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INTERPERSONAL DISCRIMINATION, GENDERED RACE, AND CARDIOVASCULAR
DISEASE INEQUITIES: APPLICATION OF THE EMERGING IDENTITY PATHOLOGY
MODEL

A Dissertation Presented

By

GANGA SARASVATI BEY

Submitted to the Faculty of the
University of Massachusetts Graduate School of Biomedical Sciences, Worcester, MA
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

MARCH 1ST, 2019

CLINICAL AND POPULATION HEALTH RESEARCH

INTERPERSONAL DISCRIMINATION, GENDERED RACE, AND CARDIOVASCULAR
DISEASE INEQUITIES: APPLICATION OF THE EMERGING IDENTITY PATHOLOGY
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March 1, 2019

DEDICATION

“Any real change implies the breakup of the world as one has always known it, the loss of all that gave one an identity, the end of safety. And at such a moment, unable to see and not daring to imagine what the future will now bring forth, one clings to what one knew, or dreamed that one possessed. Yet, it is only when a person is able, without bitterness or self-pity, to surrender a dream [s]he has long cherished or a privilege [s]he has long possessed that [s]he is set free — [s]he has set [her]self free — for higher dreams, for greater privileges.”

-James Baldwin

To all those who came before me,
willing to sacrifice the comfort of certainty for the hope of an unguaranteed freedom:

Your bravery and unwavering faith imbue me with a grim but hopeful determination.

This work is dedicated to you.

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ABSTRACT

Background: Uncertainty about the primary causes of disparities in cardiovascular health (CVH) between black and white women and men may be due to the relevant but understudied ways in which social group identity influences the experience and effects of interpersonal discrimination. An emerging framework, the Identity Pathology (IP) model, partially addresses these uncertainties through outlining how identity beliefs associated with group membership lead to predictable differences in the health-damaging effects of discrimination exposure depending on the type and setting of discrimination.

Methods: Using data from CARDIA, a community-based sample of black and white women and men in four U.S. cities, this doctoral thesis seeks to: 1) propose a novel psychosocial characteristic, identity pathology, that drives the distribution of reported race and gender discrimination in health-relevant ways, 2) assess whether there are group differences in the effects of multiple versus single forms of discrimination on future CVH, and 3) assess variation between these groups in the relationships of reported racial and gender discrimination in a variety of daily life settings with future CVH.

Results: The IP framework suggests that beliefs about identity unique to each gendered race group influence the perception of discrimination and whether reported exposure will be associated with CVH. Simultaneous reports of racial and gender discrimination in multiple settings (compared with no discrimination) were negatively associated with future CVH only among white men. Further, the setting in which discrimination was reported appeared to be a

significant indicator of whether experiencing multiple forms of discrimination negatively impacted CVH in each group.

Conclusions: Our findings contribute to the literature through introducing the novel IP framework, which explores how beliefs about identity contribute to gendered racial disparities in CVH. This work also provides preliminary evidence that compounded experiences of interpersonal racial and gender discrimination may not substantially contribute to poorer CVH among black women.

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PREFACE

Chapter II of this dissertation is under review as:

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CHAPTER I
INTRODUCTION

Cardiovascular disease (CVD) burden is not equally distributed across social groups in the United States.^{1,2,3} Contributing to disparities in disease outcomes are persistent group differences in the prevalence of CVD risk factors.⁴⁻⁸ Many chronic conditions that increase risk of developing CVD, including obesity and hypertension, are disproportionately high among black persons, with effects frequently more pronounced among women.⁷⁻⁹ Hypertension affects 51% of black men and white women and men, but 64% of black women.⁸ Fifty-four percent of black women are obese, compared with 38% of black men, white women, and white men.⁶ While approximately equal among black and white men at 8%, the national age-adjusted prevalence of CVD is notably higher among black women, afflicting 8% compared with 5% of white women.^{2,4}

Still, despite the higher prevalence of cardiometabolic risk factors for CVD among black persons, there is evidence that the effect of such exposures on CVD is not consistent across race and gender.¹⁰ The substantial body of evidence indicating that CVD risk factors and their impact on disease vary simultaneously by race and gender points to a need for further investigation into the intersecting effects of these social group designations in yielding variability in CVD risk.

Psychosocial stress as a risk factor for poorer cardiovascular health

Because the causes of social group differences in CVH and CVD have yet to be fully understood,⁴ researchers continue to investigate social factors such as psychosocial stress as potential drivers. An extensive body of literature describes the link between stress and poor mental and physical health.^{8,11,12} Numerous studies in both adolescent and adult

populations, and across race and gender, have found an association of stress with CVD-related outcomes including obesity, hypertension, and cigarette smoking.¹²⁻¹⁵

Furthermore, there is evidence that disease risk varies with stressor type,^{11,12,16} with interpersonal discrimination being the most heavily studied psychosocial risk factor for CVD.¹⁷

Interpersonal discrimination has been defined as “encounters between individuals in which one person acts in an adversely discriminatory way toward another person”.¹⁷ Typically, these interactions encompass what have been recently termed microaggressions (e.g. being followed in a store, receiving poor customer service, belittling remarks, skepticism of capability to complete a job or task, sexual harassment, police harassment, etc.)^{17,18} as well as overt expressions of racism or sexism.¹⁷⁻¹⁹ Stress stemming from perceiving devaluation on the basis of one’s membership in a social group has been shown to exert a unique physiological and psychological impact.^{11,12,16} Directly through sustained activation of the sympathetic nervous system and indirectly through coping behaviors, recurrent experiences of interpersonal discrimination are thought to increase susceptibility to cardiometabolic risk factors and thereby, CVD.^{20,21}

Subjectivity of interpersonal discrimination as a challenge to characterizing exposure’s effect on cardiovascular health

The development of validated measures distinguishing frequency, severity, and stressfulness of exposure^{18,19} has enabled a variety of theoretical and analytic approaches to evaluating the relationships of interpersonal discrimination with risk of poorer

cardiovascular health.^{22,23} However, the subjective nature of psychosocial stressors like interpersonal discrimination renders the pathogenicity of such exposures difficult to measure and characterize;^{7,17,24} despite a large literature base, little conclusive evidence has been produced.^{22,23} In this dissertation, I will make the case that this is in part because the complexity and scope of discrimination exposure have not been adequately captured in current measures of interpersonal discrimination,²⁴ nor in the methods with which they are frequently employed in epidemiologic studies.^{25,26}

The prevalence of self-reported discrimination on the basis of the social category “gendered race” varies substantially among black and white women and men²⁷ across time and geographic areas.^{28,29} The term “gendered race” captures the concomitant elements of socially-assigned gender and race categories that cannot be decomposed, neither within an individual’s self-concept nor in the manner by which social inequities operate to structure privilege and marginalization based on these characteristics.^{17,27,30-34} Mixed findings regarding the relationships of race and gender discrimination with CVD^{24,35-37} may be due to understudied differences in the conceptualization of discrimination across and within gendered race groups,^{20,27,38} unmeasured contextual factors across disparate geographical areas,³⁹⁻⁴¹ the relevance of the setting in which discrimination is experienced,²⁴ and failure to firmly ground study design in theories exploring proposed mechanisms.⁴² Persistently conflicting evidence underscores the need for reconsidering how interpersonal discrimination is investigated as an exposure,⁴³ and further, whether a focus on interpersonal discrimination overlooks other contributors to increased disease burden among marginalized groups.^{16,17} This reorientation requires

specification of the type of discrimination experienced, the setting in which discrimination is perceived, by whom discrimination is perceived, and in what sociopolitical context discrimination takes place, if the contribution of discrimination to cardiovascular health disparities is to be better understood.¹⁷

Identity Pathology and cardiovascular disease disparities

In this dissertation, I present an emerging conceptual framework, the Identity Pathology (IP) model, using the example of interpersonal discrimination and cardiovascular disease disparities to illustrate the framework's primary theories. Although there is no shortage of theoretical frameworks for the social causes of disease, the IP framework takes an innovative approach to increasing our understanding of the role of structured inequity, and associated psychosocial exposures such as interpersonal discrimination, in driving disparities in CVD outcomes between social groups defined by characteristics such as gendered race. The major premise of the IP model is that in moderating whether and how exposure to chronic psychosocial stressors will affect disease, socially-constructed identities can be rendered pathological. Gaining a more thorough understanding of the effects of psychosocial stressors on disease outcomes therefore requires additional clarity on the ways in which identity shapes the experience of stress.

A strong body of literature within the sociological disciplines describes the racial and gender inequity inherent to the hierarchical social structure of the United States.^{17,32,44-46} Intersectionality theory,³³ Ecosocial theory,⁴² and the Environmental Affordances model⁴⁷ specifically emphasize the unique effect of multiple forms of

structured inequity acting at the junction of various socially defined groups to influence the distribution of health-impacting resources across dominant-status and marginalized populations. Alongside these theories, evidence emerging from the social psychological disciplines, including Social Identity⁴⁸ and Multidimensional Identity⁴⁹ theories, describe how the construction of a gendered racial identity is informed by these intersecting axes of structured oppression. Social dominance theory³⁷ further suggests that social hierarchy is supported through “legitimizing myths” or consensually shared ideologies which position certain groups as beneficiaries of social and material resources while depriving other groups of access. Application of the IP model to cardiovascular disease draws from these and other existing frameworks (e.g. The Jedi Public Health framework¹⁶) in explicating how observed patterns in reported interpersonal racial and gender discrimination among black and white women and men have important implications for disparities in CVD between these groups.

Based on the IP framework, I hypothesize that discrimination occurs, and is perceived and reported, differentially across gendered race groups, settings, and geographic areas in predictable ways fundamentally as a result of structured inequities acting through identity paradigms to construct illness. Specifically, the framework details potential mechanisms through which experiences of interpersonal discrimination are influenced by structural and psychosocial factors that bear important implications for CVD disparities between black and white women and men.

Specific Aims

The proposed study will be the first to prospectively assess how the joint effects of racial and gender discrimination impact the development of CVD risk factors among black and white women and men in different cities and settings. Grounded in the emerging Identity Pathology framework, these longitudinal analyses will address both theoretical and methodological limitations in the literature on discrimination and CVD, and in so doing advance an understanding of the causes of gendered racial disparities in cardiovascular outcomes. The proposed aims of this dissertation are to:

Aim 1: Present the emerging Identity Pathology framework, using data from the CARDIA study to demonstrate the frameworks central claims as they pertain to interpersonal discrimination and CVD

Aim 2: Assess the excess risk of developing CVD risk factors attributable to the joint effects of reported gender and racial discrimination

H1: CVD risk associated with reporting multiple forms of discrimination compared to racial or gender discrimination alone or none will be lower among black women and higher among white men than other groups.

Aim 3: Assess potential gendered racial variation in the associations of CVH with reported racial and gender discrimination across eight possible daily life settings

H2: The settings in which reporting both racial and gender discrimination is associated with CVH will differ for each gendered race group

CHAPTER II

IDENTITY PATHOLOGY AND CARDIOVASCULAR DISEASE DISPARITIES:

EXPLORATION OF A NEW CONCEPTUAL FRAMEWORK USING CARDIA DATA

Abstract

Background: Variation in exposure to interpersonal discrimination has been proposed as a contributor to disparities in cardiovascular disease (CVD) among black and white women and men in the U.S. Using data from a community-based cohort to explore the potential for differences in the pathogenicity of discrimination across these groups, we present an emerging framework, the Identity Pathology (IP) model, proposing ways in which factors driving variation in the prevalence of reported racial and gender discrimination bear important implications for CVD disparities.

Methods: Sociological and social psychological literature inform the major premises of the IP model. CARDIA participants were recruited in Birmingham, AL; Chicago, IL; Minneapolis, MN, and Oakland, CA in 1985-6. Racial and gender discrimination reported in several settings were assessed using the Experiences of Discrimination scale at years 7, 15, and 20 (2005-6). We assessed the prevalence at each of these exams and in each setting, stratified by gendered race group and city.

Results: Reported interpersonal discrimination varied by setting, level, and type across the four groups in a manner largely consistent with objective measures of structured discrimination. Although the prevalence of simultaneously reported racial and gender discrimination was notably different between white women and men across settings and cities, reported exposure tended to be more comparable among black women and men, particularly in Birmingham and Chicago. The prevalence of reported discrimination was notably higher in Minneapolis and Oakland for all groups.

Conclusions: The observed patterns are consistent with the IP model, which suggests that intersecting axes of structured inequity inform variation in self-reported racial and gender discrimination across gendered race groups, cities, and settings. Through shaping beliefs about identity, structured racism and sexism influence differences in the occurrence, perception, and reporting of interpersonal discrimination in ways that lead to social group differences in the health-damaging effects of exposure.

Introduction

“For the privileged, equality feels like oppression.”

-Anonymous

As continued racial and gender disparities in cardiovascular disease (CVD) have become of central public health concern,¹ researchers have increasingly investigated psychosocial stressors such as recurrent exposure to discrimination on the basis of membership in a social group as potential contributors.² Interpersonal racial and gender discrimination have been of particular interest due to their prevalence and clear differences in exposure among U.S. black and white women and men.³⁻⁵

Interpersonal discrimination has been defined as “encounters between individuals in which one person acts in an adversely discriminatory way toward another person”.⁵ Typically, these interactions encompass what have been recently termed microaggressions (e.g. being followed in a store, receiving poor customer service, belittling remarks, skepticism of capability to complete a job or task, sexual harassment, police harassment, etc.)^{5,6} as well as overt expressions of racism or sexism.⁵⁻⁷ The resulting stress stemming from perceiving discrimination on the basis of classification in a social group, particularly race or gender, has been shown to exert unique physiological and psychological impacts.^{8,9} Through sustained activation of the sympathetic nervous system, responses to recurrent experiences of interpersonal discrimination are thought to increase susceptibility to cardiometabolic risk factors and thereby, CVD.^{10,11}

The development of validated measures distinguishing frequency, severity, and stressfulness of exposure^{6,7} has enabled a variety of theoretical and analytic approaches to evaluating the relationships of interpersonal discrimination with risk of poorer cardiovascular health.^{12,13} However, the subjective nature of psychosocial stressors like interpersonal discrimination renders the pathogenicity of such exposures difficult to measure and characterize;^{5,8,14} despite a large literature base, little conclusive evidence has been produced.^{12,13} We argue this is in part because the complexity and scope of discrimination exposure have not been adequately captured in current measures of interpersonal discrimination,¹⁴ nor in the methods with which they are frequently employed in epidemiologic studies.^{15,16}

The prevalence of self-reported discrimination on the basis of the social category “gendered race” varies substantially among black and white women and men¹⁴ across time and geographic areas.^{17,18} The term “gendered race” captures the concomitant elements of socially-assigned gender and race categories that cannot be decomposed, neither within an individual’s self-concept nor in the manner by which social inequities operate to structure privilege and marginalization based on these characteristics.^{5,14,19-21} Mixed findings regarding the relationships of race and gender discrimination with CVD^{15,22-24} may be due to understudied differences in the conceptualization of discrimination across and within gendered race groups,^{14,25} unmeasured contextual factors across disparate geographical areas,^{18,26,27} the relevance of the setting in which discrimination is experienced,¹⁴ and failure to firmly ground study design in theories exploring proposed mechanisms.²⁸ Persistently conflicting evidence underscores the need

for reconsidering how interpersonal discrimination is investigated as an exposure,¹⁶ and further, whether a focus on interpersonal discrimination overlooks other contributors to increased disease burden among marginalized groups.^{5,11} This reorientation requires specification of the type of discrimination experienced, the setting in which discrimination is perceived, by whom discrimination is perceived, and in what sociopolitical context discrimination takes place, if the contribution of discrimination to cardiovascular health disparities is to be better understood.⁵

In this chapter, I present an emergent conceptual framework, the Identity Pathology model, using the example of interpersonal discrimination and cardiovascular disease disparities to illustrate the framework's primary theories. I hypothesize that discrimination occurs, and is perceived and reported, differentially across gendered race groups, settings, and geographic areas fundamentally as a result of structured inequities acting through identity paradigms to construct illness. Specifically, the framework details potential mechanisms through which experiences of interpersonal discrimination are influenced by structural and psychosocial factors that bear important implications for cardiovascular disease disparities between black and white women and men. Using observational data from a community-based sample of black and white women and men, I assess the consistency of findings on self-reported discrimination with the framework's central claims.

