, 2011; Hotez, 2008) due, in part, to more warm and humid climates in those states. Additionally, Black Americans have higher rates of infectious diseases relative to White Americans (Richardus & Kunst, 2001). The increased anti-Black prejudice typically shown by White Americans in states with large Black populations may, therefore, reflect the operation of an adaptive BIS which is stronger than any prejudice-reducing effects of contact. Here, our first study contrasts the race exposure prediction with the parasite-stress prediction and tests whether race exposure or parasite stress is better at predicting increases in race-related prejudice across the United States for both Black and White respondents (Study 1). An experimental study (Study 2) was also used to test the prediction that being primed with diseases increases anti-Black/pro-White prejudice among White participants, especially for those with strong GA.

Study 1

We used a secondary data set from Project Implicit which had over 1.5 million participants. The data set included measures of individuals' explicit (conscious) attitudes and implicit (automatic) associations toward racially defined in-groups and

out-groups. An advantage of examining implicit as well as explicit attitudes is that participants may behave in a socially desirable manner when reporting attitudes explicitly; such tendencies are especially problematic when socially sensitive topics such as racial prejudice are concerned (Greenwald, Poehlman, Uhlmann, & Banaji, 2009). The current study used similar dependent variables and covariables as Rae, Newheiser, and Olson (2015), with an additional parasite-stress independent variable (rates of infectious disease) and a Bayesian racism-dependent variable included. The added benefit of our approach, in comparison to Rae et al. (2015), is that we used multilevel analysis rather than simple linear regression of aggregated state-level scores. Multilevel analysis groups individual responses, which provides a more nuanced analysis because individuals' variability in responding within a region is considered, in addition to regional variation (Pollet, Tybur, Frankenhuys, & Rickard, 2014).

Method

Participants

The sample consisted of volunteers who completed the Race Implicit Association Test (IAT) on the Project Implicit website (<https://implicit.harvard.edu/implicit/>) between 2006 and 2013. We used these years because in 2006 Project Implicit added a racial identifying question, and data were only available up to 2013 when the analysis began. Analyses were restricted to Black and White participants within the 50 U.S. states because these were the focal groups in the Race IAT. We used standard IAT analytic procedures to remove inappropriate IAT scores (Greenwald, Nosek, & Banaji, 2003) which resulted in approximately 2% of the sample being removed. To facilitate reporting, we performed separate analyses on White ($N > 355,000$) and Black respondents ($N > 77,000$) within the United States (see Online Supplemental Table 1 for a full description of demographics). The large sample size ensures strong statistical power. The data set we used is available for public use (<https://osf.io/y9h1q/>; see Xu, Nosek, & Greenwald, 2014, for details).

Materials and Procedure

Implicit bias. All participants completed the Race IAT with "African American" and "European American" as the category labels and "Good" and "Bad" as the valence labels. These labels appeared at the top of the screen. The stimuli included gray scale pictures of Black and White individuals as well as positive (e.g., glorious, wonderful) and negative (e.g., terrible, horrible) words. These stimuli were presented successively to participants at the center of their screen. On each trial, participants were required to sort the stimulus into the appropriate category using the correct key press. If a correct response was given, the stimulus disappeared, and a new stimulus appeared after 400 ms. If an incorrect response was given, a red "X" appeared directly below the stimulus and both remained until the correct response was given.

In one of the two critical blocks, participants had to press the E key on a computer keyboard if a “good” word or a picture of a White person appeared and press the I key if a “bad” word or a picture of a Black person appeared. In the other critical block, participants pressed E if a “good” word or a picture of a Black person was shown and pressed I key for a “bad” word or a picture of a White person. The order of the sorting task was randomized across participants. The assumption underlying the IAT is that participants will make faster and more accurate responses when those responses are congruent with their current beliefs than when they are not. Participants’ implicit biases were analyzed using the IAT *D*-algorithm (Greenwald et al., 2003).

Explicit (bipolar) bias. Participants used a 7-point Likert-type scale to respond to the question “Which statement best describes you?”: (1) I strongly prefer African Americans to European Americans—(4) I like European Americans and African Americans Equally—(7) I strongly prefer European Americans to African Americans. A relative explicit feeling thermometer score was also calculated by subtracting the Black feeling thermometer score (0 = *coldest feelings*, 5 = *neutral*, 10 = *warmest feelings*) from the White feeling thermometer score. This explicit feeling thermometer-dependent variable showed similar results to the explicit bipolar score (see Supplementary Materials). Participants who completed these explicit questions also completed the Race IAT.

The Bayesian Racism Scale. The Bayesian Racism Scale (Uhlmann, Brescoll, & Machery, 2010) is a 15-item measure that measures beliefs relating to the appropriateness of discriminating against individuals based on stereotypes about their racial group. The scale does not specifically refer to Black and White Americans and therefore, it measures racism toward several racial groups (e.g., Asians, Native Americans, Arabs). The scale includes items such as “When the only thing you know about someone is their race, it makes sense to use your knowledge of their racial group to form an impression of them” and “If it will increase profits, it makes sense to use statistics about the performance of different racial groups.” Each item was rated on a 6-point Likert-type scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). Each participant in the sample was randomly allocated between 1 and 4 items from the possible 15. Therefore, we created a composite score based on the items the respondents answered, and we followed an approach used by Bianchi (2016) who used the same data set.¹ For each item, a *z*-score was derived, and then the composite score was created by averaging the *z*-scores for each item a participant responded to. Most of the participants who completed the items from the Bayesian Racism Scale also completed the explicit questions and the Race IAT.

