Article

Disgust Toward Interracial Couples: Mixed Feelings About Black–White Race Mixing

Social Psychological and Personality Science
2021, Vol. 12(5) 769-779

DOI: 10.1177/1948550620939411
journals.sagepub.com/home/spp
SAGE

Shoko Watanabe[1] and Sean M. Laurent[1]

Abstract

Three studies further explored Skinner and Hudac's (2017) hypothesis that interracial couples elicit disgust. Using verbal and face emotion measures (Study 1), some participants reported more disgust toward interracial couples than same-race White and Black couples. In Study 2, only people higher in disgust sensitivity tended to "guess" that rapidly presented images of interracial (vs. White) couples were disgusting. Study 3 used a novel image classification paradigm that presented couples side-by-side with neutral or disgusting images. Participants took longer to decide whether target images were disgusting only when interracial (vs. White) couples appeared next to neutral images. Greater sexual disgust heightened this difference. Mixed evidence suggesting an association of disgust with Black couples also emerged in Studies 2 and 3. Thus, the disgust–interracial romance association may only emerge under certain conditions, and the current research offers limited support for the hypothesis that disgust response is exclusively linked to interracial unions.

Keywords

interracial romance, disgust, racial bias, person-perception

"It just ain't right" might summarize the attitude of people opposing the interracial union of Mildred and Richard Loving in 1958. Like Nuremberg laws in Nazi Germany and Apartheid in South Africa, "race-mixing" was a crime in Virginia. Although laws have changed, opposition against interracial couples continues today (e.g., responses to a mixed-family Cheerios commercial; Stump, 2013). Potentially explaining this, some people may find interracial romance intuitively disgusting, similar to the moral dumbfounding effect (Haidt et al., 2000) in which people condemn disgust-evoking actions on the basis of gut feelings by saying, "I can't explain it . . . I just know it's wrong" (Haidt, 2001, p. 814).

Studying potential biases against interracial couples is important because although interracial unions are becoming common in the United States (e.g., 17% of all U.S. newlyweds in 2015 were interracial/interethnic; Livingston & Brown, 2017), these couples still face discrimination. For example, an event hall in Mississippi recently refused to host a "mixed-race" wedding on religious grounds (Jacobo, 2019). Because negative partner experiences can affect individual health and relationship quality (Trail et al., 2012; Wofford et al., 2019), interracial couples may face a uniquely stigmatized "couple identity" that exerts additional stress beyond the racial discrimination individual minority-group partners may face. Studying feelings about interracial couples allows us to understand whether unfair treatment of people who intermarry represents a unique bias apart from general negativity toward minority group members.

Prior research informs that White adults perceive interracial (vs. same-race) families as less family-like (Kille & Tse, 2017; Lewandowski & Jackson, 2001), and White, Black, and East Asian Americans exhibit negative attitudes and implicit bias against interracial couples (Chuang et al., 2020; Skinner & Rae, 2018). However, these studies did not explore disgust. Correlations between disgust sensitivity and antigay/out-group attitudes have also been documented (Hodson & Costello, 2007; Inbar et al., 2009; Terrizzi et al., 2010), but only one published paper to our knowledge (Skinner & Hudac, 2017) has empirically linked disgust and interracial couples. In three studies, these researchers found that for a sample of mostly White American undergraduates, acceptance of Black–White interracial romance and self-reported disgust toward interracial couples were negatively correlated, insula activation was associated with viewing images of interracial couples, and after priming with disgusting images, dehumanization of interracial (vs. same-race) couples on an Implicit Association Test (IAT) was heightened. The authors concluded that "interracial

[1] Department of Psychology, University of Illinois at Urbana–Champaign, IL, USA

Corresponding Author:
Sean M. Laurent, Department of Psychology, University of Illinois at Urbana–Champaign, 603 East Daniel Street, Champaign, IL 61820, USA.
Email: slauren@illinois.edu

couples elicit a disgust response that translates into implicit dehumanization of interracial couples" (pp. 74-75).

Although this work is informative, further research is needed to draw any firm conclusions. As the authors acknowledge, whether people experience more disgust toward interracial (vs. same-race) couples cannot be ascertained from their correlational study, and although neuroimaging studies are informative, the anterior insula activates in response to various emotional states (Craig, 2009; Poldrack, 2006). Finally, even when disgust was not primed, a stronger association was found between interracial (vs. same-race) couples and nonhuman animals (vs. humans) in their IAT task, suggesting that this association may not rely on disgust. Even if experimentally induced disgust strengthens this association, no firm conclusion can be drawn that people perceive interracial couples as repulsive.

Although compelling historical evidence exists for opposition to interracial romances, a provocative claim that interracial couples uniquely elicit disgust requires substantial evidence. If incorrect or only partially correct, drawing this conclusion prematurely could undermine the theoretical understanding of bias toward interracial couples, and practical consequences, such as harming interracial couples and their reputations, are also possible. The current research therefore reexamines Skinner and Hudac's (2017) hypothesis that disgust is associated (and exclusively associated) with interracial couples. To be clear, we are not suggesting that disgust *ought to be* associated with the racial composition of any couple. Rather, given the societal implications in suggesting that people have "irrational" emotional responses to members of a growing social group in the United States, we believe that further examination of the proposed link between disgust and interracial romance is warranted.

Why Disgust?

The pathogen avoidance account posits that disgust is an evolved emotion that facilitates disease avoidance, prompting strategic decision-making regarding which moral rules to endorse/resist (Curtis et al., 2011; Tybur et al., 2013). Relatedly, stigmatization may stem from an error management system that encourages withdrawal from humans whose behavior threatens the group, just as disgust encourages withdrawal from bodily contaminants (Chapman & Anderson, 2013; Oaten et al., 2011). Supporting this, disease salience is associated with negative attitudes toward out-groups (e.g., Navarrete & Fessler, 2006). Although interracial couples probably do not trigger disease cues today, avoiding interaction with out-group members who potentially harbored novel pathogens or threatened in-group norms would have been adaptive in ancestral environments (Oaten et al., 2009).

Given that the social function of disgust[1] is to protect oneself and one's group from danger, interracial unions may symbolically represent contamination of in-group values. Instead of perceiving that in-group members have exited one's group (e.g., "marrying out"), in-group members who marry outsiders may be seen as having invited foreign intrusion, compromising the group's established social norms. Supporting this idea, disgust sensitivity predicts the disliking of groups that threaten traditional sexual morality (Crawford et al., 2014). To the extent that interracial unions suggest one's group identity has been sullied, interracial couples, like ingesting a to-be-avoided substance, might elicit disgust.