Methods

Study design and participants

I used data from the Coronary Artery Risk Development in Young Adults (CARDIA) study, an ongoing population-based prospective cohort study of risk factors for cardiovascular disease conducted in four U.S. centers (Birmingham, AL; Minneapolis, MN; Chicago, IL; and Oakland, CA). 5,114 self-described black and white persons, aged 18 - 30 years at baseline examination (1985-1986), were recruited primarily from random-digit dialing of community lists and random selection from a health-care plan.^{29,30} The goal of recruitment was to balance gender and race; participants aged 18 - 25 years and those older than 25; and those attaining up to a high school education with participants with more education, across the four centers. The institutional review board at each center approved the CARDIA study protocol and informed consent was obtained from each participant. Following the initial examination, participants were re-surveyed at years 2, 5, 7, 10, 15, 20, 25, and 30 post-baseline. Participants were also contacted annually to assess the occurrence of CVD events between face-to-face examinations as a means of improving the accuracy of event dates.

Reported discrimination

Racial and gender discrimination were assessed in the CARDIA study at 7, 15, and 20 years post-baseline, using the valid and reliable Experiences of Discrimination scale.³¹ Participants reported having ever experienced discrimination, been prevented from doing something, or been hassled or made to feel inferior (yes/no) in any of the following domains: at school; getting a job; at work; at home; getting medical care; getting housing; by the police or courts; or on the street or in a public setting. At year 7, the racial

discrimination scale excluded “at home” and the gender discrimination scale excluded “getting housing” or “by the police or courts”. Because preliminary analyses of CARDIA data showed the prevalence of reported race and gender discrimination is comparable at years 7, 15, and 25 within each gendered race group, I used discrimination reported at year 7 only. Each type of discrimination (based on gender or race or color) was categorized as reported in 0, 1, or ≥ 2 settings, following the method used by Krieger and Sidney.²⁴ Information on gendered race (self-reported black women/black men/white women/white men) and city (study center) was taken from data collected at baseline. Fewer than 5% reported geographic migration between baseline and year 7, so the study center in which the baseline exam was conducted was used for geographic location.

Covariates

Socioeconomic status (SES) as measured by annual family income and years of education were included for descriptive purposes. Education was categorized as less than high school, high school degree, some college or college degree, and graduate or professional degree. Annual income was operationalized as a dichotomous variable with categories of $< \$25,000$, $\geq \$25,000$.

Statistical analysis

I provide descriptive statistics by type and level of discrimination across SES, as well as across setting and geographic location, for each gendered race group. Differences were

examined for statistical significance using the t-test for continuous variables and Pearson's chi-square for categorical variables. For the primary analyses, the statistical significance of differences in reported race and gender discrimination by setting were evaluated using Pearson's Chi-square tests for each gendered race group in each city.

Results

Figure 1 details the application of the Identity Pathology (IP) concept model to cardiovascular disease, which describes pathways from structured racial and gender inequity to cardiovascular disease as synthesized across current sociological and social psychological theories. The framework draws concepts from the Jedi Public Health¹¹ and Environmental Affordances³³ models as well as other literature, including Intersectionality,³⁴ Social Identity,³⁵ Multidimensional Identity,³⁶ and Social Dominance^{37,38} theories, in outlining three distinct dimensions to the experience of interpersonal discrimination. These dimensions include: 1) the occurrence of intentional and/or implicit interpersonal discrimination; 2) the perception of interpersonal discrimination; and 3) the reporting of interpersonal discrimination. The model centrally asserts that in the context of intersecting axes of structured inequity, psychosocial characteristics, specifically what are treated as "pathological" beliefs about identity, inform variability among black and white women and men in the precision with which these three dimensions map onto one another. Discrepancies between the occurrence, perception, and reporting of interpersonal discrimination contribute to the variability in measured effects of discrimination on CVD across these groups. In this initial report, I

examine only the variability of discrimination as reported by gendered race. Subsequent analyses will empirically link these findings to cardiovascular outcomes to further explore hypotheses generated by the IP model.

The prevalence of reported racial or gender discrimination did not differ markedly over time; we report on year 7 only (n=4,019), with qualitatively similar findings at the other years. Patterns in reported racial and gender discrimination depended on a number of sociodemographic characteristics (Table 1). Black women and men reporting any racial discrimination tended to be of higher SES (higher education, income), whereas white persons reporting this type of discrimination were of lower SES. Similar patterns were seen for gender discrimination. Black and white women reporting any gender discrimination were more educated than women who did not report discrimination in any setting, while men of both races reporting any gender discrimination were less educated and had lower income than men who reported no discrimination in any setting.

The proportion reporting both racial and gender discrimination exposure in ≥ 2 settings was 50% of black women, 32% of black men, 11% of white women, and 5% of white men (Table 1). For black women and men, simultaneously reported racial and gender discrimination was most frequent in Minneapolis and Oakland and least frequent in Birmingham in every setting, with one exception; the proportion of black men reporting both types of discrimination while receiving medical care ranged from 11% in Chicago to 4% in Oakland (Table 2). The proportion of black men reporting discrimination by the police or courts was substantially greater than the other three

gendered race groups in each of the four cities (Table 2). Among white women and men, the prevalence of reporting both racial and gender discrimination in some settings was consistent across cities (e.g. ~1-2% while receiving medical care in all cities.) In others settings, there was large variation between cities; reported discrimination in public or on the street ranged from 30% of white women and 12% of white men in Oakland to 10% and 6% in Birmingham, respectively (Table 2).

Discussion

The empirical data in this study reveal important variation in reported racial and gender discrimination among black and white women and men across eight possible settings in four metropolitan locations. Consistent with historical contexts of systemic discrimination against black persons and women,^{4,5,21} these groups were more likely to report racial discrimination and gender discrimination, respectively, than their white and male counterparts in all four cities. Black men reported racial discrimination by the police or in the courts substantially more frequently than even black women. Also congruent with these sociopolitical realities, black women were more likely than other groups to report experiencing both forms of discrimination in various social settings, whereas white men were least likely to do so. Among white women and men, reported racial discrimination in the street/in public or at school was higher in comparison with other settings, particularly in Oakland. Although no previous studies have examined the distribution of these two forms of discrimination across multiple social settings in

different metropolitan areas, these findings are consistent with previous literature describing overall patterns of racial and gender discrimination among these groups.^{4-6,14}

Theoretical foundations of the emergent conceptual framework

A strong body of literature within the sociological disciplines describes the racial and gender inequity inherent to the hierarchical social structure of the United States.^{4,5,21,38,39} Intersectionality theory,³⁴ Ecosocial theory,²⁸ and the Environmental Affordances model³³ specifically emphasize the unique effect of multiple forms of structured inequity acting at the junction of various socially defined groups to influence the distribution of health-impacting resources across dominant status and marginalized populations. Alongside these theories, evidence emerging from the social psychological disciplines, including Social Identity³⁵ and Multidimensional Identity³⁶ theories, describe how the construction of a gendered racial identity is informed by these intersecting axes of structured oppression. Social dominance theory³⁷ further suggests that social hierarchy is supported through “legitimizing myths” or consensually shared social ideologies which position certain groups as beneficiaries of social and material resources while depriving other groups of access. Application of the Identity Pathology (IP) model to cardiovascular disease (Figure 1) draws from these and other existing frameworks (e.g. The Jedi Public Health framework¹¹) in explicating how observed patterns in reported interpersonal racial and gender discrimination among black and white women and men have important implications for disparities in cardiovascular disease between these groups.

The major premise of the IP framework is that in moderating whether and how exposure to chronic psychosocial stressors will affect disease, socially-constructed identities can be rendered pathological. Gaining a more thorough understanding of the effects of psychosocial stressors on disease outcomes therefore requires additional clarity on the ways in which identity shapes the experience of stress. As applied to cardiovascular disease disparities, the model makes three central assertions. First, that in order to more accurately capture the effects of interpersonal discrimination on cardiovascular health and health disparities, multiple aspects of the discrimination experience must be considered in the design, analysis, and interpretation of epidemiologic studies. Secondly, the IP framework posits that experiences of interpersonal discrimination are fundamentally based in historically structured inequities that impact on each dimension of the discrimination process in health-relevant ways. Finally, the model purports that the precision with which reported experiences map onto perceptions and intentionally or implicitly-driven acts of discrimination depend on a variety of psychosocial characteristics, one of the most important of which is an individual's beliefs about their gendered racial identity. These psychosocial factors also act through pathways independent of discrimination to impact on risk for cardiovascular disease. In the following sections, I expand on key features of the IP framework in explicating the patterns of reported discrimination observed in this study and their implications for cardiovascular disease outcome differences between black and white women and men.

Three dimensions of the discrimination process relevant for health disparities research

In order to more accurately assess the impact of interpersonal discrimination on cardiovascular disease disparities between black and white women and men, epidemiologic investigations should consider experiences of interpersonal discrimination as a process spanning the occurrence, perception, and reporting of discrimination. Previous work on social identity-based stressors has also suggested a multi-faceted structure to the interpersonal discrimination experience.^{14,40} These dimensions do not necessarily map onto one another; inherent in each is variability in the likelihood of progression to the next stage. This variability is informed by both structural and psychosocial characteristics that manifest in unique ways for each gendered race group.^{11,36} Moreover, these psychosocial characteristics, which are frequently excluded from analyses of discrimination and health, are likely important predictors of risk for cardiovascular disease independent of their effects on interpersonal discrimination.^{4,5} Unidimensional conceptualizations of interpersonal discrimination mask this variability^{21,36} and may contribute to persistent conflicting findings on the relationship of exposure with cardiovascular disease.^{14,42}

Historical contexts inform current interpersonal experiences of discrimination

The racial and gender inequity structured into the social fabric of U.S. society are the backdrop for all pathways that yield health outcome differences between black and white women and men.^{4,5,37} As such, structured inequities can be considered the root cause of gendered racial cardiovascular disease disparities, whether acting through access to

resources,^{4,5,42} through influences on identity,^{36,43} or through more readily observable effects on interpersonal discrimination,^{2,13,14} as is the focus of this section.

Discriminatory practices and attitudes that currently persist^{28,44} have been partially attributed to slavery, legalized discrimination, and legally-sanctioned violence in the U.S.^{4,5,21,28} Historically legal discriminatory policies, such as racial segregation and a lack of voting rights for women or black persons, continue to foster attitudes and beliefs that influence the practice of discriminatory behavior today and increase the likelihood that these groups will encounter instances of interpersonal discrimination.^{28,38} The disparities in the prevalence of reported racial discrimination between black and white persons as well as in gender discrimination between women and men in specific settings in this study reflect objective measures of prevalent discrimination in a manner consistent with these realities.

An example of how current experiences of discrimination are situated within contexts of structured inequity can be seen in the differences we found in reported race-based discrimination while seeking housing. Under 5% of white persons in each of the four cities reported experiences of racial discrimination while getting housing, while prevalence was 20-40% among black women and men. Although recent federal policy has barred discrimination in housing on the basis of race,^{45,46} decades of national research reveal how real estate agents and rental providers recommend and show fewer homes to equally qualified racial minorities.⁴⁵⁻⁴⁷ In this manner, although intended to reflect the stress generated by discrete discriminatory interactions, reported interpersonal

discrimination in certain settings may additionally capture the systemic racism that is proposed as the fundamental cause of poorer cardiovascular health within marginalized populations.^{4,5,42}

The contribution of structured inequity to increased likelihood of exposure to intentional and/or implicit interpersonal discrimination can also be observed in the geographical patterns of reported exposure observed in this study. Legalized discrimination was enforced to differing degrees across the U.S.^{48,49} leading to regional differences in the prevalence and scope of discriminatory practices.^{39,50} Historically-rooted phenomenon such as racial segregation and isolation differentially yield opportunities for interpersonal experiences of discrimination. High proportions of black women and men in this study reported racial discrimination in most settings of every city. However, the reporting of racial discrimination was lower in Birmingham in the settings of police and the courts, and in schools, than in the other three cities. These results may be consistent with the neighborhood-level findings from previous analyses, which indicate that black residents of predominantly black neighborhoods report lower levels of discrimination than black persons in predominantly white settings.^{32,51} This is particularly true with respect to hostile police interactions and “surveillance” related forms of discrimination, in which black persons in predominantly white neighborhoods are considerably more likely to report police harassment and mistrust than blacks living in majority black neighborhoods.⁵¹ Thus, the observed findings would be consistent with a higher degree of social segregation extant in Birmingham than in the three other cities, patterns driven by historical Jim Crow policies.^{49,52} Perhaps reinforcing this interpretation

is that in settings less tied to one's residence (e.g. at work, getting a job, seeking health care), the degree of racial discrimination reported by black women and men shows less variability between cities.

While segregation can act to buffer the occurrence of racial discrimination,³² racial isolation has the opposite effect, operating to increase the likelihood that black persons of higher SES experience intentional and/or implicit interpersonal racial discrimination.^{7,32,50} Extant literature shows that black persons of higher SES are more likely than blacks of lower SES to work and live in environments where they comprise a racial minority.^{7,32} Our results are concordant with previous literature showing that black persons of higher SES report higher levels of racial discrimination.⁴⁴ Among white persons, particularly white men, the opposite may be more common; white persons of lower SES are more likely to live in less racially segregated environments where opportunities for experiencing interpersonal racial discrimination are greater than whites of higher SES.^{7,32,51} Our findings of higher prevalence of reported racial discrimination among low SES whites supports this hypothesis.

