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Villains or Vermin? The Differential Effects of Discrimination and Dehumanization on Immigrant Cardiovascular Responses

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Villains or Vermin? The Differential Effects of Discrimination and Dehumanization on

Immigrant Cardiovascular Responses

by

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A dissertation submitted in partial fulfillment
of the requirements for the degree of
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DEDICATION

This dissertation is dedicated to my parents, immigrants in this country who sacrificed a lot to give their children even more. There are no words strong enough to express my love and gratitude for everything you have done and continue to do for our family. Thank you to my siblings, my rocks and forever best friends, for your unwavering support in everything I do, and my nephews for bringing me more joy than I ever thought possible. My ultimate blessing in this life is and will always be my family.

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ABSTRACT

Immigration has been pushed to the forefront of a national political debate, and immigrants are commonly portrayed as villains and vermin looking to invade and infest Western nations. These negative portrayals of immigrants may have negative implications for immigrant health outcomes. Among other negative health outcomes, studies have found that immigrant cardiovascular disease rates increase with time spent in the U.S. This phenomenon of decreasing immigrant health with extended U.S. residency has been labeled "the immigrant health paradox", and discrimination has often been posited as a possible explanatory factor. In addition to discrimination, immigrants are often the targets of dehumanization, or the stripping away of one's humanity, which may be perceived as more threatening than discrimination and may therefore have worse implications for immigrant health. To test the differential cardiovascular impact of the two experiences, I examined cardiovascular reactivity and recovery from 153 first- and second-generation immigrants during both a neutral and immigration speech task. For the immigration speech, participants were randomly assigned to read a fabricated article that either primed dehumanizing ideas about immigrants or one that primed discriminating ideas. Reactivity differences appeared between the two conditions, such that individuals reporting less experience with past mistreatment reacted more strongly to the immigration speech, but only for those primed with dehumanization. These effects were prolonged, such that dehumanized participants displayed poorer recovery after the task compared to those primed with discrimination.

INTRODUCTION

Of the 325 million people living in the United States, more than 40 million residents are foreign-born (i.e. first-generation), constituting more than 13 percent of the U.S. population (Pew Research Center, 2018). Another 12 percent of the U.S. population is comprised of U.S.-born children of immigrants (i.e. second-generation). The U.S. has more immigrants than any other country in the world, and alone accounts for about one-fifth of the world's migrant population. Of the 44 million foreign-born residents, 26 percent come from Mexico, followed by China (6%), India (6%), the Philippines, (4%), and El Salvador (3%) (Pew Research Center, 2018). Immigration has been pushed to the forefront of a national political debate, and while the general view of immigrants in the U.S. is positive, with 65 percent of Americans reporting that immigrants strengthen rather than burden the country, this view is dependent on the origin of the immigrant groups in question. European and Asian immigrants are more positively regarded compared to African and Latinx immigrants (Pew Research Center, 2018). The issue of immigration is a critical and contentious topic in the political realm, and the general public is often exposed to misleading information as to the actual threat that immigrants pose. Immigrants are commonly portrayed as criminals and enemies looking to invade Western nations (El Refaie, 2001), and such depictions grab the public's attention and have been shown to have direct influences on levels of dehumanization of immigrants and support for relevant immigration policies (Esses, Mediano, & Lawson, 2013). Research has consistently shown that dehumanization, or the denial of membership to the human identity, can facilitate discrimination

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and aggression against a variety of subgroups (e.g. Bandura, Underwood, & Fromson, 1975; Goff, Eberhardt, Williams, & Jackson, 2008; Bruneau & Kteily, 2017). Conversely, the literature on the outcomes of meta-dehumanization, or the feeling of being dehumanized by others (Kteily, Hodson, & Bruneau, 2016), is scarcer.

Immigrant health outcomes have also been studied extensively over the years, and an intriguing phenomenon has continuously appeared: immigrants, as a whole, arrive to the U.S. reporting better health outcomes than U.S. citizens, but this advantage decreases as length of time spent in the U.S. increases (Cunningham, Ruben, & Narayan, 2008). This "Immigrant Health Paradox" has been a focus of many scientific fields of study, identifying the patterns of immigrant health outcomes as well as the reasons for why immigrant health gradually resembles the health of U.S. natives with increased duration of stay. One identified reason for this increased risk is perceived discrimination and the stress that accompanies it. Studies have shown that discrimination is associated with negative mental and physical health outcomes among immigrants (Viruell-Fuentes, 2007; Gee, Ryan, Laflamme, & Holt, 2006; Szaflarki & Bauldry, 2018). Few studies, however, have focused specifically on how dehumanization impacts immigrant health. This study seeks to examine the unique consequences of dehumanization relative to the experience of discrimination on the stress responses of U.S. first- and second-generation immigrants.

The Immigrant Health Paradox

Unsurprisingly, immigrants present a unique set of complications when it comes to health status. Non-citizens in the U.S. are both less likely to have health insurance and a regular source of care, and they are less likely to use these resources than U.S. born individuals. Many studies

on immigrant health have resulted in data that support the immigrant health paradox, despite these immigrants entering with generally lower socioeconomic statuses than the average American citizen (e.g. Gubernskaya, 2015; Bostean, 2013). However, as duration of residence in the United States grows, risk for various chronic ailments such as type 2 diabetes (Misra & Ganda, 2007) and cardiovascular disease (CVD) (Lear, Humphries, Hage-Moussa, Chockalingam, & Mancini, 2009) increases as well. Cardiovascular disease accounts for over 30 percent of deaths among Hispanic adults, and mortality is higher for foreign-born compared to U.S.-born Hispanic adults (Rodriquez et al., 2017). This effect has been shown to be due to a variety of factors, such as health care access, income assimilation, and acculturation to U.S. behaviors (Antecol & Bedard, 2006). This effect is also influenced by lack of awareness of one's condition, as shown among foreign-born Black individuals who report lower rates of awareness of their high blood pressure (BP) than their U.S.-born counterparts (Cole, 2018).

Negative physical health outcomes have been found among children of immigrants and immigrant children as well, including a higher risk of obesity (Baker, Rendall, & Weden, 2015; Lawrence, Mollborn, & Riosmena, 2016), lower overall health status (Gelatt, 2016), and a higher risk of mortality compared to children with U.S.-born parents (Shor, Roelfs, & Vang, 2017). Among direct descendants of African immigrants, intergenerational birth weights have been shown to decrease across subsequent generations (Collins, Wu, & David, 2002). Recent work has provided evidence that immigrant children in the U.S. have higher C-reactive protein than children with a U.S-born parent, a finding that may indicate that immigrant children face higher levels of chronic stress exposure than those with U.S-born parents (Schmeer, 2018). The physiological changes related to this may help to explain the worsening of health outcomes among immigrants with increased U.S. residency.

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Discrimination as a Chronic Stressor

Repeated exposure to race-based discrimination has often been examined as a chronic stressor that may make the body more physically reactive in stressful situations, increasing vulnerability to physical illness and theoretically playing a part in explaining racial differences in CVD and hypertension (Pascoe & Richman, 2009). Acts of discrimination can be overt, hard to ignore, and obvious in negative intentions, but they can also be subtle, difficult to detect, and ambiguous in intentions to harm (Jones, Peddie, Gilrane, King, & Gray, 2016). Examples of overt discrimination include insults, threats, rude treatment, and physical violence, while examples of subtle discrimination include unfair treatment, refusal of services, and being ignored. Importantly, these forms of discrimination are equally detrimental to the targets' psychological and physical well-being (Jones et al., 2016). Immigrant populations are commonly discriminated against and portrayed as illegals, criminals, and villains. Common metaphors regarding immigrants used in the media include inflammatory words such as criminal, infestation, disease, invader, and burden (Cisneros, 2008). Additionally, Hispanic immigrants have often been targeted as criminals and associated with the illegal distribution of drugs (Auerhahn, 1999).

Scholars have argued that this process of villainizing immigrants contributes to harmful effects such as human rights abuses (e.g. Kil & Menjivar, 2006), but this process may also be influencing immigrant health outcomes. Overall, foreign-born individuals and non-English speakers report less life satisfaction and more instances of discrimination than U.S. born individuals (Derose, Bahney, Lurie, & Escarce, 2009). Negative correlations between discrimination experiences and physical health have also been reported for Black immigrants in the U.S., an effect that was still present but attenuated among Latinx immigrants (Ryan, Gee, &

Laflamme, 2006). Among Mexican immigrants, discrimination was related to self-reported poor physical health, and depression was identified as a mechanism through which discrimination affects physical health (Finch, Hummer, Kolody, & Vega, 2001). Additionally, racial discrimination was among the factors that most strongly contributed to the development of depressive symptoms among Latinx immigrant parents (Ornelas & Perreira, 2011). Discrimination has also been shown to affect children with foreign-born parents by creating more stressful family conditions which increase psychological distress (Molina, Little, & Rosal, 2016). Second-generation Mexican immigrant women report experiencing more pervasive experiences of discrimination than their first-generation counterparts, which has implications for the erosion of health with increased U.S. residency (Viruell-Fuentes, 2007). Studies have been conducted examining other immigrant populations, and groups under the category of "Model Minority" are no exception to these negative health outcomes. For instance, everyday discrimination is associated with many chronic conditions among Asian Americans, such as heart disease and respiratory illness (Gee, Spencer, Chen, & Takeuchi, 2006). Among foreign-born Chinese American women, self-reported acculturative stress (i.e. the stresses associated with integration into one's new society) was positively associated with levels of C-reactive protein, a common indicator of inflammation in the body that is associated with negative health outcomes (Fang, Ross, Pathak, Godwin, & Tseng, 2014).

Discrimination and Cardiovascular Stress Reactivity

While not much work has examined the causal influences of discrimination on immigrant health outcomes, racial and ethnic disparities in rates of CVD have been a topic of research interest for many years. Researchers have conceptualized perceived discrimination as a chronic stressor that may explain some of the variance in CVD disparities. Much of this research has

focused on the impact of discrimination on Black/African Americans in the U.S., a population that is almost twice as likely as White/European Americans to develop some form of CVD, even after accounting for other risk factors such as socioeconomic status and education level, (Benjamin et al., 2018). One way in which discrimination has been linked to CVD risk is by examining cardiovascular (CV) reactivity to discrimination in the laboratory. Cardiovascular reactivity is defined as the increase or decrease of CV responses to behavioral stimuli that is perceived as engaging, challenging, or aversive (Manuck, Kasprowiz, & Muldoon, 1990). The reactivity hypothesis links exaggerated CV reactivity to psychological stressors with increased risk for CVD, particularly through measures of increased blood pressure and heart rate (HR) (Obrist, 1981; Manuck, 1994), and empirical literature supports the link between heightened reactivity and negative cardiovascular health status (e.g. Chida & Steptoe, 2010). Cardiovascular reactivity has also been found to predict future instances of hypertension (e.g. Kasagi, Akahoshi, & Shimaoki, 1995) as well as elevations in future levels of resting blood pressure (Matthews, Salomon, Brady, & Allen, 2003). Reactivity has been examined via a multitude of tasks, both social (e.g. speech tasks, interpersonal discussions) and non-social (e.g. mental arithmetic, mirror tracing) in nature.

Using a variety of tasks and manipulations encompassing both subtle and overt forms of prejudice, the effects of discrimination have been evidenced widely in the literature. Studies have utilized blatantly discriminatory content, such as racist or sexist statements (e.g. Fang & Myers, 2001; Merritt, Bennet, Williams, Edwards, & Sollers, 2006), as well as more subtle discrimination manipulations such as negative feedback or uncivil interactions that lend to situational ambiguity (e.g. El-Hout & Salomon, under review; Salomon & Jagusztyn, 2008). These subtle manipulations rely on the effects of perceived discrimination rather than the

discriminatory event itself, but can have implications similar to blatantly racist encounters. Perceived discrimination has been found to be positively associated with blood pressure levels during working hours, with instances of anger inhibition, and with higher sleep blood pressure as well as smaller dips in blood pressure from day to night among Black individuals (Steffen, McNeilly, Anderson, & Sherwood, 2003). Perceptions of discrimination have also been found to influence CV reactivity to non-racial tasks. In a study using both racist and non-racist stimuli, perceptions of discrimination appeared to be the most important factor in CV reactivity to the task (Merritt et al., 2006). Despite having reported less anger than participants in the racial-stimulus condition, participants in the no-racism condition who reported perceiving racism in the task displayed the greatest blood pressure reactivity.

In addition to perceptions of discrimination, past experiences with discrimination and mistreatment have been shown to impact CV reactivity to discriminatory instances. For instance, prior experiences with subtle discrimination moderated CV reactivity to a racial speech task, but not to a neutral mirror tracing task, among Black women (Guyll, Matthews, & Bromberger, 2001). Past experiences with discrimination have also been shown to moderate both resting CV levels and reactivity to interpersonal instances of mistreatment. Specifically, Latinxs self-reporting greater past experiences with discrimination exhibited high levels of resting blood pressure but displayed lower CV reactivity during an uncivil interaction in the lab, while White individuals exhibited lower blood pressure levels at rest but larger blood pressure reactivity during the uncivil interaction (Salomon & Jagusztyn, 2008). El-Hout and Salomon (under review) also found a significant positive relationship between past experiences of mistreatment and CV reactivity during an uncivil interaction with White, female research associates. Taken

together, these results depict the insidious nature of ambiguous discriminatory experiences among ethnic minorities.