Present Research

Three studies reexamine the hypothesis that interracial couples are associated with disgust (Skinner & Hudac, 2017). To test this, we used both direct self-reports (Study 1) and indirect performance-based measures (Studies 2 and 3). By employing a novel image classification task and disgust sensitivity measures, the current work further extends research on this important topic. All study materials are reported in the Online Supplementary Materials (OSM). R codes and data are available at https://osf.io/pc2ay/.

Study 1

Study 1 used self-reports to directly examine whether people find interracial couples more disgusting than same-race couples. Given people's willingness to vocally express negative affect in online settings (e.g., Crockett, 2017)—especially if interactions are anonymous (e.g., Glaser et al., 2002)—we expected little motivation to distort responses in a socially desirable direction. Based on previous research (Skinner & Hudac, 2017), we hypothesized that interracial couples would receive higher average disgust ratings than same-race White couples. However, we were not sure whether any differences in reported disgust would emerge between interracial and same-race Black couples, given the evolved function of disgust pertaining to out-groups.

Method

Participants and Procedure

To achieve 80% power ($\alpha = .05$) to detect small within-participants effects ($d = .20$), we decided to recruit 50 participants per set (see "Measures and Design" section). Although we advertised for 200 participants on Amazon Mechanical Turk, 211 completed the survey (see Table 1). One participant was excluded because they spent less than a minute on the survey.

After providing informed consent, participants evaluated seven images of each couple type on various affective measures including disgust. In randomized orders, images of couples were singly presented with questions below them. We used 112 images of heterosexual couples: 28 White male/White female (White), 28 Black male/Black female (Black), 28 White male/Black female (WMBF), and 28 Black male/White female (BMWF). Images were gray-scaled versions of wedding and engagement photos used by Skinner and Hudac (2017). Displays of romantic affection (e.g., holding hands, embracing) were evident in each photo, suggesting that participants would

Table 1. Demographics (Studies 1–3).

Variables	Study 1	Study 2	Study 3
Sample size	210	96	98
Sample type	MTurk	Undergraduates	Undergraduates
Residence	United States	United States	United States
Gender	47.76% female	76.04% female	71.43% female
Age, *M* (*SD*)	40.72 (13.53)	19.42 (1.22)	19.41 (1.66)
Ethnicity			
Asian/Asian American (%)	8.96	37.50	36.73
Black/African American (%)	3.48	4.17	12.24
Hispanic/Latino(a) (%)	5.47	11.46	10.20
Native American/Pacific Islander (%)	0.00	1.04	0.00
White/European American (%)	78.11	40.62	40.82
More than one (%)	2.99	4.17	0.00
Other or prefer not to say (%)	0.99	1.04	0.00

perceive couples as social units. After evaluating all images, participants answered demographic questions.

Measures and Design

Face emotions and verbal items measured disgust. For face emotion, a photo of a female expression of open-mouth disgust (Rozin et al., 1999) was shown beneath target images, and participants indicated how strongly the face represented their feelings (1 = *not at all* to 7 = *very much*). Four verbal items were used: "How disgusted/grossed out/repulsed/nauseated do you feel?" (1 = *not at all* to 7 = *very much*). To mask our hypothesis, filler items including other emotion measures (e.g., sorrow) were included.

There were 22 questions total, including filler items. Rather than having participants rate all images (requiring 112 × 22 = 2,464 responses per participant), images were divided into four sets, and participants were randomly assigned to rate one set. Each set contained seven unique images of each couple type, paired with 1 of the 22 questions. Questions did not vary across sets. Individual responses were nested within participants and targets, reducing participant load while increasing the number of targets to enhance generalizability.

Analytic Strategy

All reported analyses in Studies 1–3 used linear mixed models (Baayen, 2008), which enabled simultaneously modeling within/between-participant effects (Barr et al., 2013; Judd et al., 2012). We used the *lme4* package (Bates et al., 2015) in R 4.0.0 to estimate fixed and random coefficients using restricted maximum likelihood unless noted. Random participant and target intercepts were always included. White (White male/White female) was the couple-type reference group. Perceiver race/ethnicity did not moderate results of main analyses; the OSM provides supplementary analyses examining this and additional predictors.

Table 2. Study 1 Linear Mixed Model Predicting Disgust Ratings.

Fixed Effects	*b*	*SE*	*t*	*p*
Intercept	1.32	.08	15.98	<.001
Same-race Black	0.05	.07	0.78	.443
Interracial (WMBF)	0.21	.07	2.98	.006
Interracial (BMWF)	0.22	.07	3.12	.005
Measure type	−0.02	.05	−0.45	.656
Random Effects	**Variance**	***SD***	***N***	
Subject	0.79	.89	210	
Target	0.01	.09	32	
Residual	0.65	.81		

Note. Same-race White was the reference category for couple type, and face emotion was the reference category for measure type. WMBF = White male/Black female; BMWF = Black male/White female.

Results

Face disgust emotion in response to WMBF ($M = 1.55$, $SD = 1.36$) and BMWF ($M = 1.52$, $SD = 1.42$) couples was rated higher than White ($M = 1.34$, $SD = 0.97$) and Black ($M = 1.37$, $SD = 1.08$) couples. A similar pattern was observed using verbal emotion: WMBF ($M = 1.50$, $SD = 1.29$), BMWF ($M = 1.54$, $SD = 1.38$), White ($M = 1.29$, $SD = 0.94$), and Black ($M = 1.37$, $SD = 1.08$). Table 2 shows the results of the mixed model predicting disgust ratings from couple type and measure type.[2] Face emotion was the reference for measure type.