Structured inequity also acts directly to influence whether an individual perceives discrimination independent of whether acts of discrimination actually occurred, intentionally or implicitly. Jim Crow laws, which existed in thirty-five states and spanned over five decades ending in 1954, were often more strictly and violently enforced in southern states like Alabama.⁴⁸⁻⁵⁰ The extremity of racist policies and associated violence black persons endured prior to and during the Jim Crow era may have rendered

subsequent manifestations of interpersonal racial discrimination less threatening and therefore less stressful for some age groups and in certain states, as has been previously suggested.¹⁶ These sociopolitical shifts may drive within-race variation in the conceptualization of discrimination, reducing likelihood that certain groups of black person persons will consider as acts of discrimination what objective measures define as discriminatory. Changes in the U.S. sociopolitical landscape following Civil Rights legislation may have, on the other hand, challenged many white persons' conceptualizations of their racial rights, including rights to racial deference, to segregation, or even the commission of violence to preserve these prerogatives.^{48,53,54} Members of these groups may consequently conceptualize interactions that violate these perceived rights as discriminatory.^{53,54}

Legally-supported gender inequity and attitudes toward traditional gender norms have also historically been more extreme in southern states.^{39,55} For both black and white women in this study, reported experiences of gender discrimination were less common in Birmingham than elsewhere. A higher prevalence of socially conservative views among women in the southern U.S. may reflect greater endorsement of traditional gender roles,^{39,55} thus decreasing the likelihood of perceived gender discrimination among women in this city, even as ecologic studies identify a larger degree of gender inequity.^{39,55} On the other hand, conservative views may increase the likelihood that men report experiences of gender discrimination, as men holding these views may more frequently perceive challenges to traditional gender norms (e.g. policies diversifying the types of jobs women and men work) as discriminatory.³⁷ In support of this assertion,

Birmingham was the only city in which a higher percentage of both black and white men reported experiencing gender and racial discrimination while seeking a job than women of the same race. In this way, inequity structured into institutional policy contributes to variation among black and white women and men in the perception of interpersonal discrimination. Multiple structured oppressions also act on the various dimensions of the discrimination process indirectly by informing beliefs about gendered racial identity, as outlined in the following section.

Identity influences on the experience of discrimination

As longitudinal studies have begun to reveal limited associations of interpersonal racial or gender discrimination with CVD morbidity and mortality among blacks,^{15,22,24} the appropriateness of discrimination measures and methodologies for capturing the health impacts of racism and gender discrimination have been called into question.¹⁶ We contend that failure to adequately consider how the magnitude of discrepancy in the occurrence, perception, and reporting of discrimination varies across black and white women and men, and in what ways this variation might influence estimates of discrimination's impact on disease within these groups, has contributed to the problem.

By specifying the conditions under which psychosocial stressors like interpersonal discrimination will yield disease, structured inequities can yield pathological identity concepts. As proposed in the emerging IP model (figure 1), the experience of discrimination (i.e. how precisely the three proposed dimensions map onto one another) is also shaped by intersecting structured inequities through influences on an

individual's beliefs about their gendered racial identity. That is, the experience of racial discrimination that is predicated upon an individual's gender²⁴ and the experience of gender discrimination that is predicated on an individual's race, have unique health implications for members of different gendered race groups due to the inseparable nature of race and gender constructs.^{14,21,34} Whether an individual perceives an interaction as discriminatory, and in turn attributes that interaction to her race or gender is dependent on the degree of gendered racial identification^{8,56-58} beliefs about the prevalence of racial and gender prejudice,⁵⁷⁻⁶⁰ attitudes toward gender roles,^{61,62} and other psychosocial characteristics⁶³ such as social dominance orientation, an individual's degree of preference for inequity among social groups.⁵³ These traits are grounded within beliefs about multiple dimensions of an individual's identity simultaneously, identities which have been established as constructs of unequal social conditions.³⁶ I assert that such identity-related beliefs act separately on each dimension of the discrimination process to contribute variation in reporting among black and white women and men.

What an individual believes constitutes their gendered racial identity directly underlies the external expression of that identity.^{35,36} Certain practices of identity draw individuals into spaces with heightened risk of encountering an interaction that can be objectively evaluated as discriminatory. A recent example is the Black Lives Matter movement. Many individuals currently protesting police brutality and other methods of institutionalized black dehumanization do so with the express belief that black folk are systematically mistreated.⁶⁴ For black persons participating in protests associated with the movement, this belief about their racial identity can bring them into close proximity with

others who hold opposing viewpoints and may demonstrate discriminatory behavior toward them. In the same vein, for women outspoken about their feminism, beliefs about what it means to be a woman--that women are a systematically devalued gender group²¹-- may increase likelihood of encountering misogynists⁶⁵ and thereby intentional occurrences of discrimination on the basis of gender. As explored in the following paragraphs, beliefs about gender identity may increase the recognition of unfair treatment as unfair, and the attribution of discrimination to having a gendered basis, thus increasing reporting levels, particularly among more educated and privileged populations.

Like actual encounters with discriminatory treatment, perceptions of discrimination are similarly influenced by beliefs about identity, and can manifest even in the absence of intentionally and/or implicitly directed behavior. Historical contexts have been shown to inform beliefs about the rights to which members of one's gendered race group or social strata are entitled.^{38,57,68} Because black and white women and men have been differentially advantaged or disadvantaged as a result of historical practices and policies, these groups have likely come to define discrimination in distinct ways.^{53,62} Perceptions of being targeted by discrimination among members of dominant status groups such as whites or men, for example, may be based more in challenges to a perceived right to elevated status or right to discriminate rather than in being negatively stereotyped or made to feel inferior as is likely to be more prevalent among women and black persons.^{53,58,60,61} Feeling excluded from the full privileges of dominant group membership as a result of not meeting the canonical archetype of whiteness (such as whites of Arab, Irish or Italian heritage, or men who struggle to achieve full financial

independence as an essential component of “true” masculinity) can also lead to the perception of discriminatory treatment.^{62,65}

The notable discrepancy in reported gender discrimination between black and white men we found has been previously highlighted in the literature^{14,56} and further speaks to the influence of gendered racial identity on perceiving discrimination.¹⁴ White women were as likely or more so than black women in each city to report gender discrimination in multiple settings, while the frequency of reporting gender discrimination among black men was considerably higher than among white men. If men’s reported experiences of gender discrimination were purely on the basis of being perceived as male, the prevalence would be more comparable among black and white men, even accounting for SES differences between the groups. More likely, what black men recognize when attributing discrimination to their gender is the racialized aspect of their gender identity perceived by others, on which a host of stereotypes distinct from those applied to white men or black women, are founded.^{14,56} Negative characteristics such as unfounded aggression and threatening affect attributed specifically to the black male body^{14,66} are often cited as the basis on which discriminatory treatment against members of this group is enacted.⁶⁶ As nearly half of black men in this study reported experiencing both types of discrimination in various social settings, compared to only 5% of white men, our findings provide further evidence for a cornerstone of the Intersectionality and Multidimensional Identity frameworks—that inequity is embodied through multiple aspects of an individual’s socialized identity simultaneously.

Beliefs about gendered racial identity inform the third dimension of the interpersonal discrimination process, the reporting of discrimination, in multiple ways. Researchers have typically viewed the number of settings in which discrimination is reported as an indicator of the severity or frequency of discrimination experienced.^{7,32} These conceptualizations may not hold for all gendered race groups, however. As noted earlier, a large body of evidence has established the existence of social inequity; the disadvantaged statuses of black persons and women contrast with the advantaged social positions of white persons and men.^{5,21,38} For black women, reporting only one or no experiences of interpersonal racial or gender discrimination may therefore not correspond with a lack of exposure to actual occurrences but more likely reflects psychological or personality traits which lead to alternative attributions of adversity.^{8,14,63}

For example, racism targeted at black women frequently draws on dominant stereotypes about this group, that black women are incapable, loud, angry, and/or promiscuous.^{14,67} Beliefs about identity influence whether those experiencing this type of gendered racism differentially attribute the discrimination to their race or to their gender. Black women frequently conceptualize race as more central to their identity than gender^{14,68} and may therefore be more likely to characterize such experiences as racial rather than gender discrimination. For white men reporting no exposure or exposure in only one setting, the opposite is likely true; objective measures validate the comparatively infrequent nature of race or gender-based discrimination against members of this group. White men reporting frequent encounters of racial and gender discrimination may therefore be distinct in their belief systems from other white men.⁶⁰⁻⁶²

The IP model characterizes these pathologized identities of entitlement and privilege as catalysts for this subgroup of white men to perceive and report discrimination even in the absence of intentional or implicit discrimination targeted against them.

Further, there are likely individuals who report discrimination regardless of whether they have ever personally experienced or perceived discrimination. Like the factors influencing perceptions of discrimination, the reasons underlying misreporting of discrimination are varied and complex. Tenets of Social Identity theory suggest that identification with other mistreated members of their group^{35,36} might lead to perception or reporting of discrimination even by those black individuals who have not been directly exposed.³⁶ Dominant cultural narratives defining the scope of white entitlement^{53,54,60,61} may similarly inform misreporting of interpersonal discrimination among white persons. A recent national study found that over half of white millennials believe discrimination against white persons is as big a problem in the U.S. as discrimination against black persons.⁴⁴ This prevalent belief about white persons as targets of racial discrimination exemplifies what researchers have termed “competitive victimhood”,⁶⁹ inserting counter narratives that dominant status groups are being illegitimately targeted into discourses about the urgency of social justice. Such claims can underlie misreporting of discrimination by white persons and men who have never encountered an interaction they would even perceive as discriminatory.

Implications for cardiovascular health and disease disparities

The Identity Pathology model outlines potential mechanisms through which the joint effects of structured racism and sexism differentially impact on the experience of interpersonal discrimination among black and white women and men. Directly by positioning individuals to encounter discriminatory treatment and indirectly through shaping beliefs about identity, hierarchical social conditions inform the occurrence, perception, and reporting of interpersonal discrimination, which we argue largely accounts for the patterns observed in this and other community-based observational studies.

Regardless of whether an individual perceives and reports discrimination, individual instances of discriminatory behavior can have immediate, considerable, and long-term impacts on health. Gender and racial bias influence physician recommendations for cardiovascular tests,⁷⁰ pain management following CVD-related hospitalization,⁷¹ and use of emergency procedures in acute stroke treatment.⁷² These examples are select ways unperceived interpersonal discrimination contributes to the disproportionate cardiovascular disease morbidity and mortality among black persons and women. Perceiving devaluation on the basis of one's membership in a social group can also act in the absence of intentional or implicit acts, and regardless of reporting, to influence cardiovascular health through chronic activation of the sympathetic nervous system. As described in the introduction, repeatedly perceiving encounters with discriminatory treatment can serve as a chronic, toxic stressor by triggering awareness of unequal social conditions.^{11,73} When the resulting physiological responses to the

perception of inequity are sustained, permanent changes to the body's systems increase vulnerability to cardiovascular disease.^{10,73}

The setting in which discrimination is expected or perceived may also influence the stressfulness of the experience and the effect of exposure on cardiovascular health.^{14,40,73} Perceiving oneself as the target of discrimination by the police, for example, can be uniquely stressful owing to the physical violence and lack of legal repercussions that has often accompanied policing within certain gendered race groups and geographic regions.^{48,66,75} As an example, shooter biases are often attributed partially to police officers' perceptions of black males as more threatening and aggressive than either black females or white males.^{14,75} In this manner, the gender-specific racism which is more likely to occur in certain settings can lead individuals to employ coping strategies they believe are only available to and effective for members of their gendered race group¹⁴ (i.e. a proclivity for hypervigilance)⁶⁷ that increase risk for specific cardiovascular disease antecedents such as hypertension and obesity.^{76,77}

For individuals with increased risks of actually encountering discriminatory treatment on the basis of their gendered race, reporting discrimination may reflect coping behaviors that reduce the psychological strain caused by these experiences.⁷⁶⁻⁷⁸ Through increased access to social support and other health-promoting resources,⁷⁷ reporting exposure that actually occurs can be captured as a protective factor in epidemiologic studies, as is consistent with recent findings.^{15,74} On the other hand, when there is little overlap in the three dimensions of the interpersonal discrimination process, reported

discrimination likely captures pathological identity belief paradigms or subscription to “legitimizing myths”^{5,38} that carry negative implications for cardiovascular health. White men reporting multiple experiences of racial and gender discrimination may be of strong social dominance orientation,³⁸ harboring beliefs that legitimize the dominance of one social group over another in a manner contrary to the ideals of equity and justice on which the U.S. purports to be founded.⁵ These arguably marginalized belief systems can yield toxic stress through recurrent encounters with perceived rights and privilege violations, particularly as conversations around social equity become increasingly mainstream. Concomitant physiological wear and tear, social isolation, and negative coping may raise risk for cardiovascular dysfunction and disease among individuals subscribing to these pathologized identities.^{74,79}

Due to the disparate and complex ways in which discrimination acts on cardiovascular health and disease among black and white women and men, standard disease-exposure approaches will likely fail to adequately capture the variation in these relationships. Challenges to mapping analytical methods onto conceptual frameworks complicate the investigation of discrimination as a driver of racial and gender disparities in morbidity and mortality. For example, perceiving multiple forms of discrimination has been proposed as more damaging than experiences of discrimination based on a single social group characteristic (e.g. Udo and Grilo²² and Everson-Rose et. al.²⁴). Aside from the problematic assumption that individuals accurately attribute specific types of discrimination, extant theory suggests that intersectional experiences of discrimination will not necessarily have an additive effect.^{14,80,81} Because of the unique nature of the

discrimination experience for each gendered race group, reporting compounded experiences of inequity can differentially manifest as protective and harmful in epidemiologic studies.^{5,74} In this way, identity paradigms stemming from distinct social contexts yield coping mechanisms unique for each gendered race group which subsequently influence how experiencing discrimination will impact on disease risk.^{62,76} These disparate psychosocial states may link experiences of discrimination with different cardiovascular disease outcomes for black and white women and men, challenging efforts to isolate interpersonal discrimination exposure as a cause of disparities in cardiovascular outcomes between these groups.

Conclusions

The empirical findings of this study outline a number of key variations in the prevalence of reported racial and gender discrimination across daily life settings with potential implications for cardiovascular health disparities between black and white women and men. No previous research has detailed the distribution of multiple types and levels of discriminations across demographic factors and geographical areas in a manner that allows comparisons to be so clearly drawn between these four groups. Using these observed patterns as an empirical basis, the Identity Pathology framework suggests that there are as yet understudied but relevant structural and psychosocial factors that have profound impacts on the degree to which black and white women and men encounter, perceive, and report racial and gender discrimination in their daily lives.