Disease rates across U.S. states. Fincher and Thornhill (2012) developed a measure of disease rates across the 50 U.S. states. This measure aggregates all infectious diseases reported by the U.S. Centers for Disease Control (available at www.cdc.gov)

for the years 1993–2007 for each state, divides the number of diseases by state population, and transforms the result into a *z*-score thus representing a disease prevalence score for each state.²

Control variables. For the U.S. state analysis, five individual-level control variables were used. These included political ideology (1 = *strongly liberal* to 7 = *strongly conservative*), religious belief (1 = *not at all religious* to 4 = *strongly religious*), gender (dummy coded: 0 = *female* and 1 = *male*), age and education level (dummy coded: 0 = *as far as completion of high school*, 1 = *any educational accreditation after high school*). For the U.S. analysis, the state-level controls included median income (logged), state inequality, land population density per square mile, whether a state was previously part of the Confederacy, the percentage of U.S. citizens, non-Black to White exposure and race exposure (Black to White exposure). Median income, inequality, population density, percentage citizens, non-Black to White exposure, and race exposure used the American Community Survey 5-year estimates (2008–2012).³

Race exposure. Based on the acknowledgment by Rae et al. (2015, p. 537) that their race exposure index “may seem incomplete as an index of exposure to racial out-groups as it ignores the possibility that apparently diverse locales may be divided into homogeneous subregions,” we developed a race exposure index that estimated both race diversity and segregation within a state. Focusing exclusively on diversity or segregation within a region cannot adequately capture race exposure (Holloway, Wright, & Ellis, 2012), hence the necessity for our new race exposure index. To create our state-level race exposure index, we used the logged ratio of White Americans living in a state relative to Black Americans (see Alba, Rumbaut, & Marotz, 2005; Rae et al., 2015) and then this ratio was multiplied by $1 - (\text{state segregation}/100)$. State segregation scores ranged from 0 (*complete integration*) to 100 (*complete segregation*), where the value indicates the percentage of Black Americans within a state that would need to move for them to be distributed exactly like White Americans (e.g., as the percentage of Black people needing to move decreases, state segregation scores decrease, see <https://www.psc.isr.umich.edu/dis/census/segregation.html>; Frey & Myers, 2005). Therefore, lower scores on the Race Exposure Index indicate more Black exposure for both White and Black respondents while also accounting for state segregation scores. In Online Supplemental Tables 8–17, we present alternative analyses using different methods to estimate effects of out-group exposure; results largely support parasite-stress theory. For the non-Black to White exposure index, we could not accurately estimate segregation because of the multiple racial groups included. Therefore, this index only used the number of White Americans living in a state relative to non-Black Americans.

Figure 1. White respondents' state-level mean implicit (A), explicit (B), and Bayesian racism (C) scores as predicted by rates of infectious diseases after controlling for five individual and seven state-level controls, with a line of best fit included. Scores were coded such that higher numbers indicate a greater anti-Black/out-group prejudice.

Figure 2. Black respondents' state-level mean implicit (A), explicit (B), and Bayesian racism (C) scores as predicted by rates of infectious diseases after controlling for five individual and seven state-level controls, with a line of best fit included. Scores were coded such that lower numbers indicate greater anti-White/out-group prejudice.

Analysis. We used multilevel analysis. We grouped participants by U.S. state; we used the SPSS linear mixed model function, and the model included a random intercept term at the U.S. state level. We conducted three separate analyses, and the dependent variables for each analysis were Race IAT *D*-scores, explicit (bipolar) bias scores, and Bayesian racism scale scores. We added all the independent variables included in the model as fixed effects. We used *z*-scores throughout to allow for comparisons of the relative magnitude differences between the independent variable's fixed effects estimates.

Results

Consistent with the parasite-stress hypothesis, the multilevel analysis revealed that White participants ($N > 702,000$) residing in states with higher disease prevalence showed a greater anti-Black/pro-White bias in both their implicit ($t = 6.27$,

$p < .001$) and explicit attitudes ($t = 5.90$, $p < .001$, Figure 1A and B). This finding survived the inclusion of controls for individual-level variables (age, gender, education, political ideology, religious belief) and state-level variables (median income, inequality, race exposure, population density, confederate state). Also, Black participants ($N > 149,000$) living in states with higher disease rates showed a greater anti-White/pro-Black bias. This effect held for both implicit ($t = -3.96$, $p < .001$) and explicit attitudes ($t = -4.76$, $p < .001$) even after the control variables were included (Figure 2A and 2B). Finally, in line with parasite-stress theory and after applying the controls, both White ($N = 356,561$) and Black ($N = 77,173$) participants living in states with higher disease rates displayed stronger Bayesian racism ($t = 5.05$, $p < .001$, $t = 4.16$, $p < .001$, Figure 1C and 2C, respectively). In Tables 1–3, we present the full models, including all the individual- and state-level controls, of disease rates predicting

Table 1. Summary of Multilevel Analysis for Variables Predicting U.S. State-Level Scores for White Participants.