Mean disgust ratings were higher for WMBF and BMWF than White couples, respectively, bs = 0.21 and 0.22, ps = .006 and .005, CIs [0.06, 0.35] and [0.07, 0.36]. Mean disgust ratings were also higher for WMBF and BMWF than Black couples, respectively, bs = 0.15 and 0.16, ps = .037 and .028, CIs [0.01, 0.30] and [0.02, 0.31]. Disgust ratings for Black and White couples did not significantly differ, $b = 0.05$, $p = .443$. Similarly, ratings for WMBF and BMWF did not significantly differ, $b = 0.01$, $p = .893$. These findings are

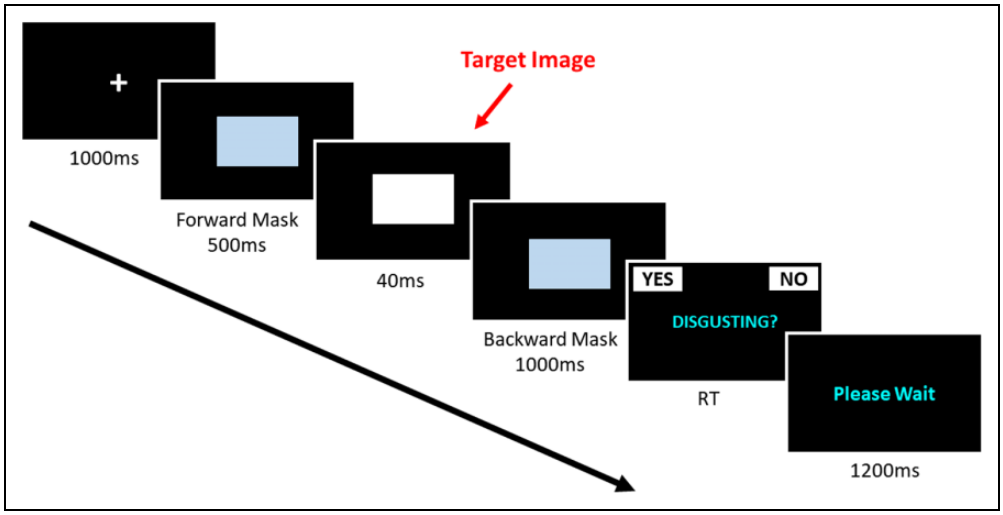

Figure 1. Study 2 trial sequence. Trial sequence was as follows: White fixation cross (1,000 ms), forward mask (500 ms), target image (40 ms), backward mask (1,000 ms), and screen with YES and NO on top corners with the screen-centered prompt ("Disgusting?") presented until a response was made, followed by "Please Wait" (1200 ms) until the next trial began.

consistent with the idea that disgust is linked exclusively with interracial couples, as average disgust ratings toward both types of interracial couple were greater than both types of same-race couple. Notably, however, disgust ratings were low across all couple types, with most participants responding 1 = *not at all*. Although this might represent socially desirable responding (despite the survey being anonymous), it seems equally likely that participants did not find any target couples especially disgusting. Thus, for those people who explicitly reported *any* disgust in response to couples, levels were higher for interracial (vs. same-race) couples.

Study 2

Study 2 employed a performance-based measure designed to capture difficult-to-control potential associations between disgust and interracial couples. Images of disgusting stimuli, neutral stimuli, or couples were presented for a brief duration, and participants were asked to "guess" whether or not target images were disgusting. We operationalize responding "YES (disgusting)" to preselected disgust images (e.g., feces) as a hit, whereas responding "NO (not disgusting)" to these targets as a miss. For couples and control images (e.g., landscapes), "NO" and "YES" responses represent correct rejections and false alarms, respectively. Although evaluations regarding disgustingness of images are subjective, to the extent that interracial romance is associated with disgust (Skinner & Hudac, 2017), we hypothesized more false alarms for images of interracial couples relative to White couples when stimulus presentations were brief. We also examined whether this effect would be enhanced for those higher in disgust sensitivity. Similar to Study 1, we were uncertain whether false alarm rates would differ between interracial and Black couples.

Method

Participants and Procedure

We aimed to recruit 100 participants; this number was determined by maximal recruitment efforts for one semester. Ninety-six undergraduate psychology students with normal/corrected-to-normal vision and no reported color blindness participated for course credit, affording 80% power ($\alpha = .05$) to detect effect sizes of $d = .34$. No participants were excluded (see Table 1). After providing consent, participants answered demographic questions and the Disgust Scale–Revised (DS-R; Olatunji et al., 2007) before completing the rapid image identification task, answering several suspicion probe questions, and being debriefed. At the end of the task, 73% reported recognizing none of the target images; of the remaining 27%, one participant reported having seen an image of a couple.

Measures

Disgust sensitivity. DS-R (Olatunji et al., 2007) is a widely used measure of disgust sensitivity, consisting of "core" (e.g., maggots), "contamination" (e.g., toilet), and "animal reminder" disgust (e.g., death). We administered Core and Contamination subscales using 5-point Likert-type scales[3] and computed disgust sensitivity scores by averaging all items ($\alpha = .84$) before mean centering.

Subliminal image identification task. Prior to the main task, participants completed seven longer-stimulus-duration practice trials (100 ms), receiving feedback to facilitate task understanding. Participants were then instructed to decide, as quickly as possible, whether target images flashed quickly (40 ms, forward/backward masked) in the center of the screen were disgusting or not by pressing the left or right buttons on a button box. Figure 1 depicts the event sequence for each trial.

Table 3. Study 2 Summary of Response Pattern by Target Type.

Target Type	"NO" Response (It's Not Disgusting)	"YES" Response (It's Disgusting)	Total	False Alarm Rate (%)
White	1,075	461	1,536	30.01
Black	995	541	1,536	35.22
WMBF	1,024	512	1,536	33.33
BMWF	1,031	505	1,536	32.88
Control	2,113	959	3,072	31.22
Disgust	2,021	1,051	3,072	n/a
Total	8,259	4,029	12,288	n/a

Note. False alarm rate is the proportion of "YES" responses to total responses for nondisgusting targets (i.e., couples and control). WMBF = White male/Black female interracial couple; BMWF = Black male/White female interracial couple ; n/a = not applicable.

The main task contained two blocks, each with 64 critical trials containing one target image plus 10 attention trials (e.g., "press the left button"). Each target image appeared once in each block. The side of the screen on which YES (and NO) appeared varied by trial and across blocks. Trial order was randomized within blocks, and the order of blocks was counterbalanced across participants. Responses were recorded via DirectRT (Version 2006).