Regardless of occurrence and perception, decisions to report being victimized by discrimination reflect disparate identity concepts constructed in contexts of social hierarchy. Reporting patterns--no discrimination, experiences in only one setting or multiple settings, multiple types of discrimination in multiple settings—are driven both by beliefs about identity and by the structured inequities shaping those beliefs. The IP model theorizes that these interdependent system and individual-level factors create unique circumstances under which interpersonal experiences of discrimination will be reported, calling into question whether interpersonal discrimination itself, or the pathologized identity paradigms represented in the reporting—or lack of reporting--of discrimination, are the better predictors of health risk. Our framework also emphasizes an important drawback to using interpersonal experiences of discrimination as a proxy for structured social inequity. Despite validity and reliability of measurement instruments in different populations, these experiences may not be comparable across gendered race groups depending on the setting in which discriminatory interactions are purported to take place, and may be incomparable even within gendered race groups across varied psychosocial factors. Grouping experiences of discrimination which differentially impact on health may mask important variation in associations with disease.

Given the observed patterns, I suggest that the rigor and utility of subsequent studies on interpersonal discrimination and cardiovascular disease can be increased with careful attention to a number of considerations. In conceptualization, analysis, and presentation of findings on interpersonal discrimination, researchers should distinguish the terms “percieved” and “reported”. At most what can be captured in survey-based

methods are reported experiences, and, as argued in this paper, the two terms are not interchangeable. Analytic methods (stratification by gendered race, decomposition analysis⁸²) and conceptual approaches (treating gendered race as a single measurable characteristic rather than modeling the joint effects of race and gender or race and sex as statistical interactions^{14,83}) can also aid improvements in capturing the complexity of discrimination as a health-damaging exposure.

More research is necessary to build empirical evidence for the IP model. Moreover, future research aiming to characterize the consequences of unequal social status on cardiovascular disease outcome differences between black and white women and men should continue to consider ways of expanding the types of exposures evaluated beyond experiences of interpersonal discrimination, which may account for only a very limited proportion of disease burden. Even still, current measures of interpersonal discrimination have provided a useful foundation for the daunting challenge of elucidating mechanisms for the effects of structured inequity on health. Research employing these measures has spearheaded the movement to address downstream causes of disease, contributing insights to the epidemiological literature on the importance and complexity of social exposures. My objective is therefore not to dismiss or minimize the significance of the work to date, but rather to provide a framework built on the strength of this work to guide future analyses toward a more targeted approach to understanding and intervening on persistent and growing gendered racial disparities in cardiovascular disease.

Table 2.1. Participant Characteristics at Year 7 by Number of Settings and Type of Reported Discrimination across Gendered Race Groups in the CARDIA Study

	Black women			Black men			White women			White men		
Age, yrs (mean)	31.3			31.1			32.5			32.3		
# of settings	0	1	2+	0	1	2+	0	1	2+	0	1	2+
Racial discrimination												
%	23.4	14.4	62.2	16.0	11.9	72.1	69.5	17.0	13.5	70.4	17.8	12.2
Education, %												
< High school	10.0	6.3	4.9	17.7	12.4	9.0	2.9	1.6	5.2	3.3	1.7	11.1
High school degree	34.0	37.5	24.2	42.3	28.9	31.4	18.1	13.7	16.3	15.5	18.1	23.1
Some college or	50.6	52.5	62.0	34.6	51.5	51.2	50.8	56.3	45.1	53.4	53.1	46.8
Graduate or	5.4	3.8	8.9	5.4	7.2	8.4	28.2	28.4	33.3	27.9	27.1	19.0
Income, % < \$25K	55.6	54.9	44.0	59.8	50.0	46.4	23.9	30.3	35.0	26.9	27.6	32.7
Gender discrimination												
%	28.2	16.2	55.6	38.8	15.0	46.2	24.7	22.1	53.2	70.2	16.5	13.3
Education, %												
< High school	8.6	3.9	5.8	10.1	10.7	11.4	6.3	1.7	2.0	3.2	5.5	6.3
High school degree	33.9	30.2	25.1	28.4	38.5	34.7	27.4	16.3	12.8	14.7	25.0	18.3
Some college or	51.4	57.5	61.4	50.2	45.1	48.4	47.0	57.1	50.2	51.9	45.1	64.1
Graduate or	6.1	8.4	7.7	11.3	5.7	5.4	19.3	25.0	35.0	30.3	42.4	11.3
Income, % < \$25K	51.0	51.0	47.6	25.9	25.1	35.0	25.9	25.1	35.0	23.6	38.5	32.7
Both racial and gender discrimination												
%	16.1	4.3	47.7	12.6	5.3	42.4	22.8	4.7	11.2	56.9	5.0	5.4
Education, %												
< High school	12.3	4.2	5.2	17.5	11.4	10.1	6.0	2.1	4.9	3.0	0.0	9.3
High school degree	34.7	29.2	23.8	43.7	36.4	34.2	28.4	22.9	14.9	14.5	34.0	25.9
Some college or	48.0	62.5	62.6	33.0	47.7	50.1	48.0	56.3	43.8	52.1	38.0	59.3
Graduate or	5.0	4.2	8.3	5.8	4.5	5.5	17.6	18.8	36.4	30.3	28.0	5.6
Income, % < \$25K	53.3	48.9	43.4	56.4	47.5	50.5	26.5	22.0	36.0	23.0	29.5	35.4

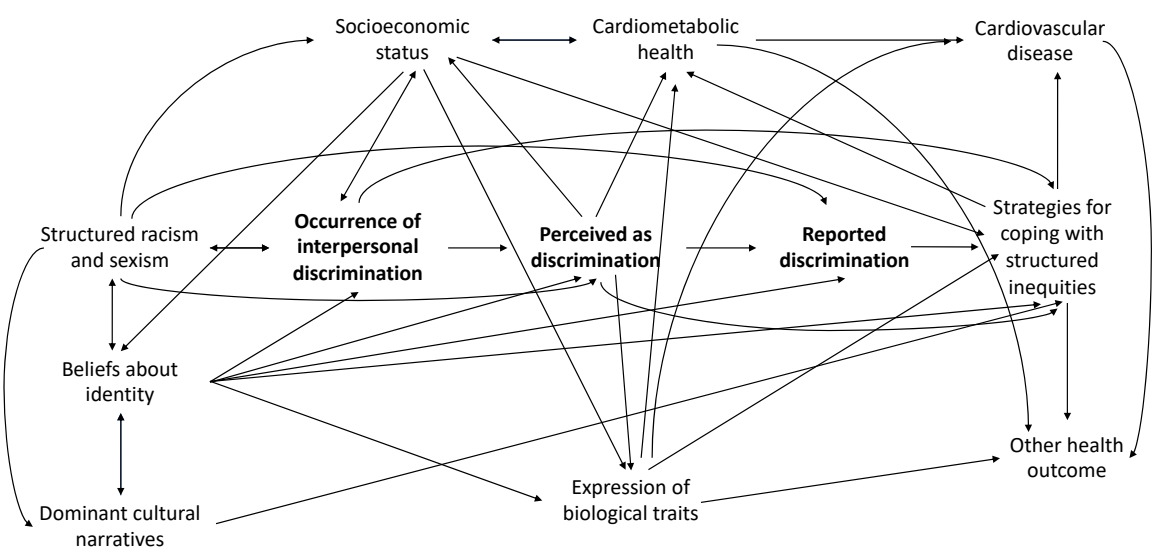
Table 2.2 Percentage Reporting Both Racial and Gender Discrimination[†] in Daily Life Settings by Gendered Race and City in the CARDIA Study, %[‡]

Setting	Black women	Black men	White women	White men
Birmingham				
In public/on the street	36.2	36.1	10.0	6.2
Getting a job	29.1	33.5	1.1	4.2
Getting housing	21.4	24.4	1.6	2.2
At work	32.3	32.5	5.6	4.3
At school	11.8	8.9	2.2	2.4
Receiving medical care	8.3	6.3	1.0	1.4
By the police or courts	13.7	39.3	1.6	4.8
At home	10.3	6.0	15.6	2.6
Chicago				
In public/on the street	44.1	38.0	12.8	3.7
Getting a job	31.0	26.7	4.0	1.4
Getting housing	26.4	29.6	1.3	1.0
At work	35.4	32.0	4.4	2.8
At school	14.0	13.3	4.0	<1.0
Receiving medical care	9.6	11.3	<1.0	1.0
By the police or courts	25.5	60.6	3.0	3.1
At home	14.2	7.7	17.2	4.0
Minneapolis				
In public/on the street	59.2	48.4	25.0	10.3
Getting a job	35.3	39.6	3.8	3.5
Getting housing	40.5	41.3	1.4	1.2
At work	42.4	40.1	4.4	4.8
At school	23.4	22.5	5.2	1.9
Receiving medical care	10.3	9.9	2.9	1.0
By the police or courts	44.8	70.2	2.8	3.0
At home	16.2	11.5	24.8	6.4
Oakland				
In public/on the street	51.3	38.2	30.0	12.3
Getting a job	31.7	28.7	3.0	4.6
Getting housing	31.2	32.3	1.6	<0.1
At work	43.3	30.0	8.4	2.5
At school	23.6	15.5	9.8	6.2
Receiving medical care	8.6	3.6	<1.0	1.0
By the police or courts	28.0	61.0	1.0	3.3
At home	14.4	5.2	26.1	6.6

[†]At year 7, discrimination “at home” was excluded from the race or color scale; “by the police or courts” and “getting housing” were excluded from the gender scale.

[‡]All comparisons across gendered race groups were statistically significant at P=0.05.

Figure 2.1. Application of the emerging Identity Pathology framework to describe potential pathways from intersecting axes of structured racism and sexism through interpersonal discrimination to cardiovascular disease



CHAPTER III**INTERSECTIONAL EFFECTS OF RACIAL AND GENDER DISCRIMINATION ON
CARDIOVASCULAR HEALTH VARY AMONG BLACK AND WHITE WOMEN AND
MEN**

Abstract

Background Some evidence suggests a synergistic effect of exposure to multiple forms of discrimination on cardiovascular health (CVH) among U.S. black and white women and men. Testing hypotheses from the emergent Identity Pathology framework, I assessed whether there are gendered racial differences in the effects of reporting experiences of racial and gender discrimination simultaneously compared with racial or gender discrimination alone, or no discrimination, on future CVH.

Methods Data were from a sample of 3,758 black or white adults in CARDIA, a community-based cohort recruited in Birmingham, AL; Chicago, IL; Minneapolis, MN, and Oakland, CA in 1985-6 (year 0). Racial and gender discrimination were assessed using the Experiences of Discrimination scale at year 7. CVH at year 30 was evaluated using a 12-point composite outcome modified from the AHA's Simple 7, with higher scores indicating better health. Multivariable linear regressions evaluated the associations between level of reported discrimination at year 7 and CVH scores at year 30 stratified by gendered race.

Results Reporting racial and gender discrimination in ≥ 2 settings were 48% of black women, 42% of black men, 10% of white women, and 5% of white men. Year 30 CVH scores (mean, SD) were 7.9(1.4), 8.1(1.6), 8.8(1.6), and 8.7(1.3), respectively. Compared with those of their gendered race groups reporting no discrimination, white women reporting only gender-based discrimination saw an adjusted score difference of +0.3 ($p=0.04$), whereas white men reporting only racial discrimination had on average a 0.4 ($p=0.02$) higher score, and scores among white men reporting both racial and gender

discrimination were on average 0.6 ($p=0.03$) lower than those of their group reporting no discrimination.

Conclusions Reported racial and gender discrimination interact in their association with CVH differently for different gendered race groups. More research is needed to understand why reported discrimination might better predict CVH for whites than blacks, and which other factors associated with gendered race contribute variability to CVH among these groups.

Introduction

Due to prominent disparities in cardiovascular outcomes between black and white women and men in the United States,^{1,2} researchers have examined social group-specific exposures as potential contributors to these inequities.³ Consistent with the dominant biomedical, individual-level orientation of epidemiological research,⁴ the literature has largely focused on interpersonal racial discrimination as a driver of poorer cardiovascular health (CVH) within these groups.³⁻⁶ Previous studies have linked reported racial discrimination to sedentary behavior, smoking, hypertension, obesity, and incident cardiovascular disease (CVD) within black and white populations.⁷⁻¹¹ Because the prevalence of reported interpersonal racial discrimination is substantially higher among black persons than whites,¹²⁻¹⁵ these findings have generally been interpreted through the lens of differential exposure rather than vulnerability.¹⁶ That is, a higher prevalence of disease theorized to correspond with a higher prevalence of exposure, rather than with a greater vulnerability to the effects of exposure.^{4,5} Consequently, consensus has leaned toward an association of what has been conceptualized as “perceived” but measured as “reported” racial discrimination with the disproportionate rate of cardiovascular morbidity and mortality among blacks.³⁻⁵

Yet, while structural and interpersonal discrimination are also more prevalent among women,^{12,17,18} recent evidence showing no association of reported gender discrimination with incident CVD,¹¹ along with other recent findings inconsistent with previous evidence,¹⁹ calls into question unidimensional conceptualizations of

discrimination as a cause of poorer CVH. A focus on differential exposure to interpersonal discrimination as underlying racial and gender disparities in CVH may prevent identification of other relevant group-specific characteristics such as varying susceptibility to the health effects of perceiving discrimination.^{4,20-24} For example, a recent study assessing the effect of cumulative unfair treatment on subclinical CVD among a multi-ethnic sample of women found an association only among white women.²⁴ Such evidence supports the argument^{12,25,26} that while women and black persons are more likely to experience both structural and interpersonal gender or racial discrimination, men and white persons may be more susceptible to the health consequences of perceiving interpersonal discrimination. Whether this increased vulnerability is due to a lower tolerance for psychosocial adversity^{27,28} or stress stemming from the absence of objective evidence or consensus that such experiences frequently occur to members of dominant status groups^{12,29} has yet to be determined.