Cardiovascular Stress Recovery

Another way in which discrimination has been linked to CVD risk is by examining the impact of poor recovery from psychological stressors. While reactivity establishes the magnitude of a stress response, recovery must also be examined for a more useful stress-disease model, as reactivity to stress is likely to be most deleterious when CV responses are prolonged (Schwartz et al., 2003). Impaired CV recovery is associated with increased CVD risk (e.g. Brosschot & Thayer, 1998; Panaite, Salomon, Jin, & Rottenberg, 2015) as well as longitudinal changes in BP (Stewart & France, 2001). A variety of studies have demonstrated the relationship between discrimination and impaired cardiovascular recovery (El-Hout & Salomon, under review; Hoggard, Hill, Gray, & Sellers, 2015; Richman, Bennett, Pek, Siegler, Willams, 2007). Hoggard et al. (2015) found that Black women exposed to discrimination from a White researcher exhibited lower heart-rate variability both immediately after exposure and the next day. El-Hout and Salomon (under review) found that Black participants instructed to ruminate after an uncivil interaction with a White research accomplice displayed poorer heart rate recovery after the interaction ended, as well as poorer systolic blood pressure recovery among individuals with less experience with past unfair treatment.

Based on the perseverative cognition hypothesis, rumination is one such mechanism by which CV responses to stressors are prolonged (Brosschot, Gerin, & Thayer, 2006). Perseverative cognition is defined as a mechanism shared by both worry and rumination which prolongs CV activation to a stressor by lengthening its cognitive representation. Worry is defined

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as negative-affect laden thoughts regarding the uncontrollability of a stressor (Brosschot et al., 2006), and rumination is generally defined as the tendency to repetitively think about one's negative emotional experience (Nolen-Hoeksema, 1991). By focusing on the uncontrollability of a stressor, an individual delays the CV responses activated by that stressor, thereby solidifying the stressor's perceived uncontrollability in a relentless negative spiral of cognitive and physiological activity (Brosschot et al., 2006). Perseverative cognition is believed to represent a highly vigilant state of chronic CV activation that leads to pathogenic states in which CVD develops, and is associated both with increased sympathetic nervous system activity and decreased parasympathetic nervous system activity. Many studies have shown that rumination delays cardiovascular recovery to stress (e.g. Gerin, Davidson, Christenfeld, Goyal, & Schwartz, 2006), particularly as it relates to heart rate variability (e.g. Key, Campbell, Bacon, & Gerin, 2008). Respiratory sinus arrhythmia (RSA), a commonly used index of heart rate variability, is thought to indicate capacity for emotion regulation (Thayer & Lane, 2000; Porges, 2007) and has been linked to CVD risk in various studies (Gianaros, et al., 2005; Matthews, Salomon & Brady, 2003; Salomon, 2005). Thus, discrimination may impair recovery via perseverative cognition, particularly in such cases of situational ambiguity where the perceiver must decide for themselves the reasons behind their mistreatment. In such cases, one's capacity for emotion regulation may play an important role in attributions made for discrimination experiences.

Meta-analyses have reliably reported significant associations between perceived discrimination and poorer psychological and physical health outcomes (Paradies, 2006; Pascoe & Richman, 2009; Doleszar et al, 2014). Given the similarities in discrimination experiences between immigrants and racial and ethnic minorities in the U.S., as well as the high mortality

rate among immigrants due to CVD, discrimination should be critically examined as a causal factor of poor health outcomes among immigrants.

The Effects of Dehumanization

In addition to experiences of discrimination, immigrants are also subjected to dehumanization in the media and political realm. Dehumanization, or the act of perceiving or treating people as if they are less than fully human, works to exclude the dehumanized from the moral boundaries of humanity and allows for guiltless harm against the dehumanized by their dehumanizers (Haslam, 2016). By excluding an individual or group from their moral rights, they are perceived as expendable and unworthy of protection, making it easier to enact harm against them. These individuals are deemed as threatening and dangerous, and dehumanizing them is simply a consequence of their exclusion from the moral boundaries afforded to ingroup members (Opotow, 1990). Dehumanization can occur in many ways, both subtle and blatant, and the method of dehumanization can have varying consequences for the dehumanized groups. Haslam's (2006) dual model of dehumanization distinguishes between two types of dehumanization involving the denial of human characteristics: animalistic and mechanistic dehumanization. The denying of traits deemed "uniquely human", such as civility, culture, rationality, refinement, and logic, results in animalistic dehumanization which likens an individual to an animal state, while the denial of traits deemed "human nature", such as interpersonal warmth, sociability, agency, depth, and cognitive openness results in mechanistic dehumanization, reducing the target to a robotic state. On the one hand, denying an individual experience and warmth leads to their being perceived as cold, robotic, and unfeeling, which then encourages active harm against them (Waytz, Gray, Epley, & Wegner, 2010). On the other hand, denying someone agency and competence leads to perceptions of submissiveness and animalism,

which licenses perceivers to contain these individuals and strip them of their civil rights (Waytz et al., 2010).

However, these more subtle methods of dehumanization may not capture the full array of consequences against dehumanized targets. Studies of blatant dehumanization, which involves individuals outwardly expressing their views on the evolutionary progress of specific targets-likening them to animals in a literal sense, has been shown to uniquely predict support for aggressive policies in a wide variety of contexts with real-world intergroup conflict, including among Americans and Muslims, Palestinians and Israelis, and Hungarians and Roma (Kteily, Bruneau, Waytz, & Cotterill, 2015). These effects occur independently of prejudice and have been shown to predict support for leaders and politicians known for their inflammatory rhetoric and aggressive policies (Kteily & Bruneau, 2017). The associations between blatant dehumanization and support for aggressive policies and intergroup conflict have been shown to spike after instances of real-world conflict, such as immediately after the Boston Marathon bombing of 2013, while measures of subtle dehumanization remained unaffected (Kteily et al., 2015). It is possible that variations in the results from subtle and blatant measures of dehumanization can be explained by the types of effects captured. Subtle measures of dehumanization focus on the denial of emotional attributions, which is a more abstract consequence than those related to acts of concrete dehumanization such as endorsement of aggressive policies and violence.

Immigrants in the U.S. are currently facing the very real threat of anti-immigration policies and the denigration that accompanies these discussions, and their dehumanization may explain these concrete outcomes. These groups are portrayed as less than human through the proliferation of images depicting immigrants as vermin and the use of negative rhetoric

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regarding the group's ability to bring disease and terror to the countries they enter (Esses et al., 2013). Researchers have shown that immigration news coverage, particularly in regards to Latinx immigration, focuses heavily on criminality and undocumented immigrants, creating an association between Latinx immigrants and national security that most viewers find threatening (Fujioka, 2011). Negative media images of minority groups are associated with negative attitudes and perceptions of the portrayed groups (e.g., Dixon, 2006; Ramasubranian, 2010). For the negatively depicted group, exposure to negative media is associated with negative psychological or physical outcomes, such as lower self-esteem among African American teenagers (Ward, 2004) and trauma and poor health among Iraqi refugees (Kira et al., 2008).

The feeling of being dehumanized, or meta-dehumanization, has also been shown to have profound influences on victims' psychological well-being and their responses to those dehumanizing them. For instance, individuals who were dehumanized via social ostracism view themselves as less human, rate their ostracizers as less human, and believe that they are perceived as less human by those who ostracized them (Bastian & Haslam, 2010). From an affective perspective, studies have also shown that individuals led to believe that others failed to perceive them as equals reported increased feelings of shame and guilt, whereas individuals led to believe that others failed to perceive them as sentient beings with minds reported increased feelings of sadness and anger associated with destructive cognitive states (Bastian & Haslam, 2011). In cases such as these, dehumanized individuals may be ruminating over their negative experiences, particularly when denied uniquely human traits and likened to an animal state (Bastian & Haslam, 2011).

While the studies described examined the psychological and social outcomes of dehumanization, these findings may indicate a possible influence of dehumanization on physical

health outcomes as well. Physical health outcomes of dehumanization have not yet been examined, but given the theoretical similarities between the experiences of dehumanization and discrimination, it may be inferred that dehumanization is, too, related to negative health responses. However, given that dehumanization is often the mechanism underlying severe and harmful consequences against targets, it is possible that the experience of dehumanization may result in even poorer health outcomes than discrimination via more exaggerated stress reactivity. Furthermore, given the research that suggests that animalistic dehumanization leads to ruminative outcomes (Bastian & Haslam, 2011), and the influence of rumination on prolonging stress responses and delaying recovery (Brosschot et al., 2006), it is also possible that the experience of dehumanization could lead to prolonged cardiovascular responses and delayed recovery.

Discrimination vs. Dehumanization

Given the theoretical definitions of the two concepts, it is important to address the similarities between discrimination and dehumanization. One can be discriminated against without being dehumanized, but as the definition of dehumanization involves behaviors invoked by discrimination (i.e. the denial of something desired by the outgroup), dehumanization may be conceptualized as a form of or a pathway to discrimination. The two concepts are therefore highly interrelated and this can be seen through the ways in which certain groups are dehumanized by their respective outgroups. For instance, Black individuals have historically been discriminated against and stereotyped through dehumanizing depictions of Black people as brutal animals, particularly as apes (Goff et al., 2008). In a series of in-lab studies, the Black-ape association was shown to alter visual perception and attention such that participants who were generally faster at ascribing ape-related words to Black faces were more likely to endorse

violence against Black individuals (Goff et al., 2008). These concrete discriminatory outcomes appear to be driven specifically by the dehumanization of Black people.

While these two phenomena can act in tandem, it is also important to distinguish between discrimination and dehumanization. The distinction between the two experiences lies primarily in the path of stigmatization. While discrimination involves the unjust treatment of individuals and groups based on social identities such as race or gender, dehumanization is a very specific mechanism which involves an individual's humanness, rather than a socially constructed identity. The identity of "human" is one shared by all humans, whereas identities such as race, gender, and sexual orientation are specific to certain groups of people. Yet, both experiences involve the denial of something that is reserved for the perpetrator's ingroup, whether it be the morality and empathy associated with being human or a physical resource. The difference between the experiences of discrimination and dehumanization, then, may also be due to the variances in the object being denied to the target: morality (abstract) or a physical resource (concrete).

Viewing others as less-than-human, or animal-like, works to justify discrimination against them (Costello & Hodson, 2010). The specific act of dehumanization may be a worse form of discrimination in that it provides a built-in rationalization for the discrimination enacted against the target. This rationalization can act as a pathway between exposure to dehumanization to the act of discrimination. In this way, dehumanization may be deemed as more psychologically threatening than discrimination, particularly in terms of ability to cope with the demands of such stressors (i.e. coping resources).

The Connection to Appraisals of Challenge and Threat

In addition to the potentially poorer psychological outcomes of dehumanization, there may also be greater negative implications of this increased perception of threat for physical health. Based on the biopsychosocial model of arousal regulation, cognitive appraisals of challenge and threat are the primary process in which goal-relevant situations lead to specific behavioral, affective, and cardiovascular paradigms of reactivity (Blascovich & Tomaka, 1996). The model is said to activate with a goal-relevant situation that is then cognitively appraised by the individual in one of two ways. First, the individual must appraise the situation in terms of its level of demand, danger, and uncertainty. Second, the individual must decide whether they have the resources and ability to cope with the situation at hand. Depending on these two appraisals, two arousal regulation profiles are said to emerge. If an individual perceives a situation as high in demand but views themselves as low in coping ability, then a threat appraisal is activated. If, on the other hand, an individual perceives high demand but also perceive themselves as exceeding the threshold of ability necessary to cope with that demand, then a challenge appraisal is activated.

Given the already threatening nature of experiences of discrimination and the possibly more-threatening nature of dehumanization, the perceptions of these two experiences as threatening may have specific implications for cardiovascular reactivity. Blascovich and his colleagues found specific physiological patterns that emerge as a result of both challenge and threat appraisals with the use of impedance cardiography, a noninvasive method of measuring cardiac activity. These cardiovascular patterns have varying implications for cardiovascular health outcomes. Importantly, both challenge and threat are commonly indexed by increases in heart rate and pre-ejection period (PEP; amount of time, in milliseconds, between the

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depolarization of the heart ventricles and the opening of the aortic valve, providing a measure of heart contractility), indicating that the heart beats faster and harder in both paradigms. These measures are believed to index task engagement, which is necessary for both challenge and threat appraisals to occur. Typically associated with positive outcomes, instances of challenge are indexed by increases in cardiac output (CO; amount of blood ejected by the heart over a minute, in liters) as well as no change or small decreases in total peripheral resistance (TPR; amount of resistance offered by the body's vasculature and organs). Instances of threat are indexed by increases in TPR, as well as no change or small decrease in CO.

These cardiovascular indexes are all primarily controlled by the sympathetic nervous system and have varying implications for health outcomes. Challenge reactivity is seen as more heart-efficient and resilient in the face of stress, whereas threat reactivity is more indicative of psychological vulnerability and reduced cardiac efficiency (Seery, 2011). Elevated levels of TPR have been established as a primary factor in the development of hypertension (Cowley, 1992), which increases risk for various other negative health outcomes such as myocardial infarctions and strokes (Brown & Haydock, 2000). The physiological changes associated with challenge signal an approach orientation in which the body moves blood more quickly to prepare for action, whereas the changes associated with threat indicate the body's orientation to avoidance, which prepares the body for damage (Mendes, Blascovich, Hunter, Lickel, & Jost, 2007). Additionally, threat appraisals have both short-term and long-term consequences. Threat appraisals worsen decision-making in the short-term and its maladaptive cardiovascular response is linked to accelerated cognitive decline and CVD via the increase in allostatic load, or the wear-and-tear on the body produced through the repeated activation of the stress-response system (Jefferson et al., 2010; McEwen, 2003).

Studies have found these challenge and threat patterns in a number of interpersonal and social-evaluative contexts, including interracial interactions (Mendes, Blascovich, Lickel, & Hunter, 2002), stereotype threat among women (Vick, Seery, Blascovich, & Weisbuch, 2008), and upward social comparisons (Mendes, Blascovich, Major, & Seery, 2001). Black participants have been shown to display CV responses consistent with threat patterns of reactivity during intergroup interactions involving both social acceptance and rejection (Mendes, McCoy, Major, & Blascovich, 2008). Women asked to give a speech about prevalent sexism displayed threat-consistent reactivity during the speech, and highly identified women remained in a threat pattern of reactivity after a recovery period (Eliezer, Major, & Mendes, 2010). Utilizing these studies as examples of cardiovascular threat paradigms in the face of racial and gender discrimination, this study will examine possible differences in the magnitude of threat appraisals and stress responses among immigrant participants primed with either discrimination or dehumanization.