Target images included 36 color photos of couples obtained from Skinner and Hudac (2017), 23 control photos (e.g., landscapes), and 22 disgust photos (e.g., toilet) from the International Affective Picture System (IAPS; Lang et al., 2008). Masks were 18 additional IAPS images divided into small, randomly arranged blocks, rendering the original images unrecognizable. Critical trials consisted of 64 target images (450 × 337 pixels)—8 White, 8 Black, 8 WMBF, 8 BMWF, 16 control, and 16 disgust. Image luminance did not differ by target type (see OSM). In total, 12,288 recorded responses were nested within 96 participants and 64 targets.

Results

Response patterns for target types are summarized in Table 3. Because the main hypotheses concerned couple-type differences, analyses focused on the 6,144 responses involving target couples. Couple type was dummy coded with White (White male/White female; reference group), Black (Black male/Black female), and interracial (i.e., both types of interracial couples) categories. We combined both types of interracial couples because Study 1 found no differences between WMBF and BMWF. We did not combine same-race couples because whether bias (captured using an indirect method) against interracial couples might be worse than general bias against racial minority members remained of theoretical interest. Analyses examining all four couple types separately are reported in the OSM Table S6. We estimated a generalized linear mixed model using Laplacian approximations, in which the conditional probability of responding YES was predicted using a logit link function (see Table 4). Provided effect sizes are odds ratios (*OR*).

Table 4. Study 2 Generalized Linear Mixed-Effects Model Predicting False Alarms (i.e., "YES [Disgusting]") Responses From Couple Type and Disgust Sensitivity.

Fixed Effects	Logit	*SE*	*z*	*p*	*OR*
Intercept	−.97	.12	−7.77	<.001	0.38
Black	.26	.14	1.88	.061	1.29
Interracial	.15	.12	1.31	.192	1.17
Disgust sensitivity	.09	.15	0.62	.533	1.10
Black × Disgust Sensitivity	−.12	.13	−0.94	.349	0.89
Interracial × Disgust Sensitivity	.24	.11	2.16	.031	1.27

Random Effects	Variance	*SD*	*N*
Subject	.57	.75	96
Target	.05	.22	32

Note. Same-race White is the reference category. Disgust sensitivity is the mean-centered composite score of the Contamination and Core Disgust subscales of the Disgust Sensitivity Revised Scale (Olatunji et al., 2007). *OR* = odds ratio.

White Versus Interracial

We hypothesized that the probability of false alarms (i.e., indicating YES) would be higher when target couples were interracial (vs. White) and that this difference would be moderated by disgust sensitivity. At the mean of disgust sensitivity, the logit of a false alarm (i.e., YES) was greater for interracial (vs. White) couples by .15, $OR = 1.17$, CI [0.92, 1.48], but this was not significant, $p = .192$. However, a significant Interracial × DS-R interaction effect was found, logit = .24, $p = .031$, $OR = 1.27$, CI [1.02, 1.59]. Figure 2 depicts the predicted probability of responding YES as a function of disgust sensitivity and couple type. Follow-up analysis revealed that for participants who scored above 3.57 on DS-R ($M = 3.19$; observed range = 1.47–4.53), significantly more false alarms were estimated for interracial (vs. White) couples, $p < .05$. Below 3.57, the conditional effect of the interracial (vs. White) couple contrast was not significant (see OSM Figure S1).

Black Couples

At the mean of disgust sensitivity, the logit of a false alarm was nonsignificantly smaller for interracial (vs. Black) couples, logit = −.10, $p = .390$, $OR = 0.90$, CI [0.71, 1.15]. However, there was a significant interaction effect, logit = .36, $p < .001$, $OR = 1.43$, CI [1.16, 1.78] (see Figure 2). Follow-up analyses showed that false alarm rates were significantly higher ($p < .05$) for interracial (vs. Black) couples only when DS-R scores reached above 4.45—the highest end of the observed range. Below scores of 2.79, however, a significantly higher rate of false alarms for *Black* (vs. interracial) couples was found (see OSM Figure S2). In addition, the logit of a false alarm for Black (vs. White) couples was nonsignificantly greater, logit = .26, $p = .061$, $OR = 1.29$, CI [0.98, 1.70]. This trend was not moderated by disgust sensitivity (see Table 4 and Figure 2).

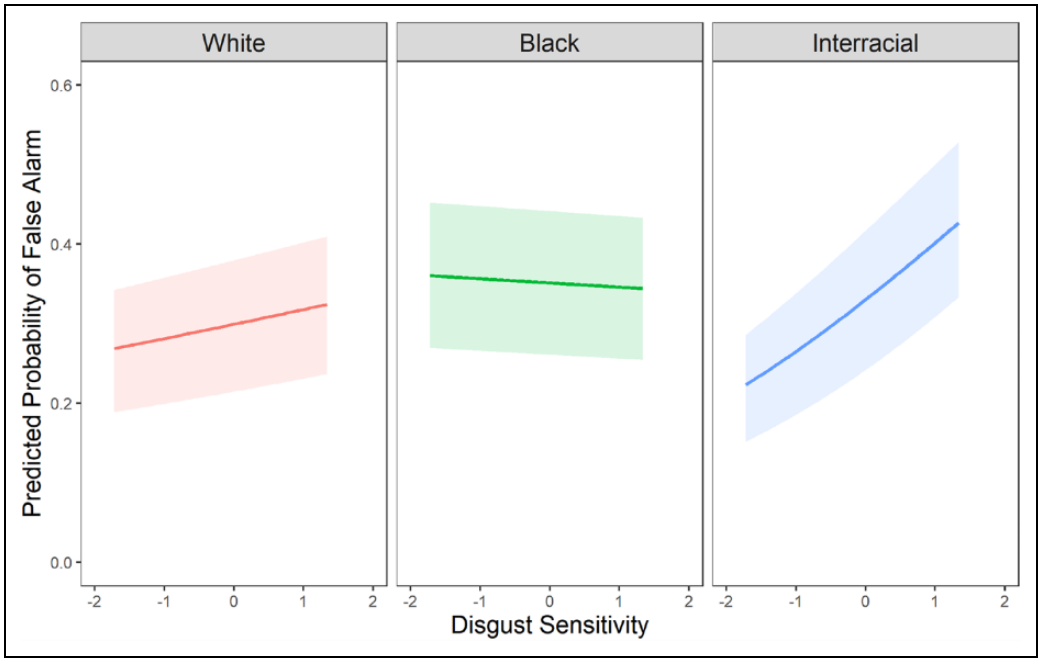

Figure 2. Predicted probability (with 95% confidence bands) of responding "YES (disgusting)" to White, Black, and interracial couples as a function of disgust sensitivity (mean-centered) in Study 2.