Within-gender racial differences (referred to as “gendered racial” from here out) in the prevalence and severity of CVD further highlight the necessity for a stronger theoretical foundation in understanding the role of discrimination in yielding CVH disparities.^{12,17} The age-adjusted likelihood of a CVD diagnosis is approximately equal for black and white men,^{30,31} but black women are nearly twice as likely as white women in the same age group to develop CVD.³⁰⁻³² Black women are also more likely than white women or black men to develop cardiometabolic precursors to CVD.^{1,33} Among other risk factors,^{4,33} researchers frequently attribute this increased risk among black women to a greater likelihood of experiencing racial and gender discrimination.^{17,23,34} Unlike the

large gender disparity among whites, however, black women and men report comparable exposure to interpersonal gender and racial discrimination^{12,35} even as black men develop CVD at a faster rate than black women.^{1,2,32} The complex relationships of these psychosocial exposures with CVH among black and white women and men connoted in the literature point to a need for further consideration of how and in whom discrimination operates to affect risk for disease.⁴

The emergent Identity Pathology framework¹² provides a useful model for investigating these inconsistencies in the relationship of discrimination with CVH. This framework describes the health impacts of occupying multiply marginalized social positions, positing an effect of systemic race and gender inequities, as well as associated psychosocial factors, on the relationships of interpersonal discrimination with CVD. The model is distinct from Intersectionality theory³⁶ in that it hypothesizes the concept of identity pathology, which describes a disease-prone state characterized by certain acquired beliefs about individual or group identity that are inherently pathological, as a primary mediator of the effects of unequal social conditions on health. Constructed in the context of structured inequities such as institutional racism and sexism, these identity beliefs are informed by unique experiences at the junction of multiple social group designations and may account for the types of chronic diseases prevalent among different socially-defined groups. While not solely applicable to CVD, the model is useful for clarifying inconsistencies in the literature on interpersonal discrimination and CVD because it specifies the conditions under which—and in whom—reported experiences of

interpersonal discrimination will be measured as damaging to CVH and lead to the development of disease.

The major premise of the IP framework is that in moderating whether and how exposure to chronic psychosocial stressors will affect disease, socially-constructed identities can be rendered pathological. Gaining a more thorough understanding of the effects of psychosocial stressors on disease outcomes therefore requires additional clarity on the ways in which identity shapes the experience of stress. As applied to CVD disparities and interpersonal discrimination, the model makes three central assertions. First, that in order to more accurately capture the effects of interpersonal discrimination on cardiovascular health and health disparities, multiple aspects of the discrimination experience must be considered in the design, analysis, and interpretation of epidemiologic studies. Secondly, the IP framework posits that experiences of interpersonal discrimination are fundamentally based in historically structured inequities that impact on each dimension of the discrimination process in health-relevant ways. Finally, the model purports that the precision with which reported experiences map onto perceptions and intentionally or implicitly-driven acts of discrimination depend on a variety of psychosocial characteristics, one of the most important of which is an individual's beliefs about their gendered racial identity. Importantly, the framework does not assert that compounded inequity necessarily translates to greater likelihood of a specific disease outcome. Contrarily, the lived experience of race and gender in a society which advantages some groups based on these sociodemographic traits while disadvantaging others^{17,23} is framed as generating toxic stress that manifests as a

differential vulnerability to disease and also yields variation in the efficacy of protective factors across gendered race groups.^{4,25,36,37}

Extant epidemiological literature in accordance with the IP framework has identified gendered racial differences among black and white women and men in lung cancer treatment and mortality;²³ in the protective effects of income on depression;²¹ in the association of depression with mortality;²² in the association of discrimination with CVD risk factors;³⁸ and in the link between chronic stress and depression;^{25,39} among other exposure-health combinations. Udo and Grilo¹¹ also showed a larger effect on CVD events for individuals reporting race and weight discrimination compared with those reporting either or none, although the authors did not examine whether effects varied by gendered race. These studies suggest that the contribution of discrimination to disparities in CVH may extend beyond gendered racial variation in exposure to gendered racial differences in the effect of perceiving multiple forms of interpersonal discrimination. Because increased exposure to social stressors among marginalized groups may yield an array of adaptive coping strategies that are protective against the health consequences of psychosocial adversity, the IP model predicts, perhaps counterintuitively, that the association between reports of racial and gender discrimination and declining CVH will be stronger among members of dominant status groups.

The aim of this study was to empirically test hypotheses generated from the IP framework. Specifically, the analysis evaluated whether the associations of reported interpersonal experiences of racial and gender discrimination simultaneously compared

with racial or gender discrimination alone, or no discrimination, with cardiovascular health 23 years later among a community-based sample of black and white women and men in four U.S. cities was stronger among white men than other groups.

Methods

Study design and participants

The Coronary Artery Risk Development in Young Adults (CARDIA) study is an ongoing community-based prospective cohort study of risk factors for cardiovascular disease conducted in four U.S. centers (Birmingham, AL; Minneapolis, MN; Chicago, IL; and Oakland, CA). 5,114 self-reported black and white persons, aged 18 - 30 years at baseline examination (1985-1986), were recruited primarily from random-digit dialing of community lists and random selection from a health-care plan.^{40,41} The goal of recruitment was to balance on gender and race; participants aged 18 - 25 years and those older than 25; and those attaining a high school education or less, and those with more education, across the four centers. The institutional review board at each center approved the CARDIA study protocol and informed consent was obtained from each participant. Following the initial examination, participants were re-surveyed at years 2, 5, 7, 10, 15, 20, 25, and 30 post-baseline.

Reported discrimination

The primary exposure was reported interpersonal discrimination based on race and gender as a source of chronic, toxic psychosocial stress. Discrimination was first assessed

in the CARDIA study at 7 years post-baseline, using the valid and reliable Experiences of Discrimination scale.¹³ Participants reported having ever experienced discrimination, been prevented from doing something, or been hassled or made to feel inferior (yes/no) in any of the following settings: at school; getting a job; at work; at home; getting medical care; getting housing; by the police or courts; or on the street or in a public setting. At year 7, the racial discrimination scale excludes “at home” and the gender discrimination scale excludes “getting housing” or “by the police or courts”.

Previous CARDIA studies have treated discrimination as a 4-category variable to capture the extent and persistence of discrimination in only one subscale (race or color) across years 7 and 15.³⁷ Because preliminary analyses of CARDIA data show that the prevalence of reported race and gender discrimination is comparable at years 7, 15, and 25 within each gendered race group, we used discrimination reported at year 7 only. Each type of discrimination (based on gender or race or color) was categorized as reported in 0, 1, or ≥ 2 domains, as these categories are shown to represent variable health risk.³⁷ To contrast single with multiple forms of discrimination, the main exposure variable included five categories: none (no racial or gender discrimination reported); any racial only (only racial discrimination in one or more settings); any gender discrimination (only gender discrimination in one more settings); any racial and gender, in <2 settings; and racial and gender discrimination, in ≥ 2 settings. Information on gendered race (black women/black men/white women/white men) and city (as measured by study center) was taken from data collected at baseline. Less than 5% reported geographic migration

between baseline and year 7, so the study center in which the last exam (prior to the first reported experience of discrimination) was conducted was used for geographic location.

Cardiovascular health score

The primary outcome was a cardiovascular health score, based on the American Heart Association (AHA) Simple 7 Cardiovascular Health scoring.¹ Because no dietary measures were included in the analysis, the composite score comprised six rather than seven different measures including two behavioral factors (smoking status and physical activity) and four cardiometabolic factors (hypercholesterolemia, hypertension, obesity, and diabetes defined per AHA and National Heart, Lung, and Blood Institute guidelines). The total score was calculated as a summation of points assigned for each factor. Smoking status was operationalized as self-report of never (2 points), former (1 point), or current (0 points). Physical activity was defined by CDC guidelines for promoting cardiovascular health (ref) as ≥ 75 minutes/week vigorous physical activity (VPA) or ≥ 150 minutes/week of moderate physical activity (MPA) (2 points); $< 75, > 0$ minutes/week VPA or $< 150, > 0$ minutes/week MPA) (1 point); and none (0 points). Hypercholesterolemia was operationalized as total cholesterol < 200 mg/dL (2 points); 200-239 mg/dL (1 point); and ≥ 240 (0 points); hypertension as the average of three systolic/diastolic readings $< 120/80$ (2 points); 120/81-139/89 (1 point); and $\geq 140/90$ (0 points); obesity as body mass index (BMI) of < 25 kg/m² (2 points); 25-29.9 (1 point); ≥ 30 (0 points); and diabetes as fasting blood glucose of < 100 mg/dL (2 points); 100-125.9 (1 point); and ≥ 126 (0 points). Total scores ranged from 0-12, with higher points

indicating healthier status. The cardiovascular health score was treated as a continuous variable.

Covariates

Potential confounders for this analysis are limited to age (continuous), and geographic location, measured by the study center in which the year 7 exam was conducted. Other potentially relevant sociodemographic variables such as annual family income, marital status, and education level were not included as confounders because they were conceptualized as potential mediators. However, given hypothesized racial differences in the pathways from interpersonal discrimination to CVD, we also conducted sensitivity analyses with models additionally adjusting for SES (as measured by years of education) among white women and men.

Statistical analysis

Descriptive statistics including age, study center, type and level of discrimination, and CVH scores were calculated for each gendered race group using Pearson's chi-square test for categorical variables and t-tests for continuous variables. Multivariable linear regressions were used to evaluate the associations between category of perceived discrimination at year 7 and CVH scores at year 30 (or the last follow-up) for those reporting both racial discrimination and gender discrimination (either in <2 or ≥ 2

settings) compared with those reporting racial or gender discrimination alone, or no discrimination, stratified by gendered race group. Models were adjusted for age and geographic location. We conducted additional significance testing **using likelihood ratio tests?** to assess non-zero differences between group-specific coefficients. Analyses were conducted using Stata 14.0 (ref).

Terminology

The term “gendered race” captures the concomitant elements of socially-assigned gender and race categories that cannot be decomposed, neither within an individual’s self-concept nor in the manner by which social inequities operate to structure privilege and marginalization based on these characteristics. Although CARDIA measures only binary biological sex, we use a “race x sex” variable as a proxy for gendered race, intentionally distinguishing any biologically-driven effects from the hypothesized effects of race-dependent socially-constructed characteristics captured in gender.

Results

There was considerable variation in the prevalence of each level and type of discrimination reported by each gendered race group, and in CVH scores across categories of discrimination (table 1). Among black women and men, 84% and 88%, respectively, reported some form of racial or gender discrimination exposure, compared

with 67% of white women and 42% of white men. Of these, the proportion of black women (48%) and men (42%) reporting both racial and gender discrimination in ≥ 2 settings was comparable, while twice as many white women (10%) as white men (5%) reported exposure to both forms of discrimination. Within each gendered race group, unadjusted CVH scores also varied by level and type of discrimination. Among black women and white men, those reporting only racial discrimination had the highest CVH scores of their groups, while white women reporting only racial discrimination had lower scores than white women reporting in all other categories. For men of both races, those reporting both types of discrimination in ≥ 2 settings had lower CVH scores than those in their groups reporting no exposure. For women, those reporting dual exposure had approximately the same scores as women reporting no experiences of discrimination.

Adjusted differences in CVH score at year 30 across levels and type of discrimination for each gendered race group can be found in table 2. Among black women and men, neither racial nor gender discrimination, alone or in combination, was statistically significantly associated with CVH score. For black women, there was a positive association between reporting only racial discrimination and CVH score which approached significance ($\beta = +0.4, p = 0.06$). White women who reported experiencing only gender discrimination saw a positive difference ($\beta = +0.3, p = 0.04$) compared with white women reporting no discrimination. Among white men, whether the CVH score difference was positive or negative depended on both the type and level of discrimination. White men reporting only racial discrimination saw a positive difference of $+0.4$ ($p = 0.02$) compared with white men reporting no discrimination, while those

reporting racial and gender discrimination in ≥ 2 settings had lower CVH scores ($\beta = -0.6$, $p = 0.03$).

In the sensitivity analyses (data not shown), which included models additionally adjusting for years of education in white women and men, all effect estimates became non-significant, except among white men reporting only racial discrimination, among whom the coefficient remained $\beta = +0.4$, $p = 0.02$.

Discussion

Our findings identified important characteristics of the relationships between reported racial and gender discrimination and cardiovascular health (CVH). Black women and men were comparable in likelihood of reporting experiences of racial and gender discrimination in multiple settings, while twice as many white women as men reported experiencing both types of discrimination. In addition to gendered race differences in magnitude of exposure, there were differences in the associations between reported gender and racial discrimination and CVH score, suggesting differential vulnerability. No statistically significant associations were found among black women or men. Among white women, reporting any gender discrimination predicted higher CVH scores than reporting no discrimination. For white men, predicted CVH scores were higher for those reporting any racial discrimination, and lower for those reporting racial and gender discrimination in at least two settings, than in those reporting no discrimination.

These results are consistent with the body of evidence describing varied experiences of interpersonal racial and gender discrimination among black and white women and men. Previous studies using CARDIA data^{12,13,37} as well as other community-based samples^{7,8} have shown the prevalence of reported racial discrimination to be slightly higher among black men than women and similar between white women and men. Also consonant with our findings, other studies show a higher prevalence of reported gender discrimination among women than men, but only among white persons; black men have previously been shown to report levels of exposure to gender discrimination comparable to black women.^{12,34}

On the other hand, our findings contrast with those describing a link between racial discrimination and poorer cardiovascular health among black persons.^{4,5,37} Though inconsistent, the literature has demonstrated associations of reported racial discrimination with CVD risk factors including diet, hypertension, smoking, sedentary behavior, obesity, and inflammation,^{7,10,37,42} as well as social predictors of CVD such as marital status, socioeconomic position, and education, in both black women and men.^{4,15,43} In this study, we did not find a statistically significant association between racial discrimination and poorer CVH within these groups. Other cross-sectional analyses^{8,44} and the only study prospectively examining the relationships of racial discrimination with incident CVD exclusively among black women and men have also failed to find a connection.¹⁹ Taken together, these findings offer evidence that traditionally accepted risk factors may be poorer predictors of CVD among black persons, as has been previously posed.³² Accordingly, while interpersonal racial discrimination may increase the likelihood that

black women and men develop cardiometabolic risk factors for CVD, other factors integral to the experience of multiply marginalized identities may have a much more substantial impact on the development of CVD in these groups. As these other potential risk factors remain under studied,^{4,17} the long history of investigating discrimination as a cause of poorer health has done little to expand an understanding of CVD disparities between black and white women and men. Consequently, there is limited evidence that a continued focus on interpersonal discrimination as a cause of increased CVD burden among black women and men is even warranted.

In addition to suggesting alternative causes of higher CVD morbidity and mortality among marginalized groups, our emerging IP model theorizes that discrepancies between the occurrence, perception, and reporting of interpersonal discrimination contribute to the observed variability in the associations of reported racial and gender discrimination with CVH among black and white women and men. The model suggests that for some gendered race groups in certain places and settings, reported discrimination is more likely to reflect interactions that meet objective standards of inequitable treatment. In these cases, acknowledging experiences that actually occur may be beneficial for health, while denying may lead to increased stress and stress-related pathology regardless of one's gendered race group.^{42,47} From building social networks based on shared experiences to enabling the development of healthier coping behaviors,^{37,48} recognizing and acknowledging the discrimination one encounters may allow for chronic stress relief that reduces risk for CVD.^{42,47} Reported experiences of

racial and gender discrimination may thus be measured as protective among those against whom such experiences actually occur.