THE PRESENT STUDY

Discrimination may be among the most salient of stressors for many races and ethnicities and has been tied to negative health outcomes among both first- and second-generation immigrants. While the literature is much clearer in regards to the effects of discrimination on mental health, studies looking at the effects of discrimination on physical health have been on the rise and suggest the presence of a strong relationship between the two variables (e.g. Dolezsar et al., 2014). Discrimination has been linked to poor health outcomes (e.g. Pascoe & Richman, 2009), stress reactivity (e.g. Salomon & Jagusztyn, 2008), threat response patterns (e.g. Mendes et al., 2002), and impaired recovery (e.g. Hoggard et al., 2015). Dehumanization may be an important pathway to discrimination that could also have negative health implications. However, the effects of dehumanization on the victims has rarely been studied, and to my knowledge, has not been examined as a stressor related to cardiovascular health outcomes.

The purpose of the present study is to examine immigrant cardiovascular responses to dehumanization and discrimination. As the general American opinion regarding immigrants is favorable mostly toward those of European ancestry (Pew Research Center, 2018), it is likely that the experience of discrimination and dehumanization will differ greatly between European immigrants and immigrants of color. Immigrant participants not of European descent were therefore recruited for this study. Given the literature on discrimination and threat responses, as well as the potentially stronger potency of dehumanization compared to discrimination, priming dehumanization should lead to stronger threat responses of cardiovascular reactivity compared to

priming discrimination. These cardiovascular patterns will be tied to similar cognitive appraisals of threat. These differences in reactivity should be moderated by past experiences of unfair treatment, which can influence perceptions of discrimination.

To examine this, speech tasks where first- and second-generation immigrant participants were primed with either dehumanizing stereotypes or discriminatory stereotypes and then asked to argue against anti-immigration policy were utilized. Speech tasks are commonly employed in the literature as a successful means of eliciting CV reactivity, and their social salience has been shown to elicit greater CV changes compared to mental arithmetic tasks (Al'Absi et al., 1997). Additionally, instances of challenge and threat appraisals result from motivated performance situations such as speech delivery (Blascovich & Tomaka, 1997). Speech stressors have also been shown to produce poor recovery, particularly if participants engage in rumination after the task (e.g. Gerin, et al., 2006; Brosschot et al., 2006). To ensure that these effects are not the result of general speech stress reactivity, participants acted as their own controls by first participating in a neutral speech arguing for the reduction of college tuition, a topic that is salient to the general college-student population.

Following the immigration speech task, participants primed with dehumanization should exhibit poorer CV recovery in comparison to those primed with discrimination, controlling for immigration speech reactivity. Based on the perseverative cognition hypothesis (Brosschot et al., 2006), this effect should be mediated by the presence of rumination. Following the potentially moderating effects of past unfair treatment on reactivity, recovery outcomes should also be moderated by past experiences of unfair treatment. This study tested the following hypotheses:

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(1) Participants will exhibit greater task engagement during the primed condition immigration speeches (dehumanization and discrimination) compared to the neutral speech (college tuition), as indexed by HR and PEP. There will be no difference in task engagement between the two primed conditions.

(2) Controlling for neutral speech reactivity, participants primed with dehumanization relative to discrimination will exhibit greater threat responses during the immigration-related, as indexed by little- to no-changes in CO and increased TPR.

   a. This effect will be moderated by past experiences of unfair treatment, such that those reporting greater experiences of past mistreatment will display greater threat responses after a dehumanizing prime than a discriminating prime.

   b. To this effect, participants in the dehumanization condition will also report greater cognitive appraisals of threat compared to the discrimination condition, and both priming conditions will report greater levels of cognitive threat compared to the neutral speech task.

   c. As exaggerated reactivity is most commonly indexed by increases in BP and HR, greater BP and HR reactivity are also expected among the dehumanization condition compared to discrimination.

(3) Participants primed with dehumanization will exhibit impaired CV recovery after the immigration speech compared to participants primed with discrimination. This effect will be mediated by the presence of rumination, such that individuals in the dehumanization condition will ruminate more than participants in the discrimination condition, which in turn will explain their impaired recovery. Effects of immigration

speech on recovery will also be moderated by past experiences of unfair treatment, such that greater reports of past unfair treatment will predict greater rumination and lead to more impaired recovery for those in the primed dehumanization condition compared to those in the primed discrimination condition.

METHODS

Study design

The study was a 2x2 mixed experimental design, with priming condition (dehumanization vs. discrimination) as the between-subjects factor and speech topic (neutral vs. immigration) as the within-subjects factor. Past experiences of unfair treatment were used as a moderator of the relationship between priming condition and cardiovascular reactivity and recovery. Rumination was also included as a potential mediating factor in the relationship between priming condition and cardiovascular recovery.

Participants

A power analysis was conducted for the analyses that would require the most participants, i.e. Hypothesis 3, which involves testing a moderated mediation of a between-subjects effect. A power analysis for an R^2 increase, calculated with an expected small-medium effect size, a numerator df of 1, two predictors, an alpha of .05, and an 80% expected power, suggested a minimum 115 participants. One hundred and fifty-three self-identified first- or second-generation immigrant participants ($M_{age} = 20.11$, $SD_{age} = 2.63$, 69.3% female, 30.7% male) were recruited from the university's undergraduate SONA participant pool. Racial and ethnic demographics revealed that 24.2% of participants were Black/African/Caribbean, 28.1% Hispanic, 9.2% Middle Eastern, 7.2% Southeast Asian, 3.9% East Asian, 19% South Asian, and 7.2% bi/multi-racial. Seventy percent of participants indicated being born in the U.S., 29% were

born outside of the U.S., and 1% did not answer the question. Additional demographics can be found in Table 1. Participant pool subjects were compensated with course credit.

One participant withdrew prior to the end of the study due to time constraints. Of the remaining 152 participants, six were excluded from moderation analyses due to incomplete or missing mass testing data, and three participants were excluded from analyses involving impedance outcomes (HR, PEP, CO, and TPR) due to impedance equipment failure. All participants reported no history of cardiovascular disease, or taking any medication that may interfere with cardiovascular function.

Measures

Cardiovascular. Systolic blood pressure (SBP) and diastolic blood pressure (DBP) were obtained using the an Accutorr Plus non-invasive BP monitor (Datascope Corp., Mahwah, NJ) according to published guidelines (Shapiro et al., 1996). An appropriately sized cuff was placed on participants' non-dominant arm. Pressure readings were taken during the 5th, 7th, and 9h minutes of a 10-minute baseline period, once during speech preparation periods, during the 1st and 3rd minutes of the 3-minute speech tasks, and every 2 minutes for each 10-minute recovery period. Electrocardiogram (ECG) was measured continuously during the last five minutes of baseline, throughout the speech tasks, and during the 10 minutes of recovery, using silver-silver chloride electrodes in a modified lead II configuration to derive values for HR according to published guidelines (Jennings et al., 1981). Impedance cardiography (ICG) was also collected continuously along with ECG using mylar tape electrodes with two bands encircling the neck and two bands encircling the torso in accordance with published measurement guidelines (Sherwood et al., 1990). A Biopac MP150 system with Biopac ECG100 and NICO100C modules

was used to collect data, and Biopac AcqKnowledge 3.9.1 software was used to save that data (Biopac Instruments, Goleta, GA). ECG and ICG signals were digitized at 1000 Hz.

Everyday Discrimination Scale. The Everyday Discrimination Scale (EDS; Williams, Yu, Jackson, & Anderson, 1997) is comprised of 10 items asking participants to rate how often they experience various types of unfair treatment in their day-to-day life. Sample questions included "You are treated with less respect than other people" and "People act as if they think you are not smart", rated on a scale from 1 (Often) to 4 (Never). The measure ends by asking participants to choose (yes, no) if the unfair treatment they have reported can be attributed to any of the following reasons: race, ethnicity, gender, age, income level, language, religion, body weight, and other physical appearance. Approximately 69% of participants indicated either race and/or ethnicity as a possible attribution for their experiences of mistreatment, 14% indicated another reason, and 17% did not respond to the question. Cronbach's alpha for this scale was .85.

Task Challenge and Threat. Two questions were asked of all participants prior to the start of each speech task. The first question concerned participant perceptions of task demand ("This task is very demanding") and the second question concerned participant perceptions of resources to cope with the task ("I have the resources to perform this task successfully"). Both questions were rated on a scale from 1 (not at all) to 7 (very much). Responses to these two questions were divided, and final values equal to or less than 1 will indicate challenge appraisals, while values greater than 1 indicate threat appraisals (Tomaka, Blascovich, Kelsey, & Leitten, 1993).

Priming Articles. Participants were randomly assigned into one of two immigration speech conditions. In the first, participants were asked to read a fabricated article (adapted from Kteily et al., 2016) purportedly written by the Pew Research Center that contained

discriminatory quotes from the American public who were surveyed on immigrants in the U.S. (ex. "They take over our communities and ride on the coattails of hard-working Americans…"). The second article contained dehumanizing quotes of a similar nature, also allegedly from American respondents (ex. "They infest our communities like cockroaches and leech off hard-working Americans…"). Each article contained four quotes containing such language. Both articles displayed three images depicting immigrants in the U.S. in either a discriminatory or dehumanizing light, chosen to match the tone of each respective article. These images were found via Google image search and were collected from sources such as the U.S. Customs and Border Protection.

State Rumination. A thought-report technique was used to assess for state rumination during the recovery period after the speech tasks. Participants were prompted 5 and 10 minutes after the speech tasks to write down one or two words concerning what they were thinking in that moment. Following the recovery periods, participants were asked to elaborate on the words they had written, and anything else they may have thought about over the last 10 minutes. The written reports garnered from the immigration speech recovery period were imported into LIWC, a word-processing software, to examine levels of rumination during the recovery period (Pennebaker, Booth, Boyd, & Francis, 2015). As rumination is generally defined as the tendency to repetitively think about one's negative emotional experience (Nolen-Hoeksema, 1991), these reports were analyzed with the provided affect dictionary that includes terms of anxiety, anger, and sadness (Pennebaker et al., 2015). The percent of negative emotion terms used by each participant in their open-ended response was then used as a continuous measure of rumination.

Manipulation Check. To ensure that participants were accurately primed with neutral, dehumanizing, or discriminating content, participants were asked to indicate their agreement

with nine statements regarding American opinion of immigrants and college tuition rates. These items were measured on a sliding scale from 0 (strongly agree) to 100 (strongly disagree) and included items such as "Americans think that the average college tuition rate is too high" (neutral), "Americans think of immigrants as animal-like" (dehumanization), and "Americans think of immigrants as criminals" (discrimination). Cronbach's alphas for the neutral, dehumanization, and discrimination items were .74, .97, and .96, respectively.

Demographics. Participant gender, age, race/ethnicity, and religious affiliation were collected. Participants were also asked if English is their first language, and whether or not they were born in the U.S.

Prescreening. Prior to participating in the study, participants were asked a variety of health questions to ensure their eligibility. Participants were excluded from the study if they reported having any cardiovascular disease, diabetes, were pregnant or breastfeeding, or if they were taking any medications that could affect their cardiovascular functioning.

Procedure

Prior to participating in the laboratory portion of the study, participants completed the Everyday Discrimination Scale (EDS; Williams et al., 1997) as a part of the subject pool mass testing. After informed consent was granted in the laboratory, participants were given a health intake survey to ensure their eligibility in the study. To calculate body mass index (BMI) as a potential covariate in analyses with CV measures, participant weight and height were measured and recorded by a research assistant. Electrodes were then attached to the participant by the same research assistant. Participants were seated in a comfortable chair in front of a computer, and a

blood pressure cuff was placed on their non-dominant arm. Next, participants engaged in a rest period for 10 minutes during which they watched an emotionally-neutral Alaska travel video.

After baseline, participants were told that they will be preparing and giving two speeches on "hot topics" in America and that the speeches would be randomly assigned by the computer. All participants were first assigned to give a speech arguing for the reduction of college tuition prices. Participants spent three minutes reading an article purportedly by the Pew Research Center (created for the purposes of this study) to prepare their speech response. Prior to giving their speech, participants were asked to complete the two-item measure of task appraisals of challenge and threat. They then spent three minutes delivering the speech to a research assistant who was pretending to evaluate their speech for effort and quality. Immediately afterward, participants were asked to sit quietly for a 10-minute recovery period, during which they were prompted twice by the computer to jot down a few words regarding what they are thinking in that exact moment to help them recall their thoughts later, once after 5 minutes and again after 10 minutes. After recovery, participants were told to elaborate on the words they wrote down during the last ten minutes, along with any other thoughts they may have had during the rest period as a measure of rumination.

Next, participants were asked to give a second speech arguing against anti-immigration policy (i.e. pro-immigration). For this task, participants were randomly assigned to one of two priming conditions: an article that contained discriminatory quotes from the American public or one that contained dehumanizing quotes. They spent three minutes reading the fabricated article and preparing their speeches. Prior to giving their speech, participants were again asked to complete the two-item measure of perceived task challenge and threat. They then spent three minutes giving the speech to the same research assistant pretending to evaluate them. After the

second speech task, participants were asked to sit quietly for a 10-minute recovery period during

which the equipment continued to collect physiological data. During this time, participants were

again prompted twice to write down a few words regarding what they are thinking in that exact

moment, to be elaborated on after recovery as a measure of rumination, once after 5 minutes and

again after 10 minutes. Following recovery, participants were asked to elaborate on the words

they provided during the recovery prompts. They then completed the manipulation check items,

a brief demographics questionnaire, and were debriefed by the researcher at the end of the study.