In sum, only partial support was found for the hypothesis that interracial couples are more strongly associated with disgust than same-race couples. Specifically, the difference in response tendency indicating bias exclusively against interracial couples was observed only for people with high disgust sensitivity. Furthermore, participants with lower DS-R tended to misclassify Black couples more than interracial, and the false alarm rate was somewhat higher for Black (vs. White) couples, more generally.

Study 3

Study 3 used a novel image classification task to test the disgust–interracial couples association. Additionally, we examined whether sexual disgust moderated this association. Although the DS-R (Olatunji et al., 2007) assesses disgust sensitivity with pathogen-related disgust elicitors, it does not assess disgust toward sexual acts, which seems highly relevant when examining feelings toward romantic couples. In Study 3, we used the Three Domains of Disgust Scale (TDDS; Tybur et al., 2009) consisting of sexual, moral, and pathogen disgust domains. We present specific hypotheses after the task is described.

Method

Participants and Procedure

We aimed to recruit 100 participants, with this number determined by maximal recruitment efforts for one semester. Ninety-eight undergraduate psychology students with the same vision qualifications as Study 2 participated for course credit, providing 80% power ($\alpha = .05$) to detect effect sizes of $d = .33$. No participants were excluded, and no participants from Study 2 completed Study 3 (see Table 1). After providing consent, participants answered a demographic questionnaire, completed the TDDS (Tybur et al., 2009), performed the image classification task after completing practice trials, and were debriefed.

Measures

Sexual disgust. The Sexual Disgust ($\alpha = .80$) subscale of the TDDS (Tybur et al., 2009) contains 7 items (e.g., "hearing two strangers have sex") rated on a 1 = *not at all disgusting* to 7 = *extremely disgusting* scale. All measured items are reported in the OSM.[4]

Supraliminal image classification task. Similar to Study 2, we used 48 color photos of couples (Skinner & Hudac, 2017), plus 33 control and 49 disgust images from the IAPS (Lang et al., 2008). All images were 450 × 337 pixels. Each trial featured two images presented side-by-side. Between them, a green arrow pointed toward one image (i.e., the "target"). The other image was a distractor. The words YES and NO were located on the top left and right corners of the screen (locations varied across trials). Participants classified images as disgusting or not by pressing buttons on the appropriate sides of a button box as quickly as possible. For example, if a couple image was presented next to a preselected disgusting image (e.g., toilet) and the green arrow pointed to the couple (see Figure 3), we expected NO (not disgusting) responses. If the arrow pointed to the toilet, expected responses were YES (disgusting). Images remained on the screen until participants responded. If trial

Figure 3. An example of the image classification task in Study 3. Here, the interracial couple was the target because the green arrow was pointing toward it. "NO" was the expected response. The toilet on the right is the distractor.

responses took longer than 2,000 ms, "please respond faster" appeared.

To keep participants engaged, green arrows were sometimes replaced with red arrows. In these trials, participants classified images the arrow did *not* point to. The main task had two blocks with 60 trials each (20 red arrow trials in each block). Blocks contained 32 disgust-couple pairings, 16 control-couple pairings, 12 disgust–control pairings, and 2 no-image attention trials. Trial order was randomized within blocks, and the order of blocks and combination of arrow direction and positions of target images were counterbalanced across participants. In total, there were 11,760 recorded responses nested within 98 participants and 120 targets.

Hypotheses

All hypotheses are for critical trials involving couples (i.e., control-couple or disgust-couple pairings) where participants responded YES for preselected disgust targets and NO for couples and control targets.

Hypothesis 1 (H1): Slower response time (RT) for disgust-couple (vs. control-couple) trials. For control-couple pairings where neither image is of a disgusting stimulus, expected responses were always NO. However, for disgust-couple trials, participants needed to consider the color and direction of arrows before responding YES or NO. Therefore, we hypothesized slower RT on trials containing (vs. not containing) a disgusting image as target or distractor.

Hypothesis 2 (H2): Slower RT for red arrow (vs. green) trials. Red arrows pointed away from target images, adding an extra cognitive step to correctly classify targets. Thus, we predicted a slower RT on red (vs. green) arrow trials.

Hypothesis 3 (H3): Slower RT for interracial (vs. White) couples. If people associate interracial couples with disgust, correct classification of interracial (vs. White) couples as *not* disgusting should require more effort (i.e., should take longer). Similarly, if interracial couples are perceived as disgusting, then their presentation as distractors should interfere with the classification of target images, slowing responses. We therefore hypothesized that RT for trials containing interracial (vs. White) couples as targets or distractors would be slower. Again, we remained agnostic about whether RT on trials with Black couples would differ from trials containing interracial couples.

Hypothesis 4 (H4): Couple Type × Sexual Disgust interaction. We further hypothesized that H3 would be moderated by sexual disgust, such that hypothesized RT differences on trials involving interracial (vs. White) couples would increase as sexual disgust increases.

Results

Of the original 11,760 responses, 10,472 (89.05%) were correctly classified (see the OSM for response-pattern analyses). After removing 501 false alarms (i.e., YES for couple and control targets), 456 misses (i.e., NO to disgust targets), and 2,352 noncritical trials (i.e., trials with no couples), 8,451 responses remained. We then examined individual trial RTs to detect outliers. Following Leys et al. (2013), RTs greater or less than 2.5 times the median absolute deviation were identified as outliers and removed (342/8,451, or 4.05%). Mean RT in milliseconds as a function of trial type is shown in Table 5. Table 6 presents the results of a linear mixed model. Trial type was dummy coded with control-couple pairing as reference, green arrow was the reference for arrow color, and sexual disgust was mean-centered.

Table 5. Study 3 Means and Standard Deviations (*SD*s) of Response Time (in Milliseconds).

Disgust-Couple Pairing					Control-Couple Pairing				
Target	Distractor	*N*	*M*	*SD*	Target	Distractor	*N*	*M*	*SD*
White	Disgust	665	1,560	430	White	Control	372	1,322	394
Black	Disgust	690	1,593	433	Black	Control	356	1,361	430
WMBF	Disgust	661	1,547	420	WMBF	Control	359	1,371	408
BMWF	Disgust	659	1,567	443	BMWF	Control	363	1,321	403
Disgust	White	641	1,574	405	Control	White	367	1,360	414
Disgust	Black	635	1,581	419	Control	Black	363	1,360	419
Disgust	WMBF	634	1,579	414	Control	WMBF	359	1,425	433
Disgust	BMWF	629	1,564	421	Control	BMWF	356	1,396	445

Note. WMBF = White male/Black female interracial couple; BMWF = Black male/White female interracial couple.