This would explain why, relative to those of their gendered race group reporting no discrimination, white women reporting only gender discrimination on average had higher CVH scores. Although effect estimates did not reach statistical significance among black women, we believe they warrant discussion given their consistency with theory proposed in the IP model, particularly the coefficient for black women reporting only racial discrimination. The positive CVH score increase among this group of black women is consistent with the theory that reporting experiences of discrimination that actually occur may indicate a tendency for health-promoting coping strategies. We also do not take the non-significant and negative effect estimates for black women reporting only gender discrimination as indication that the gender discrimination black women endure is somehow less impactful than racial discrimination. Instead, higher CVH scores among black women claiming to only have experienced racial discrimination in their lifetime (but no gender discrimination) suggests that within this group there are women whose racial identities predominate their self-concepts and who are therefore more likely to attribute any experiences of discrimination that occur to their race.⁴⁹ Regardless of attribution, acknowledging everyday experiences of discrimination that actually occur may in fact be protective of CVH, as is indicated by previous research⁴⁸ and a recent longitudinal study.¹⁹

To fully account for our results in the context of this theory, it is important to note that across the four gendered race groups, reporting or not reporting exposure likely signify different health-relevant psychological and emotional states.^{12,49} The relatively low percentage of black women who reported experiencing no racial or gender discrimination did so despite a considerable body of evidence to the contrary, indicating a measure of denial or “tough it out” mentality in this group⁴⁹ distinct from the evidence-based reasons that a much greater proportion of white men would report no exposure. Even within gendered race groups, the meaning of reported exposure to discrimination may vary. As proposed in the IP framework,¹² white men reporting few experiences of racial discrimination may subscribe to identity paradigms distinct from those in their group reporting both racial and gender discrimination in multiple settings. The framework posits that among white persons, reported experiences of racial discrimination in only one setting (e.g. at school) may be more likely to meet objective standards of discriminatory treatment, particularly in metropolitan areas such as Oakland with a greater degree of racial integration. Accordingly, higher average CVH scores among white men who reported only racial discrimination would not be inconsistent with a protective effect of reporting interpersonal experiences of discrimination that meet objective measures. That is, white men who reported only exposure to racial discrimination were likely the white men for whom the overlap of the occurrence, perception, and reporting of discrimination was relatively accurate. As the IP model predicts, in such cases, there is likelihood that reported discrimination will be measured as protective of CVH. That the positive effect on CVH among white men reporting only

racial discrimination persisted even after adjusting for SES further supports this assertion.

Among white persons in other places and settings, perceiving discrimination in the absence of external validation of such experiences may represent endorsement of belief systems which generate chronic, toxic stress in a society proclaiming ideals contrary to these beliefs—beliefs about identity which the IP framework positions as pathological. In support of this theory, one study examining reported experiences of racial discrimination and inflammation found the association to be highest among white women reporting exposure in at least three settings while no associations were found among black women or men reporting in as many settings.⁴² Further, having had fewer opportunities than black persons to become accustomed to the psychological hardship of perceiving unequal treatment,^{27,28} white persons may be more vulnerable to the negative effects of perceiving racial and gender discrimination on CVH.^{27,28,42}

Limitations

There are some limitations to this analysis requiring acknowledgment. CVH health scores are taken from data at the last follow-up. For some participants, this is as early as year 15. Because CVH scores are associated with age, there is potential that those participants retained through year 30 have lower CVH scores because they are older. Although the rate of attrition is slightly higher among black women and men, we do not believe differential dropout rates significantly impacted on effect estimates due to the high proportion of participants in each gendered race group whose CVH scores were

calculated based on year 30 data. This study also only measures lifetime discrimination; findings may be different for different measures of discrimination, such as those assessing frequency of encounters. CVH scores for this study were modified from the AHA's simple 7 and do not include dietary measures. For this reason, CVH scores may not reflect cardiovascular health with the same accuracy. Despite this modification, we believe that the included markers sufficiently represent risk for poorer cardiovascular outcomes and therefore do not negate the validity of our findings. Finally, the epidemiological nature of the data used in this analysis precludes additional exploration of some of the proposed explanations for our results. We do, however, base our interpretations on strong--though in some instances empirically untested—evidence and believe the perspectives merit consideration as researchers continue to seek explanations for the complex problems of racial and gender disparities in CVD.

The sensitivity analyses we conducted revealed that adjusting for years of education attenuated effect estimates among white women who reported only gender discrimination and white men who reported both racial and gender discrimination. Because SES is known to highly correlate with reports of racial discrimination and with CVD among whites, these results may indicate a spurious association of CVH with reported discrimination in this study. However, as noted, the effect estimates among white men who reported only racial discrimination persisted despite accounting for SES. This suggests that rather than contradicting the IP theory, the additionally adjusted analyses offer some evidence that white men who report experiencing only racial discrimination may be fundamentally distinct from those reporting both racial and gender

discrimination in multiple settings. The distinctions between these groups of white men, potentially regarding identity beliefs about racial and gender hierarchy that might influence perceptions of discrimination, also appear to have important implications for CVH. Additional research is needed to empirically assess whether identity pathology accounts for any of the increased risk for CVD prevalent among white persons of lower SES.

Conclusions

This study offers evidence of important variation in the health effects associated with reported racial and gender discrimination among black and white women and men, while also providing empirical support for the emerging IP framework.¹² Our findings suggest that the literature remains conflicted on the relationships of interpersonal discrimination with CVH perhaps because the associations vary between these groups in direction and magnitude. Black persons and women may be at greater risk for exposure, but white men appear to be most susceptible to the negative effects of perceiving multiple forms of discrimination on CVH. These results highlight the necessity for additional research in a number of areas. Studies with larger sample sizes can statistically verify differences in the effect estimates between these groups and allow for a more confident interpretation of findings. As previously postulated,¹³ the experience of interpersonal discrimination among white persons appears fundamentally distinct from that of black persons in ways that impact on health and disease. Qualitative methods are necessary to explore the

meaning and health significance of reported discrimination in more depth within white populations.

In trying to understand the factors driving increased CVD burden among black women and men, more attention should also be given to other characteristics comprising the unique social experiences of these groups. In a society still fraught with structured racial and gender inequity, multiply marginalized individuals may be forced to navigate in ways that more substantially contribute to their increased risk for disease than being mistreated on a personal basis. If the intent of examining interpersonal discrimination as a predictor of health is to identify possible interventions on CVD disparities, future research should consider more in-depth exploration of the causes behind differential reporting of discrimination, and whether these predecessors are better predictors of CVH. Such lines of investigation may yield more comprehensive explanations of persistent CVH inequities and identify targets for intervention more amenable to change.

Table 3.1 Reported Racial and/or Gender Discrimination and Cardiovascular Health Score (CVH) by Gendered Race: CARDIA, 1992-2016.

	Black women		Black men		White women		White men	
N	1039		743		1045		931	
Yr 30 age, mean yrs (SD)	54.6 (3.8)		54.3 (3.7)		55.6 (3.4)		55.5 (3.3)	
Reported Discrimination	Yr 7 Disc., %	Mean (SD) CVH Score ^a	Yr 7 Disc., %	Mean (SD) CVH Score	Yr 7 Disc., %	Mean (SD) CVH Score	Yr 7 Disc., %	Mean (SD) CVH Score
None	15.7	7.6 (2.0)	12.4	8.3 (1.5)	22.6	8.7 (2.1)	57.8	8.7 (1.8)
Only racial	12.1	8.0 (1.8)	27.5	8.2 (1.8)	2.0	8.5 (2.0)	13.0	9.2 (1.6)
Only gender	6.8	7.3 (2.0)	3.1	8.5 (2.1)	47.0	9.0 (2.0)	13.6	8.7 (1.9)
Any racial or gender, in <2 settings	17.5	7.7 (1.8)	15.1	8.3 (1.9)	18.0	9.0 (2.0)	10.8	8.5 (2.0)
Both racial and gender, in ≥2 settings	47.7	7.8 (1.9)	41.9	8.0 (1.7)	10.4	8.8 (2.0)	4.8	8.2 (1.8)

^aHealth scores are calculated based on data collected in year 30 or the last follow-up, using six components with a total possible 12 points: body mass index, total cholesterol, systolic blood pressure, fasting glucose, smoking status, and physical activity. Higher scores indicate better health.

Table 3.2 Adjusted Difference in Cardiovascular Health Score^a for Categories of Reported Racial and/or Gender Discrimination compared to No Reported Discrimination by Gendered Race^b: CARDIA, 1992-2016

Discrimination (year 7)	Black women		Black men		White women		White men	
	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>
None	ref	-	ref	-	ref	-	ref	-
Any racial only	+0.4	0.06	-0.1	0.74	-0.3	0.47	+0.4*	0.02
Any gender only	-0.3	0.28	+0.2	0.56	+0.3*	0.04	0.0	0.98
Any racial or gender, in <2 settings	+0.1	0.58	0.0	1.00	+0.2	0.24	-0.2	0.22
Both racial and gender, in ≥2 settings	+0.2	0.15	-0.3	0.18	0.0	1.00	-0.6*	0.03

^aHealth scores are calculated based on data collected in year 30 or the last follow-up using six components: body mass index, total cholesterol, systolic blood pressure, fasting glucose, smoking status, and physical activity. Higher scores indicate better health.

^bModels are adjusted for age and geographic location.

*Denotes statistically significant estimates

CHAPTER IV

SETTING MATTERS IN THE RELATIONSHIPS OF REPORTED

INTERPERSONAL DISCRIMINATION WITH CARDIOVASCULAR HEALTH:

FINDINGS FROM CARDIA

Abstract

Background The emerging Identity Pathology framework asserts that reporting experiences of interpersonal discrimination may be measured as either protective or damaging to cardiovascular health (CVH) depending on gendered race and the setting in which the interaction is reported to have occurred. We assessed the relationships of reported racial and gender discrimination in a variety of daily life settings with future CVH among black and white women and men.

Methods We used data from 3,758 black and white adults in CARDIA, a community-based, multi-city cohort assembled in the mid-1980s. Racial and gender discrimination in eight possible settings were assessed using the Experiences of Discrimination scale at year 7 (1992-93) and CVH at year 30 was evaluated using a 12-point composite outcome with higher scores indicating better health. Separate multivariable linear regressions evaluated the associations between reports of racial and gender discrimination and CVH score in each possible setting stratified by gendered race.

Results Mean (SD) CVH scores at year 7 were 9.4(1.7), 9.4(1.6), 10.3(1.4), and 9.4(1.8) among black women, black men, white women, and white men, respectively. For black women, reporting both racial and gender discrimination while receiving medical care was the only setting associated with poorer CVH. Among black men, reporting both forms of discrimination while getting a job, at work, at school, and while receiving medical care was associated with poorer CVH. Among white persons, reported discrimination while

getting housing and by the police or courts (women), and in public and at work (men), was associated with a lower CVH score.

Conclusions The setting in which discrimination is reported may be an important indicator of whether discriminatory experiences are negatively associated with CVH, providing insight on distinct effect pathways among racially diverse women and men.

Introduction

Although interpersonal discrimination has long been the focus of efforts to explain persistent disparities in cardiovascular disease between black and white women and men,^{1,2} it remains unclear how this psychosocial stressor is related to poorer cardiovascular health (CVH).^{2,3} Recent research^{4,5} suggests that conflicting findings in the epidemiological literature may be attributable, in part, to an inadequate conceptualization, measurement, and analysis of interpersonal discrimination in relation to CVH across racially and ethnically diverse populations. Evidence suggests that the complex, multifaceted nature of the interpersonal discrimination experience operates within distinct social groups to differentially influence CVH in a manner not frequently captured.^{2-4,6}

One such social group designation is “gendered race”, a term increasingly used to describe inseparable racialized and gendered identity characteristics that are internalized in the context of social inequity.^{6,7} Identity beliefs (e.g. gender-dependent racial identity) associated with social group membership can lead to variation in susceptibility to the health consequences of adverse psychosocial exposures, such as discrimination, through influencing the stressfulness of the experiences and risk for maladaptive coping.⁸ Current theories also suggest that the magnitude of stress these experiences cause and whether coping behaviors exacerbate or reduce the risk of cardiovascular disease depends on the context in which they occur.⁹⁻¹¹ As involuntary reminders of marginalization or privilege that manifest differently in various social contexts, discriminatory interactions can serve

as sources of stress that increase risk for poor CVH directly through recurrent activation of the inflammatory response, or indirectly through health behaviors leading to physiological wear and tear.^{2,12-14} Reported exposure to interpersonal discrimination may consequently be measured as either protective or damaging to CVH depending on an individual's gendered race and the setting in which the interaction occurs.^{6,9,15}

The epidemiological study of interpersonal discrimination has been undertaken largely in efforts to explain the excess burden of disease among marginalized persons. Because of this focus, little attention has been given to how reported discrimination among dominant status groups affects risk for cardiovascular disease,² an area of study that may reveal important drawbacks to concentrating on interpersonal discrimination as a driver of racial health disparities. There is also some suggestion that different types of discrimination—on the basis of race versus gender, for example¹⁶—pose different risks for poorer CVH, and that multiple forms of discrimination may have a more substantial effect on CVH than a single form of discrimination.¹⁷ Assumptions of a homogenous effect of interpersonal discrimination on health across gendered race and different social settings in which discrimination can be experienced may partially account for inconsistencies in studies that have examined associations between discrimination and cardiovascular disease risk.

To the best of our knowledge, no studies have previously examined the importance of social setting in determining whether experiencing multiple forms of interpersonal discrimination will affect CVH, and whether these relationships depend

further on an individual's gendered race. Using data from the Coronary Artery Risk Development in Young Adults (CARDIA) study, we examined whether setting matters for the associations of simultaneously reported racial and gender discrimination with future CVH in a large, community-based population of black and white women and men.

Methods

Study design and participants

The CARDIA study is an ongoing population-based prospective cohort study of risk factors for CVD conducted in four U.S. centers (Birmingham, AL; Minneapolis, MN; Chicago, IL; and Oakland, CA). A total of 5,114 self-reported black or white persons, aged 18 - 30 years at the baseline examination (1985-1986), were recruited primarily from random-digit dialing of community lists and random selection from a health-care plan.^{18,19} The goal of recruitment was to balance on gender and race; those aged 18 - 25 years and aged 25 - 30 years; and those attaining a high school education or less versus more education, at each of the four centers. The institutional review board at each center approved the CARDIA study protocol and informed consent was obtained from each participant. Following the initial in-person examination, participants were re-examined at years 2, 5, 7, 10, 15, 20, 25, and 30 post-baseline.

