Taking Racism to Heart: Race-Related Stressors and Cardiovascular Reactivity for Multiracial People

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Multiracial people experience an accumulation of racial stress for both their minority and their multiracial identities, yet no research has examined the physiological impact of this stress. This within-groups experimental study examined whether two race-related stressors—identity invalidation and discrimination from family—affect cardiovascular reactivity for Black/White multiracial adults (N = 60). The authors found a Condition × Phase interaction effect indicating that discrimination from family affected blood pressure. Invalidation had no effect on blood pressure.

Keywords: multiracial, cardiovascular reactivity, identity invalidation, discrimination from family, blood pressure

Racial disparities between Black and White individuals exist in cardiovascular health, with striking differences in mortality due to cardiac disease (Lloyd Jones et al., 2010). Experiences of racism have been shown to affect cardiovascular reactivity, and over time, the accumulation...
of physiological stress responses leads to chronic health conditions (Clark, Anderson, Clark, & Williams, 1999; Steptoe & Marmot, 2005). Multiracial people are at heightened risk for cardiovascular disease compared with monoracial people (U.S. Department of Health and Human Services, 2012), perhaps because of their experience of race-related stress stemming from their multiracial and minority statuses (Shih & Sanchez, 2005). The purpose of this study was to advance understanding regarding disparities in cardiac disease by examining the degree to which two race-specific stressors—identity invalidation (the negation or imposition of a racial identity) and racial discrimination from family—elicited cardiovascular stress responses in a sample of Black/White multiracial people.

Multiracial individuals are a growing population in the United States, now numbering more than 9 million (Humes, Jones, & Ramirez, 2010). Black/White multiracial people may face the most potent racial stressors as they are judged against a historical context of racial tensions originating during slavery, and have heritages comprised of the most socially disparate racial groups (Rockquemore & Laszloffy, 2003). Because these individuals are a product of unions that continue to be viewed as wrong by some (Carroll, 2007), they may face heightened stress pertaining to their racial heritage.

The biopsychosocial model provides a useful framework (Clark et al., 1999) for this study; this model links race-related stressors with both psychological and physical long-term health outcomes (e.g., blood pressure, chronic health issues; see Williams & Mohammed, 2009). The current study examines the model’s theoretical association between discrimination and physical health, specifically cardiovascular reactivity. Experiences of race-related stress (e.g., invalidation, discrimination from family) are hypothesized to produce physiological responses, which may influence long-term health, such as rates of hypertension and cardiovascular disease.

Although the relationship between laboratory analogues of race-related stress and physiological distress has not been examined for multiracial people, numerous studies provide support for this relationship in Black people (Lepore et al., 2006; Merritt, Bennett, Williams, Edwards, & Sollers, 2006; Peters, Butler, Gjini, Yeragani, & Boutros, 2011). Following discussions of experiencing a hypothetical subtle racist stressor, Black women had higher diastolic blood pressure reactivity than White women (Lepore et al., 2006). Similarly, heart rate and heart rate variability for Black participants increased after viewing racially noxious images (Peters et al., 2011). Also, subtle mistreatment ambiguously related to race was found to increase diastolic blood pressure for Black people but not for White people (Guyll, Matthews & Bromberger, 2001). In addition, Black women discussing a hypothetical experience of mistreatment had higher cardiovascular reactivity when they attributed mistreatment to racism (Lepore et al., 2006). Moreover, many studies have found that physiological stress responses to race-related stressors persisted in a recovery period after the race-related stressor was removed (e.g., Fang & Myers, 2001; Lepore
et al., 2006), suggesting that the effects of racism on health linger and that racism may affect health in the long term.

Similar studies examining racial stress and physical health are needed for the multiracial population (Edwards & Pedrotti, 2008). To date, research examining multiracial-specific racial stressors and well-being have used only self-report measures. These studies have found relationships between discrimination and poorer psychological health (e.g., Franco & O’Brien, 2018; Sanchez, Shih, & Garcia, 2009). However, individuals completing self-report measures underreport stress, even when their bodies exhibit physiological reactions (Clark et al., 1999; Peters et al., 2011).

Of all racial stressors that multiracial people face, two of the most potent are identity invalidation and racial discrimination from family (Jourdan, 2006; Rockquemore & Brunsma, 2002; Sanchez, 2010). Identity invalidation is defined as the negation of one’s racial identity by others and applies to experiences in which others perceive one as a race of which they do not personally identify (Lou, Lalonde & Wilson, 2011; Rockquemore & Laszloffy, 2003). As a result of the one-drop rule, which dictates that one drop of Black blood makes one Black, Black/White multiracial people face overwhelming societal pressure to identify with their minority group and are particularly vulnerable to invalidation (Coleman & Carter, 2007). Additionally, because Black/White mixed race individuals are the product of a union of two of the most socially and culturally distant racial groups, Black and/or White family members are likely to discriminate against a family member who reflects or partially identifies with the other racial group. In samples of multiracial individuals, discrimination from family was related negatively with self-esteem and social connectedness and positively with depression and social anxiety (Coleman & Carter, 2007; Salahuddin & O’Brien, 2011). Because of the vulnerability of Black/White multiracial people to these race-related stressors, it is important to identify the extent to which these race-related stressors produce cardiovascular stress.