Table 6. Linear Mixed Model Predicting Response Time From Trial Type, Arrow Color, Couple Type, and Sexual Disgust.

Fixed Effects	*B*	*SE*	*t*	*p*
Intercept	1,342.62	26.85	50.00	<.001
Trial type	169.54	18.95	8.95	<.001
Arrow color	148.77	10.08	14.76	<.001
Black	19.07	22.73	0.84	.402
Interracial	42.08	19.66	2.14	.033
Sexual disgust	9.19	17.73	0.52	.605
Black × Trial Type	−8.40	23.69	−0.35	.723
Interracial × Trial Type	−40.11	20.51	−1.96	.051
Black × Sexual Disgust	6.83	9.08	0.75	.452
Interracial × Sexual Disgust	15.96	7.90	2.02	.043
Random Effects	**Variance**	***SD***	***N***	
Subject	41,022.73	202.54	98	
Target	4,342.01	65.89	120	
Distractor	864.64	29.40	120	
Residual	129,469.10	359.82		

Note. Trial type was coded with control-couple pairings as 0 and disgust-couple pairings (i.e., trials containing a preselected disgusting image either as target or distractor) as 1. Arrow Color was dummy coded with green arrow as the reference. Same-race White was the reference category for couple type. Sexual disgust is the mean-centered composite score of the sexual subscale of the Three Domains of Disgust Scale (Tybur et al., 2009).

Control Versus Disgust Pairing (H1) and Green Versus Red Arrow (H2)

Supporting H1, RT was slower for disgust-couple (vs. control-couple) trials, $b = 169.54$, $p < .001$, CI [132.38, 206.80], confirming that classification was more difficult on trials with couples presented next to disgust (vs. control) images. Supporting H2, RT on red (vs. green) arrow trials was also slower, $b = 148.77$, $p < .001$, CI [129.04, 168.55].

White Versus Interracial (H3) and Sexual Disgust (H4)

Our main hypothesis (H3) regarded whether people would take longer to decide that interracial (vs. White) couples are not disgusting. Partially supporting H3, when paired with control images, mean RT for interracial (vs. White) couples was longer, $b = 42.08$, $p = .033$, CI [3.69, 80.46]. However, there was a nonsignificant but noteworthy Interracial × Trial Type interaction (see Table 6) such that when couples were paired with disgust images, the difference in RT for interracial versus White couples substantially diminished, $b = -40.11$, $p = .051$, CI [−80.29, 0.09]. This suggests that when couples were presented next to clearly disgusting images, RT differences between interracial and White couples were minimal. However, when interracial (vs. White) couples were presented next to neutral images, people took longer to recognize that neither image was disgusting. As hypothesized (H4), this RT difference increased as scores on sexual disgust increased, $b = 15.96$, $p = .043$, CI [0.44, 31.41]. Follow-up analysis revealed that only when sexual disgust was higher than 3.97 ($M = 4.19$; observed range: 1.00–7.00), were RTs for interracial (vs. White) couples significantly slower (see OSM Figure S4).

Black Couples

Although interracial-control pairings had slower RT than Black-control pairings, this difference was not significant, $b = 23.01$, $p = .246$, CI [−15.80, 61.87]. No significant interaction with trial type or sexual disgust emerged for this comparison (see OSM Table S15). In addition, although participants took somewhat longer to respond on Black-control (vs. White-control) trials, this difference was not significant, $b = 19.07$, $p = .402$, CI [−25.47, 63.55], and there was no significant interaction with sexual disgust (see Table 6). Thus, echoing the results of Study 2, no clear evidence was found that interracial couples were more strongly associated with disgust than Black couples.

General Discussion

Historically and anecdotally, opposition to interracial unions is evident. Although prior research on this topic has documented explicit and implicit biases against interracial couples (Chuang et al., 2020; Skinner & Rae, 2018), whether disgust helps explain these biases was not explored until recently. Skinner and Hudac (2017) reported that interracial couples are

associated with disgust, which leads to dehumanization. However, a robust link between disgust and interracial couples or the proposition that disgust responses are specific to interracial couples has not been sufficiently demonstrated. Given the potentially harmful ramifications of drawing this conclusion (e.g., both for interracial couples and for our theoretical understanding of race-based biases), more evidence is clearly needed. This research sought to reexamine this hypothesis by conducting three studies varying in sample type (MTurk vs. undergraduates), measures (self-reported vs. performance-based), and stimuli presentation (subliminal vs. supraliminal).

Do people perceive interracial couples to be more disgusting than same-race couples? Cautiously, yes, but only for some people and under certain conditions, and the effects may not be particularly large or widespread. Consistent with recent social surveys showing a dramatic decline in opposition to intermarriage over time (Livingston & Brown, 2017), most respondents in Study 1 reported feeling not at all disgusted toward interracial (or same-race) couples. However, when respondents reported any level of disgust, ratings of interracial (vs. same-race White or Black) couples were higher, indicating some support for the hypothesis that disgust is exclusively linked to interracial unions. In Study 2, no link between disgust and interracial (vs. White) couples was found for people at or below the mean on disgust sensitivity. When compared with Black couples, higher false alarms (i.e., responding that subliminally presented images of couples was disgusting) for interracial couples only emerged for those highest in disgust sensitivity, and this effect reversed at lower levels. Notably, the highest rate of false alarms in Study 2 was for Black couples, suggesting that disgust toward interracial couples may, to some extent, reflect general bias against minority out-groups. Finally, in Study 3, people were slower to indicate that interracial (vs. White) couples were *not* disgusting when paired with neutral stimuli, and greater sexual disgust magnified this difference. However, no difference between interracial and Black couples was observed on this indirect measure of association, and when couples were presented alongside disgusting images, people tended to respond similarly to all couple types. This further suggests no robust specificity (i.e., to only interracial couples) for this hypothesized effect.