Predictor	White Implicit Attitudes (N = 735,119)			White Explicit Attitudes (N = 702,815)		
	B (est.)	SE B	t	B (est.)	SE B	t
Disease rates	.019	.003	6.270***	.065	.011	5.900***
<i>Political ideology</i>	.023	.000	74.919***	.104	.001	143.310***
<i>Religious belief</i>	-.012	.001	-22.593***	-.056	.001	-43.843***
<i>Gender</i>	.023	.001	23.553***	.177	.002	77.668***
<i>Age</i>	.000	.000	4.560***	.001	.000	12.636***
<i>Education</i>	-.005	.001	-4.594***	.076	.003	30.464***
Median income	.038	.049	0.769	.077	.178	0.432
State inequality	.161	.173	0.933	.282	.634	0.445
Population density	.000	.000	3.674**	.000	.000	0.557
Confederate state	.001	.007	0.186	-.012	.026	-0.461
Percentage citizens	.001	.001	0.848	.002	.004	0.420
Non-Blacks to Whites	.046	.010	4.718***	.086	.033	2.616*
Race exposure	-.005	.010	-0.531	-.067	.036	-1.890

Note. For the dependent variables, higher numbers indicate a greater anti-Black/pro-White bias. For the independent variables, higher numbers on each variable indicate more diseases, conservatism, more religious, male, older, more education, higher income, more inequality, higher population density, a nonconfederate state, more U.S. citizens, more White relative to non-Black exposure, more White relative to Black exposure. Individual-level controls are in italics. The variable in bold indicates the best/strongest environmental factor at predicting racial prejudice.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 2. Summary of Multilevel Analysis for Variables Predicting U.S. State-Level Scores for Black Participants.

Predictor	Black Implicit Attitudes (N = 155,038)			Black Explicit Attitudes (N = 149,551)		
	B (est.)	SE B	t	B (est.)	SE B	t
Disease rates	-.017	.004	-3.958***	-.053	.011	-4.758***
<i>Political ideology</i>	-.002	.001	-2.435*	.048	.002	20.298***
<i>Religious belief</i>	-.012	.001	-9.352***	-.050	.004	-12.747***
<i>Gender</i>	.015	.002	6.149***	.173	.007	23.811***
<i>Age</i>	-.002	.000	-20.580***	-.012	.000	-40.125***
<i>Education</i>	.017	.002	6.784***	-.081	.007	-10.976***
Median income	.121	.072	1.672	-.068	.194	-0.352
State inequality	-.134	.232	-.578	-.301	.614	-0.490
Population density	.000	.000	-.174	.000	.000	1.065
Confederate state	-.008	.008	-.935	-.030	.022	-1.371
Percentage citizens	.000	.002	.032	-.002	.004	-0.374
Non-Blacks to Whites	.003	.018	.143	-.025	.051	-0.498
Race exposure	.010	.014	.722	.095	.036	2.661*

Note. For the dependent variables, lower numbers indicate a greater anti-White/pro-Black bias. For the independent variables, higher numbers on each variable indicate more diseases, conservatism, more religious, male, older, more education, higher income, more inequality, higher population density, a nonconfederate state, more U.S. citizens, more White relative to non-Black exposure, more White relative to Black exposure. Individual-level controls are in italics. The variable in bold indicates the best/strongest environmental factor at predicting racial prejudice.

* $p < .05$. ** $p < .01$. *** $p < .001$.

implicit and explicit prejudice for both White and Black participants including Bayesian racism (see Online Supplemental Tables 2–7 for additional statistical information). Readers can find details of the results concerning the individual and remaining state-level controls, including all the additional analyses mentioned above, in the supplementary materials.

Discussion

This study is the first to show that disease rates predict both implicit and explicit racial prejudice among both White and

Black respondents across the United States. Even when controlling for race exposure, previously purported to increase implicit and explicit racial prejudice across the United States (Rae et al., 2015), we find that disease rates consistently predicted increases in racial prejudice while race exposure did not. Furthermore, disease rates remained the best (most consistent across all the analyses) environmental factor predicting racial prejudice after all the remaining control variables used in Rae et al. (2015) were included in the analysis. The substantial impact that the individual-level factors have on prejudice should also be acknowledged (see Online Supplementary Materials).

Table 3. Summary of Multilevel Analysis for Variables Predicting U.S. State-Level Scores.

Predictor	White Bayesian Racism (N = 356,561)			Black Bayesian Racism (N = 77,173)		
	B (est.)	SE B	t	B (est.)	SE B	t
Disease rates	.038	.008	5.049***	.030	.007	4.159***
<i>Political ideology</i>	.082	.001	81.051***	.053	.002	21.345***
<i>Religious belief</i>	-.027	.002	-14.913***	.019	.004	4.531***
<i>Gender</i>	.109	.003	34.287***	.082	.008	10.745***
<i>Age</i>	-.004	.000	-28.255***	-.002	.000	-5.938***
<i>Education</i>	-.062	.003	-17.808***	-.056	.008	-7.187***
<i>Median income</i>	-.221	.121	-1.820	-.109	.129	-.842
<i>State inequality</i>	-.092	.423	-.217	-.280	.380	-.738
<i>Population density</i>	.000	.000	1.726	.000	.000	1.685
<i>Confederate state</i>	.000	.017	-.013	.000	.012	.019
<i>Percentage citizens</i>	.002	.003	.871	-.002	.003	-.541
<i>Non-Blacks to Whites</i>	.044	.026	1.670	-.028	.040	-.691
<i>Race exposure</i>	-.002	.024	-.078	.026	.020	1.329

Note. For the dependent variables, higher numbers indicate stronger Bayesian Racism. For the independent variables, higher numbers on each variable indicate more diseases, conservatism, more religious, male, older, more education, higher income, more inequality, higher population density, a nonconfederate state, more U.S. citizens, more White relative to non-Black exposure, more White relative to Black exposure. Individual-level controls are in italics. The variable in bold indicates the best/strongest environmental factor at predicting racial prejudice.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Study 2