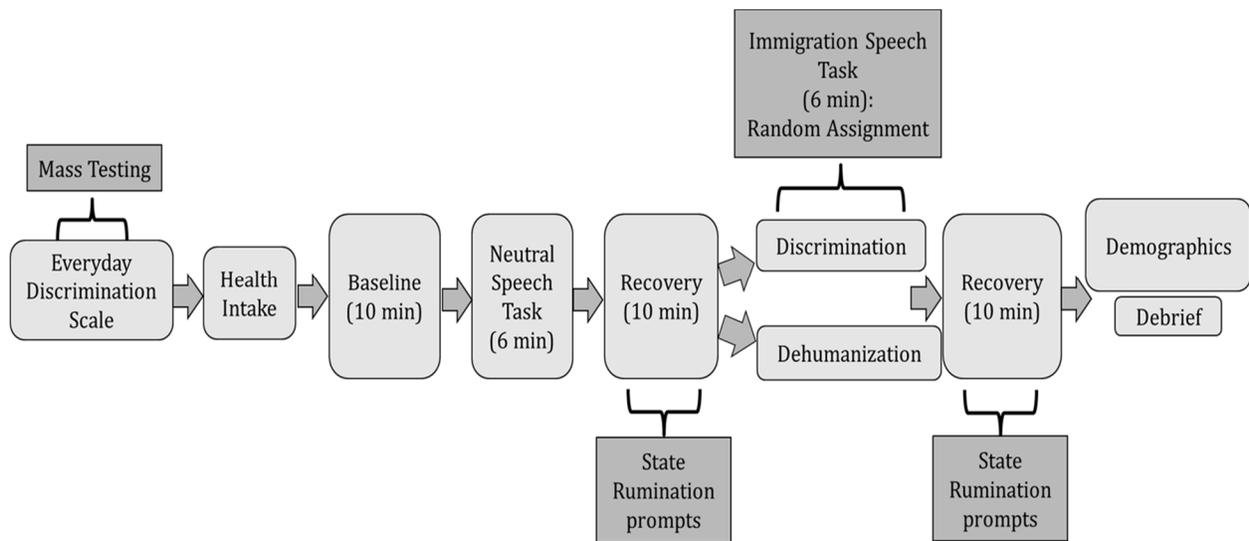The full procedure can be viewed in Figure 1.

Figure 1. Study Procedure.

Data Reduction

Measures of HR, CO, PEP, and RSA derived from ECG and ICG recordings were scored

using Mindware IMP 2.51 and Mindware HRV (MindWare Technologies LTD, Gahanna, OH).

Blood pressure readings were averaged across the first and last minute of each speech task to

analyze speech reactivity, and across the six recovery readings to analyze impairments in recovery. To create reactivity and recovery change scores, baseline averages were subtracted from speech and recovery averages, respectively. Measures of ECG and ICG were collected continuously throughout the study, and these outcomes were obtained from ensemble averages of one-minute segments per task period. Mean arterial pressure (average BP in an individual across the span of a heart beat) was calculated as the weighted average of SBP and DBP using the formula MAP = (SBP + (2 * DBP))/3. TPR values were calculated using MAP with the formula TPR = (MAP/CO) * 80 for each segment of baseline, speech tasks, and recovery periods. Reactivity scores were examined by averaging across the three minutes of each speech. Recovery change scores were calculated by subtracting average baseline values from average recovery values for each respective outcome measure. Body mass index (BMI) was calculated using the following formula: weight (lb) / height (inches)^2 x 703.

RESULTS

One-way ANOVAs examining baseline CV differences associated with sex and race, and linear regressions examining baseline CV differences associated with BMI, were conducted for each CV outcome. Repeated measures ANOVAs were conducted for HR and PEP to assess for reactivity differences in task engagement between the primed conditions as well as differences between the two speech topics (neutral vs. immigration). Moderation analyses were conducted using the SPSS PROCESS package (Hayes, 2018) to test for the moderating effects of past experiences of mistreatment on CV reactivity. Finally, moderated mediation analyses using the SPSS PROCESS package were conducted to test the moderating influence of prior experiences with unfair treatment and the mediating effects of rumination on recovery. To ensure that strength of recovery is not driven by level of reactivity to the speech tasks, reactivity was included as a covariate in all recovery analyses. Data inspection indicated the presence of outliers for TPR reactivity and recovery, SBP recovery, and CO reactivity and recovery. These outliers were winsorized to the 95th percentile in order to retain these participants in our sample.

Baseline Differences

There were no baseline difference in cardiovascular outcomes between the two priming conditions. Baseline sex differences appeared for SBP, $F(1,143) = 20.87$, $p < .001$, $\eta_p^2 = .128$, such that males ($M = 111.02$, $SD = 9.64$) had a higher resting SBP than females ($M = 103.70$, $SD = 8.34$). Resting differences in BMI also emerged for SBP, $F(1,142) = 13.29$, $p < .001$, $R^2 = .086$, and for DBP, $F(1,142) = 4.43$, $p = .04$, $R^2 = .030$. Higher BMIs were associated with greater

resting SBP and DBP. A baseline difference in CO was found for race/ethnicity, $F(7,144) = 2.27$, $p = .03$, $\eta_p^2 = .104$. No other baseline differences were found. There were also no differences in EDS scores found between the priming conditions, $F(1,148) = .45$, *ns*, or in participants' attributions of past unfair treatment to their race/ethnicity, $F(1,126) = .04$, *ns*. Nonparametric tests found no differences between priming conditions in distributions of religious affiliation, English as a first language, and whether participants were born in the U.S, *Us* > 2726, *ns*. Sex, BMI, and race/ethnicity were entered as covariates for SBP, DBP, and CO, as needed, in all further analyses.

Manipulation Check

One-way ANOVAs revealed a significant difference in the discrimination manipulation check between the two priming conditions, $F(1,150) = 6.96$, $p = .009$, $\eta_p^2 = .045$, such that those primed with discrimination ($M = 72.90$, $SD = 25.72$) were more likely to perceive that the general American public believes discriminatory stereotypes about immigrants compared to those primed with dehumanization ($M = 61.72$, $SD = 26.35$). There was no significant difference in perceptions of American beliefs in dehumanizing stereotypes about immigrants between the two priming conditions, $F(1,150) = .24$, *ns*. Of note, participants were significantly more likely to perceive discrimination attitudes ($M = 67.20$, $SD = 26.55$) compared to dehumanizing attitudes ($M = 54.37$, $SD = 30.05$), regardless of priming condition, $t(150) = -8.17$, $p < .001$, *95% CI* [-15.96, -9.71].

Task Engagement Reactivity Analyses

To assess for differences in task engagement, repeated measures ANOVAs were conducted for HR and PEP with speech topic (neutral or immigration) as the within-subjects

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factor and priming condition (dehumanization or discrimination) as the between-subjects factor, per Hypothesis 1. Results showed a significant main effect of speech type for HR reactivity, $F(1,147) = 25.92$, $p < .001$, $\eta_p^2 = .150$, plotted in Figure 2. Contrary to the predictions of Hypothesis 1, HR reactivity was significantly lower for participants when they participated in the immigration speech ($M = 13.74$, $SD = 8.86$) compared to when they participated in the neutral speech ($M = 16.02$, $SD = 9.60$). There were no differences between speech types in PEP reactivity, $ps > .05$. T-tests assessing for differences between average baseline values and average speech values for both neutral and immigration speeches were also conducted. Results indicated significant increases in immigration speech reactivity for both HR, $t(148) = -18.92$, $p < .001$, and PEP, $t(143) = 12.59$, $p < .001$, compared to resting levels. Similar results were found for neutral speech reactivity compared to resting levels for both HR, $t(148) = -20.38$, $p < .001$, and PEP, $t(143) = 13.68$, $p < .001$. These increases from baseline indicate the presence of task engagement for both speech tasks, despite any possible habituation.
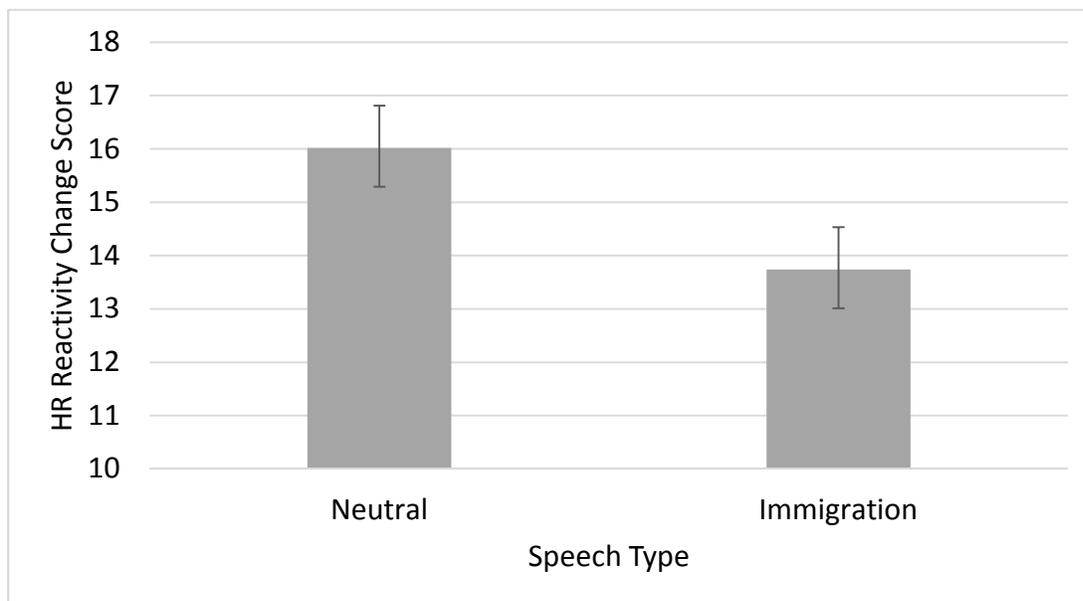

Figure 2. Heart Rate (HR) Reactivity Main Effect of Speech Type.

Challenge and Threat Appraisals

To examine whether dehumanization prompted greater cognitive appraisals of threat compared to discrimination (Hypothesis 2b), a paired samples t-test was conducted. Results indicated a significant difference between the neutral and immigration speech tasks in the demand/resources ratio indicating appraisals of challenge and threat, such that prior to giving the immigration speech, participants reported greater levels of threat ($M = 1.43$, $SD = 1.47$) compared to their appraisals prior to giving their college tuition speech ($M = 1.12$, $SD = 1.05$), $t(152) = -3.00$, $p = .003$, *95% CI -.51, -.10*]. No significant differences in perceived challenge and threat were found between the primed dehumanization and discrimination conditions, but both conditions, on average, reported levels greater than 1, indicating appraisals of threat prior to the immigration speech.

EDS Moderation Reactivity Analyses

Moderation analyses were conducted with PROCESS (Hayes, 2018) and included EDS scores as the moderator to examine the relationship between priming condition and cardiovascular reactivity, as moderated by past experiences of unfair treatment, to test Hypothesis 2. Neutral speech reactivity was included as a covariate for all analyses to control for general speech reactivity. A significant main effect of EDS scores emerged for HR reactivity, $t(136) = 2.12$, $p = .04$, $R^2 = .677$, such that as EDS scores increased, HR reactivity increased as well. This effect is shown in Figure 3. A significant main effect of immigration speech was also found for TPR reactivity, $t(128) = -2.26$, $p = .03$, $R^2 = .464$, as shown in Figure 4. Participants primed with dehumanization ($M = 174.13$, $SD = 290.99$) exhibited significantly greater TPR reactivity during their immigration speech compared to those primed with discrimination ($M =$

100.99, *SD* = 255.07). A significant DBP reactivity interaction also emerged, $t(138) = 2.03$, $p = .04$, R^2-*change* = .025, such that as past unfair treatment increases, DBP reactivity decreases, but only for those in the dehumanization condition. This interaction is plotted in Figure 5. A marginally significant interaction in the same direction was also found for SBP, $t(137) = 1.94$, $p = .05$, R^2-*change* = .017. No significant effects of priming condition or EDS appeared for PEP, CO, or RSA, ts < .87, ps > .05.
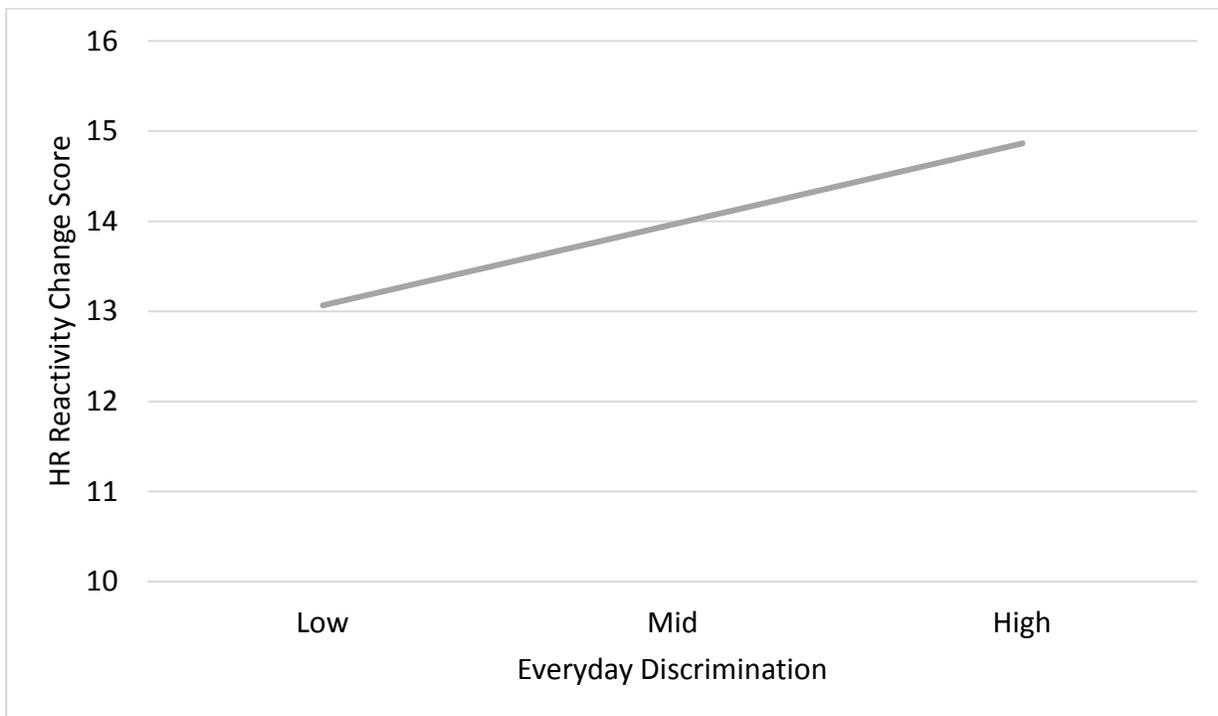

