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Capturing the cardiac effects of racial discrimination: Do the effects "keep going"?

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ABSTRACT

Racial discrimination negatively impacts cardiac functioning, but few studies examine the more distal cardiac effects of racial discrimination experiences. The present study examined the momentary and prolonged impact of lab-based intergroup and intragroup racial discrimination on heart rate variability (HRV) and heart rate (HR) in a sample (N = 42) of African American (AA) women across two days. On day one, the women were exposed to simulated racial discrimination from either a European American (EA) or AA confederate in the lab. On day two, the women returned to the lab for additional physiological recording and debriefing. Women insulted by the EA confederate exhibited lower HRV on day one and marginally lower HRV on day two. These women also exhibited marginally higher HR on day two. The HRV and HR effects on day two were not mediated by differences in perseveration about the stressor. The findings indicate that racial discrimination – particularly intergroup racial discrimination – may have both momentary and prolonged effects on cardiac activity in AAs.

1. Introduction

A strong corpus of research documents the damaging effects of racial discrimination on African American (AA) mental and physical health. Racial discrimination has been associated with a host of negative outcomes, including elevated blood pressure and hypertension, increased heart rate (HR), decreased heart rate variability (HRV), and risk for cardiovascular diseases, cellular aging, and dysregulation of the HPA axis (Brondolo et al., 2008, 2011; Chae et al., 2014; Dorr et al., 2007; Hill et al., 2007; Paradies, 2006; Pascoe and Smart Richman, 2009; Williams and Mohammed, 2013). Yet, researchers have little understanding of the pathways through which racial discrimination contributes to changes in physiological systems and poorer health outcomes (Harrell et al., 2011).

Exaggerated "fight or flight" processes are initiated when AA individuals perceive that an event is racially discriminatory (Clark et al., 1999). While scholars note that these responses, governed largely by the sympathetic nervous system, may continue long after a racially discriminatory event occurs (Dorr et al., 2007; Harrell, 2000; Utsey et al., 2013), few studies examine the longer-term effects of racial discrimination (see Hoggard et al., 2015, for an exception). For instance, Dorr et al., 2007 found that AAs who inhibited their anger following a racist or nonracist debate with a European American (EA) confederate experienced delayed total peripheral resistance recovery during a 10-minute recording period. Conversely, AAs who expressed their anger experienced delayed blood pressure, HR, cardiac output, and HRV recovery during the 10-minute recording period. As this study illustrates, the impact of race-related stimuli on cardiovascular functioning may continue to unfold after an initial exposure. We believe the inclusion of longer recovery periods (e.g., beyond a brief lab session) is imperative as prolonged, not momentary, "fight or flight" responses to stressful events lead to disease and premature death (Brosschot et al., 2006). In the present study, we assess AAs' cardiac activity on two consecutive days, during two lab sessions.

Perseverative cognition is a potential mechanism by which individuals experience extended or prolonged physiological responses to stressors (Brosschot et al., 2005, 2006). Perseverative cognition refers to repeated or chronic activation of the cognitive representations of psychological stressors. As a deviation from stress and coping models that tend to focus on the short-term effects of stressors, Brosschot et al. (2006) proposed the Perseverative Cognition Hypothesis, arguing that prolonged physiological responses to stressors – both stressors that have already occurred as well as stressors that are anticipated – ensue when repeated and/or prolonged representation of stressors occurs.

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Moreover, the theorists assert that perseverative cognition mediates the link between these stressors and somatic illness. As it is possible that AAs' responses to racial discrimination events unfold over time (e.g., across multiple days) such that the longer or more frequently they perseverate over these events, the longer their physiological recovery, we adopt the Perseverative Cognition Hypothesis as a framework for understanding the lingering physiological effects of racial discrimination.

In this investigation, we acknowledge that the momentary and prolonged effects of racial discrimination on cardiac activity may depend on the *race of the perpetrator*. However, few studies disentangle the unique influences of *intergroup* and *intragroup* racial discrimination on the health and well-being of AAs. One notable exception is a study wherein AAs who listened to racial discrimination vignettes reported significantly higher levels of distress and disgust when the perpetrator was EA than when the perpetrator was AA (Rucker et al., 2014). In another study, AAs viewed scenes depicting an unjust arrest for shoplifting or an encounter with a rude and threatening EA or AA highway patrolman. Surprisingly, there was no effect of officer/patrolman race on the AAs' blood pressure and pulse rate reactivity (Morris-Prather et al., 1996). Given these discrepant findings, additional research is needed to elucidate whether the consequences of intergroup and intragroup racial discrimination are comparable. In particular, do AAs exhibit differential patterns of physiological activity following racial discrimination (e.g., being treated as if intellectually inferior, being avoided) when the perpetrator is EA versus AA?