Prior research has shown that being exposed to White faces results in White participants liking Black people less (Smith, Dijksterhuis, & Chaiken, 2008) and being exposed to faces from a different race reduces negative biases toward that race (Zebrowitz, White, & Wieneke, 2008). These findings are difficult to reconcile with Rae et al.'s (2015) race exposure findings, and consequentially, the face exposure findings are more in line with the contact hypothesis. To date, no research has used an experimental approach to test the hypothesized causal link between disease prevalence and racial prejudice. In this preregistered replication (<https://osf.io/fwse8/>) of Supplementary Study (SS) 1, we hypothesized that White participants primed with disease images will show higher levels of anti-Black/pro-White biases compared with participants primed with control images (furniture and buildings). We also included a terror threat priming condition because previous research has shown that such priming can increase prejudice, conservative worldviews (Van de Vyver, Houston, Abrams, & Vasiljevic, 2016), and aggressive thoughts (Benjamin, Kepes, & Bushman, 2018). This condition allowed us to test whether any threat to a persons' life increased racial prejudice or if the effect (if present) is specific to disease threats. Our second hypothesis aimed to extend SS2 by showing that an individual's perceived vulnerability to disease (PVD; Duncan & Schaller, 2009; especially an individual's GA, Makhanova et al., 2015) will moderate the disease threat priming effects, such that those with high GA will show stronger explicit and implicit prejudice compared to those with low GA.

Method

Participants. The final sample included 588 U.S. Amazon Mechanical Turk (MTurk) participants (275 were male). Each

participant was randomly allocated to the control (202), disease threat (184), or the terror threat condition (202). The mean age of the sample was 42.75 years ($SD = 12.85$), and 543 participants had at least a college diploma. The sample was slightly religious ($M = 1.94$, $SD = 1.07$) and politically moderate ($M = 4.32$, $SD = 1.85$). See <https://osf.io/fwse8/> for all exclusion criteria, data, and materials.

Materials

Demographic information. We collected participants' gender, age, race, country of residence, state of residence, educational level, political ideology, and religious belief via an online questionnaire.

Disease, terror and control images. The disease threat images consisted of 30 images of mold, feces, and people with infections. We sourced 20 of the images from previous research that used pathogen primes (Schaller, Miller, Gervais, Yager, & Chen, 2010; Wu & Chang, 2012). Ten of these images had White individuals with chicken pox, cuts or who were coughing or sneezing, and so on. Ten images of Black individuals with infections/diseases were added and closely matched the 10 images of White people. The remaining 10 images were nonhuman such as mold and feces. The control images included 15 images of buildings and 15 images of single furniture items against a white background. For the terror threat condition, 30 images of terrorist attacks (e.g., 9/11, Madrid's Euskadi Ta Askatasuna (ETA) bombings) were used and were matched for the proportion of Black and White individuals across the set. For the three conditions, the order of the images was the same for each participant, and this order was maintained for the two time points when the images were shown.

Table 4. Linear Model of Predictors of Explicit Prejudice (Explicit Thermometer Scores).

Predictors	B (est.)	SE B	t	p	95% CI [Lower, Upper]
Constant	1.870	.932	2.006	.045	[0.039, 3.701]
Prime-type	−0.993	.428	−2.323	.021	[−1.833, −0.153]
Germ aversion	−0.251	.213	−1.181	.238	[−0.668, 0.166]
Prime-Type × Germ Aversion	0.2672	.097	2.758	.006	[0.077, 0.457]

Prime feedback. To ensure the disease and terror threat primes differed from the control primes, participants had to respond to the questions “How unpleasant or disturbing did you find the images?” “How disgusted did the images make you feel?” and “How fearful did the images make you feel?” Each item used a 1–7 Likert-type scale, and higher scores indicate more aversive responses. The full results from these analyses can be found in the supplementary materials. In summary, for all three questions, the mean scores on each question were significantly different from one another ($t_s > 2.64$, $p_s < .009$) across the three priming conditions. Terror threats consistently showed the highest scores for all three of the questions, followed by disease threat and the control condition showed the lowest unpleasantness, disgust, and fear responses.

The PVD Scale (Duncan & Schaller, 2009) is a 15-item measure addressing participants' perceived vulnerability to infectious diseases. The PVD Scale has two subscales: perceived infectability (PI, $\alpha = .92$) and germ aversion (GA, $\alpha = .76$), with each item using a 1–7 Likert-type scale. The PI subscale measures an individual's perception of their likelihood of contracting an infection and includes items such as “If an illness is going around, I will get it” and “My immune system protects me from most illnesses that other people get.” The GA subscale measures an individual's fear of encountering potential pathogens and includes items such as “I prefer to wash my hands pretty soon after shaking someone's hand” and “It does not make me anxious to be around sick people.” Previous research has shown GA, but not PI, to increase the likelihood of White participants categorizing Black individuals as more dissimilar to them (Makhanova et al., 2015) and GA to increase explicit, but not implicit, pro-White/anti-Black prejudice (see SS2).

Implicit and explicit biases. The exact same IAT, explicit (bipolar) question, and explicit feeling thermometer questions used by Project Implicit described in Study 1 above were used in the current study (Study 2).