**The current study**

We investigated cardiovascular effects of laboratory analogues of two racial stressors—identity invalidation and familial discrimination—among Black/White multiracial individuals. We predicted that cardiovascular reactivity markers (systolic and diastolic blood pressure, heart rate) during and after (i.e., recovery period) the identity invalidation and discrimination from family conditions would be higher than in the control condition.

**Method**

This study employed a within-subjects quasi-experimental design; each participant took part in three conditions (i.e., control, invalidation, discrimination from family), with each condition having three phases (i.e., imagination,
discussion, and recovery; see Figure 1). The independent variables were race-related stressors (i.e., identity invalidation and discrimination from family), and the dependent variables were cardiovascular activity (i.e., systolic blood pressure, diastolic blood pressure, and heart rate change scores from baseline).

**PROCEDURE**

After institutional review board approval was obtained, participants were recruited through word of mouth, personal and research team connections, advertisements on online groups, a registrar email list, multiracial student organizations, and fliers. Interested individuals came to the lab for 60 minutes. They were compensated with $10 or course credit.

After obtaining consent in the laboratory, the experimenter attached the sensor—comprised of two finger cuffs and an arm cuff—to the participant’s nondominant arm, which allowed for blood pressure to be taken continuously throughout the experiment. Participants then were told to refer to the computer screen for further instructions, and the experimenter left the room. In line with other studies (e.g., Fang & Myers, 2001; Merritt et al., 2006), baseline measures of heart rate and blood pressure were taken continuously for 5 minutes and averaged to form a baseline score. Participants were video recorded throughout their participation.

Cardiovascular responses were averaged for each phase of each condition (3 conditions × 3 phases), for a total of nine sets of scores (one set = systolic blood pressure, diastolic blood pressure, and heart rate scores within a phase of a particular condition) and 27 individual mean cardiovascular response scores (not including mean scores at baseline): nine for systolic blood pressure scores, nine for diastolic blood pressure scores, and nine for pulse rates.

![FIGURE 1](image-url)

**Experimental Design**
For each condition, participants were given 3 minutes for the imagination phase, during which they were prompted to recall an experience. In the control condition, they were asked to think about engaging in a leisurely activity, and in the invalidation and discrimination from family conditions, they were asked to think about an experience they had of each of these stressors. All conditions were counterbalanced to control for order effects. The participant then moved on to the 4-minute discussion phase, where the computer prompted the participant to discuss the experience that they recalled during the imagination phase. In the recovery phase of each condition, participants were instructed to rest for 3 minutes before receiving additional instructions.

PARTICIPANTS

Sixty-two participants took part in the study; however, data from two participants were deleted due to errors in measurement and failure of blood pressure software. Therefore, the final sample consisted of 60 participants. If participants indicated that they had not experienced invalidation or discrimination from family, their data in the respective conditions were deleted, leaving 57 participants in the identity invalidation and 49 in the discrimination from family conditions.

Most participants were female (70.0%), and 30.0% were male. Most participants identified as multiracial (81.7%), whereas some identified as Black (15.0%) or White (3.3%). The majority were students (85.2%) with an average age of 22.25 years (SD = 4.51 years). With regard to annual household income, 33.3% had incomes below $49,000, 28.3% had between $50,000 and $99,999, and 38.4% had over $100,000. The majority had White mothers (56.7%), some had multiracial mothers (26.7%), and a few had Black mothers (16.7%; percentages do not total 100 because of rounding). The majority of participants had Black fathers (63.3%), some had White fathers (26.7%), and a few had multiracial fathers (8.3%). One participant did not report father’s race. Most of the participants (92.0%) were nonsmokers. The mean body mass index was within normal limits (M = 24.35, SD = 5.67). Baseline systolic (M = 117.90, SD = 16.91), diastolic (M = 68.82, SD = 9.89), and pulse rates (M = 85.7, SD = 10.95) were within normal limits.

MEASURES

Cardiovascular outcomes. Measures of systolic and diastolic blood pressure and heart rate were taken continuously using the NIBP100D, a noninvasive continuous blood pressure system, which provides beat-to-beat readings collected through the middle and index finger of the subject. Continuous noninvasive blood pressure monitors have convergent validity with other more invasive measures of blood pressure (Sackl-Pietsch, 2008).