In many studies examining race-related stress in the lab context, AA participants are often instructed to *imagine* that they are experiencing racial discrimination or to *view* scenes of individuals experiencing racial discrimination (e.g., Morris-Prather et al., 1996; Neblett and Roberts, 2013; Rucker et al., 2014). Although these approaches provide useful insights, they remain limited as there are likely to be discrepancies between how individuals think they will emotionally and behaviorally respond to a situation and their emotional and behavioral responses *in vivo* (Lazarus, 1995; Lepore et al., 2006; Robinson and Clore, 2001). Moreover, vicarious racial discrimination experiences (e.g., viewing scenes) and direct racial discrimination experiences likely differ with regard to their impact on cardiac activity. Compared to these more traditional approaches, we employ an innovative experimental paradigm by focusing on cardiac responses to direct racial discrimination that *actually* unfolds in the lab context via the use of confederates.

The present study examines AAs' cardiac responses, both in the moment and over time, to *actual* racial discrimination involving an EA (intergroup racial discrimination) or AA (intragroup racial discrimination) perpetrator. To assess cardiac activity, we focus on HRV as it reflects the dynamic beat-to-beat influence of the parasympathetic nervous system and is thought to reflect individual differences in the capacity to navigate changing demands in the environment (Appelhans and Luecken, 2006; Berntson et al., 2009; Brosschot et al., 2003; Task Force, 1996). Indeed, in their neurovisceral integration model of health disparities, Thayer and Friedman (2004) suggest that anticipation, worry, and rumination – all perseverative psychological states that may result from experiencing racism – disrupt the functioning of the parasympathetic nervous system in reducing stress responses to a race-related stressor. We also focus on HR as it is dynamically regulated by both the sympathetic and parasympathetic nervous systems (Verkuil et al., 2014). Finally, we examine cognitive perseveration as a mechanism (mediator) by which AAs may experience prolonged HRV and HR responses to the lab stressor.

The present study investigates three research questions: First, do AAs experience lower HRV and higher HR activity following an *actual* intergroup versus intragroup race-related stressor in the relative short-term (on day one)? Second, do the aforementioned differences in HRV and HR activity persist over time (on day two)? Third, are the potential differences in HRV and HR responses to the *actual* intergroup and intragroup race-related stressors on day two mediated by cognitive perseveration? We expect that: (1) AAs will experience lower HRV and greater HR after experiencing intergroup racial discrimination than after experiencing intragroup racial discrimination on day one; (2) the comparatively lower HRV and greater HR activity for intergroup racial discrimination will persist during the lab session on day two; and (3) the intergroup racial discrimination will lead to more perseveration than the intragroup racial discrimination which will, in turn, lead to comparatively longer physiological activation periods. We focused on AA women as AA men and women may differ with regard to the frequency with which they experience racial discrimination and the types of race-related events most commonly experienced (e.g., Banks et al., 2006; Sellers and Shelton, 2003; Sidanius and Veniegas, 2000). For instance, AA men may be more likely to be treated with fear and suspicion, and to be overtly harassed (Evans, 2011) whereas AA women may be more likely to be ignored in social, legal, political, and academic contexts (Purdie-Vaughns and Eibach, 2008). Moreover, AA women may be more vulnerable to the consequences and impact of racial discrimination (e.g., anxiety) (Banks et al., 2006; Greer et al., 2009). Furthermore, we focus on AA women in the present study as scholars have documented gender differences in HRV with women typically exhibiting higher HRV (e.g., Sztajzel et al., 2008). Finally, we wanted to maximize our sample size (our experimental samples are typically 55–65% women) while also matching the experimenter, confederate, and participants with respect to gender. We note that while women are the sample of choice, we selected a race-related stressor that is equally likely to be experienced by AA women and men: Being treated as if intellectually inferior (Evans, 2011).

2. Method

2.1. Participants

Forty-two AA female college students (M_{age} = 19.83 years, SD = 2.10) were recruited at a large public university in the Midwest. Exclusionary criteria for the study were as follows: not being female; being less than 18 years of age; having participated in a study that was previously conducted in the lab; having major medical conditions or currently using medications for cardiovascular disease; and currently being pregnant. Participants were instructed to refrain from eating, drinking anything other than water, consuming caffeine, smoking, and engaging in physical activity for an hour prior to both research appointments. Participants were randomly assigned to experimental condition (e.g., EA or AA perpetrator) using an online random number generator (http://www.randomizer.org/form.htm). Twenty-four participants were randomly assigned to the condition in which they interacted with the EA perpetrator and 18 participants were randomly assigned to the condition in which they interacted with the AA perpetrator.

Participants earned $20 for their participation in the two-day experiment. The present study was conducted in compliance with the university Institutional Review Board.

2.2. Procedure

2.2.1. Overview

During recruitment, participants were informed that they would participate in a two-day study examining the relationship between mood, thoughts, and physiological activity. Upon arrival to the lab on day one, participants were greeted by an EA female experimenter who remained present in the experimental room with the exception of the manipulation and spontaneous processing periods (detailed below). Electrodes were applied to measure the participants' electrocardiogram (ECG) activity. After a physiological baseline recording and a brief questionnaire completion period, the participant sat quietly for a pre-manipulation period. The participant then witnessed a scripted interaction between the experimenter and an EA or AA female confederate (perpetrator) meant to convey that the participant is intellectually inferior because of her race (detailed below). Participant ECG activity was recorded during the interaction as well as during a 5-minute period