Self-reported discrimination

Our primary exposure variable was reported interpersonal discrimination based on race and gender. Discrimination was first assessed in CARDIA at 7 years after the baseline, in-person clinical examination using the valid and reliable Experiences of Discrimination

Scale.²⁰ Participants reported having ever experienced discrimination, been prevented from doing something, or been hassled or made to feel inferior (yes/no) in any of the following settings: at school; getting a job; at work; at home; getting medical care; getting housing; by the police or courts; or on the street or in a public setting. At year 7, the racial discrimination scale excluded “at home” and the gender discrimination scale excluded “getting housing” or “by the police or courts”. Information on gendered race (black women/black men/white women/white men) was collected at baseline. Since less than 5% of the study population reported changes in their geographic location between baseline and year 7, we used the study center in which the baseline examination was conducted to characterize participants’ geographic location.

Cardiovascular health

Cardiovascular health (CVH), as distinct from CVD, refers to a multidimensional measure recently adopted by the American Heart Association (AHA) as an important area of focus for CVD prevention efforts.²¹ The primary outcome of this study was a CVH score, based on the AHA’s Simple 7 Cardiovascular Health scoring method.²¹ Because no dietary measures were included in the present study, the composite score consisted of six rather than the standard seven measures. These measures included: two behavioral factors (smoking status and physical activity) and four cardiometabolic factors (hypercholesterolemia, hypertension, obesity, and diabetes defined per AHA and National Heart, Lung, and Blood Institute guidelines).²¹ The total CVH score was calculated as a summation of points assigned for each factor. Smoking status was

operationalized as self-report of never (2 points), former (1 point), or current (0 points).

Physical activity was defined according to Centers for Disease Control and Prevention (CDC) guidelines²¹ as ≥ 75 minutes/week vigorous physical activity (VPA) or ≥ 150 minutes/week of moderate physical activity (MPA) (2 points); $< 75, > 0$ minutes/week VPA or $< 150, > 0$ minutes/week MPA) (1 point); and none (0 points).

Hypercholesterolemia was operationalized as total cholesterol < 200 mg/dL (2 points); 200-239 mg/dL (1 point); and ≥ 240 (0 points); systolic hypertension as the average of three systolic readings < 120 mm/Hg (2 points); 120-139 mm/Hg (1 point); and ≥ 140 mm/Hg (0 points); obesity as a body mass index (BMI) of < 25 kg/m² (2 points); 25-29.9 (1 point); ≥ 30 (0 points); and diabetes as a fasting blood glucose of < 100 mg/dL (2 points); 100-125.9 (1 point); and ≥ 126 (0 points). Total scores ranged from 0-12, with higher points indicating healthier status. The CVH score was treated as a continuous variable.

Covariates

Potential confounders for this analysis included age and the study center in which the baseline exam was conducted. Other potentially relevant sociodemographic variables such as annual family income, marital status, and education level were not included as potential confounders because they were conceptualized as potential mediators of the association between reported interpersonal discrimination and CVH.

Statistical analysis

Descriptive statistics including age, study center, education (included for descriptive purposes only), type and level of discrimination, and CVH scores, were calculated for each gendered race group using Pearson's chi-square test for categorical variables and t-tests for continuous variables. Multivariable linear regression analyses were performed to evaluate the associations between level of perceived discrimination at year 7 and CVH scores at year 30 (or the last follow-up) for those reporting both racial discrimination and gender discrimination, separately for each setting and further stratified by gendered race group. All models were adjusted for age and study center. Analyses were conducted using *Stata 14.0* (ref). Individuals missing a CVH score (n=787) or data on discrimination (n=1,089) were excluded.

Results

Study population

The mean age of the study sample of 3,758 participants at year 30 was 55 years, and 28% were black women, 20% were black men, 29% were white women, and 26% were white men. On average, white women and men completed 16 years of education by year 30 compared with 14 years among black women and men (Table 1).

Baseline characteristics

The proportion of participants who reported interpersonal racial and gender discrimination in each setting varied within and across gendered race groups (Table 2). For all groups, discrimination on the street or in public was most frequently reported, and experiences of discrimination while receiving medical care were the least frequently

reported. Exposure was most prevalent among black women in every setting, with the exception of discrimination while getting a job; in this setting, the proportion of black men reporting discrimination was higher than the proportion of the other comparison groups. Mean CVH scores at year 7 were highest among white women, and comparable across settings within each gendered race group except among white men. White men who reported racial and gender discrimination in the street or in public had the highest year 7 CVH scores of their gendered race group (9.9, SD=1.6), while white men who reported feeling discrimination while receiving medical care had the lowest scores of their group (8.8, SD=1.8).

Discrimination and CVH

With a single exception, multivariable-adjusted CVH score differences at year 30 associated with reported racial and gender discrimination in each of the eight settings examined were either non-significant or were associated with a positive score difference among black women (Table 3). For black men, self-reported discrimination in four of the eight settings was significantly associated with poorer CVH. For both black women and men, there was a statistically significant association of reported racial and gender discrimination while receiving medical care with poorer CVH. Associations across settings also differed between white women and men. For white women, reported racial discrimination by the police or courts or while getting housing was associated with lower CVH scores, while among white men, self-reports of both racial and gender discrimination in public or at work were associated with poorer CVH.

Discussion

Regardless of setting, simultaneously reported experiences of racial and gender discrimination were stronger predictors of poorer CVH for men than women, particularly for black persons. Among black women, reported instances of discrimination tended to show a protective effect while the opposite findings were observed among all other gendered race groups. For all groups, reporting discriminatory experiences while receiving medical care had a negative impact on future CVH, although effect estimates did not reach statistical significance among white women and men. While the observed estimates may appear modest, the magnitude of change in CVH score from year 7 to year 30 was in some cases more than one half the standard deviation of year 7 CVH scores.

Gendered racial differences in the effects of discrimination on CVH

To our knowledge, this is the first study to examine how the relationships of self-reported experiences of interpersonal racial and gender discrimination with future CVH vary across a number of daily life settings. In demonstrating how discriminatory experiences in certain settings may have unique impacts among black and white women and men, our findings build on other ongoing analyses. In a separate analysis of overall (not by setting) reporting of racial and/or gender discrimination also using CARDIA data, we are finding an association with poorer CVH only among white men.²² This discrepancy in our findings offers further evidence that grouping certain experiences of discrimination can mask important differences in effect. As far as we are able to determine, ours are the only

two studies examining variation in the associations between reporting racial and gender discrimination simultaneously and future CVH among racially diverse women and men.

A number of previous studies have examined the effects of racial discrimination on risk factors for CVD including hypertension,²³ sedentary behavior,²⁴ cigarette smoking,²⁵ and inflammation²⁶ in black and whites. These analyses consistently found that associations observed depended on gendered race. For example, in the study assessing racial discrimination and inflammation, the authors found an association only among white women.²⁶ Other studies have assessed multiple forms of discrimination on CVD risk.^{16,17} Most found that whether multiple forms of discrimination were more detrimental to CVH than a single form depended on the type of discrimination reported and the race of the individuals reporting. Furthermore, although we could not find any investigations that examined whether simultaneous reports of racial and gender discrimination differentially impacted on CVH in different social contexts, studies that have examined associations of reported racial or gender discrimination in occupational^{3,27,28} and healthcare settings^{14,29} with CVD-related outcomes have also hypothesized or found differences between black and white women and men.

One explanation for the patterns that we observed in the present study is that interpersonal discrimination may act as an “identity trigger”.¹² The authors suggest that identity triggers, or elements of the social environment that trigger awareness of one’s social status, are one mechanism through which structured inequities act to differentially impact on health and lead to health disparities. The unequal social conditions in which

black and white women and men are situated influence the type and saturation of identity triggers, as well as available coping resources,^{30,31} within and across various social settings.¹² According to this framework, experiences of discrimination pose a setting-specific disease risk for each gendered race group. We suggest further that perceived experiences of interpersonal discrimination can act as identity cues, even in the absence of actual occurrences of discrimination, which might partially explain the associations we found among white women and men. Identity triggers and the perceived coping resources³⁰ particular to black and white women and men act to specify conditions under which experiences of interpersonal discrimination will have a measurable impact on CVH.

Hierarchical social conditions create power dynamics between marginalized and dominant status groups which influence how inequity will be experienced on a personal basis by members of both types of groups.^{2,6,8,32} Experiences of discrimination based on gendered race that occur in the context of medical care, education, or in interactions with law enforcement, for example, can bring to bear historically structured power imbalances through heightened awareness of one's stigmatized status in the form of race consciousness.^{14,33} Instances of interpersonal discrimination in these specific settings may be uniquely stressful for marginalized persons both because of the likelihood of recurrence and a perceived lack of opportunities for retribution.^{12,30,31} On the other hand, the settings in which awareness of unequal social status might be triggered among dominant group members—whether or not a discriminatory interaction actually occurred—and the resources they believe are available for coping with the accompanying

stress, likely differ. These perceptions of social status triggered by interpersonal discrimination lead to between-group differences in the types of social contexts in which experiencing discrimination will contribute to deteriorated CVH. This interplay is consistent with our findings that although a higher percentage of black men reported encountering discriminatory treatment in public or on the street than in any other setting, this setting was the only one in which exposure was not associated with poorer CVH within this group. In contrast, “in public or on the street” was one of the two settings in which white men who reported experiencing racial and gender discrimination experienced declining CVH.

Differences across settings provide insight into effect pathways

Differences in the effects of reported discrimination across various settings can also provide some indication of the mechanisms by which interpersonal discrimination acts to affect CVH. Frequently reported discriminatory interactions such as those that occur in public or at work may act directly on CVH by eliciting recurrent and sustained stress response activation, whereas experiences while receiving medical care might act indirectly through deterring use of health services.^{14,29} In this manner, instances of discrimination in settings of perceived power imbalances necessitate coping strategies and resources that are fundamentally distinct from how individuals might respond to being discriminated against by someone not holding a position of authority or not likely to be encountered again. As a result, discrimination experienced in different settings may act through distinct pathways to affect CVH.^{9,10} That the settings in which reported racial and gender discrimination was associated with poorer CVH differed among black and

white women is consistent with this reasoning and indicates disparate pathways for these groups.

Our findings may suggest that for black women, interpersonal experiences of discrimination are more likely to act indirectly on CVH by deterring access to health-influencing resources such as medical care, a mechanism that has been demonstrated in previous research.²⁹ Black women who reported racial and gender discrimination while receiving medical care were the only individuals of their gendered race group to experience a decline in CVH associated with reported discrimination; reported exposure in other settings was measured as either protective or had no influence on CVH. Rather than yielding a greater vulnerability to the negative health consequences of psychosocial stress as might be intuitively concluded, these findings suggest that black women may more readily adapt to hostile social environments such that the effects of recurrent interpersonal discrimination on the stress response system,⁸ or on certain health-related behaviors,²⁴ are minimized in comparison to other gendered race groups. We do not suggest that black women are completely immune to the effects of discrimination. Rather, we take these findings as evidence that structural barriers, such as reduced access to high-quality medical care, may have a much more compelling effect on the health of black women than stress stemming from encounters with interpersonal discrimination.

The settings in which reported discrimination impacted CVH among black men in this study indicate that members of this group may be more susceptible to the direct physiological impact of perceived subordinate status than black women. This may be

because racism targeted at black men has historically been more violent,⁶ or due to other psychosocial and cultural factors influencing the distinct coping methods of these individuals.^{6,8,10} In either case, we were surprised at the lack of association of CVH with reported discrimination by the police or courts among black men in this study. We consider that the prevalent, highly publicized, severe mistreatment that black men have endured by the police may enable black men to adapt and cope in healthier ways as a result of both the duration and validation of these experiences. Although hypervigilance has been considered as detrimental to health,³⁴ in encounters with law enforcement, expectation and recognition of mistreatment may lead black men to connect with resources which ameliorate long-term physiological effects of associated stress. With this exception, the observed patterns in the associations of reported discrimination with CVH indicate that reminders of marginalized status may be experienced as more stressful among black men than black women and therefore may be more likely to act on CVH through direct physiological mechanisms in addition to creating barriers to health and social resources in this group.

The results of the present study also provide evidence that reported racial and gender discrimination act on CVH both directly and indirectly for white men and women, but likely not triggered by the same psychosocial cues operating among black persons. For members of dominant status groups, reported experiences of racial and gender discrimination in settings with a heightened risk of perceiving violations of their group privileges³⁵ may be inherently more stressful for individuals aware of their racial or gender privilege,³⁵ as is suggested by prior research finding an association of racial

privilege with poorer health and health behaviors among whites.¹³ Our findings that reports of racial and gender discrimination in public and at work are associated with poorer CVH among white men are consistent with this theory. More research is necessary to better understand why experiences of discrimination in certain settings, such as race-based mistreatment while seeking housing, are more damaging to the CVH of white women than discrimination in other settings.

Limitations

Our findings need to be considered in the context of several limitations. There is some indication that race consciousness among white persons, which has been interpreted as an awareness of racial privilege,^{13,32} in the context of medical care is associated with lower medication adherence.¹⁴ Our point estimates for change in CVH score in this study were highest in the setting of receiving medical care for white women and men, indicating that interpersonal discrimination may impact on CVH through influencing health behaviors such as accessing healthcare. However, we cannot draw any conclusions due to a limited sample size. We also caution the generalizability of our findings. Despite CARDIA's rigorous study design and samples from drawn from multiple geographic areas, because of the interdependency of structural and individual-level factors that influence how interpersonal discrimination affects CVH, the results of this study should not be used to draw conclusions about demographically dissimilar populations.

Public health implications

In revealing the importance of setting in the health effects of reported interpersonal discrimination, this study provides insight into the distinct mechanisms by which exposure to racial and gender discrimination operates to impact on the CVH of black and white women and men. Future research should empirically evaluate whether experiences that trigger awareness of social status differentially influence risk for CVD in these groups. Additional research is also needed to explore the ways in which white women and men conceptualize discrimination. The results of this study suggest that evaluating associations of reported discrimination with health among socially-privileged, as well as dually marginalized and privileged, groups can aid in identifying inconsistencies in the conceptualization and operationalization of self-reported experiences of discrimination. These lines of investigation would advance our understanding of whether and how interpersonal experiences of racial and gender discrimination contribute to persistent gendered racial disparities in both risk of developing, and prognosis after, CVD.