Procedure. The design included a between-subject variable called prime-type that had three levels: control, disease threat, and the terror threat. To begin the online experiment, participants had to verify they were consenting adults. Next, they completed demographic information and were randomly allocated to one of the three priming conditions. Participants were then presented with a set of images related to their priming condition. They scrolled through these images for as long as they wanted but a minimum of 30 seconds elapsed before participants could continue to the explicit questions.

Figure 3. Bar chart of the regression of explicit anti-Black/pro-White biases at three levels of germ aversion (GA) across the three conditions in Study 2.

Following these questions, participants viewed the same images previously shown for at least another 30 seconds and had to complete the three priming questions below all the images. Then they completed the Race IAT. Next, participants responded to a memory question to ensure they viewed the images, followed by the PVD Scale and finally, they were thanked and debriefed. The full experiment can be viewed at <http://psychologyboss.com/SPPS2019/tdc.html>

Results

Our first hypothesis did not directly replicate SS1. Using a one-way between-subject analysis of variance, the main effects of prime-type (control, terrorism, disease) for IAT *D*-scores, explicit bipolar scores, and the explicit thermometer scores were not significant ($F_s < 1.18$, $p_s > .31$). However, our second hypothesis did directly replicate SS2. Using PROCESS (Hayes, 2017) to test for moderating effects, the predicted interactions between prime-type and GA for the explicit bipolar scores ($t = 2.09$, $p = .04$), and the explicit feeling thermometer scores ($t = 2.76$, $p < .01$) were significant (see Table 4 and Figure 3 for the model predicting the explicit feeling thermometer scores). As shown in Figure 3, participants in the disease prime-type condition with high GA showed the strongest anti-Black/pro-White biases. Importantly, these interactions were only shown for the GA subscale and not the PI subscale or Total PVD Scale. This interaction likely only occurred for GA because as expected, GA is more

Table 5. Correlational Matrix of the Variables in Study 2.

	IAT	Explicit Bipolar	Explicit Thermometer	Gender	Age	Political	Religion	Perceived Infectability	Germ Aversion	PVD Total
IAT	—									
Explicit (bipolar)	.285***	—								
Explicit (thermometer)	.259***	.790***	—							
Gender	.059	.060	.071	—						
Age	.120**	.052	.042	-.093*	—					
Political	.182***	.280***	.306***	.107**	.134**	—				
Religiosity	.118**	.089*	.083*	-.069	.145***	.439***	—			
Perceived infectability	.049	.084*	.019	-.152***	-.085*	-.080	-.017	—		
Germ aversion	.108**	.155***	.155***	-.137***	-.017	.033	.116**	.324***	—	
PVD total	.093*	.143***	.099*	-.178***	-.066	-.035	.054	.849***	.774***	—

Note. High scores on the IAT and explicit measures indicate a stronger anti-Black/pro-White bias as well as stronger germ aversion and perceived infectability. IAT = implicit association test; PVD = perceived vulnerability to disease. Political ideology: 1 = *strongly liberal* to 7 = *strongly conservative*. Religious belief: 1 = *not at all religious* to 4 = *strongly religious*. Gender: 0 = *female*, 1 = *male*.

* $p < .05$. ** $p < .01$. *** $p < .001$.

strongly related to prejudice (see Table 5 for the correlational analysis of the variables used in Study 2). Like SS2, the significant interaction between condition and GA did not extend to the implicit IAT *D*-scores ($t = .64$, $p = .52$).

Discussion

This preregistered study is the first to show that infectious disease primes increase explicit, but not implicit, anti-Black/pro-White biases among White participants with strong GA. A weaker but similar trajectory was also shown in the terror threat condition, even though participants rated the terror primes as evoking more fear and disgust than the disease primes. This finding further emphasizes the impact that diseases can have on explicit prejudice. This study did not directly replicate SS1 in which the disease primes increased both implicit and explicit anti-Black/pro-White biases. The major differences between the current study and SS1 are as follows: (1) the current study used paid MTurk participants versus Reddit volunteers, (2) the MTurk participants were older and less liberal than the Reddit sample and lastly, (3) the MTurk sample here contained only U.S. participants, whereas the Reddit sample (SS1) did not restrict nationality (41% of the sample were not from the United States). Importantly, the current study did directly replicate SS2's findings.

General Discussion

Our findings are consistent with the hypothesis that living in regions with higher disease rates (Study 1), especially among those with strong GA (Study 2) will increase anti-out-group/pro-in-group racial prejudice. Both Black and White residents in U.S. states with higher disease rates displayed stronger Bayesian racism as well as racial prejudice at both the implicit and explicit level. These effects remained after controlling for important individual- and state-level factors often used to explain prejudice. For example, greater diversity (Putnam, 2007) and conflict over limited resources (Baumeister &

Bushman, 2010; Carvacho et al., 2013) have previously been used to explain racial prejudice in the United States. However, compared with race exposure, percentage of U.S. citizens, non-Black to White race exposure (a proxy for diversity), median income, and inequality (a proxy for limited resources), infectious disease rates were the best and most consistent environmental predictor of implicit and explicit prejudice and Bayesian racism.

Although the individual-level variables in Study 1 showed stronger overall effects than the state-level variables in each of the analyses, no consistent patterns emerged for the individual-level variables for both the White and Black respondents in terms of their implicit, explicit, and Bayesian racism scores. Importantly, none of the individual-level factors completely explained all the variance in each analysis and therefore, future work should consider infectious disease rates when developing models of prejudice. Similarly, none of the state-level factors, apart from disease rates, showed any consistent pattern when predicting racial prejudice (see Online Supplemental Materials for full details).