To calculate heart rate and blood pressure scores for each phase (e.g., imagination, discussion, recovery), mean scores during each phase were subtracted from mean score at baseline. Then, discussion blood pressure
values were subtracted from those of the recovery phase. This decision was made because the sharp spike in heart rate induced by speaking may otherwise lead to recovery scores that are an artifact of individual differences in heart rate return following speaking-related elevations (Linden, Earle, Gerin, & Christenfeld, 1997). Because of the nature of the within-groups design, within each phase, participants’ blood pressure scores are compared against themselves, and extraneous factors that might influence heart rate, such as height, weight, diet, and smoking status, were controlled.

Demographics. A demographic questionnaire assessed age, gender, racial identification, race of biological parents, year in school (if applicable), education level, and income.

Manipulation check. To determine whether participants appropriately engaged in condition prompts, experimenter logs (that included notes on participant responses) were reviewed for participants who were not video recorded due to technical errors. For participants who were recorded, the two coauthors separately watched videos of most participants (n = 57) engaging in conditions to assess whether the prompts solicited appropriate data. In total, we reviewed videos from 55 participants engaging in the leisurely activity and discrimination conditions, and 53 participants engaging in the invalidation condition. Coauthors independently watched videos and rated the degree to which participants fulfilled the tasks of the condition (i.e., discussed leisurely activity, invalidation, or discrimination) on a scale ranging from 0 (not at all) to 4 (completely). Mean ratings were as follows: leisurely activity (M = 3.56, SD = 0.86), invalidation (M = 3.64, SD = .92), and discrimination from family (M = 2.79, SD = 1.52). Interrater reliability was high, intraclass correlation coefficient = .90, p < .001, 95% confidence interval [0.84, 0.92] (Shieh, 2012). Videos rated differently by each rater were rewatched and discussed until a consensus was reached. Data from participants who could not come up with experiences relevant to the prompt (score = 0) were deleted. From the video content and logs, it was determined that three participants did not report invalidation (remaining n = 57), and 11 did not report discrimination from family (remaining n = 49).

results

We chose mixed-model analyses with repeated measures to test the effects of condition and phase on blood pressure because they use all available data, carry fewer assumptions, and are more accurate at predicting error (Quené & van den Bergh, 2004). Each model included two fixed factors: condition and phase. Maximum likelihood estimation and an autoregressive covariance structure were used in SPSS (Version 20). Three mixed models were run—one for each outcome variable.

The first model examined whether systolic blood pressure varied across conditions (i.e., leisurely activity, invalidation, discrimination) for each phase
(imagination, discussion, and recovery). The interaction of condition and phase predicted systolic blood pressure, $F(4, 400.45) = 2.70, p < .05$. Post hoc pairwise analyses ($p < .05$) revealed that in the discussion phase, blood pressure was lower for participants in the discrimination condition ($M = 0.67, SE = 1.46$) than in the control ($M = 5.22, SE = 1.35$). This effect was moderate ($d = 0.44$). Within the recovery phase, systolic blood pressure was higher ($p < .05$) in the discrimination condition ($M = -1.84, SE = 1.48$) than in the control ($M = -6.14, SE = 1.35$). This effect was moderate ($d = 0.42$). The interaction of condition and phase did not predict diastolic blood pressure, $F(4, 412.45) = 0.47, p > .05$, or pulse rate, $F(4, 408.33) = 1.13, p > .05$.

**Discussion**

The purpose of this laboratory experiment was to examine the physiological responses associated with two race-related stressors—identity invalidation and discrimination from family—in Black/White multiracial individuals. Results indicated that recollections of discrimination from family experiences—and not identity invalidation—affect cardiovascular responses.

Counter to our hypotheses and to past research on race-related stressors and physiological stress (e.g., Fang & Myers, 2001), during the discussion phase, systolic blood pressure was lower in the discrimination from family condition than in the control condition. This unexpected finding may have arisen because of the unique manipulation of racial stress in this study. Previous researchers operationalized racial stressors by asking participants to imagine or discuss a hypothetical racial stress scenario (Guyll et al., 2001; Lepore et al., 2006; Merritt et al., 2006), whereas we asked participants to discuss personal experiences of racial stress. Discussing personal experiences of racial stress might have had cathartic, rather than aggravating, effects on cardiovascular reactivity. Alternatively, our findings might signify disengagement from the prompt. When individuals are exposed to exceedingly difficult stress, they may cope by disengaging and show no cardiovascular response to stress (Allen, 2000). Zanstra and Johnston (2011) highlighted the mediating role of participant engagement in experimental cardiovascular reactivity studies. Moreover, their awareness of an experimenter observing them may have contributed to a sense of discomfort with revealing personal experiences, thus leading to disengagement.