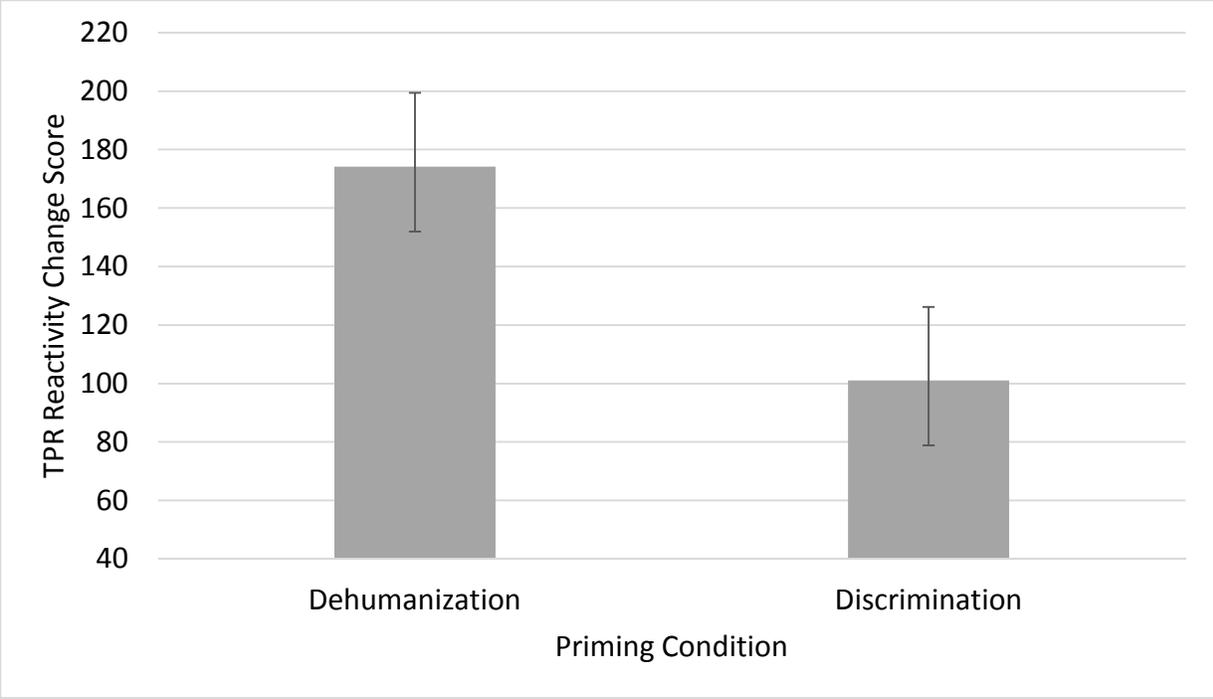*Figure 3.* Heart Rate (HR) Reactivity Main Effect of Everyday Discrimination Scores.

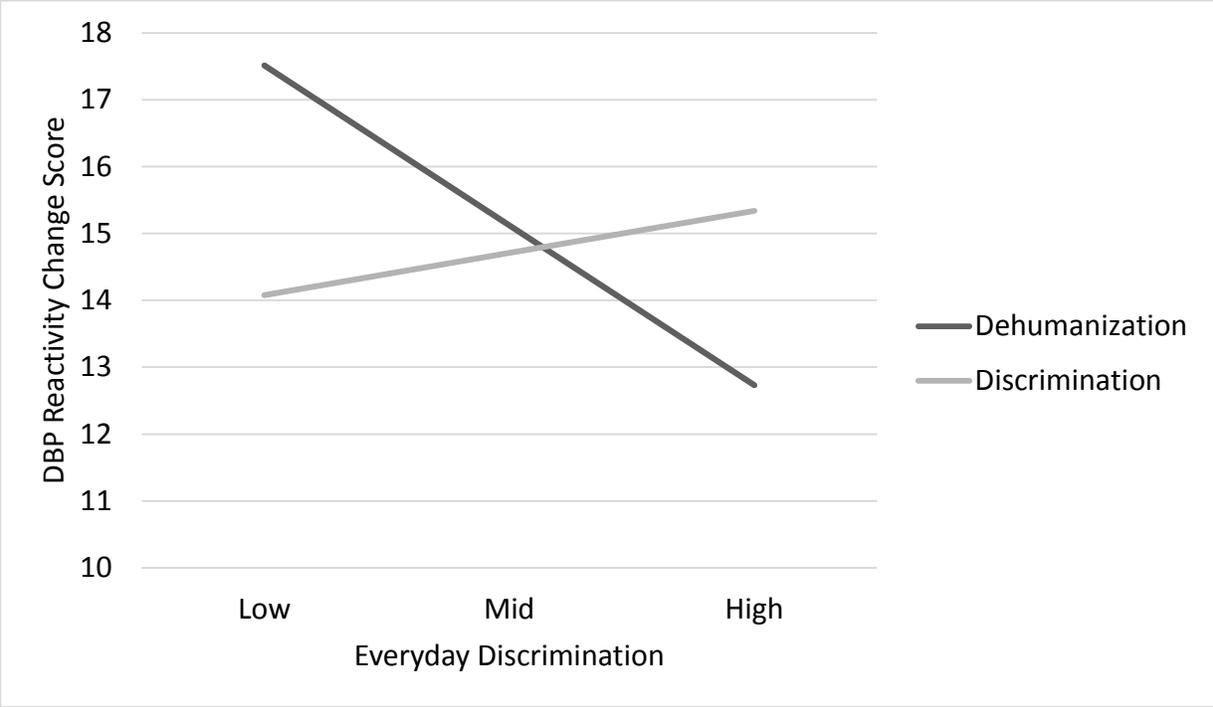*Figure 4.* Total Peripheral Resistance (TPR) Reactivity Main Effect of Priming Condition.

Figure 5. Priming Condition by EDS Scores Interaction for Diastolic Blood Pressure (DBP) Reactivity.

Recovery Analyses

Moderated mediation analyses using PROCESS were conducted for each CV outcome to test the predictions of Hypotheses 3, examining the moderating effects of past unfair treatment (EDS) and the mediating effects of rumination on the relationship between priming condition and cardiovascular recovery. While the full moderated mediation models were not significant for any of the CV outcomes, results from these analyses demonstrated a significant effect of priming condition on RSA $t(138) = 2.10$, $p = .04$, $R^2 = .385$, and SBP recovery, $t(134) = -2.07$, $p = .04$, $R^2 = .341$. Participants in the dehumanization condition displayed poorer RSA and SBP recovery compared to the discrimination condition. These effects are plotted in Figures 6 and 7, respectively. Additionally, an effect of rumination also emerged for RSA recovery, $t(138) = 2.78$, $p = .006$, $R^2 = .385$, such that greater levels of rumination led to worse recovery. The complete model with significant pathways for RSA recovery can be found in Figure 8. No significant main effects or pathways emerged for the remaining CV measures, ts < .06, ps > .05.
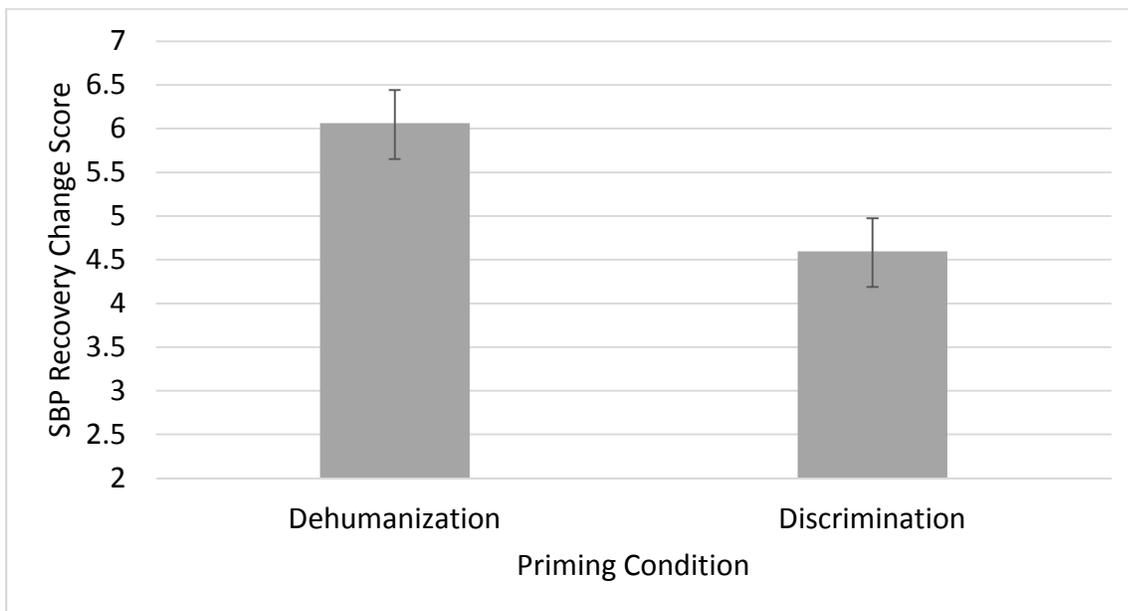

Figure 6. Systolic Blood Pressure (SBP) Recovery Main Effect of Priming Condition.
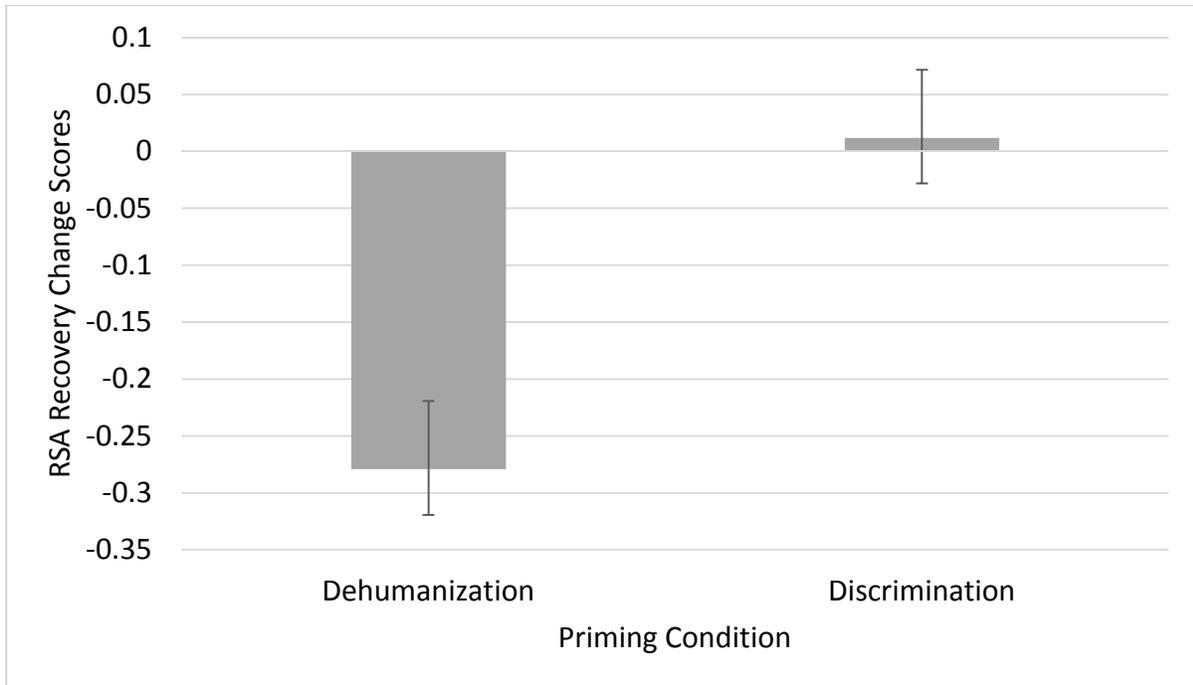
Figure 7. Respiratory Sinus Arrhythmia (RSA) Recovery Main Effect of Priming Condition.
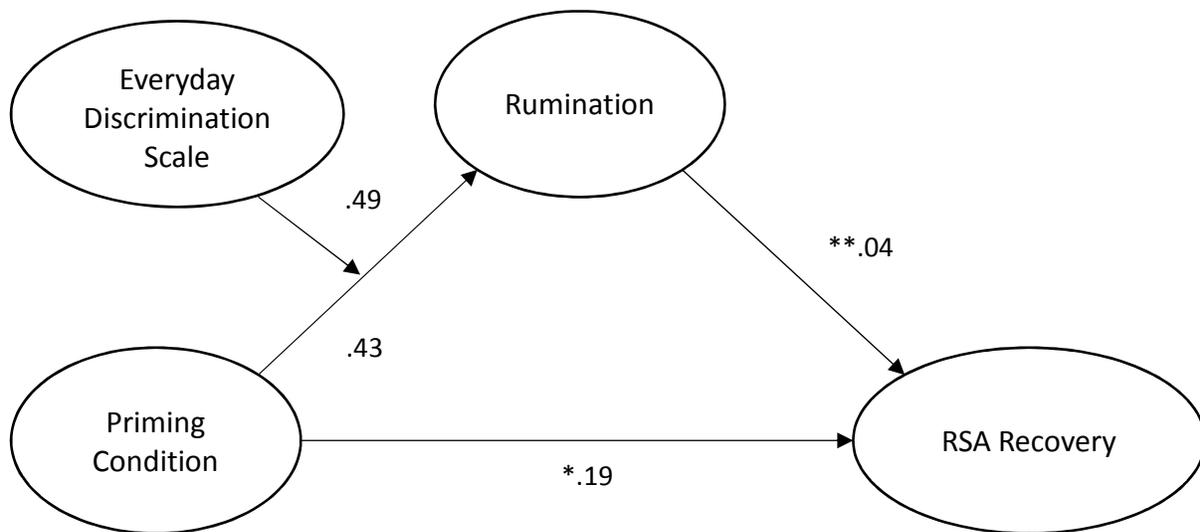

Figure 8. Moderated Mediation Model of Respiratory Sinus Arrhythmia (RSA) Recovery. PROCESS coefficients for moderated mediation model; * = significant at .05; ** significant at .01.