A core argument of this article is that a third untested variable (i.e., infectious diseases) causes the association between Black race exposure and higher racial prejudice among White people across the United States, reported by Rae et al. (2015). However, we still cannot rule out the possibility that another untested variable better explains the association between infectious disease rates and racial prejudice. The experimental findings showing that disease/infection primes increase anti-Black/pro-White biases among White individuals (SS1), especially those with strong GA (Study 2 and SS2), strengthens our correlational findings, yet caution is necessary. SS1 showed the effect for only White participants, and Study 2 and SS2 showed it only on the explicit scales for White participants with strong GA. We would expect similar findings for Black participants, such that those with strong GA will show increased anti-White/pro-Black biases when primed with disease images. It would be beneficial for future work to show this effect.

Additionally, implicit prejudice is linked to more subtle forms of prejudice, while explicit prejudice is often related to more overt forms of prejudice (Ajzen, Fishbein, Lohmann, & Albarracín, 2018). Therefore, the experimental studies indicate that disease threats may increase more observable forms of aggression or disdain toward racial out-groups, especially for those with high GA. This disdain has the potential to lead to policies (i.e., segregation and reduced medical expenditure/research) that could exacerbate health inequalities between minority and nonminority groups (Nelson, 2002). These inequalities could further increase infectious disease rates, especially among disadvantaged groups.

Our studies underline the importance of parasite-stress theory and BIS research by demonstrating that infectious diseases are an influential factor in explaining variability in racial prejudice across the United States. We expect that contact with out-groups will have the most beneficial effects when infectious diseases are low. Conversely, if out-group contact occurs when infectious disease rates are high, comparable outcomes to the negative-contact literature are expected (i.e., negative contact will weigh more than positive contact resulting in more racial prejudice: Barlow et al., 2012; Graf, Paolini, & Rubin, 2014). Our research also suggests that disease outbreaks (e.g., Ebola; Beall, Hofer, & Schaller, 2016; Inbar, Westgate, Pizarro, & Nosek, 2016; Kim, Sherman, & Updegraff, 2016) might be an important contributor to heightened prejudice toward ethnic out-groups. Similarly, refugees and undocumented immigrants often originate from regions with high disease rates which could be vital in explaining the race-motivated attacks or social segregation that these groups often experience.

Acknowledgments

The authors would like to thank members of Mahzarin Banaji's lab for their useful discussions relating to this work and to Osiris Rankin and Steve Durack for feedback on early drafts of the manuscript (Data sets are available at <https://osf.io/hxyz/>).

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This research was supported by a Department of Psychology PhD Studentship from the University of Warwick, and an EU Marie Curie Global Fellowship (No.794913) awarded to B. O'Shea.

ORCID iD

Gordon D. A. Brown <https://orcid.org/0000-0002-2257-1459>

Supplemental Material

The supplemental material is available in the online version of the article.

Notes

1. Comparable findings emerge when we calculated each participant's mean score.
2. Shrira, Wisman, and Webster (2013) developed a measure that only included the eight most common infectious diseases across the 50 U.S. states. The results of the analyses using this measure were similar to those using Fincher and Thornhill's (2012) disease measure reported here.
3. A reviewer indicated that overall government expenditure for each state, but especially health-care expenditure could better explain variability in racial prejudice. Regardless, the effects of parasite stress remain robust when these two variables are added to the model.

References

- Ajzen, I., Fishbein, M., Lohmann, S., & Albarracín, D. (2018). The influence of attitudes on behavior. In D. Albarracín & B. T. Johnson (Eds.), *The handbook of attitudes: Volume 1. Basic principles* (2nd ed., pp. 197–255). New York, NY: Routledge.
- Alba, R., Rumbaut, R. G., & Marotz, K. (2005). A distorted nation: Perceptions of racial/ethnic group sizes and attitudes toward immigrants and other minorities. *Social Forces*, 84, 901–919.
- Barlow, F. K., Paolini, S., Pedersen, A., Hornsey, M. J., Radke, H. R. M., Harwood, J., . . . Sibley, C. G. (2012). The contact caveat: Negative contact predicts increased prejudice more than positive contact predicts reduced prejudice. *Personality and Social Psychology Bulletin*, 38, 1629–1643. doi:10.1177/0146167212457953
- Baumeister, R. F., & Bushman, B. J. (2010). *Social psychology and human nature*. Boston, MA: Cengage Learning.
- Beall, A. T., Hofer, M. K., & Schaller, M. (2016). Infections and elections: Did an Ebola outbreak influence the 2014 U.S. Federal elections (and if so, How)? *Psychological Science*, 27, 595–605. doi:10.1177/0956797616628861
- Benjamin, A. J., Kepes, S., & Bushman, B. J. (2018). Effects of weapons on aggressive thoughts, angry feelings, hostile appraisals, and aggressive behavior: A meta-analytic review of the weapons effect literature. *Personality and Social Psychology Review*, 22, 347–377. doi:10.1177/1088868317725419
- Bianchi, E. C. (2016). American individualism rises and falls with the economy: Cross-temporal evidence that individualism declines when the economy falters. *Journal of Personality and Social Psychology*, 111, 567–584. doi:10.1037/pspp0000114
- Carvacho, H., Zick, A., Haye, A., González, R., Manzi, J., Kocik, C., & Bertl, M. (2013). On the relation between social class and prejudice: The roles of education, income, and ideological attitudes. *European Journal of Social Psychology*, 43, 272–285. doi:10.1002/ejsp.1961
- Chaplin, D. D. (2010). Overview of the immune response. *The Journal of Allergy and Clinical Immunology*, 125, S3–S23. doi:10.1016/j.jaci.2009.12.980
- Cosmides, L., Tooby, J., & Kurzban, R. (2003). Perceptions of race. *Trends in Cognitive Sciences*, 7, 173–179. doi:10.1016/S1364-6613(03)00057-3