One limitation of the current work is that Black American respondents were underrepresented. The online sample in Study 1 consisted of mainly White Americans, whereas most undergraduate participants in Studies 2 and 3 identified as either White or Asian/Asian American. Although including perceivers' ethnicity in the analyses did not substantively alter the main results (see OSM), Black–White interracial couples are simply combinations of two out-group members for Asians and therefore may not evoke strong norm violation or in-group identity concerns related to disgust. Future research using larger samples of more diverse participants and stimuli featuring additional interracial couples (e.g., White-Asian) would help address this issue. In addition, although the current research provides some evidence for an association between disgust and interracial couples, disgust often correlates with anger (Gutierrez & Giner-Sorolla, 2007). For those who strongly oppose interracial unions, anger or fear may be more relevant than disgust because of perceived harm (Giner-Sorolla & Russell, 2019; Glaser et al., 2002; Gray et al., 2014). If moral emotions serve distinct functions (Young & Tsoi, 2013), disgust might be associated with the in-group member engaging in interracial unions (for *defiling* the in-group), while anger might be directed toward the out-group partner (for *harming* the in-group). Future research might benefit by separating disgust from anger (e.g., Russell & Giner-Sorolla, 2013) and measuring the association of both with interracial couples.

The Mississippi event venue owner who declined to host the interracial couple's wedding later apologized, admitting that, to her dismay, she could not find Biblical verses forbidding interracial relationships (Pittman, 2019). This example illustrates that rejection of interracial couples may occur intuitively for some people, just like aversion to harmless disgust elicitors. Importantly, however, realizing the irrationality of her initial opposition changed her view of interracial couples. Although public apologies do not reverse harms done or ensure that a person's attitudes have been completely reformed (e.g., implicit biases might persist), acknowledging past mistakes regarding unfair treatment of interracial couples is progress. As the human mind adapts to interactions with dissimilar or unfamiliar others, the old expression once uttered with disgust may be replaced with a new interpretation: "it just ain't right" that lovers cannot be together because of their race.

Acknowledgments

We thank Allison L. Skinner for sharing stimulus materials used for this study. We also thank Julia Spielmann for her contributions to the project in its early stages

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) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Shoko Watanabe https://orcid.org/0000-0002-6118-1736
Sean M. Laurent https://orcid.org/0000-0003-0130-7867

Supplemental Material

The supplemental material for this article is available online.

Notes

1. We note that anger or fear may also be elicited from out-group threats and revisit this point in the General Discussion.
2. No Couple Type × Measure Type interaction was predicted or of theoretical interest. Similarly, all four adjectives measured a single emotion (i.e., disgust), and we had no interest in adjective-based differences.

3. Theoretical support for the "animal reminder" disgust has been questioned (Tybur et al., 2009).
4. Moral and Pathogen Disgust subscales were also administered, and their simple effects and interaction with couple type were nonsignificant.

References

Baayen, R. H. (2008). *Analyzing linguistic data: A practical introduction to statistics using R*. Cambridge University Press. https://doi.org/10.1017/CBO9780511801686

Barr, D. J., Levy, R., Scheepers, C., & Tily, H. J. (2013). Random effects structure for confirmatory hypothesis testing: Keep it maximal. *Journal of Memory and Language*, *68*(3), 255–278.

Bates, D., Mächler, M., Bolker, B. M., & Walker, S. C. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software*, *67*(1), 1–48. https://doi.org/10.18637/jss.v067.i01

Chapman, H. A., & Anderson, A. K. (2013). Things rank and gross in nature: A review and synthesis of moral disgust. *Psychological Bulletin*, *139*(2), 300–327.

Chuang, R., Wilkins, C., Tan, M., & Mead, C. (2020). Racial minorities' attitudes toward interracial couples: An intersection of race and gender. *Group Processes & Intergroup Relations*. https://doi.org/10.1177/1368430219899482

Craig, A. D. (2009). How do you feel—now? The anterior insula and human awareness. *Nature Reviews Neuroscience*, *10*(1), 59–70. https://doi.org/10.1038/nrn2555

Crawford, J. T., Inbar, Y., & Maloney, V. (2014). Disgust sensitivity selectively predicts attitudes toward groups that threaten (or uphold) traditional sexual morality. *Personality and Individual Differences*, *70*, 218–223. https://doi.org/10.1016/j.paid.2014.07.001

Crockett, M. J. (2017). Moral outrage in the digital age. *Nature Human Behaviour*, *1*(11), 769–771. https://doi.org/10.1038/s41562-017-0213-3

Curtis, V., de Barra, M., & Aunger, R. (2011). Disgust as an adaptive system for disease avoidance behaviour. *Philosophical Transactions: Biological Sciences*, *366*(1563), 389–401.

Giner-Sorolla, R., & Russell, P. S. (2019). Not just disgust: Fear and anger also relate to intergroup dehumanization. *Collabra: Psychology*, *5*(1), 56. https://doi.org/10.1525/collabra.211

Glaser, J., Dixit, J., & Green, D. P. (2002). Studying hate crime with the internet: What makes racists advocate racial violence? *Journal of Social Issues*, *58*(1), 177–193. https://doi.org/10.1111/1540-4560.00255

Gray, K., Schein, C., & Ward, A. F. (2014). The myth of harmless wrongs in moral cognition: Automatic dyadic completion from sin to suffering. *Journal of Experimental Psychology: General*, *143*(4), 1600–1615. https://doi.org/10.1037/a0036149

Gutierrez, R., & Giner-Sorolla, R. (2007). Anger, disgust, and presumption of harm as reactions to taboo-breaking behaviors. *Emotion*, *7*(4), 853.

Haidt, J. (2001). The emotional dog and its rational tail: A social intuitionist approach to moral judgment. *Psychological Review*, *108*(4), 814–834. https://doi.org/10.1037//0033-295X.108.4.814

Haidt, J., Bjorklund, F., & Murphy, S. (2000). *Moral dumbfounding: When intuition finds no reason* [Unpublished manuscript]. University of Virginia.