DISCUSSION

This study provides a novel contribution to the study of the immigrant health paradox as well as the discrimination and dehumanization literature by showcasing the differences in physiological stress responses between the two experiences. Discrimination and dehumanization are often experienced by immigrants in the U.S., and it is important to understand how these experiences are influencing immigrant health outcomes. By asking participants to argue against anti-immigration policies in the second speech task, they were essentially arguing for their own presence in the U.S. To ensure that speech reactivity during the immigration speech task was not driven by general speech anxiety, neutral speech reactivity was included as a covariate in all reactivity analyses. The topic of college tuition reduction was chosen to be a self-relevant topic to all of the college-aged student participants in the study, but one that is unrelated to immigration.

The findings of this study showcase the more insidious nature of dehumanization compared to discrimination, highlighting the harmful effects of dehumanizing speech utilized against immigrants by the media. The literature has focused on dehumanization as a mediating pathway to discrimination, but these results indicate the subtle and seemingly ambiguous differences between the two experiences. While there were no differences in rumination between the two condition primes, recovery was impaired for those primed with dehumanization compared to discrimination. So, while participants in the dehumanization condition may not have ruminated to a greater degree compared to the discrimination condition, they were still affected

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in some way by the dehumanizing stereotypes that they consumed which led to poorer recovery compared to the discriminatory stereotypes. Future research on dehumanization should assess perceptions of dehumanization as well as awareness of dehumanization against the targeted groups, particularly in comparison to perceptions of discrimination against those groups.

Contrary to Hypothesis 1, which tested for task engagement differences between the neutral and immigration speeches as well as between the two primed immigration conditions, task engagement appeared to decrease overall during the immigration speech compared to the neutral speech, but only for HR reactivity. As predicted, there were no differences in task engagement between the two priming conditions. As all participants were assigned to give the immigration speech after the neutral speech topic, this result may be indicative of habituation to the speech tasks and not to the topic itself. However, a significant difference in challenge and threat appraisals emerged between the neutral and immigration speeches, such that participants perceived greater levels of cognitive threat prior to the immigration speeches than prior to the neutral speeches. The BPS model conceptualizes challenge and threat as motivational states that occur only when task engagement is present, because task engagement indicates that a situation has been evaluated as self-relevant (Blascovich and Tomaka, 1996). Given the discrepancy between the cardiovascular indexes of task engagement and participants' cognitive appraisals of threat, it is likely that habituation to the speech task had occurred, but this did not affect participants' task engagement levels. Heart rate and PEP reactivity were significantly different from baseline for both the neutral and immigration speeches, indicating that there was still task engagement during the immigration speech regardless of any habituation that occurred. The speech tasks were not counterbalanced in this study under the idea that each participant would act as their own control and that the neutral speech tasks would be covaried in all immigration

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speech analyses. Additionally, counterbalancing may have led to unwanted effects of the primed articles on neutral speech performance, which may have led to order effects. However, counterbalancing the two speech tasks would have allowed for the controlling of speech order in the analyses looking at Hypothesis 1.

Reactivity results partially supported Hypothesis 2, which tested the moderating effects of past experiences of mistreatment on the relationship between priming condition and CO and TPR reactivity to test for cardiovascular patters of threat. A main effect of TPR reactivity showed that priming participants with dehumanization produced a cardiovascular response in line with greater threat reactivity compared to participants primed with discrimination. Additionally, no differences in reactivity appeared for CO, further indicating the presence of threat reactivity. An interesting finding appeared for blood pressure reactivity that bears noting. People who reported lower frequencies of past unfair treatment appeared to be more reactive to dehumanization priming compared to individuals with more experience with mistreatment. It may be the case that individuals with less experience of mistreatment lack the resources or capacity to regulate their emotions as effectively as those with more experience with these negative instances. Additionally, there was no effect of the discrimination prime in these moderation reactivity analyses, so the experience of discrimination may be easier to cope with regardless of past experiences of mistreatment. On the other hand, this may be evidence of a blunted effect in blood pressure reactivity that may reflect a desensitized response pattern to mistreatment. Blunted reactivity to stress has more recently been emphasized in the literature as just as harmful as exaggerated reactivity, as both imply a loss of homeostatic regulation within the body (Lovallo, 2011), and has been considered a result of prior adverse life events (e.g. Phillips, Ginty, & Hughes, 2013). Past research has shown these blunted reactivity effects among

Latinx samples reporting greater levels of ethnic discrimination (Salomon & Jagusztyn, 2008). As 28% of this study's sample is comprised of Hispanic/Latinx individuals, there may be similar trends in discrimination reactivity between the two studies.

These exaggerated effects of dehumanization also seem to extend into the stress recovery period, such that dehumanization prolonged cardiovascular recovery more so than discrimination. This prolonged cardiovascular response lends further support to the more insidious nature of dehumanization, but contrary to Hypothesis 3 and the perseverative cognition hypothesis (Brosschot et al., 2006), these effects were not mediated by the presence of rumination. While there were no ruminative differences between priming conditions, RSA recovery was impaired for participants engaging in ruminative thought during the recovery period regardless of priming condition, as indicated by the percentage of negative-affect terms utilized during the thought prompt activity. RSA has long been thought to index capacity for emotion regulation (Thayer & Lane, 2000), and this result provides further support for that literature. As EDS did not moderate any of these effects, these results only partially support Hypothesis 3.

It is possible that there was no difference in rumination between the two priming conditions because of a lack of awareness of dehumanization, or the inability to perceive dehumanization for what it is. Dehumanization is also conceptualized as a form or pathway to discrimination, and may therefore not have been perceived as different by participants. Results showed that regardless of their priming condition, participants reported similar perceptions of Americans' dehumanizing beliefs toward immigrants, which may indicate a failure of the dehumanization manipulation to enhance participants' beliefs that Americans generally perceive them as "animals". However, results also showed that regardless of priming condition,

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participants tended to perceive greater belief in Americans' discriminatory attitudes towards

immigrants compared to dehumanizing attitudes. Despite this possible lack of awareness or

unwillingness to label dehumanization as such, the lasting effects of the dehumanization

condition are evident in the participants' prolonged stress responses. Research in other areas of

stress have found similar patterns. For example, a study on hostile (angry, condescending,

negative attitudes and behaviors toward women) and benevolent (patronizing yet seemingly

well-intentioned attitudes and behaviors toward women) sexism has found impaired recovery

among women exposed to benevolent sexism compared to women exposed to hostile sexism, but

no difference between conditions in terms of the mediating effect of ruminative thought

(Salomon, Burgess. & Bosson, 2015). Women exposed to benevolent sexism may have been

unwilling or unable to recognize benevolently sexist statements as sexism. In a similar vein, it is

possible that immigrants are either less willing to believe dehumanizing attitudes about

themselves, less willing to discuss or report those dehumanizing attitudes, or that they are less

aware of these types of attitudes compared to discriminatory attitudes, which may be more

pervasive in immigrants' daily lives.

Limitations

While the present study has taken novel steps to better understand the immigrant health

paradox and the influence of discrimination and dehumanization on immigrant health outcomes,

a number of limitations should be addressed. One possible limitation of this study comes from

the strength of immigrant identification among the sample. The majority (70%) of participants

were second-generation immigrants, suggesting that the strength of identification as an

immigrant may be less than their first-generation counterparts. This may then influence the

strength of reactivity and task engagement to the immigration speech. No direct measure of

immigrant identity was collected in this study. However, doing so may have primed participants to the study hypotheses and changed their responses to the tasks. Participants were unaware until the debriefing that this study was interested in the cardiovascular responses of first- and second-generation immigrants, and asking about immigrant identity may have given away the study purpose and effected the results. Additionally, as the literature has shown evidence of negative health implications for children of immigrants, this difference in immigrant identification may not be as relevant in terms of health outcomes.

Another limitation of this study involves the LIWC text analysis software. Like most text analysis tools, LIWC searches for key words based on a pre-determined internal dictionary and is therefore blind to context surrounding participants' words and meaning. Therefore, certain words such as "sad" may be used by a participant to refer to their own emotional state, or to refer to a general thought about a certain topic (i.e. "I think it's sad that someone may feel this way about immigrants"). Nevertheless, whether or not these words were accompanied by a negative emotion or connotation, the simple act of mentioning the word should indicate that you have that concept in mind, signifying the presence of rumination. However, future replications of this study could utilize independent coders to analyze open-ended rumination prompts for ruminative thoughts, taking into account context to more accurately code for emotional cues.

A third limitation stems from the sample utilized in this study. Recruiting from a student subject pool, while convenient, limits the generalizability and external validity of these results to non-college aged populations. Future research should recruit community samples of immigrants to get a wider range of ethnicities, ages, and experiences to further our understanding of immigrant populations.

Future Directions

Future studies should consider how the experiences of dehumanization and discrimination may differ among varying immigrant populations. For instance, Asian Americans are often considered a "Model Minority" and may therefore have different experiences with discrimination and stereotypes compared to other immigrant groups. The discriminatory stereotypes employed in the discrimination prime may have been more effective for groups that are commonly portrayed as criminals in the media, such as Black and Hispanic groups, in comparison to "Model Minority" groups (i.e. East Asians, South Asians). Dehumanization may also be experienced in very different ways among different ethnic groups. Depending on the traits being denied to the dehumanized individuals, certain groups may be likened to an animal state via animalistic dehumanization, while others may be likened to a robotic state via mechanistic dehumanization (Haslam, 2006). These two routes to dehumanization may have differing consequences for the dehumanized. Denying an individual warmth and experience leads to mechanistic dehumanization which has been found to encourage active harm against them, while denying someone competency and agency leads to animalistic dehumanization and encourages that individual's containment and the stripping of their civil rights (Waytz et al., 2010). The ways in which groups are perceived has implications on the emotional and behavioral responses of the targeted groups.

The stereotype content model (SCM; Fiske, Cuddy, Glick, & Xu, 2002) posits that groups perceived as low in warmth and high in competence elicit envious prejudice and feelings of jealousy due to perceptions of high status competition. Groups that fall into this category include Asian Americans, and these perceptions of status and competition, as defined by stereotypes of warmth and competence, work together to rationalize mistreatment of those

outgroups. It may therefore be the case that utilizing more robotic and mechanistically dehumanizing statements in the dehumanizing prime would have elicited different reactions from participants who fall into the mechanistic dehumanization group. The SCM places Black, Hispanic, and Muslim groups into a middle cluster that is not believed to elicit emotions such as envy, pity, or contempt, which does not necessarily rationalize the mistreatment of individuals belonging to that middle cluster. However, existing dehumanization literature would argue that Black and Brown individuals are most commonly subjected to animalistic dehumanization (e.g. Goff et al., 2008), despite falling into the middle cluster of the SCM. While there were no differences in reactivity between the racial categories in this study, the sample sizes of each racial group may lack sufficient power to detect such effects. Future studies should take care to collect data from each racial category to assess for differences in CV responses between various immigrant groups.

Conclusions

Dehumanization has long been utilized in the media as propaganda against outgroups, but little research has been done to examine the effects of dehumanizing experiences on the victims. The results of this study shed some light on the negative consequences of dehumanizing experiences and how they may differ from the effects of discrimination. This contribution to the literature, which has focused on the effects of dehumanization as a mediating factor in discrimination behaviors and attitudes, highlights the importance of studying dehumanization as a unique and separate construct with its own distinct impact on health outcomes. Immigrants in the U.S. are an understudied population, but they are also perhaps at greatest risk in our current tumultuous political atmosphere. Faced with the daily stress of their unstable and inflammatory status, the tangible threat of anti-immigration policy, denigration by the media, politicians, and

fellow Americans, personal issues of acculturation, and poor access to proper health care, immigrants provide a unique but increasingly important challenge to the study of inequality, discrimination, and health. Future studies should focus on this increasingly important population and work to better understand the immigrant health paradox and its implications for cardiovascular disease risk.

REFERENCES

Abrams, D. E., & Hogg, M. A. (1990). *Social identity theory: Constructive and critical advances*. Springer-Verlag Publishing.

Al'Absi, M., Bongard, S., Buchanan, T., Pincomb, G. A., Licinio, J., & Lovallo, W. R. (1997). Cardiovascular and neuroendocrine adjustment to public speaking and mental arithmetic stressors. *Psychophysiology*, *34*(3), 266-275. https://doi.org/10.1111/j.1469-8986.1997.tb02397.x

Andrighetto, L., Riva, P., Gabbiadini, A., & Volpato, C. (2016). Excluded from all humanity: Animal metaphors exacerbate the consequences of social exclusion. *Journal of Language and Social Psychology*, *35*(6), 628-644. https://doi.org/10.1177/0261927X16632267

Antecol, H. & Bedard, K. (2006). Unhealthy assimilation: Why do immigrants converge to American health status levels? *Demography, 43*(2), 337-360. https://doi.org/10.1353/dem.2006.0011

Auerhahn, K. (1999). The split labor market and the origins of antidrug legislation in the United States. *Law & Social Inquiry*, *24*(2), 411-440. https://doi.org/10.1111/j.1747-4469.1999.tb00135.x

Baker, E. H., Rendall, M. S., & Weden, M. M. (2015). Epidemiological paradox or immigrant vulnerability? Obesity among young children of immigrants. *Demography, 52*(4), 1295-1320. https://doi.org/10.1007/s13524-015-0404-3.