- Crandall, C. S., & Moriarty, D. (1995). Physical illness stigma and social rejection. *The British Journal of Social Psychology*, 34, 67–83.
- Dobson, A. P., & Carper, E. R. (1996). Infectious diseases and human population history. *BioScience*, 46, 115–126. doi:10.2307/1312814
- Duncan, L. A., & Schaller, M. (2009). Prejudicial attitudes toward older adults may be exaggerated when people feel vulnerable to infectious disease: Evidence and implications. *Analyses of Social Issues and Public Policy*, 9, 97–115. doi:10.1111/j.1530-2415.2009.01188.x
- Eppig, C., Fincher, C. L., & Thornhill, R. (2011). Parasite prevalence and the distribution of intelligence among the states of the USA. *Intelligence*, 39, 155–160. doi:10.1016/j.intell.2011.02.008
- Faulkner, J., Schaller, M., Park, J. H., & Duncan, L. A. (2004). Evolved disease-avoidance mechanisms and contemporary xenophobic attitudes. *Group Processes & Intergroup Relations*, 7, 333–353. doi:10.1177/1368430204046142
- Fincher, C. L., & Thornhill, R. (2012). Parasite-stress promotes in-group assortative sociality: The cases of strong family ties and heightened religiosity. *Behavioral and Brain Sciences*, 35, 61–79. doi:10.1017/S0140525X11000021
- Frey, W. H., & Myers, D. (2005). Racial segregation in US metropolitan areas and cities, 1990–2000: Patterns, trends, and explanations. *Population Studies Center Research Report* (05–573). Retrieved from <http://www.psc.isr.umich.edu/pubs/pdf/r05-573.pdf>
- Graf, S., Paolini, S., & Rubin, M. (2014). Negative intergroup contact is more influential, but positive intergroup contact is more common: Assessing contact prominence and contact prevalence in five central European countries. *European Journal of Social Psychology*, 44, 536–547. doi:10.1002/ejsp.2052
- 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
- Greenwald, A. G., Poehlman, T. A., Uhlmann, E. L., & Banaji, M. R. (2009). Understanding and using the implicit association test: III. Meta-analysis of predictive validity. *Journal of Personality and Social Psychology*, 97, 17–41. doi:10.1037/a0015575
- Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis* (2nd ed.). New York, NY: Guilford Press.
- Holloway, S. R., Wright, R., & Ellis, M. (2012). The racially fragmented city? Neighborhood racial segregation and diversity jointly considered. *The Professional Geographer*, 64, 63–82. doi:10.1080/00330124.2011.585080
- Hotez, P. J. (2008). Neglected infections of poverty in the United States of America. *PLoS Neglected Tropical Diseases*, 2, e256. doi:10.1371/journal.pntd.0000256
- 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*, 7, 420–427. doi:10.1177/1948550616639651
- Jones, K. E., Patel, N. G., Levy, M. A., Storeygard, A., Balk, D., Gittleman, J. L., & Daszak, P. (2008). Global trends in emerging infectious diseases. *Nature*, 451, 990–993. doi:10.1038/nature06536
- Jost, J. T., Banaji, M. R., & Nosek, B. A. (2004). A decade of system justification theory: Accumulated evidence of conscious and unconscious bolstering of the status Quo. *Political Psychology*, 25, 881–919.
- Kim, H. S., Sherman, D. K., & Updegraff, J. A. (2016). Fear of Ebola: The influence of collectivism on xenophobic threat responses. *Psychological Science*, 27, 935–944. doi:10.1177/0956797616642596
- Kurzban, R., & Leary, M. R. (2001). Evolutionary origins of stigmatization: The functions of social exclusion. *Psychological Bulletin*, 127, 187–208. doi:10.1037//0033-2909.127.2.187
- MacInnis, C. C., & Page-Gould, E. (2015). How can intergroup interaction be bad if intergroup contact is good? Exploring and reconciling an apparent paradox in the science of intergroup relations. *Perspectives on Psychological Science*, 10, 307–327. doi:10.1177/1745691614568482
- Makhanova, A., Miller, S. L., & Maner, J. K. (2015). Germs and the out-group: Chronic and situational disease concerns affect intergroup categorization. *Evolutionary Behavioral Sciences*, 9, 8–19. doi:10.1037/ebbs0000028
- Murray, D. R., & Schaller, M. (2016). The behavioral immune system. In J. M. Olson & M. P. Zanna (Eds.), *Advances in experimental social psychology* (Vol. 53, pp. 75–129). New York, NY: Academic Press.
- Navarrete, C. D., & Fessler, D. M. T. (2006). Disease avoidance and ethnocentrism: The effects of disease vulnerability and disgust sensitivity on intergroup attitudes. *Evolution and Human Behavior*, 27, 270–282. doi:10.1016/j.evolhumbehav.2005.12.001
- Nelson, A. (2002). Unequal treatment: Confronting racial and ethnic disparities in health care. *Journal of the National Medical Association*, 94, 666–668.
- Park, J. H., Faulkner, J., & Schaller, M. (2003). Evolved disease-avoidance processes and contemporary anti-social behavior: Prejudicial attitudes and avoidance of people with physical disabilities. *Journal of Nonverbal Behavior*, 27, 65–87.
- Park, J. H., Schaller, M., & Crandall, C. S. (2007). Pathogen-avoidance mechanisms and the stigmatization of obese people. *Evolution and Human Behavior*, 28, 410–414. doi:10.1016/j.evolhumbehav.2007.05.008
- Petersen, M. B. (2017). Healthy out-group members are represented psychologically as infected in-group members. *Psychological Science*, 28, 1857–1863. doi:10.1177/0956797617728270
- Pettigrew, T. F., & Tropp, L. R. (2006). A meta-analytic test of intergroup contact theory. *Journal of Personality and Social Psychology*, 90, 751–783. doi:10.1037/0022-3514.90.5.751
- Pollet, T. V., Tybur, J. M., Frankenhuys, W. E., & Rickard, I. J. (2014). What can cross-cultural correlations teach us about human nature? *Human Nature*, 25, 410–429. doi:10.1007/s12110-014-9206-3
- Putnam, R. D. (2007). E Pluribus Unum: Diversity and community in the twenty-first century the 2006 Johan Skytte Prize Lecture. *Scandinavian Political Studies*, 30, 137–174.
- Rae, J. R., Newheiser, A.-K., & Olson, K. R. (2015). Exposure to racial out-groups and implicit race bias in the United States. *Social Psychological and Personality Science*, 6, 535–543. doi:10.1177/1948550614567357
- Reid, S. A., Zhang, J., Anderson, G. L., Gasiorek, J., Bonilla, D., & Peinado, S. (2012). Parasite primes make foreign-accented English