Disengagement might be less likely to occur during the recovery phase, when participants do not have to actively disclose to an onlooker. In this phase, consistent with research on racism and physiological stress (Lepore et al., 2006; Merritt et al., 2006), systolic blood pressure scores were higher in the discrimination from family condition than in the control. Blood pressure alterations during the recovery phase are important because recovery blood pressure scores from a stressor are a better predictor of long-term health than reactance (Steptoe & Marmot, 2005).
The discrepancy in the direction of the findings between the discussion and recovery phase is interesting; the recovery phase may be more likely to cultivate rumination as scholars have posited that the active discussion of a stressor may precede rumination that arises once recounting is finished (Lepore et al., 2006; Merritt et al., 2006). Laboratory analogue studies have found that rumination relates to poorer cardiovascular outcomes following stressors (Larsen et al., 2012; Radstaak, Geurts, Brosschot, Cillessen, & Kompier, 2011). Although the current study did not actively measure rumination in the recovery phase, rumination has been found to occur in periods directly following stressful events (Radstaak et al., 2011). Thus, it is possible that rumination played a mediating role in reactivity to discrimination from family.

In contrast to the discrimination from family condition, discussion of identity invalidation experiences had no physiological effects. Participants may have described invalidating experiences that they already worked through; many of the experiences described by the participants had occurred years ago. Thus, their experiences may have ceased to be stressful by the time the participant engaged in the study. This is in contrast to experiences of discrimination from family, since participants may continue to interact with family members who discriminated against them.

Although differences between conditions were found for the discussion and recovery phases, no differences were found in the imagination phase. Clark, Adams, and Clark (2001) used a similar preparation phase within their study on reactivity and racial stress and also found insignificant effects within this phase, while finding significant effects during the active discussion of stressors. It may be that the nature of the imagination phase does not allow for as vivid of a reliving of racial stressors and that actively discussing the experience may be more effective at evoking past stressors.

**IMPLICATIONS FOR PRACTITIONERS**

Should the findings of this study be replicated, counselors should be aware that experiences of discrimination from family among multiracial clients may negatively affect cardiovascular health. It is important for practitioners to recognize that multiracial clients’ reactions to experiences of discrimination from family may change within and between sessions, and that residual feelings likely persist after discriminatory experiences.

Counselors also should be aware that race-related stressors may have differential effects on multiracial clients and should strategically cultivate interventions depending on the type of health implications for particular types of racial stressors. Past research illustrated that both identity invalidation and discrimination from family have effects on psychological well-being (Salahuddin & O’Brien, 2011; Sanchez, 2010). Counselors can provide biofeedback to clients to assist them in identifying and mitigating their cardiovascular stress response when experiencing and discussing dis-
Craination from family. Other heart rate regulation strategies supported by the literature include relaxation training and mindfulness (Bell, 2015; Yucha, Tsai, Calderon, & Tian, 2005). Other specific techniques to assist with blood pressure include psychoeducation regarding sympathetic and parasympathetic nervous system functioning, diaphragmatic breathing, attention to mind-body sensations, and encouraging sleep and exercise (Russell-Chapin, 2016).

LIMITATIONS AND FUTURE DIRECTIONS

First, discussing and imagining experiences of racism will not fully reflect the actual experiences of racism, and the process of recalling racial stress experiences is vulnerable to memory and cognitive bias. In recalling racial stress experiences that happened previously, the emotional responses to the initial experiences may be forgotten—or possibly distorted. Future studies might manipulate discrimination through in vivo laboratory experiences. Future research should include microaggressions as these stressors have been found to affect cardiovascular health (Guyll et al., 2001; Lepore et al., 2006; Merritt et al., 2006). Second, the sample consisted mostly of women and college students from an urban area. Living in an urban area might provide participants with resources that would mitigate the effects of racial stressors, such as increased availability of social networks composed of individuals from similar racial groups. Finally, participants in the current study were self-selected; individuals who felt apathetic (or highly stressed) toward their multiracial identity may not have participated.

CONCLUSION

This study was the first to examine the physiological effects of racial stressors on multiracial individuals. For this sample of multiracial individuals, talking about experiences of discrimination from family decreased cardiovascular outcome scores. In contrast, cardiovascular response increased in the period directly after talking about these experiences. Research is needed to understand the complex interplay between racial stress experiences and physiological health for the multiracial population. We hope that this study will stimulate research and practice to reduce the harmful health disparities affecting multiracial individuals as this (and related) research can be used to prevent cardiovascular disease in an understudied at-risk population.

REFERENCES