Bandura, A. (1999). Moral disengagement in the perpetration of inhumanities. *Personality and Social Psychology Review, 3*(3), 193-209. https://doi.org/10.1207/s15327957pspr0303_3

Bandura, A., Underwood, B., & Fromson, M. E. (1975). Disinhibition of aggression through diffusion of responsibility and dehumanization of victims. *Journal of Research in Personality*, *9*(4), 253-269. https://doi.org/10.1016/0092-6566(75)90001-X

Bastian, B., & Haslam, N. (2010). Excluded from humanity: The dehumanizing effects of social ostracism. *Journal of Experimental Social Psychology, 46*(1), 107–113. https://doi.org/10.1016/j.jesp.2009.06.022

Bastian, B., & Haslam, N. (2011). Experiencing Dehumanization: Cognitive and emotional effects of everyday dehumanization. *Basic and Applied Social Psychology, 33*(4), 295–303. https://doi.org/10.1080/01973533.2011.614132

Benjamin, E. J., Virani, S. S., Callaway, C. W., Chamberlain, A. M., Chang, A. R., Cheng, S., ... & de Ferranti, S. D. (2018). Heart disease and stroke statistics—2018 update: a report from the American Heart Association. *Circulation, 137*(12), e67-e492.

Bennet, G. G., Merrit, M. M., Edwards, C. L., & Sollers III, J. J. (2004). Perceived Racism and Affective Resonses to Ambiguous Interpersonal Interactions among African American Men. *American Behavioral Scientist, 47*(7), 963-976. https://doi.org/10.1177/0002764203261070

Bishop, G. D., & Quah, S. H. (1998). Reliability and validity of measures of anger/hostility in singapore: Cook & Medley Ho Scale, STAXI and Buss-Durkee hostility inventory. *Personality and Individual Differences*, *24*(6), 867-878. https://doi.org/10.1016/S0191-8869(98)00024-5

Blascovich, J., Seery, M. D., Mugridge, C. A., Norris, R. K., & Weisbuch, M. (2004). Predicting athletic performance from cardiovascular indexes of challenge and threat. *Journal of Experimental Social Psychology*, *40*(5), 683-688. https://doi.org/10.1016/j.jesp.2003.10.007

Blascovich, J., & Tomaka, J. (1996). A Biopsychosocial Model of Arousal Regulation. *Advances in Experimental Social Psychology, 28*, 1–51.

Bostean, G. (2013). Does selective migration explain the Hispanic paradox? A comparative analysis of Mexicans in the US and Mexico. *Journal of Immigrant and Minority Health, 15*(3), 624-635. https://doi.org/10.1007/s10903-012-9646-y

Brietzke, M. & Perreira, K. (2017). Stress and coping: Latino youth coming of age in a new Latino destination. *Journal of Adolescent Research, 32*(4), 407-432. https://doi.org/10.1177/0743558416637915

Brondolo, E., Libby, D. J., Denton, E. G., Thompson, S., Beatty, D. L., Schwartz, J., ... & Gerin, W. (2008). Racism and ambulatory blood pressure in a community sample. *Psychosomatic Medicine, 70*(1), 49-56. https://doi.org/10.1097/PSY.0b013e31815ff3bd

Brosschot, J. F., Gerin, W., Thayer, J. F. (2006). The preservative cognition hypothesis: a review of worry, prolong stress-related physiological activation, and health. *Journal of Psychosomatic Research, 60*(2), 113-24. https://doi.org/10.1016/j.jpsychores.2005.06.074

Brosschot, J. F., & Thayer, J. F. (1998). Anger inhibition, cardiovascular recovery, and vagal function: A model of the link between hostility and cardiovascular disease. *Annals of Behavioral Medicine*, *20*(4), 326-332. https://doi.org/10.1007/BF02886382

Brown, M. J., & Haydock, S. (2000). Pathoaetiology, epidemiology and diagnosis of hypertension. *Drugs*, *59*(2), 1-12. https://doi.org/10.2165/00003495-200059002-00001

Chida, Y., & Steptoe, A. (2010). Greater cardiovascular responses to laboratory mental stress are associated with poor subsequent cardiovascular risk status: A meta-analysis of prospective evidence. *Hypertension*, *55*(4), 1026-1032. https://doi.org/10.1161/HYPERTENSIONAHA.109.146621

Cole, H. V. (2018). Awareness of High Blood Pressure by Nativity Among Black Men: Implications for Interpreting the Immigrant Health Paradox. *Preventing Chronic Disease, 15*. http://dx.doi.org/10.5888/pcd15.170570

Cowley Jr, A. W. (1992). Long-term control of arterial blood pressure. *Physiological Reviews*, *72*(1), 231-300. https://doi.org/10.1152/physrev.1992.72.1.231

Crocker, J., & Major, B. (1989). Social stigma and self-esteem: The self-protective properties of stigma. *Psychological Review, 96*(4), 608. https://doi.org/10.1037/0033-295X.96.4.608

Crosby, F. (1976). A model of egoistical relative deprivation. *Psychological Review*, *83*(2), 85. https://doi.org/10.1037/0033-295X.83.2.85

Cunningham, S. A., Ruben, J. D., & Narayan, K. V. (2008). Health of foreign-born people in the United States: a review. *Health & Place, 14*(4), 623-635. https://doi.org/10.1016/j.healthplace.2007.12.002

Deitch, E. A., Barsky, A., Butz, R. M., Chan, S., & Brief, A. P. (2003). Subtle Yet Significant: The Existence and Impact of Everyday Racial Discrimination in the Workplace. *Human Relations, 56*(11), 1299-1324. https://doi.org/10.1177/00187267035611002

Derose, K. P., Bahney, B. W., Lurie, N., & Escarce, J. J. (2009). Review: Immigrants and Health Care Access, Quality, and Cost. *Medical Care Research and Review, 66*(4), 355-408. https://doi.org/10.1177/1077558708330425

Dixon, T. L. (2006). Psychological reactions to crime news portrayals of Black criminals: Understanding the moderating roles of prior news viewing and stereotype endorsement. *Communication Monographs*, *73*(2), 162-187. https://doi.org/10.1080/03637750600690643

Dolezsar, C. M., McGrath, J. J., Herzig, A. J., & Miller, S. B. (2014). Perceived racial discrimination and hypertension: A comprehensive systematic review. *Health Psychology*, *33*(1), 20-34. https://doi.org/10.1037/a0033718

Dubé, L., & Guimond, S. (1986). Relative deprivation and social protest: The personal-group issue. In *Relative deprivation and social comparison: The Ontario symposium* (Vol. 4, pp. 201-216). Hillsdale: Erlbaum.

El Refaie, E. (2001). Metaphors we discriminate by: Naturalized themes in Austrian newspaper articles about asylum seekers. *Journal of Sociolinguistics, 5*(3), 352-371. https://doi.org/10.1111/1467-9481.00154

Ellemers, N., & Barreto, M. (2009). Collective action in modern times: How modern expressions of prejudice prevent collective action. *Journal of Social Issues*, *65*(4), 749-768. https://doi.org/10.1111/j.1540-4560.2009.01621.x

Esses, V. M., Medianu, S., & Lawson, A. S. (2013). Uncertainty, threat, and the role of the media in promoting the dehumanization of immigrants and refugees. *Journal of Social Issues, 69*(3), 518-536. https://doi.org/10.1111/josi.12027

Fang, C. Y., Ross, E. A., Pathak, H. B., Godwin, A. K., & Tseng, M. (2014). Acculturative stress and inflammation among Chinese immigrant women. *Psychosomatic Medicine, 76*(5), 320–326. https://dx.doi.org/10.1097%2FPSY.0000000000000065

Finch, B. K., Hummer, R. A., Kol, B., & Vega, W. A. (2001). The role of discrimination and acculturative stress in the physical health of Mexican-origin adults. *Hispanic Journal of Behavioral Sciences, 23*(4), 399-429. https://doi.org/10.1177/0739986301234004

Fiske, S. T., Cuddy, A. J. C., Glick, P., & Xu, J. (2002). A model of (often mixed) stereotype content: Competence and warmth respectively follow from perceived status and competition. *Journal of Personality and Social Psychology*, *82*(6), 878–902. https://doi.org/10.1037/pspa0000163

Fujioka, Y. (2011). Perceived threats and Latinx immigrant attitudes: How White and African American college students respond to news coverage of Latinx immigrants. *The Howard Journal of Communications*, *22*(1), 43-63. https://doi.org/10.1080/10646175.2011.546743

Gee, G. C., Spencer, M. S., Chen, J., & Takeuchi, D. (2007). A Nationwide Study of Discrimination and Chronic Health Conditions Among Asian Americans. *American Journal of Public Health, 97*(7), 1275-1282. https://doi.org/10.2105/AJPH.2006.091827

Gelatt, J. (2016). Immigration status and the healthcare access and health of children of immigrants. *Social Science Quarterly, 97*(3), 540-554. https://doi.org/10.1111/ssqu.12261

Gerin, W., Davidson, K. W., Christenfeld, N. J., Goyal, T., & Schwartz, J. E. (2006). The role of angry rumination and distraction in blood pressure recovery from emotional arousal. *Psychosomatic Medicine*, *68*(1), 64-72. https://doi.org/10.1097/01.psy.0000195747.12404.aa

Goff, P. A., Eberhardt, J. L., Williams, M. J., & Jackson, M. C. (2008). Not yet human: implicit knowledge, historical dehumanization, and contemporary consequences. *Journal of Personality and Social Psychology*, *94*(2), 292. https://doi.org/10.1037/0022-3514.94.2.292

Gubernskaya, Z. (2014). Age at migration and self-rated health trajectories after age 50: Understanding the older immigrant health paradox. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 70*(2), 279-290. https://doi.org/10.1093/geronb/gbu049

Guyll, M., Matthews, K. A., & Bromberger, J. T. (2001). Discrimination and unfair treatment: Relationship to cardiovascular reactivity among African American and European American women. *Health Psychology*, *20*(5), 315. https://doi.org/10.1037/0278-6133.20.5.315

Haslam, N. (2006). Dehumanization: An integrative review. *Personality and Social Psychology Review*, *10*(3), 252-264. https://doi.org/10.1207/s15327957pspr1003_4

Hayes, A. F. (2018). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (2nd Ed.) New York: The Guilford Press

Hoggard, L. S., Hill, L. K., Gray, D. L., & Sellers, R. M. (2015). Capturing the cardiac effects of racial discrimination: Do the effects "keep going*"?*. *International Journal of Psychophysiology, 97*(2), 163-170. https://doi.org/10.1016/j.ijpsycho.2015.04.015

Kteily, N., & Bruneau, E. (2017). Backlash: The politics and real-world consequences of minority group dehumanization. *Personality and Social Psychology Bulletin, 43*(1), 87-104. https://doi.org/10.1177/0146167216675334

Kteily, N., Bruneau, E., Waytz, A., & Cotterill, S. (2015). The ascent of man: Theoretical and empirical evidence for blatant dehumanization. *Journal of Personality and Social Psychology*, *109*(5), 901. https://doi.org/10.1037/pspp0000048

Kteily, N., Hodson, G., & Bruneau, E. (2016). They see us as less than human: Metadehumanization predicts intergroup conflict via reciprocal dehumanization. *Journal of Personality and Social Psychology*, *110*(3), 343. https://doi.org/10.1037/pspa0000044

Jefferson, A. L., Himali, J. J., Beiser, A. S., Au, R., Massaro, J. M., Seshadri, S., ... & Benjamin, E. J. (2010). Cardiac index is associated with brain aging: the Framingham Heart Study. *Circulation*, *122*(7), 690-697. https://doi.org/10.1161/CIRCULATIONAHA.109.905091

Jones, K. P., Peddie, C. I., Gilrane, V. L., King, E. B., & Gray, A. L. (2016). Not so subtle: A meta-analytic investigation of the correlates of subtle and overt discrimination. *Journal of Management*, *42*(6), 1588-1613. https://doi.org/10.1177/0149206313506466

Kamans, E., Gordijn, E. H., Oldenhuis, H., & Otten, S. (2009). What I think you see is what you get: Influence of prejudice on assimilation to negative meta☐stereotypes among Dutch Moroccan teenagers. *European Journal of Social Psychology*, *39*(5), 842-851. https://doi.org/10.1002/ejsp.593

Kasagi, F., Akahoshi, M., & Shimaoka, K. (1995). Relation between cold pressor test and development of hypertension based on 28-year follow-up. *Hypertension*, *25*(1), 71-76. https://doi.org/10.1161/01.HYP.25.1.71

Kawakami, K., & Dion, K. L. (1993). The impact of salient self-identities on relative deprivation and action intentions. *European Journal of Social Psychology*, *23*(5), 525-540. https://doi.org/10.1002/ejsp.2420230509

Key, B. L., Campbell, T. S., Bacon, S. L., & Gerin, W. (2008). The influence of trait and state rumination on cardiovascular recovery from a negative emotional stressor. *Journal of Behavioral Medicine*, *31*(3), 237-248. https://doi.org/10.1007/s10865-008-9152-9

Kil, S. H., & Menjivar, C. (2006). The "war on the border": Criminalizing immigrants and militarizing the US-Mexico border. *Immigration and Crime: Race, Ethnicity, and Violence*, 164-188.