Table 4.1 Year 30 Participant Characteristics by Gendered Race: CARDIA

	Black women n=1,039	Black men n=743	White women n=1,045	White men n=931
Age, mean (SD)	54.6 (3.8)	54.3 (3.7)	55.6 (3.4)	55.5 (3.3)
Education, mean yrs (SD)	14.6 (2.4)	14.0 (2.4)	16.1 (2.4)	16.0 (2.6)
Study Center, %				
Birmingham	24.4	25.7	17.0	22.6
Chicago	22.0	20.2	21.6	23.0
Minneapolis	17.7	24.5	32.9	33.5
Oakland	35.8	29.6	28.4	20.9
CVH score, mean (SD)	7.8 (1.9)	8.1 (1.8)	8.9 (2.0)	8.8 (1.8)
Body mass index, kg/m ² %				
<25	13.8	20.1	38.7	22.2
25-29.9	24.3	35.0	26.7	40.7
≥30	62.0	45.0	34.6	37.1
Total cholesterol, mg/dL %				
<200	64.1	71.6	52.7	65.7
200-239	26.3	22.2	34.5	25.9
≥240	9.6	6.2	12.7	8.4
Systolic blood pressure, mm/Hg %				
<120	43.6	41.0	68.9	55.6
120-139	39.0	43.3	24.3	37.1
≥140	17.4	15.6	6.8	7.3
Fasting blood glucose, mg/dL %				
<100	67.9	61.5	78.0	61.0
100-125.9	22.3	27.2	17.5	30.7
≥126	9.7	11.3	4.5	8.3
Smoking status, %				
Never	64.6	56.8	57.1	64.3
Former	16.0	16.4	31.4	23.0
Current	19.4	26.8	11.5	12.7
Physical activity, min/wk %				
≥75 VPA or ≥150 MPA	48.9	73.1	70.4	81.8
<75, >0 VPA or <150, >0 MPA	43.1	22.6	26.7	16.8
0 VPA and 0 MPA	8.0	4.3	2.9	1.4

^aCardiovascular health scores were calculated based on data collected in year 30 or the last follow-up after year 7

Table 4.2 Racial and Gender Discrimination and Mean Cardiovascular Health Score at Year 7 across Settings by Gendered Race: CARDIA, 1992-93

Setting ^a	Black women		Black men		White women		White men	
	Yr 7 Disc., % ^b	Mean (SD) CVH Score ^c	Yr 7 Disc., %	Mean (SD) CVH Score	Yr 7 Disc., %	Mean (SD) CVH Score	Yr 7 Disc., %	Mean (SD) CVH Score
In public/on the street	47.4	9.3 (1.7)	40.1	9.5 (1.6)	21.1	10.3 (1.5)	8.3	9.9 (1.6)
Getting a job	31.6	9.4 (1.7)	32.1	9.3 (1.6)	3.2	10.3 (1.4)	3.4	9.4 (1.6)
Getting housing	29.5	9.3 (1.7)	31.2	9.2 (1.7)	1.3	9.7 (1.8)	1.1	9.8 (1.6)
At work	38.7	9.4 (1.7)	33.5	9.3 (1.6)	5.7	10.3 (1.5)	3.7	9.6 (2.0)
At school	18.6	9.3 (1.7)	15.1	9.5 (1.5)	5.7	10.5 (1.3)	2.6	9.5 (1.7)
Receiving medical care	9.0	9.5 (1.6)	7.4	9.3 (1.7)	<1.0	10.1 (1.5)	1.0	8.8 (1.8)
By the police or courts	26.9	9.4 (1.7)	57.1	9.4 (1.7)	2.1	9.2 (1.6)	3.2	9.2 (1.6)
At home	13.6	9.3 (1.8)	7.9	9.1 (1.6)	21.6	10.1 (1.5)	5.0	9.7 (1.8)

^aAt year 7, discrimination “at home” was excluded from the race or color scale; “by the police or courts” and “getting housing” were excluded from the gender scale

^bRacial and gender discrimination simultaneously reported

^cHealth scores are calculated based on data collected in year 7, using six components with a total possible 12 points: body mass index, total cholesterol, systolic blood pressure, fasting glucose, smoking status, and physical activity. Higher scores indicate better health.

Table 4.3 Adjusted^a Difference in Cardiovascular Health Score^b at Year 30 of the CARDIA Study across Settings of Simultaneously Reported Racial and Gender Discrimination at Year 7, β (95% CI): CARDIA, 1992-2016

Setting ^c	Black women	Black men	White women	White men
In public/on the street	+0.2* (0.0, +0.5)	0.0 (-0.3, +0.3)	+0.1 (-0.2, +0.5)	-0.5* (-1.0, -0.1)
Getting a job	0.0 (-0.3, +0.3)	-0.3* (-0.6, 0.0)	-0.6 (-1.3, +0.1)	-0.5 (-1.1, +0.1)
Getting housing	-0.1 (-0.3, +0.2)	-0.2 (-0.5, +0.1)	-1.5* (-2.5, -0.4)	-0.4 (-1.5, +0.7)
At work	+0.1 (-0.2, +0.4)	-0.4* (-0.7, -0.1)	-0.4 (-0.9, +0.1)	-1.0* (-1.6, -0.3)
At school	+0.3* (0.0, +0.6)	-0.4* (-0.8, 0.0)	-0.1 (-0.6, +0.5)	-0.3 (-1.1, +0.4)
Receiving medical care	-0.5* (-0.9, -0.1)	-0.7* (-0.9, -0.1)	-1.5 (-3.8, +0.7)	-1.1 (-2.7, +0.5)
By the police or courts	-0.1 (-0.2, +0.4)	-0.1 (-0.4, +0.2)	-1.1* (-2.0, -0.3)	-0.3 (-0.9, +0.4)
At home	+0.1 (-0.3, +0.4)	-0.1 (-0.6, +0.4)	-0.2 (-0.5, +0.1)	-0.2 (-0.7, +0.3)

^aAll models are adjusted for age and study center

^bHealth scores are calculated based on data collected in year 30 or the last follow-up after year 7, using six components with a total possible 12 points: body mass index, total cholesterol, systolic blood pressure, fasting glucose, smoking status, and physical activity. Higher scores indicate better health.

^cAt year 7, discrimination “at home” was excluded from the race or color scale; “by the police or courts” and “getting housing” were excluded from the gender scale

CHAPTER VI
DISCUSSION AND CONCLUSIONS

Summary of findings

The objective of this dissertation was to: 1) present the emerging Identity Pathology (IP) framework, using data from the CARDIA study to demonstrate the framework's central claims, 2) test a hypothesis generated by the framework through assessing the excess risk of developing CVD risk factors attributable to the joint effects of reported gender and racial discrimination, and 3) test another hypothesis generated by the framework through assessing potential gendered racial variation in the associations of CVH with reported racial and gender discrimination across eight possible daily life settings.

We began by introducing the necessity, purpose, and theoretical foundations of the IP model. A persistent lack of clarity on the causes and mechanisms of racial and gender disparities in major chronic conditions suggests that current frameworks may overlook important contributors to the development of disease. The IP model synthesizes concepts across disciplines to address the gaps in current theory on the causes of social group differences in chronic disease outcomes. Using the IP framework, we offered insight on the conflicting findings within the literature on interpersonal discrimination as a driver of poorer cardiovascular health. According to the IP framework, discrimination occurs, and is perceived and reported, differentially across gendered race groups, settings, and geographic areas fundamentally as a result of structured inequities acting through identity paradigms. Due to variation in the identity paradigms characteristic of different social groups, the prevalence of reported exposure to interpersonal discrimination will vary across these groups in predictable and health-relevant ways.

Second, we tested a hypothesis generated from the IP framework using secondary data from a community-based sample of black and white women and men (n=3,758). The model suggests that because of the psychosocial complexities of interpersonal discrimination, the effect of exposure on CVH will differ based on the type of discrimination reported and the gendered race of the individual reporting. We found that reported racial and gender discrimination interacted in their association with CVH differently for different gendered race groups such that reporting both types of discrimination compared to neither was associated with poorer CVH only among white men.

Finally, we used the same dataset (n=3,758) to examine whether the associations of reported racial and gender discrimination with future CVH differed based on the setting in which the interactions were reported to have occurred. Results showed that the CVH of black men, white women, and white men was affected by reported exposure to discrimination in a number of settings, while reporting these experiences in all but one setting had no association with or appeared protective of CVH among black women. In summary, the analyses presented in this dissertation provide evidence that the effects of experiencing interpersonal discrimination on CVH differ in important ways based on socially-defined characteristics and contexts. Depending on an individual's gendered race and the social setting, reporting encounters with both racial and gender discrimination simultaneously compared with individually or none may be measured as either protective or damaging to cardiovascular health. White women and men appear particularly susceptible to the negative health consequences of reported racial and gender

discrimination, although in certain settings exposure was also associated with deteriorated CVH among black women and men. Further, these findings indicate that mechanisms for the effects of interpersonal discrimination on CVH also differ between these groups, with black women more likely to be impacted by structural barriers such as access to care than the physiological impacts of psychosocial stress apparently more prevalent among the other groups under study. The IP model posits that these patterns are due to pathogenic beliefs about identity which act to predispose those subscribing to such beliefs to accelerated decline in CVH.

Study strengths and limitations

A major strength of these studies is the novel theory for how interpersonal discrimination contributes to CVD disparities being presented and tested. As far as we are able to determine, no other studies have examined whether gendered race contributes to variation in the associations of CVH with reported racial and gender discrimination overall and in a number of social settings, nor explored how social-group identity influences these associations. The results of these studies provide support for the IP model and position the framework as a viable theoretical foundation for future research on the causes and mechanisms of disparities in CVD between black and white women and men. Other strengths include a prospective study design which strengthens the interpretation of the findings, and the use of validated, commonly used measures of discrimination.

The generalizability of the study results is limited, however. Participants included only self-identified non-Hispanic black and white women and men from four U.S.

metropolitan areas and therefore findings may not be directly extrapolated to individuals of other racial, ethnic, or gender groups located in other geographical areas. We also did not explore how other social-group designations such as sexual orientation and gender identity influence how experiences of interpersonal discrimination affect CVH. Still, we believe the IP framework has broad applications and can be adapted to identify pathways from structured inequity through interpersonal discrimination to disparities in other chronic conditions between other socially-defined groups. Further, the analyses included no direct measures of the psychosocial characteristics proposed as mediators. For example, no measures of racial or gender identity, or identity pathology, nor any measures of stress were included as covariates or tested as mediators. The CARDIA dataset does not include any measures of social group identity, and while there were some stress measures of stress, we chose to exclude them because we did not believe the measures adequately captured the type of stress we propose is detrimental to CVH. Finally, due to the young age of the cohort from whom data was drawn for these analyses, we could not directly evaluate whether gendered race moderates the association interpersonal discrimination with incident CVD. Additional research with an older cohort is necessary to empirically assess whether the increased risk for CVD associated with interpersonal discrimination operates in a similar fashion within these gendered race groups.

Discussion and future research directions

The large literature base on racial and gender disparities in CVD has yet to yield definitive knowledge on the causes and mechanisms of health outcome differences between black and white women and men in the U.S. Despite the prospect of interpersonal discrimination as a potential explanation, a long history of research on the topic has failed to concretely link interpersonal discrimination to an increased risk of CVD among black women and men. Many researchers have speculated that cross-sectional study designs, misclassification bias, and other methodological shortcomings (ref, ref, ref) have contributed to continued conflicting results. Others have cited a failure to consider relevant mediators and moderators as part of the problem (ref, ref). The recent findings from a number of longitudinal studies (ref, ref, ref) that reporting exposure to racial discrimination may actually be protective against CVD for black persons suggests that many assumptions about how interpersonal discrimination might operate to affect disease and contribute to health disparities have been misguided. Few epidemiological studies have focused on structural discrimination as the primary driver of increased CVD burden among black Americans (Krieger, 2014). Even fewer have examined how the unique experience of an unequal social environment for individuals located at different junctions of socially-designated identity might complicate the direct exposure-disease relationship that has been one dominant framework guiding the majority of analyses on the topic (ref, ref).

The results of this thesis provide preliminary evidence that structured inequities act through gendered racial identities to influence whether reported experiences of discrimination will negatively impact CVH. Rather than due to any intrinsic property of

gender or race, the observed variation in the associations of reported racial and gender discrimination with CVH across these four gendered race groups is likely attributable to how strongly socially-constructed identity paradigms correlate with this particular social group designation. Decisions to report or deny experiences of discrimination reflect a system of beliefs that are borne of, and coexist with, the reality of structured disadvantage for black persons and women and structured advantage for white persons and men that intersect in their effects on health. Where those beliefs do not overlap with the reality of these unequal social contexts is where reported experiences of racial and gender discrimination will most likely be associated with poorer CVH. Our findings of poorer CVH among white men reporting regular experiences of both racial and gender discrimination compared with white men reporting no discrimination while the reverse pattern was observed among black women, support this theory.

These results underscore the necessity for a more nuanced approach to health disparities research. The objective of the IP model is to provide a novel, comprehensive framework for understanding and investigating disparities in chronic diseases between marginalized and dominant status groups in the context of an unequal social environment. The model synthesizes ideas from different disciplines to provide a more complete picture of how structured inequities manifest as differences in health outcomes between these groups. The most innovative aspect of the model is the concept of identity pathology, which describes a disease-prone state characterized by certain acquired beliefs about individual or group identity that are inherently pathological. Constructed in the context of structured inequities like institutional racism and sexism, these identity beliefs mediate

the effects of unequal social conditions on health and may account for the types of chronic diseases prevalent among different socially-defined groups. The model positions the degree of identity pathology an individual possesses as a more accurate predictor of disease risk than reported exposure to individual instances of interpersonal discrimination. While not solely applicable to CVD, the model is useful for clarifying inconsistencies in the literature on interpersonal discrimination and CVD in that it specifies the conditions under which—and in whom—reported experiences of interpersonal discrimination will be measured as damaging to CVH and lead to the development of disease. The IP framework thus furthers the argument that structural barriers acting through identity paradigms are far more potent contributors to health disparities between socially advantaged and disadvantaged groups than interpersonal experiences of discrimination.

Based on this framework and the evidence generated from this thesis, efforts to explain the excess burden of CVD among black persons would be strengthened by shifting the focus away from interpersonal discrimination to structural inequities. This research builds on evidence that the effect of perceiving mistreatment on an individual basis pales in comparison to the effects of systemic factors such as lack—or glut—of access to health-promoting resources and the psychosocial characteristics associated with gendered racial identity influencing how individuals cope with this resource deficit or surplus. Structural inequities acting through pathways outside of interpersonal discrimination are likely more compelling predictors of CVD among black women and men. These alternative mechanisms may account for a much greater proportion of the

disparity in CVD incidence and prevalence between these groups and their white counterparts than what can be accounted for by experiences of interpersonal discrimination.

This dissertation lays the groundwork for a number of future studies. Research examining how white women and men conceptualize racial and gender discrimination is needed to better understand how exposure acts to increase risk for CVD in these groups. Future studies should also employ measures of structural discrimination to evaluate how systemic barriers produce poorer CVD outcomes among disadvantaged populations. Finally, additional research is also necessary to develop measures of identity pathology in order to empirically evaluate the role of identity pathology in CVD disparities. Ideally, studies can employ mediation analysis to examine whether structural discrimination acts through identity pathology to contribute to the patterns of chronic disease observed among racially diverse women and men.

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Chapter I

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Chapter IV

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