- sound more distant to people who are disgusted by pathogens (but not by sex or morality). *Evolution and Human Behavior*, 33, 471–478. doi:10.1016/j.evolhumbehav.2011.12.009
- Richardus, J. H., & Kunst, A. E. (2001). Black–White differences in infectious disease mortality in the United States. *American Journal of Public Health*, 91, 1251–1253.
- Schaller, M., Miller, G. E., Gervais, W. M., Yager, S., & Chen, E. (2010). Mere visual perception of other people's disease symptoms facilitates a more aggressive immune response. *Psychological Science*, 21, 649–652. doi:10.1177/0956797610368064
- Schaller, M., & Park, J. H. (2011). The behavioral immune system (and Why It Matters). *Current Directions in Psychological Science*, 20, 99–103. doi:10.1177/0963721411402596
- Shrira, I., Wisman, A., & Webster, G. D. (2013). Guns, germs, and stealing: Exploring the link between infectious disease and crime. *Evolutionary Psychology*, 11. doi:10.1177/147470491301100124
- Smith, P. K., Dijksterhuis, A., & Chaiken, S. (2008). Subliminal exposure to faces and racial attitudes: Exposure to whites makes whites like blacks less. *Journal of Experimental Social Psychology*, 44, 50–64. doi:10.1016/j.jesp.2007.01.006
- Taylor, M. C. (1998). How white attitudes vary with the racial composition of local populations: Numbers count. *American Sociological Review*, 63, 512–535. doi:10.2307/2657265
- Thornhill, R., & Fincher, C. L. (2014). *The parasite-stress theory of values and sociality*. Cham, Switzerland: Springer International.
- Uhlmann, E. L., Brescoll, V. L., & Machery, E. (2010). The motives underlying stereotype-based discrimination against members of stigmatized groups. *Social Justice Research*, 23, 1–16. doi:10.1007/s11211-010-0110-7
- Van de Vyver, J., Houston, D. M., Abrams, D., & Vasiljevic, M. (2016). Boosting belligerence: How the July 7, 2005, London bombings affected liberals' moral foundations and prejudice. *Psychological Science*, 27, 169–177. doi:10.1177/0956797615615584
- Wu, B.-P., & Chang, L. (2012). The social impact of pathogen threat: How disease salience influences conformity. *Personality and Individual Differences*, 53, 50–54. doi:10.1016/j.paid.2012.02.023
- Xu, K., Nosek, B., & Greenwald, A. (2014). Psychology data from the race implicit association test on the project implicit demo website. *Journal of Open Psychology Data*, 2. doi:10.5334/jopd.ac
- Zebrowitz, L. A., White, B., & Wieneke, K. (2008). Mere exposure and racial prejudice: Exposure to other-race faces increases liking for strangers of that race. *Social Cognition*, 26, 259–275. doi:10.1521/soco.2008.26.3.259

Author Biographies

Brian A. O'Shea completed his PhD in experimental social psychology in 2017 from the University of Warwick. He is currently on a Marie Curie Global Fellowship based at the University of Amsterdam and Harvard University. His research focuses on implicit social cognition, environmental influences of prejudice, including developing new methods to detect those at risk of suicide and self-harm.

Derrick G. Watson is a professor in psychology at the University of Warwick. His research areas include visual search and attentional prioritization, attentional capture, the effects of emotion on perception, driver behavior, and physiological measurement.

Gordon D. A. Brown is a professor in behavioral science at the University of Warwick. His research interests include the economic determinants of well-being, computational models of memory, social influence, and contextual influences on judgment and decision-making.

Corey L. Fincher is an assistant professor in psychology at the University of Warwick. He uses evolutionary science to better understand the effects of coping with infectious diseases in the domains of individual and cross-cultural psychology.

Handling Editor: Joseph Cesario