Kira, I. A., Templin, T., Lewandowski, L., Ramaswamy, V., Ozkan, B., & Mohanesh, J. (2008). The physical and mental health effects of Iraq war media exposure on Iraqi refugees. *Journal of Muslim Mental Health*, *3*(2), 193-215. https://doi.org/10.1080/15564900802487592

Lalonde, R. N., & Cameron, J. E. (1993). An intergroup perspective on immigrant acculturation with a focus on collective strategies. *International Journal of Psychology*, *28*(1), 57-74. https://doi.org/10.1080/00207599308246918

Lear, S. A., Humphries, K. H., Hage-Moussa, S., Chockalingam, A., & Mancini, G. J. (2009). Immigration presents a potential increased risk for atherosclerosis. *Atherosclerosis, 205*(2), 584-589. https://doi.org/10.1016/j.atherosclerosis.2008.12.037

Lee, Y. S. C., Suchday, S., & Wylie-Rosett, J. (2012). Perceived social support, coping styles, and Chinese immigrants' cardiovascular responses to stress. *International Journal of Behavioral Medicine, 19*(2), 174-185. https://doi.org/10.1007/s12529-011-9156-7

Lovallo, W. R. (2011). Do low levels of stress reactivity signal poor states of health?. *Biological psychology*, *86*(2), 121-128. https://doi.org/10.1016/j.biopsycho.2010.01.006

Manuck, S. B. (1994). Cardiovascular reactivity in cardiovascular disease: "Once more unto the breach". *International Journal of Behavioral Medicine*, *1*(1), 4-31. https://doi.org/10.1207/s15327558ijbm0101_2

Manuck, S. B., Kasprowicz, A. L., & Muldoon, M. F. (1990). Behaviorally-evoked cardiovascular reactivity and hypertension: Conceptual issues and potential associations. *Annals of Behavioral Medicine*, *12*(1), 17-29. https://doi.org/10.1207/s15324796abm1201_2

Maoz, I., & McCauley, C. (2008). Threat, dehumanization, and support for retaliatory aggressive policies in asymmetric conflict. *Journal of Conflict Resolution*, *52*(1), 93-116. https://doi.org/10.1177/0022002707308597

Matthews, K. A., Salomon, K., Brady, S. S., & Allen, M. T. (2003). Cardiovascular reactivity to stress predicts future blood pressure in adolescence. *Psychosomatic Medicine*, *65*(3), 410-415. https://doi.org/10.1097/01.PSY.0000057612.94797.5F

McEwen, B. S. (2003). Mood disorders and allostatic load. *Biological Psychiatry*, *54*(3), 200-207. https://doi.org/10.1016/S0006-3223(03)00177-X

Mendes, W. B., Blascovich, J., Major, B., & Seery, M. (2001). Challenge and threat responses during downward and upward social comparisons. *European Journal of Social Psychology*, *31*(5), 477-497. https://doi.org/10.1002/ejsp.80

Mendes, W. B., Blascovich, J., Hunter, S. B., Lickel, B., & Jost, J. T. (2007). Threatened by the unexpected: Physiological responses during social interactions with expectancy-violating partners. *Journal of Personality and Social Psychology*, *92*(4), 698.

Mendes, W. B., McCoy, S., Major, B., & Blascovich, J. (2008). How Attributional Ambiguity Shapes Physiological and Emotional Responses to Social Rejection and Acceptance. *Journal of Personality and Social Psychology, 94*(2), 278–291. https://doi.org/10.1037/0022-3514.94.2.278

Merrit, M. M., Bennet, Jr., G. G., Williams, R. B., Edwards, C. L., & Sollers III, J. J. (2006). Perceived Racism and Cardiovascular Reactivity and Recovery to Personally Relevant Stress. *Health Psychology, 25*(3), 364-369. https://doi.org/10.1037/0278-6133.25.3.364

Misra, A., & Ganda, O. P. (2007). Migration and its impact on adiposity and type 2 diabetes. *Nutrition, 23*(9), 696-708. https://doi.org/10.1016/j.nut.2007.06.008

Molina, K. M, Little, T. V, & Rosal, M.C. (2016). Everyday discrimination, family context, and psychological distress among latino adults in the united states. *Journal of Community Psychology, 44*(2). 145–165. https://doi.org/10.1002/jcop.21747

Moskalenko, S., & McCauley, C. (2009). Measuring political mobilization: The distinction between activism and radicalism. *Terrorism and Political Violence*, *21*(2), 239-260. https://doi.org/10.1080/09546550902765508

Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology*, *100*(4), 569. https://doi.org/10.1037/0021-843X.100.4.569

Nolen-Hoeksema, S., & Morrow, J. (1991). A prospective study of depression and posttraumatic stress symptoms after a natural disaster: the 1989 Loma Prieta Earthquake. *Journal of Personality and Social Psychology*, *61*(1), 115. https://doi.org/10.1037/0022-3514.61.1.115

Obrist, P. (1981). *Cardiovascular Psychophysiology: A Perspective*. Plenum Press, New York.

Opotow, S. (1990). Moral exclusion and injustice: An introduction. *Journal of Social Issues, 46*(1), 1-20. https://doi.org/10.1111/j.1540-4560.1990.tb00268.x

Ornelas, I. J. & Perreira, K.M. (2011). The role of migration in the development of depressive symptoms among Latino immigrant parents in the USA. *Social Science & Medicine, 73*(8), 1169-1177. https://doi.org/10.1016/j.socscimed.2011.07.002

Panaite, V., Salomon, K., Jin, A., & Rottenberg, J. (2015). Cardiovascular recovery from psychological and physiological challenge and risk for adverse cardiovascular outcomes and all-cause mortality. *Psychosomatic Medicine*, *77*(3), 215. https://doi.org/10.1097/PSY.0000000000000171

Paradies, Y. (2006). A systematic review of empirical research on self-reported racism and health. *International Journal of Epidemiology*, *35*(4), 888-901. https://doi.org/10.1093/ije/dyl056

Paradies, Y., Ben, J., Denson, N., Elias, A., Priest, N., Pieterse, A., ... & Gee, G. (2015). Racism as a determinant of health: a systematic review and meta-analysis. *PloS One, 10*(9). https://doi.org/10.1371/journal.pone.0138511

Paulhus, D. (1983). Sphere-specific measures of perceived control. *Journal of Personality and Social Psychology*, *44*(6), 1253. https://doi.org/10.1037/0022-3514.44.6.1253

Pennebaker, J.W., Booth, R.J., Boyd, R.L., & Francis, M.E. (2015). Linguistic Inquiry and Word Count: LIWC2015. Austin, TX: Pennebaker Conglomerates

Pew Research Center. (2018). "Key Findings about U.S. Immigrants." *Pew Research Center*, Washington, D.C.

Ramasubramanian, S. (2010). Television viewing, racial attitudes, and policy preferences: Exploring the role of social identity and intergroup emotions in influencing support for affirmative action. *Communication Monographs*, *77*(1), 102-120. https://doi.org/10.1080/03637750903514300

Richman, L. S., Bennett, G. G., Pek, J., Siegler, I., & Williams Jr, R. B. (2007). Discrimination, dispositions, and cardiovascular responses to stress. *Health Psychology, 26*(6), 675. https://doi.org/10.1037/0278-6133.26.6.675

Rodriquez, F., Hastings, K. G., Hu, J., Lopez, L., Cullen, M., Harrington, R. A., & Palaniappan, L. P. (2017). Nativity Status and Cardiovascular Disease Mortality Among Hispanic Adults. *Journal of the American Heart Association, 6*(12), 1-9. https://doi.org/10.1161/JAHA.117.007207

Salomon, K., Burgess, K. D., & Bosson, J. K. (2015). Flash fire and slow burn: Women's cardiovascular reactivity and recovery following hostile and benevolent sexism. *Journal of Experimental Psychology: General*, *144*(2), 469-479. https://doi.org/10.1037/xge0000061

Salomon, K., & Jagusztyn, N. E. (2008). Resting cardiovascular levels and reactivity to interpersonal incivility among Black, Latina/o, and White individuals: The moderating role of ethnic discrimination. *Health Psychology*, *27*(4), 473. https://doi.org/10.1037/0278-6133.27.4.473

Schmeer, K. K. (2019). Inflammation Among Children: Evidence of an Immigrant Advantage?. *Immigration and Health*, *19*, 275-295.

Schwartz, A. R., Gerin, W., Davidson, K. W., Pickering, T. G., Brosschot, J. F., Thayer, J. F., ... & Linden, W. (2003). Toward a causal model of cardiovascular responses to stress and the development of cardiovascular disease. *Psychosomatic Medicine*, *65*(1), 22-35. https://doi.org/10.1097/01.PSY.0000046075.79922.61

Seery, M. D. (2011). Challenge or threat? Cardiovascular indexes of resilience and vulnerability to potential stress in humans. *Neuroscience & Biobehavioral Reviews*, *35*(7), 1603-1610. https://doi.org/10.1016/j.neubiorev.2011.03.003

Spielberger, C. D. (1999). *STAXI-2: State-Trait Anger Expression Inventory-2: Professional manual*. Lutz, FL: Psychological Assessment Resources, Inc.

Steffen, P. R., McNeilly, M., Anderson, N., & Sherwood, A. (2003). Effects of perceived racism and anger inhibition on ambulatory blood pressure in African Americans. *Psychosomatic Medicine*, *65*(5), 746-750. https://doi.org/10.1097/01.PSY.0000079380.95903.78

Stewart, J. C., & France, C. R. (2001). Cardiovascular recovery from stress predicts longitudinal changes in blood pressure. *Biological Psychology*, *58*(2), 105-120. https://doi.org/10.1016/S0301-0511(01)00105-3

Stúrmer, S., & Simon, B. (2004). Collective action: Towards a dual-pathway model. *European Review of Social Psychology*, *15*(1), 59-99. https://doi.org/10.1080/10463280340000117

Szaflarski, M., & Bauldry, S. (2019). The Effects of Perceived Discrimination on Immigrant and Refugee Physical and Mental Health. *Immigration and Health*, *19*, 173-204. https://dx.doi.org/10.1108%2FS1057-629020190000019009

Tomaka, J., Blascovich, J., Kelsey, R. M., & Leitten, C. L. (1993). Subjective, physiological, and behavioral effects of threat and challenge appraisal. *Journal of Personality and Social Psychology, 65*(2), 248. https://doi.org/10.1037/0022-3514.65.2.248

Tomaka, J., & Palacios-Esquivel, R. L. (1997). Motivational systems and stress-related cardiovascular reactivity. *Motivation and Emotion, 21*(4), 275-296. https://doi.org/10.1023/A:1024414005745

Vick, S. B., Seery, M. D., Blascovich, J., & Weisbuch, M. (2008). The effect of gender stereotype activation on challenge and threat motivational states. *Journal of Experimental Social Psychology, 44*(3), 624-630. https://doi.org/10.1016/j.jesp.2007.02.007

Viruell-Fuentes, E. A. (2007). Beyond acculturation: immigration, discrimination, and health research among Mexicans in the United States. *Social Science & Medicine, 65*(7), 1524-1535. https://doi.org/10.1016/j.socscimed.2007.05.010

Viruell-Fuentes, E. A., Miranda, P. Y., & Abdulrahim, S. (2012). More than culture: structural racism, intersectionality theory, and immigrant health. *Social Science & Medicine, 75*(12), 2099-2106. https://doi.org/10.1016/j.socscimed.2011.12.037

Ward, L. M. (2004). Wading through the stereotypes: positive and negative associations between media use and black adolescents' conceptions of self. *Developmental Psychology*, *40*(2), 284. https://doi.org/10.1037/0012-1649.40.2.284

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063.

Waytz, A., Gray, K., Epley, N., & Wegner, D. M. (2010). Causes and consequences of mind perception. *Trends in Cognitive Sciences*, *14*(8), 383-388. https://doi.org/10.1016/j.tics.2010.05.006

Williams, D. R., Yu, Y., Jackson, J. S., & Anderson, N. B. (1997). Racial differences in physical and mental health: Socio-economic status, stress and discrimination. *Journal of Health Psychology*, *2*(3), 335-351. https://doi.org/10.1177/135910539700200305

PARTICIPANT DEMOGRAPHICS FOR STUDY VARIABLES BY PRIMING CONDITION

	Priming Condition					
	Dehumanization (n = 77)		Discrimination (n = 75)		Total (n = 152)	
	M	*SD*	*M*	*SD*	*M*	*SD*
Age	20.34	3.03	19.88	2.15	20.11	2.63
Sex (% female)	70.1%		67.1%		68.6%	
BMI	25.15	5.98	24.17	5.61	24.66	5.80
EDS	1.98	0.48	2.04	0.55	2.00	0.52
Attribution to race/ethnicity (% yes)	71.4%		65.8%		68.6%	
Race						
Black/African, Caribbean	27.3%		21.1%		24.2%	
Hispanic, Latino(a)	26%		30.3%		28.1%	
Middle Eastern/North African	7.8%		10.5%		9.2%	
Southeast Asian	6.5%		7.9%		7.2%	
East Asian	6.5%		1.3%		3.9%	
South Asian/Indian Subcontinent	22.1%		15.8%		19 %	
Bi/multi-racial	3.9%		11.8%		7.2%	
Religious Affiliation						
Christianity	49.4%		51.3%		50.3%	
Judaism	0%		1.3%		0.7%	
Islam	10.4%		6.6%		8.5%	

Buddhism	2.6%		1.3%		2%	
Hinduism	3.9%		5.3%		4.6%	
Non-religious/Secular	22.1%		25%		23.5%	
Other	11.7%		7.9%		9.8%	
Born in the US. (% yes)	72.7%		67.1%		69.9%	
English as first language (% yes)	59.7%		65.3%		62.5%	
Resting HR	73.39	10.23	75.00	9.79	74.20	10.02
Resting PEP	119.94	11.23	119.58	13.44	119.77	12.32
Resting CO	7.99	2.92	7.82	2.73	7.90	2.82
Resting SBP	106.02	9.25	105.60	9.22	105.81	9.21
Resting DBP	64.69	6.22	64.21	5.49	64.45	5.85
Resting TPR	1627.43	2695.27	4373.03	21401.80	2981.17	15158.14
Resting RSA	6.72	1.13	6.60	1.13	6.66	1.13

Note. EDS = Everyday Discrimination Scale; HR = heart rate; PEP = pre-ejection period; CO = cardiac output; SBP =systolic blood pressure; DBP = diastolic blood pressure; TPR = total peripheral resistance; RSA = respiratory sinus arrhythmia.