Hodson, G., & Costello, K. (2007). Interpersonal disgust, ideological orientations, and dehumanization as predictors of intergroup attitudes. *Psychological Science*, *18*(8), 691–698. https://doi.org/10.1111/j.1467-9280.2007.01962.x

Inbar, Y., Pizarro, D. A., Knobe, J., & Bloom, P. (2009). Disgust sensitivity predicts intuitive disapproval of gays. *Emotion*, *9*(3), 435–439. https://doi.org/10.1037/a0015960

Jacobo, J. (2019, September 3). Mississippi venue apparently denied interracial couple's wedding over "Christian belief," video shows. *ABC News*. https://abcnews.go.com/US/mississippi-venue-apparently-denied-interracial-couples-wedding-christian/story?id=65356377

Judd, C. M., Westfall, J., & Kenny, D. A. (2012). Treating stimuli as a random factor in social psychology: A new and comprehensive solution to a pervasive but largely ignored problem. *Journal of Personality and Social Psychology*, *103*(1), 54–69. https://doi.org/10.1037/a0028347

Kille, D. R., & Tse, C. T. (2017). Whose family fits? Categorization and evaluation of same-sex and cross-race-parent families. *Group Processes & Intergroup Relations*, *20*(1), 109–124. https://doi.org/10.1177/1368430215595106

Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (2008). *International affective picture system (IAPS): Affective ratings of pictures and instruction manual*. University of Florida.

Lewandowski, D. A., & Jackson, L. A. (2001). Perceptions of interracial couples: Prejudice at the dyadic level. *Journal of Black Psychology*, *27*(3), 288–303. https://doi.org/10.1177/0095798401027003003

Leys, C., Ley, C., Klein, O., Bernard, P., & Licata, L. (2013). Detecting outliers: Do not use standard deviation around the mean, use absolute deviation around the median. *Journal of Experimental Social Psychology*, *49*(4), 764–766. https://doi.org/10.1016/j.jesp.2013.03.013

Livingston, G., & Brown, A. (2017). *Intermarriage in the U.S. 50 years after Loving V. Virginia*. Pew Research Center. https://www.pewsocialtrends.org/2017/05/18/intermarriage-in-the-u-s-50-years-after-loving-v-virginia/

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*(4), 270–282. https://doi.org/10.1016/j.evolhumbehav.2005.12.001

Oaten, M., Stevenson, R. J., & Case, T. I. (2009). Disgust as a disease-avoidance mechanism. *Psychological Bulletin*, *135*(2), 303–321. https://doi.org/10.1037/a0014823

Oaten, M., Stevenson, R. J., & Case, T. I. (2011). Disease avoidance as a functional basis for stigmatization. *Philosophical Transactions: Biological Sciences*, *366*(1583), 3433–3452.

Olatunji, B. O., Cisler, J. M., Deacon, B. J., Connolly, K., & Lohr, J. M. (2007). The disgust propensity and sensitivity scale-revised: Psychometric properties and specificity in relation to anxiety disorder symptoms. *Journal of Anxiety Disorders*, *21*(7), 918–930. https://doi.org/10.1016/j.janxdis.2006.12.005

Pittman, A. (2019, September 1). No "mixed" or "gay" couples, Mississippi wedding venue owner says on video. *Deep South Voice*. https://www.deepsouthvoice.com/index.php/2019/09/01/no-mixed-or-gay-couples-mississippi-wedding-venue-manager-says-on-video

Poldrack, R. (2006). Can cognitive processes be inferred from neuroimaging data? *Trends in Cognitive Sciences*, *10*(2), 59–63. https://doi.org/10.1016/j.tics.2005.12.004

Rozin, P., Lowery, L., Imada, S., & Haidt, J. (1999). The CAD triad hypothesis: A mapping between three moral emotions (contempt, anger, disgust) and three moral codes (community, autonomy, divinity). *Journal of Personality and Social Psychology*, *76*(4), 574.

Russell, P. S., & Giner-Sorolla, R. (2013). Bodily moral disgust: What it is, how it is different from anger, and why it is an unreasoned emotion. *Psychological Bulletin*, *139*(2), 328–351. https://doi.org/10.1037/a0029319

Skinner, A. L., & Hudac, C. M. (2017). "Yuck, you disgust me!" Affective bias against interracial couples. *Journal of Experimental Social Psychology*, *68*, 68–77. https://doi.org/10.1016/j.jesp.2016.05.008

Skinner, A. L., & Rae, J. R. (2018). A robust bias against interracial couples among White and Black respondents, relative to multiracial respondents. *Social Psychological and Personality Science*. https://doi.org/10.1177/1948550618783713

Stump, S. (2013, June 3). Cheerios ad with mixed-race family draws racist responses. *Today*. https://www.today.com/news/cheerios-ad-mixed-race-family-draws-racist-responses-6C10169988

Terrizzi, J. A., Shook, N. J., & Ventis, W. L. (2010). Disgust: A predictor of social conservatism and prejudicial attitudes toward homosexuals. *Personality and Individual Differences*, *49*(6), 587–592. https://doi.org/10.1016/j.paid.2010.05.024

Trail, T. E., Goff, P. A., Bradbury, T. N., & Karney, B. R. (2012). The costs of racism for marriage: How racial discrimination hurts, and ethnic identity protects, newlywed marriages among Latinos. *Personality and Social Psychology Bulletin*, *38*(4), 454–465. EDSWSS. https://doi.org/10.1177/0146167211429450

Tybur, J. M., Lieberman, D., & Griskevicius, V. (2009). Microbes, mating, and morality: Individual differences in three functional domains of disgust. *Journal of Personality and Social Psychology*, *97*(1), 103–122. https://doi.org/10.1037/a0015474

Tybur, J. M., Lieberman, D., Kurzban, R., & DeScioli, P. (2013). Disgust: Evolved function and structure. *Psychological Review*, *120*(1), 65–84. https://doi.org/10.1037/a0030778

Wofford, N., Defever, A. M., & Chopik, W. J. (2019). The vicarious effects of discrimination: How partner experiences of discrimination affect individual health. *Social Psychological and Personality Science*, *10*(1), 121–130. https://doi.org/10.1177/1948550617746218

Young, L., & Tsoi, L. (2013). When mental states matter, when they don't, and what that means for morality. *Social and Personality Psychology Compass*, *7*(8), 585–604. https://doi.org/10.1111/spc3.12044

Author Biographies

Shoko Watanabe is a PhD student in the Department of Psychology at the University of Illinois, Urbana-Champaign. Her research topics include forgiveness & reconciliation, hypocrisy & punishment, group trust & cooperation, and religious cognition & worldview threat.

Sean M. Laurent is an Assistant Professor in the Department of Psychology at the University of Illinois, Urbana-Champaign. His research examines how people think and feel about other people, particularly in relation to the way people form their moral judgments.

Handling Editor: Robyn Mallett